8380548

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

June 01, 2023

THIS IS TO CERTIFY THAT ANNEXED IS A TRUE COPY FROM THE RECORDS OF THIS OFFICE OF THE FILE WRAPPER AND CONTENTS OF:

APPLICATION NUMBER: *16/032,009*
FILING DATE: *July 10, 2018*
PATENT NUMBER: *10709173*
ISSUE DATE: *July 14, 2020*

Certified by

Performing the Functions and Duties of the
Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office

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

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
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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	Herewith
Filing Date	Herewith
First Named Inventor	James Monsees
Title	VAPORIZER APPARATUS
Art Unit	Not yet assigned
Examiner Name	Not yet assigned
Attorney Docket Number	52210-508C18US/716.US18

SIGNATURE of Applicant or Patent Practitioner

Signature	/npm/	Date (Optional)	July 10, 2018
Name	Nicholas P. Mouton, Esq.	Registration Number	75306
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.

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
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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 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.

Doc Code: FAI.REQ
Document Description: Request First Action Interview

PTO/SB/413C (05-11)
Approved for use through 01/31/2013. OMB 0651-0031
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.

REQUEST FOR FIRST ACTION INTERVIEW (FULL PILOT PROGRAM)

Attorney Docket Number: 52210-508C18US/716.US18	Application Number (if known): Not yet assigned	Filing date: Herewith
First Named Inventor: James Monsees	Title: VAPORIZER APPARATUS	

APPLICANT HEREBY REQUESTS A FIRST ACTION INTERVIEW IN THE ABOVE-IDENTIFIED APPLICATION. See Instruction Sheet on page 2.

1. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims.

2. The application must not contain any multiple dependent claims.

3. By filing this request:

   Applicant is agreeing to make an election without traverse if the Office determines that the claims are not obviously directed to a single invention; and

   Applicant is agreeing not to request for a refund of the search fee and any excess claims fee paid in the application after the mailing or notification of the pre-interview communication prepared by the examiner.

4. Other attachments: _____

Signature /npm/	Date July 10, 2018
Name (Print/Typed) Nicholas P. Mouton	Registration Number 75,306

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

■ *Total of 1 forms are submitted.

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 hours 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/SB/413C (05-11)
Approved for use through 07/31/2012. OMB 0651-0031
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.

Instruction Sheet for Request for First Action Interview (Full Pilot Program)

(Not to be Submitted to the USPTO)

A grantable request must meet the following conditions:

1. The application must be a new non-reissue utility application filed under 35 U.S.C. 111(a) or an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).

2. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims. The application may not contain any multiple dependent claims.

3. The request must be filed electronically using the Office's electronic filing system, EFS-Web.

4. The claims must be directed to a single invention. If the Office determines that the claims are directed to multiple inventions (*e.g.*, in a restriction requirement), the applicant must make an election without traverse.

5. The request must be filed at least one day before a first Office action on the merits of the application appears in the Patent Application Information Retrieval (PAIR) system (*i.e.*, at least one day prior to the date when a first Office action on the merits, notice of allowability or allowance, or action under Ex parte Quayle, 1935 Dec. Comm'r Pat. 11 (1935) appears in the PAIR system). Applicant may check the status of the application using the PAIR system.

6. The request for a first action interview must include a statement that applicant agrees not to file a request for a refund of the search fee and any excess claims fees paid in the application after the mailing or notification of the Pre-Interview Communication. Any petition for express abandonment under 37 CFR 1.138(d), and request for a refund of the search fee and any excess claims fees, filed after the mailing or notification of the Pre-Interview Communication will not be granted.

For more information, see notice "Full First Action Interview Pilot Program" available on the USPTO web site at http://www.uspto.gov/patents/init_events/faipp_full.jsp

NJOY Exhibit 1002.005

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 disclosure of these records is required by the Freedom of Information Act.

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 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.

NJOY Exhibit 1002.006

Doc Code: FAI.REQ
Document Description: Request First Action Interview

PTO/SB/413C (05-11)
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REQUEST FOR FIRST ACTION INTERVIEW (FULL PILOT PROGRAM)

Attorney Docket Number: 52210-508C18US/716.US18	Application Number (if known): Not yet assigned	Filing date: Herewith
First Named Inventor: James Monsees	Title: VAPORIZER APPARATUS	

APPLICANT HEREBY REQUESTS A FIRST ACTION INTERVIEW IN THE ABOVE-IDENTIFIED APPLICATION. See Instruction Sheet on page 2.

1. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims.

2. The application must not contain any multiple dependent claims.

3. By filing this request:

   Applicant is agreeing to make an election without traverse if the Office determines that the claims are not obviously directed to a single invention; and

   Applicant is agreeing not to request for a refund of the search fee and any excess claims fee paid in the application after the mailing or notification of the pre-interview communication prepared by the examiner.

4. Other attachments: _____

Signature /npm/	Date July 10, 2018
Name (Print/Typed) Nicholas P. Mouton	Registration Number 75,306

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

■ *Total of 1 forms are submitted.

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 hours 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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PTO/SB/413C (05-11)
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U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE
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Instruction Sheet for Request for First Action Interview (Full Pilot Program)

(Not to be Submitted to the USPTO)

A grantable request must meet the following conditions:

1. The application must be a new non-reissue utility application filed under 35 U.S.C. 111(a) or an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).

2. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims. The application may not contain any multiple dependent claims.

3. The request must be filed electronically using the Office's electronic filing system, EFS-Web.

4. The claims must be directed to a single invention. If the Office determines that the claims are directed to multiple inventions (*e.g.*, in a restriction requirement), the applicant must make an election without traverse.

5. The request must be filed at least one day before a first Office action on the merits of the application appears in the Patent Application Information Retrieval (PAIR) system (*i.e.*, at least one day prior to the date when a first Office action on the merits, notice of allowability or allowance, or action under Ex parte Quayle, 1935 Dec. Comm'r Pat. 11 (1935) appears in the PAIR system). Applicant may check the status of the application using the PAIR system.

6. The request for a first action interview must include a statement that applicant agrees not to file a request for a refund of the search fee and any excess claims fees paid in the application after the mailing or notification of the Pre-Interview Communication. Any petition for express abandonment under 37 CFR 1.138(d), and request for a refund of the search fee and any excess claims fees, filed after the mailing or notification of the Pre-Interview Communication will not be granted.

For more information, see notice "Full First Action Interview Pilot Program" available on the USPTO web site at http://www.uspto.gov/patents/init_events/faipp_full.jsp

NJOY Exhibit 1002.008

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 disclosure of these records is required by the Freedom of Information Act.

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 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.

NJOY Exhibit 1002.009

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/SB/424 (12-11)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	James Monsees	Nonprovisional Application Number (if known):	Not yet assigned
Title of Invention:	VAPORIZER APPARATUS		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i), the prioritized examination fee set forth in 37 CFR 1.17(c), and if not already paid, the publication fee set forth in 37 CFR 1.18(d) have been filed with the request. The basic filing fee, search fee, examination fee, and any required excess claims and application size fees are filed with the request or have been already been paid.

2. The application contains or is amended to contain no more than four independent claims and no more than thirty total claims, and no multiple dependent claims.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed oath or declaration under 37 CFR 1.63 is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /npm/	Date July 10, 2018
Name (Print/Typed) Nicholas P. Mouton, Esq.	Practitioner Registration Number 75,306

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☑ *Total of 1 forms are submitted.

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.

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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).
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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.
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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 1002.011

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Filer:	Nicholas Paul Mouton/Matthew Tupper
Attorney Docket Number:	52210-508C18US/716.US18

Filed as Large Entity

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
REQUEST FOR PRIORITIZED EXAMINATION	1817	1	4000	4000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**5860**

Electronic Acknowledgement Receipt	
EFS ID:	33141944
Application Number:	16032009
International Application Number:	
Confirmation Number:	7691
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Customer Number:	148514
Filer:	Nicholas Paul Mouton/Matthew Tupper
Filer Authorized By:	Nicholas Paul Mouton
Attorney Docket Number:	52210-508C18US/716.US18
Receipt Date:	10-JUL-2018
Filing Date:	
Time Stamp:	21:00:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$5860
RAM confirmation Number	071118INTEFSW00006452500311
Deposit Account	500311
Authorized User	Matthew Tupper
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	Application Data Sheet	508C18US_ADS.PDF	1929451 c31ac4d5f91ff823bd9d5a0efeb7b834ac4eab83	no	10
Warnings:					
Information:					
2	Drawings-other than black and white line drawings	508C18US_OG_FIGS.pdf	2519815 9b6d1ed7305c2ec241223cdd54ad01144832b5c2	no	24
Warnings:					
Information:					
3	Oath or Declaration filed	508C18US_DECS.pdf	369471 7c200adbbc37134a5c51a6fc6069977b252e272a	no	5
Warnings:					
Information:					
4		508C18US_SPEC.pdf	415356 3f620271c38e7179ebfea354351fc05acfc4db1f	yes	85

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	77
	Claims	78	84
	Abstract	85	85

Warnings:					
Information:					
5	Power of Attorney	508C18US_POA.pdf	397559 14a8c5d526684f66805ef2aaea4b323372f5417a	no	2

Warnings:					
Information:					
6	First Action Interview - Enrollment Request	508C18US_FAI.pdf	645111 5fa35db2cb376055ee0d153847b2ee149d061589	no	3
Warnings:					
Information:					
7	TrackOne Request	508C18US_T1.pdf	163847 ebdcaa368b1d47810a4653bb8a9376d060b3768c	no	2
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	40404 465ef1fa635c207c0e5d05ba117a38a0b9ebe90b	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	6481014	

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

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
	James		Monsees	

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

City	State/Province	Country of Residence
San Francisco	CA	US

Mailing Address of Inventor:

Address 1	560 20th Street, Building 104
Address 2	
City	San Francisco
State/Province	CA
Postal Code	94107
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Adam		Bowen	

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

City	State/Province	Country of Residence
San Francisco	CA	US

Mailing Address of Inventor:

Address 1	560 20th Street, Building 104
Address 2	
City	San Francisco
State/Province	CA
Postal Code	94107
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Steven		Christensen	

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

City	San Francisco	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	560 20th Street, Building 104		
Address 2			
City	San Francisco	State/Province	CA
Postal Code	94107	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Joshua		Morenstein	

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

City	San Francisco	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	682 6th Street		
Address 2			
City	San Francisco	State/Province	CA
Postal Code	94103	Country	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Christopher	Nicholas	HibmaCronan	

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

City	Oakland	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	682 6th Street		
Address 2			
City	San Francisco	State/Province	CA
Postal Code	94103	Country	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.**

NJOY Exhibit 1002.018

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

Customer Number	148514		
Email Address	ipdocketingBOS@mintz.com	Add Email	Remove Email

Application Information:

Title of the Invention	VAPORIZER APPARATUS		
Attorney Docket Number	52210-508C18US/716.US18	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	24	**Suggested Figure for Publication (if any)**	

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	148514		

NJOY Exhibit 1002.019

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

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	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	15/257760	2016-09-06
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15/257760	Continuation in part of	14/581666	2014-12-23
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14/581666	Claims benefit of provisional	61/936593	2014-02-06
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14/581666	Claims benefit of provisional	61/937755	2014-02-10
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15/257760	Claims benefit of provisional	62/294285	2016-02-11
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15/257760	Claims benefit of provisional	62/294281	2016-02-11
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15/257760	Continuation in part of	35/001169	2016-07-28
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15/257760	Continuation in part of	35/001170	2016-07-28

NJOY Exhibit 1002.020

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

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 1002.021

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

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 1002.022

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

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	JUUL Labs, Inc.		
Mailing Address Information For Applicant:			
Address 1	560 20th Street, Building 104		
Address 2			
City	San Francisco	**State/Province**	CA
Country	US	Postal Code	94107
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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

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	/npm/			Date (YYYY-MM-DD)	2018-07-10
First Name	Nicholas	Last Name	Mouton	Registration Number	75306

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

NJOY Exhibit 1002.024

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	52210-508C18US/716.US18
	Application Number	
Title of Invention	VAPORIZER APPARATUS	

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 1002.026

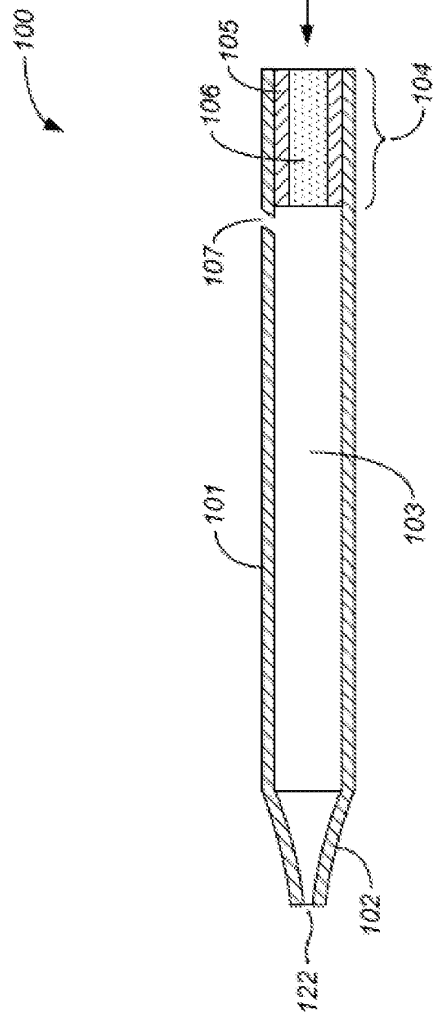


FIG. 1

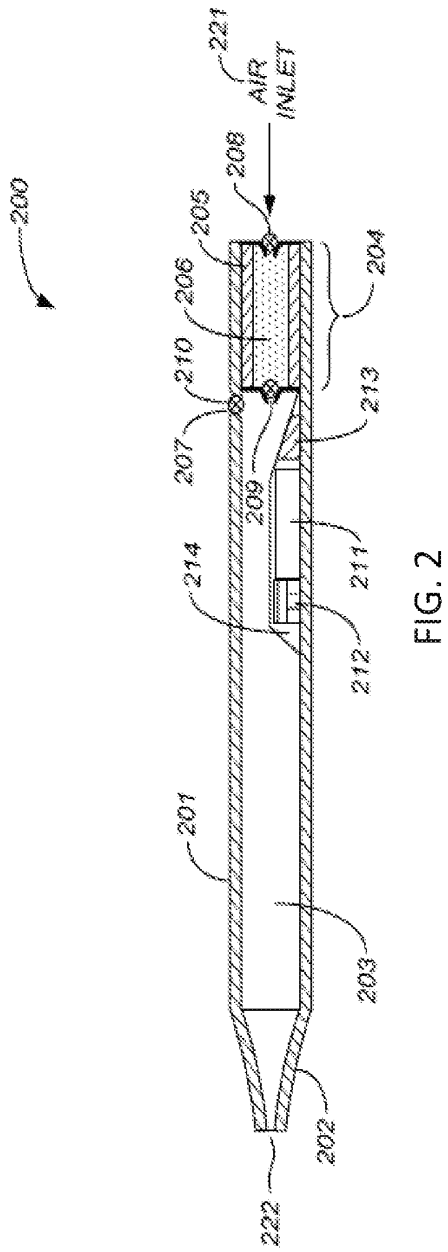


FIG. 2

NJOY Exhibit 1002.027

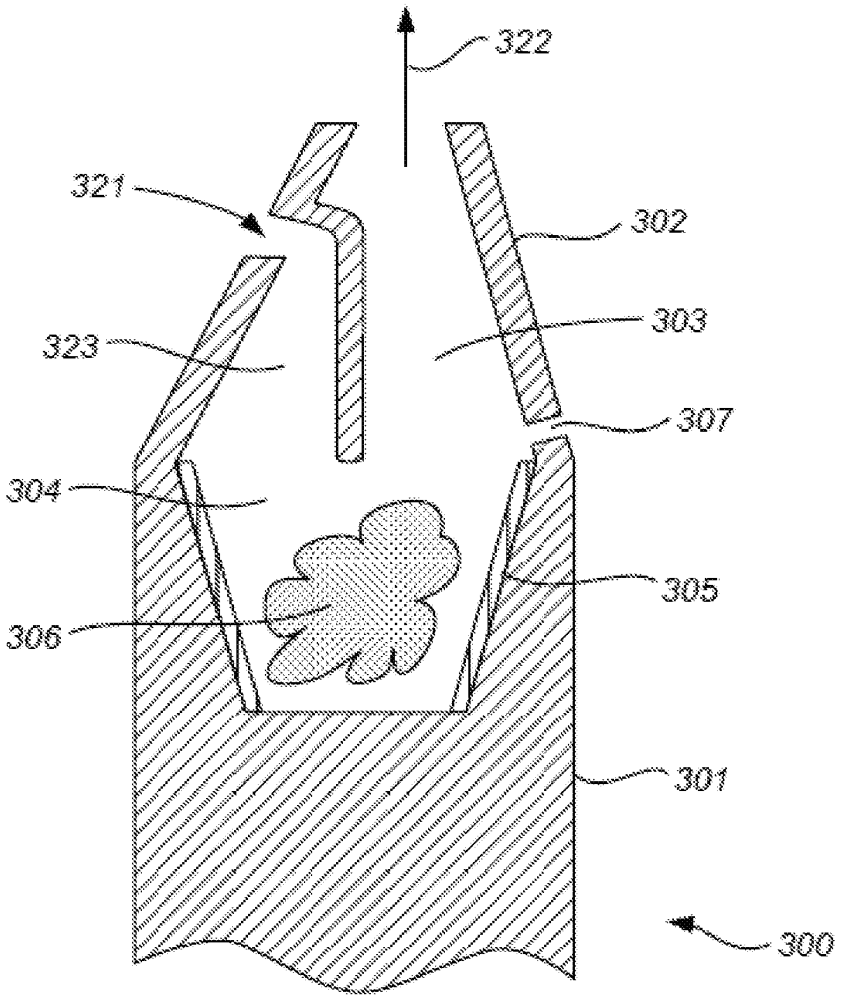


FIG. 3

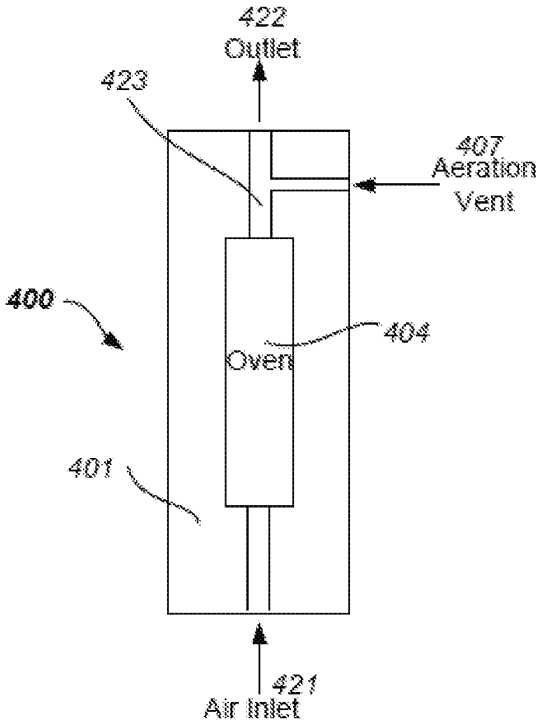


FIG. 4A

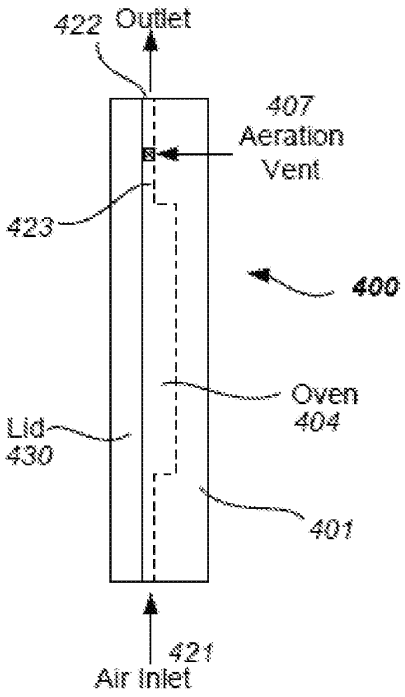


FIG. 4B

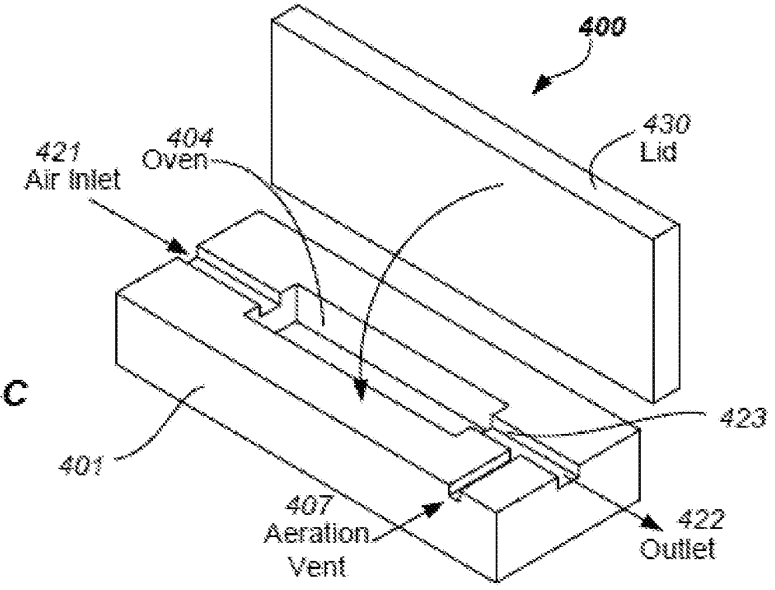


FIG. 4C

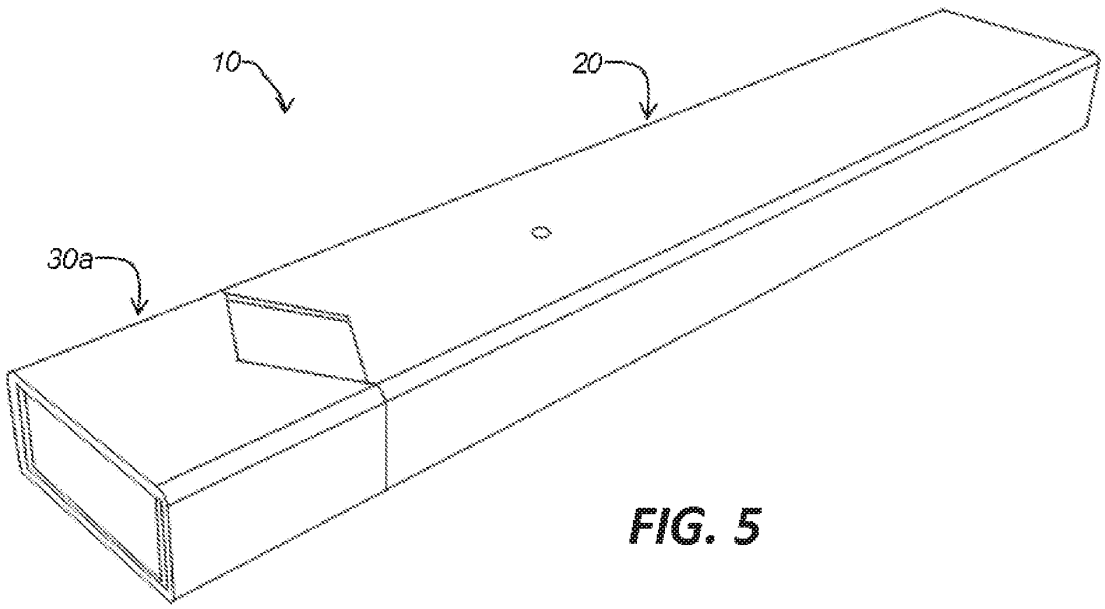


FIG. 5

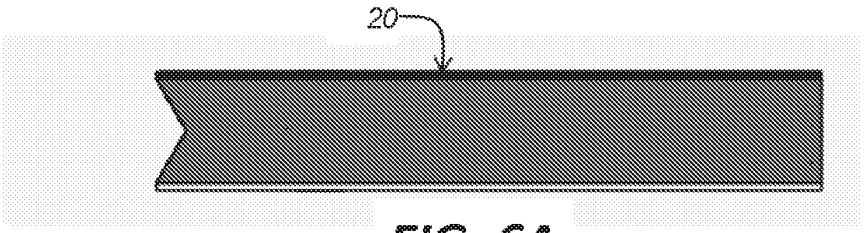


FIG. 6A

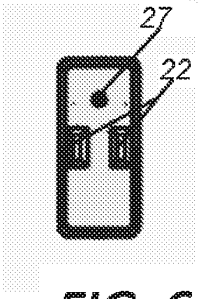


FIG. 6C

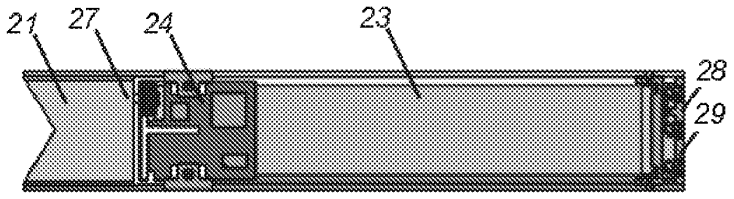


FIG. 6B

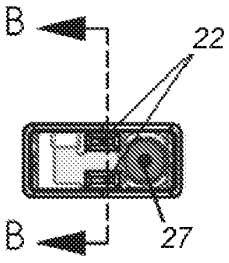
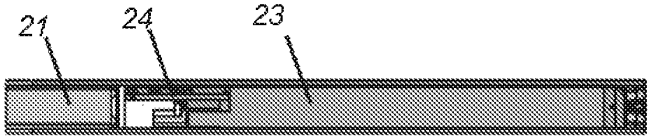


FIG. 6D



Section B-B

FIG. 7A

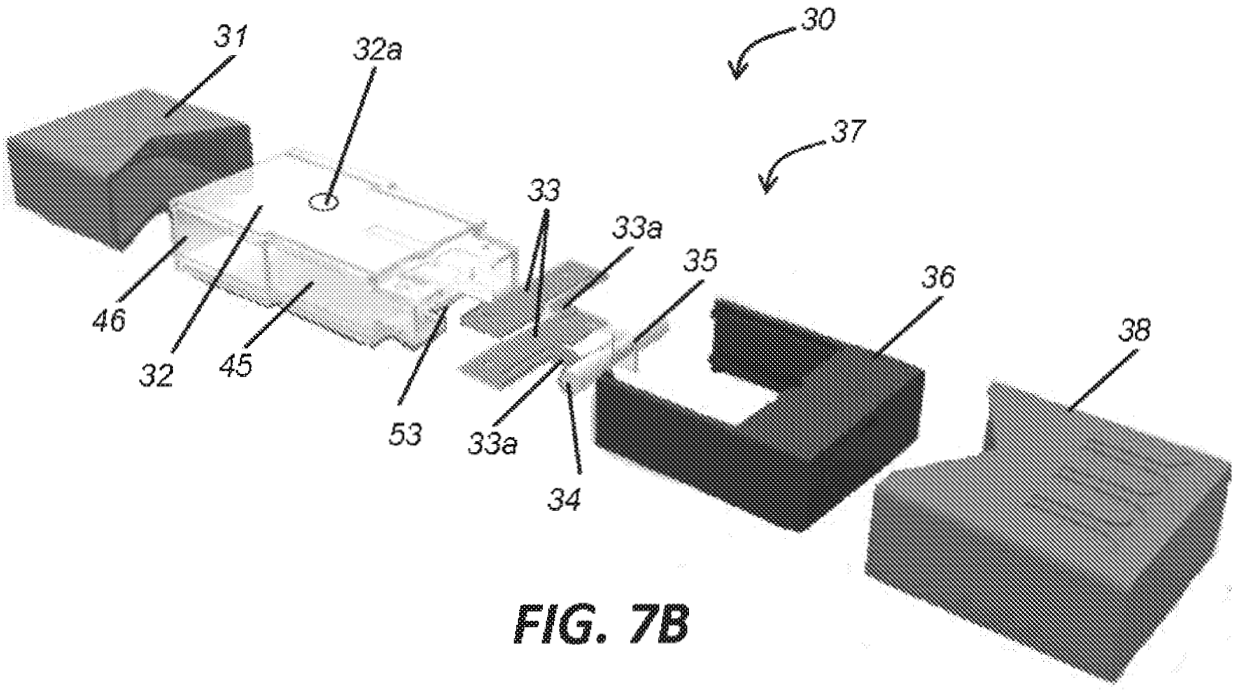


FIG. 7B

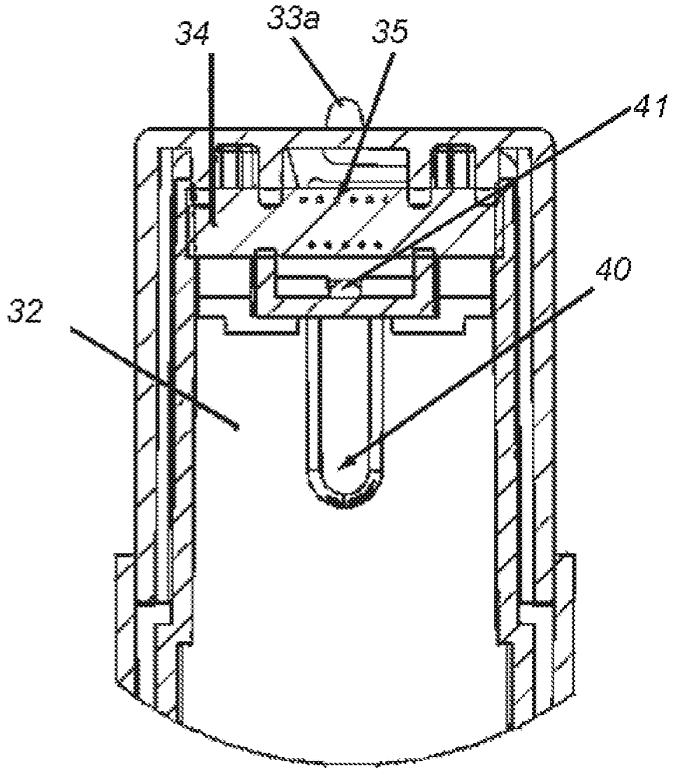


FIG. 7C

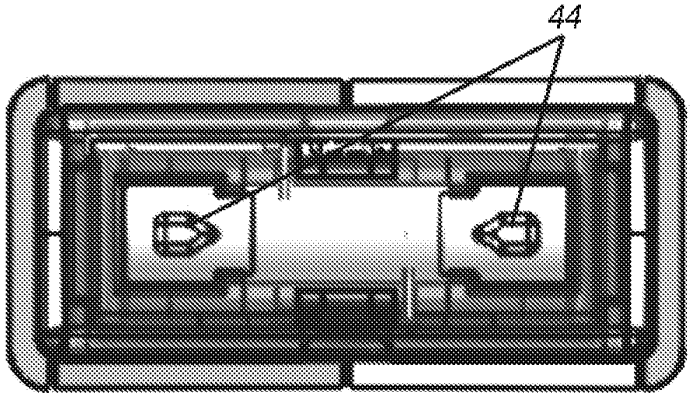


FIG. 8A

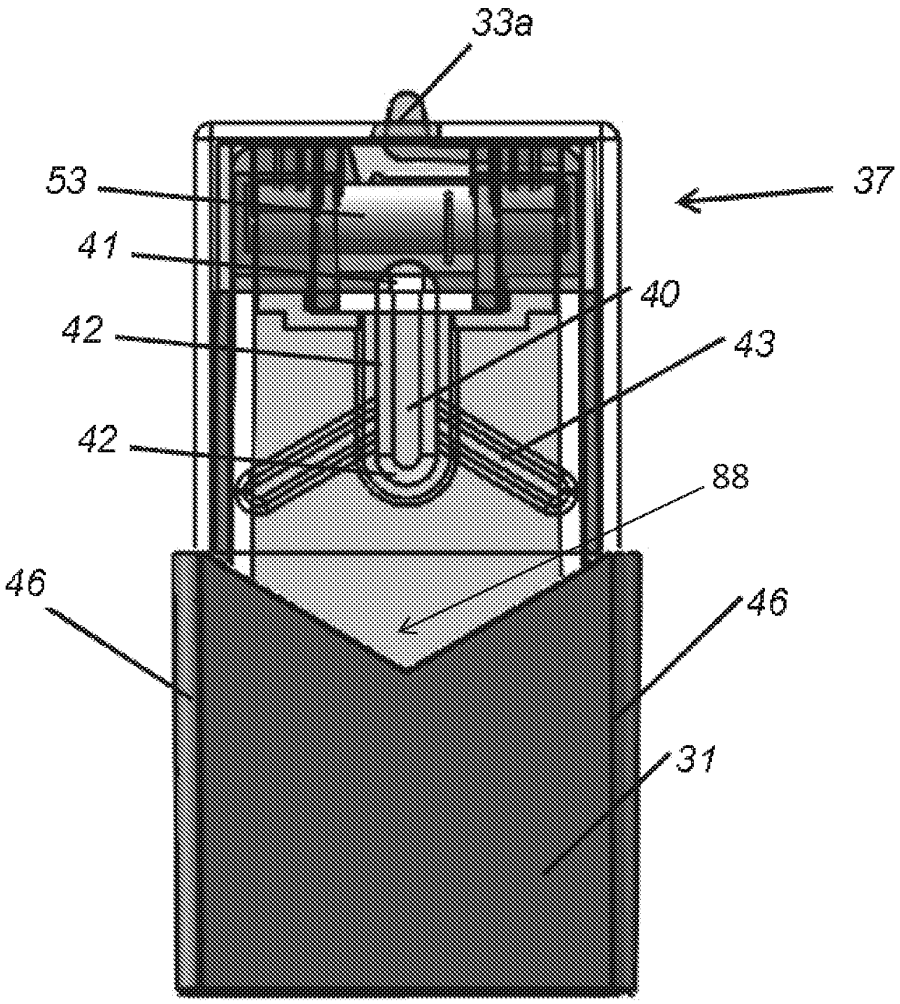
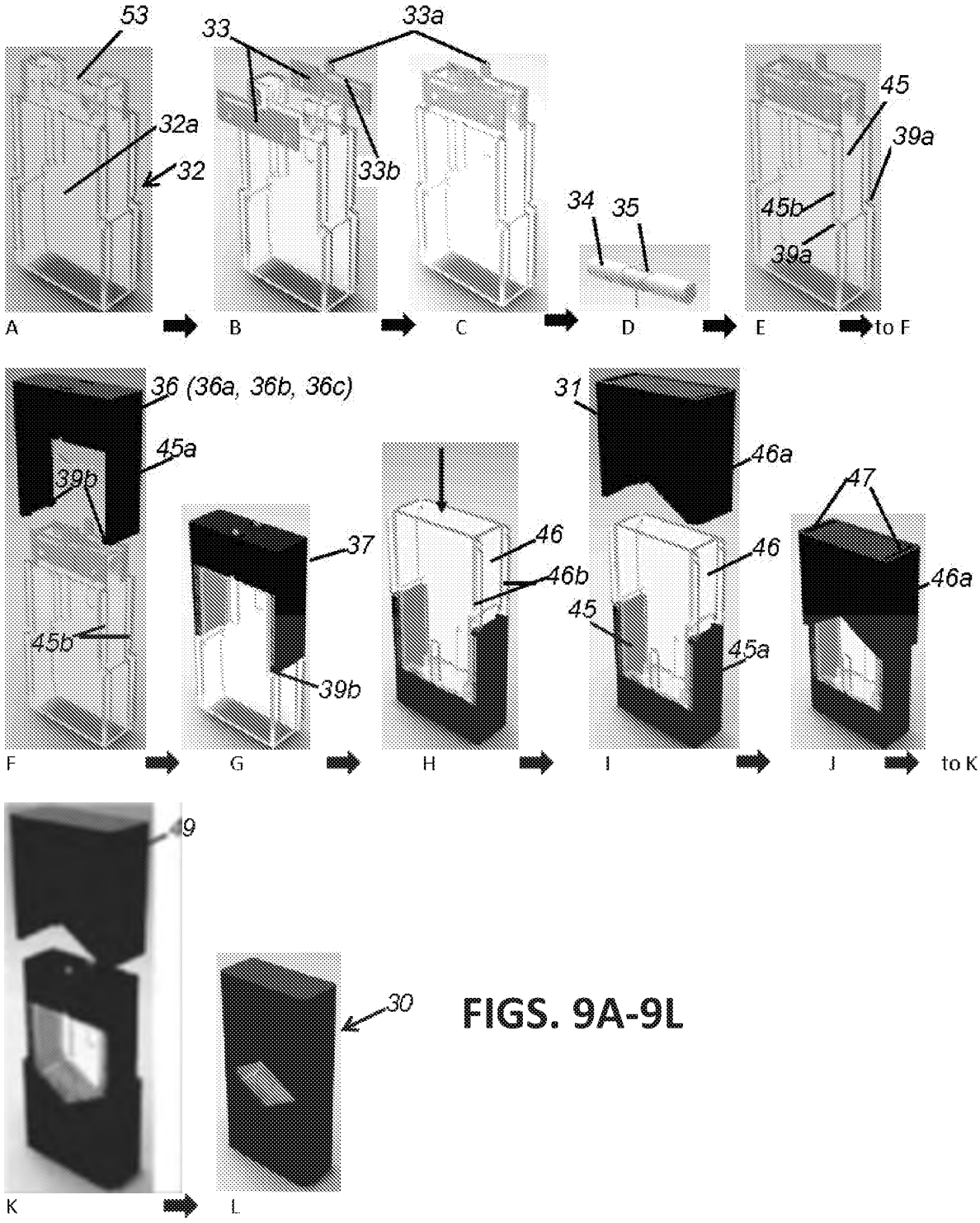


FIG. 8B


53
33
33a
32a
32
33b
34
35
45
39a
45b
39a
A
B
C
D
E
to F
36 (36a, 36b, 36c)
45a
39b
45b
37
39b
31
46a
46
46b
46
45
45a
47
46a
F
G
H
I
J
to K
9
30
K
L

FIGS. 9A-9L

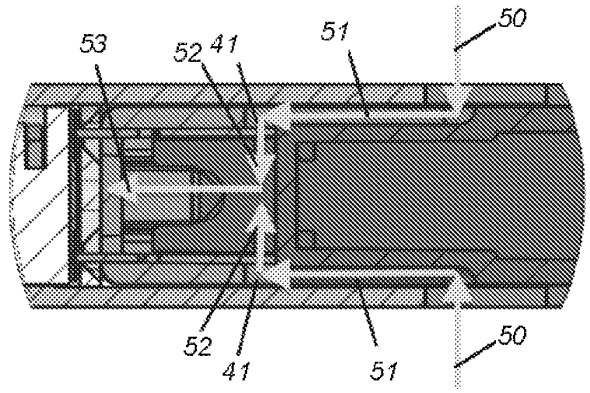


FIG. 10A

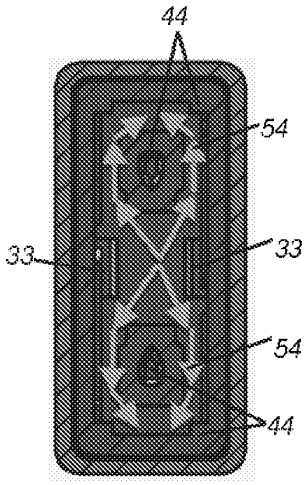


FIG. 10B

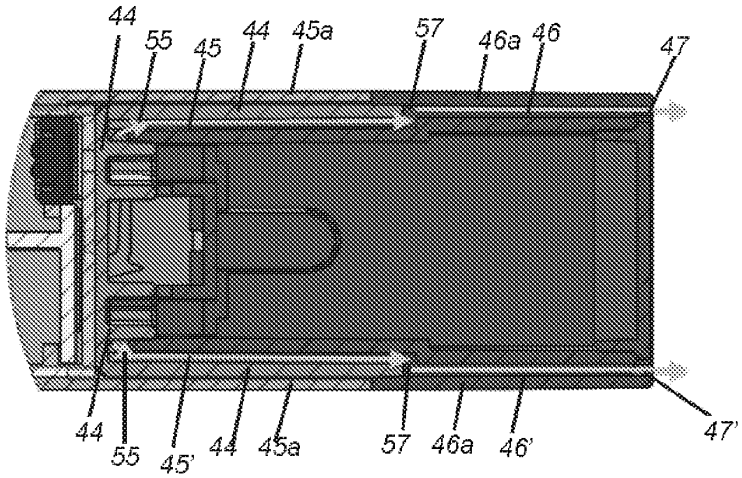


FIG. 10C

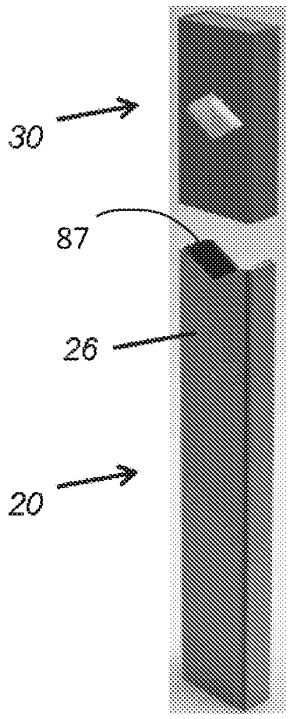


FIG. 11

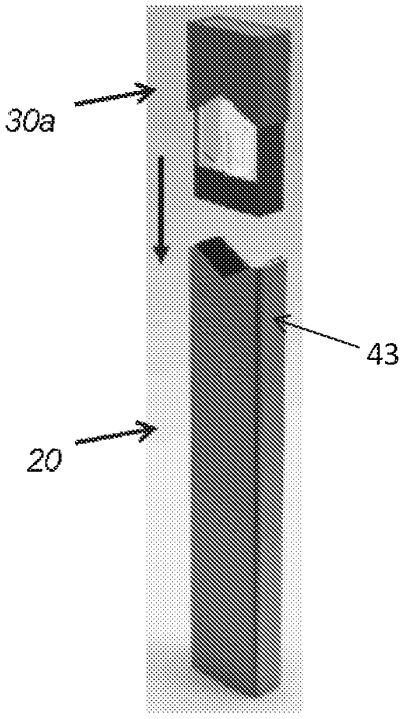


FIG. 12

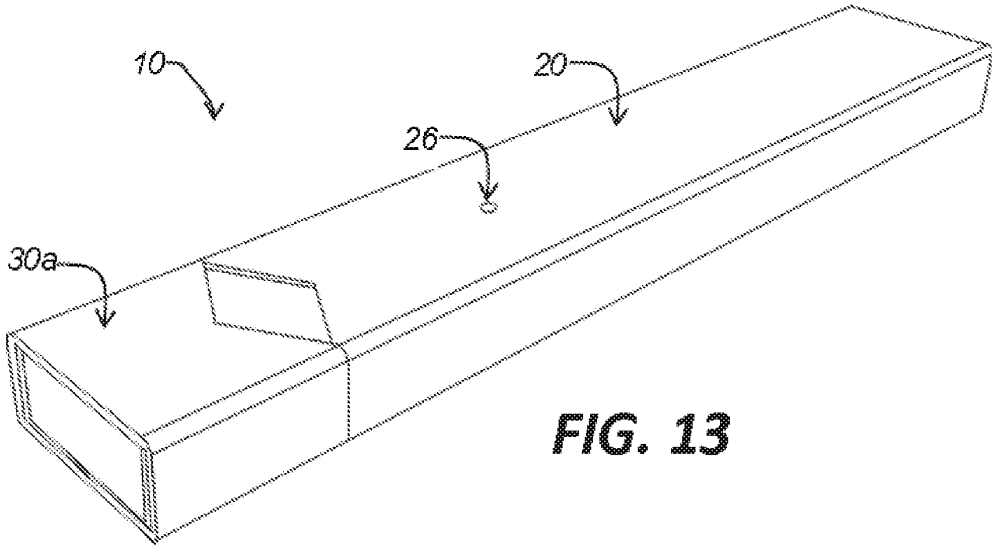


FIG. 13

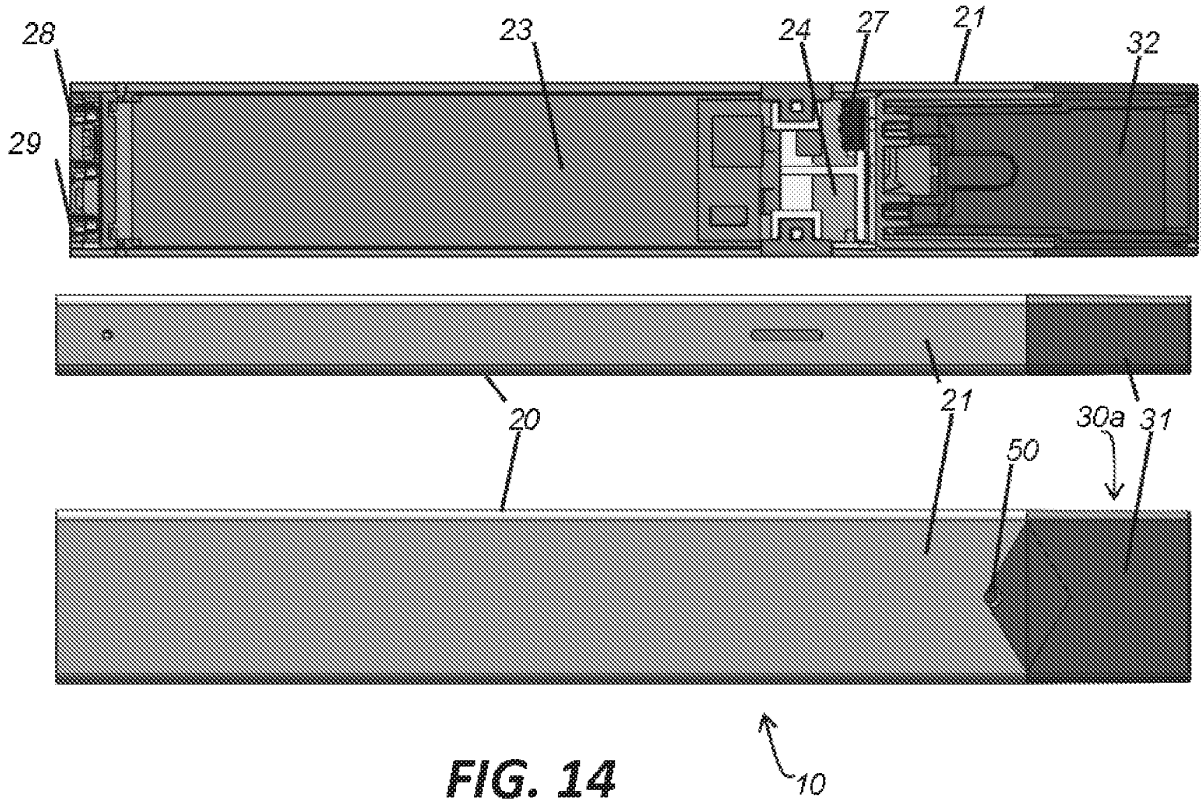


FIG. 14

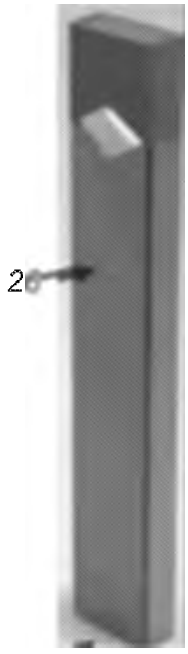


FIG. 15

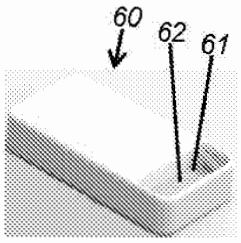


FIG. 16A

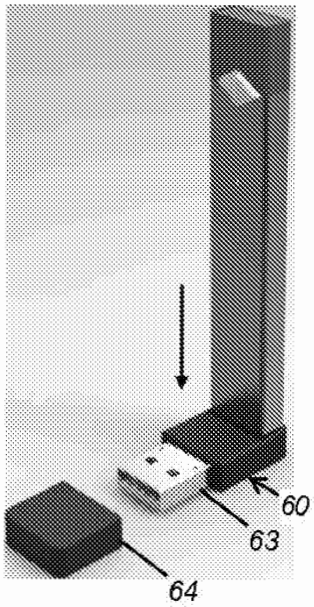


FIG. 16B

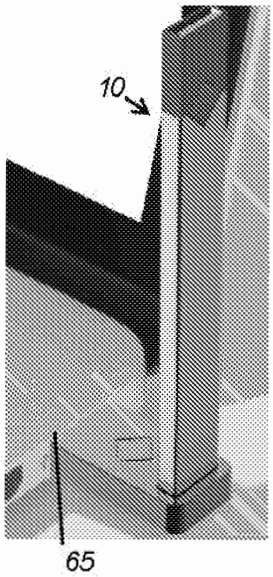


FIG. 16C

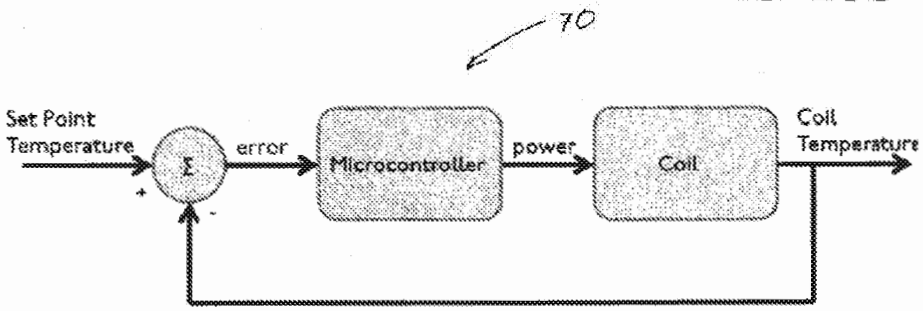


FIG. 17A

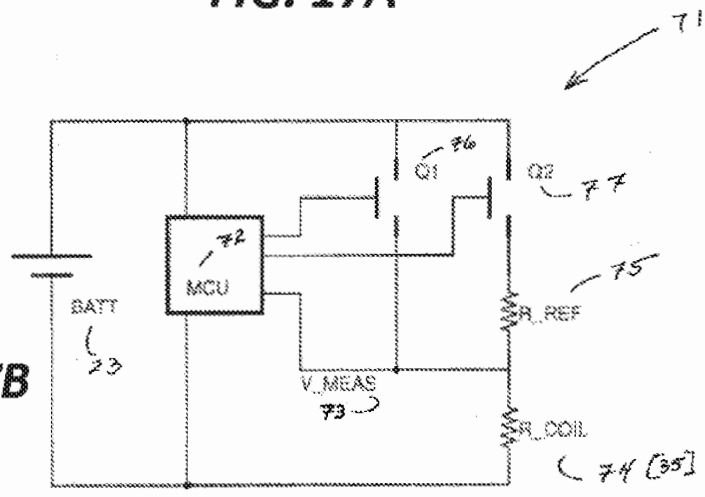


FIG. 17B

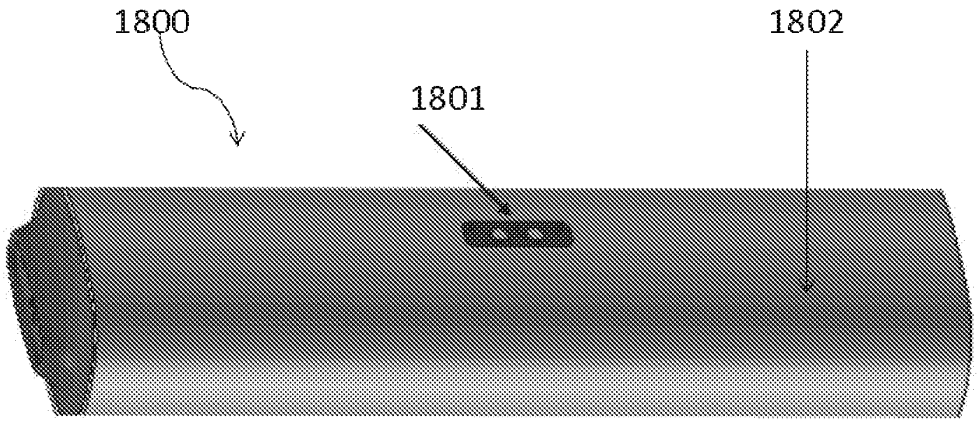


FIG. 18

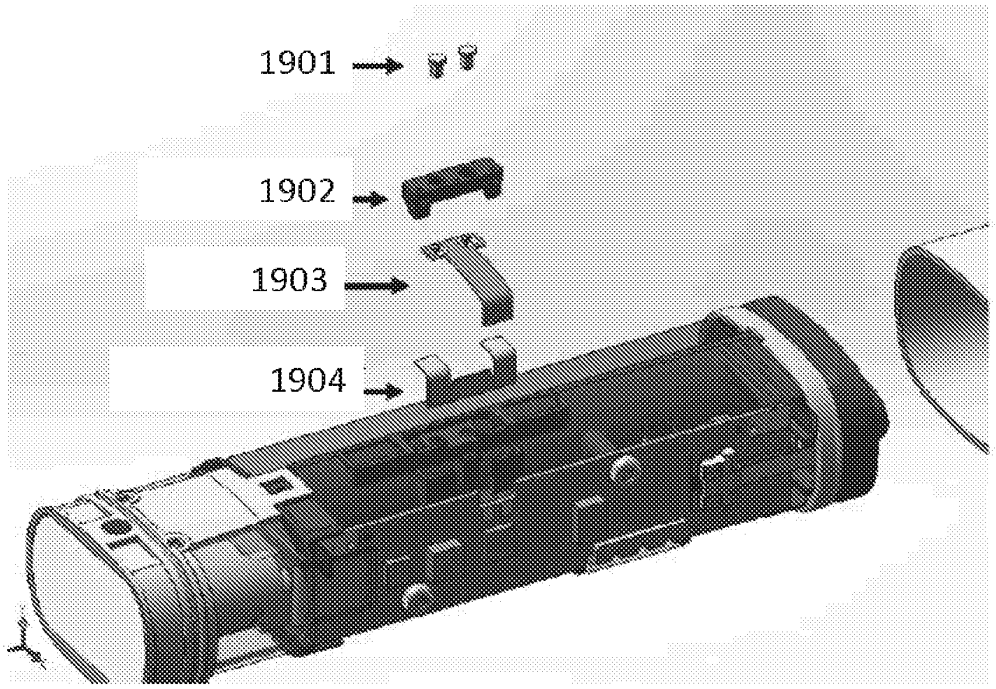


FIG. 19

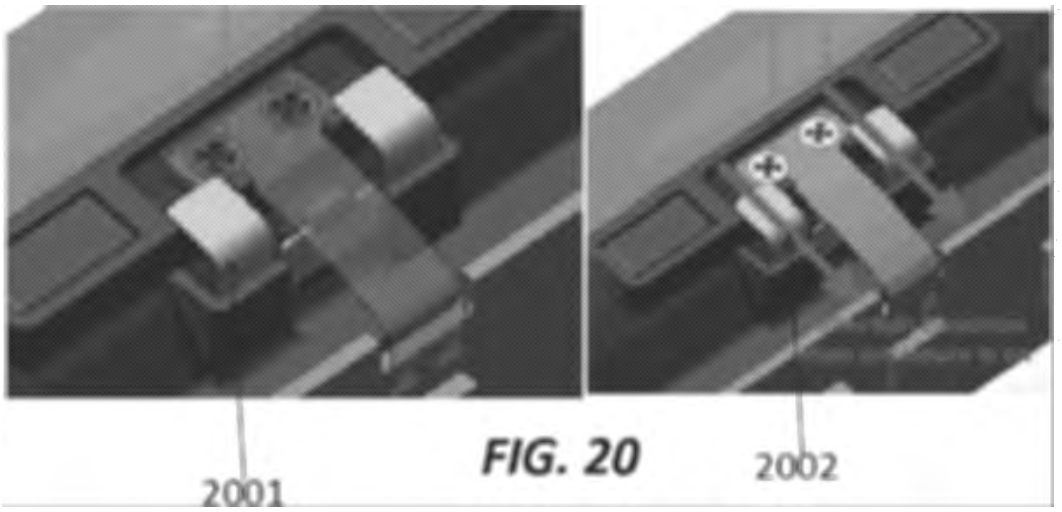


FIG. 20

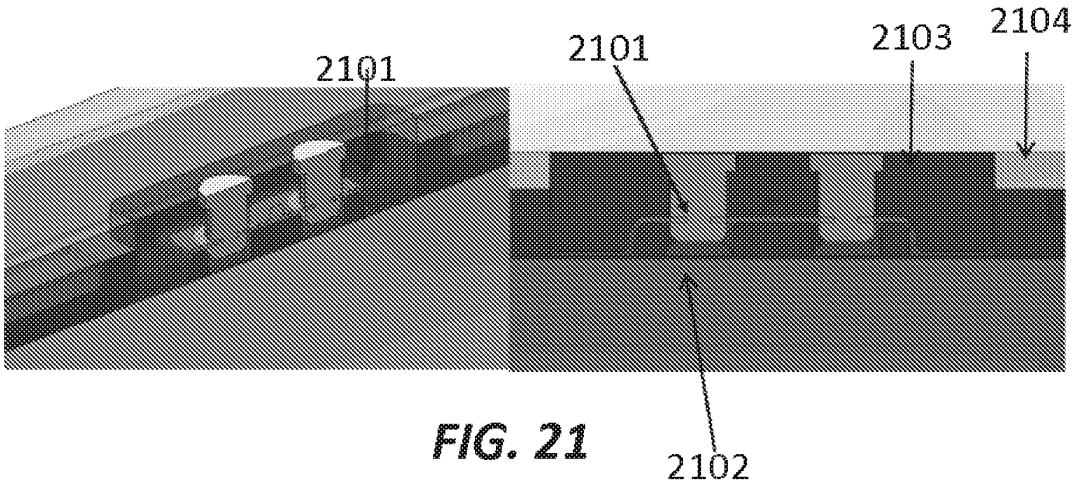


FIG. 21

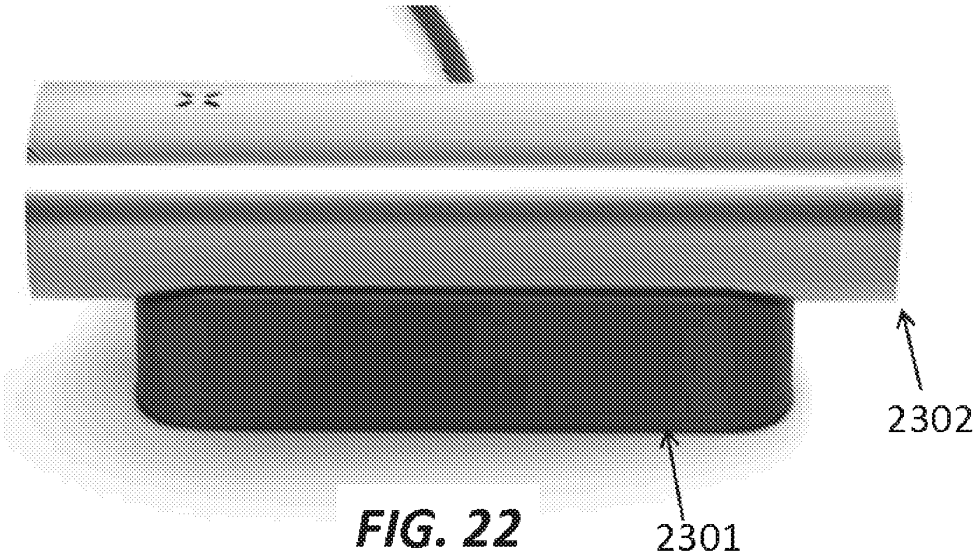


FIG. 22

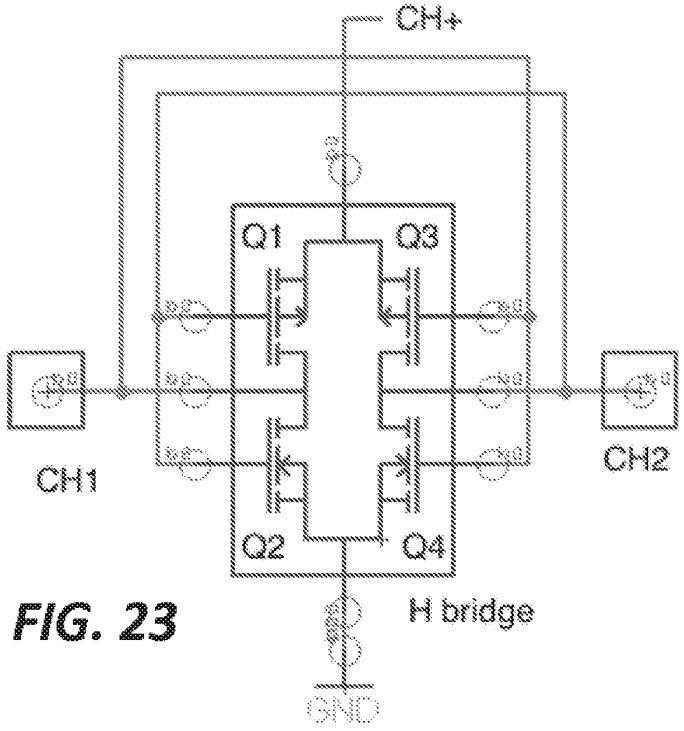


FIG. 23

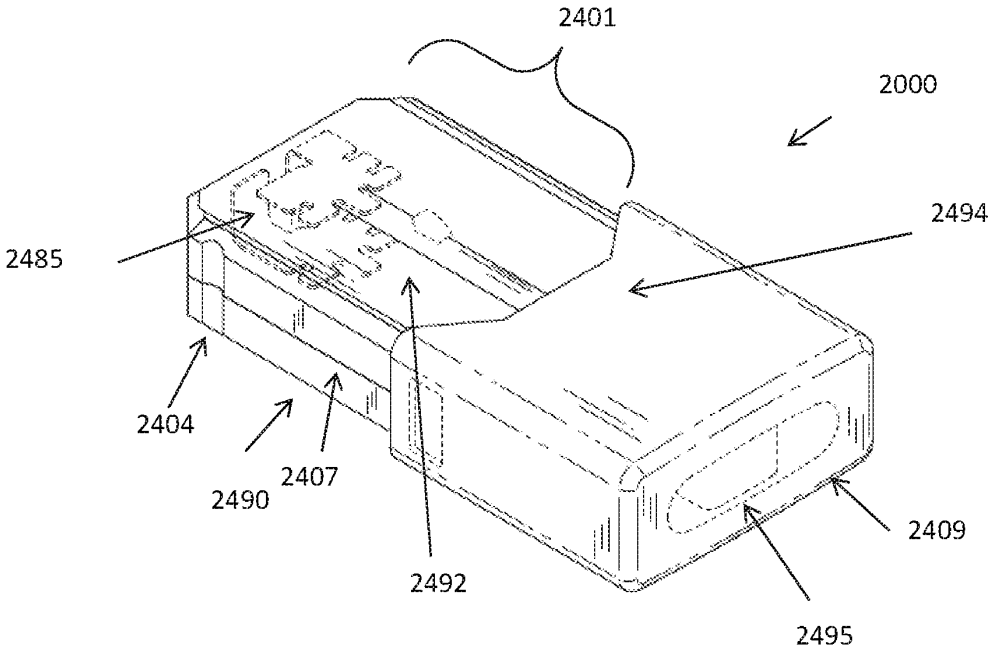


FIG. 24A

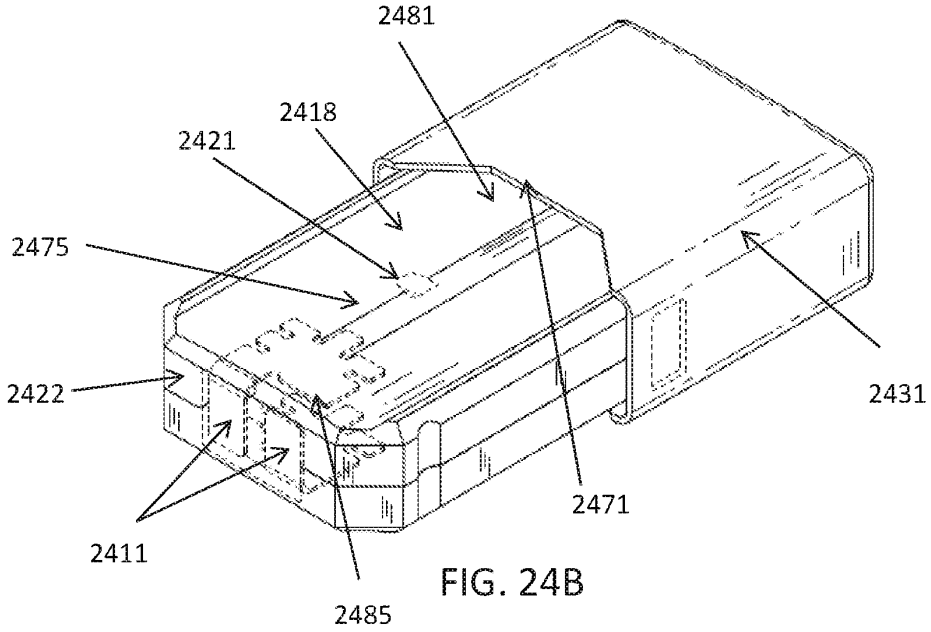


FIG. 24B

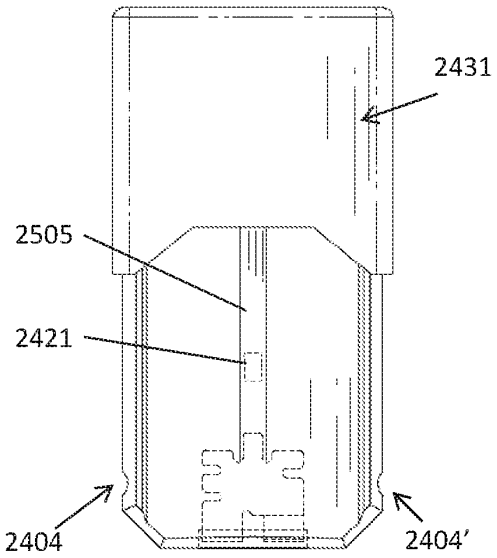


FIG. 25A

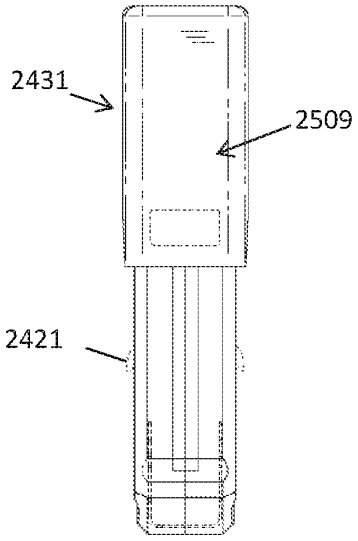


FIG. 25B

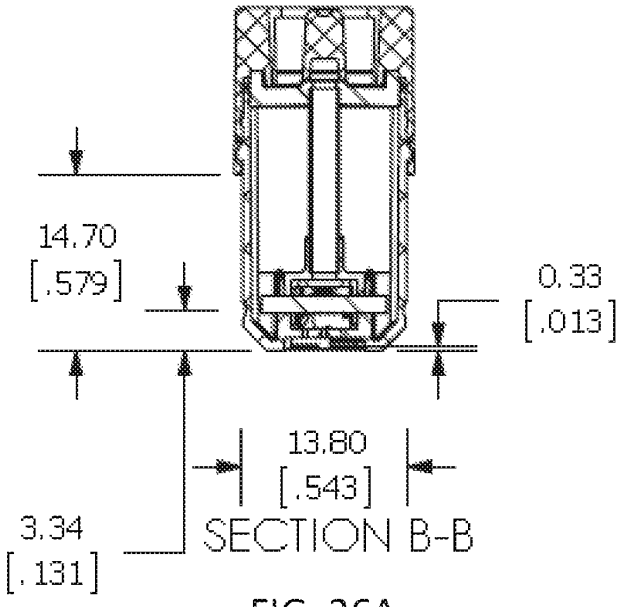


FIG. 26A

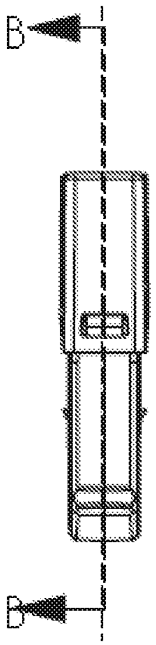


FIG. 26B

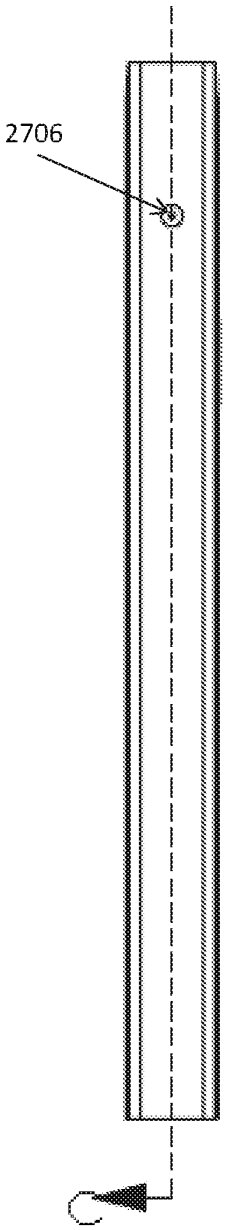


FIG. 27A

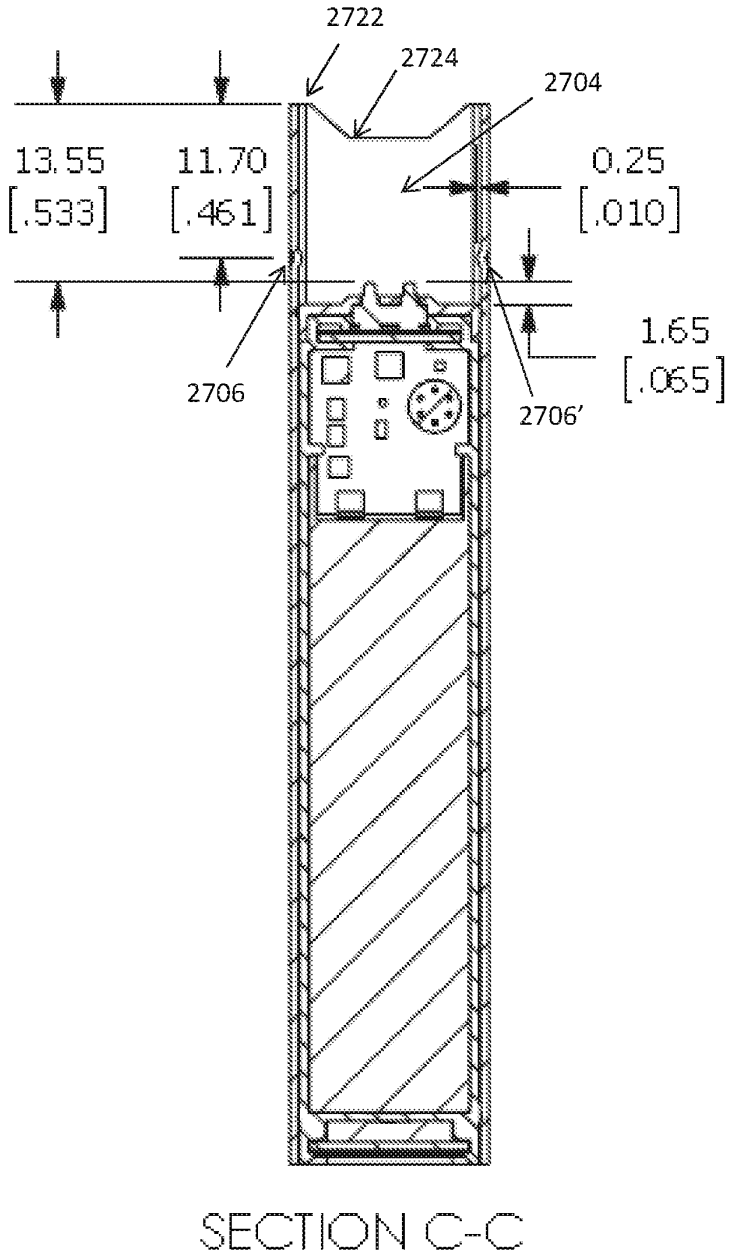


FIG. 27B

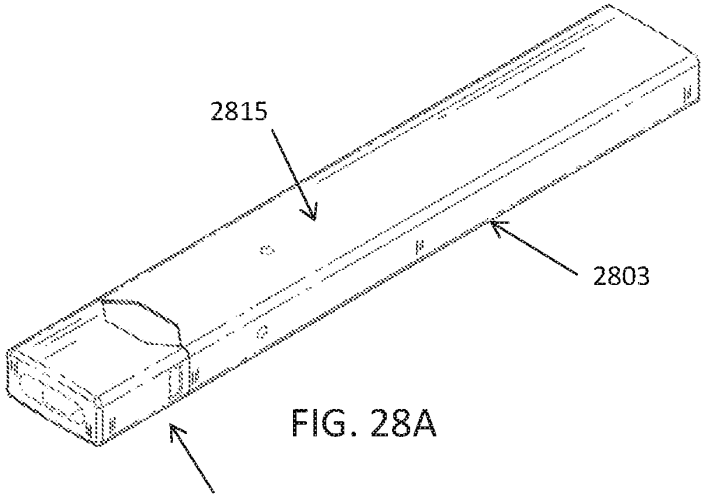


FIG. 28A

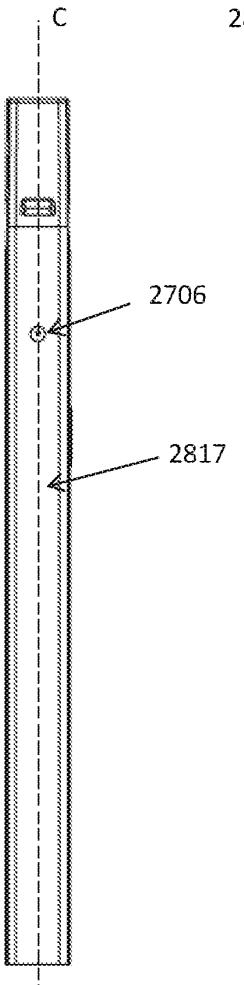


FIG. 28B

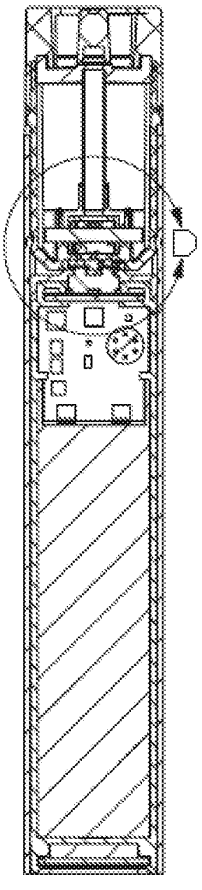


FIG. 28C

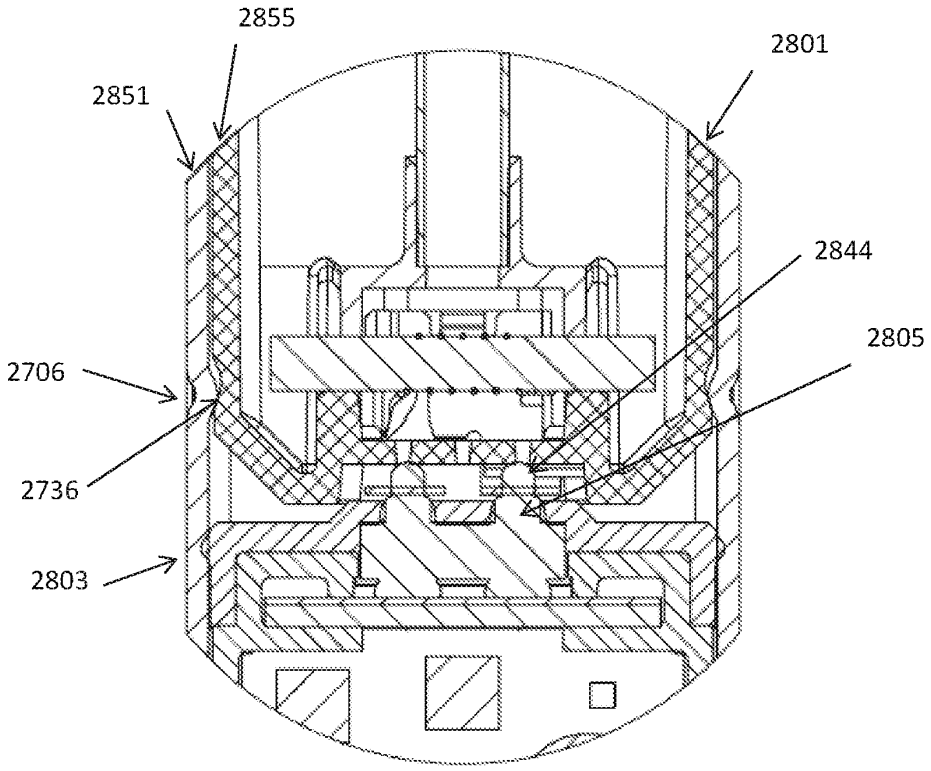


FIG. 28D

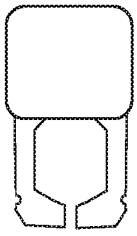


FIG. 29A

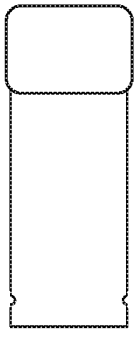


FIG. 29B

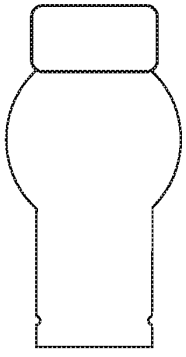


FIG. 29C

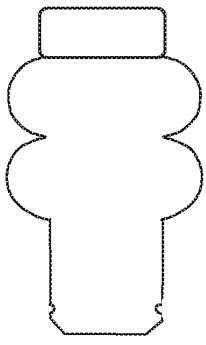


FIG. 29D

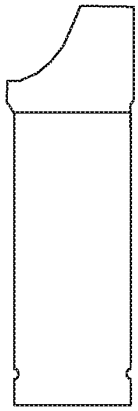


FIG. 29E

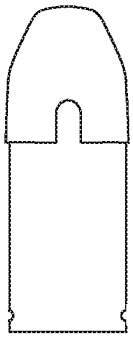


FIG. 29F

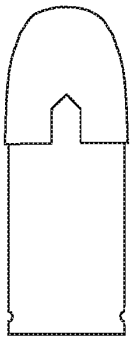


FIG. 29G

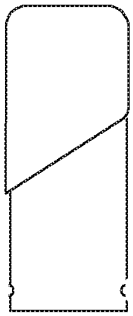


FIG. 29H

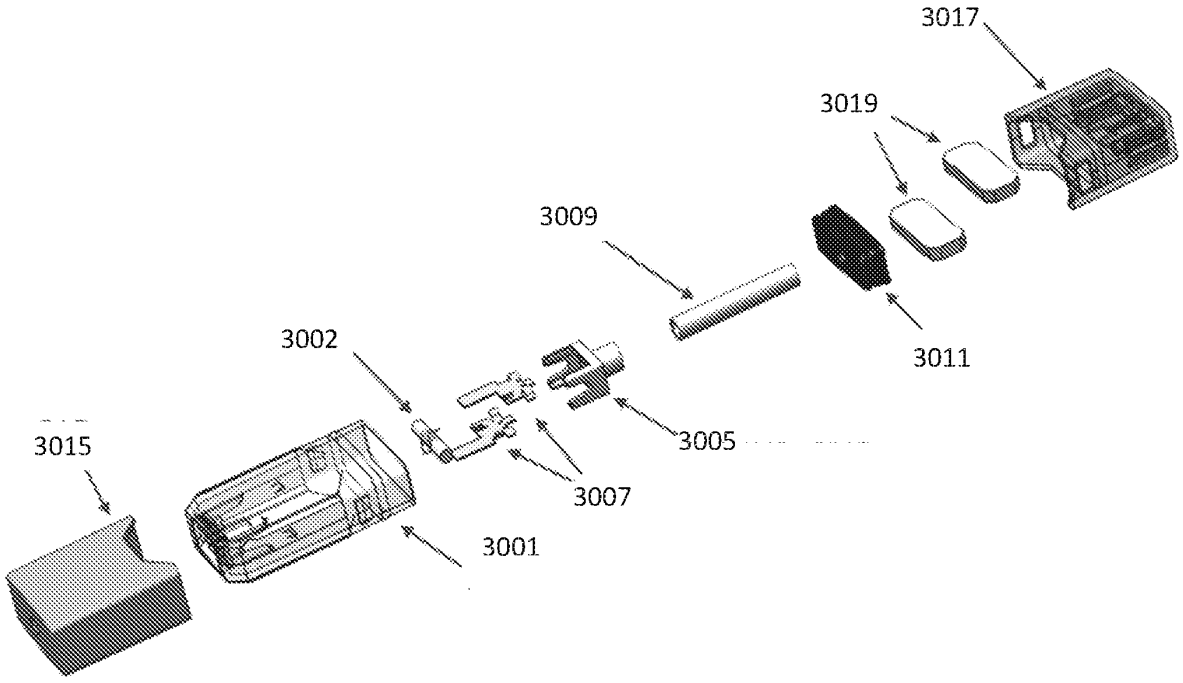


FIG. 30

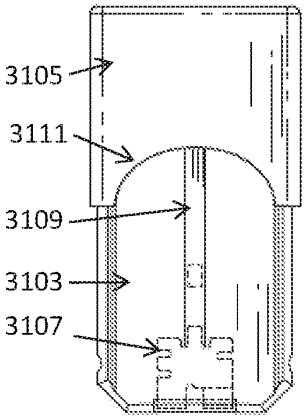


FIG. 31A

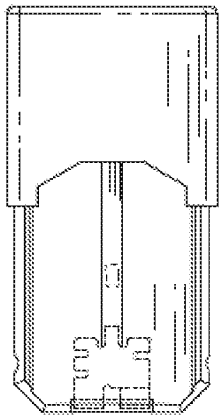


FIG. 31B

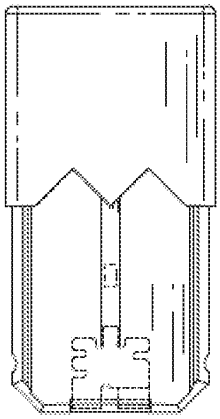


FIG. 31C

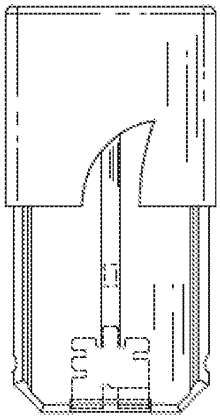


FIG. 31D

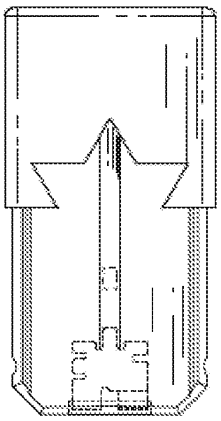


FIG. 31E

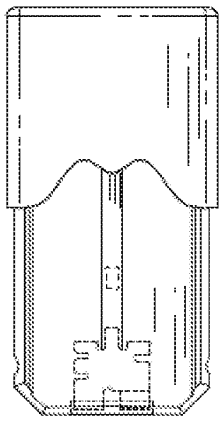


FIG. 31F

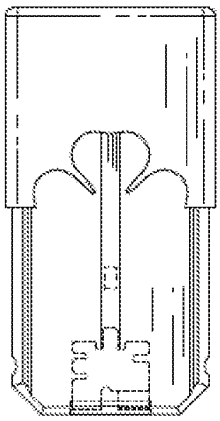


FIG. 31G

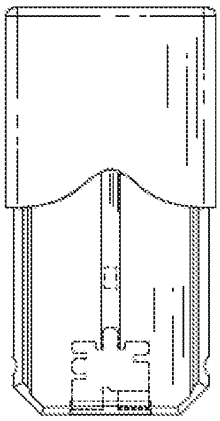


FIG. 31H

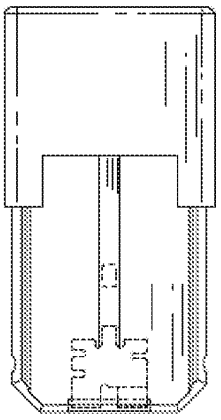


FIG. 31I

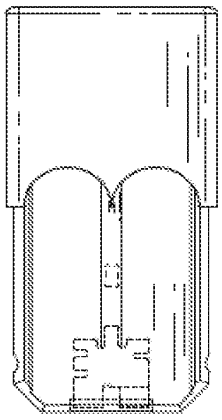


FIG. 31J

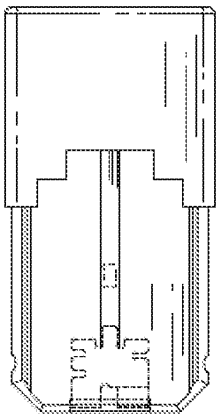


FIG. 31K

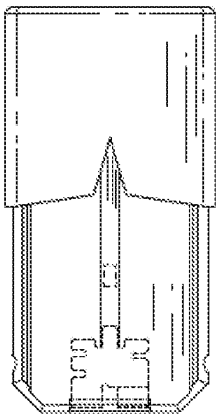


FIG. 31L

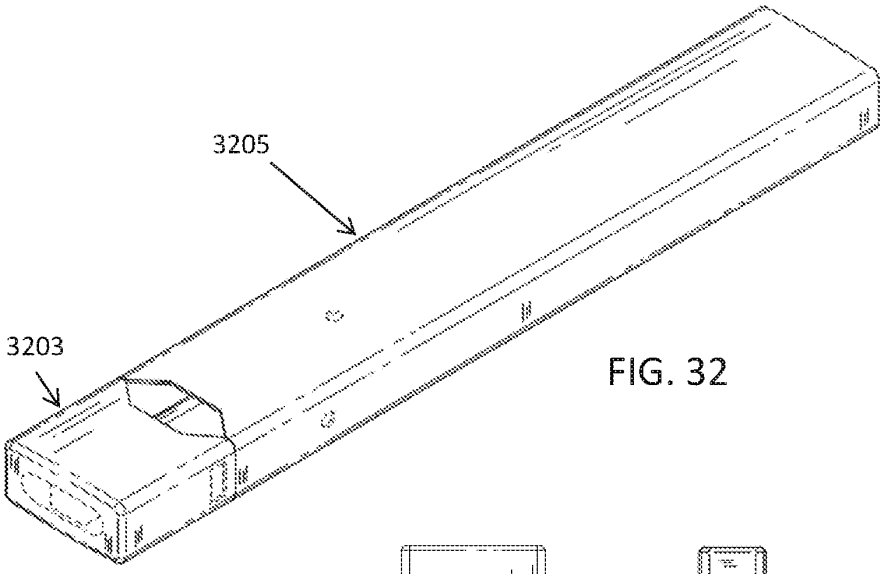


FIG. 32

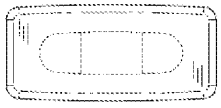


FIG. 33A

FIG. 33B

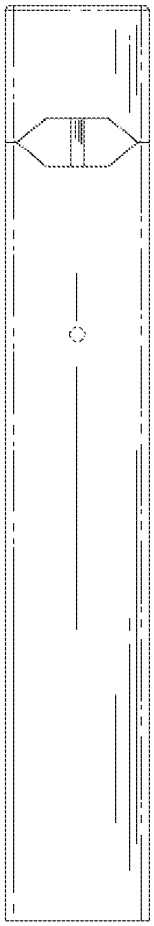


FIG. 33C

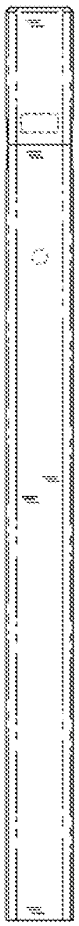


FIG. 33D

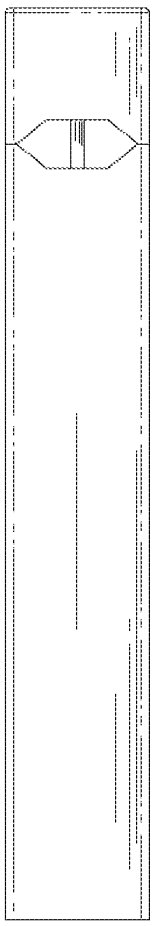
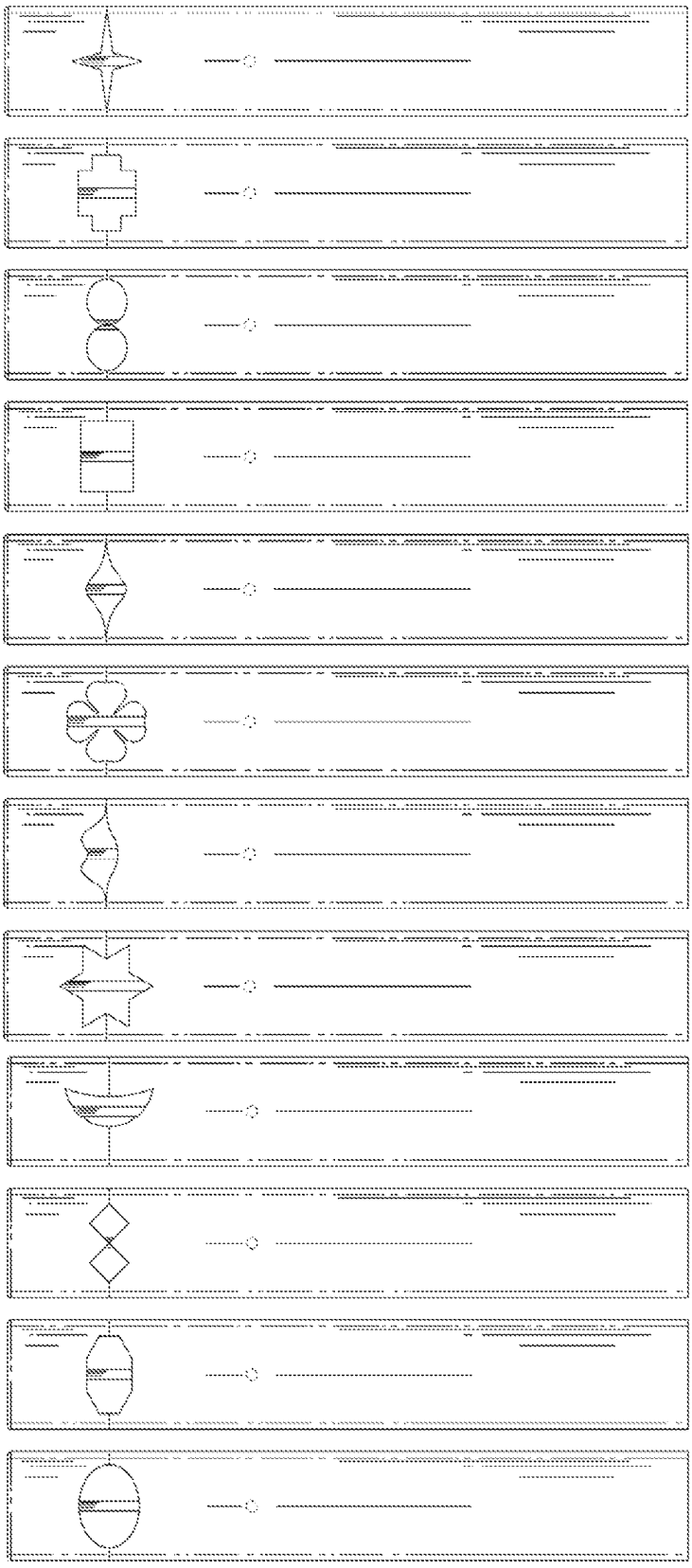


FIG. 33E



FIGS. 34A-L

Attorney No.: 13211-716.503

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	VAPORIZER APPARATUS

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number **15/257,760**

filed on **September 6, 2016**.

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

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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.

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LEGAL NAME OF INVENTOR

Inventor: **James MONSEES** Date (Optional): 9/30/2016

Signature: _____

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: **Adam BOWEN** Date (Optional): 9/29/16

Signature: A. M R

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: **Steven CHRISTENSEN** Date (Optional): 16-0928

Signature:

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: Joshua Morenstein Date (Optional) :

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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LEGAL NAME OF INVENTOR

Inventor: Christopher Nicholas HibmaCronan Date (Optional) :

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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VAPORIZER APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority as a continuation-in-part of U.S. Patent Application No. 14/581,666, filed 12/23/2014, and titled "VAPORIZATION DEVICE SYSTEMS AND METHODS", which claimed priority to U.S. Provisional Patent Application No. 61/920,225, filed 12/23/2013, and titled "ELECTRONIC VAPORIZATION DEVICE WITH RAPID COOLING AERATION", U.S. Provisional Patent Application No. 61/936,593, filed 2/6/2014, and titled "ELECTRONIC CIGARETTE JUICE DEVICE," U.S. Provisional Patent Application No. 61/937,755, filed 2/10/2014, and titled "ELECTRONIC CIGARETTE JUICE DEVICE". Each of these patent applications is herein incorporated by reference in its entirety.

[0002] This patent application also claims priority to U.S. Provisional Patent Application No. 62/294,285, filed 2/11/2016, and titled "FILLABLE ELECTRONIC CIGARETTE CARTRIDGE AND METHOD OF FILLING" and U.S. Provisional Patent Application No. 62/294,281, filed 2/11/2016, and titled "SECURELY ATTACHING CARTRIDGES FOR VAPORIZER DEVICES". Each of these patent applications is herein incorporated by reference in its entirety.

[0003] This patent application also claims priority as a continuation-in-part to International Design Application No. 35/001,169 (966973301), filed 3/11/2016, and titled "VAPORIZER WITH WINDOWED CARTRIDGE", and claims priority as a continuation-in-part International Design Application No. 35/001,170 (966973401), filed 3/11/2016, and titled "WINDOWED VAPORIZER CARTRIDGE". Each of these patent applications is herein incorporated by reference in its entirety.

INCORPORATION BY REFERENCE

[0004] All publications and patent applications mentioned in this specification are herein incorporated by reference in their entirety to the same extent as if each individual publication or patent application was specifically and individually indicated to be incorporated by reference.

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FIELD

[0005] Described herein are vaporizer apparatuses including cartridges and vaporizers (e.g., electronic inhalable aerosol devices or electronic vaping devices). In particular, described herein are compact cartridges that can be quickly and releasably secured into a vaporizer (also referred to herein as an electronic aerosol device), while containing a substantial amount of vaporizable material, allow sufficient cooling of the vapor and easily permit a user to accurately visually confirm the amount of vaporizable material within the cartridge.

BACKGROUND

[0006] Electronic cigarettes are typically battery-powered vaporizers that may be use, e.g., to simulate the feeling of smoking, but without tobacco. Instead of cigarette smoke, the user inhales an aerosol, commonly called vapor, typically released by a heating element that atomizes a liquid solution (vaporizable material or solution). Typically, the user activates the e-cigarette by taking a puff or pressing a button. Some vaporizers look like traditional cigarettes, but they come in many variations. Although mimicking the cylindrical look of traditional cigarettes may have marketing advantages because of a preexisting familiarity with this shape and potentially feel of the product, the cylindrical shape may not be optimal. Other shapes, including rectangular shapes, may offer advantages including a greater volume for holding the battery and vaporizable material, as well ease in handling and manufacture.

[0007] Many of the battery-powered vaporizers described to date include a reusable batter-containing device portion that connects to one or more cartridges containing the consumable vaporizable material. As the cartridges are used up, they are removed and replaced with fresh ones. It may be particularly useful to have cartridges and apparatuses that have a non-circular cross-section to prevent rolling of the device when placed on a table or other surface. However, a number of surprising disadvantages may result in this configuration. For example the use of a cartridge at the proximal end of the device, which is also held by the users mouth, has been found to cause instability in the electrical contacts, particularly with cartridges of greater than 1 cm length. Further, there may be difficulties in determining the amount of vaporizable material within the cartridge, sufficiently cooling or otherwise processing the vapor generated by a heater located in the cartridge, and easily and quickly securing the cartridge into the vaporizer when force may be applied by a user's mouth at the proximal mouthpiece when a user holds the device

NJOY Exhibit 1002.057

either just by the mouth or using the mouth at the proximal end and a hand on the more distal body of the vaporizer.

[0008] Described herein are apparatuses and methods that may address the issues discussed above.

SUMMARY OF THE DISCLOSURE

[0009] The present invention relates generally to apparatuses, including systems and devices, for vaporizing material to form an inhalable aerosol. Specifically, these apparatuses may include vaporizers, cartridge for use with a vaporizer device, and vaporizers with cartridges.

[0010] In particular, described herein are cartridges that are configured for use with a vaporizer having a rechargeable power supply that includes a proximal cartridge-receiving opening. These cartridges are specifically adapted to be releasably but securely held within the cartridge-receiving opening (also referred to as a cartridge receptacle) of the vaporizer and may be configured to resist disruption of the electrical contact with the controller and power supply in the vaporizer even when held by the user's mouth.

[0011] Generally, the cartridges (which may also referred to as cartomizers) described herein may have a mouthpiece, a heater/vaporizer (e.g., heating element, wick), and a tank (fluid reservoir) to hold the vaporizable material (typically a nicotine solution), in which the cartridge is flattened and has a window into the tank through the mouthpiece so that the liquid level is visible; the window can be an opening through the mouthpiece or it can be a notch up into the mouthpiece. A cannula (e.g., tube) may run through the tank, and connect the heater/vaporizer to an opening in the mouthpiece.

[0012] As will be illustrated and described below, the cannula forms a passage for the vapor from the heater to the mouthpiece, and typically passes through the tank so that it is surrounded by vaporizable fluid in the tank; this may help to regulate the temperature of the vapor within the cannula, providing a substantially improved vaping experience. The cannula may be visible through the window/notch. Although having the cannula visible in the window may obscure the view into the tank, it also helps provide a visual reference for the liquid level that makes it much easier for a user to get a quick and accurate understanding of the actual level of vaporizable material within the tank.

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[0013] In general, the mouthpiece may be opaque and may fit over the top/end of the transparent tank (storage compartment) and may be secured over the end of the storage compartment. This may allow the mouthpiece to form a lip or rim formed by the distal edge of the mouthpiece over the storage compartment that helps guide and helps secure the cartridge in the cartridge receptacle of the vaporizer.

[0014] As mentioned, the (typically opaque) mouthpiece may also or alternatively have a cut-out region on the distal edge that is cut into a shape that may form a window into the tank to show the cartridge and fluid; the cut-out region may be any appropriate shape (e.g., square, rectangular, oval, semi-circular, or combinations thereof), and may match with another cut-out region on the upper edge (proximal edge) of the cartridge receptacle of the vaporizer.

[0015] Any of these cartridges may also include a gap on the side of the cartridge to mate with a detent on the vaporizer. The gap (also referred to herein as a locking gap) may be a channel, pit, hole, divot, etc. in the sides of the elongate and flattened storage compartment. These gaps may act as a mechanical lock to secure the cartridge in the vaporizer, and may also provide tactile and/or audible \feedback (producing a click or snap) when the cartridge is properly seated in the cartridge receptacle so that there is a robust mechanical and electrical connection between the cartridge and the vaporizer.

[0016] In general, the apparatuses described herein also include vaporizers and cartridges in which the cartridge is inserted into a cartridge receptacle at the proximal end of the vaporizer so that the mouthpiece projects out of the proximal end. Overall, the combined cartridge and vaporizer may have an elongate, flattened shape that prevents rolling when the apparatus is placed on a table or other flat surface so that is is lying flat on the surface. As mentioned, the body of the vaporizer, and particularly the proximal edge of the cartridge receptacle, may include a notch or cut-out portion that forms a window into the (transparent) cartridge when the cartridge is held within the cartridge receptacle. Similarly, the cartridge receptacle portion of the vaporizer may include a coupling to secure the cartridge within the cartridge receptacle even when it projects out of the end of the vaporizer, and even when the entire apparatus is held within a user's mouth only at the mouthpiece of the cartridge. Although the majority of the weight of the apparatus is in the vaporizers (near the distal end of the apparatus), the coupling, which may be two or more detents on the side of the cartridge receptacle and/or a magnetic coupling, may hold the cartridge secured in position even where the electrical coupling is a

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biased connection (such as a pogo pin) that would tend to push the cartridge out of the cartridge receptacle.

[0017] For example, described herein are cartridges for use with a vaporizer device, the cartridge comprising: an elongate and flattened storage compartment configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment, further wherein the storage compartment comprises a distal end and a proximal end, and a first side extending between the distal end and the proximal end; an opaque mouthpiece that is secured over the proximal end of the storage compartment, the opaque mouthpiece having a front side adjacent to the first side of the storage compartment, wherein a distal end of the opaque mouthpiece terminates in a distal edge that extends only partially between the distal end and the proximal end of the storage compartment; an opening through the opaque mouthpiece at a proximal end of the opaque mouthpiece; a notch in the front side of the mouthpiece extending from the distal edge of the opaque mouthpiece toward the proximal end of the mouthpiece, wherein the notch exposes a region of the storage compartment beneath the mouthpiece; a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and a cannula within the storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula when the storage compartment is filled with liquid vaporizable material, wherein the cannula is visible through the notch, further wherein the cannula forms a fluid connection between the heating chamber and the opening through the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled.

[0018] Also described herein are cartridges for use with a vaporizer device, the cartridge comprising: an elongate and flattened storage compartment configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment, further wherein the storage compartment comprises a distal end and a proximal end, and a first side extending between the distal end and the proximal end; an opaque mouthpiece that is secured over the proximal end of the storage compartment, the opaque mouthpiece having a front side adjacent to the first side of the storage compartment, wherein a distal end of the opaque mouthpiece terminates in a distal edge that extends only partially

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between the distal end and the proximal end of the storage compartment; an opening through the opaque mouthpiece at a proximal end of the opaque mouthpiece; a window in the front side of the mouthpiece, wherein the window exposes a region of the storage compartment beneath the mouthpiece; a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and a cannula within the storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula when the storage compartment is filled with liquid vaporizable material, wherein the cannula is visible through the window, further wherein the cannula forms a fluid connection between the heating chamber and the opening through the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled.

[0019] A cartridge for use with a vaporizer device may also include: an elongate and flattened storage compartment holding a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment, further wherein the storage compartment comprises a distal end and a proximal end, and a first side extending between the distal end and the proximal end; an opaque mouthpiece that is snap-fit over the proximal end of the storage compartment, the opaque mouthpiece having a front side adjacent to the first side of the storage compartment, wherein a distal end of the opaque mouthpiece terminates in a distal edge that extends midway between the distal end and the proximal end of the storage compartment; an opening through the opaque mouthpiece at a proximal end of the opaque mouthpiece; a notch in the front side of the mouthpiece extending from the distal edge of the opaque mouthpiece toward the proximal end of the mouthpiece, wherein the notch exposes a region of the storage compartment beneath the mouthpiece; a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; a cannula or channel within the storage compartment extending from the heater to the proximal end of the storage compartment, wherein the liquid vaporizable material is visible through the notch, further wherein the cannula or channel forms a fluid connection between the heating chamber and the opening through the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled; and a pair of locking gaps on lateral sides of the cartridge that are configured to

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engage with a pair of locking detents on the vaporizer device to secure the cartridge in the vaporizer device.

[0020] In any of the cartridge described herein, the opaque mouthpiece may be secured over the proximal end of the storage compartment by a snap-fit.

[0021] In general, the storage compartment may be filled with the liquid vaporizable material. Any liquid vaporizable material may be used, including nicotine solutions, cannaboid solutions, solutions without any active ingredient, or other vaporizable solutions.

[0022] In general, as will be described in greater detail herein, the cartridges may include a pair of electrical contacts at a distal end of the cartridge. In some variations, the electrical contacts are configured to mate with connectors (e.g., pogo pin connectors) within the cartridge receptacle of the vaporizer.

[0023] The window (e.g., notch) in the cartridge through the mouthpiece may be a rectangular, triangular, semi-circular, or oval cutout region, or some combination of these. In general, the fluid within the elongate and flattened storage compartment may be visible; for example, the elongate fluid storage compartment may be transparent or translucent.

[0024] In any of the cartridges described herein, the cartridge (e.g., the elongate fluid storage compartment) may include a pair of locking gaps on lateral sides of the cartridge that are configured to engage with a pair of locking detents on the vaporizer device to secure the cartridge in the vaporizer device.

[0025] A vaporizer device may include: a cartridge, comprising: a non-opaque storage compartment holding a liquid vaporizable material; a mouthpiece overlapping a proximal end of the non-opaque storage compartment; and a heater at a distal end of the non-opaque storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and an elongate body configured to removably attach to the cartridge, the elongate body comprising a power source configured to provide power to the heater; and a notch in a proximal end of the elongate body or a distal end of the mouthpiece, the notch configured such that the non-opaque storage compartment of the cartridge is exposed therethrough when the cartridge is attached to the elongate body.

[0026] For example, a vaporizer device may include: a cartridge, comprising: a storage compartment holding a liquid vaporizable material; a mouthpiece overlapping a proximal end of

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the storage compartment; and a heater at a proximal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and an elongate body configured to removably attach to the cartridge, the elongate body comprising a power source configured to provide power to the heater; wherein an air inlet is formed between the cartridge and the elongate body when the cartridge is attached to the elongate body such that an air path is formed from the air inlet, over the wick, and out the mouthpiece.

[0027] For example, a cartridge for use with a vaporizer device may include: a storage compartment holding a liquid vaporizable material; a mouthpiece overlapping a proximal end of the storage compartment; a notch in a front side of the mouthpiece extending from a distal end of the mouthpiece toward a proximal end of the mouthpiece; and a heater at a proximal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick, wherein the notch is configured to form an air inlet between the cartridge and the vaporizer device when the cartridge is attached to the vaporizer device such that an air path is formed from the air inlet, over the wick, and out the mouthpiece.

[0028] Also described herein are apparatuses including vaporizer apparatuses that include both the cartridge and the vaporizer into which the cartridge may be inserted, e.g., into a cartridge receptacle that holds the cartridge so that it extends from one end of the vaporizer.

[0029] For example a vaporizer apparatus may include: a cartridge having: an elongate and flattened storage compartment configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment and wherein the storage compartment comprises a distal end and a proximal end; a mouthpiece at the proximal end of the storage compartment; an opening through the mouthpiece at a proximal end of the mouthpiece; a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and a vaporizer, the vaporizer having: an elongate, flattened and opaque body having a distal end and a proximal end and a front side, a back side and a pair of lateral sides extending between the distal and proximal ends, wherein the elongate, flattened and opaque body is prevented from rolling when placed on a flat surface because the diameter of the front and back sides are larger than the diameter of the pair of lateral sides; a cartridge receptacle formed

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at the proximal end of the elongate, flattened and opaque body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the elongate, flattened and opaque body, further wherein the cartridge receptacle comprises a proximal edge around the distal-facing opening; wherein the proximal edge of the cartridge receptacle forms a notch in the front side of the elongate, flattened and opaque body extending towards the distal end of the elongate, flattened and opaque body so that a portion of the storage compartment is visible through the notch when the cartridge is housed within the cartridge receptacle; a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to electrical contacts on the cartridge when the cartridge is housed within the cartridge receptacle; and a detent on each of the pair of lateral sides, wherein the detents project into the cartridge receptacle and each engage a mating region on the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle.

[0030] A vaporizer apparatus may include: a cartridge having: an elongate and flattened storage compartment configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment and wherein the storage compartment comprises a distal end and a proximal end; a mouthpiece at the proximal end of the storage compartment; an opening through the mouthpiece at a proximal end of the mouthpiece; a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; a cannula within the storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula when the storage compartment is filled with liquid vaporizable material, further wherein the cannula forms a fluid connection between the heating chamber and the opening through the mouthpiece from which vaporized liquid vaporizable material may be inhaled; and a vaporizer, the vaporizer having: an elongate, flattened and opaque body having a distal end and a proximal end and a front side, a back side and opposite lateral sides extending between the distal and proximal ends, wherein the elongate, flattened and opaque body is prevented from rolling when placed on a flat surface because the diameter of the front and back sides are larger than the diameter of the opposite lateral sides; a cartridge receptacle formed at the proximal end of the elongate, flattened and opaque body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the

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elongate, flattened and opaque body, further wherein the cartridge receptacle comprises a proximal edge around the proximal-facing opening; wherein the proximal edge of the cartridge receptacle forms a notch in the front side of the elongate, flattened and opaque body extending towards the distal end of the elongate, flattened and opaque body so that a portion of the storage compartment and the cannula within the storage compartment are visible through the notch when the cartridge is housed within the cartridge receptacle; a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to electrical contacts on the cartridge when the cartridge is housed within the cartridge receptacle; and a detent on each of the opposite lateral sides, wherein the detents project into the cartridge receptacle and each engage a mating region on the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle.

[0031] For example, a vaporizer apparatus may include a cartridge having: an elongate and flattened storage compartment holding a liquid vaporizable material that is visible through the storage compartment, wherein the storage compartment comprises a distal end and a proximal end, and a first side extending between the distal end and the proximal end; a mouthpiece at the proximal end of the storage compartment, wherein the mouthpiece comprises an opaque cover that is secured over the proximal end of the storage compartment, the opaque mouthpiece having a front side adjacent to the first side of the storage compartment, wherein a distal end of the opaque cover terminates in a distal edge that extends around a perimeter of the storage compartment from a position only partially between the distal end and the proximal end of the storage compartment of the opaque cover; a cartridge notch in the front side of the mouthpiece extending from the distal edge of the opaque cover towards the proximal end of the mouthpiece, wherein the cartridge notch exposes a region of the storage compartment beneath the mouthpiece; an opening through the mouthpiece at a distal end of the mouthpiece; a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; a cannula within the storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula, further wherein the cannula forms a fluid connection between the heating chamber and the opening through the mouthpiece from which vaporized liquid vaporizable material may be inhaled, wherein the cannula is visible through the cartridge notch; and a

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vaporizer, the vaporizer having: an elongate, flattened and opaque body having a distal end and a proximal end and a front side, a back side and opposite lateral sides extending between the distal and proximal ends, wherein the elongate, flattened and opaque body is prevented from rolling when placed on a flat surface because the diameter of the front and back sides are larger than the diameter of the opposite lateral sides; a cartridge receptacle formed at the proximal end of the elongate, flattened and opaque body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the elongate, flattened and opaque body, further wherein the cartridge receptacle comprises a proximal edge around the distal-facing opening; wherein the proximal edge of the cartridge receptacle forms a notch in the front side of the elongate, flattened and opaque body extending towards the distal end of the elongate, flattened and opaque body so that a portion of the storage compartment and the cannula are visible through the notch when the cartridge is housed within the cartridge receptacle; a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to electrical contacts on the cartridge when the cartridge is housed within the cartridge receptacle; and a detent on each of the opposite lateral sides, wherein the detents project into the cartridge receptacle and each engage a mating region on the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle, wherein the cartridge notch aligns with the notch formed in the proximal edge of the cartridge receptacle when the cartridge is housed within the cartridge receptacle.

[0032] As mentioned above, in any of the cartridges described herein, the cannula may be visible within the storage compartment is visible through the notch when the cartridge is housed within the cartridge receptacle.

[0033] In any of the cartridges described herein, the elongate, flattened and opaque body may have a cross-section such that the apparatus (including the cartridge) lies flat and does not roll, when placed on a table. For example, the cartridge may have a rectangular cross-section (e.g., through the long axis, distal-to-proximal, of the cartridge); in some variations the cross-section is oval, square, etc.

[0034] In any of the devices described here, the cartridge may couple with the vaporizer using a connector that is snap fit, or other mechanical fit that is not a threaded connection. Alternatively or additional, the connector may be magnetic.

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[0035] In any of these apparatuses, the pair of electrical contacts in a proximal surface within the cartridge receptacle may comprise pogo pins or other connectors that are biased against the contact on the cartridge when the two are connected.

[0036] The mouthpiece may generally comprise an opaque cover that is secured over the proximal end of the storage compartment, the opaque cover having a front side adjacent to a first side of the storage compartment extending between the proximal and distal ends of the storage compartment, wherein a distal end of the opaque cover terminates in a distal edge that extends around a perimeter of the storage compartment from a position only partially between the distal end and the proximal end of the storage compartment.

[0037] The cartridge may further comprises a cartridge notch in the front side of the mouthpiece extending from the distal edge of the opaque cover towards the proximal end of the mouthpiece, wherein the cartridge notch exposes a region of the storage compartment beneath the mouthpiece, further wherein the cartridge notch aligns with the notch formed in the proximal edge of the cartridge receptacle when the cartridge is housed within the cartridge receptacle.

[0038] Also described herein in particular are apparatuses (e.g., vaporizer apparatuses) in which the cartridge (including any of the cartridges described herein) are magnetically coupled to with a cartridge receptacle at a proximal end of the vaporizer body so that the proximal end (e.g., mouthpiece) of the cartridge extends proximally from out of the vaporizer body. For example, a vaporizer apparatus may include: a cartridge having: an elongate and transparent storage compartment holding a liquid vaporizable material, wherein the elongate and transparent storage compartment comprises a distal end and a proximal end; an opaque mouthpiece at the proximal end of the elongate and transparent storage compartment; a pair of electrical contacts at a distal end of the cartridge; a heater at the distal end of the elongate and transparent storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and a channel within the elongate and transparent storage compartment extending from the heater to the proximal end of the elongate and transparent storage compartment, wherein the channel is visible through the elongate and transparent storage compartment, further wherein the channel forms a fluid connection between the heating chamber and the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled; and a vaporizer, the vaporizer having: an elongate body having a distal end and a proximal end; a cartridge receptacle formed at the proximal end

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of the elongate body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the elongate body, further wherein the cartridge receptacle comprises a proximal edge around the distal-facing opening; an window though a side of the cartridge receptacle so that at least a portion of the elongate and transparent storage compartment is visible through the window when the cartridge is held within the cartridge receptacle; a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to the pair of electrical contacts at the distal end of the cartridge when the cartridge is held within the cartridge receptacle; and a first magnetic coupling configured to magnetically secure the cartridge in the cartridge receptacle; and a second magnetic coupling configured to magnetically couple the vaporizer to a charger.

[0039] For example, a vaporizer apparatus may include: a cartridge having: an elongate and transparent storage compartment holding a liquid vaporizable material, wherein the elongate and transparent storage compartment comprises a distal end and a proximal end; an opaque mouthpiece at the proximal end of the elongate and transparent storage compartment; a pair of electrical contacts at a distal end of the cartridge; a heater at the distal end of the elongate and transparent storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and a channel within the elongate and transparent storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the elongate and transparent storage compartment, wherein the channel is visible through the elongate and transparent storage compartment, further wherein the channel forms a fluid connection between the heating chamber and the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled; and a vaporizer, the vaporizer having: an elongate body having a distal end and a proximal end; a cartridge receptacle formed at the proximal end of the elongate body, wherein the cartridge receptacle has a proximal-facing opening into the distal end of the elongate body, further wherein the cartridge receptacle comprises a proximal edge around the distal-facing opening; an window though a side of the cartridge receptacle into the cartridge receptacle so that at least a portion of the elongate and transparent storage compartment and the channel is visible through the window when the cartridge is held within the cartridge receptacle; a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to the pair of electrical contacts at the distal end of the cartridge when the cartridge is held within the cartridge

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receptacle; and a first magnetic coupling configured to magnetically secure the cartridge in the cartridge receptacle; and a second magnetic coupling at a distal end of the vaporizer configured to magnetically couple the vaporizer to a charger.

[0040] In general the notch (e.g., cut-out region) on the window in the side of the elongate and opaque body may be any appropriate shape, including a rectangular, triangular, semi-circular, or oval (or any combination of these) cutout region, and the two may match or be different.

[0041] The channel within the elongate and transparent storage compartment may be visible through the window when the cartridge is housed within the cartridge receptacle.

[0042] Also described herein are cartridges in which the arrangement of contacts (e.g., between the cartridge and the vaporizer, are configured within a particular spacing regime to optimize the electrical and mechanical connection between the two, even when the cartridge is held within the user's mouth, and not supported (e.g., by a hand) at the more distal end region.

[0043] For example, described herein are cartridge devices holding a vaporizable material for securely coupling with an electronic inhalable aerosol device. A device may include: a mouthpiece; a fluid storage compartment holding a vaporizable material; a base configured to fit into a rectangular opening that is between 13-14 mm deep, 4.5-5.5 mm wide, and 13-14 mm long, the base having a bottom surface comprising a first electrical contact and a second electrical contact, a first locking gap on a first lateral surface of the base, and a second locking gap on a second lateral surface of the base that is opposite first lateral surface.

[0044] A cartridge device holding a vaporizable material for securely coupling with an electronic inhalable aerosol device may include: a mouthpiece; a fluid storage compartment holding a vaporizable material; a base configured to fit into a rectangular opening that is between 13-14 mm deep, 4.5-5.5 mm wide, and 13-14 mm long, the base having a length of at least 10 mm, and a bottom surface comprising a first electrical contact and a second electrical contact, a first locking gap on a first lateral surface of the base positioned between 3-4 mm above the bottom surface, and a second locking gap on a second lateral surface of the base that is opposite first lateral surface.

[0045] In some variations, the device may further comprise a body that comprises at least one of: a power source, a printed circuit board, a switch, and a temperature regulator. The device may further comprise a temperature regulator in communication with a temperature sensor. The

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temperature sensor may be the heater. The power source may be rechargeable. The power source may be removable. The oven may further comprise an access lid. The vapor forming medium may comprise tobacco. The vapor forming medium may comprise a botanical. The vapor forming medium may be heated in the oven chamber wherein the vapor forming medium may comprise a humectant to produce the vapor, wherein the vapor comprises a gas phase humectant. The vapor may be mixed in the condensation chamber with air from the aeration vent to produce the inhalable aerosol comprising particle diameters of average size of about 1 micron. The vapor forming medium may be heated in the oven chamber, wherein the vapor is mixed in the condensation chamber with air from the aeration vent to produce the inhalable aerosol comprising particle diameters of average size of less than or equal to 0.9 micron. The vapor forming medium may be heated in the oven chamber, wherein the vapor is mixed in the condensation chamber with air from the aeration vent to produce the inhalable aerosol comprising particle diameters of average size of less than or equal to 0.8 micron. The vapor forming medium may be heated in the oven chamber, wherein the vapor is mixed in the condensation chamber with air from the aeration vent to produce the inhalable aerosol comprising particle diameters of average size of less than or equal to 0.7 micron. The vapor forming medium may be heated in the oven chamber, wherein the vapor is mixed in the condensation chamber with air from the aeration vent to produce the inhalable aerosol comprising particle diameters of average size of less than or equal to 0.6 micron. The vapor forming medium may be heated in the oven chamber, wherein the vapor is mixed in the condensation chamber with air from the aeration vent to produce the inhalable aerosol comprising particle diameters of average size of less than or equal to 0.5 micron.

[0046] In some variations, the humectant may comprise glycerol as a vapor-forming medium. The humectant may comprise vegetable glycerol. The humectant may comprise propylene glycol. The humectant may comprise a ratio of vegetable glycerol to propylene glycol. The ratio may be about 100:0 vegetable glycerol to propylene glycol. The ratio may be about 90:10 vegetable glycerol to propylene glycol. The ratio may be about 80:20 vegetable glycerol to propylene glycol. The ratio may be about 70:30 vegetable glycerol to propylene glycol. The ratio may be about 60:40 vegetable glycerol to propylene glycol. The ratio may be about 50:50 vegetable glycerol to propylene glycol. The humectant may comprise a flavorant. The vapor forming medium may be heated to its pyrolytic temperature. The vapor forming

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medium may heated to 200° C at most. The vapor forming medium may be heated to 160° C at most. The inhalable aerosol may be cooled to a temperature of about 50° - 70° C at most, before exiting the aerosol outlet of the mouthpiece.

[0047] Also described herein are methods for generating an inhalable aerosol. Such a method may comprise: providing an inhalable aerosol generating device wherein the device comprises: an oven comprising an oven chamber and a heater for heating a vapor forming medium in the oven chamber and for forming a vapor therein; a condenser comprising a condensation chamber in which the vapor forms the inhalable aerosol; an air inlet that originates a first airflow path that includes the oven chamber; and an aeration vent that originates a second airflow path that allows air from the aeration vent to join the first airflow path prior to or within the condensation chamber and downstream from the oven chamber thereby forming a joined path, wherein the joined path is configured to deliver the inhalable aerosol formed in the condensation chamber to a user.

[0048] The oven may be within a body of the device. The device may further comprise a mouthpiece, wherein the mouthpiece comprises at least one of the air inlet, the aeration vent, and the condenser. The mouthpiece may be separable from the oven. The mouthpiece may be integral to a body of the device, wherein the body comprises the oven. The method may further comprise a body that comprises the oven, the condenser, the air inlet, and the aeration vent. The mouthpiece may be separable from the body.

[0049] The oven chamber may comprise an oven chamber inlet and an oven chamber outlet, and the oven further comprises a first valve at the oven chamber inlet, and a second valve at the oven chamber outlet.

[0050] The vapor forming medium may comprise tobacco. The vapor forming medium may comprise a botanical. The vapor forming medium may be heated in the oven chamber wherein the vapor forming medium may comprise a humectant to produce the vapor, wherein the vapor comprises a gas phase humectant. The vapor may comprise particle diameters of average mass of about 1 micron. The vapor may comprise particle diameters of average mass of about 0.9 micron. The vapor may comprise particle diameters of average mass of about 0.8 micron. The vapor may comprise particle diameters of average mass of about 0.7 micron. The vapor may comprise particle diameters of average mass of about 0.6 micron. The vapor may comprise particle diameters of average mass of about 0.5 micron.

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[0051] In some variations, the humectant may comprise glycerol as a vapor-forming medium. The humectant may comprise vegetable glycerol. The humectant may comprise propylene glycol. The humectant may comprise a ratio of vegetable glycerol to propylene glycol. The ratio may be about 100:0 vegetable glycerol to propylene glycol. The ratio may be about 90:10 vegetable glycerol to propylene glycol. The ratio may be about 80:20 vegetable glycerol to propylene glycol. The ratio may be about 70:30 vegetable glycerol to propylene glycol. The ratio may be about 60:40 vegetable glycerol to propylene glycol. The ratio may be about 50:50 vegetable glycerol to propylene glycol. The humectant may comprise a flavorant. The vapor forming medium may be heated to its pyrolytic temperature. The vapor forming medium may heated to 200° C at most. The vapor forming medium may be heated to 160° C at most. The inhalable aerosol may be cooled to a temperature of about 50° - 70° C at most, before exiting the aerosol outlet of the mouthpiece.

[0052] The device may be user serviceable. The device may not be user serviceable.

[0053] A method for generating an inhalable aerosol may include: providing a vaporization device, wherein said device produces a vapor comprising particle diameters of average mass of about 1 micron or less, wherein said vapor is formed by heating a vapor forming medium in an oven chamber to a first temperature below the pyrolytic temperature of said vapor forming medium, and cooling said vapor in a condensation chamber to a second temperature below the first temperature, before exiting an aerosol outlet of said device.

[0054] A method of manufacturing a device for generating an inhalable aerosol may include: providing said device comprising a mouthpiece comprising an aerosol outlet at a first end of the device; an oven comprising an oven chamber and a heater for heating a vapor forming medium in the oven chamber and for forming a vapor therein, a condenser comprising a condensation chamber in which the vapor forms the inhalable aerosol, an air inlet that originates a first airflow path that includes the oven chamber and then the condensation chamber, an aeration vent that originates a second airflow path that joins the first airflow path prior to or within the condensation chamber after the vapor is formed in the oven chamber, wherein the joined first airflow path and second airflow path are configured to deliver the inhalable aerosol formed in the condensation chamber through the aerosol outlet of the mouthpiece to a user.

[0055] The method may further comprise providing the device comprising a power source or battery, a printed circuit board, a temperature regulator or operational switches.

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[0056] A device for generating an inhalable aerosol may comprise a mouthpiece comprising an aerosol outlet at a first end of the device and an air inlet that originates a first airflow path; an oven comprising an oven chamber that is in the first airflow path and includes the oven chamber and a heater for heating a vapor forming medium in the oven chamber and for forming a vapor therein; a condenser comprising a condensation chamber in which the vapor forms the inhalable aerosol; and an aeration vent that originates a second airflow path that allows air from the aeration vent to join the first airflow path prior to or within the condensation chamber and downstream from the oven chamber thereby forming a joined path, wherein the joined path is configured to deliver the inhalable aerosol formed in the condensation chamber through the aerosol outlet of the mouthpiece to a user.

[0057] A device for generating an inhalable aerosol may comprise: a mouthpiece comprising an aerosol outlet at a first end of the device, an air inlet that originates a first airflow path, and an aeration vent that originates a second airflow path that allows air from the aeration vent to join the first airflow path; an oven comprising an oven chamber that is in the first airflow path and includes the oven chamber and a heater for heating a vapor forming medium in the oven chamber and for forming a vapor therein; and a condenser comprising a condensation chamber in which the vapor forms the inhalable aerosol and wherein air from the aeration vent joins the first airflow path prior to or within the condensation chamber and downstream from the oven chamber thereby forming a joined path, wherein the joined path is configured to deliver the inhalable aerosol through the aerosol outlet of the mouthpiece to a user.

[0058] A device for generating an inhalable aerosol may comprise: a device body comprising a cartridge receptacle; a cartridge comprising: a fluid storage compartment, and a channel integral to an exterior surface of the cartridge, and an air inlet passage formed by the channel and an internal surface of the cartridge receptacle when the cartridge is inserted into the cartridge receptacle; wherein the channel forms a first side of the air inlet passage, and an internal surface of the cartridge receptacle forms a second side of the air inlet passage.

[0059] A device for generating an inhalable aerosol may comprise: a device body comprising a cartridge receptacle; a cartridge comprising: a fluid storage compartment, and a channel integral to an exterior surface of the cartridge, and an air inlet passage formed by the channel and an internal surface of the cartridge receptacle when the cartridge is inserted into the cartridge

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receptacle; wherein the channel forms a first side of the air inlet passage, and an internal surface of the cartridge receptacle forms a second side of the air inlet passage.

[0060] The channel may comprise at least one of a groove, a trough, a depression, a dent, a furrow, a trench, a crease, and a gutter. The integral channel may comprise walls that are either recessed into the surface or protrude from the surface where it is formed. The internal side walls of the channel may form additional sides of the air inlet passage. The cartridge may further comprise a second air passage in fluid communication with the air inlet passage to the fluid storage compartment, wherein the second air passage is formed through the material of the cartridge. The cartridge may further comprise a heater. The heater may be attached to a first end of the cartridge.

[0061] The heater may comprise a heater chamber, a first pair of heater contacts, a fluid wick, and a resistive heating element in contact with the wick, wherein the first pair of heater contacts comprise thin plates affixed about the sides of the heater chamber, and wherein the fluid wick and resistive heating element are suspended there between. The first pair of heater contacts may further comprise a formed shape that comprises a tab having a flexible spring value that extends out of the heater to couple to complete a circuit with the device body. The first pair of heater contacts may be a heat sink that absorbs and dissipates excessive heat produced by the resistive heating element. The first pair of heater contacts may contact a heat shield that protects the heater chamber from excessive heat produced by the resistive heating element. The first pair of heater contacts may be press-fit to an attachment feature on the exterior wall of the first end of the cartridge. The heater may enclose a first end of the cartridge and a first end of the fluid storage compartment. The heater may comprise a first condensation chamber. The heater may comprise more than one first condensation chamber. The first condensation chamber may be formed along an exterior wall of the cartridge. The cartridge may further comprise a mouthpiece. The mouthpiece may be attached to a second end of the cartridge. The mouthpiece may comprise a second condensation chamber. The mouthpiece may comprise more than one second condensation chamber. The second condensation chamber may be formed along an exterior wall of the cartridge.

[0062] The cartridge may comprise a first condensation chamber and a second condensation chamber. The first condensation chamber and the second condensation chamber may be in fluid communication. The mouthpiece may comprise an aerosol outlet in fluid communication with

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the second condensation chamber. The mouthpiece may comprise more than one aerosol outlet in fluid communication with more than one the second condensation chamber. The mouthpiece may enclose a second end of the cartridge and a second end of the fluid storage compartment.

[0063] The device may comprise an airflow path comprising an air inlet passage, a second air passage, a heater chamber, a first condensation chamber, a second condensation chamber, and an aerosol outlet. The airflow path may comprise more than one air inlet passage, a heater chamber, more than one first condensation chamber, more than one second condensation chamber, more than one second condensation chamber, and more than one aerosol outlet. The heater may be in fluid communication with the fluid storage compartment. The fluid storage compartment may be capable of retaining condensed aerosol fluid. The condensed aerosol fluid may comprise a nicotine formulation. The condensed aerosol fluid may comprise a humectant. The humectant may comprise propylene glycol. The humectant may comprise vegetable glycerin.

[0064] The cartridge may be detachable. The cartridge may be receptacle and the detachable cartridge forms a separable coupling. The separable coupling may comprise a friction assembly, a snap-fit assembly or a magnetic assembly. The cartridge may comprise a fluid storage compartment, a heater affixed to a first end with a snap-fit coupling, and a mouthpiece affixed to a second end with a snap-fit coupling.

[0065] A device for generating an inhalable aerosol may comprise: a device body comprising a cartridge receptacle for receiving a cartridge; wherein an interior surface of the cartridge receptacle forms a first side of an air inlet passage when a cartridge comprising a channel integral to an exterior surface is inserted into the cartridge receptacle, and wherein the channel forms a second side of the air inlet passage.

[0066] A device for generating an inhalable aerosol may comprise: a device body comprising a cartridge receptacle for receiving a cartridge; wherein the cartridge receptacle comprises a channel integral to an interior surface and forms a first side of an air inlet passage when a cartridge is inserted into the cartridge receptacle, and wherein an exterior surface of the cartridge forms a second side of the air inlet passage.

[0067] A cartridge for a device for generating an inhalable aerosol may include: a fluid storage compartment; a channel integral to an exterior surface, wherein the channel forms a first side of an air inlet passage; and wherein an internal surface of a cartridge receptacle in the device

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forms a second side of the air inlet passage when the cartridge is inserted into the cartridge receptacle.

[0068] A cartridge for a device for generating an inhalable aerosol may comprise: a fluid storage compartment, wherein an exterior surface of the cartridge forms a first side of an air inlet channel when inserted into a device body comprising a cartridge receptacle, and wherein the cartridge receptacle further comprises a channel integral to an interior surface, and wherein the channel forms a second side of the air inlet passage.

[0069] The cartridge may further comprise a second air passage in fluid communication with the channel, wherein the second air passage is formed through the material of the cartridge from an exterior surface of the cartridge to the fluid storage compartment.

[0070] The cartridge may comprise at least one of: a groove, a trough, a depression, a dent, a furrow, a trench, a crease, and a gutter. The integral channel may comprise walls that are either recessed into the surface or protrude from the surface where it is formed. The internal side walls of the channel may form additional sides of the air inlet passage.

[0071] A device for generating an inhalable aerosol may comprise: a cartridge comprising; a fluid storage compartment; a heater affixed to a first end comprising; a first heater contact, a resistive heating element affixed to the first heater contact; a device body comprising; a cartridge receptacle for receiving the cartridge; a second heater contact adapted to receive the first heater contact and to complete a circuit; a power source connected to the second heater contact; a printed circuit board (PCB) connected to the power source and the second heater contact; wherein the PCB is configured to detect the absence of fluid based on the measured resistance of the resistive heating element, and turn off the device.

[0072] The printed circuit board (PCB) may comprise a microcontroller; switches; circuitry comprising a reference resister; and an algorithm comprising logic for control parameters; wherein the microcontroller cycles the switches at fixed intervals to measure the resistance of the resistive heating element relative to the reference resistor, and applies the algorithm control parameters to control the temperature of the resistive heating element.

[0073] The micro-controller may instruct the device to turn itself off when the resistance exceeds the control parameter threshold indicating that the resistive heating element is dry.

[0074] A cartridge for a device for generating an inhalable aerosol may comprise: a fluid storage compartment; a heater affixed to a first end comprising: a heater chamber, a first pair of

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heater contacts, a fluid wick, and a resistive heating element in contact with the wick; wherein the first pair of heater contacts comprise thin plates affixed about the sides of the heater chamber, and wherein the fluid wick and resistive heating element are suspended there between.

[0075] The first pair of heater contacts may further comprise: a formed shape that comprises a tab having a flexible spring value that extends out of the heater to complete a circuit with the device body. The heater contacts may be configured to mate with a second pair of heater contacts in a cartridge receptacle of the device body to complete a circuit. The first pair of heater contacts may also be a heat sink that absorbs and dissipates excessive heat produced by the resistive heating element. The first pair of heater contacts may be a heat shield that protect the heater chamber from excessive heat produced by the resistive heating element.

[0076] A cartridge for a device for generating an inhalable aerosol may comprise: a heater comprising; a heater chamber, a pair of thin plate heater contacts therein, a fluid wick positioned between the heater contacts, and a resistive heating element in contact with the wick; wherein the heater contacts each comprise a fixation site wherein the resistive heating element is tensioned therebetween.

[0077] A cartridge for a device for generating an inhalable aerosol may comprise a heater, wherein the heater is attached to a first end of the cartridge.

[0078] The heater may enclose a first end of the cartridge and a first end of the fluid storage compartment. The heater may comprise more than one first condensation chamber. The heater may comprise a first condensation chamber. The condensation chamber may be formed along an exterior wall of the cartridge.

[0079] A cartridge for a device for generating an inhalable aerosol may comprise a fluid storage compartment; and a mouthpiece, wherein the mouthpiece is attached to a second end of the cartridge.

[0080] The mouthpiece may enclose a second end of the cartridge and a second end of the fluid storage compartment. The mouthpiece may comprise a second condensation chamber. The mouthpiece may comprise more than one second condensation chamber. The second condensation chamber may be formed along an exterior wall of the cartridge.

[0081] A cartridge for a device for generating an inhalable aerosol may comprise: a fluid storage compartment; a heater affixed to a first end; and a mouthpiece affixed to a second end;

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wherein the heater comprises a first condensation chamber and the mouthpiece comprises a second condensation chamber.

[0082] The heater may comprise more than one first condensation chamber and the mouthpiece comprises more than one second condensation chamber. The first condensation chamber and the second condensation chamber may be in fluid communication. The mouthpiece may comprise an aerosol outlet in fluid communication with the second condensation chamber. The mouthpiece may comprise two to more aerosol outlets. The cartridge may meet ISO recycling standards. The cartridge may meet ISO recycling standards for plastic waste.

[0083] A device for generating an inhalable aerosol may comprise: a device body comprising a cartridge receptacle; and a detachable cartridge; wherein the cartridge receptacle and the detachable cartridge form a separable coupling, wherein the separable coupling comprises a friction assembly, a snap-fit assembly or a magnetic assembly.

[0084] A method of fabricating a device for generating an inhalable aerosol may comprise: providing a device body comprising a cartridge receptacle; and providing a detachable cartridge; wherein the cartridge receptacle and the detachable cartridge form a separable coupling comprising a friction assembly, a snap-fit assembly or a magnetic assembly.

[0085] A method of fabricating a cartridge for a device for generating an inhalable aerosol may comprise: providing a fluid storage compartment; affixing a heater to a first end with a snap-fit coupling; and affixing a mouthpiece to a second end with a snap-fit coupling.

[0086] A cartridge for a device for generating an inhalable aerosol with an airflow path may include: a channel comprising a portion of an air inlet passage; a second air passage in fluid communication with the channel; a heater chamber in fluid communication with the second air passage; a first condensation chamber in fluid communication with the heater chamber; a second condensation chamber in fluid communication with the first condensation chamber; and an aerosol outlet in fluid communication with second condensation chamber.

[0087] A cartridge for a device for generating an inhalable aerosol may comprise: a fluid storage compartment; a heater affixed to a first end; and a mouthpiece affixed to a second end; wherein said mouthpiece comprises two or more aerosol outlets.

[0088] A system for providing power to an electronic device for generating an inhalable vapor may comprise; a rechargeable power storage device housed within the electronic device for generating an inhalable vapor; two or more pins that are accessible from an exterior surface

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of the electronic device for generating an inhalable vapor, wherein the charging pins are in electrical communication with the rechargeable power storage device; a charging cradle comprising two or more charging contacts configured to provided power to the rechargeable storage device, wherein the device charging pins are reversible such that the device is charged in the charging cradle for charging with a first charging pin on the device in contact a first charging contact on the charging cradle and a second charging pin on the device in contact with second charging contact on the charging cradle and with the first charging pin on the device in contact with second charging contact on the charging cradle and the second charging pin on the device in contact with the first charging contact on the charging cradle.

[0089] The charging pins may be visible on an exterior housing of the device. The user may permanently disable the device by opening the housing. The user may permanently destroy the device by opening the housing.

[0090] Additional aspects and advantages of the present disclosure will become readily apparent to those skilled in this art from the following detailed description, wherein only illustrative embodiments of the present disclosure are shown and described. As will be realized, the present disclosure is capable of other and different embodiments, and its several details are capable of modifications in various obvious respects, all without departing from the disclosure. Accordingly, the drawings and description are to be regarded as illustrative in nature, and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

[0091] FIG. 1 is an illustrative cross-sectional view of an exemplary vaporization device.

[0092] FIG. 2 is an illustrative cross-sectional view of an exemplary vaporization device with various electronic features and valves.

[0093] FIG. 3 is an illustrative sectional view of another exemplary vaporization device comprising a condensation chamber, air inlet and aeration vent in the mouthpiece.

[0094] FIGS. 4A-4C is an illustrative example of an oven section of another exemplary vaporization device configuration with an access lid, comprising an oven having an air inlet, air outlet, and an additional aeration vent in the airflow pathway, after the oven.

[0095] FIG. 5 is an illustrative isometric view of an assembled inhalable aerosol device.

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[0096] FIGS. 6A-6D are illustrative arrangements and section views of the device body and sub-components.

[0097] FIG. 7A is an illustrative isometric view of an assembled cartridge.

[0098] FIG. 7B is an illustrative exploded isometric view of a cartridge assembly

[0099] FIG. 7C is a side section view of FIG. 3 illustrating the inlet channel, inlet hole and relative placement of the wick, resistive heating element, and heater contacts, and the heater chamber inside of the heater.

[0100] FIG. 8A is an illustrative end section view of an exemplary cartridge inside the heater.

[0101] FIG. 8B is an illustrative side view of the cartridge with the cap removed and heater shown in shadow / outline.

[0102] FIGS. 9A-9L are illustrative sequence of the assembly method for the cartridge.

[0103] FIGS. 10A-10C are illustrative sequences showing the airflow / vapor path for the cartridge.

[0104] FIGS. 11, 12, and 13 represent an illustrative assembly sequence for assembling the main components of the device.

[0105] FIG. 14 illustrates front, side and section views of the assembled inhalable aerosol device.

[0106] FIG. 15 is an illustrative view of an activated, assembled inhalable aerosol device.

[0107] FIGS. 16A-16C are representative illustrations of a charging device for the aerosol device and the application of the charger with the device.

[0108] FIGS. 17A and 17B are representative illustrations of a proportional-integral-derivative controller (PID) block diagram and circuit diagram representing the essential components in a device to control coil temperature.

[0109] FIG. 18 is a device with charging contacts visible from an exterior housing of the device.

[0110] FIG. 19 is an exploded view of a charging assembly of a device.

[0111] FIG. 20 is a detailed view of a charging assembly of a device.

[0112] FIG. 21 is a detailed view of charging pins in a charging assembly of a device.

[0113] FIG. 22 is a device in a charging cradle.

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[0114] FIG. 23 is a circuit provided on a PCB configured to permit a device to comprise reversible charging contacts.

[0115] FIGS. 24A and 24B show top and bottom perspective views, respectively of a cartridge device holding a vaporizable material for securely coupling with an electronic inhalable aerosol device as described herein.

[0116] FIGS. 25A and 25B show front a side views, respectively, of the cartridge of FIGS. 24A-24B.

[0117] FIG. 26A shows a section through a cartridge device holding a vaporizable material for securely coupling with an electronic inhalable aerosol device and indicates exemplary dimensions (in mm).

[0118] FIG. 26B shows a side view of the cartridge of FIG. 26A, indicating where the sectional view of FIG. 26A was taken.

[0119] FIGS. 27A and 27B show an exemplary vaporizer device without a cartridge attached. FIG. 27A is a side view and FIG. 27B shows a sectional view with exemplary dimensions of the rectangular opening for holding and making electrical contact with a cartridge.

[0120] FIG. 28A shows a perspective view of a vaporizer coupled to a cartridge as described herein.

[0121] FIG. 28B shows a side view of the vaporizer of FIG. 28A.

[0122] FIG. 28C shows a sectional view through the vaporizer of FIG. 28B taken through the dashed line.

[0123] FIG. 28D is an enlarged view of the region showing the electrical and mechanical connection between the cartridge and the vaporizer indicted by the circular region D.

[0124] FIGS. 29A-29H illustrate side profiles of alternative variations of cartridges as described herein.

[0125] FIG. 30 is an exploded view of one example of a cartridge, including a reservoir, for an electronic cigarette.

[0126] FIGS. 31A-31L show cartridges for use with a vaporizer device that each include an opaque mouthpiece that is secured over the proximal end of the transparent storage compartment, and one or more notches in the front side of the mouthpiece that exposes a region of the storage compartment beneath the mouthpiece. In FIGS. 32A-32L the central cannula passing through

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the storage compartment is visible through the notch and the region below the opaque mouthpiece.

[0127] FIG. 32 and FIGS. 33A-33E illustrate exemplary vaporizer apparatuses including a cartridge and a vaporizer; the cartridge is mated in a cartridge receptacle at the proximal end of a vaporizer. The cartridge has an opaque mouthpiece over a storage compartment holding a vaporizable material; the inside of the storage compartment is visible through the storage compartment and a notch in the mouthpiece that mates with a notch through the cartridge receptacle at the proximal end of the vaporizer. FIG. 32 is a perspective front view of the apparatus. FIG. 33A is a top view of the proximal end, showing the mouthpiece. FIG. 33B is a bottom view of the distal end. FIGS. 33C-33E are front, side and back views, respectively, of the apparatus.

[0128] FIGS. 34A-34L illustrate examples of vaporizer devices similar to that shown in FIG. 33A-33F, in which the notched regions of the cartridge and the vaporizer are different, but provide a window into the inside of the storage compartment, showing the central cannula and the level of any fluid vaporizable material therein.

DETAILED DESCRIPTION

[0129] Provided herein are systems and methods for generating a vapor from a material. The vapor may be delivered for inhalation by a user. The material may be a solid, liquid, powder, solution, paste, gel, or any a material with any other physical consistency. The vapor may be delivered to the user for inhalation by a vaporization device. The vaporization device may be a handheld vaporization device. The vaporization device may be held in one hand by the user.

[0130] The vaporization device may comprise one or more heating elements the heating element may be a resistive heating element. The heating element may heat the material such that the temperature of the material increases. Vapor may be generated as a result of heating the material. Energy may be required to operate the heating element, the energy may be derived from a battery in electrical communication with the heating element. Alternatively a chemical reaction (e.g., combustion or other exothermic reaction) may provide energy to the heating element.

[0131] One or more aspects of the vaporization device may be designed and/or controlled in order to deliver a vapor with one or more specified properties to the user. For example, aspects

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of the vaporization device that may be designed and/or controlled to deliver the vapor with specified properties may comprise the heating temperature, heating mechanism, device air inlets, internal volume of the device, and/or composition of the material.

[0132] In some cases, a vaporization device may have an "atomizer" or "cartomizer" configured to heat an aerosol forming solution (e.g., vaporizable material). The aerosol forming solution may comprise glycerin and/or propylene glycol. The vaporizable material may be heated to a sufficient temperature such that it may vaporize.

[0133] An atomizer may be a device or system configured to generate an aerosol. The atomizer may comprise a small heating element configured to heat and/or vaporize at least a portion of the vaporizable material and a wicking material that may draw a liquid vaporizable material in to the atomizer. The wicking material may comprise silica fibers, cotton, ceramic, hemp, stainless steel mesh, and/or rope cables. The wicking material may be configured to draw the liquid vaporizable material in to the atomizer without a pump or other mechanical moving part. A resistance wire may be wrapped around the wicking material and then connected to a positive and negative pole of a current source (e.g., energy source). The resistance wire may be a coil. When the resistance wire is activated the resistance wire (or coil) may have a temperature increase as a result of the current flowing through the resistive wire to generate heat. The heat may be transferred to at least a portion of the vaporizable material through conductive, convective, and/or radiative heat transfer such that at least a portion of the vaporizable material vaporizes.

[0134] Alternatively or in addition to the atomizer, the vaporization device may comprise a "cartomizer" to generate an aerosol from the vaporizable material for inhalation by the user. The cartomizer may comprise a cartridge and an atomizer. The cartomizer may comprise a heating element surrounded by a liquid-soaked poly-foam that acts as holder for the vaporiable material (e.g., the liquid). The cartomizer may be reusable, rebuildable, refillable, and/or disposable. The cartomizer may be used with a tank for extra storage of a vaporizable material.

[0135] Air may be drawn into the vaporization device to carry the vaporized aerosol away from the heating element, where it then cools and condenses to form liquid particles suspended in air, which may then be drawn out of the mouthpiece by the user.

[0136] The vaporization of at least a portion of the vaporizable material may occur at lower temperatures in the vaporization device compared to temperatures required to generate an

inhalable vapor in a cigarette. A cigarette may be a device in which a smokable material is burned to generate an inhalable vapor. The lower temperature of the vaporization device may result in less decomposition and/or reaction of the vaporized material, and therefore produce an aerosol with many fewer chemical components compared to a cigarette. In some cases, the vaporization device may generate an aerosol with fewer chemical components that may be harmful to human health compared to a cigarette. Additionally, the vaporization device aerosol particles may undergo nearly complete evaporation in the heating process, the nearly complete evaporation may yield an average particle size (e.g., diameter) value that may be smaller than the average particle size in tobacco or botanical based effluent.

[0137] A vaporization device may be a device configured to extract for inhalation one or more active ingredients of plant material, tobacco, and/or a botanical, or other herbs or blends. A vaporization device may be used with pure chemicals and/or humectants that may or may not be mixed with plant material. Vaporization may be alternative to burning (smoking) that may avoid the inhalation of many irritating and/or toxic carcinogenic by-products which may result from the pyrolytic process of burning tobacco or botanical products above 300° C. The vaporization device may operate at a temperature at or below 300° C.

[0138] A vaporizer (e.g., vaporization device) may not have an atomizer or cartomizer. Instead the device may comprise an oven. The oven may be at least partially closed. The oven may have a closable opening. The oven may be wrapped with a heating element, alternatively the heating element may be in thermal communication with the oven through another mechanism. A vaporizable material may be placed directly in the oven or in a cartridge fitted in the oven. The heating element in thermal communication with the oven may heat a vaporizable material mass in order to create a gas phase vapor. The heating element may heat the vaporizable material through conductive, convective, and/or radiative heat transfer. The vapor may be released to a vaporization chamber where the gas phase vapor may condense, forming an aerosol cloud having typical liquid vapor particles with particles having a diameter of average mass of approximately 1 micron or greater. In some cases the diameter of average mass may be approximately 0.1-1 micron.

[0139] A used herein, the term "vapor" may generally refer to a substance in the gas phase at a temperature lower than its critical point. The vapor may be condensed to a liquid or to a solid by increasing its pressure without reducing the temperature.

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[0140] As used herein, the term "aerosol" may generally refer to a colloid of fine solid particles or liquid droplets in air or another gas. Examples of aerosols may include clouds, haze, and smoke, including the smoke from tobacco or botanical products. The liquid or solid particles in an aerosol may have varying diameters of average mass that may range from monodisperse aerosols, producible in the laboratory, and containing particles of uniform size; to polydisperse colloidal systems, exhibiting a range of particle sizes. As the sizes of these particles become larger, they have a greater settling speed which causes them to settle out of the aerosol faster, making the appearance of the aerosol less dense and to shorten the time in which the aerosol will linger in air. Interestingly, an aerosol with smaller particles will appear thicker or denser because it has more particles. Particle number has a much bigger impact on light scattering than particle size (at least for the considered ranges of particle size), thus allowing for a vapor cloud with many more smaller particles to appear denser than a cloud having fewer, but larger particle sizes.

[0141] As used herein the term "humectant" may generally refer to as a substance that is used to keep things moist. A humectant may attract and retain moisture in the air by absorption, allowing the water to be used by other substances. Humectants are also commonly used in many tobaccos or botanicals and electronic vaporization products to keep products moist and as vapor-forming medium. Examples include propylene glycol, sugar polyols such as glycerol, glycerin, and honey.

[0142] Rapid Aeration

[0143] In some cases, the vaporization device may be configured to deliver an aerosol with a high particle density. The particle density of the aerosol may refer to the number of the aerosol droplets relative to the volume of air (or other dry gas) between the aerosol droplets. A dense aerosol may easily be visible to a user. In some cases the user may inhale the aerosol and at least a fraction of the aerosol particles may impinge on the lungs and/or mouth of the user. The user may exhale residual aerosol after inhaling the aerosol. When the aerosol is dense the residual aerosol may have sufficient particle density such that the exhaled aerosol is visible to the user. In some cases, a user may prefer the visual effect and/or mouth feel of a dense aerosol.

[0144] A vaporization device may comprise a vaporizable material. The vaporizable material may be contained in a cartridge or the vaporizable material may be loosely placed in one or more cavities the vaporization device. A heating element may be provided in the device to

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elevate the temperature of the vaporizable material such that at least a portion of the vaporizable material forms a vapor. The heating element may heat the vaporizable material by convective heat transfer, conductive heat transfer, and/or radiative heat transfer. The heating element may heat the cartridge and/or the cavity in which the vaporizable material is stored.

[0145] Vapor formed upon heating the vaporizable material may be delivered to the user. The vapor may be transported through the device from a first position in the device to a second position in the device. In some cases, the first position may be a location where at least a portion of the vapor was generated, for example, the cartridge or cavity or an area adjacent to the cartridge or cavity. The second position may be a mouthpiece. The user may suck on the mouthpiece to inhale the vapor.

[0146] At least a fraction of the vapor may condense after the vapor is generated and before the vapor is inhaled by the user. The vapor may condense in a condensation chamber. The condensation chamber may be a portion of the device that the vapor passes through before delivery to the user. In some cases, the device may include at least one aeration vent, placed in the condensation chamber of the vaporization device. The aeration vent may be configured to introduce ambient air (or other gas) into the vaporization chamber. The air introduced into the vaporization chamber may have a temperature lower than the temperature of a gas and/or gas/vapor mixture in the condensation chamber. Introduction of the relatively lower temperature gas into the vaporization chamber may provide rapid cooling of the heated gas vapor mixture that was generated by heating the vaporizable material. Rapid cooling of the gas vapor mixture may generate a dense aerosol comprising a high concentration of liquid droplets having a smaller diameter and/or smaller average mass compared to an aerosol that is not rapidly cooled prior to inhalation by the user.

[0147] An aerosol with a high concentration of liquid droplets having a smaller diameter and/or smaller average mass compared to an aerosol that is not rapidly cooled prior to inhalation by the user may be formed in a two-step process. The first step may occur in the oven chamber where the vaporizable material (e.g., tobacco and/or botanical and humectant blend) may be heated to an elevated temperature. At the elevated temperature, evaporation may happen faster than at room temperature and the oven chamber may fill with the vapor phase of the humectants. The humectant may continue to evaporate until the partial pressure of the humectant is equal to

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the saturation pressure. At this point, the gas is said to have a saturation ratio of 1 (S = Ppartial/Psat).

[0148] In the second step, the gas (e.g., vapor and air) may exit the oven and enter a condenser or condensation chamber and begin to cool. As the gas phase vapor cools, the saturation pressure may decrease. As the saturation pressure decreases, the saturation ratio may increase and the vapor may begin to condense, forming droplets. In some devices, with the absence of added cooling aeration, the cooling may be relatively slower such that high saturation pressures may not be reached, and the droplets that form in the devices without added cooling aeration may be relatively larger and fewer in numbers. When cooler air is introduced, a temperature gradient may be formed between the cooler air and the relatively warmer gas in the device. Mixing between the cooler air and the relatively warmer gas in a confined space inside of the vaporization device may lead to rapid cooling. The rapid cooling may generate high saturation ratios, small particles, and high concentrations of smaller particles, forming a thicker, denser vapor cloud compared to particles generated in a device without the aeration vents.

[0149] For the purpose of this disclosure, when referring to ratios of humectants such as vegetable glycerol or propylene glycol, "about" means a variation of 5%, 10%, 20% or 25% depending on the embodiment.

[0150] For the purpose of this disclosure, when referring to a diameter of average mass in particle sizes, "about" means a variation of 5%, 10%, 20% or 25% depending on the embodiment.

[0151] A vaporization device configured to rapidly cool a vapor may comprise: a mouthpiece comprising an aerosol outlet at a first end of the device; an oven comprising an oven chamber and a heater for heating a vapor forming medium in the oven chamber and for forming a vapor therein; a condenser comprising a condensation chamber in which the vapor forms the inhalable aerosol; an air inlet that originates a first airflow path that includes the oven chamber and then the condensation chamber, an aeration vent that originates a second airflow path that joins the first airflow path prior to or within the condensation chamber after the vapor is formed in the oven chamber, wherein the joined first airflow path and second airflow path are configured to deliver the inhalable aerosol formed in the condensation chamber through the aerosol outlet of the mouthpiece to a user.

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[0152] In some embodiments, the oven is within a body of the device. The oven chamber may comprise an oven chamber inlet and an oven chamber outlet. The oven may further comprise a first valve at the oven chamber inlet, and a second valve at the oven chamber outlet.

[0153] The oven may be contained within a device housing. In some cases the body of the device may comprise the aeration vent and/or the condenser. The body of the device may comprise one or more air inlets. The body of the device may comprise a housing that holds and/or at least partially contains one or more elements of the device.

[0154] The mouthpiece may be connected to the body. The mouthpiece may be connected to the oven. The mouthpiece may be connected to a housing that at least partially encloses the oven. In some cases, the mouthpiece may be separable from the oven, the body, and/or the housing that at least partially encloses the oven. The mouthpiece may comprise at least one of the air inlet, the aeration vent, and the condenser. The mouthpiece may be integral to the body of the device. The body of the device may comprise the oven.

[0155] In some cases, the one or more aeration vents may comprise a valve. The valve may regulate a flow rate of air entering the device through the aeration vent. The valve may be controlled through a mechanical and/or electrical control system.

[0156] A vaporization device configured to rapidly cool a vapor may comprise: a body, a mouthpiece, an aerosol outlet, a condenser with a condensation chamber, a heater, an oven with an oven chamber, a primary airflow inlet, and at least one aeration vent provided in the body, downstream of the oven, and upstream of the mouthpiece.

[0157] FIG. 1 shows an example of a vaporization device configured to rapidly cool a vapor. The device 100, may comprise a body 101. The body may house and/or integrate with one or more components of the device. The body may house and/or integrate with a mouthpiece 102. The mouthpiece 102 may have an aerosol outlet 122. A user may inhale the generated aerosol through the aerosol outlet 122 on the mouthpiece 102. The body may house and/or integrate with an oven region 104. The oven region 104 may comprise an oven chamber where vapor forming medium 106 may be placed. The vapor forming medium may include tobacco and/or botanicals, with or without a secondary humectant. In some cases the vapor forming medium may be contained in a removable and/or refillable cartridge.

[0158] Air may be drawn into the device through a primary air inlet 121. The primary air inlet 121 may be on an end of the device 100 opposite the mouthpiece 102. Alternatively, the

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primary air inlet 121 may be adjacent to the mouthpiece 102. In some cases, a pressure drop sufficient to pull air into the device through the primary air inlet 121 may be due to a user puffing on the mouthpiece 102.

[0159] The vapor forming medium (e.g., vaporizable material) may be heated in the oven chamber by a heater 105, to generate elevated temperature gas phases (vapor) of the tobacco or botanical and humectant / vapor forming components. The heater 105 may transfer heat to the vapor forming medium through conductive, convective, and/or radiative heat transfer. The generated vapor may be drawn out of the oven region and into the condensation chamber 103a, of the condenser 103 where the vapors may begin to cool and condense into micro-particles or droplets suspended in air, thus creating the initial formation of an aerosol, before being drawn out of the mouthpiece through the aerosol outlet 122.

[0160] In some cases, relatively cooler air may be introduced into the condensation chamber 103a, through an aeration vent 107 such that the vapor condenses more rapidly compared to a vapor in a device without the aeration vent 107. Rapidly cooling the vapor may create a denser aerosol cloud having particles with a diameter of average mass of less than or equal to about 1 micron, and depending on the mixture ratio of the vapor-forming humectant, particles with a diameter of average mass of less than or equal to about 0.5 micron

[0161] Also described herein are devices for generating an inhalable aerosol said device comprising a body with a mouthpiece at one end, an attached body at the other end comprising a condensation chamber, a heater, an oven, wherein the oven comprises a first valve in the airflow path at the primary airflow inlet of the oven chamber, and a second valve at the outlet end of the oven chamber, and at least one aeration vent provided in the body, downstream of the oven, and upstream of the mouthpiece.

[0162] FIG. 2 shows a diagram of an alternative embodiment of the vaporization device 200. The vaporization device may have a body 201. The body 201 may integrate with and/or contain one or more components of the device. The body may integrate with or be connected to a mouthpiece 202

[0163] The body may comprise an oven region 204, with an oven chamber 204a having a first constricting valve 208 in the primary air inlet of the oven chamber and a second constricting valve 209 at the oven chamber outlet. The oven chamber 204a may be sealed with a tobacco or botanical and/or humectant / vapor forming medium 206 therein. The seal may be an air tight

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and/or liquid tight seal. The heater may be provided to the oven chamber with a heater 205. The heater 205 may be in thermal communication with the oven, for example the heater may be surrounding the oven chamber during the vaporization process. Heater may contact the oven. The heater may be wrapped around the oven. Before inhalation and before air is drawn in through a primary air inlet 221, pressure may build in the sealed oven chamber as heat is continually added. The pressure may build due to a phase change of the vaporizable material. Elevated temperature gas phases (vapor) of the tobacco or botanical and humectant / vapor forming components may be achieved by continually adding heat to the oven. This heated pressurization process may generate even higher saturation ratios when the valves 208, 209 are opened during inhalation. The higher saturation ratios may cause relatively higher particle concentrations of gas phase humectant in the resultant aerosol. When the vapor is drawn out of the oven region and into the condensation chamber 203a of the condenser 203, for example by inhalation by the user, the gas phase humectant vapors may be exposed to additional air through an aeration vent 207, and the vapors may begin to cool and condense into droplets suspended in air. As described previously the aerosol may be drawn through the mouthpiece 222 by the user. This condensation process may be further refined by adding an additional valve 210, to the aeration vent 207 to further control the air-vapor mixture process.

[0164] FIG. 2 also illustrates an exemplary embodiment of the additional components which would be found in a vaporizing device, including a power source or battery 211, a printed circuit board 212, a temperature regulator 213, and operational switches (not shown), housed within an internal electronics housing 214, to isolate them from the damaging effects of the moisture in the vapor and/or aerosol. The additional components may be found in a vaporizing device that may or may not comprise an aeration vent as described above.

[0165] In some embodiments of the vaporization device, components of the device are user serviceable, such as the power source or battery. These components may be replaceable or rechargeable.

[0166] Also described herein are devices for generating an inhalable aerosol said device comprising a first body, a mouthpiece having an aerosol outlet, a condensation chamber within a condenser and an airflow inlet and channel, an attached second body, comprising a heater and oven with an oven chamber, wherein said airflow channel is upstream of the oven and the

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mouthpiece outlet to provide airflow through the device, across the oven, and into the condensation chamber where an auxiliary aeration vent is provided.

[0167] FIG. 3 shows a section view of a vaporization device 300. The device 300 may comprise a body 301. The body may be connected to or integral with a mouthpiece 302 at one end. The mouthpiece may comprise a condensation chamber 303a within a condenser section 303 and an airflow inlet 321 and air channel 323. The device body may comprise a proximally located oven 304 comprising an oven chamber 304a. The oven chamber may be in the body of the device. A vapor forming medium 306 (e.g., vaporizable material) comprising tobacco or botanical and humectant vapor forming medium may be placed in the oven. The vapor forming medium may be in direct contact with an air channel 323 from the mouthpiece. The tobacco or botanical may be heated by heater 305 surrounding the oven chamber, to generate elevated temperature gas phases (vapor) of the tobacco or botanical and humectant / vapor forming components and air drawn in through a primary air inlet 321, across the oven, and into the condensation chamber 303a of the condenser region 303 due to a user puffing on the mouthpiece. Once in the condensation chamber where the gas phase humectant vapors begin to cool and condense into droplets suspended in air, additional air is allowed to enter through aeration vent 307, thus, once again creating a denser aerosol cloud having particles with a diameter of average mass of less than a typical vaporization device without an added aeration vent, before being drawn out of the mouthpiece through the aerosol outlet 322.

[0168] The device may comprises a mouthpiece comprising an aerosol outlet at a first end of the device and an air inlet that originates a first airflow path; an oven comprising an oven chamber that is in the first airflow path and includes the oven chamber and a heater for heating a vapor forming medium in the oven chamber and for forming a vapor therein, a condenser comprising a condensation chamber in which the vapor forms the inhalable aerosol, an aeration vent that originates a second airflow path that allows air from the aeration vent to join the first airflow path prior to or within the condensation chamber and downstream from the oven chamber thereby forming a joined path, wherein the joined path is configured to deliver the inhalable aerosol formed in the condensation chamber through the aerosol outlet of the mouthpiece to a user.

[0169] The device may comprise a mouthpiece comprising an aerosol outlet at a first end of the device, an air inlet that originates a first airflow path, and an aeration vent that originates a

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second airflow path that allows air from the aeration vent to join the first airflow path; an oven comprising an oven chamber that is in the first airflow path and includes the oven chamber and a heater for heating a vapor forming medium in the oven chamber and for forming a vapor therein, a condenser comprising a condensation chamber in which the vapor forms the inhalable aerosol and wherein air from the aeration vent joins the first airflow path prior to or within the condensation chamber and downstream from the oven chamber thereby forming a joined path, wherein the joined path is configured to deliver the inhalable aerosol through the aerosol outlet of the mouthpiece to a user, as illustrated in exemplary FIG. 3.

[0170] The device may comprise a body with one or more separable components. For example, the mouthpiece may be separably attached to the body comprising the condensation chamber, a heater, and an oven, as illustrated in exemplary FIGS. 1 or 2.

[0171] The device may comprise a body with one or more separable components. For example, the mouthpiece may be separably attached to the body. The mouthpiece may comprise the condensation chamber, and may be attached to or immediately adjacent to the oven and which is separable from the body comprising a heater, and the oven, as illustrated in exemplary FIG. 3.

[0172] The at least one aeration vent may be located in the condensation chamber of the condenser, as illustrated in exemplary FIGS. 1, 2, or 3 . The at least one aeration vent may comprise a third valve in the airflow path of the at least one aeration vent, as illustrated in exemplary FIG. 2. The first, second and third valve is a check valve, a clack valve, a non-return valve, or a one-way valve. In any of the preceding variations, the first, second or third valve may be mechanically actuated, electronically actuated or manually actuated. One skilled in the art will recognize after reading this disclosure that this device may be modified in a way such that any one, or each of these openings or vents could be configured to have a different combination or variation of mechanisms as described to control airflow, pressure and temperature of the vapor created and aerosol being generated by these device configurations, including a manually operated opening or vent with or without a valve.

[0173] The device may further comprise at least one of: a power source, a printed circuit board, a switch, and a temperature regulator. Alternately, one skilled in the art would recognize that each configuration previously described will also accommodate said power source (battery), switch, printed circuit board, or temperature regulator as appropriate, in the body.

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[0174] The device may be disposable when the supply of pre-packaged aerosol-forming media is exhausted. Alternatively, the device may be rechargeable such that the battery may be rechargeable or replaceable, and /or the aerosol-forming media may be refilled, by the user/operator of the device. Still further, the device may be rechargeable such that the battery may be rechargeable or replaceable, and/or the operator may also add or refill a tobacco or botanical component, in addition to a refillable or replaceable aerosol-forming media to the device.

[0175] As illustrated in FIGS. 1, 2 or 3, the vaporization device may comprise tobacco or a botanical heated in said oven chamber, wherein said tobacco or botanical further comprises humectants to produce an aerosol comprising gas phase components of the humectant and tobacco or botanical. The gas phase humectant and tobacco or botanical vapor produced by said heated aerosol forming media 106, 206, 306 may further be mixed with air from a special aeration vent 107, 207, 307 after exiting the oven area 104, 204, 304 and entering a condensation chamber 103a, 203a, 303a to cool and condense said gas phase vapors to produce a far denser, thicker aerosol comprising more particles than would have otherwise been produced without the extra cooling air, with a diameter of average mass of less than or equal to about 1 micron.

[0176] Each aerosol configuration produced by mixing the gas phase vapors with the cool air may comprise a different range of particles, for example; with a diameter of average mass of less than or equal to about 0.9 micron; less than or equal to about 0.8 micron; less than or equal to about 0.7 micron; less than or equal to about 0.6 micron; and even an aerosol comprising particle diameters of average mass of less than or equal to about 0.5 micron.

[0177] The possible variations and ranges of aerosol density are great in that the possible number of combinations of temperature, pressure, tobacco or botanical choices and humectant selections are numerous. However, by excluding the tobacco or botanical choices and limiting the temperatures ranges and the humectant ratios to those described herein, the inventor has demonstrated that this device will produce a far denser, thicker aerosol comprising more particles than would have otherwise been produced without the extra cooling air, with a diameter of average mass of less than or equal to about 1 micron.

[0178] The humectant may comprise glycerol or vegetable glycerol as a vapor-forming medium.

[0179] The humectant may comprise propylene glycol as a vapor-forming medium.

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[0180] In preferred embodiments, the humectant may comprise a ratio of vegetable glycerol to propylene glycol as a vapor-forming medium. The ranges of said ratio may vary between a ratio of about 100:0 vegetable glycerol to propylene glycol and a ratio of about 50:50 vegetable glycerol to propylene glycol. The difference in preferred ratios within the above stated range may vary by as little as 1, for example, said ratio may be about 99:1 vegetable glycerol to propylene glycol. However, more commonly said ratios would vary in increments of about 5, for example, about 95:5 vegetable glycerol to propylene glycol; or about 85:15 vegetable glycerol to propylene glycol; or about 55:45 vegetable glycerol to propylene glycol.

[0181] In a preferred embodiment the ratio for the vapor forming medium will be between the ratios of about 80:20 vegetable glycerol to propylene glycol, and about 60:40 vegetable glycerol to propylene glycol.

[0182] In a most preferred embodiment, the ratio for the vapor forming medium will be about 70:30 vegetable glycerol to propylene glycol.

[0183] In any of the preferred embodiments, the humectant may further comprise flavoring products. These flavorings may include enhancers comprising cocoa solids, licorice, tobacco or botanical extracts, and various sugars, to name but a few.

[0184] The tobacco or botanical may be heated in the oven up to its pyrolytic temperature, which as noted previously is most commonly measured in the range of 300 - 1000° C.

[0185] In preferred embodiments, the tobacco or botanical is heated to about 300° C at most. In other preferred embodiments, the tobacco or botanical is heated to about 200° C at most. In still other preferred embodiments, the tobacco or botanical is heated to about 160° C at most. It should be noted that in these lower temperature ranges (< 300° C), pyrolysis of tobacco or botanical does not typically occur, yet vapor formation of the tobacco or botanical components and flavoring products does occur. In addition, vapor formation of the components of the humectant, mixed at various ratios will also occur, resulting in nearly complete vaporization, depending on the temperature, since propylene glycol has a boiling point of about 180° - 190° C and vegetable glycerin will boil at approximately 280° - 290° C.

[0186] In still other preferred embodiments, the aerosol produced by said heated tobacco or botanical and humectant is mixed with air provided through an aeration vent.

[0187] In still other preferred embodiments, the aerosol produced by said heated tobacco or botanical and humectant mixed with air, is cooled to a temperature of about 50° - 70° C at most,

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and even as low as 35° C before exiting the mouthpiece, depending on the air temperature being mixed into the condensation chamber. In some embodiments, the temperature is cooled to about 35° - 55° C at most, and may have a fluctuating range of ± about 10° C or more within the overall range of about 35° - 70° C.

[0188] Also described herein are vaporization devices for generating an inhalable aerosol comprising a unique oven configuration, wherein said oven comprises an access lid and an auxiliary aeration vent located within the airflow channel immediately downstream of the oven and before the aeration chamber. In this configuration, the user may directly access the oven by removing the access lid, providing the user with the ability to recharge the device with vaporization material.

[0189] In addition, having the added aeration vent in the airflow channel immediately after the oven and ahead of the vaporization chamber provides the user with added control over the amount of air entering the aeration chamber downstream and the cooling rate of the aerosol before it enters the aeration chamber.

[0190] As noted in FIGS. 4A - 4C, the device 400 may comprise a body 401, having an air inlet 421 allowing initial air for the heating process into the oven region 404. After heating the tobacco or botanical, and humectant (heater not shown), the gas phase humectant vapor generated may travel down the airflow channel 423, passing the added aeration vent 407 wherein the user may selectively increase airflow into the heated vapor. The user may selectively increase and/or decrease the airflow to the heated vapor by controlling a valve in communication with the aeration vent 407. In some cases, the device may not have an aeration vent. Airflow into the heated vapor through the aeration vent may decrease the vapor temperature before exiting the airflow channel at the outlet 422, and increase the condensation rate and vapor density by decreasing the diameter of the vapor particles within the aeration chamber (not shown), thus producing a thicker, denser vapor compared to the vapor generated by a device without the aeration vent.. The user may also access the oven chamber 404a to recharge or reload the device 400, through an access lid 430 provided therein, making the device user serviceable. The access lid may be provided on a device with or without an aeration vent.

[0191] Provided herein is a method for generating an inhalable aerosol, the method comprising: providing an vaporization device, wherein said device produces a vapor comprising particle diameters of average mass of about 1 micron or less, wherein the vapor is formed by

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heating a vapor forming medium in an oven chamber of the device to a first temperature below the pyrolytic temperature of the vapor forming medium, and cooling the vapor in a condensation chamber to a temperature below the first temperature, before exiting an aerosol outlet of said device.

[0192] In some embodiments the vapor may be cooled by mixing relatively cooler air with the vapor in the condensation chamber during the condensation phase, after leaving the oven, where condensation of the gas phase humectants occurs more rapidly due to high saturation ratios being achieved at the moment of aeration, producing a higher concentration of smaller particles, with fewer by-products, in a denser aerosol, than would normally occur in a standard vaporization or aerosol generating device.

[0193] In some embodiments, formation of an inhalable aerosol is a two-step process. The first step occurs in the oven where the tobacco or botanical and humectant blend is heated to an elevated temperature. At the elevated temperature, evaporation happens faster than at room temperature and the oven chamber fills with the vapor phase of the humectants. The humectant will continue to evaporate until the partial pressure of the humectant is equal to the saturation pressure. At this point, the gas is said to have a saturation ratio of 1 ($S = P_{partial}/P_{sat}$).

[0194] In the second step, the gas leaves the oven chamber, passes to a condensation chamber in a condenser and begins to cool. As the gas phase vapor cools, the saturation pressure also goes down, causing the saturation ratio to rise, and the vapor to condensate, forming droplets. When cooling air is introduced, the large temperature gradient between the two fluids mixing in a confined space leads to very rapid cooling, causing high saturation ratios, small particles, and higher concentrations of smaller particles, forming a thicker, denser vapor cloud.

[0195] Provided herein is a method for generating an inhalable aerosol comprising: a vaporization device having a body with a mouthpiece at one end, and an attached body at the other end comprising; a condenser with a condensation chamber, a heater, an oven with an oven chamber, and at least one aeration vent provided in the body, downstream of the oven, and upstream of the mouthpiece, wherein tobacco or botanical comprising a humectant is heated in said oven chamber to produce a vapor comprising gas phase humectants.

[0196] As previously described, a vaporization device having an auxiliary aeration vent located in the condensation chamber capable of supplying cool air (relative to the heated gas components) to the gas phase vapors and tobacco or botanical components exiting the oven

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region, may be utilized to provide a method for generating a far denser, thicker aerosol comprising more particles than would have otherwise been produced without the extra cooling air, with a diameter of average mass of less than or equal to about 1 micron.

[0197] In another aspect, provided herein is a method for generating an inhalable aerosol comprising: a vaporization device, having a body with a mouthpiece at one end, and an attached body at the other end comprising: a condenser with a condensation chamber, a heater, an oven with an oven chamber, wherein said oven chamber further comprises a first valve in the airflow path at the inlet end of the oven chamber, and a second valve at the outlet end of the oven chamber; and at least one aeration vent provided in said body, downstream of the oven, and upstream of the mouthpiece wherein tobacco or botanical comprising a humectant is heated in said oven chamber to produce a vapor comprising gas phase humectants.

[0198] As illustrated in exemplary FIG. 2, by sealing the oven chamber 204a with a tobacco or botanical and humectant vapor forming medium 206 therein, and applying heat with the heater 205 during the vaporization process, before inhalation and air is drawn in through a primary air inlet 221, the pressure will build in the oven chamber as heat is continually added with an electronic heating circuit generated through the combination of the battery 211, printed circuit board 212, temperature regulator 213, and operator controlled switches (not shown), to generate even greater elevated temperature gas phase humectants (vapor) of the tobacco or botanical and humectant vapor forming components. This heated pressurization process generates even higher saturation ratios when the valves 208, 209 are opened during inhalation, which cause higher particle concentrations in the resultant aerosol, when the vapor is drawn out of the oven region and into the condensation chamber 203a, where they are again exposed to additional air through an aeration vent 207, and the vapors begin to cool and condense into droplets suspended in air, as described previously before the aerosol is withdrawn through the mouthpiece 222. The inventor also notes that this condensation process may be further refined by adding an additional valve 210, to the aeration vent 207 to further control the air-vapor mixture process.

[0199] In some embodiments of any one of the inventive methods, the first, second and/or third valve is a one-way valve, a check valve, a clack valve, or a non-return valve. The first, second and/or third valve may be mechanically actuated. The first, second and/or third valve may be electronically actuated. The first, second and/or third valve may be automatically actuated. The first, second and/or third valve may be manually actuated either directly by a user

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or indirectly in response to an input command from a user to a control system that actuates the first, second and/or third valve.

[0200] In other aspects of the inventive methods, said device further comprises at least one of: a power source, a printed circuit board, or a temperature regulator.

[0201] In any of the preceding aspects of the inventive method, one skilled in the art will recognize after reading this disclosure that this method may be modified in a way such that any one, or each of these openings or vents could be configured to have a different combination or variation of mechanisms or electronics as described to control airflow, pressure and temperature of the vapor created and aerosol being generated by these device configurations, including a manually operated opening or vent with or without a valve.

[0202] The possible variations and ranges of aerosol density are great in that the possible number of temperature, pressure, tobacco or botanical choices and humectant selections and combinations are numerous. However, by excluding the tobacco or botanical choices and limiting the temperatures to within the ranges and the humectant ratios described herein, the inventor has demonstrated a method for generating a far denser, thicker aerosol comprising more particles than would have otherwise been produced without the extra cooling air, with a diameter of average mass of less than or equal to 1 micron.

[0203] In some embodiments of the inventive methods, the humectant comprises a ratio of vegetable glycerol to propylene glycol as a vapor-forming medium. The ranges of said ratio will vary between a ratio of about 100:0 vegetable glycerol to propylene glycol and a ratio of about 50:50 vegetable glycerol to propylene glycol. The difference in preferred ratios within the above stated range may vary by as little as 1, for example, said ratio may be about 99:1 vegetable glycerol to propylene glycol. However, more commonly said ratios would vary in increments of 5, for example, about 95:5 vegetable glycerol to propylene glycol; or about 85:15 vegetable glycerol to propylene glycol; or about 55:45 vegetable glycerol to propylene glycol.

[0204] Because vegetable glycerol is less volatile than propylene glycol, it will recondense in greater proportions. A humectant with higher concentrations of glycerol will generate a thicker aerosol. The addition of propylene glycol will lead to an aerosol with a reduced concentration of condensed phase particles and an increased concentration of vapor phase effluent. This vapor phase effluent is often perceived as a tickle or harshness in the throat when the aerosol is inhaled. To some consumers, varying degrees of this sensation may be desirable. The ratio of vegetable

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glycerol to propylene glycol may be manipulated to balance aerosol thickness with the right amount of "throat tickle."

[0205] In a preferred embodiment of the method, the ratio for the vapor forming medium will be between the ratios of about 80:20 vegetable glycerol to propylene glycol, and about 60:40 vegetable glycerol to propylene glycol.

[0206] In a most preferred embodiment of the method, the ratio for the vapor forming medium will be about 70:30 vegetable glycerol to propylene glycol. On will envision that there will be blends with varying ratios for consumers with varying preferences.

[0207] In any of the preferred embodiments of the method, the humectant further comprises flavoring products. These flavorings include enhancers such as cocoa solids, licorice, tobacco or botanical extracts, and various sugars, to name a few.

[0208] In some embodiments of the method, the tobacco or botanical is heated to its pyrolytic temperature.

[0209] In preferred embodiments of the method, the tobacco or botanical is heated to about 300° C at most.

[0210] In other preferred embodiments of the method, the tobacco or botanical is heated to about 200° C at most. In still other embodiments of the method, the tobacco or botanical is heated to about 160° C at most.

[0211] As noted previously, at these lower temperatures, (< 300° C), pyrolysis of tobacco or botanical does not typically occur, yet vapor formation of the tobacco or botanical components and flavoring products does occur. As may be inferred from the data supplied by Baker et al., an aerosol produced at these temperatures is also substantially free from Hoffman analytes or at least 70% less Hoffman analytes than a common tobacco or botanical cigarette and scores significantly better on the Ames test than a substance generated by burning a common cigarette. In addition, vapor formation of the components of the humectant, mixed at various ratios will also occur, resulting in nearly complete vaporization, depending on the temperature, since propylene glycol has a boiling point of about 180° - 190° C and vegetable glycerin will boil at approximately 280° - 290° C.

[0212] In any one of the preceding methods, said inhalable aerosol produced by tobacco or a botanical comprising a humectant and heated in said oven produces an aerosol comprising gas phase humectants is further mixed with air provided through an aeration vent.

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[0213] In any one of the preceding methods, said aerosol produced by said heated tobacco or botanical and humectant mixed with air, is cooled to a temperature of about 50° - 70° C, and even as low as 35° C, before exiting the mouthpiece. In some embodiments, the temperature is cooled to about 35° - 55° C at most, and may have a fluctuating range of ± about 10° C or more within the overall range of about 35° - 70° C.

[0214] In some embodiments of the method, the vapor comprising gas phase humectant may be mixed with air to produce an aerosol comprising particle diameters of average mass of less than or equal to about 1 micron.

[0215] In other embodiments of the method, each aerosol configuration produced by mixing the gas phase vapors with the cool air may comprise a different range of particles, for example; with a diameter of average mass of less than or equal to about 0.9 micron; less than or equal to about 0.8 micron; less than or equal to about 0.7 micron; less than or equal to about 0.6 micron; and even an aerosol comprising particle diameters of average mass of less than or equal to about 0.5 micron.

[0216] Cartridge Design and Vapor Generation from Material in Cartridge

[0217] In some cases, a vaporization device may be configured to generate an inhalable aerosol. A device may be a self-contained vaporization device. The device may comprise an elongated body which functions to complement aspects of a separable and recyclable cartridge with air inlet channels, air passages, multiple condensation chambers, flexible heater contacts, and multiple aerosol outlets. Additionally, the cartridge may be configured for ease of manufacture and assembly.

[0218] Provided herein is a vaporization device for generating an inhalable aerosol. The device may comprise a device body, a separable cartridge assembly further comprising a heater, at least one condensation chamber, and a mouthpiece. The device provides for compact assembly and disassembly of components with detachable couplings; overheat shut-off protection for the resistive heating element; an air inlet passage (an enclosed channel) formed by the assembly of the device body and a separable cartridge; at least one condensation chamber within the separable cartridge assembly; heater contacts; and one or more refillable, reusable, and/or recyclable components.

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[0219] Provided herein is a device for generating an inhalable aerosol comprising: a device body comprising a cartridge receptacle; a cartridge comprising: a storage compartment, and a channel integral to an exterior surface of the cartridge, and an air inlet passage formed by the channel and an internal surface of the cartridge receptacle when the cartridge is inserted into the cartridge receptacle. The cartridge may be formed from a metal, plastic, ceramic, and/or composite material. The storage compartment may hold a vaporizable material. FIG. 7A shows an example of a cartridge 30 for use in the device. The vaporizable material may be a liquid at or near room temperature. In some cases the vaporizable material may be a liquid below room temperature. The channel may form a first side of the air inlet passage, and an internal surface of the cartridge receptacle may form a second side of the air inlet passage, as illustrated in various non-limiting aspects of FIGS. 5-6D, 7C,8A, 8B, and 10A

[0220] Provided herein is a device for generating an inhalable aerosol. The device may comprise a body that houses, contains, and or integrates with one or more components of the device. The device body may comprise a cartridge receptacle. The cartridge receptacle may comprise a channel integral to an interior surface of the cartridge receptacle; and an air inlet passage formed by the channel and an external surface of the cartridge when the cartridge is inserted into the cartridge receptacle. A cartridge may be fitted and/or inserted into the cartridge receptacle. The cartridge may have a fluid storage compartment. The channel may form a first side of the air inlet passage, and an external surface of the cartridge forms a second side of the air inlet passage. The channel may comprise at least one of: a groove; a trough; a track; a depression; a dent; a furrow; a trench; a crease; and a gutter. The integral channel may comprise walls that are either recessed into the surface or protrude from the surface where it is formed. The internal side walls of the channel may form additional sides of the air inlet passage. The channel may have a round, oval, square, rectangular, or other shaped cross section. The channel may have a closed cross section. The channel may be about 0.1 cm, 0.5 cm, 1 cm, 2 cm, or 5 cm wide. The channel may be about 0.1 mm, 0.5 mm, 1 mm, 2 mm, or 5 mm deep. The channel may be about 0.1 cm, 0.5 cm, 1 cm, 2 cm, or 5 cm long. There may be at least 1 channel.

[0221] In some embodiments, the cartridge may further comprise a second air passage in fluid communication with the air inlet passage to the fluid storage compartment, wherein the second air passage is formed through the material of the cartridge.

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[0222] FIGS. 5-7C show various views of a compact electronic device assembly 10 for generating an inhalable aerosol. The compact electronic device 10 may comprise a device body 20 with a cartridge receptacle 21 for receiving a cartridge 30. The device body may have a square or rectangular cross section. Alternatively, the cross section of the body may be any other regular or irregular shape. The cartridge receptacle may be shaped to receive an opened cartridge 30a or "pod". The cartridge may be opened when a protective cap is removed from a surface of the cartridge. In some cases, the cartridge may be opened when a hole or opening is formed on a surface of the cartridge. The pod 30a may be inserted into an open end of the cartridge receptacle 21 so that an exposed first heater contact tips 33a on the heater contacts 33 of the pod make contact with the second heater contacts 22 of the device body, thus forming the device assembly 10.

[0223] Referring to FIG. 14, it is apparent in the plan view that when the pod 30a is inserted into the notched body of the cartridge receptacle 21, the channel air inlet 50 is left exposed. The size of the channel air inlet 50 may be varied by altering the configuration of the notch in the cartridge receptacle 21.

[0224] The device body may further comprise a rechargeable battery, a printed circuit board (PCB) 24 containing a microcontroller with the operating logic and software instructions for the device, a pressure switch 27 for sensing the user's puffing action to activate the heater circuit, an indicator light 26, charging contacts (not shown), and an optional charging magnet or magnetic contact (not shown). The cartridge may further comprise a heater 36. The heater may be powered by the rechargeable battery. The temperature of the heater may be controlled by the microcontroller. The heater may be attached to a first end of the cartridge.

[0225] In some embodiments, the heater may comprise a heater chamber 37, a first pair of heater contacts 33, 33', a fluid wick 34, and a resistive heating element 35 in contact with the wick. The first pair of heater contacts may comprise thin plates affixed about the sides of the heater chamber. The fluid wick and resistive heating element may be suspended between the heater contacts.

[0226] In some embodiments, there may be two or more resistive heating elements 35, 35' and two or more wicks 34, 34'. In some of the embodiments, the heater contact 33 may comprise: a flat plate; a male contact; a female receptacle, or both; a flexible contact and/or copper alloy or another electrically conductive material. The first pair of heater contacts may

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further comprise a formed shape that may comprise a tab (e.g., flange) having a flexible spring value that extends out of the heater to complete a circuit with the device body. The first pair of heater contact may be a heat sink that absorb and dissipate excessive heat produced by the resistive heating element. Alternatively, the first pair of heater contacts may be a heat shield that protects the heater chamber from excessive heat produced by the resistive heating element. The first pair of heater contacts may be press-fit to an attachment feature on the exterior wall of the first end of the cartridge. The heater may enclose a first end of the cartridge and a first end of the fluid storage compartment.

[0227] As illustrated in the exploded assembly of FIG. 7B, a heater enclosure may comprises two or more heater contacts 33, each comprising a flat plate which may be machined or stamped from a copper alloy or similar electrically conductive material. The flexibility of the tip is provided by the cut-away clearance feature 33b created below the male contact point tip 33a which capitalizes on the inherent spring capacity of the metal sheet or plate material. Another advantage and improvement of this type of contact is the reduced space requirement, simplified construction of a spring contact point (versus a pogo pin) and the easy of assembly. The heater may comprise a first condensation chamber. The heater may comprise more one or more additional condensation chambers in addition to the first condensation chamber. The first condensation chamber may be formed along an exterior wall of the cartridge.

[0228] In some cases, the cartridge (e.g., pod) is configured for ease of manufacturing and assembly. The cartridge may comprise an enclosure. The enclosure may be a tank. The tank may comprise an interior fluid storage compartment 32. The interior fluid storage compartment 32 which is open at one or both ends and comprises raised rails on the side edges 45b and 46b. The cartridge may be formed from plastic, metal, composite, and/or a ceramic material. The cartridge may be rigid or flexible.

[0229] The tank may further comprise a set of first heater contact plates 33 formed from copper alloy or another electrically conductive material, having a thin cut-out 33b below the contact tips 33a (to create a flexible tab) which are affixed to the sides of the first end of the tank and straddle the open-sided end 53 of the tank. The plates may affix to pins, or posts as shown in FIGS. 7B or 5, or may be attached by other common means such as compression beneath the enclosure 36. A fluid wick 34 having a resistive heating element 35 wrapped around it, is placed between the first heater contact plates 33, and attached thereto. A heater 36, comprising raised

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internal edges on the internal end (not shown), a thin mixing zone (not shown), and primary condensation channel covers 45a that slide over the rails 45b on the sides of the tank on the first half of the tank, creating a primary condensation channel / chamber 45. In addition, a small male snap feature 39b located at the end of the channel cover is configured fall into a female snap feature 39a, located mid-body on the side of the tank, creating a snap-fit assembly.

[0230] As will be further clarified below, the combination of the open-sided end 53, the protruding tips 33a of the contact plates 33, the fluid wick 34 having a resistive heating element 35, enclosed in the open end of the fluid storage tank, under the heater 36, with a thin mixing zone therein, creates an efficient heater system. In addition, the primary condensation channel covers 45a which slide over the rails 45b on the sides of the tank create an integrated, easily assembled, primary condensation chamber 45, all within the heater at the first end of the cartridge 30 or pod 30a.

[0231] In some embodiments of the device, as illustrated in FIGS. 9A-9L, the heater may encloses at least a first end of the cartridge. The enclosed first end of the cartridge may include the heater and the interior fluid storage compartment. In some embodiments, the heater further comprises at least one first condensation chamber 45.

[0232] FIGS. 9A-9L show diagramed steps that mat be performed to assemble a cartomizer and/or mouthpiece. In A-B the fluid storage compartment 32a may be oriented such that the heater inlet 53 faces upward. The heater contacts 33 may be inserted into the fluid storage compartment. Flexible tabs 33a may be inserted into the heater contacts 33. In a step D the resistive heating element 35 may be wound on to the wick 34. In step E the wick 34 and heater 35 may be placed on the fluid storage compartment. One or more free ends of the heater may sit outside the heater contacts. The one or more free ends may be soldered in place, rested in a groove, or snapped into a fitted location. At least a fraction of the one or more free ends may be in communication with the heater contacts 33. In a step F the heater enclosure 36 may be snapped in place. The heater enclosure 36 may be fitted on the fluid storage compartment. Step G shows the heater enclosure 36 is in place on the fluid storage compartment. In step H the fluid storage compartment can be flipped over. In step I the mouthpiece 31 can be fitted on the fluid storage compartment. Step J shows the mouthpiece 31 in place on the fluid storage compartment. In step K an end 49 can be fitted on the fluid storage compartment opposite the mouthpiece.

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Step L shows a fully assembled cartridge 30. FIG. 7B shows an exploded view of the assembled cartridge 30.

[0233] Depending on the size of the heater and/or heater chamber, the heater may have more than one wick 34 and resistive heating element 35.

[0234] In some embodiments, the first pair of heater contacts 33 further comprises a formed shape that comprises a tab 33a having a flexible spring value that extends out of the heater. In some embodiments, the cartridge 30 comprises heater contacts 33 which are inserted into the cartridge receptacle 21 of the device body 20 wherein, the flexible tabs 33a insert into a second pair of heater contacts 22 to complete a circuit with the device body. The first pair of heater contacts 33 may be a heat sink that absorbs and dissipates excessive heat produced by the resistive heating element 35. The first pair of heater contacts 33 may be a heat shield that protects the heater chamber from excessive heat produced by the resistive heating element 35. The first pair of heater contacts may be press-fit to an attachment feature on the exterior wall of the first end of the cartridge. The heater 36 may enclose a first end of the cartridge and a first end of the fluid storage compartment 32a. The heater may comprise a first condensation chamber 45. The heater may comprise at least one additional condensation chamber 45, 45', 45", etc. The first condensation chamber may be formed along an exterior wall of the cartridge.

[0235] In still other embodiments of the device, the cartridge may further comprise a mouthpiece 31, wherein the mouthpiece comprises at least one aerosol outlet channel / secondary condensation chamber 46; and at least one aerosol outlet 47.The mouthpiece may be attached to a second end of the cartridge. The second end of the cartridge with the mouthpiece may be exposed when the cartridge is inserted in the device. The mouthpiece may comprise more than one second condensation chamber 46, 46', 46", etc. The second condensation chamber is formed along an exterior wall of the cartridge.

[0236] The mouthpiece 31 may enclose the second end of the cartridge and interior fluid storage compartment. The partially assembled (e.g., mouthpiece removed) unit may be inverted and filled with a vaporizable fluid through the opposite, remaining (second) open end. Once filled, a snap-on mouthpiece 31 that also closes and seals the second end of the tank is inserted over the end. It also comprises raised internal edges (not shown), and aerosol outlet channel covers 46a that may slide over the rails 46b located on the sides of the second half of the tank, creating aerosol outlet channels / secondary condensation chambers 46. The aerosol outlet

channels / secondary condensation chambers 46 slide over the end of primary condensation chamber 45, at a transition area 57, to create a junction for the vapor leaving the primary chamber and proceed out through the aerosol outlets 47, at the end of the aerosol outlet channels 46 and user-end of the mouthpiece 31.

[0237] The cartridge may comprise a first condensation chamber and a second condensation chamber 45, 46. The cartridge may comprise more than one first condensation chamber and more than one second condensation chamber 45, 46, 45', 46', etc.

[0238] In some embodiments of the device, a first condensation chamber 45 may be formed along the outside of the cartridge fluid storage compartment 31. In some embodiments of the device an aerosol outlet 47 exists at the end of aerosol outlet chamber 46. In some embodiments of the device, a first and second condensation chamber 45, 46 may be formed along the outside of one side of the cartridge fluid storage compartment 31. In some embodiments the second condensation chamber may be an aerosol outlet chamber. In some embodiments another pair of first and/or second condensation chambers 45', 46' is formed along the outside of the cartridge fluid storage compartment 31 on another side of the device. In some embodiments another aerosol outlet 47' will also exist at the end of the second pair of condensation chambers 45', 46'.

[0239] In any one of the embodiments, the first condensation chamber and the second condensation chamber may be in fluid communication as illustrated in FIG. 10C.

[0240] In some embodiments, the mouthpiece may comprise an aerosol outlet 47 in fluid communication with the second condensation chamber 46. The mouthpiece may comprise more than one aerosol outlet 47, 47' in fluid communication with more than one the second condensation chamber 46, 46'.The mouthpiece may enclose a second end of the cartridge and a second end of the fluid storage compartment.

[0241] In each of the embodiments described herein, the cartridge may comprise an airflow path comprising: an air inlet passage; a heater; at least a first condensation chamber; an aerosol outlet chamber, and an outlet port. In some of the embodiments described herein, the cartridge comprises an airflow path comprising: an air inlet passage; a heater; a first condensation chamber; a secondary condensation chamber; and an outlet port.

[0242] In still other embodiments described herein the cartridge may comprise an airflow path comprising at least one air inlet passage; a heater; at least one first condensation chamber; at least one secondary condensation chamber; and at least one outlet port.

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[0243] As illustrated in FIGS. 10A-10C, an airflow path is created when the user draws on the mouthpiece 31 to create a suction (e.g., a puff), which essentially pulls air through the channel air inlet opening 50, through the air inlet passage 51, and into the heater chamber 37 through the second air passage (tank air inlet hole) 41 at the tank air inlet 52, then into the heater inlet 53. At this point, the pressure sensor has sensed the user's puff, and activated the circuit to the resistive heating element 35, which in turn, begins to generate vapor from the vapor fluid (e-juice). As air enters the heater inlet 53, it begins to mix and circulate in a narrow chamber above and around the wick 34 and between the heater contacts 33, generating heat, and dense, concentrated vapor as it mixes in the flow path 54 created by the sealing structure obstacles 44. FIG. 8A shows a detailed view of the sealing structure obstacles 44. Ultimately the vapor may be drawn, out of the heater along an air path 55 near the shoulder of the heater and into the primary condensation chamber 45 where the vapor expands and begins to cool. As the expanding vapor moves along the airflow path, it makes a transition from the primary condensation chamber 45 through a transition area 57, creating a junction for the vapor leaving the primary chamber, and entering the second vapor chamber 46, and proceeds out through the aerosol outlets 47, at the end of the mouthpiece 31 to the user.

[0244] As illustrated in FIGS. 10A-10C, the device may have a dual set of air inlet passages 50-53, dual first condensation chambers 55/45, dual second condensation chambers and aeration channels 57/46, and/or dual aerosol outlet vents 47.

[0245] Alternatively, the device may have an airflow path comprising: an air inlet passage 50, 51; a second air passage 41; a heater chamber 37; a first condensation chamber 45; a second condensation chamber 46; and/or an aerosol outlet 47.

[0246] In some cases, the devise may have an airflow path comprising: more than one air inlet passage; more than one second air passage; a heater chamber; more than one first condensation chamber; more than one second condensation chamber; and more than one aerosol outlet as clearly illustrated in FIGS. 10A-10C.

[0247] In any one of the embodiments described herein, the heater 36 may be in fluid communication with the internal fluid storage compartment 32a.

[0248] In each of the embodiments described herein, the fluid storage compartment 32 is in fluid communication with the heater chamber 37, wherein the fluid storage compartment is capable of retaining condensed aerosol fluid, as illustrated in FIGS. 10A, 10C and 14.

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[0249] In some embodiments of the device, the condensed aerosol fluid may comprise a nicotine formulation. In some embodiments, the condensed aerosol fluid may comprise a humectant. In some embodiments, the humectant may comprise propylene glycol. In some embodiments, the humectant may comprise vegetable glycerin.

[0250] In some cases, the cartridge may be detachable from the device body. In some embodiments, the cartridge receptacle and the detachable cartridge may form a separable coupling. In some embodiments the separable coupling may comprise a friction assembly. As illustrated in FIGS. 11-14, the device may have a press-fit (friction) assembly between the cartridge pod 30a and the device receptacle. Additionally, a dent / friction capture such as 43 (e.g., a detent) may be utilized to capture the pod 30a to the device receptacle or to hold a protective cap 38 on the pod, as further illustrated in FIG. 8B. Alternatively or additionally the vaporizer may include a magnetic coupling 87 (e.g., within the cartridge receptacle at the proximal end of the device) to secure the cartridge by a magnetic- or magnetic assisted capture.

[0251] In other embodiments, the separable coupling may comprise a snap-fit or snap-lock assembly. In still other embodiments the separable coupling may comprise a magnetic assembly (e.g., a magnetic coupling). As mentioned above, the magnetic coupling may secure the cartridge in the cartridge receptacle.

[0252] In any one of the embodiments described herein, the cartridge components may comprise a snap-fit or snap-lock assembly, as illustrated in FIG. 5. In any one of the embodiments, the cartridge components may be reusable, refillable, and/or recyclable. The design of these cartridge components lend themselves to the use of such recyclable plastic materials as polypropylene, for the majority of components.

[0253] In some embodiments of the device 10, the cartridge 30 may comprise: a fluid storage compartment 32; a heater 36 affixed to a first end with a snap-fit coupling 39a, 39b; and a mouthpiece 31 affixed to a second end with a snap-fit coupling 39c, 39d (not shown – but similar to 39a and 39b). The heater 36 may be in fluid communication with the fluid storage compartment 32. The fluid storage compartment may be capable of retaining condensed aerosol fluid. The condensed aerosol fluid may comprise a nicotine formulation. The condensed aerosol fluid may comprise a humectant. The humectant may comprise propylene glycol and / or vegetable glycerin.

[0254] Provided herein is a device for generating an inhalable aerosol comprising: a device body 20 comprising a cartridge receptacle 21 for receiving a cartridge 30; wherein an interior surface of the cartridge receptacle forms a first side of an air inlet passage 51 when a cartridge comprising a channel integral 40 to an exterior surface is inserted into the cartridge receptacle 21, and wherein the channel forms a second side of the air inlet passage 51.

[0255] Provided herein is a device for generating an inhalable aerosol comprising: a device body 20 comprising a cartridge receptacle 21 for receiving a cartridge 30; wherein the cartridge receptacle comprises a channel integral to an interior surface and forms a first side of an air inlet passage when a cartridge is inserted into the cartridge receptacle, and wherein an exterior surface of the cartridge forms a second side of the air inlet passage 51.

[0256] Provided herein is a cartridge 30 for a device for generating an inhalable aerosol 10 comprising: a fluid storage compartment 32; a channel integral 40 to an exterior surface, wherein the channel forms a first side of an air inlet passage 51; and wherein an internal surface of a cartridge receptacle 21 in the device forms a second side of the air inlet passage 51 when the cartridge is inserted into the cartridge receptacle.

[0257] Provided herein is a cartridge 30 for a device for generating an inhalable aerosol 10 comprising a fluid storage compartment 32, wherein an exterior surface of the cartridge forms a first side of an air inlet channel 51 when inserted into a device body 10 comprising a cartridge receptacle 21, and wherein the cartridge receptacle further comprises a channel integral to an interior surface, and wherein the channel forms a second side of the air inlet passage 51.

[0258] In some embodiments, the cartridge further comprises a second air passage 41 in fluid communication with the channel 40, wherein the second air passage 41 is formed through the material of the cartridge 32 from an exterior surface of the cartridge to the internal fluid storage compartment 32a.

[0259] In some embodiments of the device body cartridge receptacle 21 or the cartridge 30, the integral channel 40 comprises at least one of: a groove; a trough; a depression; a dent; a furrow; a trench; a crease; and a gutter.

[0260] In some embodiments of the device body cartridge receptacle 21 or the cartridge 30, the integral channel 40 comprises walls that are either recessed into the surface or protrude from the surface where it is formed.

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[0261] In some embodiments of the device body cartridge receptacle 21 or the cartridge 30, the internal side walls of the channel 40 form additional sides of the air inlet passage 51.

[0262] Provided herein is a device for generating an inhalable aerosol comprising: a cartridge comprising; a fluid storage compartment; a heater affixed to a first end comprising; a first heater contact, a resistive heating element affixed to the first heater contact; a device body comprising; a cartridge receptacle for receiving the cartridge; a second heater contact adapted to receive the first heater contact and to complete a circuit; a power source connected to the second heater contact; a printed circuit board (PCB) connected to the power source and the second heater contact; wherein the PCB is configured to detect the absence of fluid based on the measured resistance of the resistive heating element, and turn off the device.

[0263] Referring now to FIGS. 13, 14, and 15, in some embodiments, the device body further comprises at least one: second heater contact 22 (best shown in FIG. 6C detail); a battery 23; a printed circuit board 24; a pressure sensor 27; and an indicator light 26.

[0264] In some embodiments, the printed circuit board (PCB) further comprises: a microcontroller; switches; circuitry comprising a reference resister; and an algorithm comprising logic for control parameters; wherein the microcontroller cycles the switches at fixed intervals to measure the resistance of the resistive heating element relative to the reference resistor, and applies the algorithm control parameters to control the temperature of the resistive heating element.

[0265] As illustrated in the basic block diagram of FIG. 17A, the device utilizes a proportional-integral-derivative controller or PID control law. A PID controller calculates an "error" value as the difference between a measured process variable and a desired SetPoint. When PID control is enabled, power to the coil is monitored to determine whether or not acceptable vaporization is occurring. With a given airflow over the coil, more power will be required to hold the coil at a given temperature if the device is producing vapor (heat is removed from the coil to form vapor). If power required to keep the coil at the set temperature drops below a threshold, the device indicates that it cannot currently produce vapor. Under normal operating conditions, this indicates that there is not enough liquid in the wick for normal vaporization to occur.

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[0266] In some embodiments, the micro-controller instructs the device to turn itself off when the resistance exceeds the control parameter threshold indicating that the resistive heating element is dry.

[0267] In still other embodiments, the printed circuit board further comprises logic capable of detecting the presence of condensed aerosol fluid in the fluid storage compartment and is capable of turning off power to the heating contact(s) when the condensed aerosol fluid is not detected. When the microcontroller is running the PID temperature control algorithm 70, the difference between a set point and the coil temperature (error) is used to control power to the coil so that the coil quickly reaches the set point temperature, [between 200°C and 400°C]. When the over-temperature algorithm is used, power is constant until the coil reaches an over-temperature threshold, [between 200°C and 400°C]; (FIG. 17A applies: set point temperature is over-temperature threshold; constant power until error reaches 0).

[0268] The essential components of the device used to control the resistive heating element coil temperature are further illustrated in the circuit diagram of FIG. 17B. Wherein, BATT 23 is the battery; MCU 72 is the microcontroller; Q1 (76) and Q2 (77) are P-channel MOSFETs (switches); R_COIL 74 is the resistance of the coil. R_REF 75 is a fixed reference resistor used to measure R_COIL 74 through a voltage divider 73.

[0269] The battery powers the microcontroller. The microcontroller turns on Q2 for 1 ms every 100ms so that the voltage between R_REF and R_COIL (a voltage divider) may be measured by the MCU at V_MEAS. When Q2 is off, the control law controls Q1 with PWM (pulse width modulation) to power the coil (battery discharges through Q1 and R_COIL when Q1 is on).

[0270] In some embodiments of the device, the device body further comprises at least one: second heater contact; a power switch; a pressure sensor; and an indicator light.

[0271] In some embodiments of the device body, the second heater contact 22 may comprise: a female receptacle; or a male contact, or both, a flexible contact; or copper alloy or another electrically conductive material.

[0272] In some embodiments of the device body, the battery supplies power to the second heater contact, pressure sensor, indicator light and the printed circuit board. In some embodiments, the battery is rechargeable. In some embodiments, the indicator light 26 indicates the status of the device and / or the battery or both.

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[0273] In some embodiments of the device, the first heater contact and the second heater contact complete a circuit that allows current to flow through the heating contacts when the device body and detachable cartridge are assembled, which may be controlled by an on / off switch. Alternatively, the device can be turned on an off by a puff sensor. The puff sensor may comprise a capacitive membrane. The capacitive membrane may be similar to a capacitive membrane used in a microphone.

[0274] In some embodiments of the device, there is also an auxiliary charging unit for recharging the battery 23 in the device body. As illustrated in FIGS. 16A-16C, the charging unit 60, may comprise a USB device with a plug for a power source 63 and protective cap 64, with a cradle 61 for capturing the device body 20 (with or without the cartridge installed). The cradle may further comprise either a magnet or a magnetic contact 62 (magnetic coupling) to securely hold the device body in place during charging. As illustrated in FIG. 6B, the device body further comprises a mating charging contact 28 and a magnet or magnetic contact 29 for the auxiliary charging unit. FIG. 16C is an illustrative example of the device 20 being charged in a power source 65 (laptop computer or tablet).

[0275] In some cases the microcontroller on the PCB may be configured to monitor the temperature of the heater such that the vaporizable material is heated to a prescribed temperature. The prescribed temperature may be an input provided by the user. A temperature sensor may be in communication with the microcontroller to provide an input temperature to the microcontroller for temperature regulation. A temperature sensor may be a thermistor, thermocouple, thermometer, or any other temperature sensors. In some cases, the heating element may simultaneously perform as both a heater and a temperature sensor. The heating element may differ from a thermistor by having a resistance with a relatively lower dependence on temperature. The heating element may comprise a resistance temperature detector.

[0276] The resistance of the heating element may be an input to the microcontroller. In some cases, the resistance may be determined by the microcontroller based on a measurement from a circuit with a resistor with at least one known resistance, for example, a Wheatstone bridge. Alternatively, the resistance of the heating element may be measured with a resistive voltage divider in contact with the heating element and a resistor with a known and substantially constant resistance. The measurement of the resistance of the heating element may be amplified by an amplifier. The amplifier may be a standard op amp or instrumentation amplifier. The amplified

signal may be substantially free of noise. In some cases, a charge time for a voltage divider between the heating element and a capacitor may be determined to calculate the resistance of the heating element. In some cases, the microcontroller must deactivate the heating element during resistance measurements. The resistance of the heating element may be directly proportional to the temperature of the heating element such that the temperature may be directly determine from the resistance measurement. Determining the temperature directly from the heating element resistance measurement rather than from an additional temperature sensor may generate a more accurate measurement because unknown contact thermal resistance between the temperature sensor and the heating element is eliminated. Additionally, the temperature measurement may be determined directly and therefore faster and without a time lag associated with attaining equilibrium between the heating element and a temperature sensor in contact with the heating element.

[0277] Provided herein is a device for generating an inhalable aerosol comprising: a cartridge comprising a first heater contact; a device body comprising; a cartridge receptacle for receiving the cartridge; a second heater contact adapted to receive the first heater contact and to complete a circuit; a power source connected to the second heater contact; a printed circuit board (PCB) connected to the power source and the second heater contact; and a single button interface; wherein the PCB is configured with circuitry and an algorithm comprising logic for a child safety feature.

[0278] In some embodiments, the algorithm requires a code provided by the user to activate the device. In some embodiments; the code is entered by the user with the single button interface. In still further embodiments the single button interface is the also the power switch.

[0279] Provided herein is a cartridge 30 for a device 10 for generating an inhalable aerosol comprising: a fluid storage compartment 32; a heater 36 affixed to a first end comprising: a heater chamber 37, a first pair of heater contacts 33, a fluid wick 34, and a resistive heating element 35 in contact with the wick; wherein the first pair of heater contacts 33 comprise thin plates affixed about the sides of the heater chamber 37, and wherein the fluid wick 34 and resistive heating element 35 are suspended there between.

[0280] Depending on the size of the heater or heater chamber, the heater may have more than one wick 34, 34' and resistive heating element 35, 35'.

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[0281] In some embodiments, the first pair of heater contacts further comprise a formed shape that comprises a tab 33a having a flexible spring value that extends out of the heater 36 to complete a circuit with the device body 20.

[0282] In some embodiments, the heater contacts 33 are configured to mate with a second pair of heater contacts 22 in a cartridge receptacle 21 of the device body 20 to complete a circuit.

[0283] In some embodiments, the first pair of heater contacts is also a heat sink that absorbs and dissipates excessive heat produced by the resistive heating element.

[0284] In some embodiments, the first pair of heater contacts is a heat shield that protects the heater chamber from excessive heat produced by the resistive heating element.

[0285] Provided herein is a cartridge 30 for a device for generating an inhalable aerosol 10 comprising: a heater 36 comprising; a heater chamber 37, a pair of thin plate heater contacts 33 therein, a fluid wick 34 positioned between the heater contacts 33, and a resistive heating element 35 in contact with the wick; wherein the heater contacts 33 each comprise a fixation site 33c wherein the resistive heating element 35 is tensioned there between.

[0286] As will be obvious to one skilled in the art after reviewing the assembly method illustrated in FIGS. 9A-9L, the heater contacts 33 simply snap or rest on locator pins on either side of the air inlet 53 on the first end of the cartridge interior fluid storage compartment, creating a spacious vaporization chamber containing the at least one wick 34 and at least one heating element 35.

[0287] Provided herein is a cartridge 30 for a device for generating an inhalable aerosol 10 comprising a heater 36 attached to a first end of the cartridge.

[0288] In some embodiments, the heater encloses a first end of the cartridge and a first end of the fluid storage compartment 32, 32a.

[0289] In some embodiments, the heater comprises a first condensation chamber 45.

[0290] In some embodiments, the heater comprises more than one first condensation chamber 45, 45'.

[0291] In some embodiments, the condensation chamber is formed along an exterior wall of the cartridge 45b.

[0292] As noted previously, and described in FIGS. 10A, 10B and 10C, the airflow path through the heater and heater chamber generates vapor within the heater circulating air path 54, which then exits through the heater exits 55 into a first (primary) condensation chamber 45,

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which is formed by components of the tank body comprising the primary condensation channel/chamber rails 45b, the primary condensation channel cover 45a, (the outer side wall of the heater enclosure).

[0293] Provided herein is a cartridge 30 for a device for generating an inhalable aerosol 10 comprising a fluid storage compartment 32 and a mouthpiece 31, wherein the mouthpiece is attached to a second end of the cartridge and further comprises at least one aerosol outlet 47.

[0294] In some embodiments, the mouthpiece 31 encloses a second end of the cartridge 30 and a second end of the fluid storage compartment 32, 32a.

[0295] Additionally, as clearly illustrated in FIG. 10C in some embodiments the mouthpiece also contains a second condensation chamber 46 prior to the aerosol outlet 47, which is formed by components of the tank body 32 comprising the secondary condensation channel/chamber rails 46b, the second condensation channel cover 46a, (the outer side wall of the mouthpiece). Still further, the mouthpiece may contain yet another aerosol outlet 47' and another (second) condensation chamber 46' prior to the aerosol outlet, on another side of the cartridge.

[0296] In other embodiments, the mouthpiece comprises more than one second condensation chamber 46, 46'.

[0297] In some preferred embodiments, the second condensation chamber is formed along an exterior wall of the cartridge 46b.

[0298] In each of the embodiments described herein, the cartridge 30 comprises an airflow path comprising: an air inlet channel and passage 40, 41, 42; a heater chamber 37; at least a first condensation chamber 45; and an outlet port 47. In some of the embodiments described herein, the cartridge 30 comprises an airflow path comprising: an air inlet channel and passage 40, 41, 42; a heater chamber 37; a first condensation chamber 45; a second condensation chamber 46; and an outlet port 47.

[0299] In still other embodiments described herein the cartridge 30 may comprise an airflow path comprising at least one air inlet channel and passage 40, 41, 42; a heater chamber 37; at least one first condensation chamber 45; at least one second condensation chamber 46; and at least one outlet port 47.

[0300] In each of the embodiments described herein, the fluid storage compartment 32 is in fluid communication with the heater 36, wherein the fluid storage compartment is capable of retaining condensed aerosol fluid.

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[0301] In some embodiments of the device, the condensed aerosol fluid comprises a nicotine formulation. In some embodiments, the condensed aerosol fluid comprises a humectant. In some embodiments, the humectant comprises propylene glycol. In some embodiments, the humectant comprises vegetable glycerin.

[0302] Provided herein is a cartridge 30 for a device for generating an inhalable aerosol 10 comprising: a fluid storage compartment 32; a heater 36 affixed to a first end; and a mouthpiece 31 affixed to a second end; wherein the heater comprises a first condensation chamber 45 and the mouthpiece comprises a second condensation chamber 46.

[0303] In some embodiments, the heater comprises more than one first condensation chamber 45, 45' and the mouthpiece comprises more than one second condensation chamber 46, 46'.

[0304] In some embodiments, the first condensation chamber and the second condensation chamber are in fluid communication. As illustrated in FIG. 10C, the first and second condensation chambers have a common transition area 57, 57', for fluid communication.

[0305] In some embodiments, the mouthpiece comprises an aerosol outlet 47 in fluid communication with the second condensation chamber 46.

[0306] In some embodiments, the mouthpiece comprises two or more aerosol outlets 47, 47'.

[0307] In some embodiments, the mouthpiece comprises two or more aerosol outlets 47, 47' in fluid communication with the two or more second condensation chambers 46, 46'.

[0308] In any one of the embodiments, the cartridge meets ISO recycling standards.

[0309] In any one of the embodiments, the cartridge meets ISO recycling standards for plastic waste.

[0310] And in still other embodiments, the plastic components of the cartridge are composed of polylactic acid (PLA), wherein the PLA components are compostable and or degradable.

[0311] Provided herein is a device for generating an inhalable aerosol 10 comprising a device body 20 comprising a cartridge receptacle 21; and a detachable cartridge 30; wherein the cartridge receptacle and the detachable cartridge form a separable coupling, and wherein the separable coupling comprises a friction assembly, a snap-fit assembly or a magnetic assembly.

[0312] In other embodiments of the device, the cartridge is a detachable assembly. In any one of the embodiments described herein, the cartridge components may comprise a snap-lock

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assembly such as illustrated by snap features 39a and 39b. In any one of the embodiments, the cartridge components are recyclable.

[0313] Provided herein is a method of fabricating a device for generating an inhalable aerosol comprising: providing a device body comprising a cartridge receptacle; and providing a detachable cartridge; wherein the cartridge receptacle and the detachable cartridge form a separable coupling comprising a friction assembly, a snap-fit assembly or a magnetic assembly when the cartridge is inserted into the cartridge receptacle.

[0314] Provided herein is a method of making a device 10 for generating an inhalable aerosol comprising: providing a device body 20 with a cartridge receptacle 21 comprising one or more interior coupling surfaces 21a, 21b, 21c…; and further providing a cartridge 30 comprising: one or more exterior coupling surfaces 36a, 36b, 36c,..., a second end and a first end; a tank 32 comprising an interior fluid storage compartment 32a; at least one channel 40 on at least one exterior coupling surface, wherein the at least one channel forms one side of at least one air inlet passage 51, and wherein at least one interior wall of the cartridge receptacle forms at least one side one side of at least one air inlet passage 51when the detachable cartridge is inserted into the cartridge receptacle.

[0315] FIGS. 9A-9L provide an illustrative example of a method of assembling such a device.

[0316] In some embodiments of the method, the cartridge 30 is assembled with a [protective] removable end cap 38 to protect the exposed heater contact tabs 33a protruding from the heater 36.

[0317] Provided herein is a method of fabricating a cartridge for a device for generating an inhalable aerosol comprising: providing a fluid storage compartment; affixing a heater to a first end with a snap-fit coupling; and affixing a mouthpiece to a second end with a snap-fit coupling.

[0318] Provided herein is a cartridge 30 for a device for generating an inhalable aerosol 10 with an airflow path comprising: a channel 50 comprising a portion of an air inlet passage 51; a second air passage 41 in fluid communication with the channel; a heater chamber 37 in fluid communication with the second air passage; a first condensation chamber 45 in fluid communication with the heater chamber; a second condensation chamber 46 in fluid communication with the first condensation chamber; and an aerosol outlet 47 in fluid communication with second condensation chamber.

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[0319] Provided herein is a device 10 for generating an inhalable aerosol adapted to receive a removable cartridge 30, wherein the cartridge comprises a fluid storage compartment [or tank] 32; an air inlet 41; a heater 36, a [protective] removable end cap 38, and a mouthpiece 31.

[0320] Charging

[0321] In some cases, the vaporization device may comprise a power source. The power source may be configured to provide power to a control system, one or more heating elements, one or more sensors, one or more lights, one or more indicators, and/or any other system on the electronic cigarette that requires a power source. The power source may be an energy storage device. The power source may be a battery or a capacitor. In some cases, the power source may be a rechargeable battery.

[0322] The battery may be contained within a housing of the device. In some cases the battery may be removed from the housing for charging. Alternatively, the battery may remain in the housing while the battery is being charged. Two or more charge contact may be provided on an exterior surface of the device housing. The two or more charge contacts may be in electrical communication with the battery such that the battery may be charged by applying a charging source to the two or more charge contacts without removing the battery from the housing.

[0323] FIG. 18 shows a device 1800 with charge contacts 1801. The charge contacts 1801 may be accessible from an exterior surface of a device housing 1802. The charge contacts 1801 may be in electrical communication with an energy storage device (e.g., battery) inside of the device housing 1802. In some cases, the device housing may not comprise an opening through which the user may access components in the device housing. The user may not be able to remove the battery and/or other energy storage device from the housing. In order to open the device housing a user must destroy or permanently disengage the charge contacts. In some cases, the device may fail to function after a user breaks open the housing.

[0324] FIG. 19 shows an exploded view of a charging assembly 1900 in an electronic vaporization device. The housing (not shown) has been removed from the exploded view in FIG. 19. The charge contact pins 1901 may be visible on the exterior of the housing. The charge contact pins 1901 may be in electrical communication with a power storage device of the electronic vaporization device. When the device is connected to a power source (e.g., during charging of the device) the charging pins may facilitate electrical communication between the

power storage device inside of the electronic vaporization device and the power source outside of the housing of the vaporization device. The charge contact pins 1901 may be held in place by a retaining bezel 1902. The charge contact pins 1901 may be in electrical communication with a charger flex 1903. The charging pins may contact the charger flex such that a need for soldering of the charger pins to an electrical connection to be in electrical communication with the power source may be eliminated. The charger flex may be soldered to a printed circuit board (PCB). The charger flex may be in electrical communication with the power storage device through the PCB. The charger flex may be held in place by a bent spring retainer 1904.

[0325] FIG. 20 shows the bent spring retainer in an initial position 2001 and a deflected position 2002. The bent spring retainer may hold the retaining bezel in a fixed location. The bent spring retainer may deflect only in one direction when the charging assembly is enclosed in the housing of the electronic vaporization device.

[0326] FIG. 21 shows a location of the charger pins 2101 when the electronic vaporization device is fully assembled with the charging pins 2101 contact the charging flex 2102. When the device is fully assembled at least a portion of the retaining bezel may be fitted in an indentation 2103 on the inside of the housing 2104. In some cases, disassembling the electronic vaporization device may destroy the bezel such that the device cannot be reassembled after disassembly.

[0327] A user may place the electronic smoking device in a charging cradle. The charging cradle may be a holder with charging contact configured to mate or couple with the charging pins on the electronic smoking device to provide charge to the energy storage device in the electronic vaporization device from a power source (e.g., wall outlet, generator, and/or external power storage device). FIG. 22 shows a device 2302 in a charging cradle 2301. The charging cable may be connected to a wall outlet, USB, or any other power source. The charging pins (not shown) on the device 2302 may be connected to charging contacts (not shown) on the charging cradle 2301. The device may be configured such that when the device is placed in the cradle for charging a first charging pin on the device may contact a first charging contact on the charging cradle and a second charging pin on the device may contact a second charging contact on the charging cradle or the first charging pin on the device may contact a second charging contact on the charging cradle and the second charging pin on the device may contact the first charging contact on the charging cradle. The charging pins on the device and the charging contacts on the cradle may be in contact in any orientation. The charging pins on the device and the charging

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contacts on the cradle may be agnostic as to whether they are current inlets or outlets. Each of the charging pins on the device and the charging contacts on the cradle may be negative or positive. The charging pins on the device may be reversible.

[0328] FIG. 23 shows a circuit 2400 that may permit the charging pins on the device to be reversible. The circuit 2400 may be provided on a PCB in electrical communication with the charging pins. The circuit 2400 may comprise a metal–oxide–semiconductor field-effect transistor (MOSFET) H bridge. The MOSFET H bridge may rectify a change in voltage across the charging pins when the charging pins are reversed from a first configuration where in a first configuration the device is placed in the cradle for charging with the first charging pin on the device in contact with the first charging contact on the charging cradle to a second charging pin on the device in contact with the second charging contact on the charging cradle to a second configuration where the first charging pin on the device is in contact with the second charging contact on the charging cradle and the second charging pin on the device is in contact with the first charging contact on the charging cradle. The MOSFET H bridge may rectify the change in voltage with an efficient current path.

[0329] As shown in FIG. 23 the MOSFET H bridge may comprise two or more n-channel MOSFETs and two or more p-channel MOSFETs. The n-channel and p-channel MOSFETs may be arranged in an H bridge. Sources of p-channels MOSFETs (Q1 and Q3) may be in electrical communication. Similarly, sources of n-channel FETs (Q2 and Q4) may be in electrical communication. Drains of pairs of n and p MOSFETs (Q1 with Q2 and Q3 with Q4) may be in electrical communication. TA common drain from one n and p pair may be in electrical communication with one or more gates of the other n and p pair and/or vice versa. Charge contacts (CH1 and CH2) may be in electrical communication to common drains separately. A common source of the n MOSFETs may be in electrical communication to PCB ground (GND). The common source of the p MOSFETs may be in electrical communication with the PCB's charge controller input voltage (CH+). When CH1 voltage is greater than CH2 voltage by the MOSFET gate threshold voltages, Q1 and Q4 may be "on," connecting CH1 to CH+ and CH2 to GND. When CH2 voltage is greater than CH1 voltage by the FET gate threshold voltages, Q2 and Q3 may be "on," connecting CH1 to GND and CH2 to CH+. For example, whether there is 9V or -9V across CH1 to CH2, CH+ will be 9V above GND. Alternatively, a diode bridge could be used, however the MOSFET bridge may be more efficient compared to the diode bridge.

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[0330] In some cases the charging cradle may be configured to be a smart charger. The smart charger may put the battery of the device in series with a USB input to charge the device at a higher current compared to a typical charging current. In some cases, the device may charge at a rate up to about 2 amps (A), 4A, 5A, 6A, 7A, 10A, or 15A. In some cases, the smart charger may comprise a battery, power from the battery may be used to charge the device battery. When the battery in the smart charger has a charge below a predetermined threshold charge, the smart charger may simultaneously charge the battery in the smart charger and the battery in the device.

[0331] Cartridge/Vaporizer Attachment

[0332] Any of the cartridges described herein may be adapted for securely coupling with an electronic inhalable aerosol device ("vaporizer") as discussed above. In particular described herein are cartridge designs that address the unrecognized problem of maintaining adequate electrical contact between a mouthpiece-containing cartridge and a rectangular vaporizer coupling region, particularly when the mouthpiece is held in a user's mouth.

[0333] Any of the cartridges described herein may be particularly well adapted for securing to a vaporizer by including a base region that mates with the rectangular coupling region of the vaporizer, where the base unit fits into a rectangular opening that is between 13-14 mm deep, 4.5-5.5 mm wide, and 13-14 mm long. The base having generally includes a bottom surface having a first electrical contact and a second electrical contact. In particular, any of the cartridges described herein may include a first locking gap on a first lateral surface of the base, and a second locking gap on a second lateral surface of the base that is opposite first lateral surface.

[0334] For example FIGS. 24A and 24B illustrate another variation of a cartridge having a base region 2401 with at least one locking gap 2404 on the first minor lateral wall 2407. A second locking gap (not shown) may be present on the opposite minor lateral wall. One or both major lateral walls 2418 may include a detent 2421. Any of these cartridges may also include a mouthpiece 2409, which may be at an end that is opposite of the bottom 2422, on which a pair of electrodes 2411 are positioned. FIGS. 25A and 25B show front and side views, respectively, of this example. The mouthpiece 2431 may have a distal edge 2471 that fits over the (transparent or translucent) elongate body (the elongate and flattened storage compartment configured to hold a liquid vaporizable material) of the cartridge and overhands it slightly, forming a lip or distal

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edge 2471 that extends only partially between the distal end and the proximal end of the storage compartment. A cannula 2475 is visible in the figure.

[0335] In FIGS. 24A-25B the locking gaps 2404, 2404' on either side are shown as channels in the side (lateral) walls. They may extend across the entire side wall, parallel to the bottom as shown, or they may extend only partially through and may preferably be centered relative to the width of the wall. In other variations the locking gap may be a divot, pit, opening, or hole (though not into the internal volume holding the vaporizable material).

In general, the inventors have found that the vertical position of the locking gap may be important in maintaining the stability of the cartridge in the vaporizer, particularly in cartridges having a rectangular base region that is longer than 10 mm. Optimally, the locking gap may be between about 1 and 5 mm from the bottom of the base region, and more specifically, between about 3 and 4 mm (e.g., approximately 3.3 mm), as shown in FIG. 26A which indicates exemplary dimensions for the section through FIG. 26B.

[0336] The cartridges shown in FIGS. 24A-24B also include a detent 2421 that is positioned between about 7 and 11 mm up from the bottom of the cartridge. The detent may help hold the cartridge base in the vaporizer, and may cooperate with the locking gap, but is optional (and shown in dashed lines in FIGS. 2A-25B.

[0337] In FIGS. 24A-25B the cartridge base is also transparent, and shows an internal air channel (cannula 2505).

[0338] FIGS. 27A-27B show another example of a vaporizer including a battery and control circuitry. FIGS. 27A and 27B also illustrate the mating region 2704 (cartridge receptacle). In this example, the mating region includes two detents 2706 that may mate with the locking gaps on the cartridge when it is inserted into the vaporizer. Exemplary dimensions for the mating region are shown. In this example the locking detents (which complement the locking gaps on the cartridge) are indentations that project into the mating region. These locking determent may be a ridge, pin, or other projection (including spring-loaded members).

[0339] FIGS. 28A-28D show an example of a vaporizer 2803 into which a cartridge 2801 has been securely loaded. In FIG. 28A the cartridge has been snapped into position so that the locking gaps of the cartridge engage with the locking detents in the vaporizer. FIG. 28B is side view and FIG. 28C show a sectional view; an enlarged portion of the sectional view is shown in FIG. 28D, showing the base of the cartridge seated in the mating region of the vaporizer. With

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the cartridge secured as shown, good electrical contact 2805 may be maintained. As seen in FIG. 28A (and as was previously seen in FIGS. 5-6D and 11-15) the vaporizer 2803 includes an elongate, flattened and opaque body having a distal end and a proximal end and a front side 2815, a back side and opposite lateral sides 2817 extending between the distal and proximal ends. This shape may prevent the elongate, flattened and opaque body is prevented from rolling when placed on a flat surface because the diameter of the front and back sides are larger than the diameter of the opposite lateral sides. The vaporizer also includes a cartridge receptacle 2704 (clearly visible in the cross-section of FIG. 27B) formed at the proximal end of the elongate, flattened and opaque body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the elongate, flattened and opaque body. The cartridge receptacle includes a proximal edge 2722 around the proximal-facing opening, and a notch 2724 or cut-out region in the proximal edge of the cartridge receptacle. The notch may be in the front and/or back side of the elongate, flattened and opaque body extending towards the distal end of the elongate, flattened and opaque body so that a portion of the storage compartment and the cannula within the storage compartment are visible through the notch when the cartridge is housed within the cartridge receptacle, as shown in FIG. 28A.

[0340] In the sectional view of FIG. 28D, the cartridge is held securely within the cartridge receptacle by a pair of detents 2706 on either side (in this case, on two of the lateral sides) of the cartridge receptacle that mate with and engage a mating region (locking gaps 2736) on opposite sides of the cartridge. The detents project into the cartridge receptacle and each engage a mating region (locking gap) on or in the lateral sides of the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle.

[0341] When secured by this friction coupling as shown, the electrical contacts 2844 in or on the distal surface within the cartridge receptacle connect to electrical contacts 2411 (electrodes) on the cartridge. As mentioned above, the electrical contacts 2844 (see, e.g., FIG. 24B and for the vaporizer in the cartridge receptacle may be pogo pins.

[0342] A mechanical coupling or connection between the cartridge 2801 and the vaporizer 2803 is visible in the enlarged view of FIG. 28D. In this example, the outer surface of the elongate and flattened storage compartment 2855 (which is not covered at the distal end by the mouthpiece) engages snugly within the walls of the cartridge receptacle 2851. The

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[0343] Although the cartridges shown in FIGS. 24A-28D are similar, and include a proximal mouthpiece and distal base that are nearly equivalent in size, with the reservoir for the vaporizable material between them and the wick, resistive heater, heating chamber and electrodes at the distal most end (near the bottom of the base), many other cartridge configurations are possible while still securely seating into a vaporizer having the same vaporizer mating region shown in FIGS. 28A-28B. For example, FIGS. 29A-29D illustrate alternative variations of cartridges having similar electrode. In FIG. 29A the base region includes two projecting feet that include locking gaps (mating regions on the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle), and the electrodes on the base (not shown) connect via electrical traces (e.g. wires, etc.) to a heating element, wick and the reservoir nearer to the distal end (not visible).

[0344] In FIG. 29B the base extends further than 11 mm (e.g., 20-30mm) and may house the reservoir (fluid storage compartment). Similarly in FIG. 29C the base region is the same as in FIG. 29B, but the more proximal portion is enlarged. In FIG. 29D the fluid non-base portion of the cartridge (more proximal than the base region) may have a different dimension. All of the variations shown in FIGS. 29A-29D, as in the variations shown in FIG. 24A-25B, may mate with the same vaporizer, and because of the dimensions of the base region, may be securely held and maintain electrical contact, even when a user is holding the device in their mouth.

[0345] Similarly, FIGS. 29E-29H illustrate variations of cartridges that may house the fluid storage compartment. Each of FIGS. 29E-29H, as in FIGS. 29A-29D, show an elongate and flattened storage compartment and an opaque mouthpiece at the proximal end of the storage compartment. In FIGS. 29F and 29G, the mouthpiece includes a cut-out notch as illustrated and described above for FIGS. 5, 7, 9, 24A-24B, and 28A. Any of the examples shown in FIGS. 29A-29H may include a mating region on the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle.

[0346] For example, FIG. 30 shows one example of a cartridge including a reservoir that may be filled as described herein. FIGS. 1A-1G show a schematic illustration of another example of cartridge. In general a cartridge may include a reservoir into which fluid may be filled, a tank 3001 (housing the reservoir), an elastomeric cap, and a porous wick at one end of the tank, which passes from within the tank to an external surface. The porous wick may be any appropriate material, including woven, braided, fibrous, and knitted materials. The wick may be

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coupled with or integral with a heating element. For example, a wire for resistive heating may be wrapped around an external portion of the wick, forming a wick/coil assembly 3005 as shown in FIG. 30. The wick may be any appropriate material, including metals, polymers, natural fibers, synthetic fibers, or combinations of these. The wick is porous and provides a capillary pathway for fluid within the tank through and into the wick; the capillary pathway is generally large enough to permit wicking of sufficient material to replace vaporized liquid transferred from the tank by capillary action (wicking) during use of the electronic cigarette, but may be small enough to prevent leakage of the vaporizable fluid material out of the cartridge during normal operation, including when applying pressure (e.g., squeezing) the cartridge. The external portion of the wick may include a wick housing 3005. The wick housing and/or wick may be treated to prevent leakage. For example, the wick and/or wick housing may be coated after filling to prevent leakage and/or evaporation through the wick until activated by connecting to an electronic cigarette and/or applying current through the electrical contacts 3007 (e.g., operation in an electronic cigarette), or otherwise using the cartridge. Any appropriate coating may be used, including a heat-vaporizable coating (e.g., a wax or other material), a frangible material, or the like.

[0347] The cartridge may also include an air path through the tank (shown as a cannula 3009 in FIG. 30), which may at least partially partition the volume of the tank. The tank may include an elastomeric potion, such as all or a portion of the side, bottom, top, etc. In FIG. 30, the tank is covered by an elastomeric cap 3011 (elastomeric tank cap). The elastomeric portion (e.g., cap) may, in some variations, be on an opposite side from the wick.

[0348] In the variation shown in FIG. 30, the cartridge including the tank also include a cover (cap 3015) and is configured to be used as a mouthpiece, so includes a mouthpiece portion 3017 that is separated from the tank 3001 by one or more absorbent pads 3019.

[0349] In general, the methods described herein may include filling the tank (e.g. of a cartridge) that includes a wick at one end. The method may generally include positioning the empty and fully assembled tank (e.g. cartridge) so that it may be filled by a single needle that is inserted from the bottom or side (but not the top) of the empty tank. For example, the tank may be held on its side or upside down.

EXAMPLES

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[0350] Any of the cartridges described in the figures and description above may include an elongate and flattened storage compartment for holding a vaporizable material and a mouthpiece at the proximal end of cartridge. In particular, FIGS. 5-7B, 8B, 9, 11-15, and 16C show examples of a cartridge for use with a vaporizer device that includes an elongate and flattened storage compartment (see, element 32 in FIG. 7B and element 32a in FIGS. 9A-9L) configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment, further wherein the storage compartment comprises a distal end and a proximal end, and a first side extending between the distal end and the proximal end. In each of these examples the cartridge also includes an opaque mouthpiece (e.g., 31 in FIGS. 7B and 8B) that is secured over the proximal end of the storage compartment, the opaque mouthpiece having a front side adjacent to the first side of the storage compartment, wherein a distal end of the opaque mouthpiece terminates in a distal edge that extends only partially between the distal end and the proximal end of the storage compartment. The mouthpiece includes an opening 72, 72' through the opaque mouthpiece at a proximal end of the opaque mouthpiece. The mouthpiece also includes a notch (in FIGS. 5, 7A, 7B, 8, 9 and 11-13, the notch is a triangular-shaped cut-out region 88 in the front side of the mouthpiece extending from the distal edge of the opaque mouthpiece toward the proximal end of the mouthpiece, wherein the notch exposes a region of the storage compartment beneath the mouthpiece. The notch (cut-out region) in either the mouthpiece or he vaporizer body may be any appropriate shape, including rectangular, hexagonal, oval, semi-circular, pentagonal, etc. (or any combination of these). Any of the cartridges described herein may also include a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick 34 within the heating chamber, and a resistive heating element 35 in thermal contact with the wick. Any of these cartridges may also include a channel 46 or cannula within the storage compartment extending from the heater to the proximal end of the storage compartment, wherein the liquid vaporizable material is visible through the notch, further wherein the cannula or channel forms a fluid connection between the heating chamber and the opening through the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled, as shown in FIGS. 7CB and 8B. In some variations, the channel may extend through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula when the storage compartment is filled with liquid vaporizable material. The

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cannula may be visible through the notch. The cannula may form a fluid connection between the heating chamber and the opening through the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled.

[0351] The cartridges shown in FIGS. 7A-9 may also include a friction coupling between the cartridge and the vaporizer. For example, the cartridge may include a pair of locking gaps on lateral sides of the cartridge that are configured to engage with a pair of locking detents on the vaporizer device to secure the cartridge in the vaporizer device.

[0352] As discussed above, these features are also apparent in FIGS. 24A-26B, although the notch 2481 in this example may be shaped differently (e.g., shown as half of a flattened hexagon, compared to the half-diamond shape of FIGS. 8B and 9. For example, in FIGS. 24A-24B and 30, the cartridge 2000 for use with a vaporizer device includes the elongate and flattened storage compartment 2490 configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment. The storage compartment includes a distal end and a proximal end, and a first side 2492 extending between the distal end and the proximal end. The cartridge also includes an opaque mouthpiece 2409 that is secured over the proximal end of the storage compartment, the opaque mouthpiece having a front side 2494 adjacent to the first side of the storage compartment, wherein a distal end of the opaque mouthpiece terminates in a distal edge 2471 that extends only partially between the distal end and the proximal end of the storage compartment. The mouthpiece also includes an opening 2495 through the opaque mouthpiece at a proximal end of the opaque mouthpiece, and a notch 2481 in the front side of the mouthpiece extending from the distal edge of the opaque mouthpiece toward the proximal end of the mouthpiece, wherein the notch exposes a region of the storage compartment beneath the mouthpiece. The cartridge also includes a heater 2485 at the distal end of the storage compartment, wherein the heater comprises a heating chamber 2486, a wick (not visible in FIG. 24A-24B) within the heating chamber, and a resistive heating element (not visible in FIG. 24A-24B) in thermal contact with the wick. The cartridge also includes a cannula 2475, 3009 within the storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula when the storage compartment is filled with liquid vaporizable material. The cannula is visible through the notch 2481 (e.g., when the cartridge is inserted into the vaporizer fully, as shown in FIG. 33A), further wherein the cannula forms a

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fluid connection between the heating chamber and the opening through the opaque mouthpiece from which vaporized liquid vaporizable material may be inhaled.

[0353] As mentioned above, the opaque mouthpiece may be attached over the proximal end of the elongate storage compartment in any appropriate manner, including an adhesive and/or a snap-fit over the proximal end of the storage compartment.

[0354] FIGS. 31A-31L show alternative examples the mouthpiece cut-out regions (notches) that may be used. In all of these examples, the opaque mouthpiece is fixed (e.g., by adhesive, snap-fit, etc.) over the transparent or translucent elongate and flattened storage compartment 3103, similar to the examples described above (e.g., in FIGS. 9A-9L). The heater region 3107 at the distal end includes a wick and coil (as shown in FIG. 8D and 30), and a cannula 3109 is visible through the storage compartment and connects the heater forming the vapor to one or more openings on the mouthpiece. Each of the variations shown in FIGS. 31A-31L has a different notch or cut-out region 3111. The notch extends from the distal edge of the mouthpiece up towards the proximal end of the mouthpiece and exposes a window through the transparent/translucent storage compartment even when the cartridge is inserted into a vaporizer up to the distal edge formed by the mouthpiece. Thus, in general, this notch, cut-out or window extends up into the lateral side of the mouthpiece, e.g., on the front and/or back sides of the opaque mouthpiece between the distal and proximal ends of the cartridge. For example, the notch cuts up into the opaque mouthpiece from the lateral edges of the mouthpiece that extend along the minor sides (e.g., see the side 2509 of the mouthpiece 2431 in FIG. 25B, and it's opposite side, not visible in FIG. 25B), and at the lateral sides of the front and back distal edge that are at the same height as the distal edge of the mouthpiece on the minor sides of the mouthpiece. The minor sides are also referred to as the lateral sides. Note that the lateral sides are shown as having a diameter that is less than the diameter of the major (front, back) sides of the cartridge in many of these examples, which are primarily rectangular or approximately rectangular. As mentioned above, other non-rectangular, but still flattened and elongate cartridge profiles (e.g., storage compartment profiles) may be used, including hexagonal (e.g., having two pairs of minor sides with diameters that are slightly less than or equal to the major sides), oval (where the minor sides are rounded, rather than flat, etc.

[0355] The notch (cut-out region) forming the window in the cartridge may mate with complementary notch on the vaporizer, as shown in FIGS. 32-34L, below. In this case, the

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cartridge notch forms half the window, while the vaporizer notch (through the cartridge receptacle) forms the other half of the notch. The distal-most edge of the mouthpiece around the storage compartment sits flush against the vaporizer (e.g., against the upper proximal rim of the cartridge receptacle).

[0356] For example, FIG. 31A shows a notch 3111 that is a semicircle or semi-oval shape. FIG. 31B is a semi-octagonal shape; FIG. 31C shows two triangular (or semi-diamond) adjacent notches. FIG. 31D shows a semi-crescent notch. FIG. 31E shows a semi-star notch; FIG. 31F shows a semi-lip notch; FIG.31G shows a semi-clover notch. FIG. 31H shows a Gaussian notch. FIG. 31I shows a semi-square (or rectangular) notch. FIG. 31J is a pair of adjacent semicircular or semi-oval notches. FIG. 31K shows a semi-plus-shaped notch. FIG. 31L is an alternative semi-star-shaped notch.

[0357] FIG. 32 shows a cartridge 3203 such as the one shown in FIGS. 24A-25B coupled in the cartridge receptacle at the proximal end of an elongate flattened body 3205 of a vaporizer. In this example, the hemi-hexagonal notch in the front (and back) of the mouthpiece of the cartridge forms a hexagonal window with the complementary notch in the cartridge receptacle. The cannula is visible within the storage compartment and may provide a convenience reference, contrast, and scale for any vaporizing fluid within the storage compartment. The internal cannula may also provide a baffle to prevent or reduce bubbles forming within the vaporizable material.

[0358] Although the examples shown in FIGS. 32-34L all show a notch cut in the distal edge of the cartridge receptacle, this second notch may be optional. Also, although the notches are shown to be mirrors of each other, the first notch (in the cartridge) may be different from the second notch.

[0359] When a feature or element is herein referred to as being "on" another feature or element, it can be directly on the other feature or element or intervening features and/or elements may also be present. In contrast, when a feature or element is referred to as being "directly on" another feature or element, there are no intervening features or elements present. It will also be understood that, when a feature or element is referred to as being "connected", "attached" or "coupled" to another feature or element, it can be directly connected, attached or coupled to the other feature or element or intervening features or elements may be present. In contrast, when a feature or element is referred to as being "directly connected", "directly attached" or "directly coupled" to another feature or element, there are no intervening features or elements present.

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Although described or shown with respect to one embodiment, the features and elements so described or shown can apply to other embodiments. It will also be appreciated by those of skill in the art that references to a structure or feature that is disposed "adjacent" another feature may have portions that overlap or underlie the adjacent feature.

[0360] Terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. For example, as used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items and may be abbreviated as "/".

[0361] Spatially relative terms, such as "under", "below", "lower", "over", "upper" and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if a device in the figures is inverted, elements described as "under" or "beneath" other elements or features would then be oriented "over" the other elements or features. Thus, the exemplary term "under" can encompass both an orientation of over and under. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly. Similarly, the terms "upwardly", "downwardly", "vertical", "horizontal" and the like are used herein for the purpose of explanation only unless specifically indicated otherwise.

[0362] Although the terms "first" and "second" may be used herein to describe various features/elements (including steps), these features/elements should not be limited by these terms, unless the context indicates otherwise. These terms may be used to distinguish one feature/element from another feature/element. Thus, a first feature/element discussed below could be termed a second feature/element, and similarly, a second feature/element discussed below could be termed a first feature/element without departing from the teachings of the present invention.

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[0363] Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising" means various components can be co-jointly employed in the methods and articles (e.g., compositions and apparatuses including device and methods). For example, the term "comprising" will be understood to imply the inclusion of any stated elements or steps but not the exclusion of any other elements or steps.

[0364] As used herein in the specification and claims, including as used in the examples and unless otherwise expressly specified, all numbers may be read as if prefaced by the word "about" or "approximately," even if the term does not expressly appear. The phrase "about" or "approximately" may be used when describing magnitude and/or position to indicate that the value and/or position described is within a reasonable expected range of values and/or positions. For example, a numeric value may have a value that is +/- 0.1% of the stated value (or range of values), +/- 1% of the stated value (or range of values), +/- 2% of the stated value (or range of values), +/- 5% of the stated value (or range of values), +/- 10% of the stated value (or range of values), etc. Any numerical values given herein should also be understood to include about or approximately that value, unless the context indicates otherwise. For example, if the value "10" is disclosed, then "about 10" is also disclosed. Any numerical range recited herein is intended to include all sub-ranges subsumed therein. It is also understood that when a value is disclosed that "less than or equal to" the value, "greater than or equal to the value" and possible ranges between values are also disclosed, as appropriately understood by the skilled artisan. For example, if the value "X" is disclosed the "less than or equal to X" as well as "greater than or equal to X" (e.g., where X is a numerical value) is also disclosed. It is also understood that the throughout the application, data is provided in a number of different formats, and that this data, represents endpoints and starting points, and ranges for any combination of the data points. For example, if a particular data point "10" and a particular data point "15" are disclosed, it is understood that greater than, greater than or equal to, less than, less than or equal to, and equal to 10 and 15 are considered disclosed as well as between 10 and 15. It is also understood that each unit between two particular units are also disclosed. For example, if 10 and 15 are disclosed, then 11, 12, 13, and 14 are also disclosed.

[0365] Although various illustrative embodiments are described above, any of a number of changes may be made to various embodiments without departing from the scope of the invention

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as described by the claims. For example, the order in which various described method steps are performed may often be changed in alternative embodiments, and in other alternative embodiments one or more method steps may be skipped altogether. Optional features of various device and system embodiments may be included in some embodiments and not in others. Therefore, the foregoing description is provided primarily for exemplary purposes and should not be interpreted to limit the scope of the invention as it is set forth in the claims.

[0366] The examples and illustrations included herein show, by way of illustration and not of limitation, specific embodiments in which the subject matter may be practiced. As mentioned, other embodiments may be utilized and derived there from, such that structural and logical substitutions and changes may be made without departing from the scope of this disclosure. Such embodiments of the inventive subject matter may be referred to herein individually or collectively by the term "invention" merely for convenience and without intending to voluntarily limit the scope of this application to any single invention or inventive concept, if more than one is, in fact, disclosed. Thus, although specific embodiments have been illustrated and described herein, any arrangement calculated to achieve the same purpose may be substituted for the specific embodiments shown. This disclosure is intended to cover any and all adaptations or variations of various embodiments. Combinations of the above embodiments, and other embodiments not specifically described herein, will be apparent to those of skill in the art upon reviewing the above description.

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CLAIMS

What is claimed is:

1. A vaporizer apparatus, the apparatus comprising:

a cartridge having:

an elongate and flattened storage compartment configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment and wherein the storage compartment comprises a distal end and a proximal end;

a mouthpiece at the proximal end of the storage compartment;

an opening through the mouthpiece at a proximal end of the mouthpiece;

a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick; and

a vaporizer, the vaporizer having:

an elongate, flattened and opaque body having a distal end and a proximal end and a front side, a back side and a pair of lateral sides extending between the distal and proximal ends, wherein the elongate, flattened and opaque body is prevented from rolling when placed on a flat surface because the diameter of the front and back sides are larger than the diameter of the pair of lateral sides;

a cartridge receptacle formed at the proximal end of the elongate, flattened and opaque body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the elongate, flattened and opaque body, further wherein the cartridge receptacle comprises a proximal edge around the distal-facing opening;

wherein the proximal edge of the cartridge receptacle forms a notch in the front side of the elongate, flattened and opaque body extending towards the distal end of the elongate, flattened and opaque body so that a portion of the storage compartment is visible through the notch when the cartridge is housed within the cartridge receptacle;

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a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to electrical contacts on the cartridge when the cartridge is housed within the cartridge receptacle; and

a detent on each of the pair of lateral sides, wherein the detents project into the cartridge receptacle and each engage a mating region on the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle.

2. The apparatus of claim 1, wherein the mouthpiece comprises an opaque mouthpiece.

3. The apparatus of claim 1, wherein the storage compartment is filled with the liquid vaporizable material.

4. The apparatus of claim 1, wherein the storage compartment is filled with the liquid vaporizable material, further wherein the liquid vaporizable material comprises a nicotine solution.

5. The apparatus of claim 1, wherein the notch in the front side of the elongate, flattened and opaque body comprises a rectangular, triangular or oval cutout region.

6. The apparatus of claim 1, wherein a cannula within the storage compartment is visible through the notch when the cartridge is housed within the cartridge receptacle.

7. The apparatus of claim 1, wherein the elongate, flattened and opaque body has a rectangular cross-section.

8. The apparatus of claim 1, wherein the pair of electrical contacts in a proximal surface within the cartridge receptacle comprises pogo pins.

9. The apparatus of claim 1, wherein the mouthpiece comprises an opaque cover that is secured over the proximal end of the storage compartment, the opaque cover having a front side adjacent to a first side of the storage compartment extending between the proximal and distal ends of the storage compartment, wherein a distal end of the opaque cover terminates in a distal edge that extends around a perimeter of the storage

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compartment from a position only partially between the distal end and the proximal end of the storage compartment.

10. The apparatus of claim 9, further wherein the cartridge further comprises a cartridge notch in the front side of the mouthpiece extending from the distal edge of the opaque cover towards the proximal end of the mouthpiece, wherein the cartridge notch exposes a region of the storage compartment beneath the mouthpiece, further wherein the cartridge notch aligns with the notch formed in the proximal edge of the cartridge receptacle when the cartridge is housed within the cartridge receptacle.

11. A vaporizer apparatus, the apparatus comprising:

a cartridge having:

an elongate and flattened storage compartment configured to hold a liquid vaporizable material, wherein the liquid vaporizable material is visible through the storage compartment and wherein the storage compartment comprises a distal end and a proximal end;

a mouthpiece at the proximal end of the storage compartment;

an opening through the mouthpiece at a proximal end of the mouthpiece;

a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick;

a cannula within the storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula when the storage compartment is filled with liquid vaporizable material, further wherein the cannula forms a fluid connection between the heating chamber and the opening through the mouthpiece from which vaporized liquid vaporizable material may be inhaled; and

a vaporizer, the vaporizer having:

an elongate, flattened and opaque body having a distal end and a proximal end and a front side, a back side and opposite lateral sides extending between the distal and proximal ends, wherein the elongate, flattened and opaque

body is prevented from rolling when placed on a flat surface because the diameter of the front and back sides are larger than the diameter of the opposite lateral sides;

a cartridge receptacle formed at the proximal end of the elongate, flattened and opaque body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the elongate, flattened and opaque body, further wherein the cartridge receptacle comprises a proximal edge around the proximal-facing opening;

wherein the proximal edge of the cartridge receptacle forms a notch in the front side of the elongate, flattened and opaque body extending towards the distal end of the elongate, flattened and opaque body so that a portion of the storage compartment and the cannula within the storage compartment are visible through the notch when the cartridge is housed within the cartridge receptacle;

a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to electrical contacts on the cartridge when the cartridge is housed within the cartridge receptacle; and

a detent on each of the opposite lateral sides, wherein the detents project into the cartridge receptacle and each engage a mating region on the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle.

12. The apparatus of claim 11, wherein the mouthpiece comprises an opaque mouthpiece.

13. The apparatus of claim 11, wherein the storage compartment is filled with the liquid vaporizable material.

14. The apparatus of claim 11, wherein the notch in the front side of the elongate, flattened and opaque body comprises a rectangular, triangular or oval cutout region.

15. The apparatus of claim 11, wherein the elongate, flattened and opaque body has a rectangular cross-section.

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16. The apparatus of claim 11, wherein the pair of electrical contacts in a distal surface within the cartridge receptacle comprises pogo pins.

17. The apparatus of claim 11, wherein the mouthpiece comprises an opaque cover that is secured over the distal end of the storage compartment, the opaque cover having a front side adjacent to a first side of the storage compartment extending between the proximal and distal ends of the storage compartment, wherein a distal end of the opaque cover terminates in a distal edge that extends around a perimeter of the storage compartment from a position only partially between the distal end and the proximal end of the storage compartment.

18. The apparatus of claim 17, further wherein the cartridge further comprises a cartridge notch in the front side of the mouthpiece extending from the distal edge of the opaque cover towards the proximal end of the mouthpiece, wherein the cartridge notch exposes a region of the storage compartment beneath the mouthpiece, further wherein the cartridge notch aligns with the notch formed in the proximal edge of the cartridge receptacle when the cartridge is housed within the cartridge receptacle.

19. A vaporizer apparatus, the apparatus comprising:
    a cartridge having:
        an elongate and flattened storage compartment holding a liquid vaporizable material that is visible through the storage compartment, wherein the storage compartment comprises a distal end and a proximal end, and a first side extending between the distal end and the proximal end;
        a mouthpiece at the proximal end of the storage compartment, wherein the mouthpiece comprises an opaque cover that is secured over the proximal end of the storage compartment, the opaque mouthpiece having a front side adjacent to the first side of the storage compartment, wherein a distal end of the opaque cover terminates in a distal edge that extends around a perimeter of the storage compartment from a position only partially between the distal end and the proximal end of the storage compartment of the opaque cover;

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a cartridge notch in the front side of the mouthpiece extending from the distal edge of the opaque cover towards the proximal end of the mouthpiece, wherein the cartridge notch exposes a region of the storage compartment beneath the mouthpiece;

an opening through the mouthpiece at a distal end of the mouthpiece;

a heater at the distal end of the storage compartment, wherein the heater comprises a heating chamber, a wick within the heating chamber, and a resistive heating element in thermal contact with the wick;

a cannula within the storage compartment extending through the liquid vaporizable material from the heater to the proximal end of the storage compartment so that the liquid vaporizable material surrounds the cannula, further wherein the cannula forms a fluid connection between the heating chamber and the opening through the mouthpiece from which vaporized liquid vaporizable material may be inhaled, wherein the cannula is visible through the cartridge notch; and

a vaporizer, the vaporizer having:

an elongate, flattened and opaque body having a distal end and a proximal end and a front side, a back side and opposite lateral sides extending between the distal and proximal ends, wherein the elongate, flattened and opaque body is prevented from rolling when placed on a flat surface because the diameter of the front and back sides are larger than the diameter of the opposite lateral sides;

a cartridge receptacle formed at the proximal end of the elongate, flattened and opaque body, wherein the cartridge receptacle has a proximal-facing opening into the proximal end of the elongate, flattened and opaque body, further wherein the cartridge receptacle comprises a proximal edge around the distal-facing opening;

wherein the proximal edge of the cartridge receptacle forms a notch in the front side of the elongate, flattened and opaque body extending towards the distal end of the elongate, flattened and opaque body so that a portion

of the storage compartment and the cannula are visible through the notch when the cartridge is housed within the cartridge receptacle;

a pair of electrical contacts in a distal surface within the cartridge receptacle configured to connect to electrical contacts on the cartridge when the cartridge is housed within the cartridge receptacle; and

a friction capture between the cartridge receptacle and the storage compartment of the cartridge to hold the cartridge within the cartridge receptacle with the mouthpiece outside of the cartridge receptacle,

wherein the cartridge notch aligns with the notch formed in the proximal edge of the cartridge receptacle when the cartridge is housed within the cartridge receptacle.

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VAPORIZER APPARATUS

ABSTRACT

Vaporizers apparatuses, including cartridges and vaporizers having elongate and flattened (anti-roll) bodies as well as fluid-level windows formed between the cartridge and the vaporizer in which the cartridge is mechanically coupled to the vaporizer.

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Docket No.: 52210-508C18US/716.US18
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
James Monsees et al.

Application No.: 16/032,009 | Confirmation No.: 7691

Filed: July 10, 2018 | Art Unit: Not yet Assigned

For: CARTRIDGE FOR USE WITH A VAPORIZER DEVICE | Examiner: Not yet Assigned

FIRST PRELIMINARY AMENDMENT

FILED VIA EFS

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

Dear Sir or Madam:

Prior to examination on the merits, please amend the above-identified application as follows. Changes to the application have been identified with underlining to indicate insertions and by strikethrough to indicate deletions.

Amendments to the Drawings begin on page 2 of this paper.

Amendments to the Specification begin on page 3 of this paper.

Amendments to the Claims are reflected in the listing of the claims, which begins on page 4 of this paper.

Remarks begin on page 8 of this paper.

AMENDMENTS TO THE DRAWINGS

Applicant submits herewith formal replacement drawings to replace FIGs. 1-34 with cleaner copies so that they are more suitable for reproduction and to clarify references to cross-sections. Please replace the original first through twenty-fourth drawings sheets (with FIGs. 1-34) with the formal replacement drawing sheets submitted herewith.

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AMENDMENTS TO THE SPECIFICATION

Please amend the original specification by amending paragraphs [0001]-[0003] on page 1 of the originally filed application:

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This patent application is a continuation of U.S. Patent Application No. 15/257,760, filed 9/6/2016 and titled "VAPORIZER DEVICE", which claims priority as a continuation-in-part of U.S. Patent Application No. 14/581,666, filed 12/23/2014[[,]] and titled "VAPORIZATION DEVICE SYSTEMS AND METHODS", which claims ~~claimed~~ priority to ~~U.S. Provisional Patent Application No. 61/920,225, filed 12/23/2013, and titled "ELECTRONIC VAPORIZATION DEVICE WITH RAPID COOLING AERATION",~~ U.S. Provisional Patent Application No. 61/936,593, filed 2/6/2014[[,]] and titled "ELECTRONIC CIGARETTE JUICE DEVICE," and to U.S. Provisional Patent Application No. 61/937,755, filed 2/10/2014[[,]] and titled "ELECTRONIC CIGARETTE JUICE DEVICE". Each of these patent applications is herein incorporated by reference in its entirety.

[0002] U.S. Patent Application No. 15/257,760 ~~This patent application~~ also claims priority to U.S. Provisional Patent Application No. 62/294,285, filed 2/11/2016[[,]] and titled "FILLABLE ELECTRONIC CIGARETTE CARTRIDGE AND METHOD OF FILLING," and to U.S. Provisional Patent Application No. 62/294,281, filed 2/11/2016[[,]] and titled "SECURELY ATTACHING CARTRIDGES FOR VAPORIZER DEVICES". Each of these patent applications is herein incorporated by reference in its entirety.

[0003] U.S. Patent Application No. 15/257,760 ~~This patent application~~ also claims priority as a continuation-in-part to International Design Application No. 35/001,169 ~~(966973301)~~, filed 3/11/2016[[,]] and titled "VAPORIZER WITH WINDOWED CARTRIDGE", and claims priority as a continuation-in-part International Design Application No. 35/001,170 ~~(966973401)~~, filed 3/11/2016[[,]] and titled "WINDOWED VAPORIZER CARTRIDGE". Each of these patent applications is herein incorporated by reference in its entirety.

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AMENDMENTS TO THE CLAIMS

Please amend the claims as set forth below. This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of the Claims:

1. – 20. (**Canceled**)

21. (**New**) An apparatus comprising:

a cartridge comprising a mouthpiece, a storage compartment configured to hold a vaporizable material, and a heater chamber comprising a resistive heating element configured to heat the vaporizable material, wherein the heating of the vaporizable material generates an aerosol comprising the vaporizable material and air passing along an airflow path; and

a body comprising a receptacle configured to insertably receive and couple to the cartridge, wherein the heater chamber is disposed within the receptacle when the receptacle insertably receives and couples to the cartridge,

wherein the airflow path comprises:

an air inlet passage having a first side formed by an exterior surface of the cartridge and a second side formed by an internal surface of the receptacle when the receptacle insertably receives and couples to the cartridge, wherein the air inlet passage is configured to deliver the air towards the heater chamber; and

a fluid connection in the cartridge, the fluid connection connecting the heater chamber and the mouthpiece.

22. (**New**) The apparatus of claim 21, wherein the cartridge further comprises a wall protruding from the exterior surface of the cartridge, and wherein part of the wall is disposed within the receptacle when the receptacle insertably receives and couples to the cartridge.

23. (**New**) The apparatus of claim 21, wherein the cartridge has a proximal end and a distal end opposite the proximal end, wherein the mouthpiece is disposed at the proximal end, and wherein the heater chamber is disposed proximate to the distal end.

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24. (**New**) The apparatus of claim 23, wherein the receptacle terminates in a proximal edge, wherein the air inlet passage extends from the proximal edge of the receptacle towards the distal end of the cartridge when the receptacle insertably receives and couples to the cartridge.

25. (**New**) The apparatus of claim 23, wherein the mouthpiece comprises a condensation chamber, wherein the mouthpiece further comprises an aerosol outlet in fluid communication with the condensation chamber, wherein the condensation chamber is configured so that the aerosol is cooled, to a temperature between 35°C and 70°C, before exiting the first aerosol outlet and the second aerosol outlet.

26. (**New**) The apparatus of claim 23, wherein the cartridge has a longitudinal dimension extending from the proximal end of the cartridge to the distal end of the cartridge, and wherein the exterior surface of the cartridge and the internal surface of the receptacle are substantially parallel to the longitudinal dimension when the receptacle insertably receives and couples to the cartridge.

27. (**New**) The apparatus of claim 23, wherein the storage compartment comprises the exterior surface of the cartridge forming the first side of the air inlet passage.

28. (**New**) The apparatus of claim 23, wherein the storage compartment comprises four exterior walls between the distal end and the proximal end, and wherein the mouthpiece comprises four interior walls between the distal end and the proximal end, and wherein the mouthpiece is attached over part of the storage compartment by a snap fit coupling.

29. (**New**) The apparatus of claim 21, wherein the mouthpiece forms a cavity, wherein a first portion of the storage compartment is disposed inside of the cavity and a second portion of the storage compartment is disposed outside of the cavity.

30. (**New**) The apparatus of claim 29, wherein a surface feature inside of the cavity is configured to secure the mouthpiece to the storage compartment.

31. (**New**) The apparatus of claim 29, wherein the mouthpiece comprises a first coupling feature and second coupling feature, wherein the storage compartment comprises a third

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coupling feature and fourth coupling feature on opposite exterior surfaces of the storage compartment, wherein the first coupling feature is configured to couple with one of the third coupling feature and the fourth coupling feature, and wherein the second coupling feature is configured to couple with the other of the third coupling feature and the fourth coupling feature.

32. (**New**) The apparatus of claim 31, wherein the third surface feature comprises a first raised rail, and wherein the fourth surface feature comprises a second raised rail.

33. (**New**) The apparatus of claim 29, wherein the mouthpiece is opaque, and wherein the second portion comprises a surface configured so that the vaporizable material is visible through the surface.

34. (**New**) The apparatus of claim 33, wherein the receptacle is configured so that the second portion of the storage component is visible when the cartridge is coupled to the receptacle, through a notch in the receptacle.

35. (**New**) The apparatus of claim 21, wherein the cartridge comprises a first electrical contact and a second electrical contact at a first end of the cartridge, the mouthpiece disposed at a second end of the cartridge opposite the first end, wherein the first electrical contact and the second electrical contact are electrically isolated and disposed in a plane substantially parallel to the first end of the cartridge.

36. (**New**) The apparatus of claim 35, wherein the receptacle comprises a third electrical contact and a fourth electrical contact disposed in a second plane, the second plane substantially parallel to the first end of the cartridge when the cartridge is received within the receptacle.

37. (**New**) The apparatus of claim 21, wherein the wick comprises at least one of: a silica material, a cotton material, a ceramic material, a hemp material, and a stainless steel material.

38. (**New**) The apparatus of claim 21, wherein the body has a third end and a fourth end opposite the third end, wherein the receptacle is disposed at the third end, wherein a body longitudinal axis extends from the third end to the fourth end, and wherein a first body transverse

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axis and a second body traverse axis extend substantially perpendicular to the body longitudinal axis, the body having a greater dimension along the first body transverse axis than along the second body transverse axis.

39. **(New)** The apparatus of claim 21, wherein the storage compartment comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.

40. **(New)** An apparatus comprising:

a cartridge comprising a mouthpiece, a storage compartment configured to hold a vaporizable material, and a resistive heating element configured to heat the vaporizable material, wherein the heating of the vaporizable material generates an aerosol comprising the vaporizable material and air passing along an airflow path; and

a body comprising a receptacle configured to insertably receive and couple to the cartridge, wherein the resistive heating element is disposed within the receptacle when the receptacle insertably receives and couples to the cartridge,

wherein the airflow path comprises:

an air inlet passage having a first side formed by an exterior surface of the cartridge and a second side formed by an internal surface of the receptacle when the receptacle insertably receives and couples to the cartridge, wherein the air inlet passage is configured to deliver the air towards the resistive heating element; and

a fluid connection in the cartridge, the fluid connection connecting the resistive heating element and the mouthpiece.

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REMARKS

By this Amendment, Applicant has amended the Specification to match the information listed in the originally-filed application data sheet and the Drawings to replace FIGs. 1-34 with cleaner copies so that they are more suitable for reproduction and to clarify references to cross-sections. By this Amendment, Applicant has also canceled Claims 1-20 without prejudice to pursue the subject matter thereof at a later date, and added new Claims 21-40. Support for the amendments is present in at least the originally-filed specification and figures. Accordingly, no new matter is added. Upon entry of the amendments, Claims 21-40 remain pending.

Applicant respectfully submits that each of pending Claims 21-40 are allowable, and requests the allowance thereof. Nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper.

No additional fees are believed to be due at this time. However, the Commissioner is hereby authorized to charge any fees that may be due, or credit any overpayment of same, to Deposit Account No. 50-0311, Reference No. 52210-508C18US/716.US18. If there are any questions regarding this Amendment, the Examiner is encouraged to contact the undersigned at the telephone number provided below.

Respectfully submitted,

Dated: July 10, 2018

/npm/

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Electronic Acknowledgement Receipt	
EFS ID:	33142059
Application Number:	16032009
International Application Number:	
Confirmation Number:	7691
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
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Filer:	Nicholas Paul Mouton
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Receipt Date:	10-JUL-2018
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Time Stamp:	23:56:14
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	Drawings-other than black and white line drawings	508C18US_ReplacementFIGS2.pdf	10187302 e2bae75e1179f0e275def913d125e6926f6ff8ff	no	12
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
2	Drawings-other than black and white line drawings	508C18US_ReplacementFIGS.pdf	19614643 e97214061a972a4bdc03169b2af3a55480a8b5ad	no	12
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
3		508C18.pdf	131759 a7c1090ca0dfadae86c813da671104358c8634ec	yes	8

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Drawings-only black and white line drawings	2	2
Specification	3	3
Claims	4	7
Applicant Arguments/Remarks Made in an Amendment	8	8

Warnings:	
Information:	
Total Files Size (in bytes):	29933704

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.

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 16032009 Document Date: 07/10/2018

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: August 26, 2013

NJOY Exhibit 1002.152

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 16032009 Document Date: 07/10/2018

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

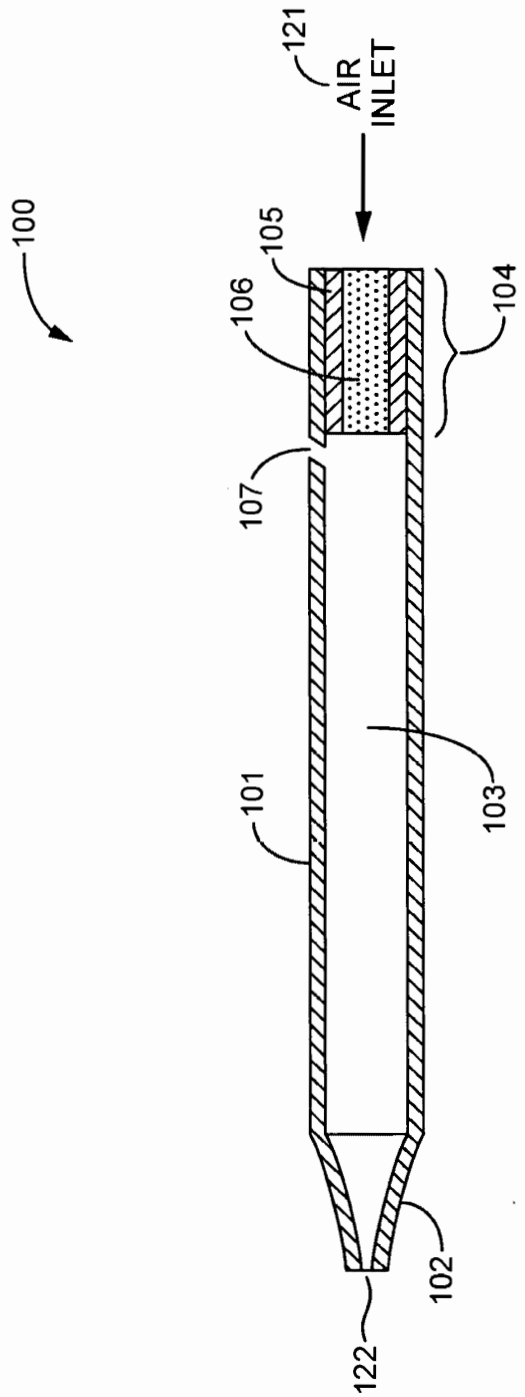
Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: August 26, 2013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102
122

FIG. 1

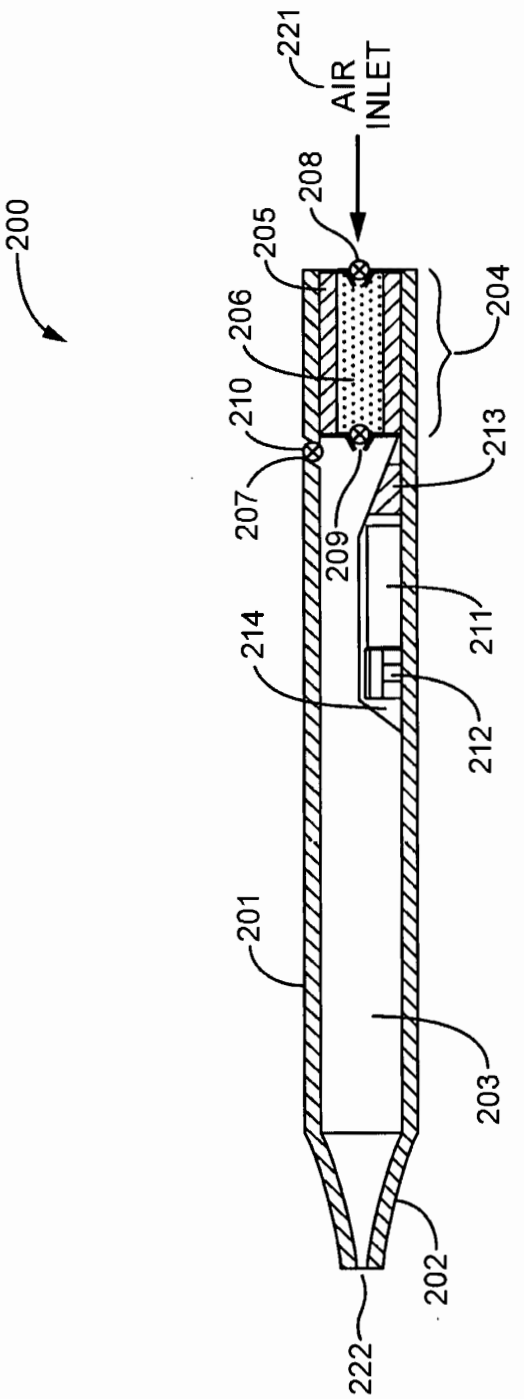
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FIG. 2

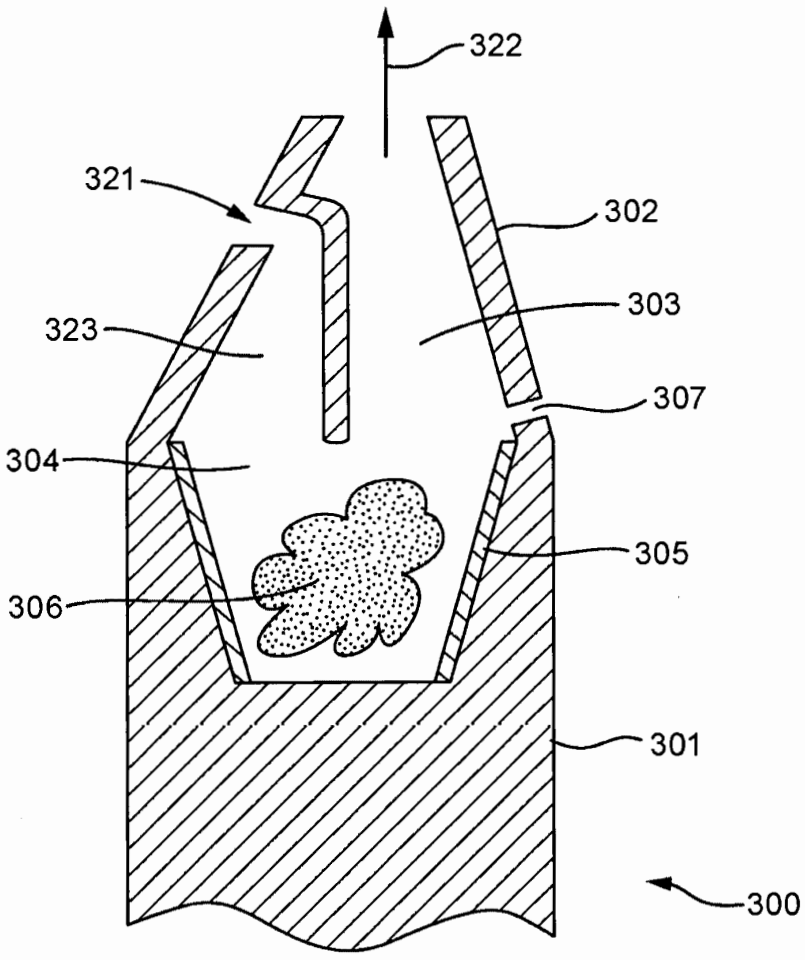


FIG. 3

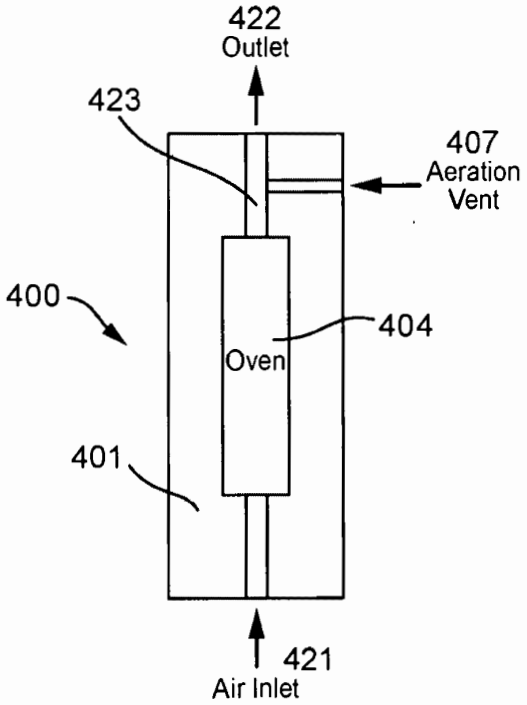


FIG. 4A

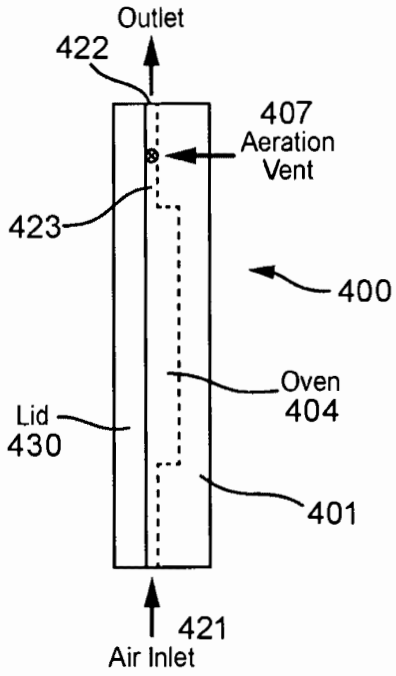


FIG. 4B

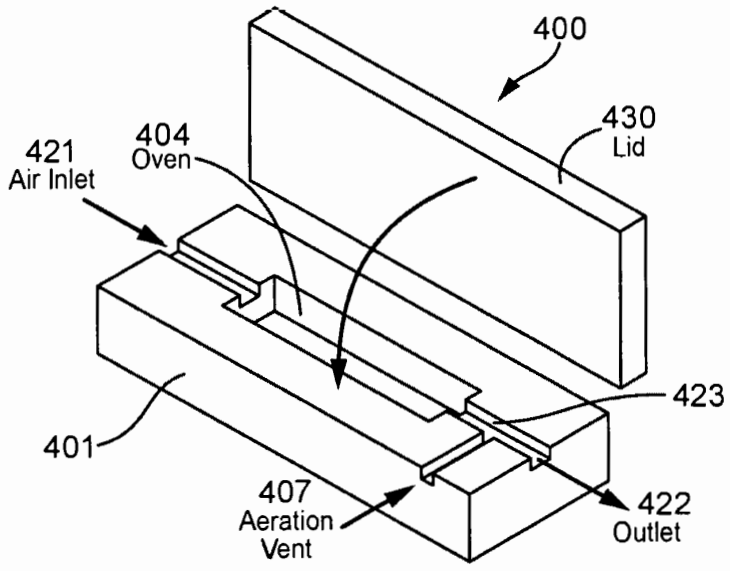


FIG. 4C

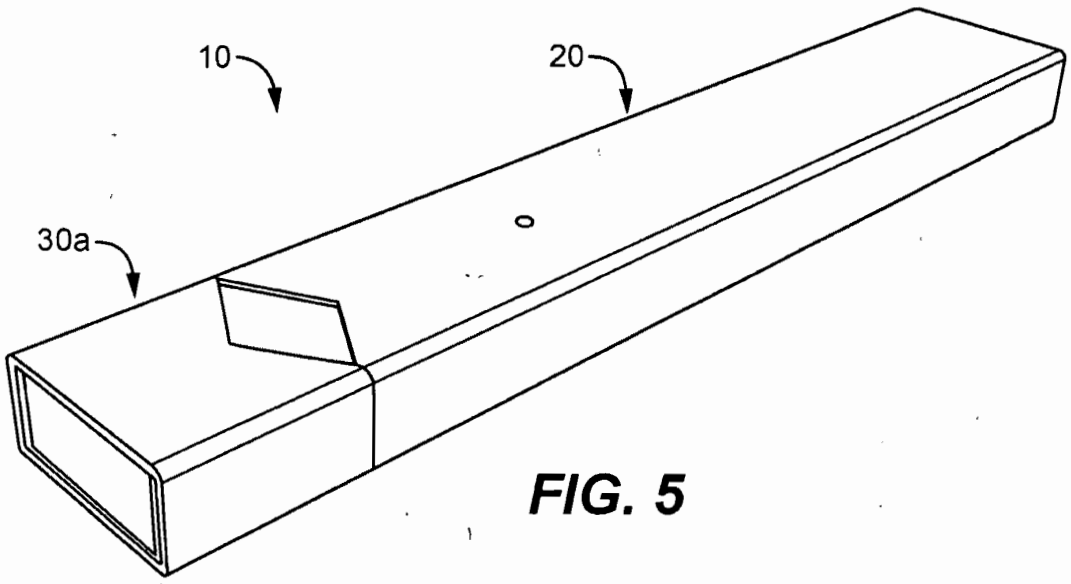
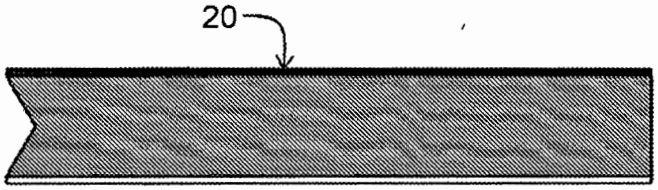


FIG. 5



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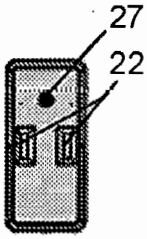


FIG. 6C

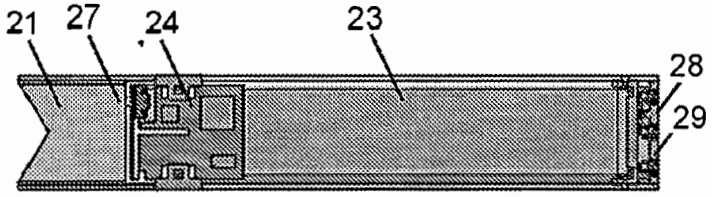
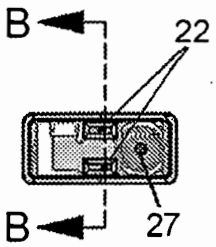
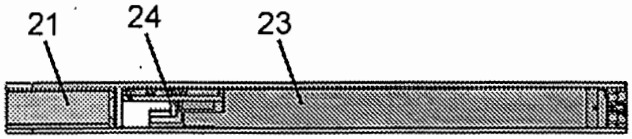


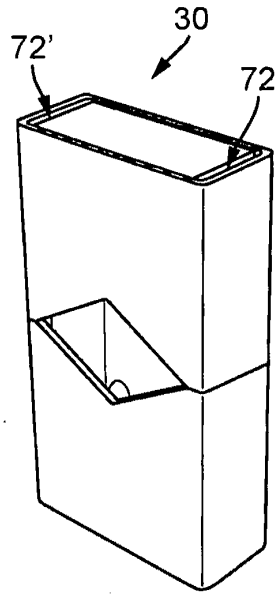
FIG. 6B

FIG. 6D





Section B-B



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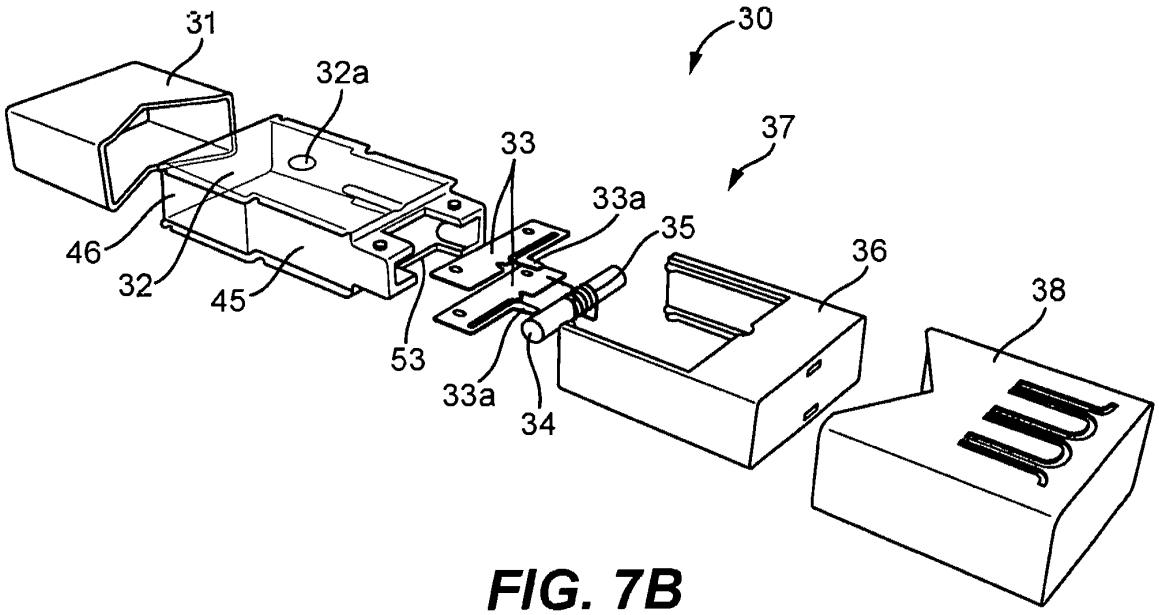


FIG. 7B

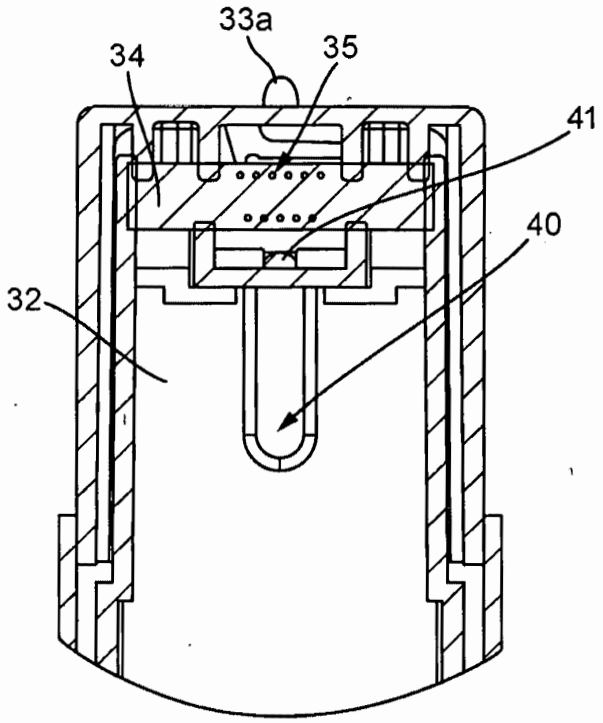


FIG. 7C

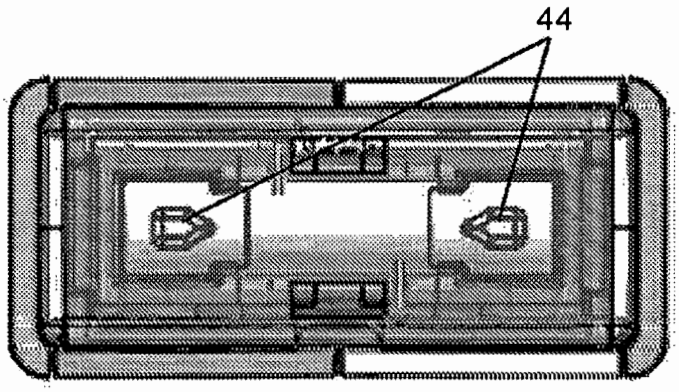


FIG. 8A

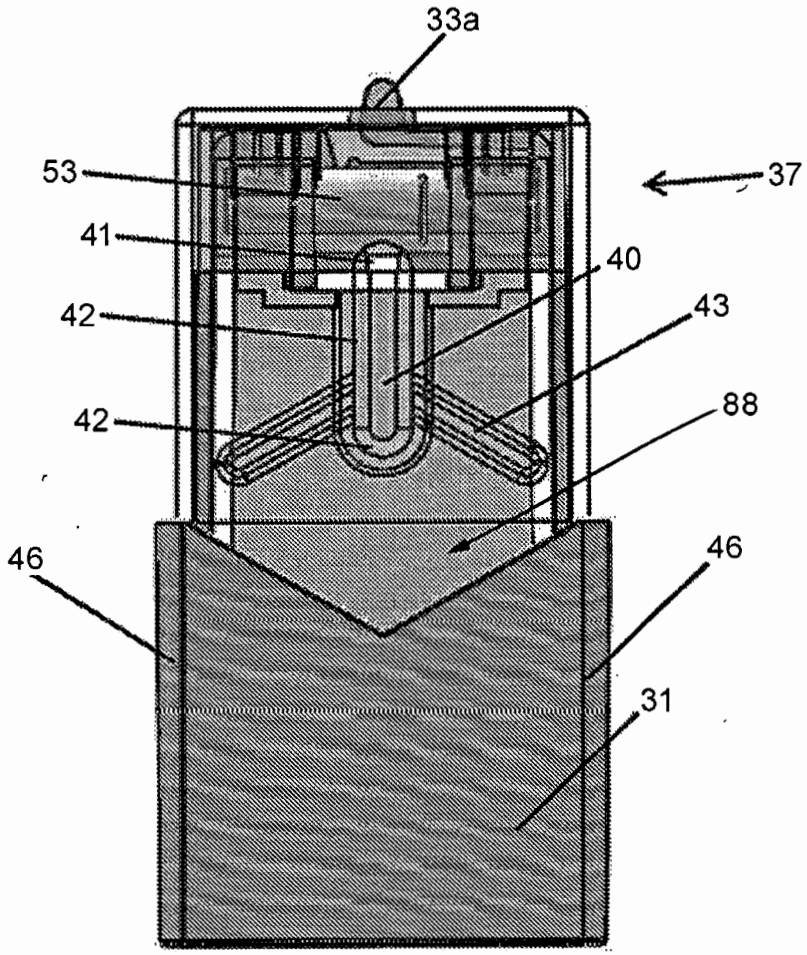
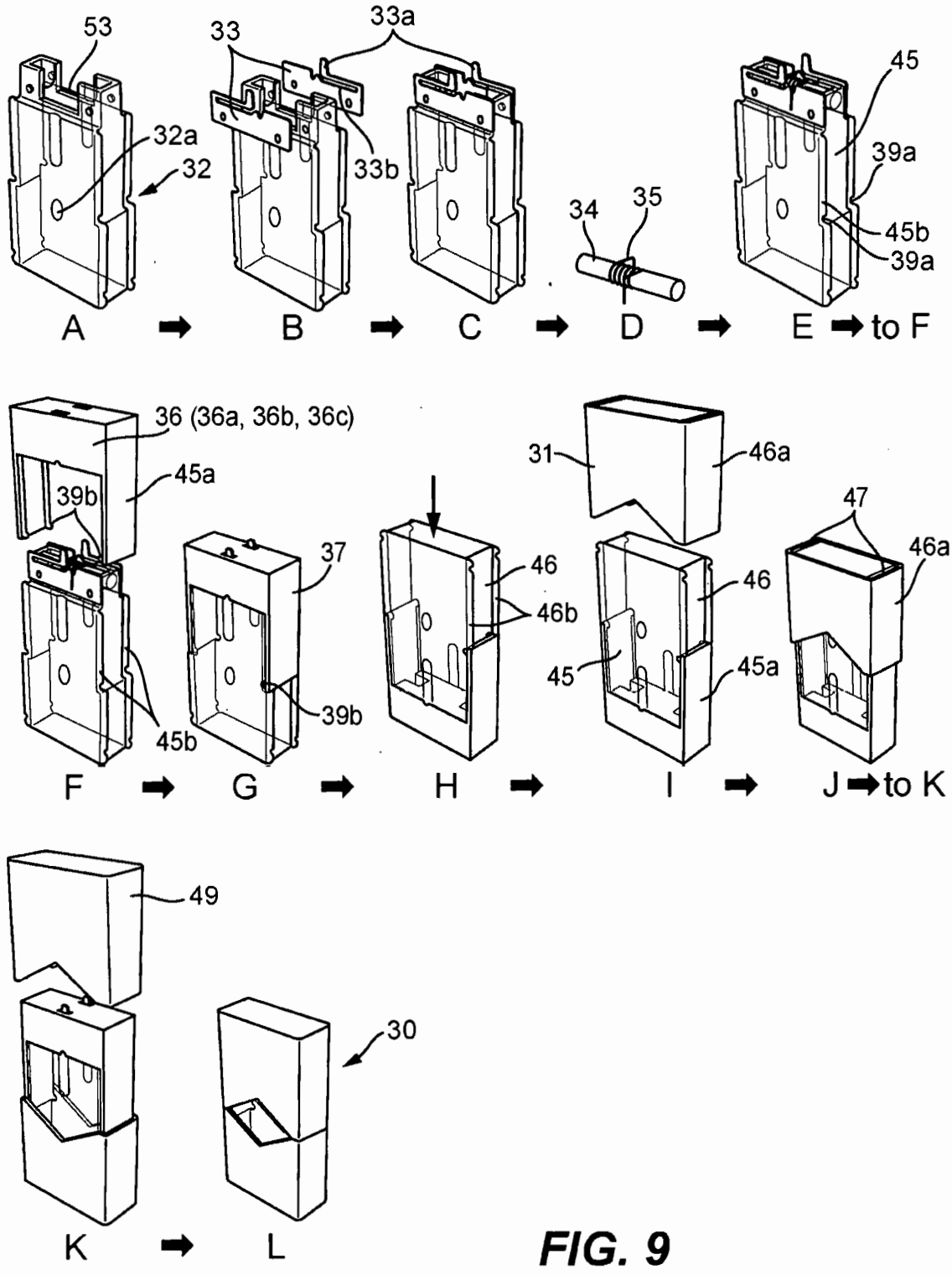


FIG. 8B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33
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32a
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33b
34
35
45
39a
45b
39a
A
B
C
D
E
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45a
39b
37
39b
45b
31
46a
46
46b
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46a
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F
G
H
I
J
to K
49
30
K
L

FIG. 9

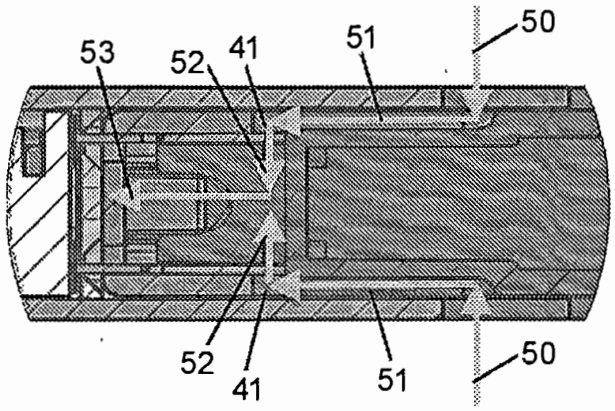


FIG. 10A

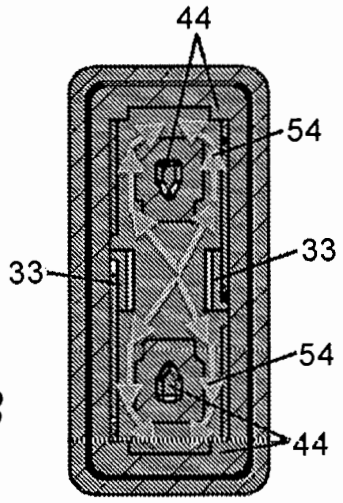


FIG. 10B

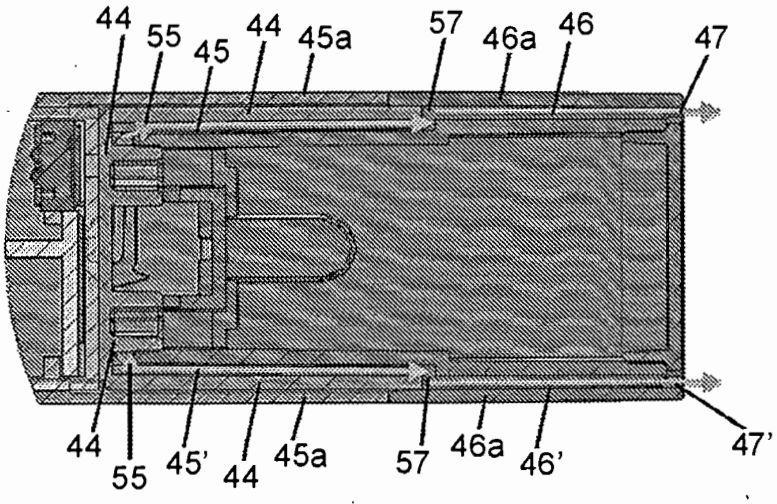


FIG. 10C

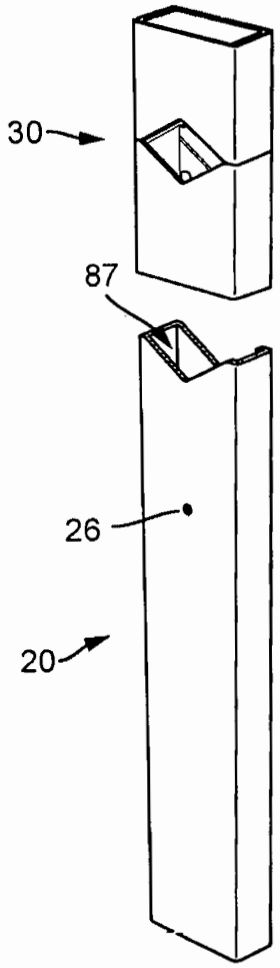


FIG. 11

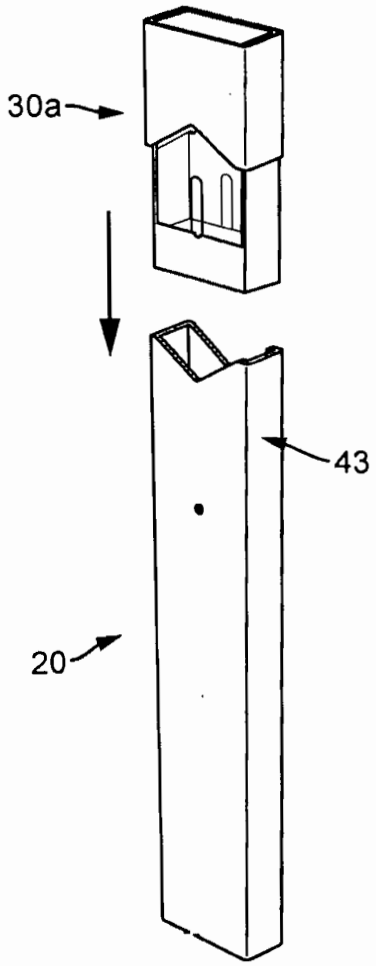


FIG. 12

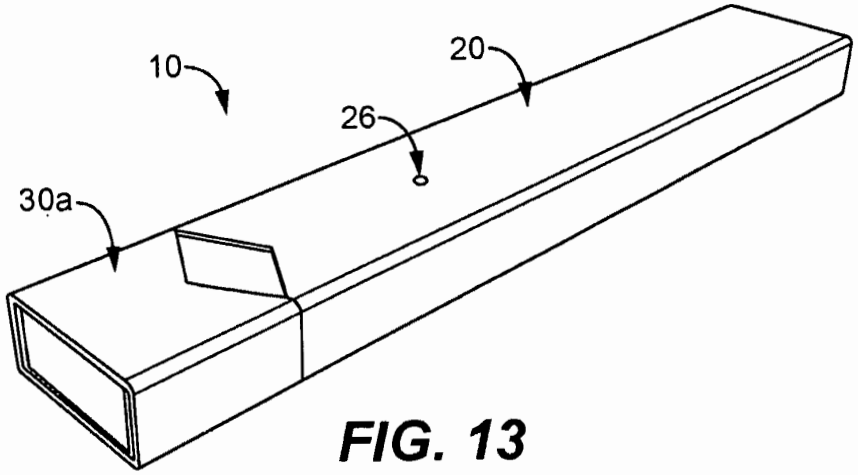


FIG. 13

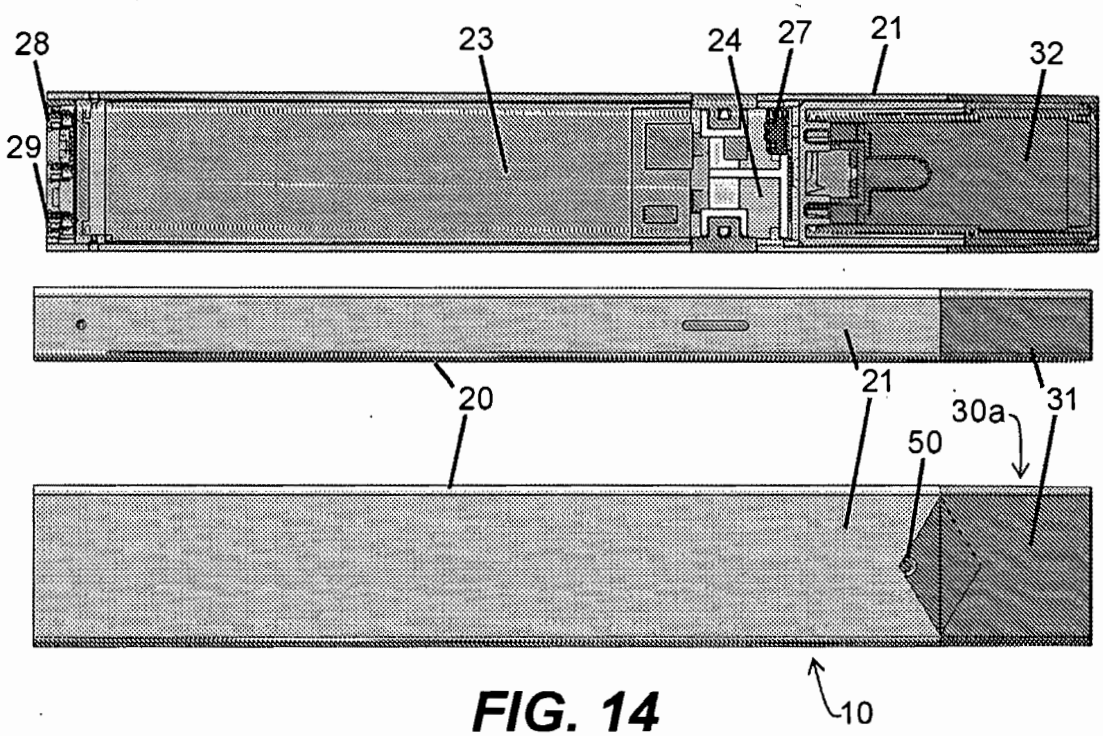


FIG. 14

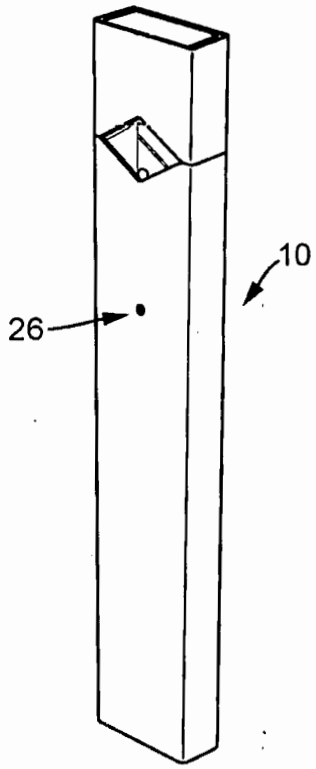


FIG. 15

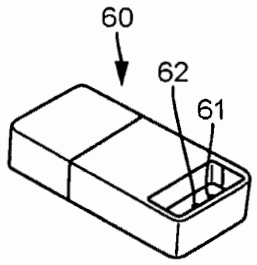


FIG. 16A

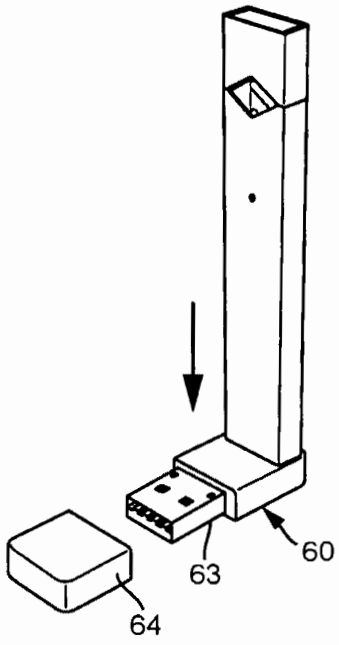


FIG. 16B

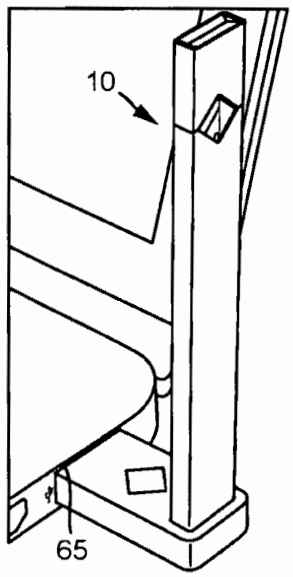


FIG. 16C

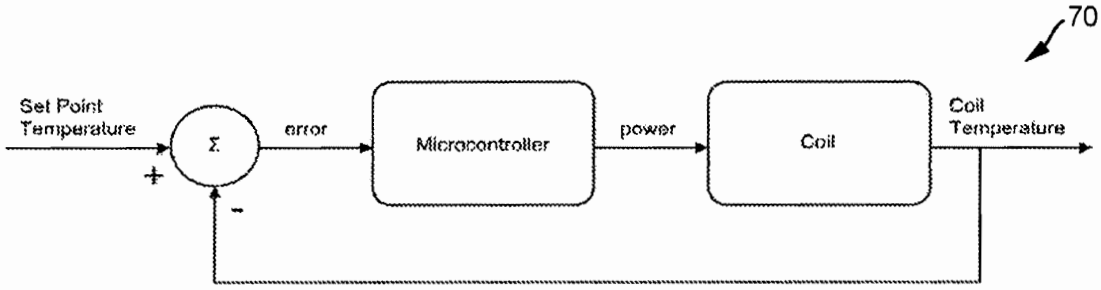


FIG. 17A

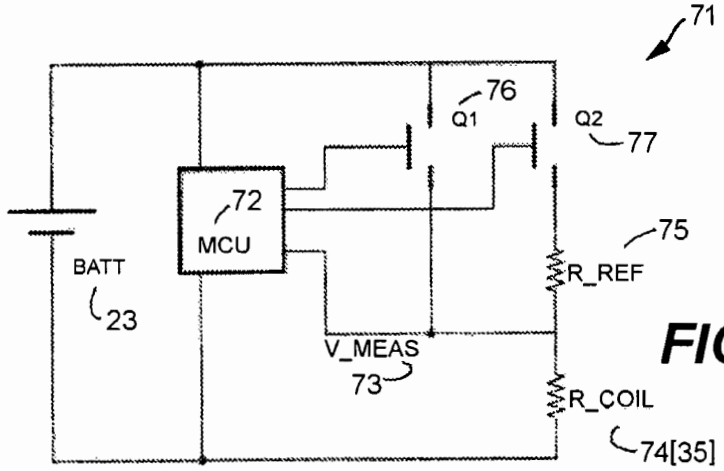


FIG. 17B

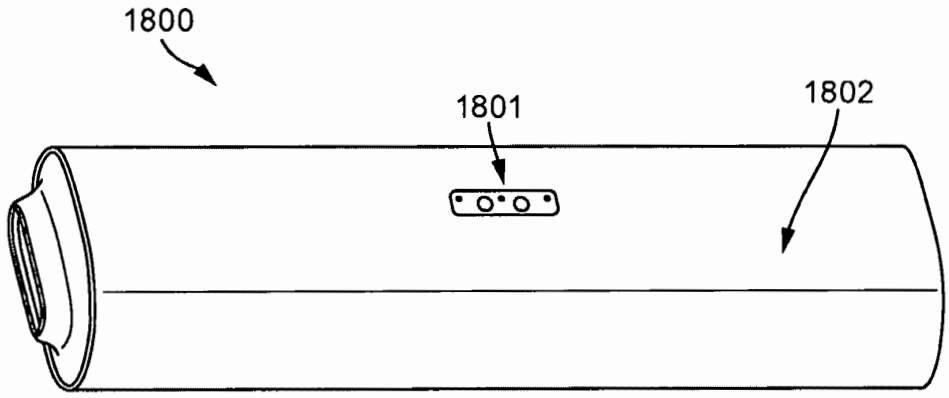


FIG. 18

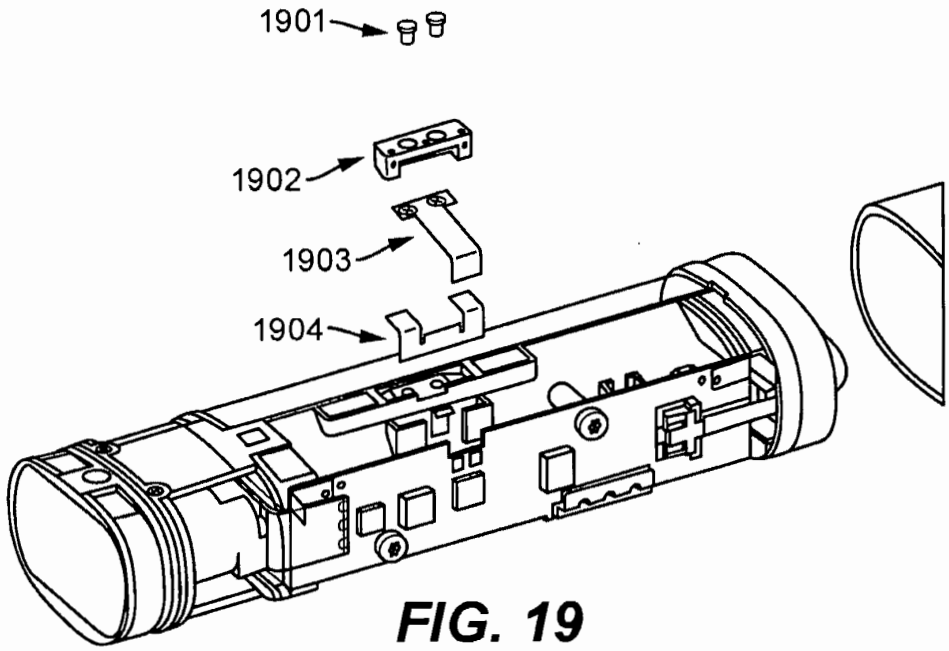
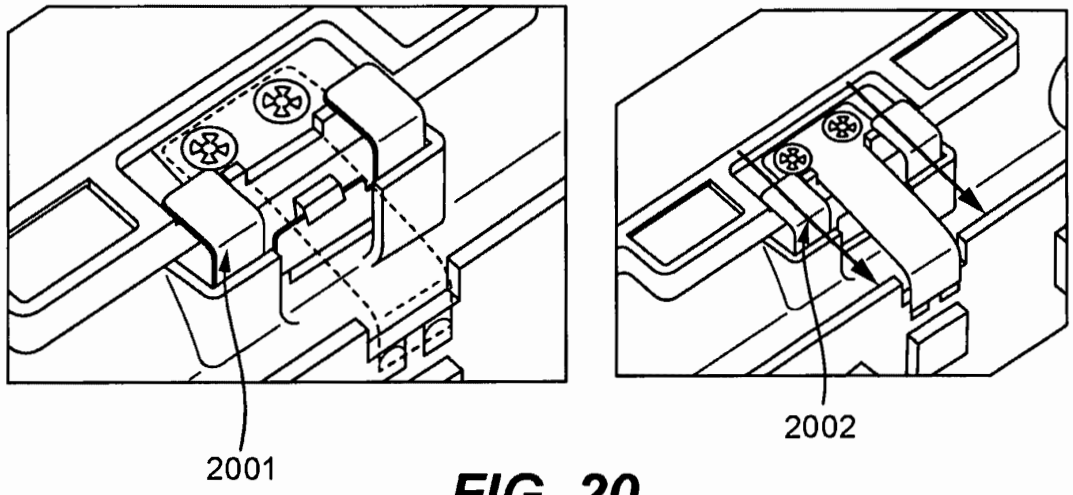


FIG. 19



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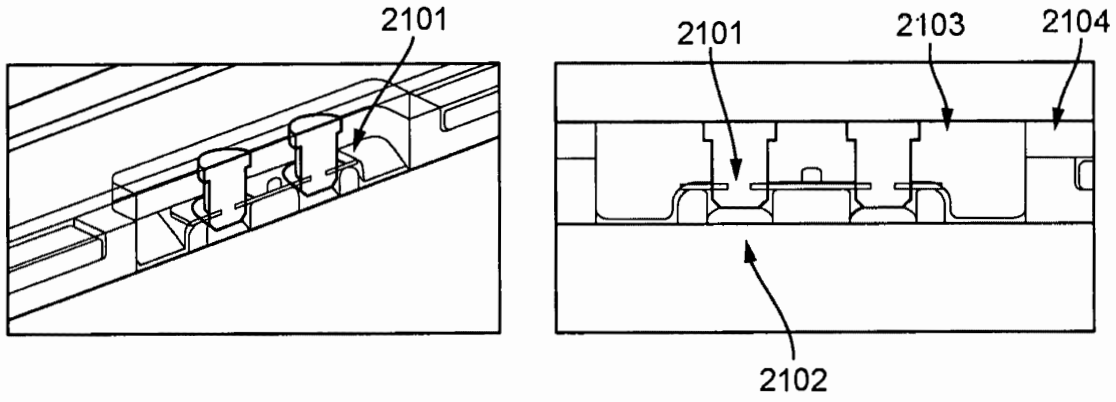

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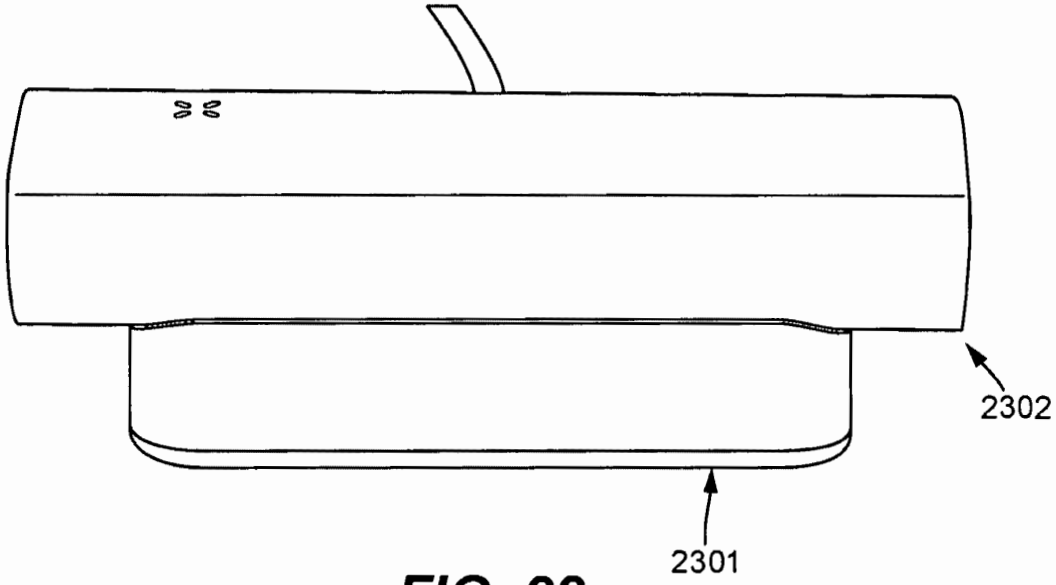
2302
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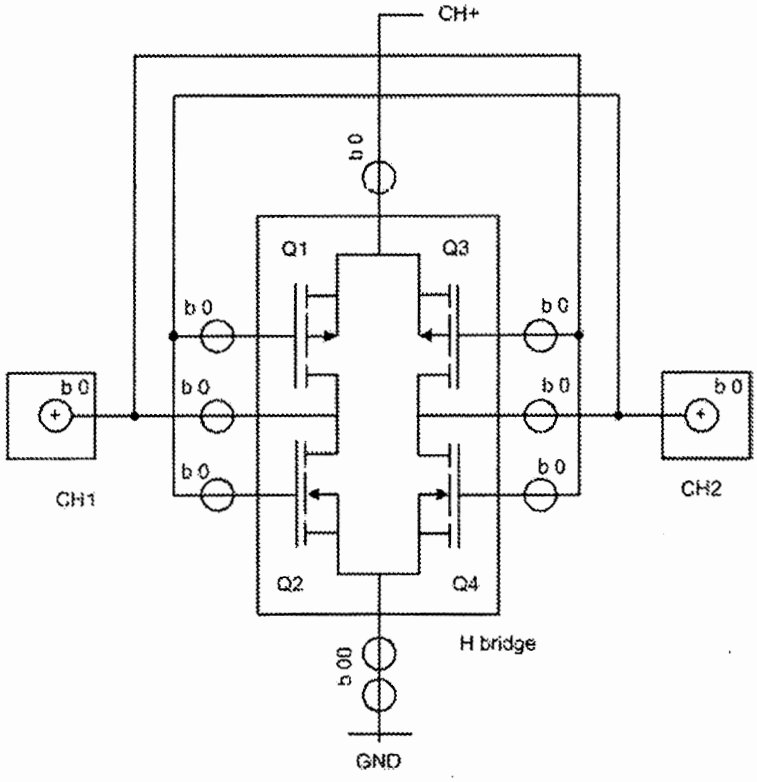
FIG. 22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Q3
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b 0
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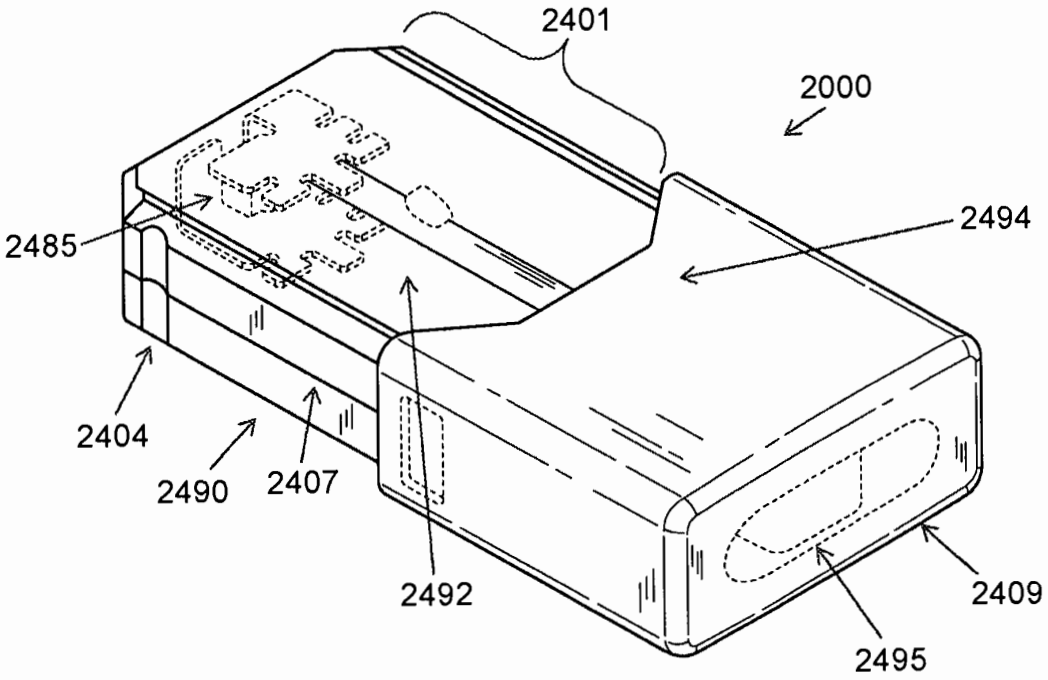
b 0
b 0
b 0
CH1
CH2
Q2
Q4
H bridge
b 00
GND

FIG. 23



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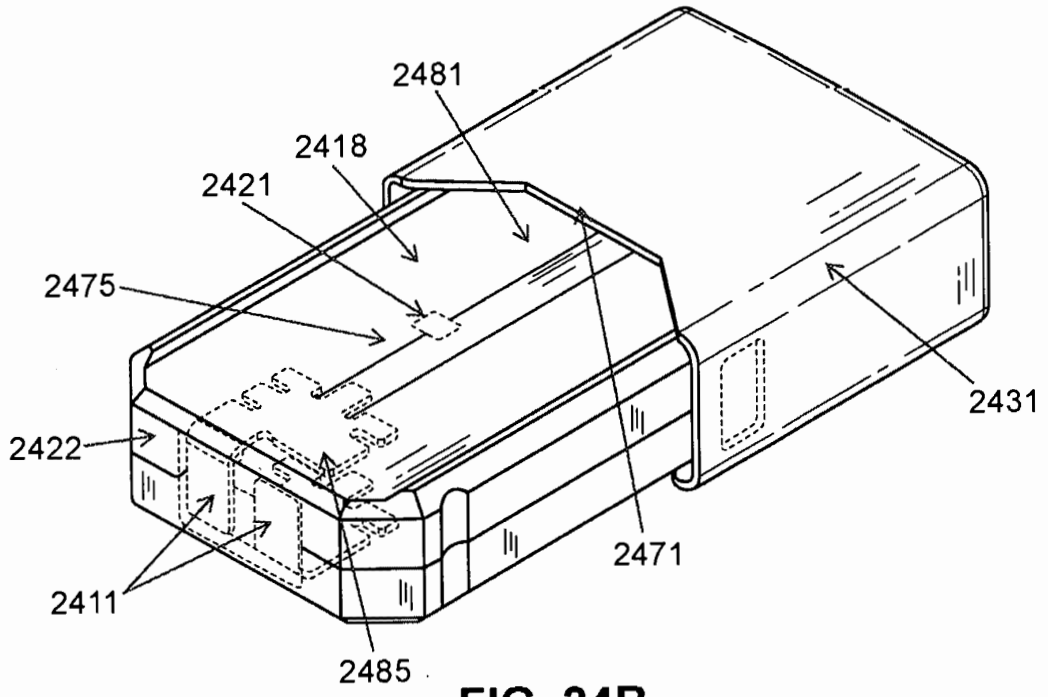
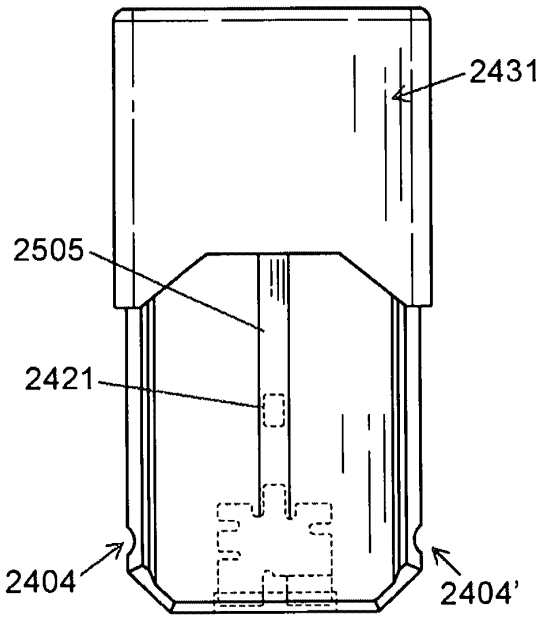


FIG. 24B



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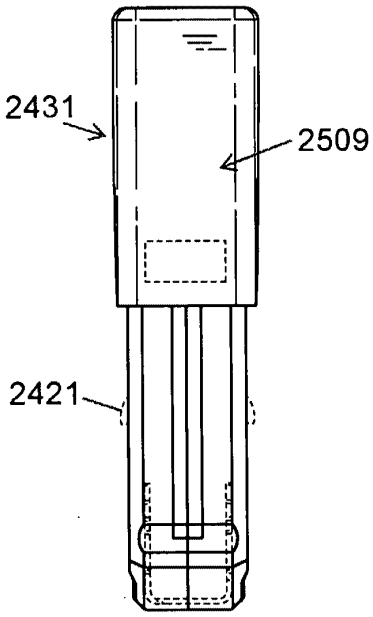
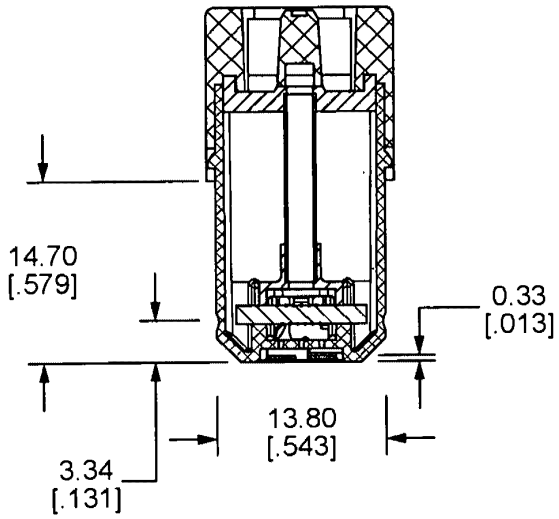


FIG. 25B



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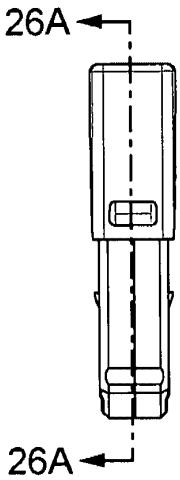
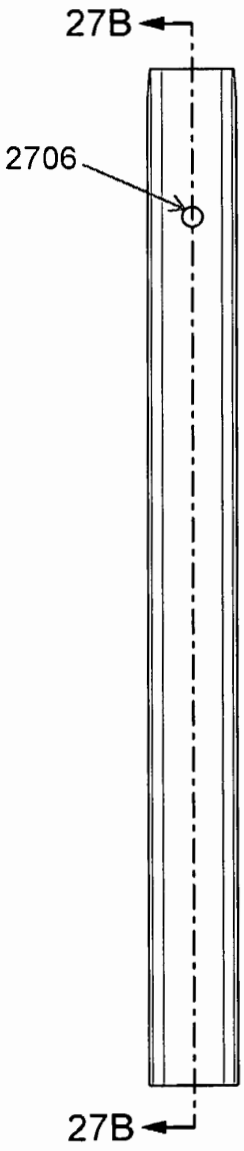


FIG. 26B



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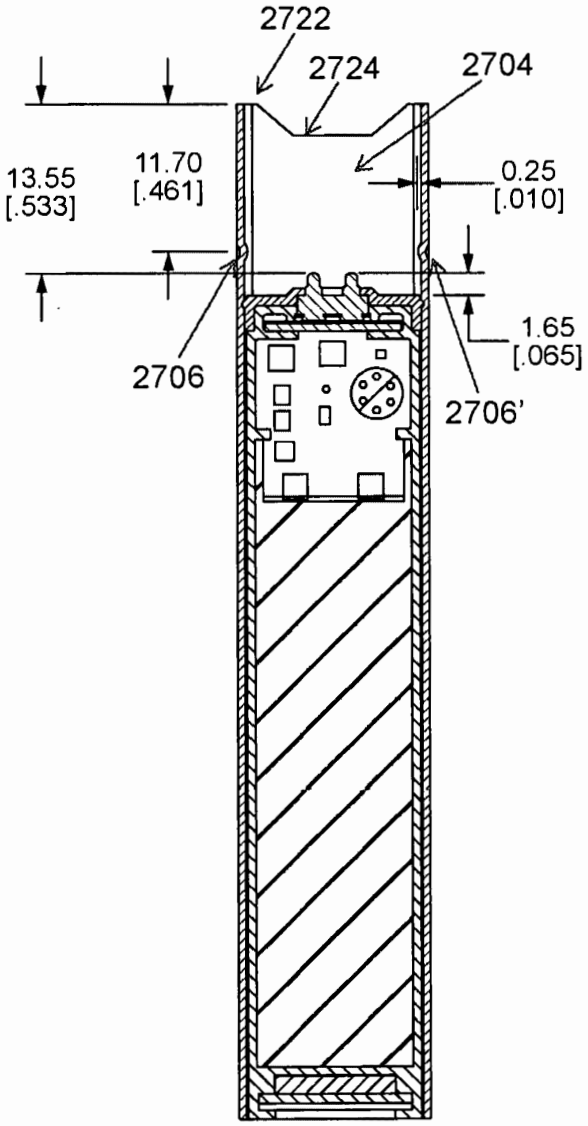

FIG. 27B

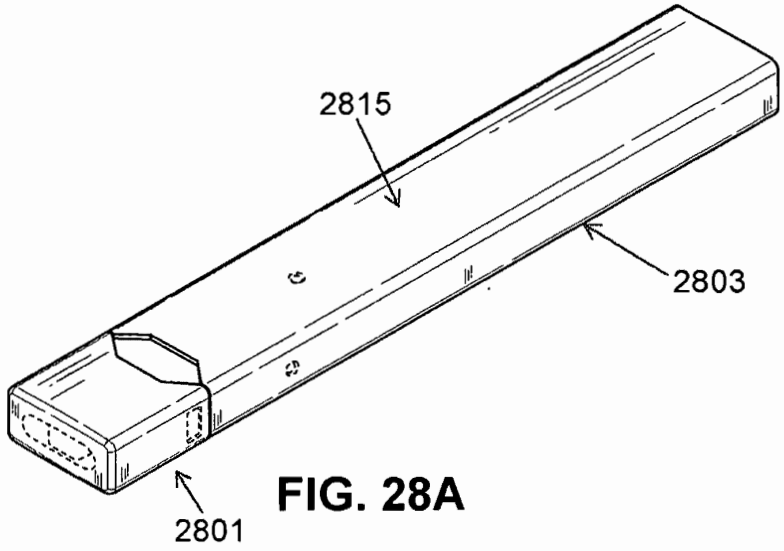

FIG. 28A

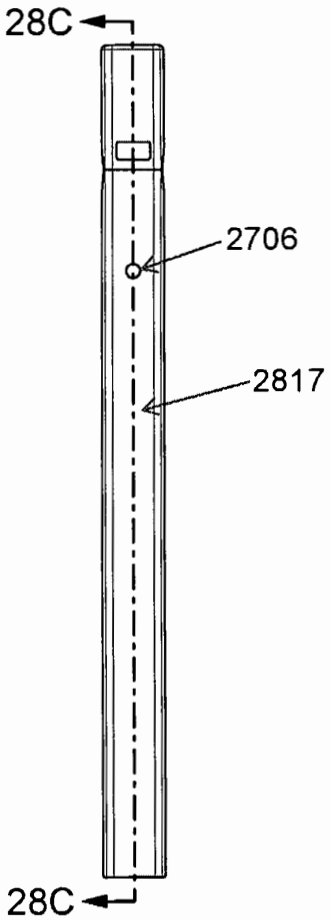

FIG. 28B

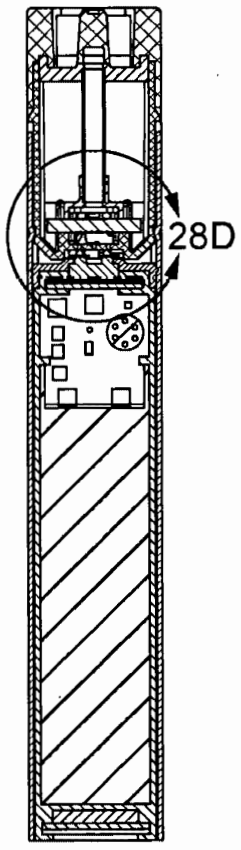

FIG. 28C

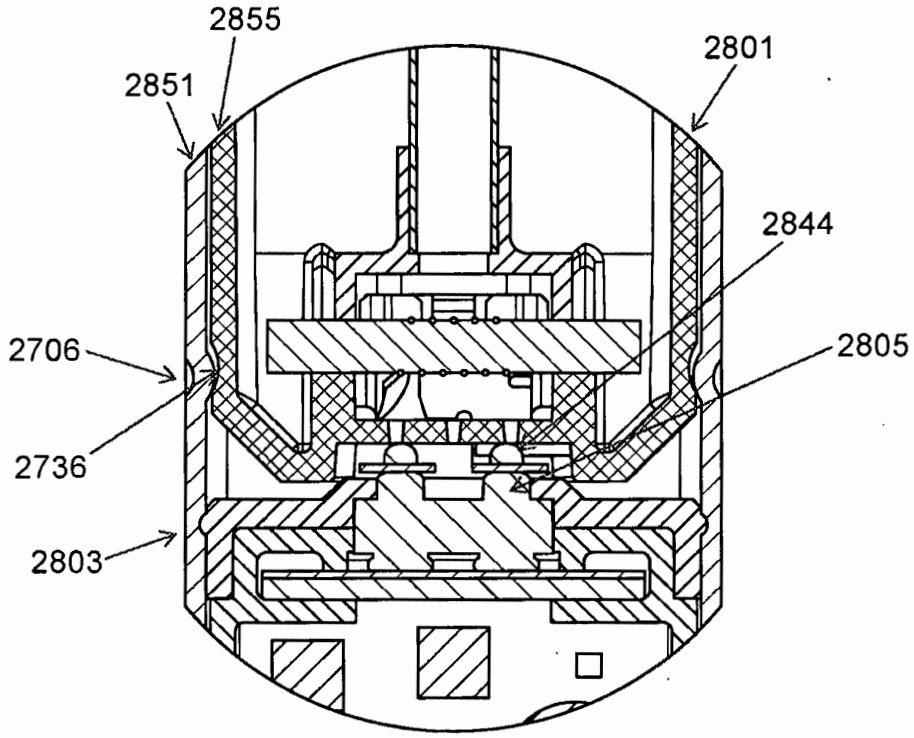

FIG. 28D

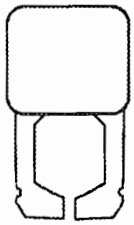

FIG. 29A

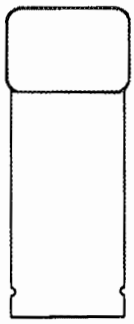

FIG. 29B

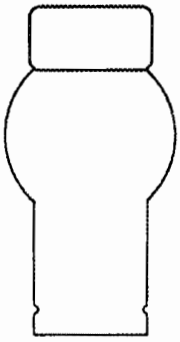

FIG. 29C

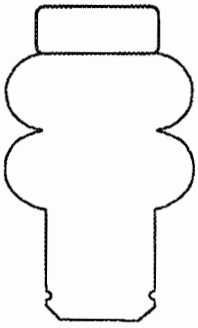

FIG. 29D

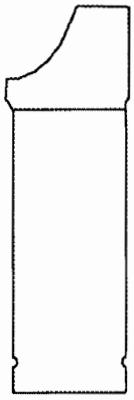

FIG. 29E

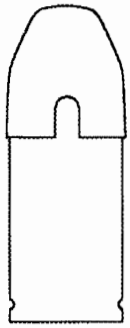

FIG. 29F

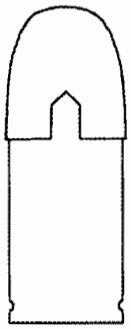

FIG. 29G

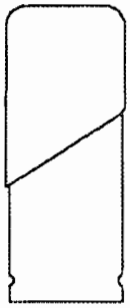

FIG. 29H

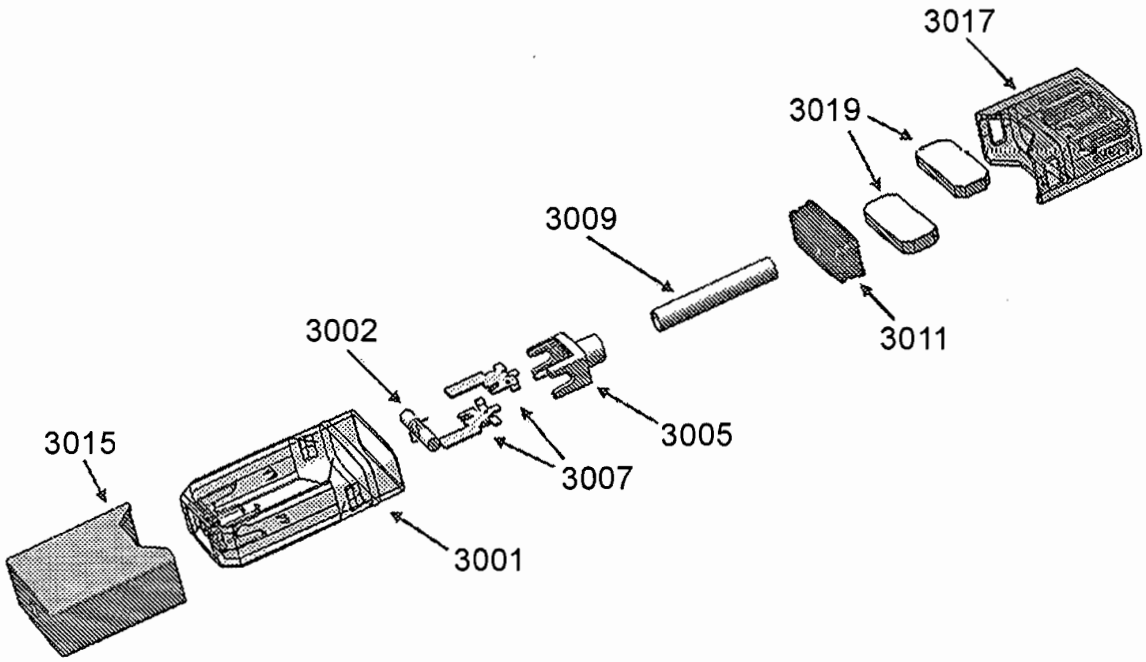

FIG. 30

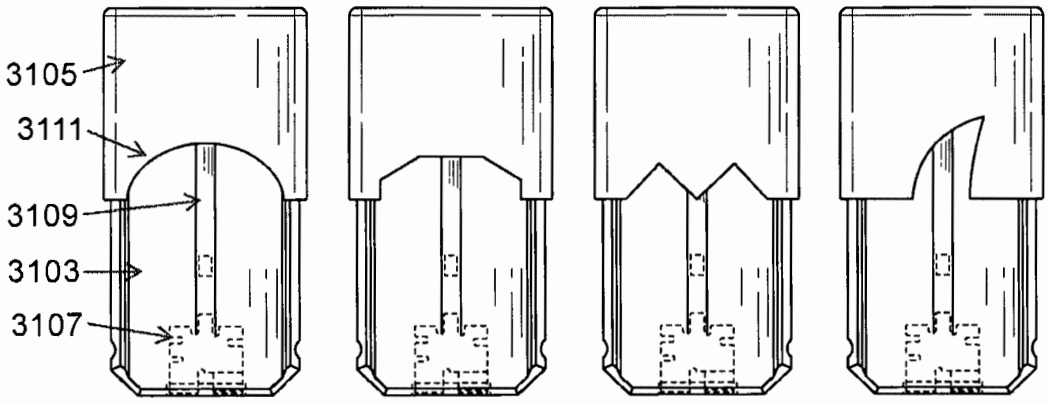

FIG. 31A FIG. 31B FIG. 31C FIG. 31D

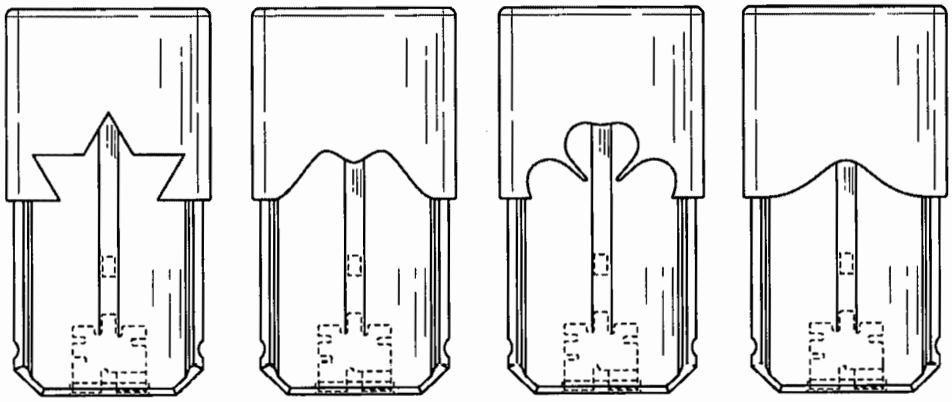

FIG. 31E FIG. 31F FIG. 31G FIG. 31H

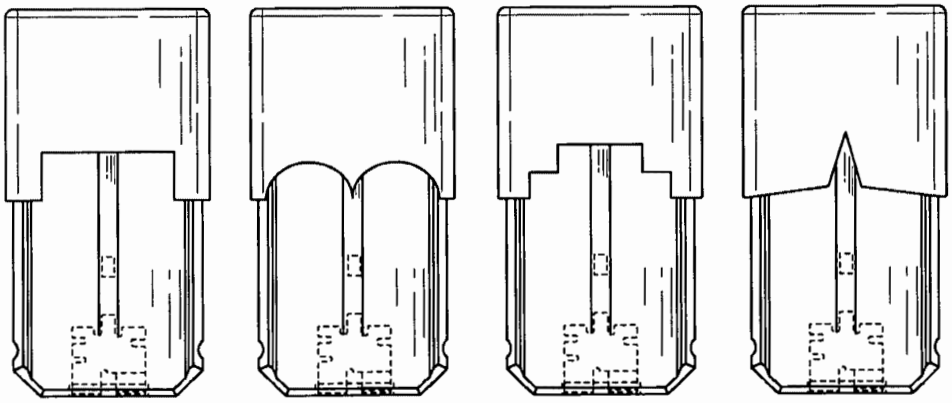

FIG. 31I FIG. 31J FIG. 31K FIG. 31L

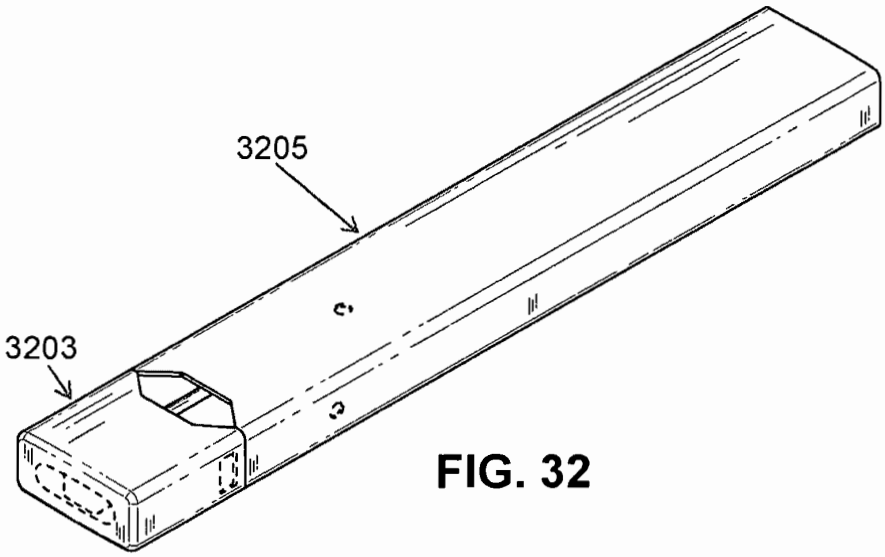

FIG. 32

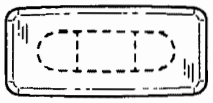

FIG. 33A

FIG. 33B

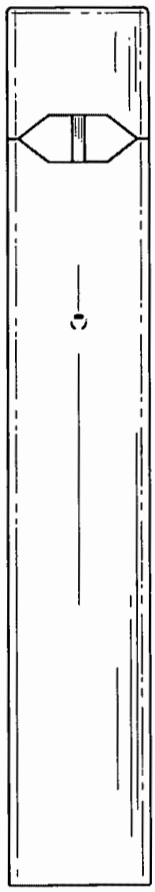

FIG. 33C

FIG. 33D

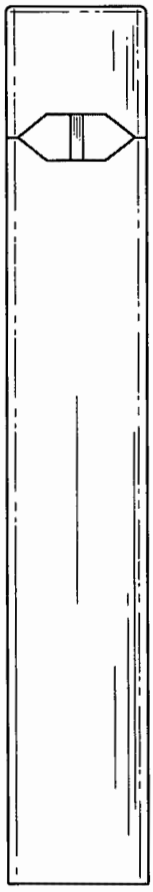

FIG. 33E

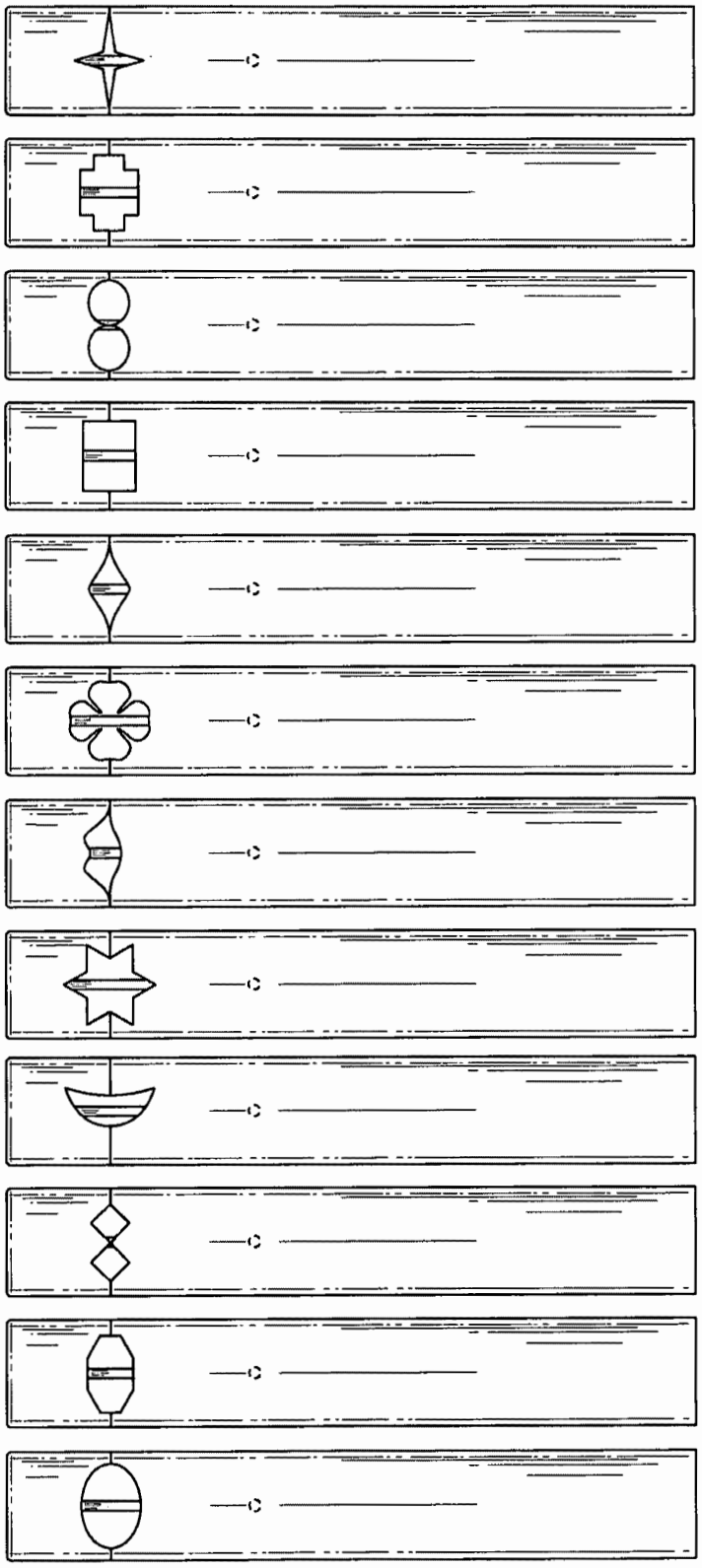

FIG. 34A-L

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/032,009	07/10/2018		1720	52210-508C18US/716.US18	20	2

CONFIRMATION NO. 7691

148514
Mintz/JUUL/PAX
One Financial Center
Boston, MA 02111

FILING RECEIPT

OC000000101244152

Date Mailed: 07/30/2018

Receipt is acknowledged of this non-provisional 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)

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Steven Christensen, San Francisco, CA;
Joshua Morenstein, San Francisco, CA;
Christopher Nicholas HibmaCronan, Oakland, CA;

Applicant(s)

JUUL Labs, Inc., San Francisco, CA;

Power of Attorney: The patent practitioners associated with Customer Number 148514

Domestic Priority data as claimed by applicant

This application is a CON of 15/257,760 09/06/2016
which is a CIP of 14/581,666 12/23/2014
which claims benefit of 61/936,593 02/06/2014
and claims benefit of 61/937,755 02/10/2014
and said 15/257,760 09/06/2016
claims benefit of 62/294,285 02/11/2016
and claims benefit of 62/294,281 02/11/2016
and is a CIP of 35/001,169 07/28/2016 PAT D825102
and is a CIP of 35/001,170 07/28/2016

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.

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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.

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/032,009**
Projected Publication Date: 11/08/2018
Non-Publication Request: No
Early Publication Request: No
Title

VAPORIZER APPARATUS

Preliminary Class

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

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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.

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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.

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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,

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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).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/032,009

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			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	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			TOTAL	1720

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($)	ADDITIONAL FEE($)		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.

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Jul 30, 2018 04:15:51 AM

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Application	Document	Mailroom Date	Attorney Docket No.
16032009	APP.FILE.REC	07/30/2018	52210-508C18US/716.US18

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/032,009	07/10/2018	James Monsees	52210-508C18US/716.US18	7691

148514 7590 08/14/2018

Mintz/JUUL/PAX
One Financial Center
Boston, MA 02111

EXAMINER	
FELTON, MICHAEL J	

ART UNIT	PAPER NUMBER
1747	

NOTIFICATION DATE	DELIVERY MODE
08/14/2018	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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IPFileroombos@mintz.com

NJOY Exhibit 1002.184

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Alexandria, VA 22313-1450
www.uspto.gov

Doc Code:
TRACK1.GRANT

Decision Granting Request for Prioritized Examination (Track I or After RCE)	Application No.:16/032,009

1. THE REQUEST FILED July 10, 2018 IS **GRANTED.**

The above-identified application has met the requirements for prioritized examination
A. ☒ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;
B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;
C. filing a **request for continued examination**;
D. filing a notice of appeal;
E. filing a request for suspension of action;
F. mailing of a notice of allowance;
G. mailing of a final Office action;
H. completion of examination as defined in 37 CFR 41.102; or
I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to Kimberly Inabinet at 571-272-4618.

/Kimberly Inabinet/ Paralegal Specialist, Office of Petitions

NJOY Exhibit 1002.185

Office of Petitions: Decision Count Sheet

Mailing Month: 8

Application No.: 16032009

16032009

For US serial numbers: enter number only, no slashes or commas. Ex: 10123456
For PCT: enter "51+single digit of year of filing+last 5 numbers", Ex. for PCT/US05/12345, enter 51512345

Deciding Official: Kimberly Inabinet

Count (1) - Palm Credit 16032009

Decision: GRANT

FINANCE WORK NEEDED
☐ Select Check Box for YES

GRANT

Decision Type: 643 - Track One request

643

Notes:

Count (2)

Decision: n/a

FINANCE WORK NEEDED
☐ Select Check Box for YES

Decision Type: NONE

Notes:

Count (3)

Decision: n/a

FINANCE WORK NEEDED
☐ Select Check Box for YES

Decision Type: NONE

Notes:

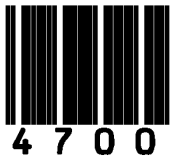
Initials of Approving Official (if required)

If more than 3 decisions, attach 2nd count sheet & mark this box ☐

Printed on: 8/9/2018

Office of Petitions Internal Document - Ver. 5.0

Office of Petitions: Routing Sheet



Application No. 16032009

This application is being forwarded to your office for further processing. A decision has been rendered on a petition filed in this application, as indicated below. For details of this decision, please see the document PET.OP.DEC filed on the same date as this document.

- [X] **GRANTED**
- [ ] **DISMISSED**
- [ ] **DENIED**

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Application	Document	Mailroom Date	Attorney Docket No.
16032009	PET.OP.DEC	08/14/2018	52210-508C18US/716.US18
	TRACK1.GRANT	08/14/2018	52210-508C18US/716.US18

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/032,009	07/10/2018	James Monsees	52210-508C18US/716.US18

CONFIRMATION NO. 7691

148514
Mintz/JUUL/PAX
One Financial Center
Boston, MA 02111

PUBLICATION NOTICE

Title:VAPORIZER APPARATUS

Publication No.US-2018-0317557-A1
Publication Date:11/08/2018

NOTICE OF PUBLICATION OF APPLICATION

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NJOY Exhibit 1002.189

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Application	Document	Mailroom Date	Attorney Docket No.
16032009	NTC.PUB	11/08/2018	52210-508C18US/716.US18

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/032,009	07/10/2018	James Monsees	52210-508C18US/716.US18	7691

148514 7590 12/04/2018

Mintz/JUUL/PAX
One Financial Center
Boston, MA 02111

EXAMINER
FELTON, MICHAEL J

ART UNIT	PAPER NUMBER
1747	

NOTIFICATION DATE	DELIVERY MODE
12/04/2018	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.

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NJOY Exhibit 1002.191

First Action Interview Pilot Program Pre-Interview Communication	**Application No.** 16/032,009	**Applicant(s)** Monsees et al.	
	Examiner MICHAEL J FELTON	**Art Unit** 1747	**AIA Status** Yes

-The MAILING OR NOTIFICATION DATE of this communication appears on the cover sheet with the correspondence address -

THE SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE **ONE MONTH OR THIRTY (30) DAYS,** WHICHEVER IS LONGER, FROM THE MAILING OR NOTIFICATION DATE OF THIS COMMUNICATION.

This time period for reply is extendable under 37 CFR 1.136(a) for only ONE additional MONTH.

This communication constitutes notice under 37 CFR 1.136(a)(1)(i).

Applicant must, within the time period for reply, file: (1) A letter requesting not to have a first action interview; (2) A reply under 37 CFR 1.111 waiving the first action interview and First Action Interview Office Action; or (3) An Applicant Initiated Interview Request Form (PTOL-413A) electronically via EFS-Web, accompanied by a proposed amendment or arguments, and schedule the interview within 2 months from the filing of the request. A failure to respond to this communication will be treated as a request not to have an interview. If applicant waives the First Action Interview Office Action, the instant Pre-Interview Communication is deemed the first Office Action on the Merits. The next subsequent Office action may be made final if appropriate. See MPEP 706.07(a).

Status

1) ☑ Responsive to communication(s) filed on 7/10/2018 .

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____ .

Disposition of Claims

2) ☑ Claim(s) 21-40 is/are pending in the application.

2a) Of the above claim(s) _____ is/are withdrawn from consideration.

3) ☐ Claim(s) _____ is/are allowed.

4) ☐ Claim(s) _____ is/are rejected.

5) ☑ Claim(s) 21-40 is/are objected to.

6) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

7) ☐ The specification is objected to by the Examiner.

8) ☐ 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

9) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

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.

Contact Information

Examiner's Telephone Number: (571)272-4805

Examiner's Typical Work Schedule: Monday, Thursday-Friday 7:00-4

Supervisor's Name: Michael H Wilson

Supervisor's Telephone Number: 571-270-3882

Attachment(s)	
1) ☑ Notice of References Cited (PTO-892)	3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ .	4) ☐ Other: _____ .

NJOY Exhibit 1002.192

First Action Interview Pilot Program Pre-Interview Communication	**Application No.** 16/032,009	**Applicant(s)** Monsees et al.	
	Examiner MICHAEL J FELTON	**Art Unit** 1747	**AIA Status** Yes

Notification of Rejection(s) and/or Objection(s)

#	Claim(s)	Reference(s) (if applicable)	Rejection Statutory Basis	Brief Explanation of Rejection
1	21-40	15/815643	DP/ODP	The instant claims appear to claim the same subject matter claimed in 15815643. In particular the air flow path appears to be the only unique feature being claimed over the prior art (see instant claim 40, where the first two paragraphs are well known to be common to most e-cigs) .

Expanded Discussion/Commentary

1		In particular the air flow path appears to be the only unique feature being claimed over the prior art (see instant claim 40, where the first two paragraphs are well known to be common to most e-cigs). Therefore, if claims 21 and 40 are allowable for the same reasons as application 15/ 815643, a Terminal Disclaimer is required.

DATE: 01 October 2018	/Michael J Felton/ Primary Examiner, Art Unit 1747	/Michael J Felton/ Primary Examiner, Art Unit 1747

NJOY Exhibit 1002.193

Notice of References Cited	Application/Control No. 16/032,009	Applicant(s)/Patent Under Reexamination	
	Examiner MICHAEL J FELTON	Art Unit 1747	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-20180070644-A1	03-2018	Monsees; James	H05B1/0244	1/1
	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.

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/032,009	Monsees et al.
	Examiner	Art Unit
	MICHAEL J FELTON	1747

CPC - Searched*		
Symbol	Date	Examiner

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
See EAST search history	10/01/2018	MJF

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/Michael J Felton/ Primary Examiner, Art Unit 1747	

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	27	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:05
S2	41	(("BOWEN") near3 ("Adam")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:05
S3	3	(("HATTON") near3 ("Nicholas")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S4	67	(("CHRISTENSEN") near3 ("Steven")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S5	6	(("LOMELI") near3 ("Kevin")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S6	5	(("ATKINS") near3 ("Ariel")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S7	4	(("KELLER") near3 ("Aaron")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S8	58	S1 S2 S3 S4 S5 S6 S7	USPAT	OR	OFF	2017/01/20 12:07
S9	111	S1 S2 S3 S4 S5 S6 S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:07
S10	13	S9 and vaporizer and cartridge	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:09
S11	11	S9 and vaporizer and cartridge and magnetic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:11
S12	2	S9 and vaporizer and cartridge and magnetic and cutout	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2017/01/20 12:11

NJOY Exhibit 1002.196

			DERWENT; IBM_TDB			
S13	5	S9 and vaporizer and cartridge and magnetic and window	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:11
S14	34	S9 and channel	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:24
S15	6	S9 and channel and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:24
S16	9	S9 and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:24
S17	8590	A24F47/008.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 13:51
S18	271	S17 and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 13:52
S19	343	S17 and (transparent or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 13:52
S20	1403	A24F47/008.cpc. and (cartridge or cartomizer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/22 14:51
S21	1	15/257768.app.	US-PGPUB; USPAT; USOCR;	OR	OFF	2017/01/22 15:33

NJOY Exhibit 1002.197

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S22	0	A24F47/008.cpc. and magenetic same (coupling or connector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/22 16:13
S23	120	A24F47/008.cpc. and magnetic same (coupling or connector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/22 16:13
S24	8	cigarette same rectangle same cross-section	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:30
S25	1568	rectangular near10 cigarette	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:30
S26	347	rectangular near2 cigarette	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:30
S27	36	square adj cigarette	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:32
S28	6639	A24F47/008	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:34
S29	221	A24F47/008 and rectangular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:34
S30	13	(US-20150208729-$ or US-	US-PGPUB;	OR	OFF	2017/01/23

NJOY Exhibit 1002.198

		20070283972-$ or US-20090095287-$ or US-20130192623-$ or US-20130228191-$ or US-20080257367-$ or US-20100031968-$).did. or (US-5649554-$ or US-5819756-$ or US-6155268-$).did. or (GB-201222205-$ or WO-2013044537-$).did. or (WO-2007012007-$).did.	USPAT; FPRS; DERWENT			10:42
S31	1	S30 and pogo	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/01/23 10:42
S32	12	A24F47/008 and pogo	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:42
S33	10	(electronic adj cigarette) and pogo	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 11:04
S34	6639	A24F47/008	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 11:18
S35	42693	(liquid adj reservoir)	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/01/24 09:31
S36	417	((liquid adj reservoir) or (liquid near3 tank)) same (cover or case) same window	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/01/24 09:32
S37	28	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S38	42	(("BOWEN") near3 ("Adam")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S39	4	(("HATTON") near3 ("Nicholas")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S40	68	(("CHRISTENSEN") near3 ("Steven")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S41	7	(("LOMELI") near3 ("Kevin")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S42	6	(("ATKINS") near3 ("Ariel")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25

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S43	4	(("KELLER") near3 ("Aaron")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
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S45	6	S44 and vaporizer and cartridge and window	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:25
S46	2	S44 and vaporizer and cartridge and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:27
S47	0	S44 and vaporizer and cartridge and clear	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:27
S48	12	S44 and vaporizer and cartridge and see	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:27
S49	490	A24F47/008.cpc. and (cartridge or cartomizer) and (transparent or visible or clear or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:29
S50	257	A24F47/008.cpc. and (cartridge or cartomizer) and (transparent or clear or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:29
S51	515	A24F47/008.cpc. and (transparent or clear or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:30
S52	221	cigarette and (window or transparent) same (tipping or plug or mouthpiece)	USPAT	OR	OFF	2017/02/19 12:28

NJOY Exhibit 1002.200

S54	1	15/257748.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/24 11:22
S55	0	"20140261408".pn.	USPAT	OR	OFF	2017/09/07 13:53
S56	2	"20140261408".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/07 13:53
S57	2	"20150335071".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/07 14:04
S58	1	14/196729.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/08 10:47
S60	196	(US-1067531-$ | US-1163183-$ | US-1299162-$ | US-1505748-$ | US-1552877-$ | US-1632335-$ | US-1706244-$ | US-1845340-$ | US-1972118-$ | US-1998683-$ | US-2031363-$ | US-2039559-$ | US-2104266-$ | US-2159698-$ | US-2177636-$ | US-2195260-$ | US-2231909-$ | US-2327120-$ | US-2460427-$ | US-2483304-$ | US-2502561-$ | US-2765949-$ | US-2830597-$ | US-2860638-$ | US-2897958-$ | US-2935987-$ | US-3146937-$ | US-3258015-$ | US-3271719-$ | US-3292634-$ | US-3373915-$ | US-3420360-$ | US-3443827-$ | US-3456645-$ | US-3479561-$ | US-3567014-$ | US-3675661-$ | US-3707017-$ | US-3792704-$ | US-3815597-$ | US-3861523-$ | US-3941300-$ | US-4020853-$ | US-4049005-$ | US-4066088-$ | US-4207976-$ | US-4215708-$ | US-4219032-$ | US-4303083-$ | US-4506683-$ | US-4519319-$ | US-4520938-$ | US-4595024-$ | US-4625737-$ | US-4648393-$ | US-4708151-$ | US-4735217-$ | US-4771796-$ | US-4793365-$ | US-4794323-$ | US-4798310-$ | US-4813536-$ | US-4819665-$ | US-4830028-$ | US-	USPAT	OR	OFF	2017/09/13 12:31

NJOY Exhibit 1002.201

		4836224-$ | US-4846199-$ | US- 4848374-$ | US-4848563-$ | US- 4870748-$ | US-4893639-$ | US- 4896683-$ | US-4907606-$ | US- 4924883-$ | US-4938236-$ | US- 4941483-$ | US-4944317-$ | US- 4945929-$ | US-4947874-$ | US- 4947875-$ | US-4955397-$ | US- 4984588-$ | US-5005759-$ | US- 5019122-$ | US-5020548-$ | US- 5027836-$ | US-5031646-$ | US- 5040551-$ | US-5050621-$ | US- 5060671-$ | US-5065776-$ | US- 5076297-$ | US-5101838-$ | US- 5105831-$ | US-5105836-$ | US- 5105838-$ | US-5123530-$ | US- 5133368-$ | US-5141004-$ | US- 5144962-$ | US-5148817-$ | US- 5152456-$ | US-5183062-$ | US- 5224498-$ | US-5228460-$ | US- 5240012-$ | US-5249586-$ | US- 5261424-$ | US-5269237-$ | US- 5269327-$ | US-5296685-$ | US- 5303720-$ | US-5322075-$ | US- 5324498-$ | US-5345951-$ | US- 5369723-$ | US-5372148-$ | US- 5388574-$ | US-5449078-$ | US- 5456269-$ | US-5472001-$ | US- 5497791-$ | US-5529078-$ | US- 5564442-$ | US-5579934-$ | US- 5591368-$ | US-5605226-$ | US- 5641064-$ | US-5649552-$ | US- 5666977-$ | US-5666978-$ | US- 5708258-$ | US-5730118-$ | US- 5730158-$ | US-5746587-$ | US- 5810164-$ | US-5819756-$ | US- 5845649-$ | US-5865185-$ | US- 5865186-$ | US-5881884-$ | US- 5894841-$ | US-5931828-$ | US- 5934289-$ | US-5938018-$ | US- 5944025-$ | US-5954979-$ | US- 5967310-$ | US-5975415-$ | US- 5979460-$ | US-5994025-$ | US- 5996589-$ | US-6024097-$ | US- 6026820-$ | US-6053176-$ | US- 6089857-$ | US-6095153-$ | US- 6102036-$ | US-6119684-$ | US- 6125853-$ | US-6155268-$ | US- 6164287-$ | US-6196232-$ | US- 6216705-$ | US-6234169-$ | US- 6269966-$ | US-6324261-$ | US- 6349728-$ | US-6381739-$ | US- 6386371-$ | US-6407371-$ | US- 6418938-$ | US-6431363-$ | US- 6443146-$ | US-6446793-$ | US- 6510982-$ | US-6532965-$ | US- 6536442-$ | US-6557708-$ | US- 6598607-$ | US-6603924-$ | US- 6606998-$ | US-6612404-$ | US- 6615840-$ | US-6622867-$ | US- 6637430-$ | US-6655379-$ | US- 6672762-$ | US-6688313-$ | US- 6708846-$ | US-6726006-$ | US- 6752649-$ | US-6772756-$ | US-				

NJOY Exhibit 1002.202

		6799576-$ | US-6803545-$ | US-6805545-$ | US-6810883-$).DID.				
S61	196	(US-6827573-$ | US-6854470-$ | US-6874507-$ | US-6909840-$ | US-6954979-$ | US-6994096-$ | US-7000775-$ | US-7015796-$ | US-7025066-$ | US-7082825-$ | US-7117707-$ | US-7185659-$ | US-7234593-$ | US-7290549-$ | US-7374048-$ | US-7415982-$ | US-7428905-$ | US-7434584-$ | US-7488171-$ | US-7530352-$ | US-7546703-$ | US-7581540-$ | US-7621403-$ | US-7644823-$ | US-7753055-$ | US-7767698-$ | US-7793860-$ | US-7793861-$ | US-7801573-$ | US-7813832-$ | US-7815332-$ | US-7832397-$ | US-7832410-$ | US-7886507-$ | US-7913686-$ | US-7988034-$ | US-8003080-$ | US-8042550-$ | US-8079371-$ | US-8091558-$ | US-8141701-$ | US-8156944-$ | US-8157918-$ | US-8205622-$ | US-8251060-$ | US-8282995-$ | US-8308624-$ | US-8314235-$ | US-8322350-$ | US-8371310-$ | US-8375957-$ | US-8381739-$ | US-8387612-$ | US-8393331-$ | US-8402978-$ | US-8424539-$ | US-8443534-$ | US-8464867-$ | US-8479747-$ | US-8490629-$ | US-8495998-$ | US-8499766-$ | US-8511318-$ | US-8539959-$ | US-8541401-$ | US-8550069-$ | US-8578942-$ | US-8578943-$ | US-8596460-$ | US-8646462-$ | US-8671952-$ | US-8678012-$ | US-8689789-$ | US-8689805-$ | US-8695794-$ | US-8714150-$ | US-8714161-$ | US-8733345-$ | US-8733346-$ | US-8739788-$ | US-8741348-$ | US-8752545-$ | US-8752557-$ | US-8757169-$ | US-8770187-$ | US-8781307-$ | US-8790556-$ | US-8794231-$ | US-8794244-$ | US-8794245-$ | US-8807140-$ | US-8809261-$ | US-8813747-$ | US-8813759-$ | US-8820330-$ | US-8829395-$ | US-8851068-$ | US-8851081-$ | US-8851083-$ | US-8857446-$ | US-8863752-$ | US-8869792-$ | US-8881737-$ | US-8893726-$ | US-8897628-$ | US-8899238-$ | US-8899240-$ | US-8905040-$ | US-8910630-$ | US-8910639-$ | US-8910640-$ | US-8910641-$ | US-8910783-$ | US-8915254-$ | US-8919561-$ | US-8925555-$ | US-8928277-$ | US-8931492-$ | US-8950395-$ | US-8955522-$ | US-8960199-$ | US-8967382-$ | US-8973587-$ | US-8975764-$ | US-	USPAT	OR	OFF	2017/09/13 12:32

NJOY Exhibit 1002.203

		8978663-$ | US-8991402-$ | US-9010335-$ | US-9016274-$ | US-9018899-$ | US-9022026-$ | US-9022039-$ | US-9025291-$ | US-9028808-$ | US-9032968-$ | US-9038626-$ | US-9038642-$ | US-9050431-$ | US-9055617-$ | US-9055770-$ | US-9060388-$ | US-9060548-$ | US-9066543-$ | US-9072321-$ | US-9072322-$ | US-9078472-$ | US-9078474-$ | US-9078475-$ | US-9089166-$ | US-9089168-$ | US-9095174-$ | US-9095175-$ | US-9099873-$ | US-9101729-$ | US-9113659-$ | US-9131733-$ | US-9197726-$ | US-9215895-$ | US-9220302-$ | US-9226526-$ | US-9255277-$ | US-9271525-$ | US-9271529-$ | US-9272103-$ | US-9277769-$ | US-9282772-$ | US-9282773-$ | US-9289014-$ | US-9295286-$ | US-9308336-$ | US-9320300-$ | US-9326547-$ | US-9326549-$ | US-9351522-$ | US-9364027-$ | US-9364800-$ | US-9380810-$ | US-9408416-$ | US-9439455-$ | US-9462832-$ | US-9497998-$ | US-9504279-$ | US-9532604-$ | US-9532605-$ | US-9549572-$ | US-9549573-$ | US-9572373-$ | US-9602646-$ | US-9603387-$ | US-9603389-$ | US-9609893-$ | US-9648905-$ | US-9648909-$ | US-9655890-$ | US-9668520-$ | US-9675118-$ | US-9681687-$).DID.				
S64	306	(US-20100275938-$ | US-20100276333-$ | US-20100307116-$ | US-20100307518-$ | US-20100313901-$ | US-20110005535-$ | US-20110011396-$ | US-20110030706-$ | US-20110036346-$ | US-20110036363-$ | US-20110041861-$ | US-20110049226-$ | US-20110083684-$ | US-20110094523-$ | US-20110097060-$ | US-20110108023-$ | US-20110120482-$ | US-20110126831-$ | US-20110155151-$ | US-20110155153-$ | US-20110162667-$ | US-20110168194-$ | US-20110180433-$ | US-20110192397-$ | US-20110226236-$ | US-20110226266-$ | US-20110232654-$ | US-20110232655-$ | US-20110236002-$ | US-20110240047-$ | US-20110265806-$ | US-20110268809-$ | US-20110277780-$ | US-20110278189-$ | US-20110290248-$ | US-20110290269-$ | US-20110308521-$ | US-20110315152-$ | US-20110315701-$ | US-20120006342-$ | US-20120060853-$ | US-20120077849-$ | US-20120111346-$ | US-20120111347-$ | US-20120118301-$ | US-20120118307-$ | US-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:33

NJOY Exhibit 1002.204

		20120125353-$ | US-20120138052-$ | US-20120174914-$ | US-20120199146-$ | US-20120199663-$ | US-20120204889-$ | US-20120211015-$ | US-20120227753-$ | US-20120234315-$ | US-20120234821-$ | US-20120247494-$ | US-20120255567-$ | US-20120260926-$ | US-20120260927-$ | US-20120261286-$ | US-20120267383-$ | US-20120279512-$ | US-20120285475-$ | US-20120291791-$ | US-20120312313-$ | US-20120318882-$ | US-20120325227-$ | US-20120325228-$ | US-20130008457-$ | US-20130014755-$ | US-20130014772-$ | US-20130019887-$ | US-20130025609-$ | US-20130037041-$ | US-20130042865-$ | US-20130047984-$ | US-20130056013-$ | US-20130068239-$ | US-20130074857-$ | US-20130081642-$ | US-20130087160-$ | US-20130140200-$ | US-20130146489-$ | US-20130152922-$ | US-20130152954-$ | US-20130167854-$ | US-20130168880-$ | US-20130186416-$ | US-20130192618-$ | US-20130199528-$ | US-20130213417-$ | US-20130213418-$ | US-20130213419-$ | US-20130220315-$ | US-20130228190-$ | US-20130228191-$ | US-20130233086-$ | US-20130247924-$ | US-20130248385-$ | US-20130255702-$ | US-20130263869-$ | US-20130276802-$ | US-20130284190-$ | US-20130284191-$ | US-20130298905-$ | US-20130312742-$ | US-20130319431-$ | US-20130319435-$ | US-20130319436-$ | US-20130319437-$ | US-20130319440-$ | US-20130333700-$ | US-20130333711-$ | US-20130336358-$ | US-20130340775-$ | US-20130342157-$ | US-20140000638-$ | US-20140007891-$ | US-20140007892-$ | US-20140014124-$ | US-20140014126-$ | US-20140020697-$ | US-20140034071-$ | US-20140041655-$ | US-20140041658-$ | US-20140048086-$ | US-20140053856-$ | US-20140053858-$ | US-20140060528-$ | US-20140060552-$ | US-20140060556-$ | US-20140062417-$ | US-20140069424-$ | US-20140069425-$ | US-20140083442-$ | US-20140096782-$ | US-20140109898-$ | US-20140109921-$ | US-20140116455-$ | US-20140123990-$ | US-20140130796-$ | US-20140130797-$ | US-20140130816-$ | US-20140130817-$ | US-20140144429-$ | US-20140144453-$ | US-20140150784-$ | US-20140150785-$ | US-20140150810-$ | US-20140166028-$ | US-20140166030-$ | US-20140174458-$ |				

NJOY Exhibit 1002.205

		US-20140174459-$).DID.				
S65	306	(US-20100275938-$ | US-20100276333-$ | US-20100307116-$ | US-20100307518-$ | US-20100313901-$ | US-20110005535-$ | US-20110011396-$ | US-20110030706-$ | US-20110036346-$ | US-20110036363-$ | US-20110041861-$ | US-20110049226-$ | US-20110083684-$ | US-20110094523-$ | US-20110097060-$ | US-20110108023-$ | US-20110120482-$ | US-20110126831-$ | US-20110155151-$ | US-20110155153-$ | US-20110162667-$ | US-20110168194-$ | US-20110180433-$ | US-20110192397-$ | US-20110226236-$ | US-20110226266-$ | US-20110232654-$ | US-20110232655-$ | US-20110236002-$ | US-20110240047-$ | US-20110265806-$ | US-20110268809-$ | US-20110277780-$ | US-20110278189-$ | US-20110290248-$ | US-20110290269-$ | US-20110308521-$ | US-20110315152-$ | US-20110315701-$ | US-20120006342-$ | US-20120060853-$ | US-20120077849-$ | US-20120111346-$ | US-20120111347-$ | US-20120118301-$ | US-20120118307-$ | US-20120125353-$ | US-20120138052-$ | US-20120174914-$ | US-20120199146-$ | US-20120199663-$ | US-20120204889-$ | US-20120211015-$ | US-20120227753-$ | US-20120234315-$ | US-20120234821-$ | US-20120247494-$ | US-20120255567-$ | US-20120260926-$ | US-20120260927-$ | US-20120261286-$ | US-20120267383-$ | US-20120279512-$ | US-20120285475-$ | US-20120291791-$ | US-20120312313-$ | US-20120318882-$ | US-20120325227-$ | US-20120325228-$ | US-20130008457-$ | US-20130014755-$ | US-20130014772-$ | US-20130019887-$ | US-20130025609-$ | US-20130037041-$ | US-20130042865-$ | US-20130047984-$ | US-20130056013-$ | US-20130068239-$ | US-20130074857-$ | US-20130081642-$ | US-20130087160-$ | US-20130140200-$ | US-20130146489-$ | US-20130152922-$ | US-20130152954-$ | US-20130167854-$ | US-20130168880-$ | US-20130186416-$ | US-20130192618-$ | US-20130199528-$ | US-20130213417-$ | US-20130213418-$ | US-20130213419-$ | US-20130220315-$ | US-20130228190-$ | US-20130228191-$ | US-20130233086-$ | US-20130247924-$ | US-20130248385-$ | US-20130255702-$ | US-20130263869-$ | US-20130276802-$ | US-20130284190-$ | US-20130284191-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:33

NJOY Exhibit 1002.206

		$ | US-20130298905-$ | US-20130312742-$ | US-20130319431-$ | US-20130319435-$ | US-20130319436-$ | US-20130319437-$ | US-20130319440-$ | US-20130333700-$ | US-20130333711-$ | US-20130336358-$ | US-20130340775-$ | US-20130342157-$ | US-20140000638-$ | US-20140007891-$ | US-20140007892-$ | US-20140014124-$ | US-20140014126-$ | US-20140020697-$ | US-20140034071-$ | US-20140041655-$ | US-20140041658-$ | US-20140048086-$ | US-20140053856-$ | US-20140053858-$ | US-20140060528-$ | US-20140060552-$ | US-20140060556-$ | US-20140062417-$ | US-20140069424-$ | US-20140069425-$ | US-20140083442-$ | US-20140096782-$ | US-20140109898-$ | US-20140109921-$ | US-20140116455-$ | US-20140123990-$ | US-20140130796-$ | US-20140130797-$ | US-20140130816-$ | US-20140130817-$ | US-20140144429-$ | US-20140144453-$ | US-20140150784-$ | US-20140150785-$ | US-20140150810-$ | US-20140166028-$ | US-20140166030-$ | US-20140174458-$ | US-20140174459-$).DID.				
S66	307	(US-20140175081-$ | US-20140182609-$ | US-20140182610-$ | US-20140182611-$ | US-20140182612-$ | US-20140190477-$ | US-20140190478-$ | US-20140190496-$ | US-20140190501-$ | US-20140190502-$ | US-20140190503-$ | US-20140196716-$ | US-20140196718-$ | US-20140196731-$ | US-20140196733-$ | US-20140196734-$ | US-20140196735-$ | US-20140202474-$ | US-20140202475-$ | US-20140202477-$ | US-20140209096-$ | US-20140209106-$ | US-20140209107-$ | US-20140209108-$ | US-20140209109-$ | US-20140216450-$ | US-20140216483-$ | US-20140216484-$ | US-20140224244-$ | US-20140224267-$ | US-20140230835-$ | US-20140238421-$ | US-20140238423-$ | US-20140238424-$ | US-20140246031-$ | US-20140246033-$ | US-20140251324-$ | US-20140251325-$ | US-20140251356-$ | US-20140254055-$ | US-20140259026-$ | US-20140261408-$ | US-20140261474-$ | US-20140261479-$ | US-20140261486-$ | US-20140261487-$ | US-20140261488-$ | US-20140261489-$ | US-20140261490-$ | US-20140261491-$ | US-20140261492-$ | US-20140261493-$ | US-20140261494-$ | US-20140261497-$ | US-20140261498-$ | US-20140261500-$ | US-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:34

NJOY Exhibit 1002.207

		20140270727-$ | US-20140276536-$ | US-20140278250-$ | US-20140278258-$ | US-20140283823-$ | US-20140283855-$ | US-20140283856-$ | US-20140283857-$ | US-20140283858-$ | US-20140290673-$ | US-20140290676-$ | US-20140290677-$ | US-20140299137-$ | US-20140299138-$ | US-20140299139-$ | US-20140299140-$ | US-20140301721-$ | US-20140305450-$ | US-20140305451-$ | US-20140305452-$ | US-20140305454-$ | US-20140311503-$ | US-20140311504-$ | US-20140311505-$ | US-20140332016-$ | US-20140332017-$ | US-20140332018-$ | US-20140332019-$ | US-20140332020-$ | US-20140332022-$ | US-20140334803-$ | US-20140338680-$ | US-20140338681-$ | US-20140338682-$ | US-20140338683-$ | US-20140338684-$ | US-20140338685-$ | US-20140345631-$ | US-20140345632-$ | US-20140345633-$ | US-20140345635-$ | US-20140352177-$ | US-20140352705-$ | US-20140352707-$ | US-20140353867-$ | US-20140354215-$ | US-20140355969-$ | US-20140360512-$ | US-20140360516-$ | US-20140366894-$ | US-20140366895-$ | US-20140366896-$ | US-20140366897-$ | US-20140366898-$ | US-20140366902-$ | US-20140373833-$ | US-20140373855-$ | US-20140373858-$ | US-20140376895-$ | US-20140378790-$ | US-20150000682-$ | US-20150000683-$ | US-20150007834-$ | US-20150007835-$ | US-20150007836-$ | US-20150013692-$ | US-20150013693-$ | US-20150013696-$ | US-20150013700-$ | US-20150013701-$ | US-20150013702-$ | US-20150015187-$ | US-20150020822-$ | US-20150020823-$ | US-20150020824-$ | US-20150020825-$ | US-20150020826-$ | US-20150020827-$ | US-20150020828-$ | US-20150020829-$ | US-20150020830-$ | US-20150020831-$ | US-20150020833-$ | US-20150027454-$ | US-20150027455-$ | US-20150027456-$ | US-20150027457-$ | US-20150027460-$ | US-20150027461-$ | US-20150027462-$ | US-20150027463-$ | US-20150027464-$ | US-20150027465-$ | US-20150027466-$ | US-20150027467-$ | US-20150027468-$ | US-20150027469-$ | US-20150027470-$).DID.				
S67	308	(US-20150027472-$ | US-20150034102-$ | US-20150034103-$ | US-20150034104-$ | US-20150034105-$ | US-20150034106-$ | US-20150034107-$ | US-20150034507-$ |	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2017/09/13 12:34

NJOY Exhibit 1002.208

		US-20150035540-$ | US-20150038567-$ | US-20150040927-$ | US-20150040928-$ | US-20150040929-$ | US-20150041482-$ | US-20150047658-$ | US-20150047659-$ | US-20150047660-$ | US-20150047661-$ | US-20150047663-$ | US-20150053215-$ | US-20150053216-$ | US-20150053217-$ | US-20150053220-$ | US-20150057341-$ | US-20150059779-$ | US-20150059780-$ | US-20150059782-$ | US-20150059783-$ | US-20150059784-$ | US-20150059785-$ | US-20150068523-$ | US-20150068543-$ | US-20150068545-$ | US-20150075545-$ | US-20150075546-$ | US-20150078735-$ | US-20150080265-$ | US-20150082859-$ | US-20150083144-$ | US-20150083145-$ | US-20150083146-$ | US-20150083147-$ | US-20150090256-$ | US-20150090277-$ | US-20150090278-$ | US-20150090279-$ | US-20150090280-$ | US-20150090281-$ | US-20150100441-$ | US-20150101622-$ | US-20150101623-$ | US-20150101625-$ | US-20150101626-$ | US-20150101945-$ | US-20150102777-$ | US-20150105455-$ | US-20150107609-$ | US-20150107612-$ | US-20150108019-$ | US-20150114407-$ | US-20150117842-$ | US-20150122252-$ | US-20150122274-$ | US-20150122278-$ | US-20150128965-$ | US-20150128966-$ | US-20150128967-$ | US-20150128969-$ | US-20150128970-$ | US-20150128971-$ | US-20150128972-$ | US-20150128973-$ | US-20150128976-$ | US-20150128977-$ | US-20150136153-$ | US-20150136155-$ | US-20150136156-$ | US-20150136157-$ | US-20150136158-$ | US-20150142387-$ | US-20150144145-$ | US-20150144147-$ | US-20150144148-$ | US-20150150302-$ | US-20150150303-$ | US-20150150305-$ | US-20150150306-$ | US-20150150307-$ | US-20150150308-$ | US-20150157053-$ | US-20150157054-$ | US-20150157055-$ | US-20150157056-$ | US-20150163859-$ | US-20150164138-$ | US-20150164141-$ | US-20150164142-$ | US-20150164143-$ | US-20150164144-$ | US-20150164145-$ | US-20150164146-$ | US-20150164147-$ | US-20150167976-$ | US-20150173124-$ | US-20150173417-$ | US-20150173419-$ | US-20150173421-$ | US-20150173422-$ | US-20150181928-$ | US-20150181937-$ | US-20150181939-$ | US-20150181941-$ | US-20150181943-$ | US-20150181944-$ | US-20150184846-	DERWENT; IBM_TDB			

NJOY Exhibit 1002.209

		$ | US-20150186837-$ | US-20150189695-$ | US-20150189915-$ | US-20150189918-$ | US-20150189919-$ | US-20150189920-$ | US-20150196055-$ | US-20150196056-$ | US-20150196057-$ | US-20150196058-$ | US-20150196059-$ | US-20150196060-$ | US-20150196062-$ | US-20150200385-$ | US-20150201674-$ | US-20150201675-$ | US-20150201676-$ | US-20150208724-$ | US-20150208725-$ | US-20150208726-$ | US-20150208728-$ | US-20150208729-$ | US-20150208730-$ | US-20150208731-$ | US-20150216232-$ | US-20150216233-$ | US-20150216234-$ | US-20150216235-$ | US-20150216237-$ | US-20150217067-$ | US-20150217068-$ | US-20150223520-$ | US-20150223521-$ | US-20150223522-$ | US-20150223523-$ | US-20150224268-$ | US-20150237914-$ | US-20150237917-$ | US-20150237918-$).DID.				
S68	304	(US-20150238723-$ | US-20150245654-$ | US-20150245658-$ | US-20150245659-$ | US-20150245660-$ | US-20150245661-$ | US-20150245668-$ | US-20150245669-$ | US-20150257441-$ | US-20150257444-$ | US-20150257445-$ | US-20150257446-$ | US-20150257447-$ | US-20150257449-$ | US-20150257451-$ | US-20150258289-$ | US-20150272217-$ | US-20150272218-$ | US-20150272220-$ | US-20150272222-$ | US-20150282524-$ | US-20150282525-$ | US-20150282526-$ | US-20150282527-$ | US-20150289565-$ | US-20150296885-$ | US-20150296887-$ | US-20150296888-$ | US-20150305409-$ | US-20150313275-$ | US-20150313284-$ | US-20150313285-$ | US-20150313287-$ | US-20150313868-$ | US-20150320114-$ | US-20150327595-$ | US-20150327596-$ | US-20150332379-$ | US-20150333542-$ | US-20150333552-$ | US-20150333561-$ | US-20150335074-$ | US-20150342254-$ | US-20150342256-$ | US-20150342257-$ | US-20150342258-$ | US-20150351456-$ | US-20150351457-$ | US-20150359262-$ | US-20150359263-$ | US-20150359264-$ | US-20150366265-$ | US-20150366266-$ | US-20150366268-$ | US-20150374035-$ | US-20150374040-$ | US-20160000148-$ | US-20160021931-$ | US-20160021932-$ | US-20160021933-$ | US-20160021934-$ | US-20160029694-$ | US-20160029697-$ | US-20160029698-$ | US-20160044967-$ | US-20160044968-$ | US-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:35

NJOY Exhibit 1002.210

		20160049682-$ | US-20160053988-$ | US-20160057811-$ | US-20160058066-$ | US-20160058071-$ | US-20160058072-$ | US-20160058073-$ | US-20160073690-$ | US-20160073691-$ | US-20160073692-$ | US-20160081393-$ | US-20160081394-$ | US-20160081395-$ | US-20160095355-$ | US-20160101909-$ | US-20160106152-$ | US-20160106154-$ | US-20160106155-$ | US-20160106936-$ | US-20160109115-$ | US-20160120218-$ | US-20160120220-$ | US-20160120222-$ | US-20160120227-$ | US-20160120228-$ | US-20160121058-$ | US-20160128384-$ | US-20160128387-$ | US-20160128388-$ | US-20160128390-$ | US-20160135500-$ | US-20160135501-$ | US-20160135503-$ | US-20160135506-$ | US-20160136153-$ | US-20160143354-$ | US-20160143359-$ | US-20160143360-$ | US-20160143361-$ | US-20160143365-$ | US-20160150820-$ | US-20160150823-$ | US-20160157523-$ | US-20160157524-$ | US-20160158782-$ | US-20160166564-$ | US-20160174609-$ | US-20160174611-$ | US-20160192705-$ | US-20160192706-$ | US-20160192710-$ | US-20160198766-$ | US-20160198767-$ | US-20160198768-$ | US-20160198769-$ | US-20160198770-$ | US-20160200463-$ | US-20160204637-$ | US-20160205999-$ | US-20160206002-$ | US-20160206005-$ | US-20160206006-$ | US-20160213065-$ | US-20160213066-$ | US-20160213067-$ | US-20160219936-$ | US-20160219938-$ | US-20160227839-$ | US-20160227840-$ | US-20160233705-$ | US-20160235120-$ | US-20160242466-$ | US-20160249680-$ | US-20160262443-$ | US-20160262449-$ | US-20160262450-$ | US-20160262451-$ | US-20160262454-$ | US-20160262455-$ | US-20160262456-$ | US-20160262457-$ | US-20160262459-$ | US-20160270441-$ | US-20160270442-$ | US-20160270443-$ | US-20160270444-$ | US-20160270447-$ | US-20160278163-$).DID.				
S69	208	(US-20160278431-$ | US-20160278434-$ | US-20160278435-$ | US-20160278436-$ | US-20160286856-$ | US-20160286858-$ | US-20160286859-$ | US-20160286862-$ | US-20160286863-$ | US-20160286864-$ | US-20160286865-$ | US-20160295915-$ | US-20160295918-$ | US-20160295922-$ | US-20160295923-$ | US-20160295924-$ | US-20160295926-$ | US-20160302471-$ |	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:35

NJOY Exhibit 1002.211

		US-20160302483-$ | US-20160302484-$ | US-20160302486-$ | US-20160302487-$ | US-20160309779-$ | US-20160309783-$ | US-20160309784-$ | US-20160316818-$ | US-20160316820-$ | US-20160316821-$ | US-20160316822-$ | US-20160324213-$ | US-20160324215-$ | US-20160325055-$ | US-20160325858-$ | US-20160331022-$ | US-20160331023-$ | US-20160331025-$ | US-20160331026-$ | US-20160331027-$ | US-20160331029-$ | US-20160331033-$ | US-20160331035-$ | US-20160331038-$ | US-20160331040-$ | US-20160332754-$ | US-20160337141-$ | US-20160337362-$ | US-20160337444-$ | US-20160338402-$ | US-20160338405-$ | US-20160338407-$ | US-20160338408-$ | US-20160338410-$ | US-20160338411-$ | US-20160338412-$ | US-20160345626-$ | US-20160345627-$ | US-20160345628-$ | US-20160345630-$ | US-20160345631-$ | US-20160345632-$ | US-20160353798-$ | US-20160360784-$ | US-20160360785-$ | US-20160360789-$ | US-20160360792-$ | US-20160360793-$ | US-20160366927-$ | US-20160366928-$ | US-20160366939-$ | US-20160366940-$ | US-20160366942-$ | US-20160366945-$ | US-20160366947-$ | US-20160368670-$ | US-20160368677-$ | US-20160371437-$ | US-20160371464-$ | US-20160374390-$ | US-20160374392-$ | US-20160374393-$ | US-20160374398-$ | US-20160374399-$ | US-20160374400-$ | US-20170006919-$ | US-20170006920-$ | US-20170019951-$ | US-20170020194-$ | US-20170021969-$ | US-20170027232-$ | US-20170042242-$ | US-20170049155-$ | US-20170055586-$ | US-20170064999-$ | US-20170071251-$ | US-20170071257-$ | US-20170079329-$ | US-20170086498-$ | US-20170095001-$ | US-20170102013-$ | US-20170112193-$ | US-20170135402-$ | US-20170164655-$ | US-20170172213-$ | US-20170181928-$ | US-20170188632-$).DID.				
S70	363	(EP-19854012-$ | DE-201430916-$ | WO-201524383-$ | CA-2017202891-$ | GB-2118034-$ | IE-2533174-$ | CN-2641869-$ | ES-3165102-$ | AU-2014206215-$ | AU-2014208287-$ | AU-2017202891-$ | CA-2641869-$ | CN-101869356-$ | CN-102754924-$ | CN-1122213-$ | CN-201430916-$ | DE-19854005-$ | DE-19854012-$ | EP-0283672-$ | EP-0503767-$ | EP-0532194-$ | EP-0535695-$ | EP-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:35

NJOY Exhibit 1002.212

		2186507-$ | EP-2399636-$ | EP-2493342-$ | EP-2614731-$ | EP-2641669-$ | EP-2711006-$ | EP-2789248-$ | EP-2856893-$ | EP-2862454-$ | EP-2862457-$ | EP-2989912-$ | EP-3056099-$ | EP-3061358-$ | EP-3075270-$ | EP-3075271-$ | EP-3081102-$ | EP-3085638-$ | EP-3087853-$ | EP-3097803-$ | EP-3135139-$ | EP-3143882-$ | EP-3143884-$ | EP-3155908-$ | EP-3165102-$ | ES-2118034-$ | GB-1025630-$ | GB-1065678-$ | GB-2533174-$ | HO-6114105-$ | HO-9075058-$ | JP-09075058-$ | JP-11178563-$ | JP-2000203639-$ | JP-2000236865-$ | JP-2001161819-$ | JP-2001165437-$ | JP-2006320285-$ | JP-2006320286-$ | JP-2009213428-$ | JP-2010020929-$ | JP-2011024430-$ | JP-2012005412-$ | JP-2015504669-$ | JP-62278975-$ | TW-201436722-$ | TW-201438608-$ | TW-201524383-$ | WO-0028842-$ | WO-03055486-$ | WO-03056948-$ | WO-03082031-$ | WO-03101454-$ | WO-2000005976-$ | WO-2004064548-$ | WO-2004080216-$ | WO-2005020726-$ | WO-2005060366-$ | WO-2006021153-$ | WO-2007141520-$ | WO-2007066374-$ | WO-2007078273-$ | WO-2007095109-$ | WO-2007117675-$ | WO-2008077271-$ | WO-2008151777-$ | WO-2009003204-$ | WO-2010003480-$ | WO-2010118122-$ | WO-2010118644-$ | WO-2010140841-$ | WO-2010145805-$ | WO-2011010334-$ | WO-2011125058-$ | WO-2012019533-$ | WO-2012043941-$ | WO-2012062600-$ | WO-2012088675-$ | WO-2012091249-$ | WO-2012100523-$ | WO-2012129812-$ | WO-2012134117-$ | WO-2012164033-$ | WO-2012173322-$ | WO-2012174677-$ | WO-2013012157-$ | WO-2013020220-$ | WO-2013030202-$ | WO-2013034453-$ | WO-2013040193-$ | WO-2013044537-$ | WO-2013076750-$ | WO-2013083635-$ | WO-2013089551-$ | WO-2013110208-$ | WO-2013110209-$ | WO-2013110210-$ | WO-2013113173-$ | WO-2013113174-$ | WO-2013113612-$ | WO-2013116983-$ | WO-2013131763-$ | WO-2013142678-$ | WO-2013150406-$ | WO-2013156658-$ | WO-2013171206-$ | WO-2013174001-$ | WO-2014020539-$ | WO-2014020953-$ | WO-2014023171-$ | WO-2014032280-$ | WO-2014040915-$ | WO-2014047948-$ | WO-2014047955-$ | WO-2014067236-$ | WO-2014071747-$ | WO-2014101119-$				

NJOY Exhibit 1002.213

		| WO-2014101401-$ | WO-2014101734-$ | WO-2014106323-$ | WO-2014110761-$ | WO-2014113949-$ | WO-2014121509-$ | WO-2014125340-$ | WO-2014127446-$ | WO-2014134781-$ | WO-2014144678-$ | WO-2014146270-$ | WO-2014147470-$ | WO-2014161181-$ | WO-2014166039-$ | WO-2014167530-$ | WO-2014169437-$ | WO-2014169667-$ | WO-2014185937-$ | WO-2014186983-$ | WO-2014194499-$ | WO-2014195687-$ | WO-2014198042-$ | WO-2014201610-$ | WO-2014201611-$ | WO-2014201646-$ | WO-2014201664-$ | WO-2014201666-$ | WO-2014201668-$ | WO-2014205749-$ | WO-2014205780-$ | WO-2014205807-$ | WO-2014205811-$ | WO-2014206148-$).DID.				
S71	204	(WO-2015000125-$ | WO-2015000180-$ | WO-2015003327-$ | WO-2015003372-$ | WO-2015003374-$ | WO-2015006929-$ | WO-2015010242-$ | WO-2015010277-$ | WO-2015010284-$ | WO-2015010291-$ | WO-2015010310-$ | WO-2015010336-$ | WO-2015010345-$ | WO-2015010349-$ | WO-2015013327-$ | WO-2015013890-$ | WO-2015013891-$ | WO-2015013892-$ | WO-2015013926-$ | WO-2015013950-$ | WO-2015013967-$ | WO-2015015156-$ | WO-2015017971-$ | WO-2015018026-$ | WO-2015018120-$ | WO-2015021612-$ | WO-2015021646-$ | WO-2015021651-$ | WO-2015021652-$ | WO-2015021655-$ | WO-2015021658-$ | WO-2015024239-$ | WO-2015024247-$ | WO-2015026081-$ | WO-2015027383-$ | WO-2015027435-$ | WO-2015027436-$ | WO-2015027470-$ | WO-2015032050-$ | WO-2015032055-$ | WO-2015032078-$ | WO-2015032093-$ | WO-2015035547-$ | WO-2015035557-$ | WO-2015035587-$ | WO-2015035623-$ | WO-2015035689-$ | WO-2015037925-$ | WO-2015039275-$ | WO-2015039280-$ | WO-2015039332-$ | WO-2015042790-$ | WO-2015042811-$ | WO-2015042848-$ | WO-2015042943-$ | WO-2015051509-$ | WO-2015051538-$ | WO-2015054815-$ | WO-2015054961-$ | WO-2015055314-$ | WO-2015058340-$ | WO-2015058341-$ | WO-2015058367-$ | WO-2015058387-$ | WO-2015062041-$ | WO-2015066136-$ | WO-2015066927-$ | WO-2015068044-$ | WO-2015070398-$ | WO-2015070405-$ | WO-2015071703-$ | WO-2015073975-$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37

NJOY Exhibit 1002.214

		| WO-2015074187-$ | WO-2015074265-$ | WO-2015074308-$ | WO-2015077998-$ | WO-2015077999-$ | WO-2015078010-$ | WO-2015079197-$ | WO-2015089711-$ | WO-2015091346-$ | WO-2015106434-$ | WO-2015106440-$ | WO-2015107551-$ | WO-2015107552-$ | WO-2015109476-$ | WO-2015109532-$ | WO-2015109540-$ | WO-2015109616-$ | WO-2015109618-$ | WO-2015117285-$ | WO-2015120588-$ | WO-2015120591-$ | WO-2015120623-$ | WO-2015123831-$ | WO-2015127609-$ | WO-2015137815-$ | WO-2015168828-$ | WO-2015175979-$ | WO-2015193456-$).DID.				
S72	129	(WO-2016012769-$ | WO-2016020675-$ | WO-2016023651-$ | WO-2016030661-$ | WO-2016040575-$ | WO-2016041114-$ | WO-2016041140-$ | WO-2016046116-$ | WO-2016050247-$ | WO-2016058189-$ | WO-2016058992-$ | WO-2016059000-$ | WO-2016059003-$ | WO-2016062777-$ | WO-2016063775-$ | WO-2016065606-$ | WO-2016071705-$ | WO-2016071706-$ | WO-2016074230-$ | WO-2016076178-$ | WO-2016079001-$ | WO-2016079152-$ | WO-2016079155-$ | WO-2016082183-$ | WO-2016090533-$ | WO-2016101200-$ | WO-2016101202-$ | WO-2016101203-$ | WO-2016110522-$ | WO-2016112491-$ | WO-2016112493-$ | WO-2016127396-$ | WO-2016128562-$ | WO-2016131755-$ | WO-2016156103-$ | WO-2016156413-$ | WO-2016162492-$ | WO-2016165125-$ | WO-2016169669-$ | WO-2016169796-$ | WO-2016176800-$ | WO-2016189086-$ | WO-2016193336-$ | WO-2016193365-$ | WO-2016207357-$ | WO-2017005835-$ | WO-2017015791-$ | WO-2017021536-$ | WO-2017028295-$ | WO-2017031678-$ | WO-2017036818-$ | WO-2017036819-$ | WO-2017036828-$ | WO-2017036829-$ | WO-2017036865-$ | WO-2017036879-$ | WO-2017046247-$ | WO-2017046334-$ | WO-2017055564-$ | WO-2017059571-$ | WO-2017060279-$ | WO-2017064051-$ | WO-2017064322-$).DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37
S73	25	(WO-2017064323-$ | WO-2017064324-$ | WO-2017072239-$ | WO-2017072277-$ | WO-2017072284-$ | WO-2017081176-$ | WO-2017084920-$ | WO-2017085240-$ | WO-2017097821-$ | WO-2017108392-$ | WO-2017121546-$ | WO-9712639-$).DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37

NJOY Exhibit 1002.215

S74	2581	S60 S61 S62 S63 S64 S65 S66 S67 S68 S69 S70 S71 S72 S73	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37
S75	72	S74 and window	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:39
S76	199	("20020088469" "20050029137" "20070089757" "20140107815" "20140161301" "20140178461" "20150245655" "20150245657" "20150245665" "20150245666" "20150245667" "20150313283" "20150320116" "20150351455" "20150357608" "20160021771" "20160315488" "5,545,904" "6,743,030" "7,214,075" "7,275,941" "7,905,236" "8,881,738" "9,167,849" D142178 D207887 D250485 D255548 D260690 D271255 D280494 D301837 D302659 D303722 D304771 D310171 D310349 D315032 D336346 D367605 D368552 D371633 D545904 D546782 D547002 D551548 D551970 D556154 D558060 D562151 D565496 D568298 D569727 D571202 D571556 D573474 D576619 D577019 D577150 D577591 D580756 D585077 D589941 D591758 D599670 D605509 D606505 D610588 D616753 D621357 D624880 D627962 D631055 D631458 D634735 D639303 D641718 D645817 D647247 D649708 D661889 D661991 D664146 D664636 D670272 D670659 D672715 D674182 D682841 D684683 D687042 D707627 D708727 D718621 D718723 D718933 D720095 D720496 D720497 D721202 D721972 D722023 D723735 D723736 D724037 D726727 D728855 D729030 D729277 D729444 D729445 D730572 D731114 D733142 D733356 D736706 D737508 D737566 D738038 D739973 D742064 D743099 D744342 D744419 D745004 D746291 D747265 D747603 D747722 D751527 D753090 D755506 D755733 D755735 D757353 D757690 D759031 D759303 D760431 D762003 D763203 D763204 D766873 D767201 D768920 D768980 D769830 D770088 D770395 D772879 D773391 D774514 D776162 D776270 D776338 D776659 D779677 D780179).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 09:50
S77	2	S76 and window	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2017/09/15 09:51

NJOY Exhibit 1002.216

			EPO; JPO; DERWENT; IBM_TDB			
S78	136	(D142178 D207887 D250485 D255548 D260690 D271255 D280494 D301837 D302659 D303722 D304771 D310171 D310349 D315032 D336346 D367605 D368552 D371633 D545904 D546782 D547002 D551548 D551970 D556154 D558060 D562151 D565496 D568298 D569727 D571202 D571556 D573474 D576619 D577019 D577150 D577591 D580756 D585077 D589941 D591758 D599670 D605509 D606505 D610588 D616753 D621357 D624880 D627962 D631055 D631458 D634735 D639303 D641718 D645817 D647247 D649708 D661889 D661991 D664146 D664636 D670272 D670659 D672715 D674182 D682841 D684683 D687042 D707627 D708727 D718621 D718723 D718933 D720095 D720496 D720497 D721202 D721972 D722023 D723735 D723736 D724037 D726727 D728855 D729030 D729277 D729444 D729445 D730572 D731114 D733142 D733356 D736706 D737508 D737566 D738038 D739973 D742064 D743099 D744342 D744419 D745004 D746291 D747265 D747603 D747722 D751527 D753090 D755506 D755733 D755735 D757353 D757690 D759031 D759303 D760431 D762003 D763203 D763204 D766873 D767201 D768920 D768980 D769830 D770088 D770395 D772879 D773391 D774514 D776162 D776270 D776338 D776659 D779677 D780179).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 09:51
S79	80	("9101729" "9220302" "9504279" "20060191546" "20080023003" "20130333711" "20140007891" "20140116455" "20140123990" "20140174458" "20140261493" "20140355969" "20150027457" "20150034104" "20150034507" "20150128971" "20150128972" "20150223521" "20160270442" "20160374393").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:01
S80	6	(WO-2012062600-$ | WO-2015027435-$ | WO-2016059000-$).DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:02
S81	4	(D695450 D707389 D725310 D730571).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:04
S82	90	S79 S80 S81	US-PGPUB;	OR	OFF	2017/09/15

NJOY Exhibit 1002.217

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:04
S83	12	S82 and (window or notch)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:04
S84	0	"20150781928".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	OFF	2017/10/25 10:45
S85	0	"201500781928".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	OFF	2017/10/25 10:45
S86	0	"2015781928".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	OFF	2017/10/25 10:45
S87	36	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/02/13 09:45
S88	125	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 09:45
S89	161219	cannula	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 09:45
S90	5	S88 and S89	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 09:45
S91	12569	A24F47/008.cpc.	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/02/13 10:06

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			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S92	2437	A24F47/008.cpc. and mouthpiece	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 10:06
S93	32	A24F47/008.cpc. and mouthpiece same (notch or indent)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 10:08
S94	2437	A24F47/008.cpc. and mouthpiece	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 10:16
S95	0	A24.cpcl.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:19
S96	155576	A24$.cpcl.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:19
S97	2896	S96 and cigarette adj holder	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:19
S98	682	S96 and cigarette adj holder same mouthpiece	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:20
S99	0	15/813089.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 14:04
S100	0	"15257748".app..app.	US-PGPUB;	OR	OFF	2018/02/13

NJOY Exhibit 1002.219

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			14:04
S101	1	15/257748.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 14:05
S102	3	"20150034104".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:13
S103	3	"20170013885".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:17
S104	2	"20160174607".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:41
S105	2	"20150305409".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:43
S106	0	(US20060191546A1 US20080023003A1 US201303337111A1 US20140116455A1 US20140123990A1 US20140174458A1 US20140261493A1 US20140355969A1 US20150034507A1 US20150128972A1 US20150223521A1 US9101729B2 US9220302B2 US9504279B2 USD260690 USD303722 USD433532 USD500301 USD532927 USD695450S USD707389S USD720095 USD721202 USD725310S USD730571S WO2012062600A1 WO2015027435A1 WO2016059000A1)	USPAT	OR	OFF	2018/03/16 15:36
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S108	0	(20060191546A1 20080023003A1 201303337111A1 20140116455A1 20140123990A1 20140174458A1 20140261493A1 20140355969A1 20150034507A1 20150128972A1 20150223521A1 9101729B2 9220302B2 9504279B2).pn.	USPAT	OR	OFF	2018/03/16 15:37
S109	3	("20060191546" "20080023003" "201303337111" 20140116455A1 "20140123990" 20140174458A1 "20140261493" "20140355969" "20150034507" "20150128972" "20150223521" "9101729" "9220302" "9504279").pn.	USPAT	OR	OFF	2018/03/16 15:38
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S117	2	WO2012062600A1	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/03/16 16:11

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NJOY Exhibit 1002.227

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NJOY Exhibit 1002.228

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NJOY Exhibit 1002.229

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NJOY Exhibit 1002.230

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NJOY Exhibit 1002.231

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NJOY Exhibit 1002.232

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		"D535261"	"D535308"	"D539813"				
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NJOY Exhibit 1002.233

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S135	182	("8689805" | "8695794" | "8714150" | "8714161" | "8733345" | "8733346" | "8739788" | "8741348" | "8752545" | "8752557" | "8757169" | "8770187" | "8781307" | "8790556" | "8794231" | "8794244" | "8794245" | "8807140" | "8809261" | "8813747" | "8813759" | "8820330" | "8829395" | "8851068" | "8851081" | "8851083" | "8857446" | "8863752" | "8869792" | "8881737" | "8893726" | "8897628" | "8899238" | "8899240" | "8905040" | "8910630" | "8910639" | "8910640" | "8910641" | "8910783" | "8915254" | "8919561" |	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17

NJOY Exhibit 1002.241

		"8925555" | "8928277" | "8931492" | "8950395" | "8955522" | "8960199" | "8967382" | "8973587" | "8975764" | "8978663" | "8991402" | "9010335" | "9016274" | "9018899" | "9022026" | "9022039" | "9025291" | "9028808" | "9032968" | "9038626" | "9038642" | "9050431" | "9055617" | "9055770" | "9060388" | "9060548" | "9066543" | "9072321" | "9072322" | "9078472" | "9078474" | "9078475" | "9089166" | "9089168" | "9095174" | "9095175" | "9099873" | "9101729" | "9113659" | "9131733" | "9197726" | "9215895" | "9220302" | "9226526" | "9255277" | "9271525" | "9271529" | "9272103" | "9277769" | "9282772" | "9282773" | "9289014" | "9295286" | "9308336" | "9320300" | "9326547" | "9326549" | "9351522" | "9364027" | "9364800" | "9380810" | "9408416" | "9439455" | "9462832" | "9497998" | "9504279" | "9532604" | "9532605" | "9549572" | "9549573" | "9572373" | "9602646" | "9603387" | "9603389" | "9609893" | "9648905" | "9648909" | "9655890" | "9668520" | "9675118" | "9681687" | "9700074" | "9713346" | "D557209" | "D590988" | "D590989" | "D590990" | "D590991" | "D611409" | "D624238" | "D642330" | "D644375" | "D649932" | "D653803" | "D674748" | "D682090" | "D686987" | "D690461" | "D691324" | "D692615" | "D693054" | "D695450" | "D696051" | "D700572" | "D704629" | "D704634" | "D705918" | "D707389" | "D719701" | "D721577" | "D725310" | "D725823" | "D729366" | "D729439" | "D730571" | "D736995" | "D741001" | "D742063" | "D742492" | "D748329" | "D749261" | "D749505" | "D750320" | "D750321" | "D752278" | "D752280" | "D754919" | "D755057" | "D757352" | "D761488" | "D763502" | "D769519" | "D774247" | "D778831" | "D788697" | "0000091" | "0000901" | "0007621" | "0008931" | "0088071" | "20150781928").PN.				
S136	1518	S129 S130 S131 S132 S133 S134 S135	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17
S137	1518	S136	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17
S138	584	S136 and mouthpiece	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17
S139	15359	a24f.cpcl.	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:16
S140	717	S139 and mouthpiece same (notch or window or view)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:18
S141	463	S139 and mouthpiece near20 (notch or window or view)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:18
S142	24	S139 and mouthpiece near20 (notch or window)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:19

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S143	102	S139 and mouthpiece same (notch or window)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:19
S144	972	Cigarette and (square same cross same section)	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:52
S145	1451	Cigarette and (triangle)	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:52
S146	8	Cigarette and (triangle) same shape same roll	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:52
S147	90	shouse.in.	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:57
S148	3	shouse.in. and cigarette	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:57
S149	1	15/257768.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/28 11:44
S150	15359	a24f.cpcl.	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:04
S151	102	S150 and mouthpiece same (notch or window)	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:04
S152	13	S151 and pogo	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:04
S153	35	a24f.cpcl. and pogo	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:05
S154	955	a24f.cpcl. and magnetic	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:08
S155	35	a24f.cpcl. and magnetic same couple	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:08
S156	1517	a24f.cpcl. and channel	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:12
S157	245	a24f.cpcl. and channel same vapor	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:12
S158	258	a24f.cpcl. and (channel or chimney) same vapor	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:19
S159	13	S158 NOT S157	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:19
S160	1379	a24f.cpcl. and reservoir	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:22
S161	344	a24f.cpcl. and reservoir same (passage)	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:23
S162	219	a24f.cpcl. and reservoir same (passage near5 air)	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:23
S163	235	a24f.cpcl. and reservoir same (passage near5 (air or vapor))	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:23
S164	159	atomizer same flow same (chimney or path or channel) same reservoir	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:39
S165	264	atomizer same flow same (chimney or path or channel) same reservoir	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2018/03/28 14:40

NJOY Exhibit 1002.243

			IBM_TDB			
S166	1379	a24f.cpcl. and (axial or concentric)	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:49
S167	14	a24f.cpcl. and (axial or concentric) and non-concentric	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:49
S168	1379	a24f.cpcl. and (reservoir)	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:51
S169	2885	a24f.cpcl. and (reservoir)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/28 14:51
S170	1690	a24f.cpcl. and (reservoir) and air	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/28 14:53
S171	656	monsees.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/05/10 14:23
S172	148	monsees.in. near3 james.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/05/10 14:23
S173	12	(monsees.in. near3 james.in.) and (mouthpiece same notch)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/05/10 14:24
S174	2	"20060191594".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/06/20 13:41
S175	2	"20130192615".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/06/20 13:44
S176	2	"9247773".pn.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2018/06/20 13:46

NJOY Exhibit 1002.244

			EPO; JPO; DERWENT; IBM_TDB			
S177	1	"D723737".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/06/20 13:47
S179	31	(monsees.in. near3 james.in.) and (interior adj surface)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 12:12
S180	0	(monsees.in. near3 james.in.) and (interior adj surface).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 12:13
S182	1	15/815643.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 14:45
S183	1	15/832743.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 14:45

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S53	0	(vaporizer apparatus comprising cartridge having elongate flattened storage compartment configured hold liquid vaporizable material visible through distal end proximal end opening through mouthpiece heater chamber wick within heating resistive element thermal contact opaque body front side back side pair lateral sides extending between prevented rolling placed flat surface because diameter larger receptacle formed edge around notch portion housed).clm.	US-PGPUB; USPAT	AND	OFF	2017/02/19 14:09
S59	0	(vaporizer apparatus comprising cartridge having elongate flattened storage compartment configured hold liquid vaporizable material visible through distal end proximal end opening through mouthpiece heater chamber wick within heating resistive element thermal contact opaque body front	US-PGPUB; USPAT	AND	OFF	2017/09/11 10:09

NJOY Exhibit 1002.245

		side back side pair lateral sides extending between prevented rolling placed flat surface because diameter larger receptacle formed edge around notch portion housed).clm.				
S178	0	(cartridge vaporizer device comprising elongate flattened storage compartment configured hold liquid vaporizable material wherein visible through further distal end proximal first side extending between opaque mouthpiece secured over having front adjacent terminates edge disposed adjacent location between opening second notch extending away from toward exposes region beneath heater heating chamber wick partially within resistive element thermal contact cannula extending surrounds filled visible forms fluid connection opening aerosol formed inhalable).clm.	US-PGPUB; USPAT	AND	OFF	2018/06/20 13:55

10/1/2018 8:43:05 AM
C:\Users\mfelton\Documents\EAST\Workspaces\16032009 - 15257768 - 257760 - 257748 e cig cartridge w window.wsp

NJOY Exhibit 1002.246

To: IPDocketingBOS@mintz.com,IPFileroombos@mintz.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 148514

Dec 04, 2018 03:58:03 AM

Dear PAIR Customer:

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UNITED STATES

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The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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Application	Document	Mailroom Date	Attorney Docket No.
16032009	OA.FAI.PRELM	12/04/2018	52210-508C18US/716.US18
	892	12/04/2018	52210-508C18US/716.US18

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Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed	PTO/SB/25 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION**
Application Number	16032009
Filing Date	10-Jul-2018
First Named Inventor	James Monsees
Attorney Docket Number	52210-508C18US/716.US18
Title of Invention	VAPORIZER APPARATUS

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
JUUL Labs, Inc.	100%

The owner(s) of percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number(s)

15815643 filed on 11/16/2017

as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that any such patent granted on the pending reference application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○	I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

○ Small Entity

○ Micro Entity

◉ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 75306

○ A sole inventor

○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

○ A joint inventor; all of whom are signing this request

Signature	/npm/
Name	Nicholas Mouton

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	16032009
Filing Date:	10-Jul-2018
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Filer:	Nicholas Paul Mouton
Attorney Docket Number:	52210-508C18US/716.US18

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**160**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 16032009

Filing Date: 10-Jul-2018

Applicant/Patent under Reexamination: Monsees

Electronic Terminal Disclaimer filed on February 4, 2019

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	35055392
Application Number:	16032009
International Application Number:	
Confirmation Number:	7691
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Customer Number:	148514
Filer:	Nicholas Paul Mouton
Filer Authorized By:	
Attorney Docket Number:	52210-508C18US/716.US18
Receipt Date:	04-FEB-2019
Filing Date:	10-JUL-2018
Time Stamp:	22:42:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$160
RAM confirmation Number	020519INTEFSW00007655500311
Deposit Account	
Authorized User	
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	33990 0ac02b0881856c7548a2d84552e9513be8d14a11	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30386 1a5baa34e50d9beab510c6927561cd056bfbfb32	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	64376		

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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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
James Monsees et al.

Application No.: 16/032,009 Confirmation No.: 7691

Filed: July 10, 2018 Art Unit: 1747

For: VAPORIZER APPARATUS Examiner: FELTON, MICHAEL J

AMENDMENT AND RESPONSE TO FIRST ACTION INTERVIEW PILOT PROGRAM PRE-INTERVIEW COMMUNICATION

FILED VIA EFS

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

Dear Sir or Madam:

In response to the First Action Interview Pilot Program Pre-Interview Communication dated December 4, 2018 (hereinafter "Office Action"), Applicant respectfully submits the following amendments and remarks for consideration. Changes to the pending claims have been identified with underlining to indicate insertions and by strikethrough to indicate deletions.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims, which begins on page 3 of this paper.

Remarks/Arguments begin on page 9 of this paper.

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AMENDMENTS TO THE SPECIFICATION

Please substitute the following paragraph(s) for the abstract appearing in the pending specification. A clean copy of the substitute Abstract is submitted herewith.

~~Vaporizers apparatuses, including cartridges and vaporizers having elongate and flattened (anti-roll) bodies as well as fluid level windows formed between the cartridge and the vaporizer in which the cartridge is mechanically coupled to the vaporizer.~~ Vaporizer apparatuses are provided. In some implementations, an apparatus includes a cartridge and a body. The cartridge comprises a mouthpiece, a storage compartment, and a heater chamber comprising a resistive heating element configured to generate an aerosol comprising vaporizable material and air passing along an airflow path. The body comprises a receptacle configured to insertably receive the cartridge with the heater chamber disposed within the receptacle. The airflow path comprises an air inlet passage and a fluid connection in the cartridge, connecting the heater chamber and the mouthpiece. The air inlet passage has a first side formed by an exterior surface of the cartridge and a second side formed by an internal surface of the receptacle when the receptacle insertably receives the cartridge. Related systems, methods, and articles of manufacture are also described.

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AMENDMENTS TO THE CLAIMS

Please amend the claims as set forth below. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the Claims:

1. – 20. (Canceled)

21. (**Currently Amended**) An apparatus comprising:

a cartridge comprising a mouthpiece, a storage compartment configured to hold a vaporizable material, and a heater chamber comprising a resistive heating element configured to heat the vaporizable material, wherein the heating of the vaporizable material generates an aerosol comprising the vaporizable material and air passing along an airflow path; and

a body comprising a receptacle configured to insertably receive and couple to the cartridge, wherein the heater chamber is disposed within the receptacle when the receptacle insertably receives and couples to the cartridge,

wherein the airflow path comprises:

an air inlet passage having a first side formed by an exterior surface of the cartridge and a second side formed by an internal surface of the receptacle when the receptacle insertably receives and couples to the cartridge, wherein the air inlet passage is configured to deliver the air to ~~towards~~ the heater chamber; and

a fluid connection in the cartridge, the fluid connection connecting the heater chamber and the mouthpiece.

22. (**Currently Amended**) The apparatus of claim 21, wherein the cartridge further comprises a protrusion extending ~~wall protruding~~ from the exterior surface of the cartridge, and wherein at least part of the protrusion ~~wall~~ is disposed within the receptacle when the receptacle insertably receives and couples to the cartridge.

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23. (Previously Presented) The apparatus of claim 21, wherein the cartridge has a proximal end and a distal end opposite the proximal end, wherein the mouthpiece is disposed at the proximal end, and wherein the heater chamber is disposed proximate to the distal end.

24. (Previously Presented) The apparatus of claim 23, wherein the receptacle terminates in a proximal edge, wherein the air inlet passage extends from the proximal edge of the receptacle towards the distal end of the cartridge when the receptacle insertably receives and couples to the cartridge.

25. (**Currently Amended**) The apparatus of claim 23, wherein the mouthpiece comprises a condensation chamber, wherein the mouthpiece further comprises [[an]] a first aerosol outlet and a second aerosol outlet, and wherein each of the first aerosol outlet and the second aerosol outlet are in fluid communication with the condensation chamber~~, wherein the condensation chamber is configured so that the aerosol is cooled, to a temperature between 35°C and 70°C, before exiting the first aerosol outlet and the second aerosol outlet~~.

26. (Previously Presented) The apparatus of claim 23, wherein the cartridge has a longitudinal dimension extending from the proximal end of the cartridge to the distal end of the cartridge, and wherein the exterior surface of the cartridge and the internal surface of the receptacle are substantially parallel to the longitudinal dimension when the receptacle insertably receives and couples to the cartridge.

27. (Previously Presented) The apparatus of claim 23, wherein the storage compartment comprises the exterior surface of the cartridge forming the first side of the air inlet passage.

28. (Previously Presented) The apparatus of claim 23, wherein the storage compartment comprises four exterior walls between the distal end and the proximal end, and wherein the mouthpiece comprises four interior walls between the distal end and the proximal end, and wherein the mouthpiece is attached over part of the storage compartment by a snap fit coupling.

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29. (**Currently Amended**) The apparatus of claim 28 [[21]], wherein the mouthpiece forms a cavity, wherein a first portion of the storage compartment is disposed inside of the cavity and a second portion of the storage compartment is disposed outside of the cavity, at least part of the second portion configured for insertion into the receptacle.

30. (**Currently Amended**) The apparatus of claim 29, wherein a surface feature ~~inside~~ of the cavity is configured to secure the mouthpiece to the storage compartment.

31. (**Currently Amended**) The apparatus of claim 29, wherein the mouthpiece comprises a first coupling feature and a second coupling feature, wherein the storage compartment comprises a third coupling feature and a fourth coupling feature on opposite exterior surfaces of the storage compartment, wherein the first coupling feature is configured to couple with one of the third coupling feature and the fourth coupling feature, and wherein the second coupling feature is configured to couple with the other of the third coupling feature and the fourth coupling feature.

32. (**Currently Amended**) The apparatus of claim 31, wherein the third ~~surface~~ coupling feature comprises a first raised rail, and wherein the fourth ~~surface~~ coupling feature comprises a second raised rail.

33. (**Currently Amended**) The apparatus of claim 29, wherein the mouthpiece is opaque, and wherein the second portion of the storage compartment comprises a surface configured so that the vaporizable material is visible through the surface.

34. (**Currently Amended**) The apparatus of claim 33, wherein the receptacle is configured so that the second portion of the storage ~~component~~ compartment is visible when the cartridge is coupled to the receptacle, through a notch in the receptacle.

35. (**Currently Amended**) The apparatus of claim 21, wherein the cartridge comprises a first electrical contact and a second electrical contact at a distal ~~first~~ end of the cartridge, the mouthpiece disposed at a proximal ~~second~~ end of the cartridge opposite the distal

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~~first~~ end, wherein the first electrical contact and the second electrical contact are electrically isolated and disposed in a plane substantially parallel to the distal ~~first~~ end of the cartridge.

36. (**Currently Amended**) The apparatus of claim 35, wherein the receptacle comprises a third electrical contact and a fourth electrical contact disposed in a second plane, the second plane substantially parallel to the distal ~~first~~ end of the cartridge when the cartridge is received within the receptacle.

37. (**Currently Amended**) The apparatus of claim 21, wherein [[the]] a wick comprises at least one of: a silica material, a cotton material, a ceramic material, a hemp material, and a stainless steel material.

38. (**Currently Amended**) The apparatus of claim 21, wherein the body has a top ~~third~~ end and a bottom ~~fourth~~ end opposite the top ~~third~~ end, wherein the receptacle is disposed at the top ~~third~~ end, wherein a body longitudinal axis extends from the top ~~third~~ end to the bottom ~~fourth~~ end, and wherein a first body transverse axis and a second body ~~traverse~~ transverse axis extend substantially perpendicular to the body longitudinal axis, the body having a greater dimension along the first body transverse axis than along the second body transverse axis.

39. (Previously Presented) The apparatus of claim 21, wherein the storage compartment comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.

40. (Previously Presented) An apparatus comprising:

a cartridge comprising a mouthpiece, a storage compartment configured to hold a vaporizable material, and a resistive heating element configured to heat the vaporizable material, wherein the heating of the vaporizable material generates an aerosol comprising the vaporizable material and air passing along an airflow path; and

a body comprising a receptacle configured to insertably receive and couple to the cartridge, wherein the resistive heating element is disposed within the receptacle when the receptacle insertably receives and couples to the cartridge,

wherein the airflow path comprises:

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an air inlet passage having a first side formed by an exterior surface of the cartridge and a second side formed by an internal surface of the receptacle when the receptacle insertably receives and couples to the cartridge, wherein the air inlet passage is configured to deliver the air towards the resistive heating element; and

a fluid connection in the cartridge, the fluid connection connecting the resistive heating element and the mouthpiece.

41. (**New**) The apparatus of claim 40, wherein the cartridge further comprises a protrusion extending from the exterior surface of the cartridge, and wherein at least part of the protrusion is disposed within the receptacle when the receptacle insertably receives and couples to the cartridge.

42. (**New**) The apparatus of claim 40, wherein the cartridge has a proximal end and a distal end opposite the proximal end, wherein the mouthpiece is disposed at the proximal end, and wherein the resistive heating element is disposed proximate to the distal end.

43. (**New**) The apparatus of claim 42, wherein the receptacle terminates in a proximal edge, wherein the air inlet passage extends from the proximal edge of the receptacle towards the distal end of the cartridge when the receptacle insertably receives and couples to the cartridge.

44. (**New**) The apparatus of claim 42, wherein the cartridge has a longitudinal dimension extending from the proximal end of the cartridge to the distal end of the cartridge, and wherein the exterior surface of the cartridge and the internal surface of the receptacle are substantially parallel to the longitudinal dimension when the receptacle insertably receives and couples to the cartridge.

45. (**New**) The apparatus of claim 42, wherein the storage compartment comprises the exterior surface of the cartridge forming the first side of the air inlet passage.

46. (**New**) The apparatus of claim 42, wherein the storage compartment comprises four exterior walls between the distal end and the proximal end, and wherein the mouthpiece

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comprises four interior walls between the distal end and the proximal end, and wherein the mouthpiece is attached over part of the storage compartment by a snap fit coupling.

47. **(New)** The apparatus of claim 46, wherein the mouthpiece forms a cavity, wherein a first portion of the storage compartment is disposed inside of the cavity and a second portion of the storage compartment is disposed outside of the cavity, at least part of the second portion configured for insertion into the receptacle.

48. **(New)** The apparatus of claim 40, wherein the body has a top end and a bottom end opposite the top end, wherein the receptacle is disposed at the top end, wherein a body longitudinal axis extends from the top end to the bottom end, and wherein a first body transverse axis and a second body transverse axis extend substantially perpendicular to the body longitudinal axis, the body having a greater dimension along the first body transverse axis than along the second body transverse axis.

49. **(New)** The apparatus of claim 21, wherein the receptacle comprises an opening that is between approximately 13 to approximately 14 mm long, approximately 4.5 to approximately 5.5 mm wide, and at least 10 mm deep.

50. **(New)** The apparatus of claim 21, wherein the storage compartment comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.

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REMARKS

By this Amendment, Applicant has amended Claims 21, 22, 25, and 29-38 and added new Claims 41-50. By this Amendment, the Specification is amended to provide a concise statement of the technical disclosure in the Abstract. Support for these amendments and new claims is present in the originally-filed specification and figures. Accordingly, no new matter is added. Upon entry of the amendments, Claims 21-50 remain pending. Reconsideration is respectfully requested in light of the amendments above and the remarks below.

Double Patenting Objections

Claims 21-40 stand objected to on the grounds of obviousness-type double patenting over co-pending US Patent App. No. 15/815,643 ("the '643 patent"). *Office Action*, p. 2. Although Applicant does not necessarily agree with the Examiner's characterizations of Claims 21-40, or the claims of the '643 patent, Applicant submits a terminal disclaimer herewith to advance prosecution, in accordance with the Examiner's suggestions. *Id.* As such, Applicant respectfully requests the withdrawal of the obviousness-type double patenting objections of Claims 21-40.

Request for Interview

The amendments/arguments presented herein are believed to be sufficient to overcome the pending rejections. However, if the contents of this paper are not deemed sufficient to further prosecution in this matter, or if any issues arise that can be most efficiently handled by telephone, the Examiner is respectfully requested to contact the undersigned by either phone or e-mail to schedule an interview at a mutually convenient time.

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CONCLUSION

On the basis of the foregoing amendments, the pending claims are in condition for allowance. It is believed that all of the pending claims have been addressed in this paper. That any specific rejection, issue, or comment was not particularly addressed, does not signify agreement with that rejection, issue, or comment. In addition, because the arguments made by the Applicant are not intended to be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper.

No additional fees are believed to be due. However, the Commissioner is hereby authorized to charge any additional claim fees and any additional fees that may be due, or credit any overpayment of same, to Deposit Account No. 50-0311, Reference No. 52210-508C18US/716.US18. If there are any questions regarding this response, the Examiner is encouraged to contact the undersigned at the telephone number provided below.

Respectfully submitted,

Dated: February 4, 2019

/npm/

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ABSTRACT

Vaporizer apparatuses are provided. In some implementations, an apparatus includes a cartridge and a body. The cartridge comprises a mouthpiece, a storage compartment, and a heater chamber comprising a resistive heating element configured to generate an aerosol comprising vaporizable material and air passing along an airflow path. The body comprises a receptacle configured to insertably receive the cartridge with the heater chamber disposed within the receptacle. The airflow path comprises an air inlet passage and a fluid connection in the cartridge, connecting the heater chamber and the mouthpiece. The air inlet passage has a first side formed by an exterior surface of the cartridge and a second side formed by an internal surface of the receptacle when the receptacle insertably receives the cartridge. Related systems, methods, and articles of manufacture are also described.

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Electronic Patent Application Fee Transmittal

Application Number:	16032009
Filing Date:	10-Jul-2018
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Filer:	Nicholas Paul Mouton
Attorney Docket Number:	52210-508C18US/716.US18

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	10	100	1000
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1000**

Electronic Acknowledgement Receipt	
EFS ID:	35056291
Application Number:	16032009
International Application Number:	
Confirmation Number:	7691
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Customer Number:	148514
Filer:	Nicholas Paul Mouton/Jeremy Johnston
Filer Authorized By:	Nicholas Paul Mouton
Attorney Docket Number:	52210-508C18US/716.US18
Receipt Date:	04-FEB-2019
Filing Date:	10-JUL-2018
Time Stamp:	23:28:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1000
RAM confirmation Number	020519INTEFSW00007774500311
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		52210-508C18US-Response.pdf	201302 bd57355f7fb09f6152af489bda45b1e73fa0a832	yes	11

Multipart Description/PDF files in .zip description

Document Description	Start	End
Reply under 1.111 to Pre-Interview Communication	1	1
Specification	2	2
Claims	3	8
Applicant Arguments/Remarks Made in an Amendment	9	10
Abstract	11	11

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30143 651c656e2de381abf73fb7b66d3bc5211917fbfc	no	2

Warnings:

Information:

Total Files Size (in bytes):	231445

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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.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

148514 7590 05/21/2019

Mintz/JUUL/PAX
One Financial Center
Boston, MA 02111

EXAMINER	
FELTON, MICHAEL J	
ART UNIT	PAPER NUMBER
1747	

DATE MAILED: 05/21/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/032,009	07/10/2018	James Monsees	52210-508C18US/716.US18	7691

TITLE OF INVENTION: VAPORIZER APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	08/21/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

148514 7590 05/21/2019
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One Financial Center
Boston, MA 02111

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/032,009	07/10/2018	James Monsees	52210-508C18US/716.US18	7691

TITLE OF INVENTION: VAPORIZER APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	08/21/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
FELTON, MICHAEL J	1747	131-329000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

NJOY Exhibit 1002.272

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/032,009	07/10/2018	James Monsees	52210-508C18US/716.US18	7691

148514 7590 05/21/2019

Mintz/JUUL/PAX
One Financial Center
Boston, MA 02111

EXAMINER	
FELTON, MICHAEL J	
ART UNIT	PAPER NUMBER
1747	

DATE MAILED: 05/21/2019

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

NJOY Exhibit 1002.273

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. 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 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. 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.

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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 disclosure of these records is required by the Freedom of Information Act.
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 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.

Notice of Allowability	Application No. 16/032,009	Applicant(s) Monsees et al.	
	Examiner MICHAEL J FELTON	Art Unit 1747	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the terminal disclaimer received 2/04/2019.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ 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.

3. ☑ The allowed claim(s) is/are 21-50 . As a result of the allowed claim(s), 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.**

4. ☐ 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)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/Michael J Felton/
Primary Examiner, Art Unit 1747

NJOY Exhibit 1002.275

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/032,009	Monsees et al.
	Examiner	Art Unit
	MICHAEL J FELTON	1747

CPC - Searched*		
Symbol	Date	Examiner

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
See EAST search history	10/01/2018	MJF
See EAST search history	05/13/2019	MJF

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	See EAST search history	05/13/2019	MJF

/Michael J Felton/ Primary Examiner, Art Unit 1747	

NJOY Exhibit 1002.276

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/032,009	Monsees et al.
	Examiner	**Art Unit**
	MICHAEL J FELTON	1747

CPC						
Symbol					**Type**	**Version**
A24F	/	47	/	008	F	2013-01-01
H05B	/	3	/	44	I	2013-01-01
A61M	/	11	/	042	I	2014-02-04
A61M	/	15	/	06	I	2013-01-01
H05B	/	1	/	0244	I	2013-01-01
H05B	/	2203	/	022	A	2013-01-01
A61M	/	2205	/	3653	A	2013-01-01
A61M	/	2205	/	8206	A	2013-01-01
H05B	/	2203	/	021	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	30	
/Michael J Felton/ Primary Examiner, Art Unit 1747	13 May 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	21	10A

U.S. Patent and Trademark Office — Part of Paper No.: 20190513

NJOY Exhibit 1002.277

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/032,009	Monsees et al.
	Examiner	**Art Unit**
	MICHAEL J FELTON	1747

INTERNATIONAL CLASSIFICATION					
CLAIMED					
A24F47/00	/	47	/	00	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	30	
/Michael J Felton/ Primary Examiner, Art Unit 1747	13 May 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	21	10A

U.S. Patent and Trademark Office — Part of Paper No.: 20190513

NJOY Exhibit 1002.278

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/032,009	Monsees et al.
	Examiner	**Art Unit**
	MICHAEL J FELTON	1747

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	30	
/Michael J Felton/ Primary Examiner, Art Unit 1747	13 May 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	21	10A

U.S. Patent and Trademark Office

Part of Paper No.: 20190513

NJOY Exhibit 1002.279

Bibliographic Data

Application No: 16/032,009

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /Michael J Felton/ (Examiner's Signature) | (Initials)

Title: VAPORIZER APPARATUS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
07/10/2018	131	1747	52210-508C18US/716.US18
RULE			

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Christopher Nicholas HibmaCronan Oakland, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 15257760 09/06/2016 PAT 10076139

15257760 is a CIP of 35001169 07/28/2016 PAT D825102

15257760 is a CIP of 35001170 07/28/2016 PAT D842536

15257760 has PRO of 62294285 02/11/2016

15257760 has PRO of 62294281 02/11/2016

15257760 is a CIP of 14581666 12/23/2014 PAT 10058124

14581666 has PRO of 61937755 02/10/2014

14581666 has PRO of 61936593 02/06/2014

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

07/25/2018

STATE OR COUNTRY

UNITED STATES

ADDRESS

Mintz/JUUL/PAX

One Financial Center
Boston, MA 02111
UNITED STATES

FILING FEE RECEIVED

$5,860

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	27	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:05
S2	41	(("BOWEN") near3 ("Adam")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:05
S3	3	(("HATTON") near3 ("Nicholas")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S4	67	(("CHRISTENSEN") near3 ("Steven")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S5	6	(("LOMELI") near3 ("Kevin")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S6	5	(("ATKINS") near3 ("Ariel")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S7	4	(("KELLER") near3 ("Aaron")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/20 12:06
S8	58	S1 S2 S3 S4 S5 S6 S7	USPAT	OR	OFF	2017/01/20 12:07
S9	111	S1 S2 S3 S4 S5 S6 S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:07
S10	13	S9 and vaporizer and cartridge	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:09
S11	11	S9 and vaporizer and cartridge and magnetic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:11
S12	2	S9 and vaporizer and cartridge and magnetic and cutout	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2017/01/20 12:11

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			DERWENT; IBM_TDB			
S13	5	S9 and vaporizer and cartridge and magnetic and window	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:11
S14	34	S9 and channel	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:24
S15	6	S9 and channel and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:24
S16	9	S9 and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 12:24
S17	8590	A24F47/008.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 13:51
S18	271	S17 and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 13:52
S19	343	S17 and (transparent or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/20 13:52
S20	1403	A24F47/008.cpc. and (cartridge or cartomizer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/22 14:51
S21	1	15/257768.app.	US-PGPUB; USPAT; USOCR;	OR	OFF	2017/01/22 15:33

NJOY Exhibit 1002.283

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S22	0	A24F47/008.cpc. and magenetic same (coupling or connector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/22 16:13
S23	120	A24F47/008.cpc. and magnetic same (coupling or connector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/22 16:13
S24	8	cigarette same rectangle same cross-section	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:30
S25	1568	rectangular near10 cigarette	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:30
S26	347	rectangular near2 cigarette	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:30
S27	36	square adj cigarette	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:32
S28	6639	A24F47/008	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:34
S29	221	A24F47/008 and rectangular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:34
S30	13	(US-20150208729-$ or US-	US-PGPUB;	OR	OFF	2017/01/23

NJOY Exhibit 1002.284

		20070283972-$ or US-20090095287-$ or US-20130192623-$ or US-20130228191-$ or US-20080257367-$ or US-20100031968-$).did. or (US-5649554-$ or US-5819756-$ or US-6155268-$).did. or (GB-201222205-$ or WO-2013044537-$).did. or (WO-2007012007-$).did.	USPAT; FPRS; DERWENT			10:42
S31	1	S30 and pogo	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/01/23 10:42
S32	12	A24F47/008 and pogo	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 10:42
S33	10	(electronic adj cigarette) and pogo	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 11:04
S34	6639	A24F47/008	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/23 11:18
S35	42693	(liquid adj reservoir)	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/01/24 09:31
S36	417	((liquid adj reservoir) or (liquid near3 tank)) same (cover or case) same window	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/01/24 09:32
S37	28	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S38	42	(("BOWEN") near3 ("Adam")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S39	4	(("HATTON") near3 ("Nicholas")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S40	68	(("CHRISTENSEN") near3 ("Steven")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S41	7	(("LOMELI") near3 ("Kevin")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S42	6	(("ATKINS") near3 ("Ariel")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25

NJOY Exhibit 1002.285

S43	4	(("KELLER") near3 ("Aaron")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/01/26 11:25
S44	112	S37 S38 S39 S40 S41 S42 S43	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:25
S45	6	S44 and vaporizer and cartridge and window	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:25
S46	2	S44 and vaporizer and cartridge and transparent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:27
S47	0	S44 and vaporizer and cartridge and clear	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:27
S48	12	S44 and vaporizer and cartridge and see	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:27
S49	490	A24F47/008.cpc. and (cartridge or cartomizer) and (transparent or visible or clear or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:29
S50	257	A24F47/008.cpc. and (cartridge or cartomizer) and (transparent or clear or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:29
S51	515	A24F47/008.cpc. and (transparent or clear or window)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/26 11:30
S52	221	cigarette and (window or transparent) same (tipping or plug or mouthpiece)	USPAT	OR	OFF	2017/02/19 12:28

NJOY Exhibit 1002.286

S54	1	15/257748.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/24 11:22
S55	0	"20140261408".pn.	USPAT	OR	OFF	2017/09/07 13:53
S56	2	"20140261408".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/07 13:53
S57	2	"20150335071".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/07 14:04
S58	1	14/196729.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/08 10:47
S60	196	(US-1067531-$ | US-1163183-$ | US-1299162-$ | US-1505748-$ | US-1552877-$ | US-1632335-$ | US-1706244-$ | US-1845340-$ | US-1972118-$ | US-1998683-$ | US-2031363-$ | US-2039559-$ | US-2104266-$ | US-2159698-$ | US-2177636-$ | US-2195260-$ | US-2231909-$ | US-2327120-$ | US-2460427-$ | US-2483304-$ | US-2502561-$ | US-2765949-$ | US-2830597-$ | US-2860638-$ | US-2897958-$ | US-2935987-$ | US-3146937-$ | US-3258015-$ | US-3271719-$ | US-3292634-$ | US-3373915-$ | US-3420360-$ | US-3443827-$ | US-3456645-$ | US-3479561-$ | US-3567014-$ | US-3675661-$ | US-3707017-$ | US-3792704-$ | US-3815597-$ | US-3861523-$ | US-3941300-$ | US-4020853-$ | US-4049005-$ | US-4066088-$ | US-4207976-$ | US-4215708-$ | US-4219032-$ | US-4303083-$ | US-4506683-$ | US-4519319-$ | US-4520938-$ | US-4595024-$ | US-4625737-$ | US-4648393-$ | US-4708151-$ | US-4735217-$ | US-4771796-$ | US-4793365-$ | US-4794323-$ | US-4798310-$ | US-4813536-$ | US-4819665-$ | US-4830028-$ | US-	USPAT	OR	OFF	2017/09/13 12:31

NJOY Exhibit 1002.287

		4836224-$ | US-4846199-$ | US-				
		4848374-$ | US-4848563-$ | US-				
		4870748-$ | US-4893639-$ | US-				
		4896683-$ | US-4907606-$ | US-				
		4924883-$ | US-4938236-$ | US-				
		4941483-$ | US-4944317-$ | US-				
		4945929-$ | US-4947874-$ | US-				
		4947875-$ | US-4955397-$ | US-				
		4984588-$ | US-5005759-$ | US-				
		5019122-$ | US-5020548-$ | US-				
		5027836-$ | US-5031646-$ | US-				
		5040551-$ | US-5050621-$ | US-				
		5060671-$ | US-5065776-$ | US-				
		5076297-$ | US-5101838-$ | US-				
		5105831-$ | US-5105836-$ | US-				
		5105838-$ | US-5123530-$ | US-				
		5133368-$ | US-5141004-$ | US-				
		5144962-$ | US-5148817-$ | US-				
		5152456-$ | US-5183062-$ | US-				
		5224498-$ | US-5228460-$ | US-				
		5240012-$ | US-5249586-$ | US-				
		5261424-$ | US-5269237-$ | US-				
		5269327-$ | US-5296685-$ | US-				
		5303720-$ | US-5322075-$ | US-				
		5324498-$ | US-5345951-$ | US-				
		5369723-$ | US-5372148-$ | US-				
		5388574-$ | US-5449078-$ | US-				
		5456269-$ | US-5472001-$ | US-				
		5497791-$ | US-5529078-$ | US-				
		5564442-$ | US-5579934-$ | US-				
		5591368-$ | US-5605226-$ | US-				
		5641064-$ | US-5649552-$ | US-				
		5666977-$ | US-5666978-$ | US-				
		5708258-$ | US-5730118-$ | US-				
		5730158-$ | US-5746587-$ | US-				
		5810164-$ | US-5819756-$ | US-				
		5845649-$ | US-5865185-$ | US-				
		5865186-$ | US-5881884-$ | US-				
		5894841-$ | US-5931828-$ | US-				
		5934289-$ | US-5938018-$ | US-				
		5944025-$ | US-5954979-$ | US-				
		5967310-$ | US-5975415-$ | US-				
		5979460-$ | US-5994025-$ | US-				
		5996589-$ | US-6024097-$ | US-				
		6026820-$ | US-6053176-$ | US-				
		6089857-$ | US-6095153-$ | US-				
		6102036-$ | US-6119684-$ | US-				
		6125853-$ | US-6155268-$ | US-				
		6164287-$ | US-6196232-$ | US-				
		6216705-$ | US-6234169-$ | US-				
		6269966-$ | US-6324261-$ | US-				
		6349728-$ | US-6381739-$ | US-				
		6386371-$ | US-6407371-$ | US-				
		6418938-$ | US-6431363-$ | US-				
		6443146-$ | US-6446793-$ | US-				
		6510982-$ | US-6532965-$ | US-				
		6536442-$ | US-6557708-$ | US-				
		6598607-$ | US-6603924-$ | US-				
		6606998-$ | US-6612404-$ | US-				
		6615840-$ | US-6622867-$ | US-				
		6637430-$ | US-6655379-$ | US-				
		6672762-$ | US-6688313-$ | US-				
		6708846-$ | US-6726006-$ | US-				
		6752649-$ | US-6772756-$ | US-				

NJOY Exhibit 1002.288

		6799576-$ | US-6803545-$ | US-6805545-$ | US-6810883-$).DID.				
S61	196	(US-6827573-$ | US-6854470-$ | US-6874507-$ | US-6909840-$ | US-6954979-$ | US-6994096-$ | US-7000775-$ | US-7015796-$ | US-7025066-$ | US-7082825-$ | US-7117707-$ | US-7185659-$ | US-7234593-$ | US-7290549-$ | US-7374048-$ | US-7415982-$ | US-7428905-$ | US-7434584-$ | US-7488171-$ | US-7530352-$ | US-7546703-$ | US-7581540-$ | US-7621403-$ | US-7644823-$ | US-7753055-$ | US-7767698-$ | US-7793860-$ | US-7793861-$ | US-7801573-$ | US-7813832-$ | US-7815332-$ | US-7832397-$ | US-7832410-$ | US-7886507-$ | US-7913686-$ | US-7988034-$ | US-8003080-$ | US-8042550-$ | US-8079371-$ | US-8091558-$ | US-8141701-$ | US-8156944-$ | US-8157918-$ | US-8205622-$ | US-8251060-$ | US-8282995-$ | US-8308624-$ | US-8314235-$ | US-8322350-$ | US-8371310-$ | US-8375957-$ | US-8381739-$ | US-8387612-$ | US-8393331-$ | US-8402978-$ | US-8424539-$ | US-8443534-$ | US-8464867-$ | US-8479747-$ | US-8490629-$ | US-8495998-$ | US-8499766-$ | US-8511318-$ | US-8539959-$ | US-8541401-$ | US-8550069-$ | US-8578942-$ | US-8578943-$ | US-8596460-$ | US-8646462-$ | US-8671952-$ | US-8678012-$ | US-8689789-$ | US-8689805-$ | US-8695794-$ | US-8714150-$ | US-8714161-$ | US-8733345-$ | US-8733346-$ | US-8739788-$ | US-8741348-$ | US-8752545-$ | US-8752557-$ | US-8757169-$ | US-8770187-$ | US-8781307-$ | US-8790556-$ | US-8794231-$ | US-8794244-$ | US-8794245-$ | US-8807140-$ | US-8809261-$ | US-8813747-$ | US-8813759-$ | US-8820330-$ | US-8829395-$ | US-8851068-$ | US-8851081-$ | US-8851083-$ | US-8857446-$ | US-8863752-$ | US-8869792-$ | US-8881737-$ | US-8893726-$ | US-8897628-$ | US-8899238-$ | US-8899240-$ | US-8905040-$ | US-8910630-$ | US-8910639-$ | US-8910640-$ | US-8910641-$ | US-8910783-$ | US-8915254-$ | US-8919561-$ | US-8925555-$ | US-8928277-$ | US-8931492-$ | US-8950395-$ | US-8955522-$ | US-8960199-$ | US-8967382-$ | US-8973587-$ | US-8975764-$ | US-	USPAT	OR	OFF	2017/09/13 12:32

NJOY Exhibit 1002.289

		8978663-$ | US-8991402-$ | US-9010335-$ | US-9016274-$ | US-9018899-$ | US-9022026-$ | US-9022039-$ | US-9025291-$ | US-9028808-$ | US-9032968-$ | US-9038626-$ | US-9038642-$ | US-9050431-$ | US-9055617-$ | US-9055770-$ | US-9060388-$ | US-9060548-$ | US-9066543-$ | US-9072321-$ | US-9072322-$ | US-9078472-$ | US-9078474-$ | US-9078475-$ | US-9089166-$ | US-9089168-$ | US-9095174-$ | US-9095175-$ | US-9099873-$ | US-9101729-$ | US-9113659-$ | US-9131733-$ | US-9197726-$ | US-9215895-$ | US-9220302-$ | US-9226526-$ | US-9255277-$ | US-9271525-$ | US-9271529-$ | US-9272103-$ | US-9277769-$ | US-9282772-$ | US-9282773-$ | US-9289014-$ | US-9295286-$ | US-9308336-$ | US-9320300-$ | US-9326547-$ | US-9326549-$ | US-9351522-$ | US-9364027-$ | US-9364800-$ | US-9380810-$ | US-9408416-$ | US-9439455-$ | US-9462832-$ | US-9497998-$ | US-9504279-$ | US-9532604-$ | US-9532605-$ | US-9549572-$ | US-9549573-$ | US-9572373-$ | US-9602646-$ | US-9603387-$ | US-9603389-$ | US-9609893-$ | US-9648905-$ | US-9648909-$ | US-9655890-$ | US-9668520-$ | US-9675118-$ | US-9681687-$).DID.				
S64	306	(US-20100275938-$ | US-20100276333-$ | US-20100307116-$ | US-20100307518-$ | US-20100313901-$ | US-20110005535-$ | US-20110011396-$ | US-20110030706-$ | US-20110036346-$ | US-20110036363-$ | US-20110041861-$ | US-20110049226-$ | US-20110083684-$ | US-20110094523-$ | US-20110097060-$ | US-20110108023-$ | US-20110120482-$ | US-20110126831-$ | US-20110155151-$ | US-20110155153-$ | US-20110162667-$ | US-20110168194-$ | US-20110180433-$ | US-20110192397-$ | US-20110226236-$ | US-20110226266-$ | US-20110232654-$ | US-20110232655-$ | US-20110236002-$ | US-20110240047-$ | US-20110265806-$ | US-20110268809-$ | US-20110277780-$ | US-20110278189-$ | US-20110290248-$ | US-20110290269-$ | US-20110308521-$ | US-20110315152-$ | US-20110315701-$ | US-20120006342-$ | US-20120060853-$ | US-20120077849-$ | US-20120111346-$ | US-20120111347-$ | US-20120118301-$ | US-20120118307-$ | US-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:33

NJOY Exhibit 1002.290

		20120125353-$ | US-20120138052-$ | US-20120174914-$ | US-20120199146-$ | US-20120199663-$ | US-20120204889-$ | US-20120211015-$ | US-20120227753-$ | US-20120234315-$ | US-20120234821-$ | US-20120247494-$ | US-20120255567-$ | US-20120260926-$ | US-20120260927-$ | US-20120261286-$ | US-20120267383-$ | US-20120279512-$ | US-20120285475-$ | US-20120291791-$ | US-20120312313-$ | US-20120318882-$ | US-20120325227-$ | US-20120325228-$ | US-20130008457-$ | US-20130014755-$ | US-20130014772-$ | US-20130019887-$ | US-20130025609-$ | US-20130037041-$ | US-20130042865-$ | US-20130047984-$ | US-20130056013-$ | US-20130068239-$ | US-20130074857-$ | US-20130081642-$ | US-20130087160-$ | US-20130140200-$ | US-20130146489-$ | US-20130152922-$ | US-20130152954-$ | US-20130167854-$ | US-20130168880-$ | US-20130186416-$ | US-20130192618-$ | US-20130199528-$ | US-20130213417-$ | US-20130213418-$ | US-20130213419-$ | US-20130220315-$ | US-20130228190-$ | US-20130228191-$ | US-20130233086-$ | US-20130247924-$ | US-20130248385-$ | US-20130255702-$ | US-20130263869-$ | US-20130276802-$ | US-20130284190-$ | US-20130284191-$ | US-20130298905-$ | US-20130312742-$ | US-20130319431-$ | US-20130319435-$ | US-20130319436-$ | US-20130319437-$ | US-20130319440-$ | US-20130333700-$ | US-20130333711-$ | US-20130336358-$ | US-20130340775-$ | US-20130342157-$ | US-20140000638-$ | US-20140007891-$ | US-20140007892-$ | US-20140014124-$ | US-20140014126-$ | US-20140020697-$ | US-20140034071-$ | US-20140041655-$ | US-20140041658-$ | US-20140048086-$ | US-20140053856-$ | US-20140053858-$ | US-20140060528-$ | US-20140060552-$ | US-20140060556-$ | US-20140062417-$ | US-20140069424-$ | US-20140069425-$ | US-20140083442-$ | US-20140096782-$ | US-20140109898-$ | US-20140109921-$ | US-20140116455-$ | US-20140123990-$ | US-20140130796-$ | US-20140130797-$ | US-20140130816-$ | US-20140130817-$ | US-20140144429-$ | US-20140144453-$ | US-20140150784-$ | US-20140150785-$ | US-20140150810-$ | US-20140166028-$ | US-20140166030-$ | US-20140174458-$ |				

NJOY Exhibit 1002.291

		US-20140174459-$).DID.				
S65	306	(US-20100275938-$ | US-20100276333-$ | US-20100307116-$ | US-20100307518-$ | US-20100313901-$ | US-20110005535-$ | US-20110011396-$ | US-20110030706-$ | US-20110036346-$ | US-20110036363-$ | US-20110041861-$ | US-20110049226-$ | US-20110083684-$ | US-20110094523-$ | US-20110097060-$ | US-20110108023-$ | US-20110120482-$ | US-20110126831-$ | US-20110155151-$ | US-20110155153-$ | US-20110162667-$ | US-20110168194-$ | US-20110180433-$ | US-20110192397-$ | US-20110226236-$ | US-20110226266-$ | US-20110232654-$ | US-20110232655-$ | US-20110236002-$ | US-20110240047-$ | US-20110265806-$ | US-20110268809-$ | US-20110277780-$ | US-20110278189-$ | US-20110290248-$ | US-20110290269-$ | US-20110308521-$ | US-20110315152-$ | US-20110315701-$ | US-20120006342-$ | US-20120060853-$ | US-20120077849-$ | US-20120111346-$ | US-20120111347-$ | US-20120118301-$ | US-20120118307-$ | US-20120125353-$ | US-20120138052-$ | US-20120174914-$ | US-20120199146-$ | US-20120199663-$ | US-20120204889-$ | US-20120211015-$ | US-20120227753-$ | US-20120234315-$ | US-20120234821-$ | US-20120247494-$ | US-20120255567-$ | US-20120260926-$ | US-20120260927-$ | US-20120261286-$ | US-20120267383-$ | US-20120279512-$ | US-20120285475-$ | US-20120291791-$ | US-20120312313-$ | US-20120318882-$ | US-20120325227-$ | US-20120325228-$ | US-20130008457-$ | US-20130014755-$ | US-20130014772-$ | US-20130019887-$ | US-20130025609-$ | US-20130037041-$ | US-20130042865-$ | US-20130047984-$ | US-20130056013-$ | US-20130068239-$ | US-20130074857-$ | US-20130081642-$ | US-20130087160-$ | US-20130140200-$ | US-20130146489-$ | US-20130152922-$ | US-20130152954-$ | US-20130167854-$ | US-20130168880-$ | US-20130186416-$ | US-20130192618-$ | US-20130199528-$ | US-20130213417-$ | US-20130213418-$ | US-20130213419-$ | US-20130220315-$ | US-20130228190-$ | US-20130228191-$ | US-20130233086-$ | US-20130247924-$ | US-20130248385-$ | US-20130255702-$ | US-20130263869-$ | US-20130276802-$ | US-20130284190-$ | US-20130284191-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:33

NJOY Exhibit 1002.292

		$ | US-20130298905-$ | US-20130312742-$ | US-20130319431-$ | US-20130319435-$ | US-20130319436-$ | US-20130319437-$ | US-20130319440-$ | US-20130333700-$ | US-20130333711-$ | US-20130336358-$ | US-20130340775-$ | US-20130342157-$ | US-20140000638-$ | US-20140007891-$ | US-20140007892-$ | US-20140014124-$ | US-20140014126-$ | US-20140020697-$ | US-20140034071-$ | US-20140041655-$ | US-20140041658-$ | US-20140048086-$ | US-20140053856-$ | US-20140053858-$ | US-20140060528-$ | US-20140060552-$ | US-20140060556-$ | US-20140062417-$ | US-20140069424-$ | US-20140069425-$ | US-20140083442-$ | US-20140096782-$ | US-20140109898-$ | US-20140109921-$ | US-20140116455-$ | US-20140123990-$ | US-20140130796-$ | US-20140130797-$ | US-20140130816-$ | US-20140130817-$ | US-20140144429-$ | US-20140144453-$ | US-20140150784-$ | US-20140150785-$ | US-20140150810-$ | US-20140166028-$ | US-20140166030-$ | US-20140174458-$ | US-20140174459-$).DID.				
S66	307	(US-20140175081-$ | US-20140182609-$ | US-20140182610-$ | US-20140182611-$ | US-20140182612-$ | US-20140190477-$ | US-20140190478-$ | US-20140190496-$ | US-20140190501-$ | US-20140190502-$ | US-20140190503-$ | US-20140196716-$ | US-20140196718-$ | US-20140196731-$ | US-20140196733-$ | US-20140196734-$ | US-20140196735-$ | US-20140202474-$ | US-20140202475-$ | US-20140202477-$ | US-20140209096-$ | US-20140209106-$ | US-20140209107-$ | US-20140209108-$ | US-20140209109-$ | US-20140216450-$ | US-20140216483-$ | US-20140216484-$ | US-20140224244-$ | US-20140224267-$ | US-20140230835-$ | US-20140238421-$ | US-20140238423-$ | US-20140238424-$ | US-20140246031-$ | US-20140246033-$ | US-20140251324-$ | US-20140251325-$ | US-20140251356-$ | US-20140254055-$ | US-20140259026-$ | US-20140261408-$ | US-20140261474-$ | US-20140261479-$ | US-20140261486-$ | US-20140261487-$ | US-20140261488-$ | US-20140261489-$ | US-20140261490-$ | US-20140261491-$ | US-20140261492-$ | US-20140261493-$ | US-20140261494-$ | US-20140261497-$ | US-20140261498-$ | US-20140261500-$ | US-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:34

NJOY Exhibit 1002.293

		20140270727-$ | US-20140276536-$ | US-20140278250-$ | US-20140278258-$ | US-20140283823-$ | US-20140283855-$ | US-20140283856-$ | US-20140283857-$ | US-20140283858-$ | US-20140290673-$ | US-20140290676-$ | US-20140290677-$ | US-20140299137-$ | US-20140299138-$ | US-20140299139-$ | US-20140299140-$ | US-20140301721-$ | US-20140305450-$ | US-20140305451-$ | US-20140305452-$ | US-20140305454-$ | US-20140311503-$ | US-20140311504-$ | US-20140311505-$ | US-20140332016-$ | US-20140332017-$ | US-20140332018-$ | US-20140332019-$ | US-20140332020-$ | US-20140332022-$ | US-20140334803-$ | US-20140338680-$ | US-20140338681-$ | US-20140338682-$ | US-20140338683-$ | US-20140338684-$ | US-20140338685-$ | US-20140345631-$ | US-20140345632-$ | US-20140345633-$ | US-20140345635-$ | US-20140352177-$ | US-20140352705-$ | US-20140352707-$ | US-20140353867-$ | US-20140354215-$ | US-20140355969-$ | US-20140360512-$ | US-20140360516-$ | US-20140366894-$ | US-20140366895-$ | US-20140366896-$ | US-20140366897-$ | US-20140366898-$ | US-20140366902-$ | US-20140373833-$ | US-20140373855-$ | US-20140373858-$ | US-20140376895-$ | US-20140378790-$ | US-20150000682-$ | US-20150000683-$ | US-20150007834-$ | US-20150007835-$ | US-20150007836-$ | US-20150013692-$ | US-20150013693-$ | US-20150013696-$ | US-20150013700-$ | US-20150013701-$ | US-20150013702-$ | US-20150015187-$ | US-20150020822-$ | US-20150020823-$ | US-20150020824-$ | US-20150020825-$ | US-20150020826-$ | US-20150020827-$ | US-20150020828-$ | US-20150020829-$ | US-20150020830-$ | US-20150020831-$ | US-20150020833-$ | US-20150027454-$ | US-20150027455-$ | US-20150027456-$ | US-20150027457-$ | US-20150027460-$ | US-20150027461-$ | US-20150027462-$ | US-20150027463-$ | US-20150027464-$ | US-20150027465-$ | US-20150027466-$ | US-20150027467-$ | US-20150027468-$ | US-20150027469-$ | US-20150027470-$).DID.				
S67	308	(US-20150027472-$ | US-20150034102-$ | US-20150034103-$ | US-20150034104-$ | US-20150034105-$ | US-20150034106-$ | US-20150034107-$ | US-20150034507-$ |	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2017/09/13 12:34

NJOY Exhibit 1002.294

		US-20150035540-$ | US-20150038567-$ | US-20150040927-$ | US-20150040928-$ | US-20150040929-$ | US-20150041482-$ | US-20150047658-$ | US-20150047659-$ | US-20150047660-$ | US-20150047661-$ | US-20150047663-$ | US-20150053215-$ | US-20150053216-$ | US-20150053217-$ | US-20150053220-$ | US-20150057341-$ | US-20150059779-$ | US-20150059780-$ | US-20150059782-$ | US-20150059783-$ | US-20150059784-$ | US-20150059785-$ | US-20150068523-$ | US-20150068543-$ | US-20150068545-$ | US-20150075545-$ | US-20150075546-$ | US-20150078735-$ | US-20150080265-$ | US-20150082859-$ | US-20150083144-$ | US-20150083145-$ | US-20150083146-$ | US-20150083147-$ | US-20150090256-$ | US-20150090277-$ | US-20150090278-$ | US-20150090279-$ | US-20150090280-$ | US-20150090281-$ | US-20150100441-$ | US-20150101622-$ | US-20150101623-$ | US-20150101625-$ | US-20150101626-$ | US-20150101945-$ | US-20150102777-$ | US-20150105455-$ | US-20150107609-$ | US-20150107612-$ | US-20150108019-$ | US-20150114407-$ | US-20150117842-$ | US-20150122252-$ | US-20150122274-$ | US-20150122278-$ | US-20150128965-$ | US-20150128966-$ | US-20150128967-$ | US-20150128969-$ | US-20150128970-$ | US-20150128971-$ | US-20150128972-$ | US-20150128973-$ | US-20150128976-$ | US-20150128977-$ | US-20150136153-$ | US-20150136155-$ | US-20150136156-$ | US-20150136157-$ | US-20150136158-$ | US-20150142387-$ | US-20150144145-$ | US-20150144147-$ | US-20150144148-$ | US-20150150302-$ | US-20150150303-$ | US-20150150305-$ | US-20150150306-$ | US-20150150307-$ | US-20150150308-$ | US-20150157053-$ | US-20150157054-$ | US-20150157055-$ | US-20150157056-$ | US-20150163859-$ | US-20150164138-$ | US-20150164141-$ | US-20150164142-$ | US-20150164143-$ | US-20150164144-$ | US-20150164145-$ | US-20150164146-$ | US-20150164147-$ | US-20150167976-$ | US-20150173124-$ | US-20150173417-$ | US-20150173419-$ | US-20150173421-$ | US-20150173422-$ | US-20150181928-$ | US-20150181937-$ | US-20150181939-$ | US-20150181941-$ | US-20150181943-$ | US-20150181944-$ | US-20150184846-	DERWENT; IBM_TDB				

NJOY Exhibit 1002.295

		$ | US-20150186837-$ | US-20150189695-$ | US-20150189915-$ | US-20150189918-$ | US-20150189919-$ | US-20150189920-$ | US-20150196055-$ | US-20150196056-$ | US-20150196057-$ | US-20150196058-$ | US-20150196059-$ | US-20150196060-$ | US-20150196062-$ | US-20150200385-$ | US-20150201674-$ | US-20150201675-$ | US-20150201676-$ | US-20150208724-$ | US-20150208725-$ | US-20150208726-$ | US-20150208728-$ | US-20150208729-$ | US-20150208730-$ | US-20150208731-$ | US-20150216232-$ | US-20150216233-$ | US-20150216234-$ | US-20150216235-$ | US-20150216237-$ | US-20150217067-$ | US-20150217068-$ | US-20150223520-$ | US-20150223521-$ | US-20150223522-$ | US-20150223523-$ | US-20150224268-$ | US-20150237914-$ | US-20150237917-$ | US-20150237918-$).DID.				
S68	304	(US-20150238723-$ | US-20150245654-$ | US-20150245658-$ | US-20150245659-$ | US-20150245660-$ | US-20150245661-$ | US-20150245668-$ | US-20150245669-$ | US-20150257441-$ | US-20150257444-$ | US-20150257445-$ | US-20150257446-$ | US-20150257447-$ | US-20150257449-$ | US-20150257451-$ | US-20150258289-$ | US-20150272217-$ | US-20150272218-$ | US-20150272220-$ | US-20150272222-$ | US-20150282524-$ | US-20150282525-$ | US-20150282526-$ | US-20150282527-$ | US-20150289565-$ | US-20150296885-$ | US-20150296887-$ | US-20150296888-$ | US-20150305409-$ | US-20150313275-$ | US-20150313284-$ | US-20150313285-$ | US-20150313287-$ | US-20150313868-$ | US-20150320114-$ | US-20150327595-$ | US-20150327596-$ | US-20150332379-$ | US-20150333542-$ | US-20150333552-$ | US-20150333561-$ | US-20150335074-$ | US-20150342254-$ | US-20150342256-$ | US-20150342257-$ | US-20150342258-$ | US-20150351456-$ | US-20150351457-$ | US-20150359262-$ | US-20150359263-$ | US-20150359264-$ | US-20150366265-$ | US-20150366266-$ | US-20150366268-$ | US-20150374035-$ | US-20150374040-$ | US-20160000148-$ | US-20160021931-$ | US-20160021932-$ | US-20160021933-$ | US-20160021934-$ | US-20160029694-$ | US-20160029697-$ | US-20160029698-$ | US-20160044967-$ | US-20160044968-$ | US-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:35

NJOY Exhibit 1002.296

		20160049682-$ | US-20160053988-$ | US-20160057811-$ | US-20160058066-$ | US-20160058071-$ | US-20160058072-$ | US-20160058073-$ | US-20160073690-$ | US-20160073691-$ | US-20160073692-$ | US-20160081393-$ | US-20160081394-$ | US-20160081395-$ | US-20160095355-$ | US-20160101909-$ | US-20160106152-$ | US-20160106154-$ | US-20160106155-$ | US-20160106936-$ | US-20160109115-$ | US-20160120218-$ | US-20160120220-$ | US-20160120222-$ | US-20160120227-$ | US-20160120228-$ | US-20160121058-$ | US-20160128384-$ | US-20160128387-$ | US-20160128388-$ | US-20160128390-$ | US-20160135500-$ | US-20160135501-$ | US-20160135503-$ | US-20160135506-$ | US-20160136153-$ | US-20160143354-$ | US-20160143359-$ | US-20160143360-$ | US-20160143361-$ | US-20160143365-$ | US-20160150820-$ | US-20160150823-$ | US-20160157523-$ | US-20160157524-$ | US-20160158782-$ | US-20160166564-$ | US-20160174609-$ | US-20160174611-$ | US-20160192705-$ | US-20160192706-$ | US-20160192710-$ | US-20160198766-$ | US-20160198767-$ | US-20160198768-$ | US-20160198769-$ | US-20160198770-$ | US-20160200463-$ | US-20160204637-$ | US-20160205999-$ | US-20160206002-$ | US-20160206005-$ | US-20160206006-$ | US-20160213065-$ | US-20160213066-$ | US-20160213067-$ | US-20160219936-$ | US-20160219938-$ | US-20160227839-$ | US-20160227840-$ | US-20160233705-$ | US-20160235120-$ | US-20160242466-$ | US-20160249680-$ | US-20160262443-$ | US-20160262449-$ | US-20160262450-$ | US-20160262451-$ | US-20160262454-$ | US-20160262455-$ | US-20160262456-$ | US-20160262457-$ | US-20160262459-$ | US-20160270441-$ | US-20160270442-$ | US-20160270443-$ | US-20160270444-$ | US-20160270447-$ | US-20160278163-$).DID.				
S69	208	(US-20160278431-$ | US-20160278434-$ | US-20160278435-$ | US-20160278436-$ | US-20160286856-$ | US-20160286858-$ | US-20160286859-$ | US-20160286862-$ | US-20160286863-$ | US-20160286864-$ | US-20160286865-$ | US-20160295915-$ | US-20160295918-$ | US-20160295922-$ | US-20160295923-$ | US-20160295924-$ | US-20160295926-$ | US-20160302471-$ |	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:35

NJOY Exhibit 1002.297

		US-20160302483-$ | US-20160302484-$ | US-20160302486-$ | US-20160302487-$ | US-20160309779-$ | US-20160309783-$ | US-20160309784-$ | US-20160316818-$ | US-20160316820-$ | US-20160316821-$ | US-20160316822-$ | US-20160324213-$ | US-20160324215-$ | US-20160325055-$ | US-20160325858-$ | US-20160331022-$ | US-20160331023-$ | US-20160331025-$ | US-20160331026-$ | US-20160331027-$ | US-20160331029-$ | US-20160331033-$ | US-20160331035-$ | US-20160331038-$ | US-20160331040-$ | US-20160332754-$ | US-20160337141-$ | US-20160337362-$ | US-20160337444-$ | US-20160338402-$ | US-20160338405-$ | US-20160338407-$ | US-20160338408-$ | US-20160338410-$ | US-20160338411-$ | US-20160338412-$ | US-20160345626-$ | US-20160345627-$ | US-20160345628-$ | US-20160345630-$ | US-20160345631-$ | US-20160345632-$ | US-20160353798-$ | US-20160360784-$ | US-20160360785-$ | US-20160360789-$ | US-20160360792-$ | US-20160360793-$ | US-20160366927-$ | US-20160366928-$ | US-20160366939-$ | US-20160366940-$ | US-20160366942-$ | US-20160366945-$ | US-20160366947-$ | US-20160368670-$ | US-20160368677-$ | US-20160371437-$ | US-20160371464-$ | US-20160374390-$ | US-20160374392-$ | US-20160374393-$ | US-20160374398-$ | US-20160374399-$ | US-20160374400-$ | US-20170006919-$ | US-20170006920-$ | US-20170019951-$ | US-20170020194-$ | US-20170021969-$ | US-20170027232-$ | US-20170042242-$ | US-20170049155-$ | US-20170055586-$ | US-20170064999-$ | US-20170071251-$ | US-20170071257-$ | US-20170079329-$ | US-20170086498-$ | US-20170095001-$ | US-20170102013-$ | US-20170112193-$ | US-20170135402-$ | US-20170164655-$ | US-20170172213-$ | US-20170181928-$ | US-20170188632-$).DID.				
S70	363	(EP-19854012-$ | DE-201430916-$ | WO-201524383-$ | CA-2017202891-$ | GB-2118034-$ | IE-2533174-$ | CN-2641869-$ | ES-3165102-$ | AU-2014206215-$ | AU-2014208287-$ | AU-2017202891-$ | CA-2641869-$ | CN-101869356-$ | CN-102754924-$ | CN-1122213-$ | CN-201430916-$ | DE-19854005-$ | DE-19854012-$ | EP-0283672-$ | EP-0503767-$ | EP-0532194-$ | EP-0535695-$ | EP-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:35

NJOY Exhibit 1002.298

		2186507-$ | EP-2399636-$ | EP-2493342-$ | EP-2614731-$ | EP-2641669-$ | EP-2711006-$ | EP-2789248-$ | EP-2856893-$ | EP-2862454-$ | EP-2862457-$ | EP-2989912-$ | EP-3056099-$ | EP-3061358-$ | EP-3075270-$ | EP-3075271-$ | EP-3081102-$ | EP-3085638-$ | EP-3087853-$ | EP-3097803-$ | EP-3135139-$ | EP-3143882-$ | EP-3143884-$ | EP-3155908-$ | EP-3165102-$ | ES-2118034-$ | GB-1025630-$ | GB-1065678-$ | GB-2533174-$ | HO-6114105-$ | HO-9075058-$ | JP-09075058-$ | JP-11178563-$ | JP-2000203639-$ | JP-2000236865-$ | JP-2001161819-$ | JP-2001165437-$ | JP-2006320285-$ | JP-2006320286-$ | JP-2009213428-$ | JP-2010020929-$ | JP-2011024430-$ | JP-2012005412-$ | JP-2015504669-$ | JP-62278975-$ | TW-201436722-$ | TW-201438608-$ | TW-201524383-$ | WO-0028842-$ | WO-03055486-$ | WO-03056948-$ | WO-03082031-$ | WO-03101454-$ | WO-2000005976-$ | WO-2004064548-$ | WO-2004080216-$ | WO-2005020726-$ | WO-2005060366-$ | WO-2006021153-$ | WO-2007141520-$ | WO-2007066374-$ | WO-2007078273-$ | WO-2007095109-$ | WO-2007117675-$ | WO-2008077271-$ | WO-2008151777-$ | WO-2009003204-$ | WO-2010003480-$ | WO-2010118122-$ | WO-2010118644-$ | WO-2010140841-$ | WO-2010145805-$ | WO-2011010334-$ | WO-2011125058-$ | WO-2012019533-$ | WO-2012043941-$ | WO-2012062600-$ | WO-2012088675-$ | WO-2012091249-$ | WO-2012100523-$ | WO-2012129812-$ | WO-2012134117-$ | WO-2012164033-$ | WO-2012173322-$ | WO-2012174677-$ | WO-2013012157-$ | WO-2013020220-$ | WO-2013030202-$ | WO-2013034453-$ | WO-2013040193-$ | WO-2013044537-$ | WO-2013076750-$ | WO-2013083635-$ | WO-2013089551-$ | WO-2013110208-$ | WO-2013110209-$ | WO-2013110210-$ | WO-2013113173-$ | WO-2013113174-$ | WO-2013113612-$ | WO-2013116983-$ | WO-2013131763-$ | WO-2013142678-$ | WO-2013150406-$ | WO-2013156658-$ | WO-2013171206-$ | WO-2013174001-$ | WO-2014020539-$ | WO-2014020953-$ | WO-2014023171-$ | WO-2014032280-$ | WO-2014040915-$ | WO-2014047948-$ | WO-2014047955-$ | WO-2014067236-$ | WO-2014071747-$ | WO-2014101119-$				

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		| WO-2014101401-$ | WO-2014101734-$ | WO-2014106323-$ | WO-2014110761-$ | WO-2014113949-$ | WO-2014121509-$ | WO-2014125340-$ | WO-2014127446-$ | WO-2014134781-$ | WO-2014144678-$ | WO-2014146270-$ | WO-2014147470-$ | WO-2014161181-$ | WO-2014166039-$ | WO-2014167530-$ | WO-2014169437-$ | WO-2014169667-$ | WO-2014185937-$ | WO-2014186983-$ | WO-2014194499-$ | WO-2014195687-$ | WO-2014198042-$ | WO-2014201610-$ | WO-2014201611-$ | WO-2014201646-$ | WO-2014201664-$ | WO-2014201666-$ | WO-2014201668-$ | WO-2014205749-$ | WO-2014205780-$ | WO-2014205807-$ | WO-2014205811-$ | WO-2014206148-$).DID.				
S71	204	(WO-2015000125-$ | WO-2015000180-$ | WO-2015003327-$ | WO-2015003372-$ | WO-2015003374-$ | WO-2015006929-$ | WO-2015010242-$ | WO-2015010277-$ | WO-2015010284-$ | WO-2015010291-$ | WO-2015010310-$ | WO-2015010336-$ | WO-2015010345-$ | WO-2015010349-$ | WO-2015013327-$ | WO-2015013890-$ | WO-2015013891-$ | WO-2015013892-$ | WO-2015013926-$ | WO-2015013950-$ | WO-2015013967-$ | WO-2015015156-$ | WO-2015017971-$ | WO-2015018026-$ | WO-2015018120-$ | WO-2015021612-$ | WO-2015021646-$ | WO-2015021651-$ | WO-2015021652-$ | WO-2015021655-$ | WO-2015021658-$ | WO-2015024239-$ | WO-2015024247-$ | WO-2015026081-$ | WO-2015027383-$ | WO-2015027435-$ | WO-2015027436-$ | WO-2015027470-$ | WO-2015032050-$ | WO-2015032055-$ | WO-2015032078-$ | WO-2015032093-$ | WO-2015035547-$ | WO-2015035557-$ | WO-2015035587-$ | WO-2015035623-$ | WO-2015035689-$ | WO-2015037925-$ | WO-2015039275-$ | WO-2015039280-$ | WO-2015039332-$ | WO-2015042790-$ | WO-2015042811-$ | WO-2015042848-$ | WO-2015042943-$ | WO-2015051509-$ | WO-2015051538-$ | WO-2015054815-$ | WO-2015054961-$ | WO-2015055314-$ | WO-2015058340-$ | WO-2015058341-$ | WO-2015058367-$ | WO-2015058387-$ | WO-2015062041-$ | WO-2015066136-$ | WO-2015066927-$ | WO-2015068044-$ | WO-2015070398-$ | WO-2015070405-$ | WO-2015071703-$ | WO-2015073975-$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37

NJOY Exhibit 1002.300

		| WO-2015074187-$ | WO-2015074265-$ | WO-2015074308-$ | WO-2015077998-$ | WO-2015077999-$ | WO-2015078010-$ | WO-2015079197-$ | WO-2015089711-$ | WO-2015091346-$ | WO-2015106434-$ | WO-2015106440-$ | WO-2015107551-$ | WO-2015107552-$ | WO-2015109476-$ | WO-2015109532-$ | WO-2015109540-$ | WO-2015109616-$ | WO-2015109618-$ | WO-2015117285-$ | WO-2015120588-$ | WO-2015120591-$ | WO-2015120623-$ | WO-2015123831-$ | WO-2015127609-$ | WO-2015137815-$ | WO-2015168828-$ | WO-2015175979-$ | WO-2015193456-$).DID.				
S72	129	(WO-2016012769-$ | WO-2016020675-$ | WO-2016023651-$ | WO-2016030661-$ | WO-2016040575-$ | WO-2016041114-$ | WO-2016041140-$ | WO-2016046116-$ | WO-2016050247-$ | WO-2016058189-$ | WO-2016058992-$ | WO-2016059000-$ | WO-2016059003-$ | WO-2016062777-$ | WO-2016063775-$ | WO-2016065606-$ | WO-2016071705-$ | WO-2016071706-$ | WO-2016074230-$ | WO-2016076178-$ | WO-2016079001-$ | WO-2016079152-$ | WO-2016079155-$ | WO-2016082183-$ | WO-2016090533-$ | WO-2016101200-$ | WO-2016101202-$ | WO-2016101203-$ | WO-2016110522-$ | WO-2016112491-$ | WO-2016112493-$ | WO-2016127396-$ | WO-2016128562-$ | WO-2016131755-$ | WO-2016156103-$ | WO-2016156413-$ | WO-2016162492-$ | WO-2016165125-$ | WO-2016169669-$ | WO-2016169796-$ | WO-2016176800-$ | WO-2016189086-$ | WO-2016193336-$ | WO-2016193365-$ | WO-2016207357-$ | WO-2017005835-$ | WO-2017015791-$ | WO-2017021536-$ | WO-2017028295-$ | WO-2017031678-$ | WO-2017036818-$ | WO-2017036819-$ | WO-2017036828-$ | WO-2017036829-$ | WO-2017036865-$ | WO-2017036879-$ | WO-2017046247-$ | WO-2017046334-$ | WO-2017055564-$ | WO-2017059571-$ | WO-2017060279-$ | WO-2017064051-$ | WO-2017064322-$).DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37
S73	25	(WO-2017064323-$ | WO-2017064324-$ | WO-2017072239-$ | WO-2017072277-$ | WO-2017072284-$ | WO-2017081176-$ | WO-2017084920-$ | WO-2017085240-$ | WO-2017097821-$ | WO-2017108392-$ | WO-2017121546-$ | WO-9712639-$).DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37

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S74	2581	S60 S61 S62 S63 S64 S65 S66 S67 S68 S69 S70 S71 S72 S73	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:37
S75	72	S74 and window	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/13 12:39
S76	199	("20020088469" "20050029137" "20070089757" "20140107815" "20140161301" "20140178461" "20150245655" "20150245657" "20150245665" "20150245666" "20150245667" "20150313283" "20150320116" "20150351455" "20150357608" "20160021771" "20160315488" "5,545,904" "6,743,030" "7,214,075" "7,275,941" "7,905,236" "8,881,738" "9,167,849" D142178 D207887 D250485 D255548 D260690 D271255 D280494 D301837 D302659 D303722 D304771 D310171 D310349 D315032 D336346 D367605 D368552 D371633 D545904 D546782 D547002 D551548 D551970 D556154 D558060 D562151 D565496 D568298 D569727 D571202 D571556 D573474 D576619 D577019 D577150 D577591 D580756 D585077 D589941 D591758 D599670 D605509 D606505 D610588 D616753 D621357 D624880 D627962 D631055 D631458 D634735 D639303 D641718 D645817 D647247 D649708 D661889 D661991 D664146 D664636 D670272 D670659 D672715 D674182 D682841 D684683 D687042 D707627 D708727 D718621 D718723 D718933 D720095 D720496 D720497 D721202 D721972 D722023 D723735 D723736 D724037 D726727 D728855 D729030 D729277 D729444 D729445 D730572 D731114 D733142 D733356 D736706 D737508 D737566 D738038 D739973 D742064 D743099 D744342 D744419 D745004 D746291 D747265 D747603 D747722 D751527 D753090 D755506 D755733 D755735 D757353 D757690 D759031 D759303 D760431 D762003 D763203 D763204 D766873 D767201 D768920 D768980 D769830 D770088 D770395 D772879 D773391 D774514 D776162 D776270 D776338 D776659 D779677 D780179).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 09:50
S77	2	S76 and window	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2017/09/15 09:51

NJOY Exhibit 1002.302

			EPO; JPO; DERWENT; IBM_TDB			
S78	136	(D142178 D207887 D250485 D255548 D260690 D271255 D280494 D301837 D302659 D303722 D304771 D310171 D310349 D315032 D336346 D367605 D368552 D371633 D545904 D546782 D547002 D551548 D551970 D556154 D558060 D562151 D565496 D568298 D569727 D571202 D571556 D573474 D576619 D577019 D577150 D577591 D580756 D585077 D589941 D591758 D599670 D605509 D606505 D610588 D616753 D621357 D624880 D627962 D631055 D631458 D634735 D639303 D641718 D645817 D647247 D649708 D661889 D661991 D664146 D664636 D670272 D670659 D672715 D674182 D682841 D684683 D687042 D707627 D708727 D718621 D718723 D718933 D720095 D720496 D720497 D721202 D721972 D722023 D723735 D723736 D724037 D726727 D728855 D729030 D729277 D729444 D729445 D730572 D731114 D733142 D733356 D736706 D737508 D737566 D738038 D739973 D742064 D743099 D744342 D744419 D745004 D746291 D747265 D747603 D747722 D751527 D753090 D755506 D755733 D755735 D757353 D757690 D759031 D759303 D760431 D762003 D763203 D763204 D766873 D767201 D768920 D768980 D769830 D770088 D770395 D772879 D773391 D774514 D776162 D776270 D776338 D776659 D779677 D780179).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 09:51
S79	80	("9101729" "9220302" "9504279" "20060191546" "20080023003" "20130333711" "20140007891" "20140116455" "20140123990" "20140174458" "20140261493" "20140355969" "20150027457" "20150034104" "20150034507" "20150128971" "20150128972" "20150223521" "20160270442" "20160374393").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:01
S80	6	(WO-2012062600-$ | WO-2015027435-$ | WO-2016059000-$).DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:02
S81	4	(D695450 D707389 D725310 D730571).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:04
S82	90	S79 S80 S81	US-PGPUB;	OR	OFF	2017/09/15

NJOY Exhibit 1002.303

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:04
S83	12	S82 and (window or notch)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/15 10:04
S84	0	"20150781928".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	OFF	2017/10/25 10:45
S85	0	"201500781928".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	OFF	2017/10/25 10:45
S86	0	"2015781928".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	OFF	2017/10/25 10:45
S87	36	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/02/13 09:45
S88	125	(("MONSEES") near3 ("James")).INV.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 09:45
S89	161219	cannula	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 09:45
S90	5	S88 and S89	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 09:45
S91	12569	A24F47/008.cpc.	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/02/13 10:06

NJOY Exhibit 1002.304

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S92	2437	A24F47/008.cpc. and mouthpiece	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 10:06
S93	32	A24F47/008.cpc. and mouthpiece same (notch or indent)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 10:08
S94	2437	A24F47/008.cpc. and mouthpiece	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 10:16
S95	0	A24.cpcl.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:19
S96	155576	A24$.cpcl.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:19
S97	2896	S96 and cigarette adj holder	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:19
S98	682	S96 and cigarette adj holder same mouthpiece	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 13:20
S99	0	15/813089.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 14:04
S100	0	"15257748".app..app.	US-PGPUB;	OR	OFF	2018/02/13

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S101	1	15/257748.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 14:05
S102	3	"20150034104".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:13
S103	3	"20170013885".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:17
S104	2	"20160174607".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:41
S105	2	"20150305409".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 09:43
S106	0	(US20060191546A1 US20080023003A1 US201303337111A1 US20140116455A1 US20140123990A1 US20140174458A1 US20140261493A1 US20140355969A1 US20150034507A1 US20150128972A1 US20150223521A1 US9101729B2 US9220302B2 US9504279B2 USD260690 USD303722 USD433532 USD500301 USD532927 USD695450S USD707389S USD720095 USD721202 USD725310S USD730571S WO2012062600A1 WO2015027435A1 WO2016059000A1)	USPAT	OR	OFF	2018/03/16 15:36
S107	0	(US20060191546A1 US20080023003A1 US201303337111A1 US20140116455A1 US20140123990A1 US20140174458A1 US20140261493A1 US20140355969A1 US20150034507A1 US20150128972A1 US20150223521A1 US9101729B2 US9220302B2 US9504279B2).pn.	USPAT	OR	OFF	2018/03/16 15:37

NJOY Exhibit 1002.306

S108	0	(20060191546A1 20080023003A1 201303337111A1 20140116455A1 20140123990A1 20140174458A1 20140261493A1 20140355969A1 20150034507A1 20150128972A1 20150223521A1 9101729B2 9220302B2 9504279B2).pn.	USPAT	OR	OFF	2018/03/16 15:37
S109	3	("20060191546" "20080023003" "201303337111" 20140116455A1 "20140123990" 20140174458A1 "20140261493" "20140355969" "20150034507" "20150128972" "20150223521" "9101729" "9220302" "9504279").pn.	USPAT	OR	OFF	2018/03/16 15:38
S110	3	("20060191546" "20080023003" "201303337111" "20140116455" "20140123990" "20140174458" "20140261493" "20140355969" "20150034507" "20150128972" "20150223521" "9101729" "9220302" "9504279").pn.	USPAT	OR	OFF	2018/03/16 15:38
S111	62	("20060191546" "20080023003" "201303337111" "20140116455" "20140123990" "20140174458" "20140261493" "20140355969" "20150034507" "20150128972" "20150223521" "9101729" "9220302" "9504279").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/16 15:38
S112	7	S111 and (window or notch or peak)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/16 15:39
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S114	0	W02012062600A1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/16 16:10
S115	0	W02012062600A1.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/16 16:11
S116	0	WO2012062600A1.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/16 16:11
S117	2	WO2012062600A1	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/03/16 16:11

NJOY Exhibit 1002.307

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S119	2	S118 and (window or notch)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/16 16:12
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NJOY Exhibit 1002.313

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NJOY Exhibit 1002.314

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NJOY Exhibit 1002.315

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NJOY Exhibit 1002.316

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NJOY Exhibit 1002.317

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NJOY Exhibit 1002.319

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NJOY Exhibit 1002.322

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NJOY Exhibit 1002.326

		"5564442" | "5579934" | "5591368" | "5605226" | "5641064" | "5649552" | "5666977" | "5666978" | "5708258" | "5730118" | "5730158" | "5746587" | "5810164" | "5819756" | "5845649" | "5865185" | "5865186" | "5881884" | "5894841" | "5931828" | "5934289" | "5938018" | "5944025" | "5954979" | "5967310" | "5975415" | "5979460" | "5994025" | "5996589" | "6024097" | "6026820" | "6053176" | "6089857" | "6095153" | "6102036" | "6119684" | "6125853" | "6155268" | "6164287" | "6196232" | "6216705" | "6234169" | "6269966" | "6324261" | "6349728" | "6381739" | "6386371" | "6407371" | "6418938" | "6431363" | "6443146" | "6446793" | "6510982" | "6532965" | "6536442" | "6557708" | "6598607" | "6603924" | "6606998" | "6612404" | "6615840" | "6622867" | "6637430" | "6655379" | "6672762" | "6688313" | "6708846" | "6726006" | "6752649" | "6772756" | "6799576" | "6803545" | "6805545" | "6810883" | "6827573" | "6854470" | "6874507" | "6909840" | "6954979" | "6994096" | "7000775" | "7015796" | "7025066" | "7082825" | "7117707" | "7185659" | "7234593" | "7290549" | "7374048" | "7415982" | "7428905" | "7434584" | "7488171" | "7530352" | "7546703" | "7581540" | "7621403" | "7644823" | "7753055" | "7767698" | "7793860" | "7793861" | "7801573" | "7813832" | "7815332" | "7832397" | "7832410" | "7886507" | "7913686" | "7988034" | "8003080" | "8042550" | "8079371" | "8091558" | "8141701" | "8156944" | "8157918" | "8205622" | "8251060" | "8282995" | "8308624" | "8314235" | "8322350" | "8371310" | "8375957" | "8381739" | "8387612" | "8393331" | "8402978" | "8424539" | "8443534" | "8464867" | "8479747" | "8490629" | "8495998" | "8499766" | "8511318" | "8539959" | "8541401" | "8550069" | "8578942" | "8578943" | "8596460" | "8646462" | "8671952" | "8678012" | "8689789").PN.				
S135	182	("8689805" | "8695794" | "8714150" | "8714161" | "8733345" | "8733346" | "8739788" | "8741348" | "8752545" | "8752557" | "8757169" | "8770187" | "8781307" | "8790556" | "8794231" | "8794244" | "8794245" | "8807140" | "8809261" | "8813747" | "8813759" | "8820330" | "8829395" | "8851068" | "8851081" | "8851083" | "8857446" | "8863752" | "8869792" | "8881737" | "8893726" | "8897628" | "8899238" | "8899240" | "8905040" | "8910630" | "8910639" | "8910640" | "8910641" | "8910783" | "8915254" | "8919561" |	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17

NJOY Exhibit 1002.327

		"8925555" | "8928277" | "8931492" | "8950395" | "8955522" | "8960199" | "8967382" | "8973587" | "8975764" | "8978663" | "8991402" | "9010335" | "9016274" | "9018899" | "9022026" | "9022039" | "9025291" | "9028808" | "9032968" | "9038626" | "9038642" | "9050431" | "9055617" | "9055770" | "9060388" | "9060548" | "9066543" | "9072321" | "9072322" | "9078472" | "9078474" | "9078475" | "9089166" | "9089168" | "9095174" | "9095175" | "9099873" | "9101729" | "9113659" | "9131733" | "9197726" | "9215895" | "9220302" | "9226526" | "9255277" | "9271525" | "9271529" | "9272103" | "9277769" | "9282772" | "9282773" | "9289014" | "9295286" | "9308336" | "9320300" | "9326547" | "9326549" | "9351522" | "9364027" | "9364800" | "9380810" | "9408416" | "9439455" | "9462832" | "9497998" | "9504279" | "9532604" | "9532605" | "9549572" | "9549573" | "9572373" | "9602646" | "9603387" | "9603389" | "9609893" | "9648905" | "9648909" | "9655890" | "9668520" | "9675118" | "9681687" | "9700074" | "9713346" | "D557209" | "D590988" | "D590989" | "D590990" | "D590991" | "D611409" | "D624238" | "D642330" | "D644375" | "D649932" | "D653803" | "D674748" | "D682090" | "D686987" | "D690461" | "D691324" | "D692615" | "D693054" | "D695450" | "D696051" | "D700572" | "D704629" | "D704634" | "D705918" | "D707389" | "D719701" | "D721577" | "D725310" | "D725823" | "D729366" | "D729439" | "D730571" | "D736995" | "D741001" | "D742063" | "D742492" | "D748329" | "D749261" | "D749505" | "D750320" | "D750321" | "D752278" | "D752280" | "D754919" | "D755057" | "D757352" | "D761488" | "D763502" | "D769519" | "D774247" | "D778831" | "D788697" | "0000091" | "0000901" | "0007621" | "0008931" | "0088071" | "20150781928").PN.				
S136	1518	S129 S130 S131 S132 S133 S134 S135	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17
S137	1518	S136	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17
S138	584	S136 and mouthpiece	US-PGPUB; USPAT	OR	OFF	2018/03/27 10:17
S139	15359	a24f.cpcl.	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:16
S140	717	S139 and mouthpiece same (notch or window or view)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:18
S141	463	S139 and mouthpiece near20 (notch or window or view)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:18
S142	24	S139 and mouthpiece near20 (notch or window)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:19

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S143	102	S139 and mouthpiece same (notch or window)	US-PGPUB; USPAT	OR	OFF	2018/03/27 11:19
S144	972	Cigarette and (square same cross same section)	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:52
S145	1451	Cigarette and (triangle)	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:52
S146	8	Cigarette and (triangle) same shape same roll	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:52
S147	90	shouse.in.	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:57
S148	3	shouse.in. and cigarette	US-PGPUB; USPAT	OR	OFF	2018/03/28 08:57
S149	1	15/257768.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/28 11:44
S150	15359	a24f.cpcl.	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:04
S151	102	S150 and mouthpiece same (notch or window)	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:04
S152	13	S151 and pogo	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:04
S153	35	a24f.cpcl. and pogo	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:05
S154	955	a24f.cpcl. and magnetic	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:08
S155	35	a24f.cpcl. and magnetic same couple	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:08
S156	1517	a24f.cpcl. and channel	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:12
S157	245	a24f.cpcl. and channel same vapor	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:12
S158	258	a24f.cpcl. and (channel or chimney) same vapor	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:19
S159	13	S158 NOT S157	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:19
S160	1379	a24f.cpcl. and reservoir	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:22
S161	344	a24f.cpcl. and reservoir same (passage)	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:23
S162	219	a24f.cpcl. and reservoir same (passage near5 air)	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:23
S163	235	a24f.cpcl. and reservoir same (passage near5 (air or vapor))	US-PGPUB; USPAT	OR	OFF	2018/03/28 12:23
S164	159	atomizer same flow same (chimney or path or channel) same reservoir	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:39
S165	264	atomizer same flow same (chimney or path or channel) same reservoir	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2018/03/28 14:40

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			IBM_TDB			
S166	1379	a24f.cpcl. and (axial or concentric)	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:49
S167	14	a24f.cpcl. and (axial or concentric) and non-concentric	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:49
S168	1379	a24f.cpcl. and (reservoir)	US-PGPUB; USPAT	OR	OFF	2018/03/28 14:51
S169	2885	a24f.cpcl. and (reservoir)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/28 14:51
S170	1690	a24f.cpcl. and (reservoir) and air	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/03/28 14:53
S171	656	monsees.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/05/10 14:23
S172	148	monsees.in. near3 james.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/05/10 14:23
S173	12	(monsees.in. near3 james.in.) and (mouthpiece same notch)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/05/10 14:24
S174	2	"20060191594".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/06/20 13:41
S175	2	"20130192615".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/06/20 13:44
S176	2	"9247773".pn.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2018/06/20 13:46

NJOY Exhibit 1002.330

			EPO; JPO; DERWENT; IBM_TDB			
S177	1	"D723737".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/06/20 13:47
S179	31	(monsees.in. near3 james.in.) and (interior adj surface)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 12:12
S180	0	(monsees.in. near3 james.in.) and (interior adj surface).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 12:13
S182	1	15/815643.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 14:45
S183	1	15/832743.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 14:45

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(apparatus comprising cartridge mouthpiece storage compartment configured hold vaporizable material heater chamber resistive heating element heat wherein generates aerosol air passing along airflow path body receptacle insertably receive couple disposed receives couples air inlet passage first side formed exterior surface second internal configured deliver fluid connection connecting).clm.	US-PGPUB; USPAT	AND	OFF	2019/05/13 08:44
S53	0	(vaporizer apparatus comprising cartridge having elongate flattened storage compartment configured hold liquid vaporizable material visible through distal end proximal end opening through mouthpiece heater chamber wick within heating resistive element thermal contact opaque body front side back side pair lateral sides extending	US-PGPUB; USPAT	AND	OFF	2017/02/19 14:09

NJOY Exhibit 1002.331

		between prevented rolling placed flat surface because diameter larger receptacle formed edge around notch portion housed).clm.				
S59	0	(vaporizer apparatus comprising cartridge having elongate flattened storage compartment configured hold liquid vaporizable material visible through distal end proximal end opening through mouthpiece heater chamber wick within heating resistive element thermal contact opaque body front side back side pair lateral sides extending between prevented rolling placed flat surface because diameter larger receptacle formed edge around notch portion housed).clm.	US-PGPUB; USPAT	AND	OFF	2017/09/11 10:09
S178	0	(cartridge vaporizer device comprising elongate flattened storage compartment configured hold liquid vaporizable material wherein visible through further distal end proximal first side extending between opaque mouthpiece secured over having front adjacent terminates edge disposed adjacent location between opening second notch extending away from toward exposes region beneath heater heating chamber wick partially within resistive element thermal contact cannula extending surrounds filled visible forms fluid connection opening aerosol formed inhalable).clm.	US-PGPUB; USPAT	AND	OFF	2018/06/20 13:55

5/13/2019 8:58:33 AM
C:\Users\mfelton\Documents\EAST\Workspaces\16032009 - 15257768 - 257760 - 257748 e cig cartridge w window.wsp

NJOY Exhibit 1002.332

To: IPDocketingBOS@mintz.com,IPFileroombos@mintz.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 148514

May 21, 2019 03:26:50 AM

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The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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Application	Document	Mailroom Date	Attorney Docket No.
16032009	NOA	05/21/2019	52210-508C18US/716.US18

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/032,009	07/10/2018	James Monsees	52210-508C18US/716.US18	7691

148514 7590 07/22/2019

Mintz/JUUL
One Financial Center
Boston, MA 02111

EXAMINER
FELTON, MICHAEL J

ART UNIT	PAPER NUMBER
1747	

NOTIFICATION DATE	DELIVERY MODE
07/22/2019	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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IPFileroombos@mintz.com

NJOY Exhibit 1002.334

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
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Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 16032009
Applicant : Monsees
Filing Date : 07/10/2018
Date Mailed : 07/22/2019

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Meriem Powell/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 16032009 **Drawings filed: 07/10/2018**

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [X] Figure numbers are duplicated or missing. FIG(s) 31H (see comment)
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [ ] The character of the lines, numbers, and letters is poor. FIG(s)
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [ ] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s)
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains added and/or amended drawings that are not labeled as “New” or “Amended” or “Canceled” as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] This Design reissue application contains a drawing that is labeled as “Canceled” but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as “Canceled.” See 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [X] COMMENTS:
Fig. 31H label is illegilbe due the letter "H" being overlapped with other text.

Application No. 16032009

IDENTIFICATION OF APPLICATION DEFICIENCIES IN APPLICATION FILED ON OR AFTER SEPTEMBER 16, 2012

☐ Applicant must provide legible text for the following item(s).

- ☐ Specification filed , page(s) .
- ☐ Claims filed , claim(s) .
- ☐ Other: .

☒ Applicant must provide missing information on the following page(s) of the specification by amending the specification to add the missing text. No new matter may be added.
Page/line no(s). 68, paragraph 0342 is incomplete

☐ The specification refers to one or more applications by attorney docket number and does not show the U.S. application number(s). Applicant must supply the U.S. application number in place of each attorney docket number.
Page/line no(s).

☐ Applicant must provide an Abstract of the Disclosure.

☐ The Application Data Sheet (ADS dated) does not supply the inventor's city and/or does not supply the inventor's U.S. state and/or does not supply the inventor's country. Applicant must submit a signed, in accordance with 37 CFR 1.76(e) and 1.33(b), application data sheet that corrects this deficiency. To be in compliance with 37 CFR 1.76, the corrected application data sheet must identify the information being changed by using underlining for additions and strikethroughs or brackets for deletions.

☐ Other:

To: IPDocketingBOS@mintz.com,IPFileroombos@mintz.com,
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Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 148514

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Application	Document	Mailroom Date	Attorney Docket No.
16032009	M327	07/22/2019	52210-508C18US/716.US18

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Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (02-18)
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16/032,009	Filing Date	2018-07-10	Docket Number (if applicable)	62210-508C18US/716.US18	Art Unit	1747
First Named Inventor	James Monsees			Examiner Name	M. J. Felton		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☐ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 50-0311

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

NJOY Exhibit 1002.339

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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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.

Signature of Registered U.S. Patent Practitioner			
Signature	/mdvl/	Date (YYYY-MM-DD)	2019-08-21
Name	Michael D. Van Loy	Registration Number	52315

This collection of information is required by 37 CFR 1.114. 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.

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

NJOY Exhibit 1002.340

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 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 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 1002.341

Docket No.: 62210-508C18US/716.US18
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: James Monsees et al.	Allowed: May 21, 2019
Application No.: 16/032,009	Confirmation No.: 7691
Filed: July 10, 2018	Art Unit: 1747
For: VAPORIZER APPARATUS	Examiner: Michael J. Felton

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, pursuant to 37 C.F.R. § 1.114(c), accompanies the Request for Continued Examination (37 C.F.R. § 1.114) submitted herewith.

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. Submitted herewith are copies of foreign patents and non-patent literature in accordance with 37 C.F.R. § 1.98(a)(2).

In accordance with 37 CFR § 1.56(a)(1), Applicant hereby provides the Office with the following chart of references[1] cited in USPTO Office Actions and search reports of a foreign patent office in related applications:

[1] In accordance with M.P.E.P § 609.04(a), analogous US patent application publications are provided herein in place of non-US patent application publications, where applicable.

Document Number/Information	Publication Date (MM-DD-YYYY)	Name of Patentee, Applicant, or Author
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In accordance with 37 CFR § 1.56 and MPEP 2001.06(c), Applicant hereby provides the Office with the following chart of references[2] cited in litigation involving related applications, including U.S. International Trade Commission Investigation No. 337-TA-1139[3], U.S. International Trade Commission Investigation No. 337-TA-1141[4], and U.S. District Court Case No. 2:19-cv-08405-JMV-MF:

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[2] In accordance with M.P.E.P § 609.04(a), analogous US patent application publications are provided herein in place of non-US patent application publications, where applicable.
[3] Applicant notes that there are a number of pending district court cases that are related to this ITC action, which are stayed by statute subject to the outcome of the ITC action.
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In accordance with 37 CFR § 1.56 and MPEP 2001.06(c), Applicant also hereby provides the Office with the following chart of products[5] cited in litigation involving related applications, including U.S. International Trade Commission Investigation No. 337-TA-1139, U.S. International Trade Commission Investigation No. 337-TA-1141, and U.S. District Court Case No. 2:19-cv-08405-JMV-MF:

[5] Applicant notes that all information about the products, outside of the product names listed in the chart, has been designated as confidential business information by third parties under protective orders in the noted ITC investigations, and is not available to Applicant.

NJOY Exhibit 1002.362

Product Name
3 M Drug Delivery Systems inhaler
Panasonic KX-T4400 Cordless Phone and Answering Machine, Operating Manual, and Service Manual (1994)
Go.Pen Plus Vaporizer
Cloud Phantom Device
Cloud F17 Device
Cloud Classic Liquid Device
Cloud Classic Liquid Vaporizer
Cloud Slim Device
Cloud Vape Pen
Cloud Electro Device
Cloud Electro Mini Device
Cloud Alien Device
Cloud Classic Device
O.penVape Craft Reserve cartrdiges
O.penVape Reserve Cartridges
O.penVape cartrdiges
O.penVape ISH
O.penVape Micro ISH, Micro Reserve, and Micro Craft Reserve
O.penVape O.ne Device
O.penVape Go.pen Device
O.penVape Batteries (Original Battery, 2.0 Battery, Dual Logic Battery, and ISH Battery)
Bakked Dabaratus
Bakked Cartrdiges
Bakked Jars

In accordance with 37 CFR § 1.56(a)(2) and MPEP 2004[6], Applicant hereby provides the Office with the following chart of references which the Applicant believes may also include relevant information over which the pending claims patentably defines:

[6] *See* Note 10: "When in doubt, it is desirable and safest to submit information." *But see also* Note 13: "It is desirable to avoid the submission of long lists of documents if it can be avoided… If a long list is submitted, highlight those documents which have been specifically brought to applicant's attention and/or are known to be of most significance."

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Document Number/Information	Publication Date (MM-DD-YYYY)	Name of Patentee, Applicant, or Author
US-20060191546-A1	08-31-2006	Takano et al.
US-20070229025-A1	10-04-2007	Tsai et al.
US-20080023003-A1	01-31-2008	Rosenthal
US-20120188687-A1	07-26-2012	Yamamoto
US-20130323941-A1	12-05-2013	Zeliff et al.
US-20130333711-A1	12-19-2013	Liu
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US-20140123990-A1	05-08-2014	Timmermans
US-20140174458-A1	06-26-2014	KATZ
US-20140202454-A1	07-24-2014	Buchberger
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US-20140355969-A1	12-04-2014	Stern
US-20150034507-A1	02-05-2015	Liu
US-20150059787-A1	03-05-2015	Qiu
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US-9,504,279	11-29-2016	Chen
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US-D405413	02-09-1999	Segers
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CN-205358224-U	07-06-2016	Joyetech (Changzhou) Electronic Tech Co Ltd
CN-303089422	01-28-2015	Ploom Inc.
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Startup behind the Lambo of vaporizers just launched an	Published on April 21, 2015	The Verge

intelligent e-cigarette. https://www.theverge.com/2015/4/21/8458629/pax-labs-e-cigarette-juul		

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 the 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. Further, in accordance with MPEP 609.02, it is requested that the examiner consider information which has been considered by the Office in the parent applications of this continuation application, including U.S. Patent App. No. 15/257,760 and U.S. Patent App. No. 14/581,666.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 50-0311, under Order No. 62210-508C18US/716.US18 from which the undersigned is authorized to draw.

Dated: August 21, 2019

Respectfully submitted,

Electronic signature: /mdvl/
Michael D. Van Loy
Registration No.: 52,315
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San Diego, California 92130-6768
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Sheet 1 of 20

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Application Number	16/032,009
Filing Date	July 10, 2018
First Named Inventor	James Monsees
Art Unit	1747
Examiner Name	M. J. Felton
Attorney Docket Number	62210-508C18US/716.US18

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-10,039,321	08-07-2018	Verleur et al.	
	B	US-10,045,568	08-14-2018	Monsees et al.	
	C	US-10,058,122	08-28-2018	Steingraber et al.	
	D	US-10,058,124	08-28-2018	Monsees et al.	
	E	US-10,058,129	08-28-2018	Monsees et al.	
	F	US-10,085,481	10-02-2018	Verleur et al.	
	G	US-10,092,713	10-09-2018	Terry et al.	
	H	US-10,111,470	10-30-2018	Monsees et al.	
	I	US-10,117,465	11-06-2018	Monsees et al.	
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	K	US-10,143,233	12-04-2018	Dubief et al.	
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	N	US-10,264,823	04-23-2019	Monsees et al.	
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	P	US-20020088469-A1	07-11-2002	Rennecamp	
	Q	US-20030096542-A1	05-22-2003	Kojima	
	R	US-20030150451-A1	08-14-2003	Shayan	
	S	US-20030226837-A1	12-11-2003	Blake et al.	
	T	US-20040050382-A1	03-18-2004	Goodchild	
	U	US-20050029137-A1	02-10-2005	Wang	
	V	US-20050134215	06-23-2005	Bozzone et al.	
	W	US-20050252511-A1	11-17-2005	Pentafragas	
	X	US-20060141344-A1	06-29-2006	Chen et al.	
	Y	US-20060191546-A1	08-31-2006	Takano et al.	
	Z	US-20060191594-A1	08-31-2006	Py	
	AA	US-20060207466-A1	09-21-2006	McNulty et al.	
	AB	US-20070074734-A1	04-05-2007	Braunshteyn et al.	
	AC	US-20070089757-A1	04-26-2007	Bryman	
	AD	US-20070119450-A1	05-31-2007	Wharton et al.	
	AE	US-20070229025-A1	10-04-2007	Tsai et al.	
	AF	US-20070277816-A1	12-06-2007	Morrison et al.	
	AG	US-20070283972-A1	12-13-2007	Monsees et al.	
	AH	US-20080023003-A1	01-31-2008	Rosenthal	
	AI	US-20080029095-A1	02-07-2008	Esser	
	AJ	US-20080092912-A1	04-24-2008	Robinson et al.	
	AK	US-20080257367-A1	10-23-2008	Paterno et al.	
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	AN	US-20090230117-A1	09-17-2009	Fernando et al.	
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				First Named Inventor	James Monsees
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Sheet	2	of	20	Attorney Docket Number	62210-508C18US/716.US18

	AQ	US-2010/0194337-A1	08-05-2010	OPOLKA		
	AR	US-2010/0253279-A1	10-07-2010	Matthias		
	AS	US-20100031968-A1	02-11-2010	SHEIKH et al.		
	AT	US-20100163063-A1	07-01-2010	FERNANDO et al.		
	AU	US-20100163065-A1	07-01-2010	CHANG		
	AV	US-20100192949-A1	08-05-2010	Wright et al.		
	AW	US-2011/0303231	12-15-2011	Li et al.		
	AX	US-20110094523-A1	04-28-2011	Thorens et al.		
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	BH	US-20120199146-A1	08-09-2012	Marangos		
	BI	US-20120199663-A1	08-09-2012	QIU		
	BJ	US-20120255546-A1	10-11-2012	Goetz et al.		
	BK	US-20120255567-A1	10-11-2012	Rose et al.		
	BL	US-20120318882-A1	12-20-2012	Abehasera		
	BM	US-2013/0104916-A1	05-02-2013	Bellinger et al.		
	BN	US-20130037041-A1	02-14-2013	Worm et al.		
	BO	US-20130042865-A1	02-21-2013	MONSEES et al.		
	BP	US-20130081642-A1	04-04-2013	Safari		
	BQ	US-20130099725-A1	04-25-2013	Burrell et al.		
	BR	US-20130168880-A1	07-04-2013	DUKE		
	BS	US-20130182421-A1	07-18-2013	Popper et al.		
	BT	US-20130192615-A1	08-01-2013	Tucker et al.		
	BU	US-20130192619-A1	08-01-2013	Tucker et al.		
	BV	US-20130213419-A1	08-22-2013	Tucker et al.		
	BW	US-20130220314-A1	08-29-2013	Bottom		
	BX	US-20130220315-A1	08-29-2013	Conley et al.		
	BY	US-20130220316-A1	08-29-2013	Oglesby et al.		
	BZ	US-20130228191-A1	09-05-2013	Newton		
	CA	US-20130253433-A1	09-26-2013	Senior et al.		
	CB	US-20130255702-A1	10-03-2013	Griffith, JR. et al.		
	CC	US-20130306065-A1	11-21-2013	Thorens et al.		
	CD	US-20130306084-A1	11-21-2013	Flick		
	CE	US-20130319435-A1	12-05-2013	Flick		
	CF	US-20130323941-A1	12-05-2013	Zeliff et al.		
	CG	US-20130333711-A1	12-19-2013	Liu		
	CH	US-2014/0150783-A1	06-05-2014	Liu		
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	CK	US-20140014126-A1	01-16-2014	Peleg et al.	
	CL	US-20140053856-A1	02-27-2014	Liu	
	CM	US-20140053857-A1	02-27-2014	Liu	
	CN	US-20140053858-A1	02-27-2014	Liu	
	CO	US-20140107815-A1	04-17-2014	LaMothe	
	CP	US-20140116455-A1	05-01-2014	Youn	
	CQ	US-20140123990-A1	05-08-2014	Timmermans	
	CR	US-20140144429-A1	05-29-2014	Wensley et al.	
	CS	US-20140144453-A1	05-29-2014	Capuano et al.	
	CT	US-20140150784-A1	06-05-2014	Liu	
	CU	US-20140161301-A1	06-12-2014	MERENDA	
	CV	US-20140174458-A1	06-26-2014	KATZ	
	CW	US-20140178461-A1	06-26-2014	RIGAS	
	CX	US-20140182610-A1	07-03-2014	Liu	
	CY	US-20140190496-A1	07-10-2014	Wensley et al.	
	CZ	US-20140202454-A1	07-24-2014	Buchberger	
	DA	US-20140224244-A1	08-14-2014	Liu	
	DB	US-20140253144-A1	09-11-2014	Novak, III et al.	
	DC	US-20140261408-A1	09-18-2014	DePiano et al.	
	DD	US-20140261486-A1	09-18-2014	Potter et al.	
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	DF	US-20140261493-A1	09-18-2014	Smith et al.	
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	DK	US-20140276536-A1	09-18-2014	Estes	
	DL	US-20140283858-A1	09-25-2014	Liu	
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	DN	US-20140299141-A1	10-09-2014	FLICK	
	DO	US-20140305454-A1	10-16-2014	Rinker et al.	
	DP	US-20140332020-A1	11-13-2014	LI et al.	
	DQ	US-20140332022-A1	11-13-2014	LI et al.	
	DR	US-20140338685-A1	11-20-2014	Amir	
	DS	US-20140345631-A1	11-27-2014	Bowen et al.	
	DT	US-20140345633-A1	11-27-2014	Talon et al.	
	DU	US-20140355969-A1	12-04-2014	Stern	
	DV	US-20140366898-A1	12-18-2014	MONSEES et al.	
	DW	US-20140373857-A1	12-25-2014	Steinberg	
	DX	US-20140376895-A1	12-25-2014	Han	
	DY	US-2015/0118895-A1	04-30-2015	Zheng et al.	
	DZ	US-20150013696-A1	01-15-2015	Plojoux et al.	
	EA	US-20150020831-A1	01-22-2015	Weigensberg et al.	
	EB	US-20150027457-A1	01-29-2015	Janardhan et al.	
	EC	US-20150027460-A1	01-29-2015	Liu	
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	EE	US-20150034104-A1	02-05-2015	Zhou	
	EF	US-20150034507-A1	02-05-2015	Liu	
	EG	US-20150059783-A1	03-05-2015	Liu	
	EH	US-20150059787-A1	03-05-2015	Qiu	
	EI	US-20150070832-A1	03-12-2015	Schneider et al.	
	EJ	US-20150083147-A1	03-26-2015	Schiff et al.	
	EK	US-20150090256-A1	04-02-2015	CHUNG	
	EL	US-20150090281-A1	04-02-2015	Chen	
	EM	US-20150101606-A1	04-16-2015	White	
	EN	US-20150101625-A1	04-16-2015	Newton et al.	
	EO	US-20150101626-A1	04-16-2015	LI et al.	
	EP	US-20150128971-A1	05-14-2015	Verleur et al.	
	EQ	US-20150128972-A1	05-14-2015	Verleur et al.	
	ER	US-20150128976-A1	05-14-2015	Verleur et al.	
	ES	US-20150136158-A1	05-21-2015	Stevens et al.	
	ET	US-20150157055-A1	06-11-2015	Lord	
	EU	US-20150164147-A1	06-18-2015	Verleur et al.	
	EV	US-20150173124-A1	06-18-2015	Qiu	
	EW	US-20150181940-A1	07-02-2015	Liu	
	EX	US-20150181944-A1	07-02-2015	LI et al.	
	EY	US-20150189919-A1	07-09-2015	Liu	
	EZ	US-20150196060-A1	07-16-2015	Wensley et al.	
	FA	US-20150208728-A1	07-30-2015	Lord	
	FB	US-20150208729	07-2015	Monsees et al.	
	FC	US-20150216237-A1	08-06-2015	Wensley et al.	
	FD	US-20150217068-A1	08-06-2015	Wakalopulos	
	FE	US-20150223521-A1	08-13-2015	Menting et al.	
	FF	US-20150237916-A1	08-27-2015	Farine et al.	
	FG	US-20150245654-A1	09-03-2015	MEMARI et al.	
	FH	US-20150245655-A1	09-03-2015	MEMARI et al.	
	FI	US-20150245657-A1	09-03-2015	MEMARI et al.	
	FJ	US-20150245665-A1	09-03-2015	MEMARI et al.	
	FK	US-20150245666-A1	09-03-2015	MEMARI et al.	
	FL	US-20150245667-A1	09-03-2015	MEMARI et al.	
	FM	US-20150245668-A1	09-03-2015	MEMARI et al.	
	FN	US-20150245669-A1	09-03-2015	CADIEUX et al.	
	FO	US-20150257447-A1	09-17-2015	Sullivan	
	FP	US-20150282526-A1	10-08-2015	Wu	
	FQ	US-20150289565-A1	10-15-2015	CADIEUX et al.	
	FR	US-20150296889-A1	10-22-2015	LIU	
	FS	US-20150305409-A1	10-29-2015	Verleur et al.	
	FT	US-20150313283-A1	11-05-2015	Collett et al.	
	FU	US-20150313287-A1	11-05-2015	VERLEUR et al.	
	FV	US-20150320116-A1	11-12-2015	Bleloch et al.	
	FW	US-20150327595-A1	11-19-2015	Scatterday	
	FX	US-20150335071-A1	11-26-2015	Brinkley et al.	

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	FY	US-20150351455-A1	12-10-2015	LIU	
	FZ	US-20150357608-A1	12-10-2015	Huang	
	GA	US-20150359263-A1	12-17-2015	BELLINGER	
	GB	US-2016/0353804-A1	12-08-2016	LORD	
	GC	US-20160007651-A1	01-14-2016	Ampolini et al.	
	GD	US-20160021933-A1	01-28-2016	THORENS et al.	
	GE	US-20160044962-A1	02-18-2016	THORENS et al.	
	GF	US-20160095356-A1	04-07-2016	Chan	
	GG	US-20160106153-A1	04-21-2016	Zhu	
	GH	US-20160150824-A1	06-02-2016	MEMARI et al.	
	GI	US-20160157523-A1	06-09-2016	LIU	
	GJ	US-20160198768-A1	07-14-2016	Liu	
	GK	US-20160270442-A1	09-22-2016	Liu	
	GL	US-20160278436-A1	09-29-2016	Verleur et al.	
	GM	US-20160331032-A1	11-17-2016	MALGAT et al.	
	GN	US-20160360790-A1	12-15-2016	Calfee et al.	
	GO	US-20160374393-A1	12-29-2016	CHEN	
	GP	US-2017/0197046-A1	07-13-2017	BUCHBERGER	
	GQ	US-20170035115-A1	02-09-2017	MONSEES et al.	
	GR	US-20170095005-A1	04-06-2017	MONSEES et al.	
	GS	US-20170119044-A1	05-04-2017	OLIGSCHLAEGER et al.	
	GT	US-20170156404-A1	06-08-2017	Novak, III et al.	
	GU	US-20170157341-A1	06-08-2017	PANDYA et al.	
	GV	US-20170231276-A1	08-17-2017	MIRONOV et al.	
	GW	US-20170318861-A1	11-09-2017	THORENS	
	GX	US-20170367410-A1	12-28-2017	HON	
	GY	US-20180070644-A1	03-15-2018	Monsees et al.	
	GZ	US-20180177234-A1	06-28-2018	LEE	
	HA	US-20190037926-A1	02-07-2019	QIU	
	HB	US-3,085,145	04-09-1963	Wray	
	HC	US-3,271,719	09-06-1966	Ovshinsky	
	HD	US-3,918,451	11-11-1975	Steil	
	HE	US-3,934,117	01-20-1976	Schladitz	
	HF	US-4,171,000	10-16-1979	Uhle	
	HG	US-4,492,480	01-08-1985	Wadso et al.	
	HH	US-4,548,454	10-22-1985	Zeller et al.	
	HI	US-4,745,705	05-24-1988	Yamamoto et al.	
	HJ	US-4,793,365	12-27-1988	Sensabaugh, Jr. et al.	
	HK	US-4,811,731	03-14-1989	Newell et al.	
	HL	US-4,947,874	08-14-1990	Brooks et al.	
	HM	US-4,947,875	08-14-1990	Brooks et al.	
	HN	US-4,993,436	02-19-1991	Bloom, Jr.	
	HO	US-5,042,509	08-27-1991	Banerjee et al.	
	HP	US-5,117,482	05-26-1992	Hauber	
	HQ	US-5,144,962	09-08-1992	Counts et al.	
	HR	US-5,259,786	11-09-1993	Huang	

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	HS	US-5,261,424	11-16-1993	Sprinkel, Jr.	
	HT	US-5,269,327	12-14-1993	Counts et al.	
	HU	US-5,479,948	01-02-1996	Counts et al.	
	HV	US-5,661,329	08-26-1997	Hiramoto et al.	
	HW	US-5,682,050	10-28-1997	Williams	
	HX	US-5,865,185	02-02-1999	Collins et al.	
	HY	US-6,090,082	07-18-2000	King et al.	
	HZ	US-6,155,268	12-05-2000	Takeuchi	
	IA	US-6,203,339	03-20-2001	Nieminen	
	IB	US-6,283,610	09-04-2001	Alajajian	
	IC	US-6,516,796	02-11-2003	Cox et al.	
	ID	US-6,637,430	10-28-2003	Voges et al.	
	IE	US-6,708,846	03-23-2004	Fuchs et al.	
	IF	US-6,743,030	06-01-2004	Lin et al.	
	IG	US-6,772,756	08-10-2004	Shayan	
	IH	US-7,019,491	03-28-2006	Bozzone et al.	
	II	US-7,173,222	02-06-2007	Cox et al.	
	IJ	US-7,214,075	05-08-2007	He et al.	
	IK	US-7,275,941	10-02-2007	Bushby	
	IL	US-7,318,435	01-15-2008	Pentafragas	
	IM	US-7,646,613	01-12-2010	Ligtenberg et al.	
	IN	US-7,726,320	06-01-2010	Robinson et al.	
	IO	US-7,802,569	09-28-2010	Yeates et al.	
	IP	US-7,905,236	03-15-2011	Bryman et al.	
	IQ	US-7,913,688	03-29-2011	Cross et al.	
	IR	US-8,485,180	07-16-2013	Smutney et al.	
	IS	US-8,522,776	09-03-2013	Wright et al.	
	IT	US-8,528,569	09-10-2013	Newton	
	IU	US-8,752,545-B2	06-17-2014	Buchberger	
	IV	US-8,833,364	09-16-2014	Buchberger	
	IW	US-8,881,738	11-11-2014	Bryman	
	IX	US-8,893,726-B2	11-25-2014	Hon	
	IY	US-8,897,628	11-25-2014	Conley et al.	
	IZ	US-8,991,402	03-31-2015	Bowen et al.	
	JA	US-9,010,335	04-21-2015	Scatterday	
	JB	US-9,072,321	07-07-2015	Liu	
	JC	US-9,078,473	07-14-2015	Worm et al.	
	JD	US-9,101,729-B2	08-11-2015	Liu	
	JE	US-9,132,248	09-15-2015	Qiu	
	JF	US-9,167,849	10-27-2015	Adamic	
	JG	US-9,220,302	12-29-2015	DePiano et al.	
	JH	US-9,247,773	02-02-2016	Memari et al.	
	JI	US-9,271,529	03-01-2016	Alima	
	JJ	US-9,282,772	03-15-2016	Tucker et al.	
	JK	US-9,289,014	03-22-2016	Tucker et al.	
	JL	US-9,345,541	05-24-2016	Greeley et al.	

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	JM	US-9,386,805	07-12-2016	Liu	
	JN	US-9,408,416	08-09-2016	Monsees et al.	
	JO	US-9,414,629	08-16-2016	Egoyants et al.	
	JP	US-9,420,829	08-23-2016	Thorens et al.	
	JQ	US-9,423,152	08-23-2016	Ampolini et al.	
	JR	US-9,427,022	08-30-2016	Levin et al.	
	JS	US-9,498,588	11-22-2016	Benassayag et al.	
	JT	US-9,504,279	11-29-2016	Chen	
	JU	US-9,510,623	12-06-2016	Tucker et al.	
	JV	US-9,516,899	12-13-2016	Plojoux et al.	
	JW	US-9,526,273	12-27-2016	Liu	
	JX	US-9,549,573	01-24-2017	Monsees et al.	
	JY	US-9,609,893	04-04-2017	Novak, III et al.	
	JZ	US-9,675,109	06-13-2017	Monsees et al.	
	KA	US-9,714,878	07-25-2017	Powers et al.	
	KB	US-9,723,877	08-08-2017	Wong et al.	
	KC	US-9,772,245	09-26-2017	Besling et al.	
	KD	US-9,781,953	10-10-2017	Verleur et al.	
	KE	US-9,795,168	10-24-2017	Zhu	
	KF	US-9,801,413	10-31-2017	Zhu	
	KG	US-9,814,263	11-14-2017	Cochand et al.	
	KH	US-9,814,265	11-14-2017	Rinker et al.	
	KI	US-9,844,234	12-19-2017	Thorens et al.	
	KJ	US-9,861,135	01-09-2018	Chen	
	KK	US-9,974,743	05-22-2018	Rose et al.	
	KL	US-D143295	12-25-1945	Fisher	
	KM	US-D260690	09-08-1981	Stutzer	
	KN	US-D267590	01-11-1983	Varma	
	KO	US-D280494	09-10-1985	Abel	
	KP	US-D299066	12-20-1988	Newell et al.	
	KQ	US-D303722	09-26-1989	Marlow et al.	
	KR	US-D310349	09-04-1990	Rowen	
	KS	US-D336346	06-08-1993	Miller et al.	
	KT	US-D368552	04-02-1996	Adams	
	KU	US-D371633	07-09-1996	Chenard	
	KV	US-D379810	06-10-1997	Giordano, Jr. et al.	
	KW	US-D382146	08-12-1997	Sandy	
	KX	US-D397504	08-25-1998	Zelenik	
	KY	US-D398150	09-15-1998	Vonarburg	
	KZ	US-D405007	02-02-1999	Naas, Sr.	
	LA	US-D405413	02-09-1999	Segers	
	LB	US-D411332	06-22-1999	Zelenik	
	LC	US-D412279	07-27-1999	Brice	
	LD	US-D422884	04-18-2000	Lafond	
	LE	US-D424236	05-02-2000	Reed	
	LF	US-D433532	11-07-2000	Higgins et al.	

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	LG	US-D450313	11-13-2001	Koinuma	
	LH	US-D450662	11-20-2001	Kwok	
	LI	US-D478569	08-19-2003	Hussaini et al.	
	LJ	US-D478897	08-26-2003	Tsuge	
	LK	US-D500301	12-28-2004	Deguchi	
	LL	US-D500302	12-28-2004	Deguchi	
	LM	US-D505922	06-07-2005	Mayo et al.	
	LN	US-D506447	06-21-2005	Mayo et al.	
	LO	US-D506731	06-28-2005	Mayo et al.	
	LP	US-D507244	07-12-2005	Mayo et al.	
	LQ	US-D523171	06-13-2006	Mitten et al.	
	LR	US-D525948	08-01-2006	Blair et al.	
	LS	US-D528992	09-26-2006	Hobart et al.	
	LT	US-D529044	09-26-2006	Andre et al.	
	LU	US-D530340	10-17-2006	Andre et al.	
	LV	US-D531190	10-31-2006	Lee et al.	
	LW	US-D532927	11-28-2006	Sann	
	LX	US-D534921	01-09-2007	Andre et al.	
	LY	US-D535261	01-16-2007	Daniels	
	LZ	US-D535308	01-16-2007	Andre et al.	
	MA	US-D539813	04-03-2007	Chen	
	MB	US-D540749	04-17-2007	Kaule	
	MC	US-D545303	06-26-2007	Chang	
	MD	US-D545490	06-26-2007	Tai	
	ME	US-D545904	07-03-2007	Chen et al.	
	MF	US-D546782	07-17-2007	Poulet et al.	
	MG	US-D556154	11-27-2007	Poulet et al.	
	MH	US-D557209	12-11-2007	Ahlgren et al.	
	MI	US-D558060	12-25-2007	{hacek over (S)}ir et al.	
	MJ	US-D566709	04-15-2008	Kim et al.	
	MK	US-D568298	05-06-2008	Lundgren et al.	
	ML	US-D571556	06-24-2008	Raile	
	MM	US-D573474	07-22-2008	Beam et al.	
	MN	US-D576619	09-09-2008	Udagawa et al.	
	MO	US-D577019	09-16-2008	Udagawa et al.	
	MP	US-D577150	09-16-2008	Bryman et al.	
	MQ	US-D579934	11-04-2008	Okamoto et al.	
	MR	US-D585077	01-20-2009	Sheba et al.	
	MS	US-D589941	04-07-2009	Maier et al.	
	MT	US-D591758	05-05-2009	Lee	
	MU	US-D607403	01-05-2010	Hara et al.	
	MV	US-D610588	02-23-2010	Chen	
	MW	US-D611409	03-09-2010	Green et al.	
	MX	US-D616753	06-01-2010	Beam et al.	
	MY	US-D624880	10-05-2010	Felegy, Jr. et al.	
	MZ	US-D631055	01-18-2011	Gilbert et al.	

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	NA	US-D631458	01-25-2011	Liao et al.	
	NB	US-D631885	02-01-2011	Maier	
	NC	US-D634735	03-22-2011	Maier	
	ND	US-D639303	06-07-2011	Ni et al.	
	NE	US-D639782	06-14-2011	Kim	
	NF	US-D641718	07-19-2011	Sakai	
	NG	US-D645817	09-27-2011	Sasada et al.	
	NH	US-D647247	10-18-2011	Jones	
	NI	US-D649708	11-29-2011	Oneil	
	NJ	US-D649932	12-06-2011	Symons	
	NK	US-D656496	03-27-2012	Andre et al.	
	NL	US-D661991	06-19-2012	Brummelhuis et al.	
	NM	US-D664636	07-31-2012	Robinson et al.	
	NN	US-D669530	10-23-2012	Hung	
	NO	US-D670659	11-13-2012	Ishikawa et al.	
	NP	US-D674748	01-22-2013	Ferber et al.	
	NQ	US-D676741	02-26-2013	van Landsveld et al.	
	NR	US-D681445	05-07-2013	van Landsveld et al.	
	NS	US-D682841	05-21-2013	Suetake et al.	
	NT	US-D686987	07-30-2013	Vanstone et al.	
	NU	US-D687042	07-30-2013	Yoneta et al.	
	NV	US-D695450	12-10-2013	Benassayag et al.	
	NW	US-D700572	03-04-2014	Esses	
	NX	US-D703679	04-29-2014	Chen	
	NY	US-D704629	05-13-2014	Liu	
	NZ	US-D704634	05-13-2014	Eidelman et al.	
	OA	US-D705918	05-27-2014	Robinson et al.	
	OB	US-D707389	06-17-2014	Liu	
	OC	US-D707688	06-24-2014	Wu	
	OD	US-D708727	07-08-2014	Postma	
	OE	US-D711389	08-19-2014	Sun et al.	
	OF	US-D711891	08-26-2014	Emami et al.	
	OG	US-D712347	09-02-2014	Awiszus et al.	
	OH	US-D718723	12-02-2014	Clymer et al.	
	OI	US-D718933	12-09-2014	Brown, Jr.	
	OJ	US-D720095	12-23-2014	Alima	
	OK	US-D721202	01-13-2015	Liu	
	OL	US-D723735	03-03-2015	Liu	
	OM	US-D723736	03-03-2015	Liu	
	ON	US-D723737	03-03-2015	Liu	
	OO	US-D724037	03-10-2015	Yoshioka	
	OP	US-D725310	03-24-2015	Eksouzian	
	OQ	US-D725821	03-31-2015	Levin et al.	
	OR	US-D726727	04-14-2015	Holz et al.	
	OS	US-D728855	05-05-2015	Liu	
	OT	US-D729277	05-12-2015	Uchida	

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	OU	US-D729444	05-12-2015	Leidel	
	OV	US-D729445	05-12-2015	Leidel	
	OW	US-D730571	05-26-2015	Chen	
	OX	US-D730572	05-26-2015	Leidel	
	OY	US-D731114	06-02-2015	Leidel	
	OZ	US-D732733	06-23-2015	Spagnolo et al.	
	PA	US-D733356	06-30-2015	Leidel	
	PB	US-D737508	08-25-2015	Liu	
	PC	US-D738038	09-01-2015	Smith	
	PD	US-D739973	09-29-2015	Chao	
	PE	US-D742492	11-03-2015	Robinson et al.	
	PF	US-D743099	11-10-2015	Oglesby	
	PG	US-D744342	12-01-2015	Blasko et al.	
	PH	US-D745004	12-08-2015	Kim	
	PI	US-D752284	03-22-2016	Doster	
	PJ	US-D753090	04-05-2016	Langhammer et al.	
	PK	US-D755733	05-10-2016	Ikegaya et al.	
	PL	US-D755735	05-10-2016	Kashimoto	
	PM	US-D756032	05-10-2016	Chen	
	PN	US-D757690	05-31-2016	Lee et al.	
	PO	US-D759031	06-14-2016	Ozolins et al.	
	PP	US-D760431	06-28-2016	Liu	
	PQ	US-D763203	08-09-2016	Ikegaya et al.	
	PR	US-D763204	08-09-2016	Ikegaya et al.	
	PS	US-D766873	09-20-2016	Washio	
	PT	US-D768920	10-11-2016	Jones et al.	
	PU	US-D769830	10-25-2016	Clymer et al.	
	PV	US-D770395	11-01-2016	Clymer et al.	
	PW	US-D773114	11-29-2016	Leidel et al.	
	PX	US-D773727	12-06-2016	Eksouzian	
	PY	US-D774514	12-20-2016	Turksu et al.	
	PZ	US-D776338	01-10-2017	Lomeli	
	QA	US-D779677	02-21-2017	Chen	
	QB	US-D779719	02-21-2017	Qiu	
	QC	US-D780179	02-28-2017	Bae et al.	
	QD	US-D793004	07-25-2017	Liu	
	QE	US-D799746	10-10-2017	Leidel et al.	
	QF	US-D800132	10-17-2017	Maus et al.	
	QG	US-D802206	11-07-2017	Huang et al.	
	QH	US-D802838	11-14-2017	Clark et al.	
	QI	US-D806311	12-26-2017	Smith	
	QJ	US-D808073	01-16-2018	Leidel	
	QK	US-D811003	02-20-2018	Folyan	
	QL	US-D815346	04-10-2018	Bagai	
	QM	US-D819881	06-05-2018	Qiu	
	QN	US-D822896	07-10-2018	Durand	

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Examiner Signature		Date Considered	

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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]
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Examiner Signature		Date Considered	

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(Based on PTO 11-07 version)

Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(Use as many sheets as necessary)*				***Complete if Known***	
				Application Number	16/032,009
				Filing Date	July 10, 2018
				First Named Inventor	James Monsees
				Art Unit	1747
				Examiner Name	M. J. Felton
Sheet	20	of	20	Attorney Docket Number	62210-508C18US/716.US18

*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). 2Applicant is to place a check mark here if English language Translation is attached.

Electronic Patent Application Fee Transmittal

Application Number:	16032009
Filing Date:	10-Jul-2018
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Filer:	Nicholas Paul Mouton/Shae Jackson
Attorney Docket Number:	52210-508C18US/716.US18

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($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1300	1300
		Total in USD ($)		**1300**

Electronic Acknowledgement Receipt	
EFS ID:	36944641
Application Number:	16032009
International Application Number:	
Confirmation Number:	7691
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
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Receipt Date:	21-AUG-2019
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File Listing:

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1	Request for Continued Examination (RCE)	062210-508C18US-RCE.pdf	1353208 3c7f8e208f9492020ddbacc0ba3d429ac77fcc2a	no	3
Warnings:					
Information:					
2		062210-508C18US-Information_Disclosure_Statement_SB08.pdf	8362733 e611668959a0e6ee8f78479feae9684c59301eab	yes	45
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
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	Information Disclosure Statement (IDS) Form (SB08)		26	45	
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30208 44b51dbffa837928c0ea5ce928a5d0e7d695372e	no	2
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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.

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DESCRIPTION CH105346

SWISS CONFEDERATION

Eidgen. OFFICE FOR

INTELLECTUAL PROPERTY

PATENT

Published on 16. June 1924

No. 105346 (Application filed: 7. September 1923, 8 pm.) Class 111b

MAIN FACULTY MASCHINENFABRIK OERLIKON, Oerlikon (Switzerland).

Electric metal blade contact.

Electric contact brushes, consisting of several contact plates, which also act as springs, are known to be chamfered at their ends so that each sheet with its machined side surfaces on the associated. Contact piece rests. In practice, however, usually not the whole brush contact surface is on; because, if the brush differs from the vorgebestämmten contact position by a few, which occurs, for example, even with small mechanical changes in the pressing device or by their drive means, the individual contact plates are instead of their side surface on only one edge. The contact resistance of the contact point is in this case no minimum, even not because the inherent resilience of the contact plates is not sufficient to achieve the necessary contact pressure. Calculations and experiments show that the transition resistance is significantly reduced with increasing pressure.

The present invention now relates to a metal blade contact with lateral contact points, which according to the invention has at least one contact plate, on which acts an additional spring force. Under this condition, it is sufficient for a contact brush, which is composed of such trained contact elements, completely, if each contact plate rests on the contact point on a line. It can thus be composed of individual punched brush and spring elements such a contact brush, without subsequent processing of the brush ends.

Figs. 1 and 2 of the drawing show a side view and the top view of an exemplary embodiment of the subject invention in the form of a contact brush. The contact plates are designated by a and the additional springs, which may be steel blades, for example, b. Between each KontaMpaar a spacer c is attached so that each contact plate can play freely and at the same time a good ventilation of the same is effected.

Such a contact brush does not require precision in machining and assembly, is significantly cheaper to manufacture and requires much less material

wall than the previously used metal sheet brushes. Another innovation of the shown brush is the dimensioning of the brush plates. A contact brush with bevelled ends is always composed of contact plates of different lengths, it therefore the shortest plates are subjected to a higher current load due to their lower resistance. In the present brush, the Blechdieken bezw with increasing brush plate lengths BEZW. the line cross-sections is increased such that practically in all brush plates, the specific current load is the same. This ensures that the innermost sheets are not heated more than the outermost, longest sheets, and lessening and oxidation of their contact surfaces are impossible. It would be conceivable to use the springs h, if they consist of

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an electrically highly conductive material, for power supply, or on the contrary, for example by means of paint coating or paper liners, not to let take part in the power supply.

Of course, by means of the metal sheet contacts shown also brushes of another shape. z. B. semicircular, U-shaped, angular, etc., and also those with only one-sided contact surface are made.

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SCHWEIZERISCHE EIDGENOSSENSCHAFT

EIDGEN. AMT FÜR GEISTIGES EIGENTUM

PATENTSCHRIFT

Veröffentlicht am 16. Juni 1924

Nr. 105346 (Gesuch eingereicht: 7. September 1923, 20 Uhr.) **Klasse 111 b**

HAUPTPATENT

MASCHINENFABRIK OERLIKON, Oerlikon (Schweiz).

Elektrischer Metallblattkontakt.

Elektrische Kontaktbürsten, bestehend aus mehreren Kontaktblechen, die zugleich als Federn wirken, werden bekanntlich an ihren Enden so abgeschrägt, daß jedes einzelne Blech mit seinen bearbeiteten Seitenflächen am zugehörigen Kontaktstück anliegt. In der Praxis liegt jedoch meistens nicht die ganze Bürstenkontaktfläche auf; denn, wenn die Bürste von der vorausbestimmten Kontaktlage um weniges abweicht, was zum Beispiel schon bei kleinen mechanischen Veränderungen der Anpreßvorrichtung oder von deren Antriebsmittel eintritt, so liegen die einzelnen Kontaktbleche statt mit ihrer Seitenfläche nur auf einer Kante auf. Der Übergangswiderstand der Kontaktstelle wird in diesem Falle kein Minimum, auch schon deshalb nicht, weil die Eigenfederung der Kontaktbleche nicht genügt, um den nötigen Kontaktdruck zu erreichen. Berechnungen und Versuche zeigen, daß der Übergangswiderstand mit zunehmendem Druck bedeutend vermindert wird.

Die vorliegende Erfindung betrifft nun einen Metallblattkontakt mit seitlichen Kontaktstellen, der erfindungsgemäß mindestens ein Kontaktblech aufweist, auf welches eine zusätzliche Federkraft wirkt. Unter dieser Voraussetzung genügt es für eine Kontaktbürste, die sich aus derart ausgebildeten Kontaktelementen zusammensetzt, vollkommen, wenn jedes Kontaktblech an der Kontaktstelle auf einer Linie aufliegt. Es kann somit eine solche Kontaktbürste aus einzelnen gestanzten Bürsten- und Federelementen zusammengesetzt werden, ohne nachherige Bearbeitung der Bürstenenden.

Fig. 1 und 2 der Zeichnung zeigen eine Seitenansicht und die Draufsicht einer beispielsweisen Ausführungsform des Erfindungsgegenstandes in der Form einer Kontaktbürste. Die Kontaktbleche sind mit *a* und die zusätzlichen Federn, die beispielsweise Stahlblätter sein können, mit *b* bezeichnet. Zwischen jedem Kontaktpaar ist ein Distanzstück *c* angebracht, damit jedes Kontaktblech frei spielen kann und zugleich eine gute Ventilation desselben bewirkt wird.

Eine solche Kontaktbürste verlangt keine Präzision in der Bearbeitung und in der Montage, ist bedeutend billiger in der Herstellung und erfordert viel weniger Materialauf-

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wand als die bisher gebräuchlichen Metallblattbürsten. Eine weitere Neuerung der gezeigten Bürste ist die Dimensionierung der Bürstenbleche. Eine Kontaktbürste mit abgeschrägten Enden setzt sich immer aus Kontaktblechen verschiedener Längen zusammen, es werden deshalb die kürzesten Bleche infolge ihres geringeren Widerstandes einer höheren Strombelastung unterworfen. Bei der vorliegenden Bürste sind mit zunehmenden Bürstenblechlängen die Blechdicken bezw. die Leitungsquerschnitte derart vergrößert, daß praktisch bei sämtlichen Bürstenblechen die spezifische Strombelastung dieselbe ist. Damit ist erreicht, daß die innersten Bleche nicht stärker erwärmt werden als die äußersten, längsten Bleche, und Erlahmung und Oxydation ihrer Kontaktflächen unmöglich sind. Es wäre denkbar, die Federn *b*, falls sie aus einem elektrisch gut leitenden Material bestehen, mit zur Stromzuführung heranzuziehen, oder im Gegenteil, zum Beispiel mittelst Lacküberzug oder Papierzwischenlagen, an der Stromführung nicht teilnehmen zu lassen.

Selbstverständlich können mittelst der gezeigten Metallblattkontakte auch Bürsten anderer Form, z. B. halbrunde, U-förmige, winkelförmige usw., und auch solche mit nur einseitiger Kontaktfläche hergestellt werden.

PATENTANSPRUCH:

Elektrischer Metallblattkontakt mit seitlichen Kontaktstellen, dadurch gekennzeichnet, daß derselbe mindestens ein Kontaktblech aufweist, und daß auf dieses eine zusätzliche Federkraft wirkt.

UNTERANSPRÜCHE:

1. Elektrischer Metallblattkontakt nach Patentanspruch, dadurch gekennzeichnet, daß mehrere Kontaktbleche mit je einer Blattfeder zu einer Kontaktbürste zusammengesetzt sind.
2. Elektrischer Metallblattkontakt nach Patentanspruch und Unteranspruch 1, dadurch gekennzeichnet, daß mit zunehmender Länge der Kontaktbleche deren Querschnitte derart vergrößert sind, daß die spezifische Strombelastung auf allen Kontaktblechen praktisch dieselbe ist.
3. Elektrischer Metallblattkontakt nach Patentanspruch und Unteranspruch 1, dadurch gekennzeichnet, daß zwischen den einzelnen Kontaktblechen Distanzstücke eingesetzt sind, um die freie Beweglichkeit der Kontaktbleche zu sichern und eine gute Ventilation derselben zu erzielen.
4. Elektrischer Metallblattkontakt nach Patentanspruch und Unteranspruch 1, dadurch gekennzeichnet, daß die Kontaktbürste aus Stanzelementen zusammengesetzt ist.
5. Elektrischer Metallblattkontakt nach Patentanspruch, dadurch gekennzeichnet, daß das die zusätzliche Kraft erzeugende Element an der Stromführung teilnimmt.
6. Elektrischer Metallblattkontakt nach Patentanspruch, dadurch gekennzeichnet, daß das die zusätzliche Kraft erzeugende Element an der Stromführung nicht teilnimmt.

MASCHINENFABRIK OERLIKON.

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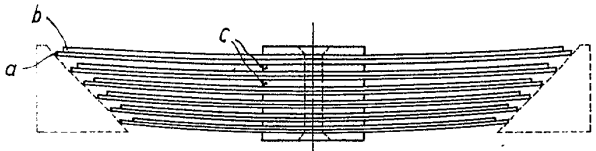

Fig. 1

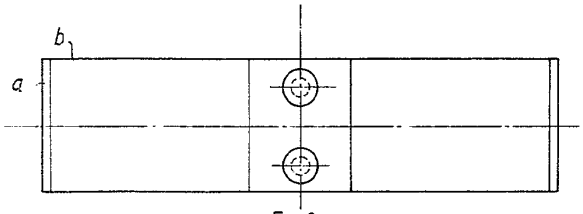

Fig. 2

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Espacenet

Bibliographic data: CN1630476 (A) — 2005-06-22

Inhaler

Inventor(s): RALF ESSER [NL] ± (ESSER RALF)

Applicant(s): THINK GLOBAL B V [NL] ± (THINK GLOBAL B V, ; INHALENESS B.V)

Classification: - international: ***A24F47/00; A61M11/00; A61M15/00; A61M15/06; A61M16/10; A24F;*** (IPC1-7): A24F47/00; A61M15/06
- cooperative: **A61M15/06**

Application number: CN2002828949 20020513

Priority number(s): WO2002DE01712 20020513

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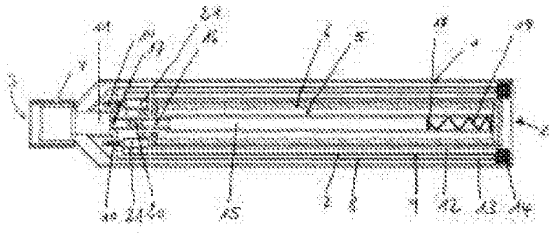
Abstract of CN1630476 (A)

The invention relates to an inhaler comprising a catalytic burner and a fuel tank (6) containing hydrogen that is connected to said burner, a container (15) for inhalation additives such as aromatic substances and/or active ingredients, at least one inlet (2) for a gaseous mixture containing oxygen, in particular for air and an outlet (3) for an inhalation mixture containing aromatic substances and/or active ingredients.



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[19] 中华人民共和国国家知识产权局

[51] Int. Cl[7]
A24F 47/00
A61M 15/06

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[85] 进入国家阶段日期 2004.11.12
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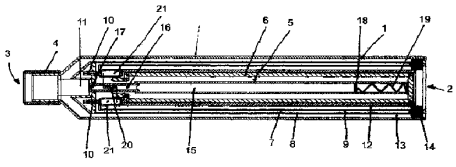
代理人 苏 娟 杨松龄

权利要求书 2 页 说明书 6 页 附图 1 页

[54] 发明名称 吸入器

[57] 摘要

本发明涉及一种吸入器，包括一个催化燃烧器和一个与上述燃烧器连接的用于容纳氢气的燃料箱，一个用于客纳像芳香物和/或活性组分这种吸入添加剂的容器，至少一个用于一种含氧混合气特别是空气的入口，以及一个用于含有芳香物和/或活性组分的吸入混合气的出口。



ISSN1008-4274

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1. 吸入器，包括一个催化燃烧器和一个与上述燃烧器连接的特别是含有氢气的燃料箱（6），一个用于容纳像芳香物和/或活性组分这种吸入添加剂的容器（15），至少一个用于一种含氧混合气特别是空气的入口（2），以及一个用于含有芳香物和/或活性组分的吸入混合气的出口（3）。

2. 根据权利要求1所述的吸入器，其特征在于，催化燃烧器为一个燃料电池（7、8）。

3. 根据权利要求2所述的吸入器，其特征在于，燃料电池（7、8）被卷成旋管的样子。

4. 根据权利要求4所述的吸入器，其特征在于，吸入添加剂溶解于水中或其他溶剂中。

5. 根据权利要求5所述的吸入器，其特征在于，有一个由催化燃烧器供能的用于让含有吸入添加剂的溶液蒸发的加热装置（20）。

6. 根据权利要求5或6所述的吸入器，其特征在于，有一个由催化燃烧器供能的用于溶液雾化的喷雾器，特别是一个超声喷雾器或者一个气动喷雾器。

7. 根据前述权利要求中任一项所述的吸入器，其特征在于，有一个附加的水箱。

8. 根据前述权利要求中任一项所述的吸入器，其特征在于，有一个用于控制输送到吸入混合气的吸入添加剂的计量的控制装置。

9. 根据前述权利要求中任一项所述的吸入器，其特征在于，燃料箱（6）和所有其他的容器（15）都是可更换的和/或可再填充的。

10. 根据前述权利要求中任一项所述的吸入器，其特征在于，有一个布置在出口（3）前面的用于向吸入混合气添加外界空气的混合装置（11）。

11. 根据前述权利要求中任一项所述的吸入器，其特征在于，有一个用于对被引导经过燃料电池的氧气的量进行控制的控制系统。

12. 根据前述权利要求中任一项所述的吸入器，其特征在于，有一个吸嘴（4）。

13. 根据前述权利要求中任一项所述的吸入器，其特征在于，有一个由催化燃烧器供能的指示灯单元。

NJOY Exhibit 1002.399

14. 根据前述权利要求中任一项所述的吸入器用作一个香烟的替代品。

NJOY Exhibit 1002.400

吸入器

本发明涉及一种新型的吸入器。

吸入器主要用于医学或治疗学目的并且根据其用途被设计成不同的样子。

无烟式吸入器（inhaler for smoking cessation）由一个吸嘴和一个尾段所组成，还有一个可以加入尼古丁胶囊的空气通道。通过依靠在吸嘴处“吸入吐出”所产生的气流，尼古丁在尼古丁胶囊中被释放出来。与香烟或雪茄相反，这样的吸入器具有在使用时不影响室内空气质量的优点，因而是其他人的福音。因此，它们特别好地适合在非吸烟区使用，例如在飞机上。然而，这种吸入器仍有释放的尼古丁会对吸烟者的健康造成不利影响的缺点。而且，使用一个吸入器时体验到的抽烟的感觉几乎是不能与抽香烟或雪茄时体验到的感觉相比的，因为吸入的空气通常是冷的并且由于没有烟而没有随之产生的满足感。

其他用于呼吸道疾病或伤寒的药物治疗的吸入器有一个连有口鼻吸嘴的可加热的水箱。香精油或药物的活性组分可被添加到水箱的水中，所以当水加热时，这些成份可以和水蒸汽一起被吸入。这些吸入器利用一个螺旋形加热丝作为热源，该螺旋形加热丝可以通过来自“壁装电源插座”的交流电或通过直流电例如汽车的电池来供电。它们具有体积大的缺点。此外，由于需要电源，它们不能在任何地方使用。

这些缺点也存在于从含有药物活性组分的溶液中产生可吸入气雾的吸入器中。特别地，两种装置被用于制造气雾——超声喷雾器和气动喷雾器。超声喷雾器通过一个由超声波引发振动的薄膜将溶液喷成雾状；在气动喷雾中，溶液在压力下通过一个喷嘴喷出。

本发明的任务是创造一种新型的吸入器，该吸入器适用于上述的应用领域但是没有上述的缺点。

该任务通过一个吸入器来完成，该吸入器包括一个催化燃烧器和一个与上述燃烧器连接的特别是含有氢气的燃料箱，一个用于容纳像芳香物和/或活性组分这种吸入添加剂的容器，至少一个用于氧气或一种含氧混合气特别是空气的入口，以及一个用于含有芳香物和/或活性

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组分的吸入混合气的出口。

本发明的一个基本构思是不但利用在氢气催化燃烧时释放的电能，而且还利用产生的废气来制造含有芳香物和/或活性组分的吸入混合气。因此，存在于废气中的热量可以被用来对吸入添加剂进行加热，例如通过对含有吸入添加剂的容器进行加热。废气热也可以被用来加热吸入混合气，这就使得水蒸汽具有了更高的吸收能力的优点，所以活性组分可以以比使用冷的吸入混合气时更高的浓度来传送。同时，废气可以直接添加到吸入混合气中，因为它们通常是绝对不含有害物质的，例如燃烧氢气时。

这就导致了许多优点。因此，一个通过催化燃烧器供能的吸入器与外部的能量源无关。所需的能量以一种无污染的途径释放，特别是利用氢气的催化燃烧时，其燃烧产物只是无害的水蒸汽，甚至被用于芳香物和活性组分的传送。正在被使用的燃料因而不但是一个能量提供者，而且它还提供了一种传送芳香物或活性组分的方法。但是甚至是其他燃料，例如天然气也能使用，它能无焰催化燃烧，具有低得多的燃烧温度，只产生水蒸汽和二氧化碳组成的废气，可以不经过任何考虑地混合到吸入混合气中。

原则上，本发明的催化转化器可以设计成这样，当吸入器工作时，可能与外界空气相结合的温热废气被导向着经过含有吸入物质的容器，同时废气流吸收了吸入添加剂。吸入添加剂[或]活性组分的类型可以提供为液态的，但也可以是固态的粉末状。如果吸入添加剂是液态的，它们可以在表面蒸发到废气中。如果吸入添加剂是固态的，它们可以利用足够的废气流输送能力和流速被废气带走，因而吸入混合气是一种含有固体颗粒的气雾。

由于有着易于控制的反应过程，燃料电池使自己成为了一种催化燃烧器。现代燃料电池有着高效率并且可以被设计成这样，吹过燃料电池的催化薄膜的空气量会自动调节通过的氢离子量。

在一种这样的用作催化燃烧器的燃料电池的有利开发中，燃料电池被卷成旋管的样子。将燃料电池卷成管不但大大减少了它所需的空间，而且还自动形成一个可输送氧气或含氧混合气的空气通道。

因为对废气流的输送能力和速度没有或仅有很少的要求，溶解于水中或其他载体中的吸入添加剂的计量与粉末状吸入添加剂的计量相

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比更简单因而是首选的。根据吸入器的设计构造，另一个优点是，在吸入添加剂的一个合适的溶解浓度的条件下，吸入混合气的这些添加剂的添加不需要其它控制。

本发明所述的吸入器最好能包括一个由催化燃烧器供能的加热装置，这可以促使含有吸入添加剂的溶液蒸发，所以吸入添加剂以蒸汽形式包含在吸入混合气之中。这样的一种加热装置可以是例如位于容纳溶解了的吸入添加剂的容器中的一个螺旋形加热丝。

然而，也可以提供一个将废气的热量传递给溶液的热交换器。

此外，吸入器可以包括一个由催化燃烧器供能的喷雾器，特别是一个用于将溶液转化为气雾的超声喷雾器或者气动喷雾器。主要有两种原理可以实现利用压力将溶液喷成雾状。含有带着吸入添加剂的溶液的导管中的气动喷雾所需的压力要么通过对溶液加热，要么最好通过一个压缩机来产生。然而，也可以使用与水相比具有相对低沸点的溶剂添加剂来产生压力，因而仅用一点热量就可以在导管中建立足够的压力。这就使得可以调节压力，因而可以通过一个可控的热量供给来调节喷雾。

在另一个优选实施例中，吸入器包括一个由催化燃烧器供能的用于水蒸发的加热装置，也包括一个附加水箱。在该情况下，完整的吸入混合气不需要在催化燃烧器中形成。相反地，氢燃烧时释放出的热量可用来将水加热成水蒸汽，然后加入从催化燃烧器中放出的水蒸汽。

在另一个优选实施例中，吸入器包括一个用于控制添加到吸入混合气的芳香物或活性组分的计量的控制系统。

如果燃料箱和所有其他的容器都是可更换的和/或可再填充的话也是一个优点。这让吸入器可以长时间使用。

此外，如果一个用于混合吸入混合气和环境空气的混合装置位于出口的上游，它将很有利。这允许使用者按所需对将要吸入的吸入混合气进行计量。

更有利的是，本发明所述的吸入器应该设有一个允许对被引导经过燃料电池的氧气的体积进行调节的控制系统。特别是在吸入器要产生持续时间恒定的吸入混合气的量的时候具有优势，在该情况下，吸入器的功能性相当于一个传统的有医学目的的吸入器。

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此外，一种本发明所述的吸入器可以包括一个吸嘴。这种吸嘴可以是例如形如一种用于香烟的吸嘴，并且特别好地适用于吸入器，使用该吸嘴可以只通过嘴来吸入混合气。然而，除了一个吸嘴之外，也可以在吸入器的出口处设有一个面具，使用者的口鼻可以使用该面具来覆盖。

催化燃烧中特别是燃料电池中所产生的电流也可以被利用。一方面，它可以用于螺旋形加热丝对添加剂或水的加热操作。然而，它也可以用于一个指示灯单元，该指示灯单元可以例如用于指示吸入器正在使用中。在另一方面，如果该吸入器被用作一个香烟的无烟式的替代品或一种新式的刺激品，它也可以用于模仿一支香烟或雪茄的发光发热。

本发明所有的实施例所共有的是该吸入器可以不顾及场所和有无外部电源来使用，一种令吸入者感到舒适的温热的吸入混合气可以生成，并且如果必要的话，不但催化燃烧器中的[...]而且燃烧产物和它们的废热可以被用于吸入混合气的配制。

下面参照图 1 对本发明作更详细的说明，图中图解了一个吸入器实例的工作原理。

大体上在图 1 中展示的吸入器包括一个带有一个空气入口 2 和一个吸入混合气出口 3 的横式中空圆筒体 1。在出口 3 处提供了一个可更换的吸嘴 4。在它的内部，中空体 1 包括一个同心布置的壁 5，一个基本上为圆筒形的含氢燃料箱 6 位于其中，该燃料箱的底部面对着空气入口 2 而其出气口面对着出口 3。

两者形成了一个燃料电池的内膜 7 和外膜 8 同心布置着并且在壁 5 和中空体的内壁之间被分隔开。两层膜 7、8 之间围起的空腔 9 在对着入口 2 的一侧用一个气密装置封住。在对着出口 3 的一侧，该空腔 9 与燃料箱 6 的出气口相通，并且可以通过阀门 10 来控制或切断从燃料箱 6 流向空腔 9 的氢气流。

在内膜 7 和壁之间以及中空体的内壁和外膜 8 之间形成的通道 12、13 在它们对着入口 2 的一端经过一个环形空气滤清器 14 与入口 2 相通。它们相反的一端通向一个布置在出口 3 前面的混合室 11（由内膜 7 和壁 5 形成的通道 12 与混合室 11 之间的连通结构在图中未示）。

同心布置在燃料箱 6 中的一个圆筒形的活性组分容器 15 为溶解于

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一种液体例如水的吸入添加剂而设。活性组分容器 15 的底部牢牢地固定在燃料箱 6 的底部上。一个空心管 16 作为活性组分的出口而设，它经过燃料箱 6 的出气口并且通向混合室 11。空心管 16 对着混合室 11 的开口设有一个卸压阀 17。在活性组分容器 15 的内部设有一个活塞 18，该活塞被一个安置在活性组分容器 15 底部上的弹簧 19 推向空心管 16。该压力将混合了吸入添加剂的溶液推入空心管 16。

一根螺旋形金属丝 20 安置于空心管 16 内部以使得含有吸入物的液体蒸发。该螺旋形金属丝 20 可以通过燃料电池的薄膜 7、8 来提供电流，就像其他部件例如气动喷雾器的压缩机或超声喷雾器一样。

此外，该燃料电池也向位于壁 5 中的两个可充电电池 21 提供电流。这里可以设有一个图中未示的控制系统，该控制系统由电池 18 或直接由燃料电池产生的电流进行供电，并且允许通过阀门 10 控制氢气的供给。另外，可以为其他的用户提供一个连接装置，该连接装置要么直接从燃料电池要么通过电池进行供电（此处连接装置图中未示）。

为了吸入，将吸入器的吸嘴 4 置于嘴上并且将空气从入口 2 吸进吸入器。在该过程中，吸进的空气流经薄膜 7、8 并且在薄膜 7、8 上与氢气发生反应，因而产生了水蒸汽并且形成了一种空气/水蒸汽混合气。

与此同时，燃料电池在该反应中产生的电流被传导给螺旋形金属丝，所以位于空心管中的含有吸入添加剂的液体蒸发了。由于因此造成了过度的压力，卸压阀 16 打开了以便于含有吸入添加剂的蒸汽可以溢出。该蒸汽与空气/水蒸汽混合气在混合室 11 中混合在一起，因此一种空气、水蒸汽和吸入添加剂的混合气可以通过喷嘴吸入。

为了让吸入装置可以长时间使用，建议将燃料箱 6 以及活性组分容器 14 以这样一种可更换或有再充填可能的方式与吸入器相连接。为此目的，中空圆筒可以包括例如一个阀门连接件，而燃料箱 6 可能与活性组分容器 14 一起拧上该连接件。

一种依靠催化燃烧器供能的吸入器的构思可以在许多其他的设计实施例中实现。例如，不是非要将薄膜、容纳燃料和活性组分的容器以及空气通道相互同心地布置。

同样地，可以设有附加的调节和控制机构。虽然现有的燃料电池通常依据供给的空气流自行调节，这还是需要根据应用领域对氢气的

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供给进行控制。例如，也可以根据空气/水蒸汽/吸入混合气的温度和/或相对湿度在混合室中设有一个可调节的新鲜空气供给装置，利用该装置可以使混合室中的混合气冷却。当然，任何必需的冷却也可以通过一个热交换器来实现。

附图标记

1	中空圆筒体	13	通道
2	入口	14	空气滤清器
3	出口	15	活性组分容器
4	吸嘴	16	空心管
5	壁	17	卸压阀
6	燃料箱	18	活塞
7	内膜	19	弹簧
8	外膜	20	螺旋形金属丝
9	空腔	21	电池
10	阀门		
11	混合室		
12	通道		

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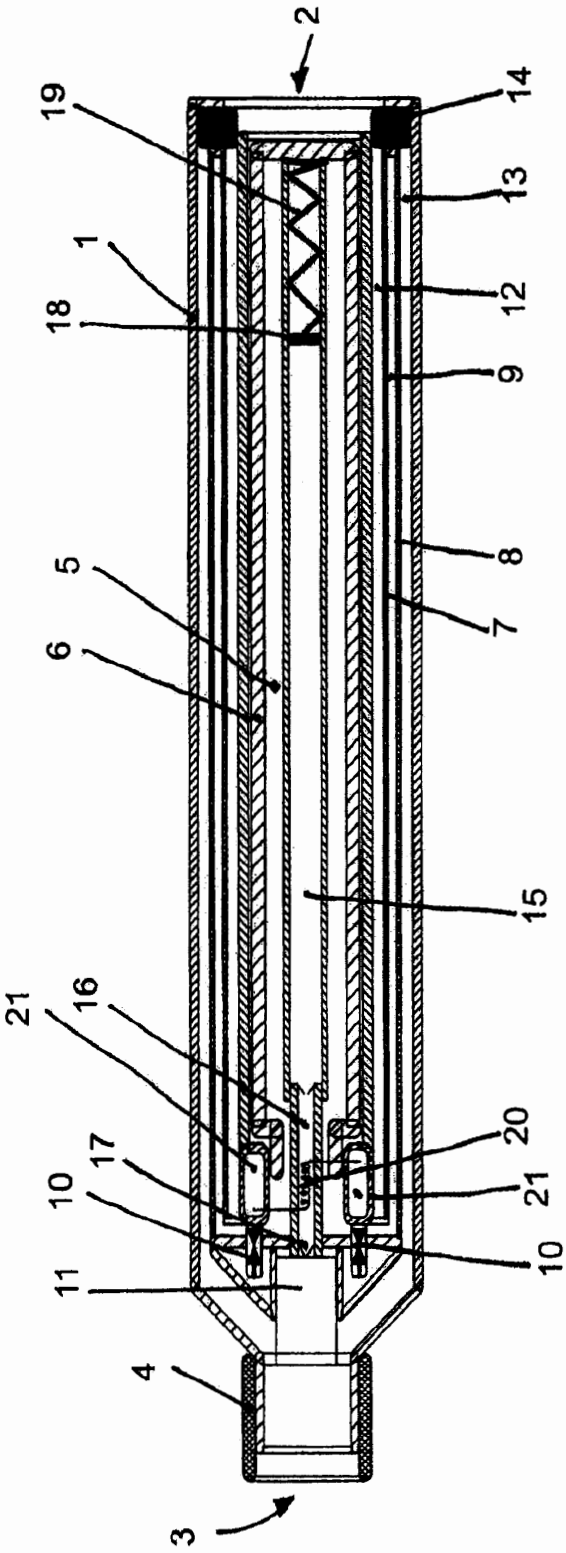

图 1

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Espacenet

Bibliographic data: CN2643529 (Y) — 2004-09-22

Handset battery charger

Inventor(s): LIANG ZUQIN [CN] ± (ZUQIN LIANG)

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Classification: **- international:** ***H02H11/00; H02H7/18; H02J7/00;*** (IPC1-7): H02H11/00; H02H7/18; H02J7/00

- cooperative:

Application number: CN2003273551U 20030815

Priority number(s): CN2003273551U 20030815

Abstract of CN2643529 (Y)

The utility model relates to a mobile-phone cell charging device, comprising a charging terminal and a DC power. The utility model also comprises a voltage comparator, a startup detecting device and an electrical switch. The voltage comparator receives the output voltage signal of the charging terminal and compares the voltage. The startup detecting device receives and processes the output signal of the voltage comparator and inputs the signal to the CPU micro-processor of the whole machine, and starts up the DC power for work. The electrical switch receives the output signal of the voltage comparator, then connects the DC power to the charging terminal, and adjusts the polarity of the charging terminals according to the output signal of the voltage comparator. The utility model can automatically identify the polarity of the cell when the cell is plugged in, and invert the positive and negative polarity of the output voltage of the charging terminal according to the identified polarity, and automatically protect the detecting and charging circuit and cease the work of the charging device.

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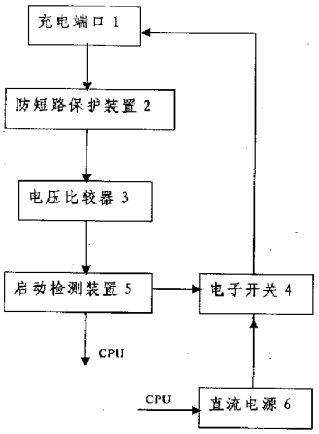
权利要求书 1 页 说明书 3 页 附图 2 页

[54] 实用新型名称 手机电池充电装置

[57] 摘要

本实用新型涉及一种手机电池充电装置，包括充电端口及直流电源；特点是：还包括一接收充电端口输出的电压信号并进行电压比较的电压比较器；一接收电压比较器输出的信号经其处理后输入至整机的 CPU 微处理器从而启动直流电源工作的启动检测装置；一接收电压比较器输出的信号后将直流电源与充电端口接通的且可根据电压比较器的输出信号来调整充电端口的极性的电子开关。当电池接入时能自动识别电池正负极性；根据所检测到的电池的正负极自动转换对电池充电端口的输出电压的正负极性；充电端口短路时，自动对检测和充电电路进行保护并中止充电装置的工作。



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1、一种手机电池充电装置，包括充电端口及直流电源；其特征在于：还包括一接收充电端口（1）输出的电压信号并进行电压比较的电压比较器（3）；一接收电压比较器（3）输出的信号经其处理后输入至整机的CPU微处理器从而启动直流电源（6）工作的启动检测装置（5）；一接收电压比较器（3）输出的信号后将直流电源（6）与充电端口（1）接通的且可根据电压比较器（3）的输出信号来调整充电端口（1）的极性的电子开关（4）。

2、根据权利要求1所述的手机电池充电装置，其特征在于：在充电端口（1）与电压比较器（3）之间还可串联一防短路保护装置（2）。

3、根据权利要求1或2所述的手机电池充电装置，其特征在于：防短路保护装置（2）为可恢复电子保险丝PTC，其串接在充电端口（1）的一输入端。

4、根据权利要求1所述的手机电池充电装置，其特征在于：电压比较器（3）包括比较放大器U805-A、U805-B，二极管D809、D818及电阻R832、R841；电阻R832与电阻R841串联，其串联后一端工作电源正端，另一端接地；比较放大器U805-A与U805-B的负向输入端电连接后接电阻R832与电阻R841的串联点，比较放大器U805-A的正向输入端接充电端口（1）的一输入端，比较放大器U805-B的正向输入端接保险丝PTC的输出端，比较放大器U805-A及U805-B的输出端分别接二极管D809、D818的阳极。

5、根据权利要求1所述的手机电池充电装置，其特征在于：电子开关（4）包括三极管Q806、继电器K803、二极管D813及电阻R833；电阻R833一端接比较放大器U805-B的输出端，另一端接三极管Q806的基极，三极管Q806的集电极接继电器K803的2脚，且该集电极还通过二极管D813接继电器K803的1脚，三极管Q806的发射极接地，继电器K803的3、4脚分别接保险丝PTC的输出端及充电端口（1）的一输入端。

6、根据权利要求1所述的手机电池充电装置，其特征在于：启动检测装置（5）包括三极管Q808及电阻R838；电阻R838一端接二极管D809、D818的阴极，另一端接三极管Q808的基极，三极管Q808的集电极接整机的CPU微处理器的一脚，其发射极接地。

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手机电池充电装置

（一）技术领域

本实用新型涉及一种手机电池充电装置。

（二）背景技术

现在市场上有很多电池充电器，但它们均不能识别电池的极性，当电池极性放反了，均不能对其充电。

（三）实用新型内容

本实用新型的目的是提供一种电池接入时能自动识别电池极性，且可根据所检测到的电池正负极性自动转换对电池充电端口的输出电压的正负极性的手机电池充电装置。

为了达到上述目的，本实用新型是这样实现的，它包括充电端口及直流电源；其特征在于：还包括一接收充电端口输出的电压信号并进行电压比较的电压比较器；一接收电压比较器输出的信号经其处理后输入至整机的 CPU 微处理器从而启动直流电源工作的启动检测装置；一接收电压比较器输出的信号后将直流电源与充电端口接通的且可根据电压比较器的输出信号来调整充电端口的极性的电子开关。

本实用新型进一步的改进为，在充电端口与电压比较器之间还可串联一防短路保护装置。防短路保护装置为可恢复电子保险丝 PTC，其串接在充电端口的一输入端。电压比较器包括比较放大器 U805-A、U805-B，二极管 D809、D818 及电阻 R832、R841；电阻 R832 与电阻 R841 串联，其串联后一端工作电源正端，另一端接地；比较放大器 U805-A 与 U805-B 的负向输入端电连接后接电阻 R832 与电阻 R841 的串联点，比较放大器 U805-A 的正向输入端接充电端口的一输入端，比较放大器 U805-B 的正向输入端接保险丝 PTC 的输出端，比较放大器 U805-A 及 U805-B 的输出端分别接二极管 D809、D818 的阳极。电子开关包括三极管 Q806、继电器 K803、二极管 D813 及电阻 R833；电阻 R833 一端接比较放大器 U805-B 的输出端，另一端接三极管 Q806 的基极，三极管 Q806 的集电极接继电器 K803 的 2 脚，且该集电极还通过二极管 D813 接继电器 K803 的 1 脚，三极管 Q806 的发射极接地，继电器 K803 的 3、4 脚分别接保险丝 PTC 的输出端及充电端口（1）的一输入端。启动检测装置包括三极管 Q808

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及电阻 R838；电阻 R838 一端接二极管 D809、D818 的阴极，另一端接三极管 Q808 的基极，三极管 Q808 的集电极接整机的 CPU 微处理器的一脚，其发射极接地。

本实用新型与现有技术相比，具有如下优点：

1、电池接入时自动识别电池正负极性；

2、根据所检测到的电池的正负极自动转换对电池充电端口的输出电压的正负极性；

3、充电端口短路时，自动对检测和充电电路进行保护并中止充电装置的工作。

（四）附图说明

图 1 为本实用新型的电路广框图；

图 2 为图 1 的电路原理图。

（五）具体实施方式

下面将结合附图和实施例对本实用新型做进一步的详述：

如图 1 所示，包括一充电端口 1 及直流电源；一接收充电端口 1 输出的电压信号并进行电压比较的电压比较器 3；一接收电压比较器 3 输出的信号经其处理后输入至整机的 CPU 微处理器从而启动直流电源 6 工作的启动检测装置 5；一接收电压比较器 3 输出的信号后将直流电源 6 与充电端口 1 接通的且可根据电压比较器 3 的输出信号来调整充电端口 1 的极性的电子开关 4；一设在充电端口 1 与电压比较器 3 之间的防短路保护装置 2。

如图 2 所示防短路保护装置 2 为可恢复电子保险丝 PTC，其串接在充电端口 1 的一输入端。电压比较器 3 包括比较放大器 U805-A、U805-B，二极管 D809、D818 及电阻 R832、R841；电阻 R832 与电阻 R841 串联，其串联后一端工作电源正端，另一端接地；比较放大器 U805-A 与 U805-B 的负向输入端电连接后接电阻 R832 与电阻 R841 的串联点，比较放大器 U805-A 的正向输入端接充电端口 1 的一输入端，比较放大器 U805-B 的正向输入端接保险丝 PTC 的输出端，比较放大器 U805-A 及 U805-B 的输出端分别接二极管 D809、D818 的阳极。电子开关 4 包括三极管 Q806、继电器 K803、二极管 D813 及电阻 R833；电阻 R833 一端接比较放大器 U805-B 的输出端，另一端接三极管 Q806 的基极，三极管 Q806 的集电

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极接继电器 K803 的 2 脚，且该集电极还通过二极管 D813 接继电器 K803 的 1 脚，三极管 Q806 的发射极接地，继电器 K803 的 3、4 脚分别接保险丝 PTC 的输出端及充电端口 1 的一输入端。启动检测装置 5 包括三极管 Q808 及电阻 R838；电阻 R838 一端接二极管 D809、D818 的阴极，另一端接三极管 Q808 的基极，三极管 Q808 的集电极接整机的 CPU 微处理器的一脚，其发射极接地。直流电源 6 包括三端稳压块 U804，三极管 Q812，稳压二极管 D806，二极管 D817，电阻 R817、R820、R823、R826、R827 及电容 C809、C812、C815；该电源为通用的稳压电源，在此不再进一步的描述；该电源的电阻 R817 接整机的 CPU 微处理器的电源输出脚，稳压电源 6 的输出端接继电器 K803 的输入端即 5、7 脚。

工作时，当充电端口 1 接入电池时，电阻 R832、R841，比较放大器 U805-A、U805-B 及二极管 D809、D818 组成的电压比较器 3 对电池进行检测，如发生端口 1 与电池极性相同时，经电阻 R833、三极管 Q806 及继电极 K803 组成电子开关 4 不动作，从而完成对电池充电。又如端口 1 与电池极性不同时，比较放大器 U805-B 输出高电平，三极管 Q806 导通，继电器动作，其触头发生动作带动 3-5、6-8 接通，对电池进行极性后充电。

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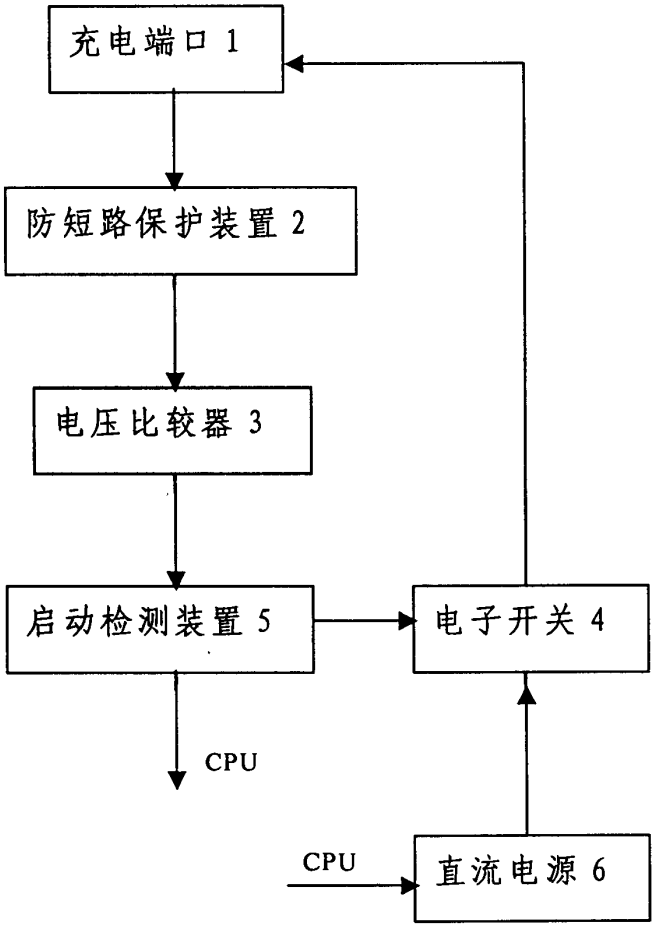

图 1

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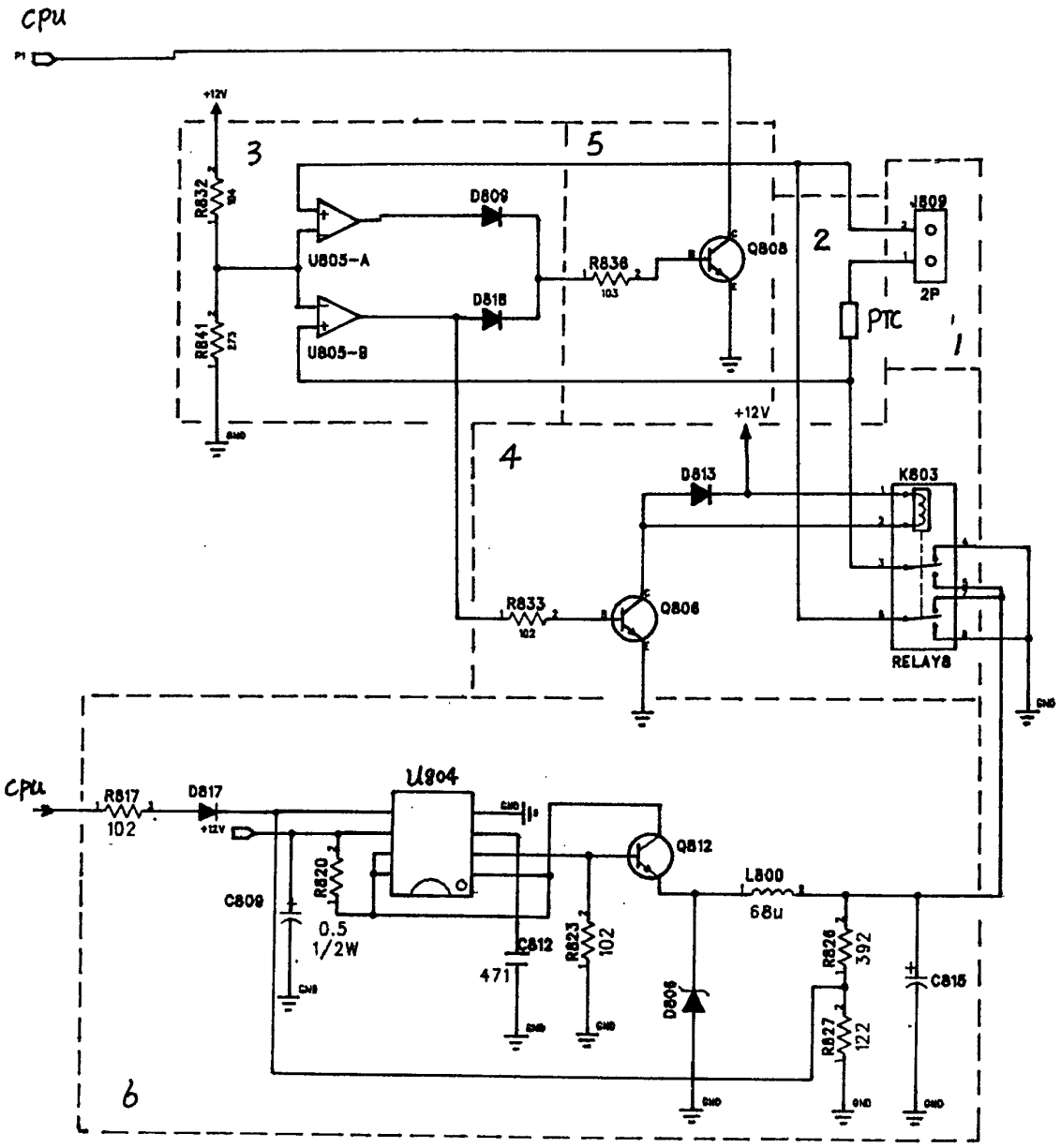

图 2

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Comparative Design 10:

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[22] Filing date: June 30, 1994 [21] Filing No.: CN94305762.0 Classification No.: 13-03

[72] Designer(s): J. E. Youens [30] Priority: December 30, 1993 US016939 Document No.: CN3037571D

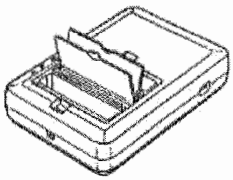
[73] Patentee: Compaq Computer Company Address: Texas, U.S.A.

[74] Patent agency: China Patent Agent (H.K.) Ltd. Agent: Tian'an Zhang

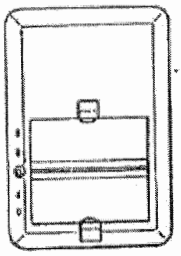
[57] Brief description: The perspective view of an open condition.

[54] Title of Product using the Design: Cellphone Battery Charger (30)

Note: 1. Part of the Bibliographic Data is not shown owing to limitations of space.
2. The views are not shown to scale for the sake of illustrative clarity.

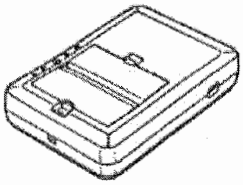


Reference figure of an open state

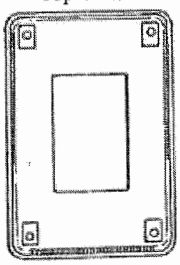


Top view

Back view

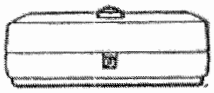


Perspective view

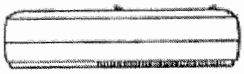


Bottom view

Right view



Front view



Left view

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Espacenet

Bibliographic data: CN1942114 (A) — 2007-04-04

Atmized electronic cigarrette

Inventor(s): LI HAN [HK] ± (HAN LI)

Applicant(s): LI HAN [HK] ± (HAN LI)

Classification: - international: ***A24D1/18; A24F47/00; A61M15/00; A61M15/06; C01B39/06***
- cooperative: **A24B15/16**; **A24F47/002**; **A24F47/008**; **A61M11/005**; **A61M11/042**; **A61M11/044**; **A61M15/0085**; **A61M15/06**; **A61M16/0003**; **F24H3/002**; **H05B1/0291**; **H05B3/0004**; **H05B3/0014**; A61M2016/0024; A61M2016/0027; A61M2205/3653; A61M2205/587; A61M2205/8206; A61M2205/8256

Application number: CN20058011022 20050318

Priority number(s): CN20042031182U 20040414 ; CN20058011022 20050318 ; WO2005CN00337 20050318

Also published as: AT432623 (T) AU2005232354 (A1) AU2005232354 (B2) BRPI0506780 (A) CA2562581 (A1) more

Abstract of CN100589726 (C)

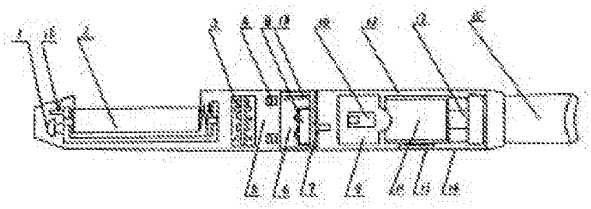

Fig. 1

The present invention relates to an aerosol electronic cigarette just containing nicotine without tar, which includes a shell and a suction nozzle. On the exterior wall of the shell, there is an air orifice, while there is an electronic circuit board, a constant pressure cavity, a sensor, a gas-liquid separator, an atomizer, and a supplying bottle orderly located in the interior of the shell, wherein the electronic circuit board consists of an electronic switching circuit and a high-frequency generator. At one side of the sensor there is an air channel. A negative pressure cavity is located inthe sensor. The atomizer connects with the supplying bottle, and there is an atomizing cavity located in the atomizer. An antiextrusion ring used to fix the supplying bottle is located between the shell and one side of the supplying bottle. At the other side of the supplying bottle there is a mirage channel. The air orifice, the constant pressure, the sensor, the gas-liquid separator, the atomizer, and the mirage duct connect orderly and throughout. Without tar, this

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invention reduces the risk of suffering cancer, meets the requirement of the smoker, need no ignition, and has no endanger of fire.

NJOY Exhibit 1002.418

[19] 中华人民共和国国家知识产权局

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A24F 47/00 (2006.01)

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专利号 ZL 200580011022.7

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[21] 申请号 200580011022.7
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[87] 国际公布 WO2005/099494 中 2005.10.27
[85] 进入国家阶段日期 2006.10.12
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[56] 参考文献
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审查员 王四珍
[74] 专利代理机构 沈阳科苑专利商标代理有限公司
代理人 周秀梅

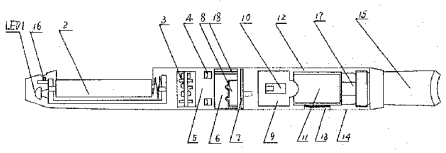
权利要求书 2 页 说明书 5 页 附图 5 页

[54] 发明名称

雾化电子烟

[57] 摘要

本发明涉及一种不含有焦油、只含烟碱(尼古丁)的雾化电子烟，包括壳体及吸嘴，壳体的外壁上开有进气孔，壳体内依次设有电子线路板、常压腔、传感器、气液分离器、雾化器、供液瓶；其中电子线路板由电子开关电路及高频发生器组成；在传感器的一侧开有传感器气流通道，传感器内设有负压腔；雾化器与供液瓶相接触，在雾化器的内部设有雾化腔；供液瓶的一侧与壳体之间设有锁定供液瓶的挡圈，供液瓶的另一侧开有雾汽通道；进气孔、常压腔、传感器、气液分离器、雾化器、雾汽通道、导气孔、吸嘴依次相连通。本发明无焦油，大大降低致癌风险，使用者仍有吸烟的感觉和兴奋，无需点燃，无火灾危害。



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1. 一种雾化电子烟，包括壳体及吸嘴，其特征在于：所述壳体（14）的外壁上开有进气孔（4），壳体（14）内依次设有电子线路板（3）、常压腔（5）、传感器（6）、气液分离器（7）、雾化器（9）、供液瓶（11）；其中电子线路板（3）由电子开关电路及高频振荡器组成；在传感器（6）的一侧开有传感器气流通道（18），与壳体（14）内腔相通，传感器（6）内设有负压腔（8）；雾化器（9）与供液瓶（11）相接触，与壳体（14）之间留有空隙，在雾化器（9）的内部设有雾化腔（10）；供液瓶（11）的一侧与壳体（14）之间设有锁定供液瓶（11）的挡圈（13），供液瓶（11）的另一侧留有雾汽通道（12）；进气孔（4）、常压腔（5）、传感器（6）、气液分离器（7）、雾化器（9）、雾汽通道（12）、导气孔（17）、吸嘴（15）依次相连通；壳体（14）内的前端还包括一个发光二极管（LED1）和电池（2），共同构成一个烟嘴形、雪茄形或烟斗形的整体。

2. 按照权利要求1所述的雾化电子烟，其特征在于：在壳体（14）内，雾化器（9）后置，供液瓶（11）设在气液分离器（7）和雾化器（9）之间，在供液瓶（11）的一端加设有将供液瓶（11）压紧在雾化器（9）上的弹片（33）。

3. 按照权利要求1或2所述的雾化电子烟，其特征在于：在壳体（14）的内壁上加设有显示屏（32），与电子线路板（3）连接。

4. 按照权利要求1或2所述的雾化电子烟，其特征在于：在壳体（14）内与传感器（6）并联的有用于手动清洁的微动开关（16）。

5. 按照权利要求1或2所述的雾化电子烟，其特征在于：所述的传感器（6）与其内部的负压腔（8）之间设有波纹膜（22），传感器（6）内还设有第一磁钢（20）、第二磁钢（21）及置于两者之间的干簧管（K1），第二磁钢（21）固接在波纹膜（22）上。

6. 按照权利要求1或2所述的雾化电子烟，其特征在于：所述的传感器（6）内置有硅胶件逆止阀（31），所述阀内设有第三磁钢（34），所述阀外靠近第三磁钢（34）的一侧设有干簧管（K1）。

7. 按照权利要求1或2所述的雾化电子烟，其特征在于：所述的气液分离器（7）上开有通孔。

8. 按照权利要求7所述的雾化电子烟，其特征在于：在气液分离器（7）上的通孔外套有硅胶件逆止阀（31）。

9. 按照权利要求1或2所述的雾化电子烟，其特征在于：所述雾化腔

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（10）的雾化腔壁（25）上开有溢流孔（29），雾化腔（10）腔内设有加热体（RL），在加热体（RL）的一侧开有第一气流喷射孔（24），多孔体（27）包在雾化腔壁（25）外，雾化器（9）的一侧设有第一压电片（M1），另一侧设有凸起（36）。

10. 按照权利要求 1 或 2 所述的雾化电子烟，其特征在于：所述的雾化器（9）中加设第二压电片（35）。

11. 按照权利要求 9 所述的雾化电子烟，其特征在于：所述的雾化器（9）中的所述多孔体（27）用泡沫镍、不锈钢纤维毡、高分子多聚物发泡体及泡沫陶瓷制成；加热体（RL）用铂丝、镍铬合金或含有稀土元素的铁铬铝合金丝制成，或者制成片状体；雾化腔壁（25）用氧化铝或陶瓷制成。

12. 按照权利要求 7 所述的雾化电子烟，其特征在于：所述的气液分离器（7）用塑料或硅橡胶制成。

13. 按照权利要求 1 或 2 所述的雾化电子烟，其特征在于：所述供液瓶（11）内装有贮液多孔体（28），其用聚丙纤维、涤纶纤维或尼龙纤维充填，或用塑料发泡成形体充填；或用聚氯乙烯、聚丙烯、聚碳酸酯注塑成多层板的柱状物。

14. 按照权利要求 5 所述的雾化电子烟，其特征在于：干簧管（K1）、第一磁钢（20）、第二磁钢（21）、波纹膜（22）用有封闭膜的半导体应变片来代替，安装在传感器所述波纹膜位置。

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雾化电子烟

技术领域

本发明涉及一种电子烟，特别是一种不含有焦油、只含烟碱（尼古丁）的雾化电子烟。

背景技术

在当今“吸烟有害健康”已成为常识的情况下，全世界目前仍有10亿人吸烟，而且每年这个数字还在扩大。2003年3月1日世界卫生组织(WHO)通过的第一个国际禁烟协定《烟草控制框架公约》，据WHO提供的数字表明，吸烟每年造成490万人死亡，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极其困难的事。

香烟的有效成分是烟碱（即尼古丁），吸烟时烟碱随着香烟燃烧产生的大量焦油雾滴进入肺泡后被迅速吸收，烟碱被吸收入血后作用于中枢神经系统的受体上，引起类似兴奋剂的“陶醉感”，如吸烟者所经历的头晕目眩或飘飘然的感觉。

烟碱是小分子生物碱，在小剂量下对人体基本无害，而且在血液中的半衰期极短。烟草的有害物质主要是焦油，烟草焦油是由数千种成分组成，其中有数十种成分是致癌物。目前证实被动吸烟对不吸烟者的危害更大。

为了寻找只含烟碱而不含有害焦油的香烟代用品，有许多发明是用较纯的烟碱制成诸如“戒烟贴”、“烟碱含漱水”、“包装在有抛射剂的高压气罐喷雾剂”、“烟碱口香糖”、“烟碱饮料”等产品，这些产品虽然没有焦油的危害，但因烟碱吸收缓慢，在血液中不能建立有效的高峰浓度，不能解决需求烟碱“过瘾”的感觉，同时也剥夺了吸烟者已经养成的“抽”、“吸”的习惯，因而类似的产品不能真正的作为戒烟用品或香烟代用品。

发明内容

为了克服上述不足，本发明的目的在于提供一种具有戒烟和香烟代用品作用的雾化电子烟。

本发明的目的是通过以下技术方案来实现的：

本发明包括壳体及吸嘴，壳体的外壁上开有进气孔，壳体内依次设有电子线路板、常压腔、传感器、气液分离器、雾化器、供液瓶；其中电子线路板由电子开关电路及高频振荡器组成；在传感器的一侧开有传感器气流通道，与壳体内腔相通，传感器内设有负压腔；雾化器与供液瓶相接触，

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与壳体之间留有空隙，在雾化器的内部设有雾化腔；供液瓶的一侧与壳体之间设有锁定供液瓶的挡圈，供液瓶的另一侧留有雾汽通道；进气孔、常压腔、传感器、气液分离器、雾化器、雾汽通道、导气孔、吸嘴依次相连通；壳体内的前端还包括一个发光二极管和电池，共同构成一个烟嘴形、雪茄形或烟斗形的整体。

其中：在壳体的内壁上加设有显示屏，与电子线路板连接；在壳体内与传感器并联的有用于手动清洁的微动开关；传感器与其内部的负压腔之间设有波纹膜，传感器内还设有第一磁钢、第二磁钢及置于两者之间的干簧管，第二磁钢固接在波纹膜上；传感器内置有硅胶件逆止阀，阀内设有第三磁钢，阀外靠近第三磁钢的一侧设有干簧管；气液分离器上开有通孔，在气液分离器上的通孔外套有硅胶件逆止阀；雾化腔的雾化腔壁上开有溢流孔，雾化腔腔内设有加热体，在加热体的一侧开有第一气流喷射孔，多孔体包在雾化腔壁外，雾化器的一侧设有第一压电片，另一侧设有凸起；雾化器中加设第二压电片；雾化器中的多孔体可用泡沫镍、不锈钢纤维毡、高分子多聚物发泡体及泡沫陶瓷制成；加热体可用铂丝、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；雾化腔壁可用氧化铝或陶瓷制成；气液分离器可用塑料或硅橡胶制成；供液瓶内装有贮液多孔体，其可用聚丙纤维、涤纶纤维或尼龙纤维充填，或用塑料发泡成形体充填；也可用聚氯乙烯、聚丙烯、聚碳酸酯注塑成多层板的柱状物；干簧管、第一磁钢、第二磁钢、波纹膜可用有封闭膜的半导体应变片来代替，安装在传感器波纹膜位置。

本发明还公开了另一种结构的雾化电子烟，在壳体内，雾化器后置，供液瓶设在气液分离器和雾化器之间，在供液瓶的一端加设有将供液瓶压紧在雾化器上的弹片。

本发明的优点是：吸烟无焦油，大大降低致癌风险，使用者仍有吸烟的感觉和兴奋，无需点燃，无火灾危害。

本发明的装置和连接结构在贮液器稍加改动后可装入常规药物供肺内给药器械。

附图说明

图 1 为本发明的一种整体结构示意图；

图 2 为本发明的另一种整体结构示意图；

图 3 为本发明带显示屏的整体结构示意图；

图 4 为本发明传感器的结构图；

图 5 为本发明带有硅胶件逆止阀的传感器结构图；

图 6 为本发明一种雾化器的结构图；

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图 7 为本发明雾化器中陶瓷件的结构图;
图 8 为本发明另一种雾化器的结构图;
图 9 为本发明一种气液分离器的结构图;
图 10 为本发明另一种气液分离器的结构图;
图 11 为本发明供液瓶及吸嘴的连接结构图;
图 12 为本发明的电路原理图。

具体实施方式

下面结合附图对本发明作进一步详述。

实施例 1

如图 1 所示，本发明可构成一个烟嘴形、雪茄形或烟斗形的整体。壳体 14 的外壁上开有进气孔 4，壳体 14 内顺序设置有发光二极管 LED1、电池 2、电子线路板 3、常压腔 5、传感器 6、气液分离器 7、雾化器 9、供液瓶 11、吸嘴 15。电子线路板 3 由电子开关电路及高频振荡器组成，在传感器 6 的一侧开有传感器气流通道 18，与壳体 14 内腔相通。如图 4 所示，传感器 6 内设有负压腔 8，由波纹膜 22 与传感器 6 隔开。传感器 6 内还设有第一磁钢 20、第二磁钢 21 及置于两者之间的干簧管 K1，第二磁钢 21 固接在波纹膜 22 上。雾化器 9 通过凸起 36 与供液瓶 11 相接触，与壳体 14 之间留有空隙，雾化器 9 内部设有雾化腔 10。如图 6、图 7 所示，雾化腔 10 的雾化腔壁 25 上开有溢流孔 29，腔内设有加热体 RL，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。正对加热体 RL 的一侧开有喷射孔，喷射孔可根据雾化腔壁 25 的材料而选用第一气流喷射孔 24 或第二气流喷射孔 30。第一气流喷射孔 24 可采用 0.1mm~1.3mm 狭缝结构或 Φ0.2mm~1.3mm 圆孔的单孔及多孔结构;第二气流喷射孔 30 的直径在 0.3mm~1.3mm。雾化腔壁 25 外包有多孔体 27，可用泡沫镍、不锈钢纤维毡、高分子多聚物发泡体及泡沫陶瓷制成。在雾化器 9 上还设有第一压电片 M1。雾化腔壁 25 可用氧化铝或陶瓷制成。如图 9 所示，气液分离器 7 上开有通孔，可用塑料或硅橡胶制成。如图 11 所示，供液瓶 11 的一侧与壳体 14 之间设有锁定供液瓶 11 的挡圈 13，另一侧开有雾汽通道 12，瓶内装有贮液多孔体 28，可用聚丙纤维、涤纶纤维或尼龙纤维充填，或用塑料发泡成形体如聚胺酯泡沫柱或聚丙泡沫柱充填，也可用聚氯乙烯、聚丙烯、聚碳酸酯注塑成多层板的柱状物。进气孔 4、常压腔 5、传感器 6、气液分离器 7、雾化器 9、雾汽通道 12、导气孔 17、吸嘴 15 依次相连通。

如图 12 电路原理图所示，电子开关电路以场效应功率管 U1 为核心。K1 为干簧管（位于传感器 6 中）、RL 为加热体（位于雾化器 9 中）、LED1 为发光二极管、U2 为低电压检测片（用于对锂电池的过放电保护）、M1 为

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第一压电片，第一电容C1、第二电容C2、第三电阻R3、第一电感L1、第三电容C3、三极管BG1、第一压电片M1构成三点式电容振荡器，即高频振荡器。其电路原理为：当干簧管K1闭合时，场效应功率管U1开启，加热体RL工作，同时三点式电容振荡器起振，第一压电片M1为雾化器9提供高频机械振动波，达到雾化效果。

当吸烟者吸烟时，吸嘴15处于负压状态，常压腔5与负压腔8之间的气压差或高速气流导致传感器6输出启动信号，与之相连接的电子线路板3工作。此时传感器6内的波纹膜22变形，带动第二磁钢21远离干簧管K1，干簧管K1在第一磁钢20的过量磁力线作用下闭合（即K1闭合），启动作为电子开关的场效应功率管U1，高频振荡器采用三点式电容振荡器，频率在550KHz至8MHz，电路中频率自动微调与环形的第一压电片M1谐振，对液体分子供能，同时发光二极管LED1在可充电电池2供电下发光。大气由进气孔4进到常压腔5内，经传感器气流通道18、再经气液分离器7上的通孔流到雾化器9内的雾化腔10，经过喷射孔的高速气流带动多孔体27中的烟液以微滴形式喷射进雾化腔10内，通过第一压电片M1的超声雾化，再在加热体RL的作用下进一步雾化，雾化后的大直径微滴在涡流的作用下附壁经溢流孔29被多孔体27重吸收，小直径微滴悬浮在气流中形成气溶胶经雾汽通道12、导气孔17、吸嘴15被吸出。供液瓶11中的贮液多孔体28与雾化器9上的凸起36接触实现毛细浸润供液。

吸嘴15上制有螺纹，当供液瓶11中的烟液用尽时，可旋转吸嘴15将其拧下，取出供液瓶11，将烟液注入供液瓶11内，重新装入壳体14内，拧紧吸嘴15。

干簧管K1、第一磁钢20、第二磁钢21、波纹膜22还可用有封闭膜的半导体应变片来代替，安装在传感器波纹膜位置。

为了简化设计，可取消雾化器9上的第一压电片M1，仅靠加热体RL将烟液雾化。这种雾化器的尺寸可做的较小，整支雾化电子烟的连接结构与实施例一相同。此外，还可如图8所示，将雾化器9中的第一压电片M1、加热体RL取消，在雾化腔内加设单层或多叠层、平板形的第二压电片35，通过喷射孔的气流在其中心振动聚焦点雾化，达到强超声雾化的效果。

如图10所示，气液分离器7的通孔外还可套有硅胶件逆止阀31。吸烟时，气流到达通孔，由于通孔内的气压升高，使硅胶件逆止阀31开启，气流通过；不吸烟时，硅胶件逆止阀31关闭。

如图5所示，传感器6还可设计成带有硅胶件逆止阀31的结构。吸烟时，气流汇聚在硅胶件逆止阀31内，气压升高、气体膨胀，阀内的第三磁钢34逐渐靠近干簧管K1，直至干簧管K1闭合、开启电路，随着气压差继

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续增大，硅胶件逆止阀 31 的出气口开启。干簧管 K1 也可以用霍尔器件或磁敏二极管或磁敏三极管代替。

实施例 2

如图 2 所示，为了改善供液状态，在壳体 14 内，雾化器 9 后置，供液瓶 11 设在气液分离器 7 和雾化器 9 之间，在供液瓶 11 的一端加设有将供液瓶 11 压紧在雾化器 9 上的弹片 33，其他部件及工作原理与实施例 1 同。

在实施例 1、实施例 2 所述的雾化电子烟的壳体 14 的内壁上，还可加设数字显示屏 32，与电子开关电路中场效应功率管 U1 输出端相连，用来显示每天吸烟的次数、电池容量。传感器 6 为线性信号输出，与吸力的强弱成正比（即吸力越大、工作的时间越长），雾化器 9 按线性方式工作，以模拟更真实的人性化香烟。

在壳体 14 内与传感器 6 还并联有用于手动清洁的微动开关 16。在不吸烟时，按下微动开关 16，与其并联的传感器 6 工作，或将壳体 14 内的残留物及其他杂质清除干净。

用于雾化的烟液含有 0.4~3.5%的烟碱，烟用香精 0.05~2%，有机酸 0.1~3.1%，抗氧剂 0.1~0.5%，余量为 1，2-丙二醇。

NJOY Exhibit 1002.426

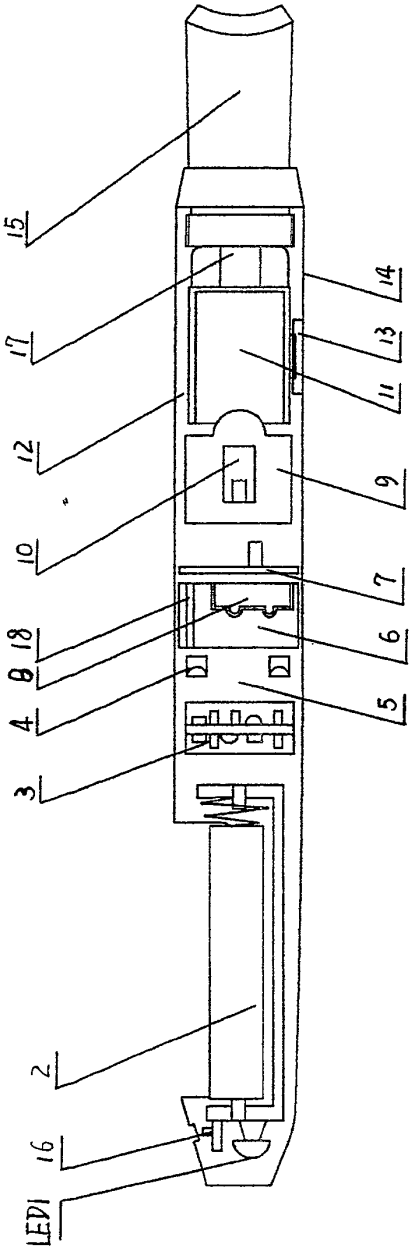

图 1

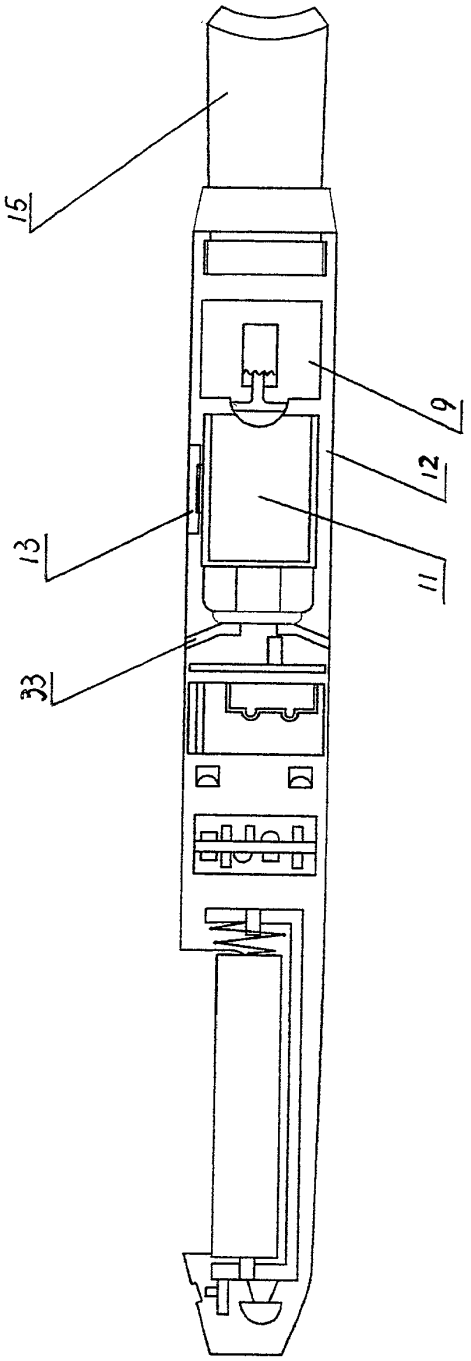

图 2

NJOY Exhibit 1002.427

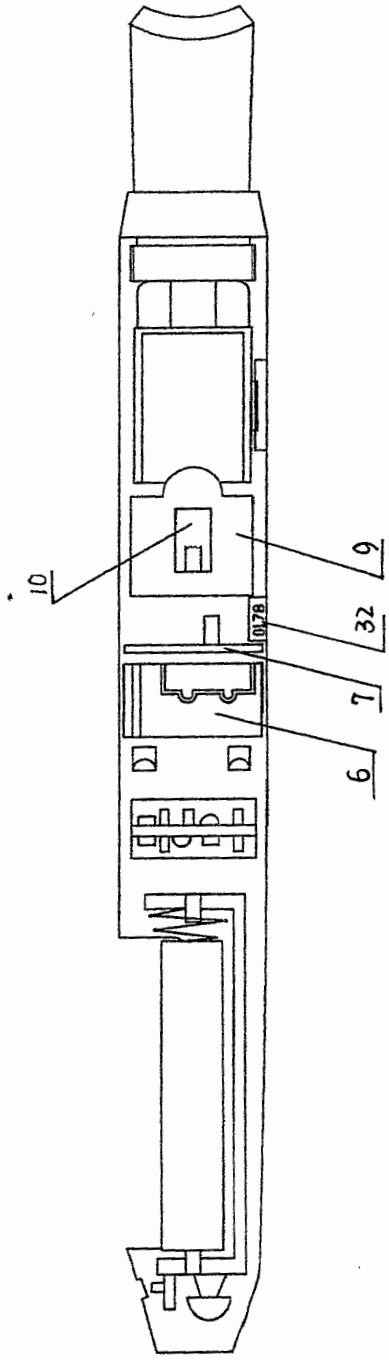

图 3

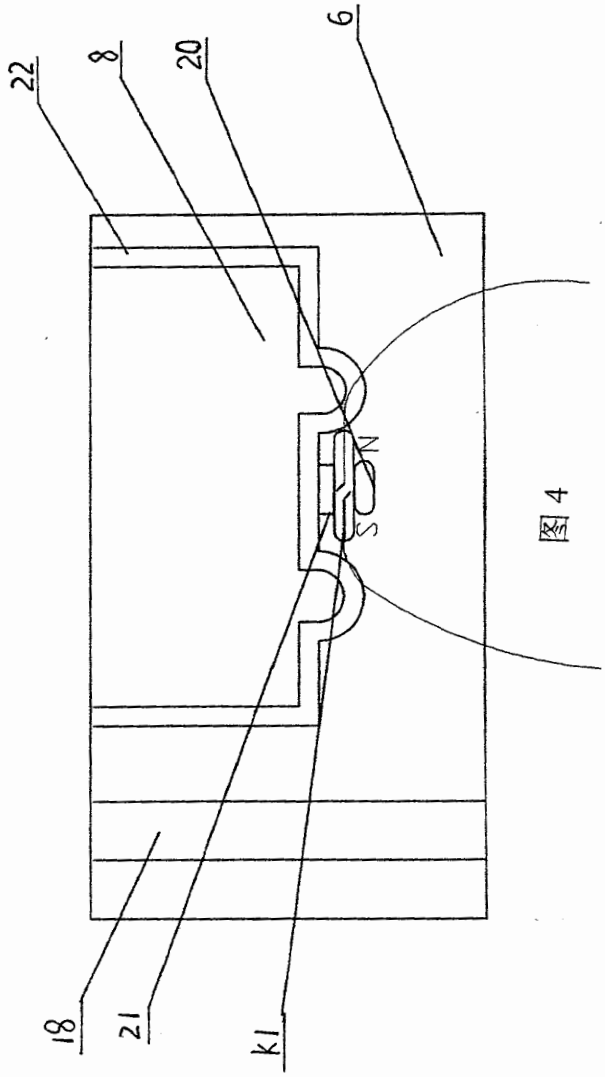

图 4

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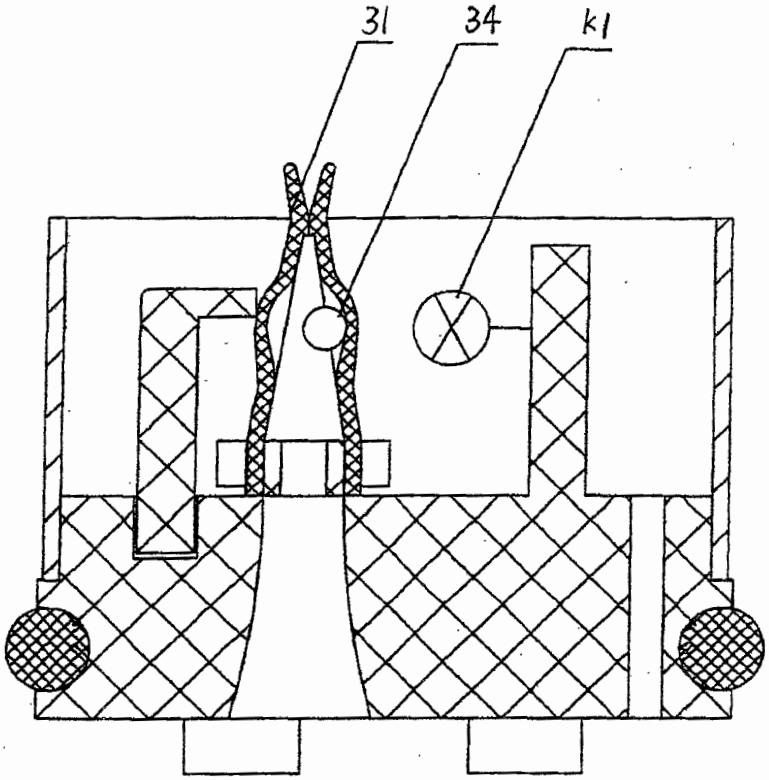


图 5

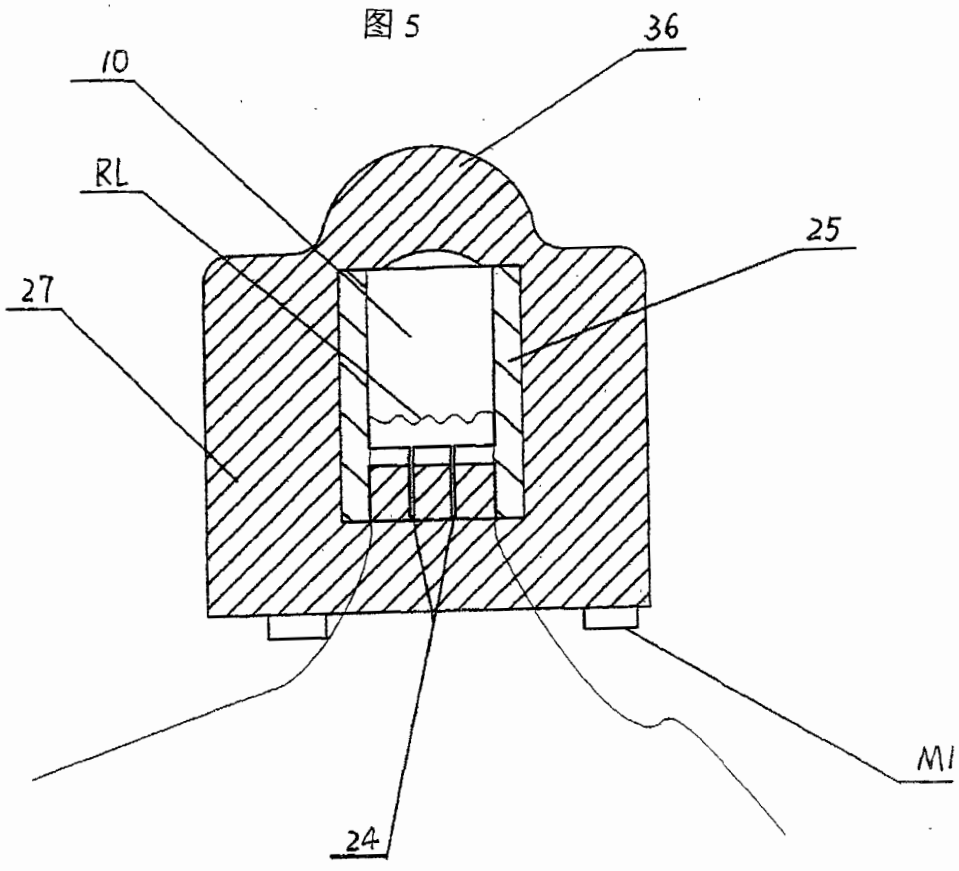


图 6

NJOY Exhibit 1002.429

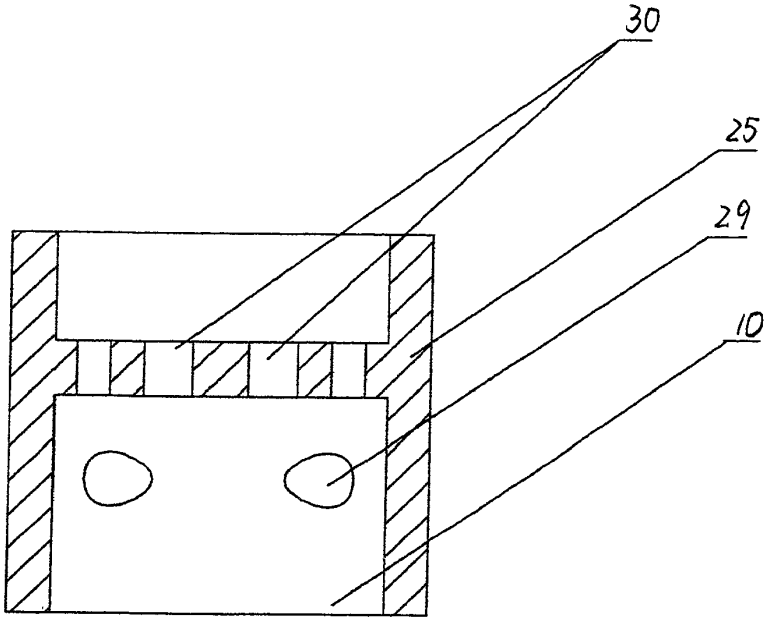


图 7

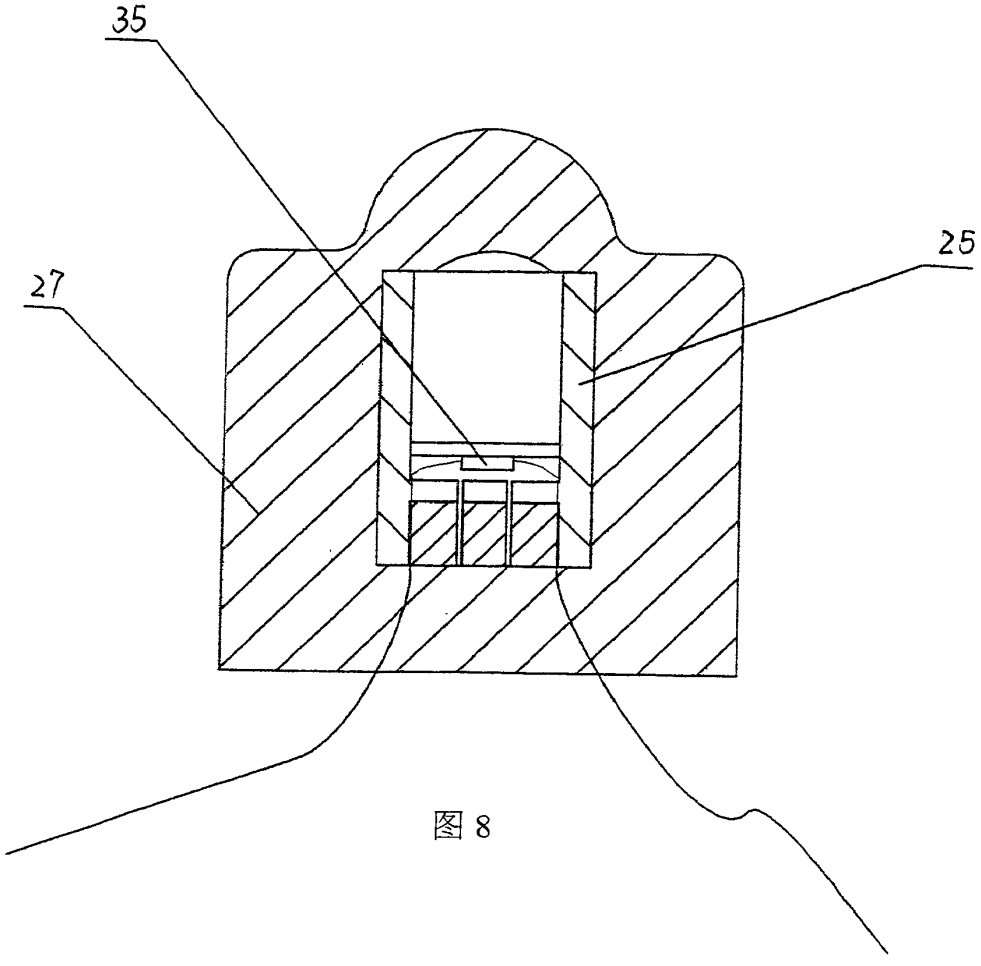


图 8

NJOY Exhibit 1002.430

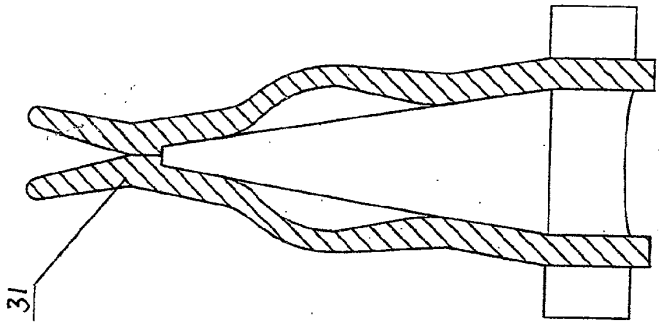


图 10

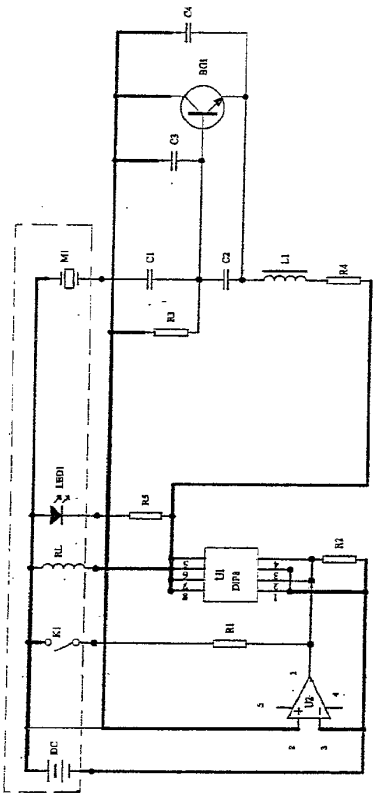


图 12

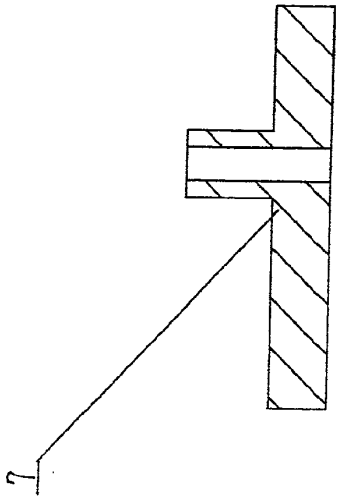


图 9

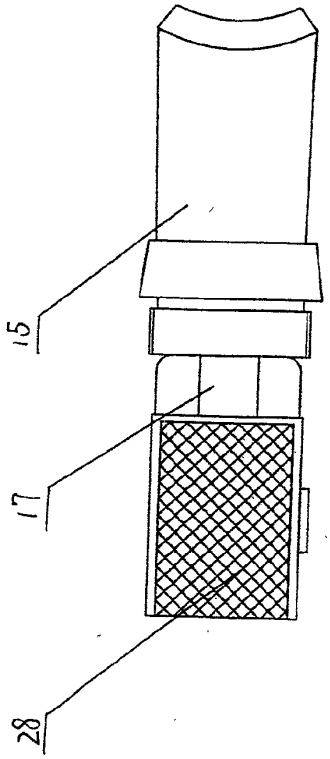


图 11

NJOY Exhibit 1002.431

Espacenet

Bibliographic data: CN101277622 (A) — 2008-10-01

Smokeless cigarette system

Inventor(s): RICHARD JUPE [CH]; GAIL YOSS [CH] ± (JUPE RICHARD, ; YOSS GAIL, ; BRAUNSHTEYN MICHAEL S, ; LYONS-HART JIMMY, ; OLEGARIO RAQUEL M)

Applicant(s): PHILIP MORRIS PROD [CH] ± (PHILIP MORRIS PROD, ; PHILIP MORRIS PRODUCTS S.A)

Classification: **- international:** ***A24F13/00; A24F47/00***
- cooperative: **A24F13/00; A24F47/008**

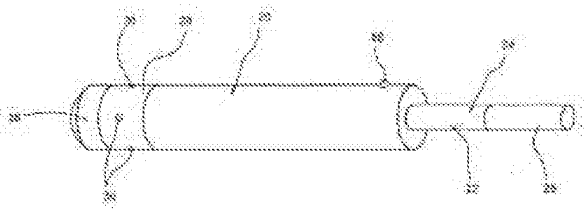
Application number: CN20068036218 20060929

Priority number(s): WO2006IB02040 20060929 ; US20050239132 20050930

Also published as: CN101277622 (B) AT457136 (T) AU2006298495 (A1) AU2006298495 (B2) BRPI0616797 (A2) more

Abstract of CN101277622 (A)

A smokeless lighter (20) includes a heater (50) sized to accommodate a smokable article such as a cigarette (22) such that a portion of the cigarette protrudes from the lighter. The heater maintains the temperature in an internal chamber (52) in the range of 1600 DEG C to 2000 DEG C so as to be below the ignition temperature for tobacco. An insulating jacket (62) surrounds the heater to protect the smoker from burn injury. Circuitry may be activated manually or by insertion of a cigarette into the heater and limits operation of the heater preferably to a period of 10 to 12 minutes. Optionally, a light (40) may be used to indicate when air is drawn through the smokeless lighter.



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J·莱昂斯-哈特 G·约斯
R·M·奥利加里奥

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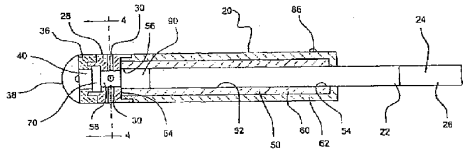
权利要求书 2 页 说明书 11 页 附图 3 页

[54] 发明名称

无烟的香烟系统

[57] 摘要

本发明公开了一种无烟的点烟器(20)，其包括加热器(50)，加热器的大小适于容纳可发烟制品如香烟(22)以使香烟的一部分从点烟器突出。加热器将内腔(52)中的温度保持在160℃到200℃的范围内以便低于烟草的点燃温度。隔离护套(62)围绕加热器以保护吸烟者不被烧伤。电路可以被手动地启动或通过将香烟插入加热器来启动并且将加热器的运行限制于优选10到12分钟。可选地，灯(40)可以用来显示何时通过无烟的点烟器吸入空气。



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1. 一种点烟器，包括：

基本上圆柱形的加热器，所述加热器形成基本上圆柱形的腔室、供气口和入口，所述入口的尺寸适于接收可发烟制品的至少一个端部，所述加热器用于在基本上圆柱形的腔室内保持基本上均匀的温度，所述温度低于烟草的点燃温度并处于大约160℃到大约200℃的范围内；

基本上围绕所述基本上圆柱形的加热器的隔离护套，其具有一外表面，由隔热材料制成，并且具有选择成使得所述外表面的温度保持在40℃以下的厚度；

用于向所述加热器供应电能的电源；和

用于控制通过所述电源向所述加热器输送电能的持续时间的电路。

2. 如权利要求1所述的点烟器，其中，所述电路包括用于在大约10到大约12分钟的时段后中断向所述加热器输送电能的定时电路。

3. 如权利要求1所述的点烟器，还包括用于检测进入所述加热器中的气流并在气流增加期间产生信号的抽吸指示器。

4. 如权利要求2所述的点烟器，其中，所述电路包括独立于定时电路而启动加热器工作的手动致动开关。

5. 如权利要求1所述的点烟器，其中，所述电路包括响应于在所述加热器的基本上圆柱形的腔室中出现物品而被致动的开关。

6. 如权利要求1所述的点烟器，还包括位于腔室中的生成烟雾剂的香料盒。

7. 一种点烟器，包括：

加热器，该加热器形成有基本上圆柱形的腔室、供气口和入口，所述入口的尺寸适于容纳可发烟制品的至少一个端部，所述加热器用于将所述基本上圆柱形的腔室内的温度保持在160℃到200℃的范围内；

基本上围绕所述加热器的护套，其具有一外表面，由隔热材料制

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成，并且具有选择成使得所述外表面的温度保持在 40℃以下的厚度；

用于向所述加热器供应电能的电源；和

用于将由电源向加热器输送电能的持续时间控制在大约 10 到大约 12 分钟的电路。

8. 一种加热至少一部分香烟杆同时将其在预选温度下保持一预定时间间隔的方法。

9. 如权利要求 8 所述的方法，其中，在所述时间间隔期间的抽吸之间，或在没有抽吸的情况下对于所述时间间隔持续期间，所述预选温度不间断地保持。

10. 如权利要求 8 所述的方法，其中，所述预选温度在抽吸之间不间断地保持。

11. 如权利要求 8 所述的方法，还包括使用抽吸传感器来启动预定时间间隔的步骤。

12. 一种通过将至少一部分香烟杆在预选温度下保持一预定时间间隔来从香烟中放出主流烟雾而不燃烧的方法。

13. 如权利要求 12 所述的方法，还包括在该预定时间间隔期间检测抽吸的步骤。

14. 如权利要求 13 所述的方法，还包括当检测到抽吸时重启该预定时间间隔的步骤。

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无烟的香烟系统

技术领域

本发明公开了一种按无烟方式使用香烟的点烟器。该点烟器可以容纳传统的香烟、香料盒或它们两者。

发明内容

无烟点烟器可包括基本上圆柱形的加热装置，该基本上圆柱形的加热装置可用于形成基本上圆柱形的腔室并将所述腔室中的温度保持在160℃到200℃之间。点烟器还可包括一基本上圆柱形的护套，所述护套围绕加热装置并可用于将点烟器的外部温度保持在40℃或40℃以下的表面温度，所述表面温度不会灼伤吸烟者的手。护套的一端形成大小适于接收发烟制品（如，香烟或雪茄）的开口。护套的另一端与供气集管连接。供气集管与电源装置连接，所述电源装置可用于来为加热装置供能、可选地包含有关的电子线路并可选地模拟点着的烟草。

为了保持电源装置的使用寿命，以及确保点烟器自熄灭操作，可以设置定时电路，该定时电路在经过与一般发烟制品燃烧相应的时间相关的一段时间以后终止向加热装置供应能量。

为了启动点烟器的操作，可以设置由发烟制品接合的开关。替代地，或相结合地，可以设置可手动操作的开关以便吸烟者可以启动点烟器操作或者超驰其电子线路。

如果需要，点烟器还可以包括与电路联接的发光指示灯，该电路可用于检测流过点烟器的空气并响应该事件来点亮发光指示灯。

本发明的一个方面提供的点烟器包括：基本上圆柱形的加热器，所述加热器形成基本上圆柱形的腔室、供气口和入口，所述入口的尺寸适于接收可发烟制品例如香烟的至少一个端部，所述加热器可用于在基本上圆柱形的腔室内保持基本上均匀的温度，所述温度低于烟草

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的点燃温度并处于大约160℃到大约200℃的范围内；基本上围绕所述基本上圆柱形的加热器的隔离护套，其具有一外表面，由隔热材料制成，并且具有选择成使得所述外表面的温度保持在40℃以下的厚度；可用于向所述加热器供给电能的电源；和可用于控制电源向加热器输送电能的持续时间的电路。

优选地，加热器的基本上圆柱形的腔室具有与香烟或雪茄的名义直径相当的横向尺寸。还优选地，基本上圆柱形的腔室具有与传统的香烟的烟丝条的长度相当的长度。

本发明的另一方面提供的点烟器包括：加热器，该加热器形成有基本上圆柱形的腔室、供气口和入口，所述入口的尺寸适于容纳可发烟制品的至少一个端部，所述加热器可用于将所述基本上圆柱形的腔室内的温度保持在160℃到200℃的范围内；基本上围绕所述加热器的护套，其具有一外表面，由隔热材料制成，并且具有选择成使得所述外表面的温度保持在40℃以下的厚度；可用于向所述加热器供给电能的电源；和可用于将由电源向加热器输送电能的持续时间控制在大约10到大约12分钟的电路。

本发明的另一方面提供的无烟点烟器包括：加热器，该加热器形成有基本上圆柱形腔室的加热器，该腔室的横向尺寸与香烟的名义直径和长度相当，所述加热器还包括供气口和尺寸适于容纳香烟的入口，所述加热器可用于接收香烟并将基本上圆柱形的腔室内的温度保持在160℃到200℃的范围内；基本上围绕所述加热器的护套，其具有一外表面，由隔热材料制成，并且具有选择成使得所述外表面的温度保持在40℃以下的厚度；可用于向所述加热器供给电能的电源；和可用于将由电源向加热器输送电能的持续时间控制在大约10到大约12分钟的电路。

优选地，本发明的点烟器包括抽吸指示器，该抽吸指示器检测进入加热器中的气流并在气流增加期间产生信号。还优选地，所述电路包括手动致动开关，该手动致动开关用来独立于定时电路而启动加热器工作。还优选地，电路包括响应于在加热器的基本上圆柱形的腔室

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中出现可发烟制品而被致动的开关。还优选地，加热器的基本上圆柱形的腔室具有与香烟的名义直径相当的横向尺寸。还优选地，本发明的点烟器包括位于腔室中的生成烟雾剂的香料盒。

本发明另一方面提供了一种用于无烟地享用发烟制品的系统，包括：至少一个可发烟制品；具有大小适于接收可发烟制品的至少一个端部的开口的点烟器，其包括隔离护套和可用于在所述开口中保持预定温度的加热装置，所述预定温度在大约 160℃到大约 200℃的范围内；和可用于向所述加热装置供给电能的电源。

优选地，所述系统的点烟器还包括有效用于检测通过点烟器的气流变化的抽吸传感器。还优选地，点烟器的加热装置运行一预定时段，其中发烟制品启动该预定时段，并且其中抽吸传感器重置该预定时段。

附图说明

图 1 是无烟点烟器的透视图。

图 2 是示出了可选的抽吸指示灯的无烟点烟器的透视图。

图 3 是图 1 的无烟点烟器的剖视图。

图 4 是沿图 3 的 4-4 线的剖视图。

图 5 是用于无烟点烟器的适用电子电路的示意图。

具体实施方式

现在参见图 1，点烟器 20 可以具有基本上圆柱形的外部结构并被设计成用于传统的发烟制品，如传统的香烟 22 或传统的雪茄或传统的小雪茄等。传统的香烟 22 一般包括杆 24，其包括由在包装纸中包裹的烟草去筋烟叶构成的杆。取决于特定的香烟 22 而定，过滤嘴端 26 也可以是香烟的一部分。点烟器 20 还可以设计成用于其它发烟制品，如雪茄或小雪茄等。然而，在该情况下，可能需要点烟器尺寸的范围能容纳雪茄的不同环尺寸。

如图所示，点烟器 20 通过一个端部处的开口来接收发烟制品长度的相当大的部分。点烟器 20 的相对端部包括设有多个基本上径向延伸的通道 30 的集管 28。当吸烟者利用通过香烟抽吸空气而抽吸香烟 22 时，集管 28 允许空气进入点烟器。

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可选地，点烟器的与用于发烟制品的开口相对的端部可以包括指示灯装置 36，当吸烟者通过发烟制品吸气时，所述指示灯能够发光。因此，当将空气吸入时，指示灯装置 36 的操作类似于传统香烟或雪茄的烟煤。指示灯装置 36（参见图 2）可以具有外盖 38 以保护 LED、灯泡或灯丝 40。如需要，外盖 38 可以是透明的或半透明的。此外，外盖 38 可以具有着色，如橙色或模拟燃烧的烟煤颜色的另一颜色。外盖 38 可以由任何合适的传统材料制成，包括例如塑料、玻璃、透明矿物等。

在点烟器 20 内部设置有加热装置 50。加热装置 50 形成了腔室 52，所述腔室为具有基本上圆形截面的基本上圆柱形。该加热器不限于所述形状，并包括如截锥形之类的其它形状和如多边形、椭圆等的其它横截面。无论选择哪种形状，腔室 52 都具有选择成适于容纳要和点烟器一起使用的发烟制品的横向尺寸的横向尺寸。此外，腔室 52 的长度选择成适于容纳相应的发烟制品的长度以便使得口部可接合的部分从点烟器 20 伸出（即，大约 0.5 到大约 2 英寸）。

腔室 52 的一端具有尺寸适于容纳发烟制品的开口 54。例如，在香烟作为发烟制品的情况下，开口 54 可以具有在大约 8 毫米到大约 10 毫米（大约 0.3 到大约 0.4 英寸）范围内的横向尺寸。例如，在发烟制品是雪茄的情况下，横向尺寸可以处于从大约 10 毫米到大约 25 毫米（大约 0.4 到大约 1.0 英寸）的范围。

腔室 52 的另一端还具有开口 56。该开口 56 与集管 28 连通并且在吸烟期间接收通过点烟器 20 吸入的空气。空气开口 56 可以按要求确定尺寸。在合适的情况中，空气开口 56 可以形成具有减小的横向尺寸的孔口。在其他情况中，空气开口 56 足够大从而不会引起限流或压降。

空气开口 56 与集管 28 的中心孔 58 流体连通。中心孔 58 与通过集管 28 径向地向外延伸的各通道 30（参见图 4）流体连通。尽管图示了四个通道 30，但应当理解，可以按要求选择通道的数量以向点烟器中输入适当的空气流。例如，可以有少到两个至多到十六个通道。通

道30可以围绕集管28的轴线等角间隔分布并且可以被布置在一个径向平面中或者布置在两个或多个轴向间隔的径向平面中。

优选地，中心孔58的横向尺寸选择成使得其不会限制通过点烟器20的气流。例如，孔58可以具有和加热装置的空气开口56的横向尺寸一样大的横向尺寸或直径。为了避免限制气流进入点烟器，优选地，中心孔58具有至少和与孔58连通的各通道30的横截面积之和一样大的横截面积。

加热装置50可以包括基本上圆柱形的元件60，所述元件具有基本上均匀的壁厚并且具有基本上圆形的截面。元件60可以由合适的传统材料制成，包括例如陶瓷材料、隔热材料或导热材料。元件60可以具有一个或多个表面安装的电阻加热部件，如薄膜或成形的带。替代地，元件60可以包括一个或多个内部加热部件。不管使用的加热部件的类型如何，加热部件布置在发热元件60中和/或布置在发热元件60上以便可以沿径向和轴向在腔室52中获得和保持基本上均匀的温度。

加热装置50可用于在很短的时段内（例如少于大约30秒，优选少于大约20秒，并最优选大约10秒或更短）将腔室52中的温度升高到预选温度或范围，优选地处于大约160℃到大约200℃的范围内。此外，加热装置50可用于将腔室52中的温度保持在大约160℃到大约200℃的范围内。该范围的较低温度（即大约160℃）构成用于从烟草释放挥发物的阈值，这些挥发物提供了抽烟的体验。该范围中的较高温度（即，大约200℃）形成了一加热温度，低于所述加热温度，在点烟器周围不会出现可见的烟雾。此外，在该较高温度下或低于该高温时，点烟器工作而不会燃烧烟草和/或纸香烟包装材料。同时，可以避免大部分热解（pyrolytic）和热合成（pyrosynthetic）过程，而否则的话，当按传统方式抽吸传统的香烟时，这些过程就会发生。

护套62布置在加热装置50的外侧，以不但提供保持点烟器20的装置，而且将吸烟者的手和手指从加热装置50隔离开来。所以，护套62由隔热材料制成，如陶瓷、酚醛塑料、木材等。护套62的厚度选择成使得其外表面的温度不会超过大约40℃。此外，为了进一步保

护吸烟者的手指不被意外灼伤，护套 62 可以与加热元件 60 基本上同轴并优选具有相似的截面形状。因为同样的理由，优选地，护套 62 具有的长度超过加热元件 60 的长度以便使得护套还可以在开口 54 处基本上覆盖加热元件 60 的端部。当护套 62 覆盖加热元件 60 的端部并朝向开口 54 延伸时，护套的形状使得其提供用于发烟制品的开口，所述开口至少与开口 54 一样大。

如果需要，护套 62 可以设计成具有允许加热元件 60 轴向滑动以用于更换目的的公差。

集管 28 附装到护套 62 上并且提供了径向延伸的表面 64，所述表面提供了用于使加热元件 60 在护套 62 内部保持就位的邻接座。如图所示，表面 64 径向地跨过加热元件 60 的端部延伸；然而，为了提供定位功能，表面 64 只需要与加热元件的一部分端部重叠。集管 28 可以按各种方式附装到护套 62 上，这取决于用于护套和集管的材料。例如，可以利用耐久性粘合剂、焊接、铜焊、过盈配合或机械装置来连接。在加热元件 60 被设计成可更换的情况下，连接可以是机械连接，如护套和集管 28 上的配合螺纹。

如果需要，点烟器 20 的远端可以包括发光灯装置 36。发光灯装置可用于按合适的传统方式检测点烟器 20 中的气流，以便当空气通过点烟器 20 时（如当可发烟物体被抽吸时），使得灯 40 开始发光。当发光灯装置不是点烟器的一部分时，可以替换为简单的盖帽，该盖帽具有相似的形状并可用于容纳电池 70。发光灯装置或盖帽可拆地连接到集管 28 上以便如果需要可以取出电池 70 并更换。

电池 70 用于向点烟器 20 供能。电池 70 可以设置在位于集管 28 和灯装置 36 之间的具有相符形状的空腔中。电池 70 不仅向加热元件 60 供能，还用于向发光灯装置供能。电池 70 可以具有任何期望的结构。例如，电池 70 可为一次性的或可再充电的；然而其必须能够在多个吸烟周期内向加热元件 60 输送电能。

点烟器 20 还包括用于对向加热元件 60 输送电能进行调节的比较简单的控制系统。所述控制系统还用于将加热室 52 中的温度控制到上

NJOY Exhibit 1002.441

述指定的范围内。当发光灯装置是点烟器 20 的一部分时，控制系统还用于向发光灯装置供能。

尽管用于控制系统的不同结构对本领域技术人员来说是显而易见的，图 5 还是图示了一个简单的控制系统。电池 70 可以与第一致动器 80、定时电路 82 及加热元件 60 串联。可以通过将香烟插入点烟器的加热室来操作第一致动器 80，如开关或合适的传统传感器来检测发烟制品的存在，或合适的传统压力传感器来指示何时吸烟者抽吸已经被插入点烟器中的发烟制品。不管使用的致动器的类型如何，致动器 80 可用于将电池 70 与定时电路 82 连接在一起。当电路通电时，定时电路开始并在预定时间内持续允许电能到达加热元件 60，如大约 10 到大约 12 分钟的期限。在该期间，加热元件 60 迅速地达到其工作条件并将该室加热到大约 160℃到大约 200℃范围内的温度。设置温度控制器 84 来检测加热室中的温度并调节所述温度。这种控制特征可以通过例如调整经过加热元件 60 的电能来实现。

可选的抽吸指示装置包括灯 40 和抽吸传感器电路 88。这些元件可以串联连接并且然后与加热元件 60 并联连接。抽吸传感器电路可用于确定何时气流开始通过加热室和/或增加。当发生所述情况时，灯 40 通电；相反，当气流减弱或停止时，灯 40 熄灭。因此，灯 40 模拟在抽吸香烟时燃烧的香烟上的烟煤的操作情况。

在定时器周期结束时，停止向抽吸传感器电路 88 和加热元件 60 供能。结果，吸烟者再抽吸时，不会伴随灯 40 的发光并且吸烟者将意识到操作周期已经结束。此外，因为停止了向加热元件 60 供能，同时结束对腔室的进一步加热。

对于吸烟者想继续抽吸可发烟物体的情况，在点烟器 20 上设置了可手动操作的开关 86。如图 1 所示，开关 86 可以设置在邻近点烟器的端部处并接近可发烟物体的突出部分。如果开关 86 被接合，则定时电路被再次供能并如上述运行。

可以使用用于控制发热元件 60 的其他不同的装置，它们也在所公开的范围之内。

NJOY Exhibit 1002.442

在使用中，发烟制品如香烟24（图3）被插入点烟器20的开口端54中。作为替代方案，可以在插入香烟之前将一次性的或永久性的香料盒90插入点烟器20中。香料盒90容许由吸烟者来定制烟草的香味。还有另一替代方案涉及既使用香料盒90又使用发烟制品24。当香料盒或发烟制品或两者被引入加热室时，点烟器20的致动开关80（图5）被闭合。因此，电池70向定时器82和发热元件60供能或者说启动定时器82和发热元件60。

优选地，电池70的规格适于使得其具有足够使点烟器20工作多个周期的容量。考虑到电池70的频繁更换或再充电可能对吸烟者造成麻烦，所以对于普通的吸烟者，电池70最好能够使点烟器20工作大约一周的时间。例如，在需要更换或再充电前，可能要坚持100到150个周期或更长时间。至少，电池应当能够使点烟器20工作至少一天，例如，在需要更换或重新充电前，应坚持大约20个周期或更长时间。

电池70还选择成使得当定时器82启动时，加热室52（图3）的温度在大约10秒的时段内上升到预选的温度或温度范围内，优选在大约160℃到大约200℃的范围内。这时，腔室52中的热作用于发烟制品中的烟草并作用于香料盒（如果存在），以开始从烟草或烟草香料提取物盒中释放易挥发的蒸气。优选大约160℃的温度是因为在该温度以下可能不能释放易挥发的蒸气。另外，优选大约200℃的温度是因为更高的温度可能产生可见的烟雾。通过将腔室52中的温度保持在该数值以下，就基本上避免了产生可见的烟雾。由于温度控制的操作、抽吸期间较冷空气的引入、温度控制对环境温度变化的响应和类似因素，限定了该范围端点的温度容许发生一定变化。一般而言，这些端点温度可以估计为在定时器82向加热元件60供能时段的时间平均值。

优选地，定时电路82（图5）向加热元件持续供能预定时段，优选在10到12分钟的范围内。该时间长度将适应于使用香烟作为发烟制品的大多数人。该时段选择成长于在按传统方式点燃发烟制品并按传统方式抽吸它时要利用点烟器来抽吸的一般发烟制品所燃烧的时间长度。在发烟制品是香烟的情况下，10到12分钟的时段大大超过一

般抽吸香烟要用的 3 到 5 分钟的时间。10 到 12 分钟的时段还超过了香烟被点燃却未被抽吸时的燃烧时间。然而，在发烟制品是雪茄的情况下，可以将由定时器确定的操作周期调节到显著长于 10 到 12 分钟的周期。再次，该时段选择成大于按传统点燃方式抽吸雪茄的正常时间长度。对于雪茄，因为吸烟者每日或每周消费的雪茄比香烟要少，所以对于电池 70 的预期工作周期可能也不同。

当定时电路达到时段结束时，切断从电池 70 通向发热元件 60 的能量流并且不再对加热室 52 进行加热。这时，可以将发烟制品从点烟器 20 中取出并丢弃。然而，如果吸烟者想继续抽吸发烟制品，则可以致动可手动操作的开关 86，例如，该开关位于护套 62 的外面接近加热室 52 的开口端 54 处。当启动开关 86 时，能量再次流过定时电路、加热元件和温度控制器，以便使得吸烟者可以继续抽吸物品。

当按正常方式抽吸香烟时，吸烟者每抽吸一次，香烟末端上的烟煤由于来自通过燃烧的末端的气流的氧气增加而至少部分地发光。该发光的烟煤提供了香烟被点燃并被抽吸的标记。如果需要，点烟器可以向指示器 40 提供增加的动力以模拟这种抽烟体验。

在加热器保持于所要求的温度期间，指示器可以仍然开着或在抽吸间隔关掉指示器。然而，例如，在使用抽吸传感器 88 和抽吸指示器 40 的情况下，无烟点烟器的吸烟者在发生抽吸时将获得可见指示。例如，抽吸传感器 88 检测进入加热室 52 的内端 56 的气流（图 3）。气流传感器可以根据需要定位在通道 30 或中心集管 58 的一个中。通常，通过所述通道和集管的气流很少，因为在香烟的端部不需要氧气来维持烟草的燃烧。但是，当吸烟者通过点烟器 20 中的发烟制品来抽吸或吸入空气时，抽吸传感器 88（图 5）允许利用电能来点亮指示器 40 而使其发光。当气流回到其正常值时，抽吸传感器 88 中断向指示器供电且指示器 40 不再发光。因此，当吸烟者通过点烟器抽吸或吸入空气时，可选的抽吸指示器显示。

在空气被吸入点烟器（即抽吸）期间，空气将烟草的易挥发和半挥发的蒸气以及香料盒（当使用时）的香料提取物凝结成烟雾剂，然

后所述烟雾剂被从点烟器 20 伸出的发烟制品的端部抽出。所述蒸馏烟雾剂看起来象烟雾，但是不包括在普通烟草烟雾中存在的颗粒物质、烟灰、热解和热合成混合物。

作为一种替代设置方案，用于点烟器工作的预定时间间隔可以设置为更短的值，例如抽吸香烟一般需要的时间。这种设置方案可能合乎增加电池使用寿命或寿命的需要。在这种情况下，当检测到吸烟者抽吸时，抽吸传感器 88 可用于重新启动预选的时间间隔。这样，预选的时间间隔可以与慢慢地抽烟的吸烟者抽吸之间间隔的一般时间长度一样短，但是点烟器保持向发热元件供能以便在抽烟体验中没有任何中断。

尽管上面讨论到的点烟器 20 可以作为独立的物品提供，其还可以作为成套工具或抽烟系统的部件提供。例如，所述成套工具可以包括至少一个（可能多个）可发烟制品以及点烟器和可更换的电源。

点烟器 20 可以抽吸普通的香烟。不需要特别制造香烟或烟制品。因此，吸烟者用于该抽烟系统的费用比其他需要特殊香烟的方法要低。此外，点烟器 20 的部件是由便宜的材料制成的。例如，所述电子元件是普通的元件因此节省了与先进电子元件有关的费用。所有这些因素都有助于得到便宜的系统和便宜的点烟器组件。

对本领域的技术人员来说显而易见的是，上述系统允许将要被加热的香烟杆的至少一部分在预定时间间隔内保持于或加热到预选的温度。在该时间间隔期间的抽吸之间，以及在没有抽吸的情况下的预定时间间隔持续期间，预选温度基本上不间断地保持。可以通过抽吸传感器来确定在预定时间间隔期间抽吸的存在情况。在一种替代方案中，抽吸传感器可以启动或重启该时间间隔以延长吸烟时间。

对本领域的技术人员来说显而易见的是，抽吸的香烟差不多被完全装入加热室 52 中并且加热温度避免了燃烧产物。结果，在抽烟期间实际上不产生侧流的烟雾。因此，点烟器 20 是无烟装置。

使该点烟器中被抽吸的烟草连续地保持在规定温度范围内。因此，吸烟者可以随心所欲地多吸几次或少吸几次。更进一步，抽吸的频率

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是不受限制的并且可以是吸烟者希望的任何频率。此外，因为温度范围比较低，所以需要比在更高温度下使用的系统更少的电池能量。

另外，对本领域的技术人员来说还显而易见的是，本发明的点烟器最多只需要进行最小程度的清理。并且，当需要进行所述清理时，可以非常简单地执行。例如，空气通道 30 是可从外部接触到的并且可以易于清理。加热室 52 在一个端部是开口的，并且也可以从外部接触到。如果需要清理空气集管的中心通道，可将集管从点烟器上拆下以接触到其内部。

现在，对本领域的技术人员来说显而易见的是，本说明书描述了一种新的、有益的和非显而易见的无烟点烟器和抽烟系统。另外，对本领域的技术人员来说还显而易见的是，对于在上述详细说明中已经描述的本发明的不同方面，存在许多改进、变化、替换和等效方案。因此，应当清楚，属于由后附权利要求书限定的本发明的精神和范围内的所有这些改进、变化、替换和等效的方案都包括于此。

NJOY Exhibit 1002.446

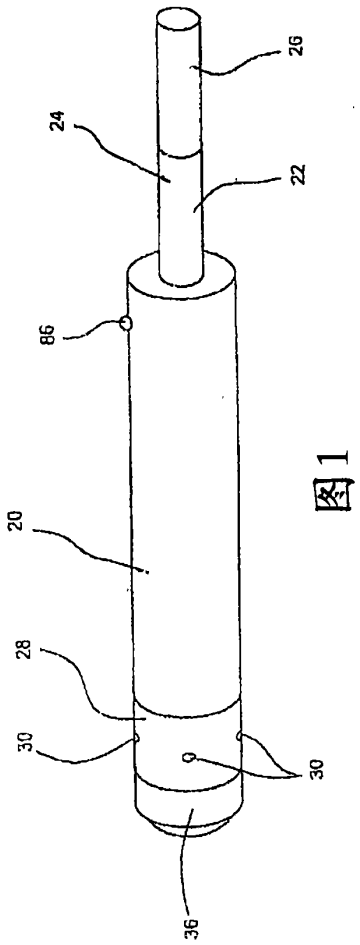

图1

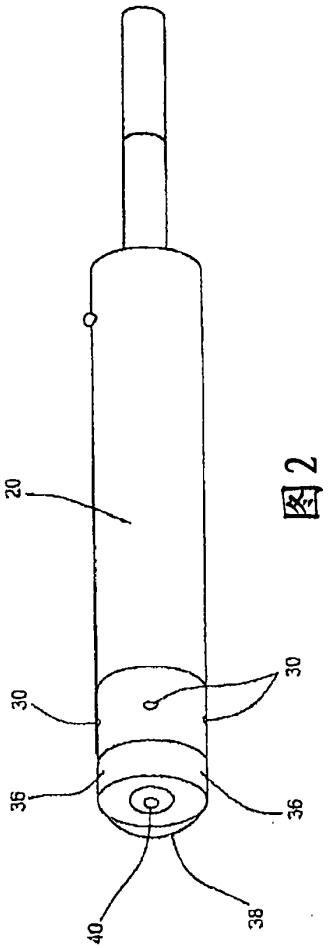

图2

NJOY Exhibit 1002.447

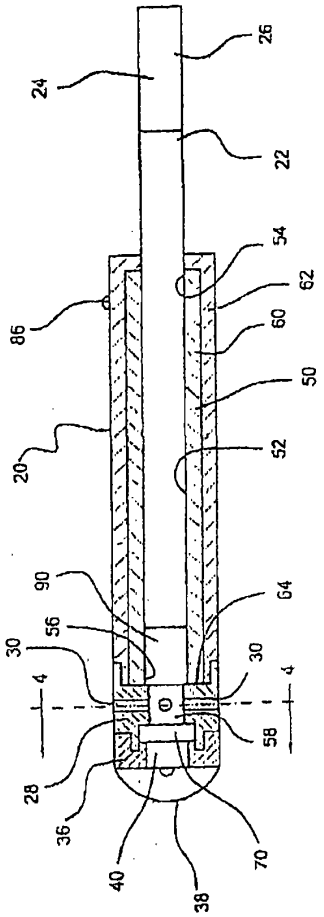

图3

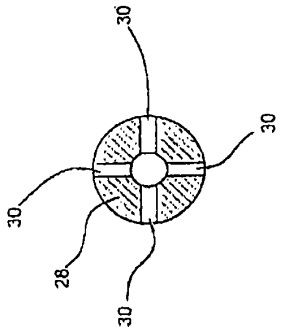

图4

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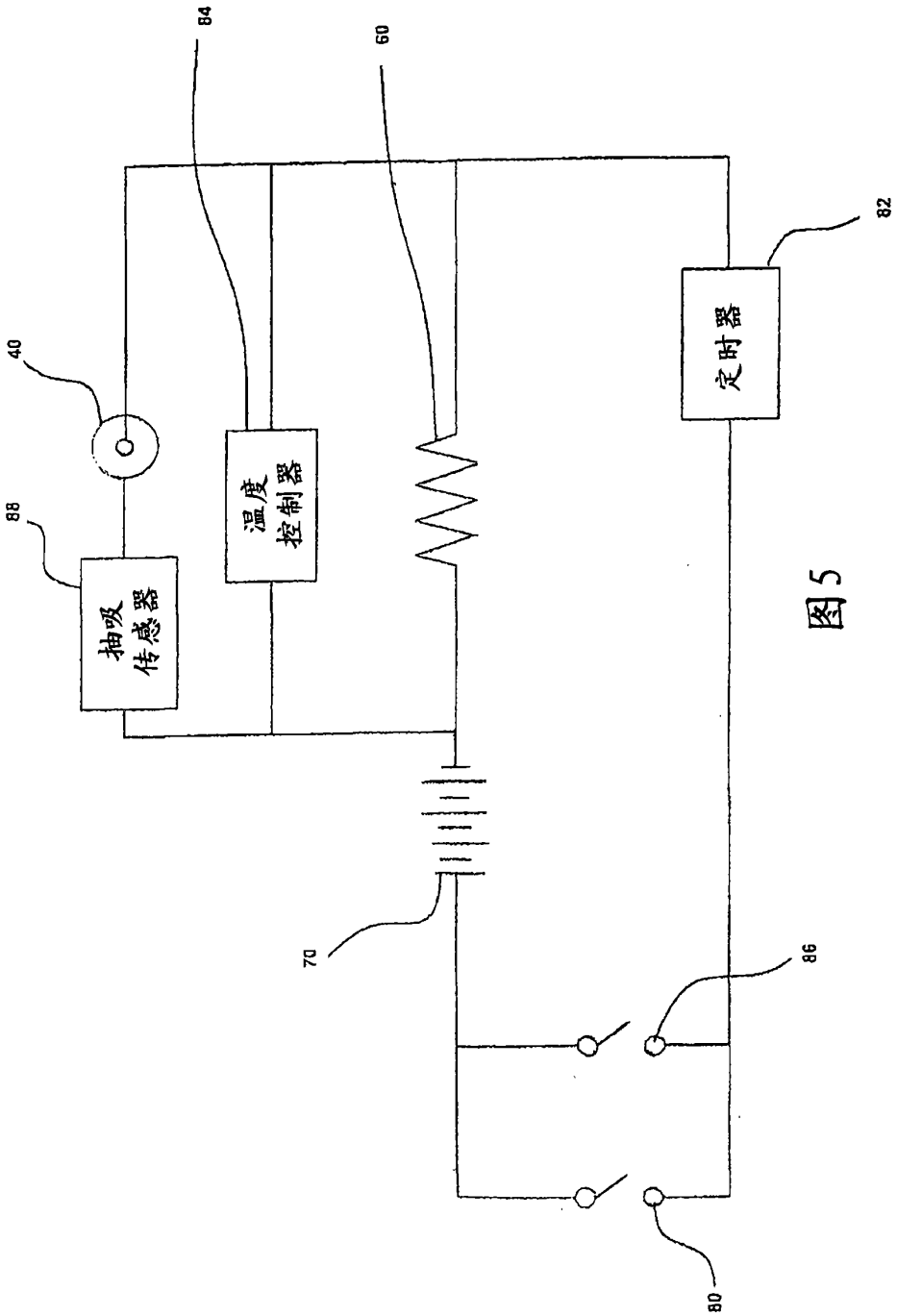

图 5

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Aerosol devices and methods for inhaling a substance and uses thereof

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Applicant(s): PLOOM INC ± (PLOOM INC)

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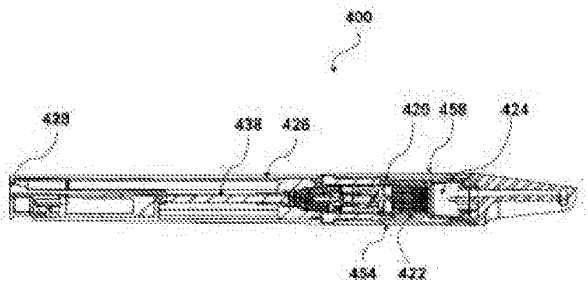
Abstract of CN101951796 (A)

Devices, cartridges, and method are described herein for emulating smoking wherein a device generates an aerosol for inhalation by a subject by heating a viscous material that can have a tactile response in the mouth or respiratory tract, while reducing Hoffman analytes and mutagenic compounds delivered to the user as compared to a common tobacco cigarette.



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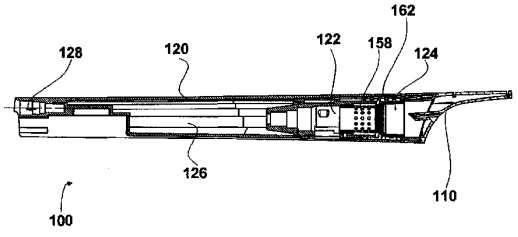
(54)发明名称

气雾装置和用于吸入物质的方法以及该装置的用法

(57)摘要

在此描述了模仿吸烟的装置、盒和方法。其中一种装置通过加热粘性材料而产生用于对象吸入的气雾，该气雾可在嘴或呼吸道中具有触觉响应，同时相比普通烟草香烟减少传递给使用者的霍夫曼分析物和致突变化合物。



CN 101951796 A

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1. 一种在用于雾化材料的装置中使用的盒，包括：

(a) 容纳粘性可汽化材料的壳体；和

(b) 密封在所述壳体上的盖，因此形成容纳粘性可汽化材料的密封盒。

2. 如权利要求 1 所述的盒，其中所述盖可刺穿。

3. 如权利要求 1 所述的盒，其中被刺穿的盖允许产生自加热所述粘性可汽化材料的气雾排出。

4. 如权利要求 1 所述的盒，其中所述盖为可热封膜。

5. 如权利要求 4 所述的盒，其中所述可热封膜包括基层和可热封层。

6. 如权利要求 1 所述的盒，其中所述盖包括铝。

7. 如权利要求 1 所述的盒，其中所述壳体包括铝。

8. 如权利要求 1 所述的盒，其中所述壳体包括凸缘。

9. 如权利要求 8 所述的盒，其中所述盖密封在所述凸缘上。

10. 如权利要求 1 所述的盒，其中所述盒被加热至雾化包含在所述壳体中的材料所需的温度。

11. 如权利要求 10 所述的盒，其中所述盒被加热到小于 400° F。

12. 如权利要求 1 所述的盒，其中所述盒插入到装置中，其中所述装置可雾化所述粘性可汽化材料。

13. 如权利要求 12 所述的盒，其中所述盒插入到所述装置的炉室中。

14. 如权利要求 1 所述的盒，其中在所述壳体和所述盖中的至少一个上打印信息。

15. 如权利要求 1 所述的盒，其中所述粘性可汽化材料包括气雾形成介质。

16. 如权利要求 15 所述的盒，其中所述气雾形成介质包括丙二醇和丙三醇中的至少一种。

17. 如权利要求 1 所述的盒，其中所述粘性可汽化材料包括烟草。

18. 一种填充容纳粘性可汽化材料的盒的方法，包括：

(a) 将所述粘性可汽化材料装填入所述盒的壳体中；和

(b) 在所述盒的所述壳体上密封盖。

19. 如权利要求 18 所述的方法，其中所述方法是自动操作的。

20. 如权利要求 19 所述的方法，其中所述方法在直线或旋转移位机上完成。

21. 如权利要求 18 所述的方法，其中所述装填步骤包括螺旋填充器方法。

22. 如权利要求 18 所述的方法，其中所述装填步骤包括活塞泵方法。

23. 如权利要求 18 所述的方法，其中在所述装填步骤中装填预定体积的粘性可汽化材料。

24. 如权利要求 23 所述的方法，其中所述体积为大约 0.1 至大约 0.8 立方厘米。

25. 如权利要求 24 所述的方法，其中所述体积为大约 0.25 立方厘米。

26. 如权利要求 18 所述的方法，其中所述密封步骤包括加热所述盒的所述盖和所述壳体中的至少一个。

27. 如权利要求 18 所述的方法，进一步包括从所述盖剪切掉所有多余的材料。

28. 一种用于产生可吸入气雾的装置，包括：

(a) 本体，

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(b) 在所述本体中的加热器，所述加热器可加热粘性可汽化材料以产生可吸入气雾，和

(c) 温度调节器，该温度调节器包括一个或多个双金属盘，其中所述盘被配置为并适于将温度变化转换为机械位移。

29. 如权利要求 28 所述的装置，其中所述加热器被提供气体燃料。

30. 如权利要求 28 所述的装置，其中所述盘移动推杆。

31. 如权利要求 30 所述的装置，所述推杆限制或停止所述气体燃料在所述装置的所述本体中的流动。

32. 如权利要求 31 所述的装置，其中所述推杆通过推动可变限流阀限制或停止所述气体燃料的流动。

33. 如权利要求 31 所述的装置，其中所述推杆支撑催化网元件。

34. 如权利要求 28 所述的装置，其中所述加热器通过压电点火器点火。

35. 如权利要求 28 所述的装置，其中所述可吸入气雾包括直径小于大约 2 微米的微粒。

36. 一种模仿吸烟的装置，其中所述装置通过加热包含植物物质的粘性材料至约 150℃而产生用于对象吸入的气雾，并且其中所述气雾在嘴中或呼吸道中具有触觉响应。

37. 如权利要求 36 所述的装置，其中所述粘性材料包括气雾形成介质。

38. 如权利要求 37 所述的装置，其中所述气雾形成介质包括丙二醇和丙三醇中的至少一种。

39. 如权利要求 38 所述的装置，其中所述丙二醇和丙三醇的至少一种在被加热时产生可视气雾。

40. 如权利要求 36 所述的装置，其中作为气雾一部分的活性元素在呼吸道中被吸收。

41. 如权利要求 36 所述的装置，其中所述粘性材料包括烟草。

42. 如权利要求 36 所述的装置，其中所述粘性材料进一步包括食用香料。

43. 如权利要求 36 所述的装置，其中所述气雾包括直径小于大约 2 微米的微粒。

44. 一种装置，包括本体和加热器，其中所述装置通过加热粘性烟草材料至目标温度而产生用于对象吸入的无烟气雾。

45. 如权利要求 44 所述的装置，其中所述粘性烟草材料包括气雾形成介质。

46. 如权利要求 45 所述的装置，其中所述气雾形成介质包括丙二醇和丙三醇的至少一种。

47. 如权利要求 46 所述的装置，其中所述丙二醇和丙三醇的至少一种在被加热时产生可视气雾。

48. 如权利要求 44 所述的装置，其中作为所述气雾的一部分的活性元素在呼吸道中被吸收。

49. 如权利要求 44 所述的装置，其中所述粘性烟草草料进一步包括食用香料。

50. 如权利要求 44 所述的装置，其中所述目标温度为大约 100℃至大约 200℃。

51. 如权利要求 50 所述的装置，其中所述目标温度为大约 150℃。

52. 如权利要求 44 所述的装置，其中所述装置可由使用者用单只手操作。

53. 如权利要求 44 所述的装置，其中所述无烟气雾包括直径小于大约 2 微米的微粒。

54. 一种气雾产生装置，其中所述装置在加热可点燃抽吸材料至目标温度之后产生基本上没有至少一种霍夫曼分析物的气雾。

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55. 如权利要求 54 所述的装置，其中所述霍夫曼分析物选自由氨、氨基萘、苯并芘、甲醛、乙醛、丙酮、甲基乙基酮、丁醛、氰化氢、氮氧化物、烟草特有亚硝胺 (TSNAS)、吡啶、喹啉、对苯二酚、苯酚、甲酚、焦油、尼古丁、一氧化碳、1,3- 丁二烯、异戊二烯、丙烯腈、苯、甲苯和苯乙烯组成的组。

56. 如权利要求 54 所述的装置，其中所述目标温度为大约 100℃至大约 200℃。

57. 如权利要求 56 所述的装置，其中所述目标温度为大约 150℃。

58. 如权利要求 54 所述的装置，其中所述气雾包括直径小于大约 2 微米的微粒。

59. 一种气雾产生装置，其中所述装置在加热可点燃抽吸材料至目标温度之后产生气雾，该气雾带有的霍夫曼分析物比普通烟草香烟少至少 70％。

60. 如权利要求 59 所述的装置，其中所述霍夫曼分析物选自由氨、氨基萘、苯并芘、甲醛、乙醛、丙酮、甲基乙基酮、丁醛、氰化氢、氮氧化物、烟草特有亚硝胺 (TSNAS)、吡啶、喹啉、对苯二酚、苯酚、甲酚、焦油、尼古丁、一氧化碳、1,3- 丁二烯、异戊二烯、丙烯腈、苯、甲苯和苯乙烯组成的组。

61. 如权利要求 59 所述的装置，其中所述目标温度为大约 100℃至大约 200℃。

62. 如权利要求 61 所述的装置，其中所述目标温度为大约 150℃。

63. 如权利要求 59 所述的装置，其中所述普通烟草香烟包括过滤嘴。

64. 如权利要求 59 所述的装置，其中所述气雾包括直径小于大约 2 微米的微粒。

65. 一种传递基本上没有霍夫曼分析物的气雾给对象的方法，包括 ：

(a) 配置包含加热器和可点燃抽吸材料的气雾产生装置 ；

(b) 使用所述装置的加热器加热所述可点燃抽吸材料至目标温度以产生气雾 ；和

(c) 传递气雾给对象以用于吸入。

66. 如权利要求 65 所述的装置，其中所述气雾包括直径小于大约 2 微米的微粒。

67. 一种在嘴或呼吸道中引起触觉响应的方法，包括 ：

(a) 配置烟雾模仿装置，其中所述装置通过加热容纳于该装置中的包含植物物质的粘性材料来产生在所述嘴或呼吸道中具有触觉响应的无烟气雾 ；

(b) 加热所述粘性材料至目标温度 ；

(c) 从被加热的粘性材料产生在所述嘴或呼吸道中具有触觉响应的气雾 ；

(d) 吸入所述气雾。

68. 如权利要求 67 所述的方法，其中所述粘性材料包括气雾形成介质。

69. 如权利要求 68 所述的方法，其中所述气雾形成介质包括丙二醇和丙三醇中的至少一种。

70. 如权利要求 69 所述的方法，其中所述丙二醇和丙三醇中的至少一种在被加热时产生可视气雾。

71. 如权利要求 67 所述的方法，其中作为所述气雾的一部分的活性元素在呼吸道中被吸收。

72. 如权利要求 67 所述的方法，其中所述粘性材料包括烟草。

73. 如权利要求 67 所述的方法，其中所述粘性材料进一步包括食用香料。

74. 如权利要求 67 所述的方法，其中所述目标温度为大约 100℃至大约 200℃。

75. 如权利要求 74 所述的装置，其中所述目标温度为大约 150℃。

NJOY Exhibit 1002.454

76. 如权利要求 67 所述的方法，其中所述气雾包括直径小于 2 微米的微粒。

77. 一种气雾产生装置，其中所述装置从可点燃抽吸材料产生气雾，其中所述气雾包含的霍夫曼分析物比燃烧所述可点燃抽吸材料所产生的物质少至少 70％。

78. 一种气雾产生装置，其中所述装置从可点燃抽吸材料产生气雾，其中通过所述装置产生的颗粒得出非致突变的艾姆斯试验结果。

79. 一种气雾产生装置，其中所述装置从可点燃抽吸材料产生气雾，其中所述气雾在艾姆斯试验中的得分显著好于燃烧所述可点燃抽吸材料所产生的物质。

80. 一种气雾产生装置，其中所述装置为使用者提供至少 4 个不连续小时的吸入气雾而无需保养该装置。

NJOY Exhibit 1002.455

气雾装置和用于吸入物质的方法以及该装置的用法

[0001] 交叉引用

[0002] 本申请要求美国 2008 年 12 月 16 日的实用申请 12/336,439 的优先权，并且要求美国 2007 年 12 月 18 日的临时申请 61/014,690 的权益，上述申请通过引用并入本文。

背景技术

[0003] 烟草产品的使用和吸用烟草的有害副作用在世界范围内持续获得越来越多的关注。由于更多关于在工作场所和公共场所吸烟的规定开始生效，发展可替代产品的兴趣正在显著增长。一种减少吸烟有害副作用的方法是不燃烧烟草产品，这是因为从吸烟得到的许多有害分析物，例如霍夫曼分析物，都是由于材料的燃烧而接收的。

[0004] 开发和销售能释放雾化烟草产品的装置的困难是在使用时的视觉上的和身体上的吸引力方面迎合使用者。一种可多次使用以雾化多种不同物质同时为使用者提供与吸烟类似感觉（例如视觉上的雾气）的装置是值得去做的。一种可雾化烟草产品并且相比于吸烟减少传递给使用者的霍夫曼分析物和致突变的化合物的装置和产品也是值得去做的。

发明内容

[0005] 本发明的一方面，公开了一种盒，该盒用在用于雾化材料的装置中，包括用于容纳粘性可汽化材料的壳体，和密封于壳体上的盖，因此形成容纳所述粘性可汽化材料的密封盒。所述盖能被刺穿，其中被刺穿的盖允许产生自加热所述粘性可汽化材料的气雾排出。所述盖也可为可热封膜，其中所述可热封膜包括基层和可热封层。所述盒的壳体或所述盒的盖可包括铝。当本发明盒的壳体包括凸缘时，盖可密封在凸缘上。

[0006] 所述盒可被加热至雾化容纳在所述壳体中材料所需的温度，最好是加热至小于 400° F。所述盒中的所述粘性可汽化材料可包含气雾形成介质、丙二醇和丙三醇中的至少一种。所述粘性可汽化材料可包含烟草。

[0007] 所述盒可插入装置中，其中该装置能雾化所述粘性可汽化材料。所述装置可包括能加热所述盒的炉室。

[0008] 为了标记本发明的盒，可在所述壳体和盖的至少一个上打印信息。

[0009] 另一方面，一种填充容纳粘性可汽化材料的盒的方法，包括将所述粘性可汽化材料装填进所述盒的所述壳体，和在所述盒的所述壳体上密封盖。所述方法可自动操作，例如，在直线或旋转的移位机上完成，或者用螺旋填充器、蠕动泵或活塞泵方法装填。在装填步骤中可装填预定体积的粘性可汽化材料，其中预定体积可为大约 0.1 至大约 0.8 立方厘米，优选地体积为大约 0.25 立方厘米。填充所述盒的方法的密封步骤可包括加热所述盒的所述盖和所述壳体的至少一个，并且从盖上剪切掉任何多余材料。

[0010] 在此提供产生可吸入气雾的装置，包括本体，本体内的加热器，该加热器可加热粘性可汽化材料以产生可吸入气雾，和包括一个或多个双金属盘的温度调节器，其中所述盘将温度变化转换为机械位移。所述可吸入气雾可包括直径小于大约 2 微米的微粒。可向所述装置的加热器提供气体燃料，例如丁烷，并且可通过压电点火器点燃。

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[0011] 温度调节器的盘可移动推杆，该推杆通过推动可变限流阀限制或停止气体燃料在所述装置本体中的流动。所述推杆也可提供对催化网元件的支撑。

[0012] 另一方面，本发明提供一种模仿吸烟的装置，其中所述装置通过加热包含植物物质的粘性材料至大约 150℃而产生用于对象吸入的气雾，并且其中所述气雾在口中或者呼吸道中具有触觉响应。所述粘性材料可包括气雾形成介质，该气雾形成介质科包括丙二醇和丙三醇中的至少一种，以在被加热时产生可视气雾。所述粘性材料也可包括烟草和食用香料。

[0013] 所述装置也可将作为气雾一部分的活性元素传递给使用者。所述活性元素可在呼吸道被吸收。所述气雾可包括直径小于大约 2 微米的微粒。

[0014] 在此公开的本发明的装置包括本体和加热器，其中所述装置通过加热粘性烟草材料至目标温度产生用于对象吸入的无烟气雾。所述粘性材料可包括气雾形成介质，该气雾形成介质可包括丙二醇和丙三醇的至少一种，以在被加热时产生可视气雾。所述装置可将作为气雾一部分的活性元素传递给使用者。所述活性元素可在呼吸道被吸收。所述气雾可包括直径小于大约 2 微米的微粒。

[0015] 用于加热装置中的粘性材料的目标温度可为大约 100℃至大约 200℃。优选地目标温度为大约 150℃。

[0016] 所述装置也可由使用者用单只手操作。

[0017] 本发明的另一方面，公开了一种气雾产生装置，其中所述装置在加热可点燃抽吸材料至目标温度之后产生基本上没有至少一种霍夫曼分析物的气雾。所述霍夫曼分析物可选自由氨、氨基萘、苯并芘、甲醛、乙醛、丙酮、甲基乙基酮、丁醛、氰化氢、氮氧化物、烟草特有亚硝胺 (TSNAS)、吡啶、喹啉、对苯二酚、苯酚、甲酚、焦油、尼古丁、一氧化碳、1,3- 丁二烯、异戊二烯、丙烯腈、苯、甲苯和苯乙烯组成的组。

[0018] 用于加热所述装置中的所述粘性材料的目标温度可为大约 100℃至大约 200℃。优选地目标温度为大约 150℃，这产生包括直径小于大约 2 微米微粒的气雾。

[0019] 本发明也提供一种气雾产生装置，其中所述装置通过加热可点燃抽吸材料至目标温度之后产生带有至少比普通烟草香烟少 70％霍夫曼分析物的气雾，并且其中霍夫曼分析物可选自由氨、氨基萘、苯并芘、甲醛、乙醛、丙酮、甲基乙基酮、丁醛、氰化氢、氮氧化物、烟草特有亚硝胺 (TSNAS)、吡啶、喹啉、对苯二酚、苯酚、甲酚、焦油、尼古丁、一氧化碳、1,3- 丁二烯、异戊二烯、丙烯腈、苯、甲苯和苯乙烯组成的组。所述普通香烟可包括过滤嘴。

[0020] 用于加热所述装置中的所述粘性材料的目标温度可为大约 100℃至大约 200℃。最好是目标温度为大约 150℃，并且产生包括直径小于大约 2 微米微粒的气雾。

[0021] 一方面，本发明公开了一种给对象传递基本上没有霍夫曼分析物的气雾的方法，包括 ：配置包含加热器和可点燃抽吸材料的气雾产生装置，用所述装置的加热器加热所述可点燃抽吸材料至目标温度以产生气雾 ；和传递所述气雾至对象以用于吸入。

[0022] 另一方面，公开了一种在口中或呼吸道中产生触觉响应的方法。所述方法包括 ：配置烟雾模仿装置，其中所述装置通过加热包含在该装置中的包含植物物质的粘性材料产生具有在口中或呼吸道中的触觉响应的无烟气雾 ；加热所述粘性材料至目标温度 ；从被加热的粘性材料产生在口中或呼吸道中的具有触觉响应的气雾 ；和吸入所述气雾。所述粘性材料可包括气雾形成介质，该气雾形成介质科包括丙二醇和丙三醇中的至少一种，以在被加

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热时产生可视气雾。所述粘性材料也可包括烟草和食用香料中的至少一种。所述装置可将作为气雾一部分的活性元素传递给使用者。所述活性元素可在呼吸道中被吸收。所述气雾可包括直径小于大约 2 微米微粒。

[0023] 另一方面，本发明公开了一种气雾产生装置，其中所述装置从可点燃抽吸材料产生气雾，其中所述气雾包含比通过燃烧本发明提供的可点燃抽吸材料产生的物质少至少 70％的霍夫曼分析物。

[0024] 也公开了一种气雾产生装置，其中所述装置从可点燃抽吸材料产生气雾，该气雾通过艾姆斯试验，和一种气雾产生装置，其中所述装置从可点燃抽吸材料产生气雾，其中气雾的艾姆斯试验得分显著好于燃烧所述可点燃抽吸材料产生的物质。

[0025] 本发明提供气雾产生装置，其中所述装置为使用者提供至少 4 个不连续小时的吸入气雾而不用补充燃料或另外保养装置。

[0026] 参考结合

[0027] 本说明书中提到的所有公开、专利和专利申请在相同程度上通过参考并入本文，如同每个单独的公开、专利和专利申请被具体地且单独地指明通过参考并入。

附图说明

[0028] 通过参考公开了示例性实施例的下列详细描述以及附图，将获得对本发明的特征和优势的更好理解，在这些实施例中使用本发明的原理，在附图中：

[0029] 图 1 图示了一种本发明的装置，包括吸嘴和具有加热器的本体、炉室、燃料箱和用于保持运行温度的带有控制器的点火器；

[0030] 图 2 图示了本发明的装置，包括意欲可再填充的燃料箱和用于该目的的口；

[0031] 图 3 图示了本发明的装置，包括可通过任何可燃燃料供能的加热器组件，和一系列双金属物体以控制流向加热器组件的可燃燃料流；

[0032] 图 4 示出了一种装置，其中通过填充阀将燃料供应至箱中，和被压缩的液体燃料可通过燃料芯汲取使用；

[0033] 图 5 图示了本发明的装置，包括阻止气体运动的单个弹性体止动器，其中气体燃料的流动被压缩泡沫流动限制器限制，并且仅可通过阀孔离开；

[0034] 图 6 示出了一种装置，其中多个塑料体排出小孔定位在加热器排出小孔之上，并且流出的气体必须沿着加热器本体通过，从而与加热器本体交换更多的热，因此改善装置的效率；

[0035] 图 7 图示了带有铰链连接吸嘴的本发明装置；

[0036] 图 8A 示出了一种装置，其中使用者可将材料条朝装置的吸嘴端滑动以开启该装置，然后将该条向回朝向填充口滑动以将该装置关闭；

[0037] 图 8B 从不同立体图图示了图 8A 装置；

[0038] 图 9 图示了可容纳湿润的可汽化产品的盒，该盒汽化与能够汽化该产品的装置一起使用，该盒包括壳体、盖和将盖粘附至壳体的凸缘；

[0039] 图 10 示出了带有 PET 基层和 APET 热封层的基本可热封膜；

[0040] 图 11 显示带有 PET 基层和 APET 热封层，还有另外的金属层和金属粘附层的复合膜；

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[0041] 图 12 图示了本发明的盒，该盒容纳湿润的可汽化产品，并且包括多个小孔或通风口以允许盒中所容纳的东西接触环境；

[0042] 图 13A-B 图示了具有两部分的盒，这两部分能组合在一起并且可具有多个小孔或通风口以释放来自盒内所容纳的东西的雾气；

[0043] 图 14 示出了本发明的装置的示例性使用方法，该装置能通过仍然提供使用者所要求的许多期望的吸烟效果来模仿吸烟，但减少霍夫曼分析物的吸入量；

[0044] 图 15 示出了本发明的装置的示例性使用方法，其中使用者以如下方式从本发明的装置接收吸入的烟草物质：该方式使使用者的霍夫曼分析物吸入量减少至少 70％，并且使用者可吐出来自雾气形成介质的可视雾气，以提供与吸烟动作中的所吐出的烟的视觉辅助类似的视觉辅助；

[0045] 图 16 示出了细菌突变形成试验（艾姆斯化验）的结果，该结果显示通过吸本发明装置而产生的微粒是非致突变的。

具体实施方式

[0046] 本文所描述的本发明具有宽范围的应用以吸入活性物质，本领域技术人员在学习本公开之后将理解这些应用。例如，装置、盒、系统、成套工具和方法可被使用，例如，以通过嘴或鼻子吸入烟草产品。与吸烟或燃烧烟草相比，所述装置、盒、系统、成套工具和方法也可用于减少通过吸入烟草产品而提供给使用者的霍夫曼分析物。另外，所述装置、盒、系统、成套工具和方法可用于，例如，吸入任何物质，例如植物性药材、药物、保健品或任何其它向最终使用者提供益处或感觉的物质。

[0047] I. 气雾产生装置

[0048] 图 1 图示了本发明的一种示例性装置。该装置 100 可产生足够高的温度以雾化容纳在装置 100 中产品。本发明的一种装置可包括吸嘴 110 和具有加热器 122 的本体 120，炉室 124，燃料箱 126，和用于保持运行温度的带有控制器的点火器。装置的运行温度调节器的例子包括双金属致动器。可选择地，可采用填满石蜡的部件，该部件膨胀或收缩以调节丁烷流量。可选择地，可采用一种系统以例如使用热电偶传感器测量当前温度并且例如使用微控制器并通过控制电动机械阀（例如伺服阀或电磁阀）将该温度与规定的温度比较。使用者所选择的温度，如上面的描述，该所选择的温度可用作这个系统的输入。

[0049] 一种装置，可构造为没有主动调节元件。这可导致减少复杂性并且降低制造装置的总成本。例如，流向加热器 122 的燃料流可被设置为低水平。使用中，炉室 124 内部的温度增加直到平衡点，此时引入额外的热等于散失至环境的热。热由通过装置 100 本体的传导和随着传递至使用者的雾气而散失。该平衡点决定装置 100 的运行温度。通过改变燃料流率、燃烧器的尺寸和材料，以及其它因素，该系统可被标定为提供相当稳定的期望运行温度。

[0050] 可使用压电点火器，其它的点火器也能使用，例如，打火石启动器或者电池供电电阻线圈。

[0051] 如图 2 图示，本发明的装置 200 也可包括意欲可再填充的燃料箱 226，并具有用于该目的的口 230。该箱 226 可以是在其燃料耗尽后可丢弃的。可使用释放机构（例如销或凸轮）以允许使用者快速移除耗尽的箱 226，并且代之以充满的箱。可替换的箱可包括该

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装置的附加零件，例如点火器和加热器。液体燃料为优选的燃料源，然而液体燃料可由电池供电的电加热器或者其它紧凑的热源补充或替换。该箱 126 可由如图 1 所示的填充阀机构 128 与专门的燃料源或标准商业燃料源填充。

[0052] 燃料箱可装有足够的燃料以供该装置的重复使用。该装置可被使用高达 10、20、30、40、50 或 60 次。在一些实施例中，该装置可被使用多于 60 次。该装置也可连续或不连续的使用达 1、2、3、4、5、6、7 或 8 小时。用于与该装置一起使用的盒可在每次使用后丢弃或可多次使用。本发明的装置的长时间持续使用为使用者提供如下益处：即无需保养该装置或定期地重新填充燃料箱。多次使用的优点可优选地通过使用更大尺寸燃料箱和 / 或使用丁烷作为燃料而获得，这可产生必要的温度以在高效的方式下使用该装置。

[0053] 通常，该装置的运行温度不超过 200℃。通常所需要的雾化产品的温度在大约 100 至 200℃之间。在一些实施例中，该需要的雾化产品的温度为大约 150℃。一旦装置中的产品被雾化，通过吸嘴将已经雾化的产品提供给使用者。在很多情况下，本发明的装置设计为模仿吸烟装置，例如香烟、烟斗或雪茄烟嘴。

[0054] 图 3 中，该装置 300 包括加热器组件 322（其可由任何的可燃燃料供能），和一系列的双金属物体 332 以控制流向加热器组件 322 的可燃燃料流。可燃燃料的例子包括，但不限于，丙烷，丁烷，甲烷，和乙醇。当该装置 300 变热或该装置 300 的一部分变热时，该双金属物体 332 改变它们的形状（例如，从扁平变为凹入或凸起）以调节进入加热器组件 322 燃料的量。这可通过多种机构发生，包括如图 3 所示地抵靠着可变流量阀 336 推动杆 334（在此称为推杆 334）。

[0055] 双金属物体可用于将温度变化转换成机械位移。该物体包括两种加热时具有不同膨胀率的不同金属，例如，钢和铜。该物体可为合金或固定在一起的两种金属。该双金属物体可为任意平面形状，例如正方形、长方形或带形。最好是该双金属物体为双金属盘。如果被加热，不同的膨胀力迫使平坦的物体朝一侧弯曲，如果冷却则朝相反方向弯曲。该双金属物体为双金属盘，例如商业上可获得的 Truflex P675/700 盘。

[0056] 双金属的机械位移比两种金属中的任一种的较小纵向膨胀大很多。该效果在一系列的机械和电装置中被使用。在本发明大多数的示例装置中，双金属物体以平坦的形式被使用。其它方面，其可被缠绕成盘卷以缩小体积。

[0057] 镍钛 (NiTi) 为形状记忆合金，也通常被称为镍钛诺。高于其变形温度，镍钛诺为超弹性的，并且当应用负载时能够承受较大量的变形和当负载移除时恢复其初始形状。低于其变形温度，其显示形状记忆效应。当它被变形时它会保持在该形状直到被加热至高于其变形温度，此时其将恢复到初始形状。镍钛诺通常由重量大约 55％的镍组成。对该组成方式作微小的变化可显著地改变合金的转变温度。镍钛诺的在宽范围温度中使用的这些独特性质和可修整性，使其适于作为本发明的双金属物体的替代物。如本领域技术人员所理解的，在不脱离本发明范围的情况下也可使用其它形状记忆合金。

[0058] 在本发明的装置中使用交替堆叠的双金属盘不仅是在很小的空间内实现热调节方案的简单且低成本的解决方案，而且具有相对其它热调节方法的一些关键的益处。这些盘为模块化解决方案，意味着不同数量的盘可用于调整装置的温度敏感性。用多个盘代替一个盘，对于给定（小）的盘直径允许更长的总行程。更薄或更厚的盘也可用于同样的目的，或增加额外的施加力的能力。由于这些盘的凸起形状特别地强健，燃料的压力变化对调

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节温度将具有最小的影响。同样，由于双金属堆叠为非离散的、连续动作系统，该装置通过使用上面提到的粗糙座设计可具有阻尼调节效果，使该装置自熄火可能性更小。这些盘也响应于最接近所述装置的炉的点处的温度，所以该炉被保持在可能的最恒定的温度。

[0059] 图 4 图示了本发明装置 400 的一些部件的详细例子。图 4 中，燃料通过填充阀 428 供应至箱 426，并且压缩液体燃料可使用燃料芯 438 汲取使用。在图 5 的例子中，气体燃料的流动之后受到压缩泡沫流体限制器 540 的限制，并且仅可通过阀孔 542 离开。具有阻止气体运动的单个弹性体止动器 544。使用单个止动器 544 以用于所有气体流的调节可显著提高系统的简单性和可靠性。该止动器 544 在此也称为可变流量阀 544。还可包括简单但独立的装置以随温度调节丁烷流，分配非常低的气体流以保持催化剂的一部分在熄灯温度之上，并且允许使用者打开和关闭装置 500。可变流量阀 544 可允许所有这三个需求以通过单个阀来处理。

[0060] 该止动器 544 可连接到以电绝缘部件 546 终止的刚性喷射组件。该喷射组件通常通过相当低弹簧常数的偏压弹簧 548 保持就位以允许气体离开阀口 542 并进入喷射组件。通过滑动密封 550 限制气体仅进入喷射组件。可选择地，可使用柔性膜片。使用者能够通过滑动激励滑动器而阻挠气体的正常流动，所以喷射组件被抑制以使止动器 544 密封阀孔 542，这装置 500 的关闭状态。当使用者通过滑动激励滑动器至打开位置允许正常气体流动状态时，压电点火器被按下，使得在喷射座 552 和炉加热器 522 之间产生火花，因此点燃流动气体。当炉加热器 522 开始达到其运行温度时，一系列交替堆叠的双金属盘 532 改变形状（从平坦的转变到凸起的）并且作用在推杆部件 534 上，部件 534 进而压迫喷射组件，以使该止动器 544 限制或停止气体流。

[0061] 通过使用双金属盘设计，可通过简单地改变这些盘的支撑物和阀座之间距离来将本发明的装置调整到指定的温度调节范围。在图 4-5 中，通过将炉加热器部件 422、522 螺入装置 400、500 的塑料本体 420、520，可通过使用与炉配合的工具从外部简单地扭转炉部件 422、522 而改变运行温度。炉 424 也可设计为由使用者手动移动。这些特征也可并入到用于扭转该部件的炉 424。

[0062] 图 5 中，推杆部件 534 可提供多种功能。推杆 534 可将双金属盘 532 的纵向运动转移至喷射组件，该喷射组件进而将该运动转移至阀止动器 544。推杆 534 也可以容易被组装的方式保持催化剂，例如该催化剂简单地围绕这该推杆 534 缠绕。推杆 534 在喷射座 552 和催化剂之间指定了固定空间，以使初始燃烧可容易发生。在一个例子中，推杆 534 大致具有哑铃形状，在相对端具有两个平坦的圆形表面，这两个表面用于在顶部接触双金属盘 532 和在底部接触绝缘部件 546。推杆 534 的较低端具有允许气体流通过并发生初始燃烧的多个大切口。

[0063] 本发明的许多装置使用温度调节方案，因为温度调节器（双金属盘）定位在非常接近（在炉上的）温度最关键的区域。相关领域通常将温度敏感部件定位在流量阀，该敏感部件可容易地受到膨胀燃料气体的较冷温度的影响，并且具有与汽化室最小的密切接触。相关的装置和方法的例子在美国专利申请 11/485,168、美国专利 4819665、美国专利 4793365、美国专利 5027836 和 PCT 申请 WO2006/082571 中描述。本发明装置的调节方案可通过炉的简单扭转而调整至特定温度。

[0064] 在图 4-5 的示例性装置中，空气通过入口小孔 454、554 进入喷射组件，并且在文丘

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里管 556 与丁烷流动路径混合。废气通过排出口 458 离开。

[0065] 通过环绕隔热特征而防止使用者接触热的内部元件。本发明的装置可包括隔热部分以阻止使用者接触装置的必然热的部分。虽然更好的隔热能力是优选的以使装置以可能的最佳效率运行，但对使用者来说重要的方面是感觉到相对冷的表面温度。可采用不同的策略以满足使用者关于装置温度的感觉。该装置可缠绕在对于外部使用来说具有足够耐久性的隔热材料内。用于该目的的材料具有低的热传导性和低热容（比热）。这些性能的组合可允许少量的热传至使用者的手指。具有低热传导性和低热容的材料的例子包括一些聚合物和陶瓷。另一策略是使用隔开特征以保持使用者不直接接触高温区域。这也可最小化使用者手指与装置的接触面积，以额外地减少所感觉到的热。隔开特征的热传导性和比热应当尽可能低。

[0066] 本发明装置的加热器可包括导热壳体和催化剂，其中壳体可由一种或多种材料通过焊接或压在一起而形成。加热器中的催化剂可选择为提供燃料的高效无焰燃烧。在一些情况下，为了给使用者提供视觉提示，当加热器正在加热时该催化剂或加热器可发出颜色（例如红色）以指示该装置被激活。

[0067] 在一些情况中，加热器可通过侧面小孔直接向周围大气中排放。然而，如图 1 图示，本发明的装置 100 优选包括围绕加热器组件 122 的一系列更小的小孔 158，这些小孔 158 更好地从被催化的气体向炉 124 传递热。同样，如图 6 显示，由于塑料本体 620 的排放小孔 662 定位在加热器排放小孔之上，流出的气体必须沿加热器本体通过并且与加热器本体交换更多的热量，改善装置 600 的效率。双屏障（加热器壁和本体壁）的使用，结合交错排列多个通风小孔，具有额外的改善防风性（例如，周围的风更不可能干扰内部气体流动，或者冷却催化剂至熄灭点）的益处。排放路径的特定几何形状允许这些益处而不会抑制对于启动催化活性来说所必需的气体的初始燃烧。该气体平稳地流过连续地扩大的排放区域，没有会导致气体的初始爆发而熄灭该气体的令人头疼的转向。

[0068] 在燃烧催化剂的区域中，熄灯温度通常用于描述最低温度，催化剂必须被保持在该温度以催化燃料和氧的放热反应。必须使催化剂的一部分保持在此温度才能防止该反应完全熄灭。本发明装置的加热器的目标运行温度接近于大多数催化剂的熄灯温度，并可使得维持催化剂难以实现。加热器的目标运行温度可为 180℃。用于本发明装置中催化剂类型的例子包括，但不限于，铂、钯、和铑。与本发明一起使用的催化剂的催化剂熄灯温度可为从大约 100 至 200℃。

[0069] 为了处理加热器温度与熄灯温度的细微差别，气体的小细流可流过催化剂和 / 或可将催化剂与外界因素（例如风）屏蔽开。本发明的装置可包括受保护的排放路径，即排气不直接排出至外部空气，而是改为沿盘绕路径行进，以使催化剂很难被风熄灭。

[0070] 对本发明装置的可靠性的担心是保持催化剂在装置的低目标温度上运行。离散的开 / 关阀自身可能在该方面有困难，因为丁烷爆发之间的循环时间有时可允许催化剂冷却至太低的温度，并且由于丁烷温度较低，丁烷膨胀的迅速爆发实际上可导致催化剂熄灭。可与本发明的装置结合的简单解决方案是使阀座表面稍微变粗糙，或者使用有纹理的止动器表面，以使该装置在调节期间就在完全关闭流动之前可获得丁烷的低流动。这与针形阀的运行类似，此外实施起来更便宜和更容易。针形阀也可使用在本发明的装置中以调节燃料流。一些现有技术使用热质量以使可在调节间隔之间维持熄灯温度。当气体流动在调节间

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隔之间恢复时，仅仅接触热质量的区域将初始催化气体，排出合理量的未使用燃料。本发明的装置不需要这样的热质量，因为阀座可作为类似阀并且允许装置阻尼调节间隔和强度。本发明的装置可使保持催化剂在熄灯温度之上所需要的丁烷量细细地流，换句话说，不淹没催化剂。

[0071] 如图 3 示出，本发明的装置 300 可用于雾化容纳在盒 370 中材料，该盒 370 可插入到装置 300 的炉室 324 中，用点火器的火花（紧接在气体流动开始后），气体点火并且热开始传导至全部加热组件 322。热通过传导、对流和 / 或辐射转移至盒 370。该盒 370 可为填满该室的形状，以最大化用于热传导的表面接触。当该盒 370 变热时，在盒 370 内和在该盒上并与其紧邻的空间中立刻产生雾气。当使用者吸装置 300 时，新鲜空气通过空气入口进入，与雾气混合，并且该混合物经过吸入通道传递给使用者。一个或多个空气入口可方向朝下，以改进从盒 370 中提取雾气。空气入口也可沿通过吸嘴 310 的对角线定向，或者在盒 370 之上横向地穿过壳体本身。一个或多个空气入口的直径和方向可设计为允许周围空气进入室 324 以搅动雾气而不影响运行温度。该空气入口小孔也可将周围空气进入并与在炉室 424 中产生的雾气混合的速度调节为设定速度或使用者选择的速度。例如，空气进入装置 300 的速率可向使用者提供如同通过香烟吸出的烟的感觉。一旦盒 370 用完，该装置可关闭并且通过打开装置 300 的炉室 324 移除盒 370。该盒 370 可手动移除或通过能迅速简单地移除盒 370 的机械装置移除。该机械装置可包括当装置 300 的其它部分移动或移除时，使用销或滑动部分以推出盒 370。该移除机械装置也可包括引入外部物体。

[0072] 如图 7 显示的装置可包括吸嘴 710，该吸嘴连接至装置 700 的本体 720。该吸嘴 710 可为铰链连接的部件。该吸嘴 710 也可制造为当其关闭在装置本体 720 上时牢固地配合入位。也可使该装置 700 与在此描述的本发明的盒 770 一起使用。盒 770 可插入至本发明装置 700 的炉室 724。如图 7 示出，吸嘴 710 可移除，或者铰链连接地打开，以提供进入炉室 724 的通道，并且容纳待雾化材料的盒 770 可插在该炉室 724 中。该装置 700 的吸嘴 710 也可为可移除的或者可移除的并且构造为一次使用。这样，多个使用者可使用同一装置 700 但具有多个可互换的吸嘴 710。或者如果吸嘴 710 被污染，另一吸嘴 710 容易替换之以避免不得不将整个装置 700 丢弃。当装置 700 包括连接至装置本体的吸嘴 710 时，例如铰链连接的吸嘴 710，该装置 700 可通过使用者的单手操作。

[0073] 吸嘴可用高温和食用安全材料制成，例如陶瓷、玻璃或各种高温塑料，例如聚酰亚胺热塑性树脂、聚醚酰亚胺 (PEI) 树脂（商标ULtem®）。通过使用高温材料而简化设计，但在添加隔热部件的情况下也可使用标准塑料或木材，该隔热部件防止过多热到达使用者，例如使用者嘴唇。另外，可延长吸嘴的长度，以使在使用者嘴处的温度大大低于吸嘴接近于热源端的温度。

[0074] 本发明装置 700 的吸嘴 710，例如图 7 中的例子可包括用于刺穿与装置 700 一起使用的容纳材料的密封盒的穿刺件 712。例如，铰链连接的吸嘴 710 可被打开，盒 770 插入到该装置 700 中，并且该吸嘴 710 然后可关闭，吸嘴 710 刺穿与该装置 710 一起使用的盒 770。该穿刺件 712 可为本领域技术人员显而易见的任意物体。优选地，该穿刺件 712 为模制在吸嘴 710 上的小突起 712，并且该小突起以点或边缘 714 终止以当应用小量的力时刺穿盒 770。

[0075] 一些相关技术的装置需要两只手点燃，导致使用者感觉不灵活。优选地，使用本发

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明装置的点燃方法允许单手点燃。如图 8A-8B 显示，使用者可按压装置 800 上的按钮 802 以将其打开，并且然后再次按压按钮 802 以将其关闭。在其它的实施例中，使用者可朝装置 800 的吸嘴端 810 滑动材料条以将该装置打开，并且然后向回朝填充口滑动该条以将其关闭。如本领域技术人员显而易见的，其它部件也可结合至本发明的装置，例如开关。机械效益可提供给使用者以在无需来自使用者的过分的力的情况下就可激活点火器。机械效益的例子包括，但不限于，杠杆、四杆机构和其它本领域技术人员显而易见的装置。

[0076] 本发明的装置也可提供额外的使用者友好益处。例如，双金属物体温度调节器允许该装置具有纤细、紧凑，并且因此吸引人的形式。热隔绝方法阻止使用者被高热惊吓。简单的开关机械装置允许使用者用单手开始和结束使用时间。

[0077] II 盒

[0078] 图 9 图示了盒 970，该盒可包含湿润的可汽化产品 972（在此有时称为粘性可汽化材料、流体可汽化材料、湿润的可点燃抽吸的材料、流体的可点燃抽吸材料或者湿润的可汽化容纳物）以与能汽化该产品 970 的装置一起使用。在该图中，盒 970 包括用盖 976 密封的壳体 974。在该例子中，该壳体 974 包括凸缘 978 以将该盖 976 粘结至壳体 974。该盒 970 的壳体 974 或者整个盒 970 可由多种材料制造，包括但不限于，金属、硬塑料、软塑料、纸、纸板、卡纸板和蜡纸。该盒 970 的壳体 974 通常包括食用安全材料，如在很多情况中，该盒 970 与吸入物质的装置一起被对象使用。一些食用安全材料的例子包括铝、不锈钢、聚对苯二甲酸乙二醇酯 (PET)、无定形聚对苯二甲酸乙二醇酯 (APET)、高密度聚乙烯 (HDPE)、聚氯乙烯 (PVC)、低密度聚乙烯 (LDPE)、聚丙烯、聚苯乙烯、聚碳酸酯和多种纸产品。在一些情况中，特别地当该材料为纸时，该壳体 974 可用材料或食用安全材料作衬里以阻止湿润的可汽化容纳物 972 干燥并保护湿润的可汽化容纳物 972。

[0079] 优选地，盒形成和成形为更容易地插入本发明装置的炉室中，并且紧密地配合在炉室的腔从而改善热传导和汽化。盒可在不产生大量有害气体的过程中形成和包装。

[0080] 盒的壳体可盖上例如能热密封的盖膜，以制造完全地封闭和气密的盒。本发明的密封盒可具有如下优点：保持容纳物新鲜，并且在运输或使用者操作期间阻止盒中材料溢出。

[0081] 盒的盖也可由各种材料制造。通常，该盖包括食用安全材料。该盖可在湿润的可汽化容纳物被添加到本发明的盒内后密封在盒上。在盒的壳体上密封盖的许多方法是本领域技术人员熟知的。在包括凸缘的盒壳体上密封盖的方法的一个例子是加热密封。优选地，该盒的盖在至少大约 400° F 被认为食用安全。该盖可为与在传统炉中烹饪的食品一起使用的商业上可获得的膜，并且经常被称为能用于双重炉（用于微波炉和传统炉应用）。该能用于双重炉的膜通常包括 PET（聚对苯二甲酸乙二醇酯）基层和 APET（无定形聚对苯二甲酸乙二醇酯）热封层。这样的盖膜可易于事先被金属化或贴上金属箔，优选地，用铝以改善膜对湿气、氧和其它气体的屏障性能。金属化的膜可通过本领域技术人员熟知的传统转换过程生产。

[0082] 作为例子，图 10 显示带有 PET 基层 1080 和 APET 热封层 1082 的基本可热封膜 1076。图 11 显示带有类似的 PET 基层 1180 和 APET 热封层 1182 的，此外还有金属层 1184 和金属粘附层 1186 的复合膜 1176。在两种情况中，APET 热封层 1182 与本发明的盒的壳体的凸缘接触。

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[0083] 本发明盒的材料和壳体可用于保持填充材料的新鲜度，并且增加盒的储藏寿命。金属化的盒或盖或壳体也可改进盒的视觉吸引力和感知价值。该盒的材料也可允许改进产品信息的打印和可见性，例如商标和风味说明。

[0084] 本发明的容纳有湿润的可汽化产品的盒 1270 可在该盒 1270 具有多个小孔或通风口 1288，如图 12 的盒 1270 的例子图示。这些小孔 1288 可允许盒 1270 中的容纳物接触环境。一些类型的容纳物可能需要接触环境或发现接触环境是有益的。

[0085] 图 12 中示例性盒 1270 也可由在被放入能汽化盒 1270 中容纳物的装置时可被刺穿或打开的材料组成。例如，如果盒 1270 加热至某一温度，该容纳物汽化，并且由该装置建立的一个或多个小孔或多个开口 1288 允许雾气状的容纳物从被加热的盒 1270 逸出。在不同的方式中，该盒 1270 可包括就在盒 1270 被插入装置之前能被打开的盖或密封件 1276。

[0086] 盒的各部分可如图 13A，盒 1370 带有两个可配合在一起的部分 1390、1392，或具有机械装置将这两部分 1390、1392 密封在一起。图 13B 图示了放在一起的盒 1370，每个部分都包含用于当盒 1370 被加热时释放盒 1370 容纳物的雾气的多个小孔或出口 1388。

[0087] 在很多情况中，本发明的盒设计为单次使用并且可丢弃。然而，一些类型的盒，例如那些具有将两个部分密封在一起的方法的盒，可作为可重复使用的盒使用多次。

[0088] 包含单次使用湿润可汽化产品的盒可提供或卖给终端使用者。容纳在盒中产品的类型可印在或写在盒上，或者由盒的颜色、尺寸和形状指示。然而，盒可由终端使用者用湿润的可汽化产品填充。

[0089] 当打算由消费者使用时，本发明的密封盒可插入本发明装置的炉室中。所述装置的吸嘴然后恢复至关闭位置，并且该点吸嘴可刺穿盒顶部的膜。然后允许加热过程产生的雾气离开该盒并且由使用者通过吸嘴吸入。

[0090] III 被雾化的材料

[0091] 如本领域技术人员显而易见的，任何可被雾化并由使用者吸入的材料都可包含在本发明的装置和盒内。特别有趣的是该材料给使用者提供在呼吸道内的触觉响应方面的或关于吐出吸入材料的视觉反馈方面的体验。例如，许多材料被任务能与本发明一起使用，包括但不限于，那些包含烟草的材料、自然或人工食用香料、咖啡渣或咖啡豆、薄荷、甘菊、柠檬、蜂蜜、茶叶、可可粉和基于其它植物性药材的其它非烟草替代物。本发明的装置或盒也可与药物化合物或人工化合物的使用相容，用于医药或愉悦用途。可在相当低的温度下汽化（或挥发）且没有有害的降解产物的任何上述化合物都可适合于与本发明的盒或装置一起使用。化合物的例子包括但不限于，薄荷醇、咖啡因、牛磺酸和尼古丁。

[0092] 包含在植物性药材中的活性元素在不同的温度汽化。该装置可被标定成建立单一的稳定温度，以例如汽化特定的产品。控制器也可用于选择不同的温度设置。使用者将基于所使用盒的类型选择设置。控制器也可机械地影响期望温度，例如通过阀流动速率的改变，或电子地影响期望温度，例如通过电动机械阀和微控制器媒介。例如，为了改变本发明装置的运行温度，可相对于温度调节器（例如双金属盘）移动炉室。

[0093] 此处，烟草或烟草材料定义为可被汽化以用于愉悦或治疗用途的自然或合成材料的任意组合。在本发明的一个实施例中，可用加工过的烟草、丙三醇和调味料来准备盒。烟草产品制造领域的技术人员熟悉这些和其它用于香烟、雪茄和类似物的成分。该盒可通过如下方式生产：将烟草切成细片（例如小于 2mm 直径，优选小于 1mm），加入其它成分，并且

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混合直到获得均匀的状态。在其它的实施例中，盒可通过将填充材料处理成均匀的类似糊状（例如，粒子尺寸少于 1mm）准备，这有利于对填充该盒的处理，例如，使用螺旋填充器、蠕动泵或活塞泵。

[0094] 优选地，与本发明装置一起使用的或容纳于本发明盒中的材料包括下列中的至少一种：形成雾气的介质和在使用者呼吸道中提供触觉响应介质。来自插入装置中该材料的雾化产品可为汽相气体和从汽相凝结的并保持悬浮在气体 / 空气混合物中的小液滴的组合（后者构成吸入物质的可视部分）。

[0095] 可使用丙二醇 (PG)、丙三醇或该两种物质组合作为雾气形成介质，其它的雾气形成介质也可用于本发明的盒和装置。该雾气形成介质在被加热时用于产生可视雾气，例如烟状雾气。该雾气在吸入该介质前和吐出该介质期间均可视。PG 相比单独的丙三醇具有一些益处，因其在同样的温度呈现高得多的雾气压力并且允许装置在更低的温度运行。减少运行温度节约能量，并且潜在地进一步改善使用该系统的健康益处。

[0096] 在一些情况中，被使用者吸入的产生自 PG 的雾气可在呼吸道中部分地吸收。如果发生该情况，其可能看起来好像使用者正在主要地吐出空气。这不同于传统吸烟经历，因为在吸烟的情况下，当使用者吐气时通常可看见和玩吐出的烟。因为通过加热丙三醇所产生的可视雾气能够在吐出后被看见，所以用于本发明的填充材料的一些准备可包括丙三醇和 PG 两者的组合。在这些实施例中，PG 提供高浓度的可视雾气以及呼吸道内的触觉响应，使用者在吸入前可看见 / 体验该可视雾气，并且丙三醇添加物允许增加在吐出后可被看见或以其他方式体验的雾气的量。

[0097] 制造用于本发明装置和盒中的材料的一种方法是在低热下将加工过的烟叶与其它成分组合，并且然后允许混合物在室温下吸收或腌泡一段延长的时间，从一天至三周那么长（依赖于所使用的特定的配方和香料）。然后可通过切成带有直径为 1-2mm 的粒子的均匀状态来处理该材料，并且将处理后的材料插入盒中，或直接插入装置中。可选择地，该材料可处理成更平均的、类似糊状，以改善在传统泵装置中的处理，如本文所述。

[0098] 将材料填充入盒中的方法的例子包括螺旋填充方法和活塞泵方法。它们都是用于食品和药品包装工业的普通填充过程。每种方法允许将重复受控体积（例如，大约 0.25 立方厘米）的填充材料装载进壳体中。然后该填满的壳体可用可热封盖膜盖上。该填充和密封操作可结合在食品和药品包装领域技术人员熟知的移位机上。

[0099] IV 用法

[0100] 该装置可通过提供许多使用者所需要的吸烟的期望效果而模仿吸烟。使用本发明装置和 / 或盒的方法的一个例子如图 14 图示。在此描述的雾气形成介质可与烟草材料组合并且直接或用本发明的盒插入本发明的装置 1400 中。该烟草材料为使用者提供物质 1494（例如尼古丁）的吸入，但没有吸入许多燃烧烟草材料时产生的焦油型物质，例如许多霍夫曼分析物（参见下面）。通过将装置 1400 的吸嘴放置与使用者 10 的嘴 12 接触，可以以与香烟或其它吸烟物品类似的方式使用本发明的装置 1400。然而，没有烟雾或烟雾的感觉，使用者可能不满意这样的体验。为了提供对烟草材料吸入的触觉响应，可添加雾气形成介质 1494（例如丙二醇），该介质可在呼吸道 14 中被吸收。

[0101] 同样，当吸烟草材料时，烟物可为使用者提供视觉辅助和 / 或视觉识别。为了提供同样的视觉辅助，该雾气形成介质可包含物质（例如丙三醇），该物质在吸入前和吸入期间

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以及吐出期间可被看见。在图 15 图示的使用方法的一个例子中，使用者 10 以减少使用者 10 的霍夫曼分析物吸入量至少 70％的方式从本发明的装置 1500 接收吸入的烟草物质。吸入物质之后，使用者可通过嘴 12 呼出来自雾气形成介质的可视雾气 1596。可视雾气 1596 可提供与吸烟行为中所吐出的烟雾相似的视觉辅助。

[0102] V 霍夫曼分析物

[0103] 香烟的烟雾是上千种化学成分的复杂混合物。这些物质中的很多都与吸烟相关的疾病关联。关于在香烟的烟雾中发现的更有害化合物的标准参考是霍夫曼分析物列表，该列表认识到大约 44 种不同分析物可能出现在主流烟中。以生物化学家迪特里希 . 霍夫曼的名字命名，他是烟草致癌作用的第一权威。该列表包含了通常与吸烟的健康风险相关联的化学物质。这些分析物和化学物质包括，例如，氨、氨基萘、苯并芘、甲醛、乙醛、丙酮、甲基乙基酮、丁醛、氰化氢、氮氧化物、烟草特有亚硝胺 (TSNAS)、吡啶、喹啉、对苯二酚、苯酚、甲酚、焦油、尼古丁、一氧化碳、1,3- 丁二烯、异戊二烯、丙烯腈、苯、甲苯、苯乙烯和各种其它物质。已经确定了来自吸烟物品的主流烟中的一些霍夫曼分析物可能是有害的。如此，已经对减少霍夫曼分析物进行了广泛的研究。霍夫曼分析物也可致癌，因此用于吸烟或模仿吸烟的装置将是值得去做的。

[0104] 使用本发明的装置，烟草材料可雾化而不用燃烧该材料。通过雾化该烟草，许多有害的化学物质和霍夫曼分析物不被使用者吸入。例如，本发明的装置可减少大约 70％或更多的霍夫曼分析物吸入。在一些实施例中，本发明的装置可减少大约 50％或更多的霍夫曼分析物吸入。在一些实施例中，本发明的装置可减少大约 60％或更多的霍夫曼分析物吸入。在一些实施例中，本发明的装置可减少大约 70％或更多的霍夫曼分析物吸入。在一些实施例中，本发明的装置可减少大约 80％或更多的霍夫曼分析物吸入。在一些实施例中，本发明的装置可减少大约 90％或更多的霍夫曼分析物吸入。

[0105] VI 艾姆斯化验

[0106] 细菌回复突变试验最初由艾姆斯等发展。艾姆斯化验充当对可在人类中导致癌症作用的化合物的预报器。该方法已经广泛地被采用，并且 FDA 将其作对新食品添加剂和药物毒性的更全面研究的一部分。同样的试验已经广泛地用于研究烟草产品和烟草的烟雾的毒性研究。艾姆斯试验为生物化验以评估化学化合物的潜在致突变性。由于癌症通常与 DNA 破坏关联，该试验也作为快速化验以估计化合物的潜在致癌性。相比之下，在啮齿动物上做的致癌标准试验花费几年完成并且成本昂贵。艾姆斯试验使用包含在组氨酸合成中的携带基因突变的杆菌属鼠伤寒沙门菌的若干菌株，以使它们需要组氨酸以生长。被试验的变量为诱变剂的导致回复突变而在无组氨酸培养基中生长的能力。试验菌株被特别构造成具有为合成组氨酸所需要的基因中的移码突变和基因点突变，这允许经由不同的机械装置检测诱变剂作用。一些化合物是非常特别，仅在一个或两个菌株中产生回复突变。该试验菌株也携带用于脂多糖合成的基因中的突变，使得细菌的细胞壁更具渗透性，并且在切补修复系统中使得该试验更敏感。加入大鼠肝提取物以模拟新城代谢的作用，因为一些化合物（例如苯并芘）本身不是致突变的但他们新陈代谢的产物是致突变的。为了完成化验，细菌散布在带有少量组氨酸的琼指平皿上。这些在生长培养基中的少量组氨酸允许细菌在一段初始时间上生长并且具有变异的机会。当组氨酸耗尽时，仅有变异为获得产生组氨酸能力的细菌将存活。培养该平皿 48 小时。物质的诱变性与观察到的菌落数量成比例。

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[0107] 如下面例 2 所示，与许多类型的吸烟草相比，用于与包含烟草的材料一起使用的本发明装置能在艾姆斯化验结果中呈现显著的改善。因此，本发明的装置可提供很多烟草物质给使用者，例如尼古丁，而不提供一些与燃烧或抽吸烟草相关的关键致癌成分。

[0108] 例 1

[0109] 香烟的烟雾是几千种化学成分的复杂混合物。这些成分中的很多成分都与吸烟有关的疾病关联。霍夫曼分析物列表为在香烟的烟雾中发现的更有害化合物的标准参考。将基于霍夫曼列表选择一组 52 种目标化合物，期望本发明装置产生的雾气将显著地减少这些目标化合物的水平（减少 70％或更多）。

[0110] 本发明原型装置和参考香烟 (KY2R4F) 的成分测试将在实验室进行。两种类型装置的样本将在自动吸烟机器中和在加拿大强烈体制下（每 30 秒喷出 55 立方厘米 (cc)）的现场获得。认为本方法比 FTC 测试（每 60 秒喷出 35cc）更接近真实吸烟条件。Arista 基于文献发展了对目标化合物的分析的大量草案。这些草案将用于测试。表 1 中总结了每组分析物的收集和提取方法。

[0111] 表 1 :霍夫曼分析物分析

[0112]

分析物	收集方法	提取方法	分析方法
氨	5 支香烟通过带有两个包含 20ml 的 0.01NMSA 的撞击滤尘器的 44mm 剑桥过滤垫	用撞击滤尘器溶液提取该垫	带有 Dionex IonPac CS14 阳离子交换分析柱的离子色谱法（IC）。
芳香胺 2-萘胺 3-氨基联苯	五支香烟通过 44-mm 剑桥过滤垫	用 5%HCl 和内部标准提取该垫。使用二氯甲	带有 J&W DB5MS, 30-m×0.25-mm×0.25-μm 膜厚度的气相色

[0113]

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4-氨基联苯（共 3 种）		烷液-液提取。收集并且然后浓缩洗脱液。添加三甲胺并且使用五氟丙酸酐衍生提取物。得到的溶液通过弗罗里硅土柱洗脱并且然后在分析前浓缩	谱法-质谱分析法选择性离子监测法（GC/MS SIM）
多环芳族烃 苯并(a)蒽 苯并(b)荧蒽 苯并(j)荧蒽 苯并(k)荧蒽 苯并(a)芘 屈 二苯并(a,h)蒽 二苯并(a,i)芘 二苯并(a,l)芘 茚并(1,2,3 – c,d)芘 5-甲基屈（共 11 种）	五支香烟通过 44-mm 剑桥过滤垫	加入内部标准和然后使用环己胺和苯的混合物提取垫。通过硅石固相萃取（SPE）盒过滤并且浓缩。加入 33%的甲醇水混合物并且通过 C18 SPE 盒。使用 30%甲醇水混合物洗涤并且使用 1.5mL 的苯提取以用于分析	带有 J&W DB5MS, 30-m×0.25-mm×0.25-μm膜厚度的GC/MS SIM
羰基 甲醛 乙醛 丙酮 丙烯醛 丙醛	一支香烟通过两个包含 25ml 的在乙腈中的 2,4-二硝基苯肼和高氯酸的撞击滤尘器	结合撞击滤尘器溶液。移除试样量，在试样量中加入吡啶并且分析该溶液	带有具有反相、C18、250-mm×4.6-mm 柱的 UV 探测器的高压液相色谱法（HPLC-UV）

[0114]

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巴豆醛 丁醛 乙基甲基甲酮 （共 8 种）			
氰化氢	通过后跟一个包含 0.1N 氢氧化钠的撞击滤尘器的 44mm 剑桥过滤垫从 1-3 支烟中收集主流烟	使用 0.1N 氢氧化钠提取剑桥过滤垫。用手摇晃撞击滤尘器溶液	通过连续流动分析单独地分析气相和微粒相
一氧化碳	在气体采样袋中收集气相烟	不可应用	用不分光红外线光谱仪（NDIR 光谱仪）确定 CO 的浓度
一氧化氮	一口烟一口烟地在线分析	不可应用	使气相烟雾通过 NO 化学发光检测器
汞	在包含高锰酸钾的撞击滤尘器中捕获汞	微波煮解样品	流体注射，冷蒸气原子吸收光谱测定法（冷蒸气 AA）
金属 镍 铅 镉 铬 砷 硒 （共 6 中）	在静电沉淀单元中捕获烟雾	首先用甲醇提取 CSC，然后在使用加热和硝酸煮解前蒸发溶剂	通过电感耦合等离子体质谱法（ICP-MS）分析
亚硝胺 NNN NNK NAT NAB	5 支香烟通过 44-mm 剑桥过滤垫	带有 0.1N 的醋酸铵过滤器提取	液相色谱串联带有使用 2.0X 50mm C18 柱的电喷雾电离的质谱分析法（LC-MS/MS）

[0115]

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（共四种）			
半挥发性物质 吡啶 3-乙烯基吡啶 喹啉 （共 3 种）	3-5 支香烟通过后接包含甲醇和三乙醇胺（TEA）的撞击滤尘器的 44mm 剑桥过滤垫	过滤垫和撞击滤尘器溶液结合。用轨道摇动加入内部标准。滗析得到的溶液并分析	带有 J&W DB-Wax，30-m×0.25-mm×0.25-μm 膜厚度的气相色谱分析-质谱分析法（GC/MS）
苯酚 邻苯二酚 苯酚 对苯二酚 间苯二酚 m-&p-甲酚 o-甲酚 （共 6 种）	五支香烟通过 44mm 剑桥过滤垫	使用 30% 甲醇中的 1% 乙酸并搅拌 60 分钟提取。过滤提取物的试样量并且分析	HPLC/带有反相柱的荧光
挥发性物质 1,3-丁二烯 异戊二烯 丙烯腈 苯 甲苯 苯乙烯 （共 6 种）	3-5 支香烟通过后接包含温度保持在环境温度之下的甲醇的撞击滤尘器的 44mm 剑桥过滤垫	过滤垫和冷撞击滤尘器溶液结合。加入内部标准并且短暂旋转溶液。倒出得到的溶液并分析	带有 J&W DB5MS，60-m×0.25-mm×1-μm 膜厚度柱的 GC/MS

[0116] 对于每个目标化合物，对本发明的装置和参考香烟都将进行 5 次重复测试。两个物品之间的平均值的差被确定为百分数。期望本发明的装置相比参考香烟减少大约 70% 或更多的霍夫曼分析物水平。

[0117] 例 2

[0118] 细菌回复突变测试，或“艾姆斯化验”，作为对可导致人类癌症发生的化合物的预报器。该测试被广泛用于研究烟草产品和烟草的烟雾的毒性。在此描述的本研究的目的为利用艾姆斯化验筛去导致杆菌属鼠伤寒沙门菌的 TA98 菌株中突变的本发明烟凝结物。选择菌株 TA98 是因为其为鼠伤寒沙门菌的最敏感菌株之一，并且可检测大量的诱变剂。如果检测到剂量依赖的反应，烟凝结物被认为导致该菌株的突变。

[0119] 测试设备。测试物品准备（例如，“吸烟”和提取）、化学成分分析和遗传毒性在阿里斯塔实验室实施，1941 雷梅特路，弗吉尼亚州 23237。

NJOY Exhibit 1002.471

[0120] 测试物品提取准备。每次重复使用连接到自动旋转吸烟机器 (Borgwaldt RM-20CSR) 上的本发明的吸烟装置吸三个盒，自动旋转吸烟器 (Borgwaldt RM-20CSR) 使用如下参数 :1) 喷出 55ml 的体积 ;2) 喷出持续 30 秒和根据 ISO 标准的空气流。总颗粒物 (TPM) 相被收集到 44mm 剑桥过滤垫上并且提取至二甲基亚砜 (DMSO) 中。提取后紧接着，TPM 样品被等分入单独琥珀瓶，并且在通过艾姆斯化验测试之前，在小于或等于 -70℃下保存大于等于 48 小时。一旦解冻并且用于测试，TPM 提取物不被再使用或再冷冻。

[0121] 致突变性测试 (艾姆斯化验)。艾姆斯化验在三个独立“吸烟”期间产生的 TPM 提取物上完成。该化验根据依据阿里斯塔标准操作程序 #TOX001 完成。被测试的 TPM 样品一式三份外加外生新陈代谢的激活系统 (S9)。对于每个重复样品，范围从 0-2000μgTPM 每平皿的微粒相的十个浓度都在每个浓度下的三个平皿中的最小一个被测试。同时执行对菌株特定正控制 (带有和没有 S9) 和 KY2R4F 参照香烟凝结物的单一浓度 (例如，100μg) 的测试。化验是根据《加拿大卫生部官方方法 501》，第二版，2004-11-01，阿里斯塔标准操作程序 #TOX001 进行的。艾姆斯分析的结果显示在图 16 中。每次测试同时进行的并且与细菌菌株和培养条件有关的媒介物控制和正控制，KY2R4F 和自发的回复突变都在期望的实验室控制限度内或者研究负责人认为科学上可接受。

[0122] 结果。如图 16 显示，研究发现“吸”本发明装置所产生的总颗粒物 (TPM) 没有剂量依赖影响。此外，所有的 TPM 样品显示比控制的速率一半还少的回复突变速率。相反，根据“1R4F”Kentucky 参考香烟的公布数据，具有普通烟草和过滤器组成的香烟，产生 TA98 测试菌株的呈正斜率趋势。参见 D.W.Bombick et al.,“Chemical and Biological Studies of a New Cigarette that Primarily Heats Tobacco. 部分 3. In vitro toxicity of whole smoke,”Food and Chemical Toxicology,36 :183-190(1997).

[0123] 虽然在此示出和描述了本发明优选的实施例，仅仅作为例子提供的那些实施例对本领域技术人员来说是显而易见的。本领域技术人员在不脱离本发明的范围内将立刻想到很多变化、改变和替代。应当理解，在此描述的本发明实施例的各种选择可在本发明的实践中使用。随后的权利要求目的为定义本发明的范围，并且在这些权利要求范围内的方法和结构和那些等同替代在此被覆盖。

NJOY Exhibit 1002.472

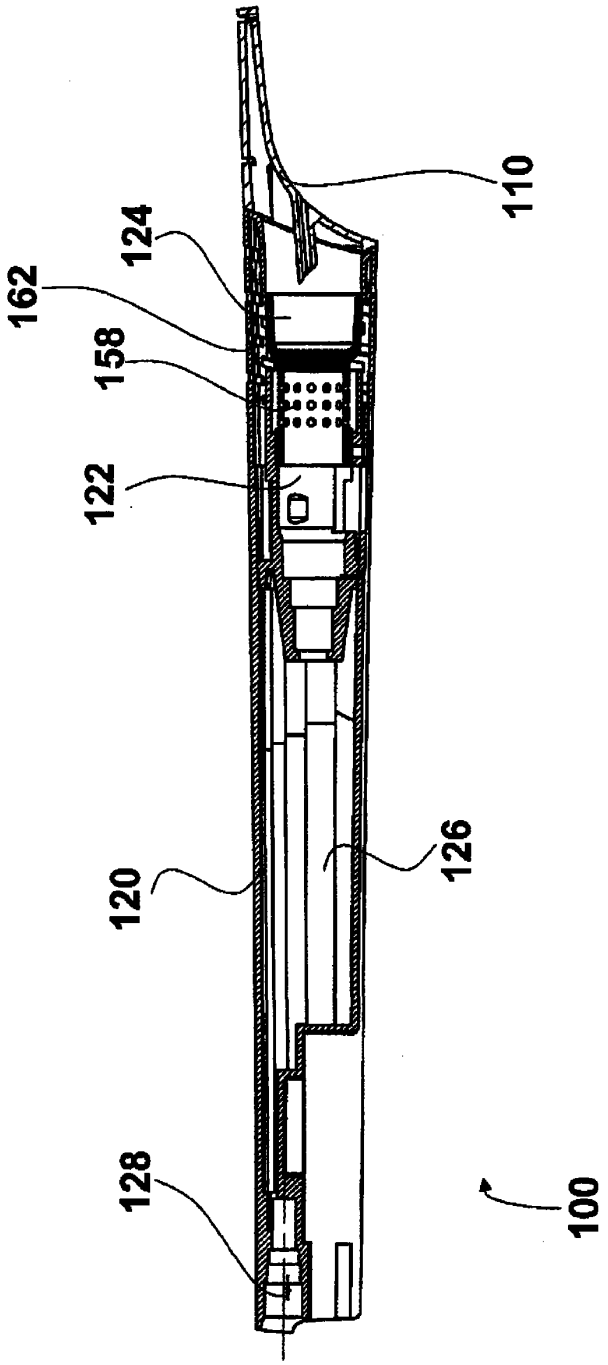

图 1

NJOY Exhibit 1002.473

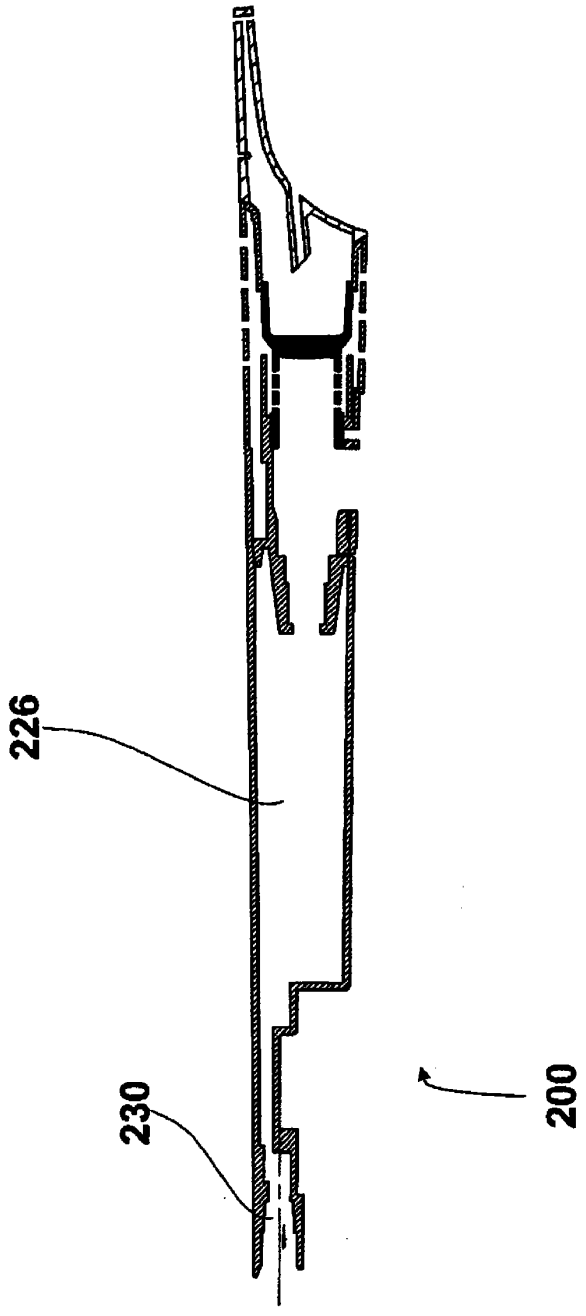

图 2

NJOY Exhibit 1002.474

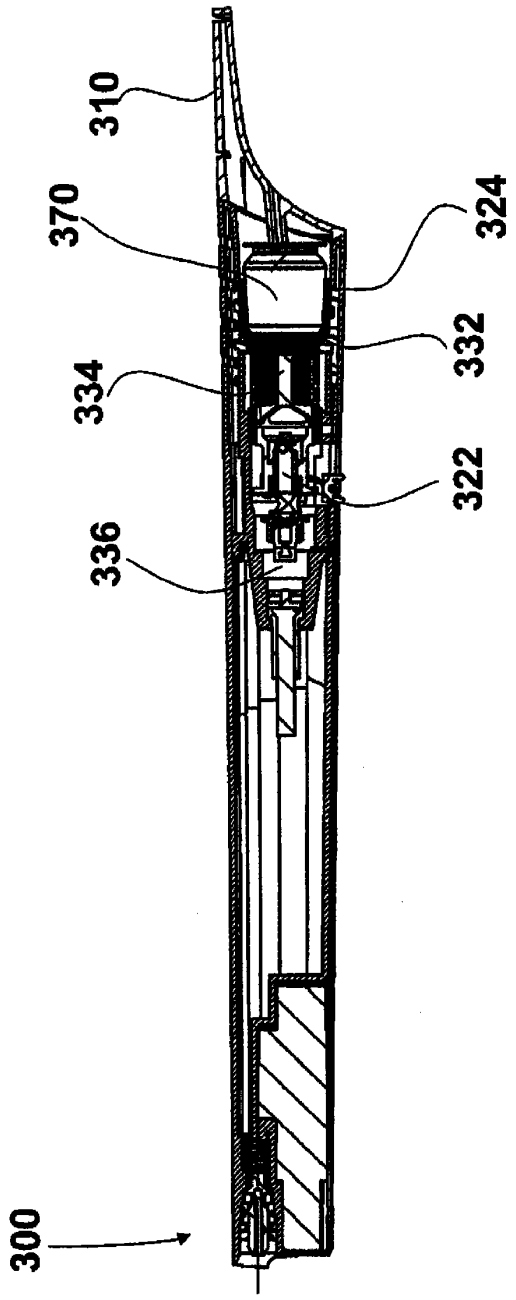

图 3

NJOY Exhibit 1002.475

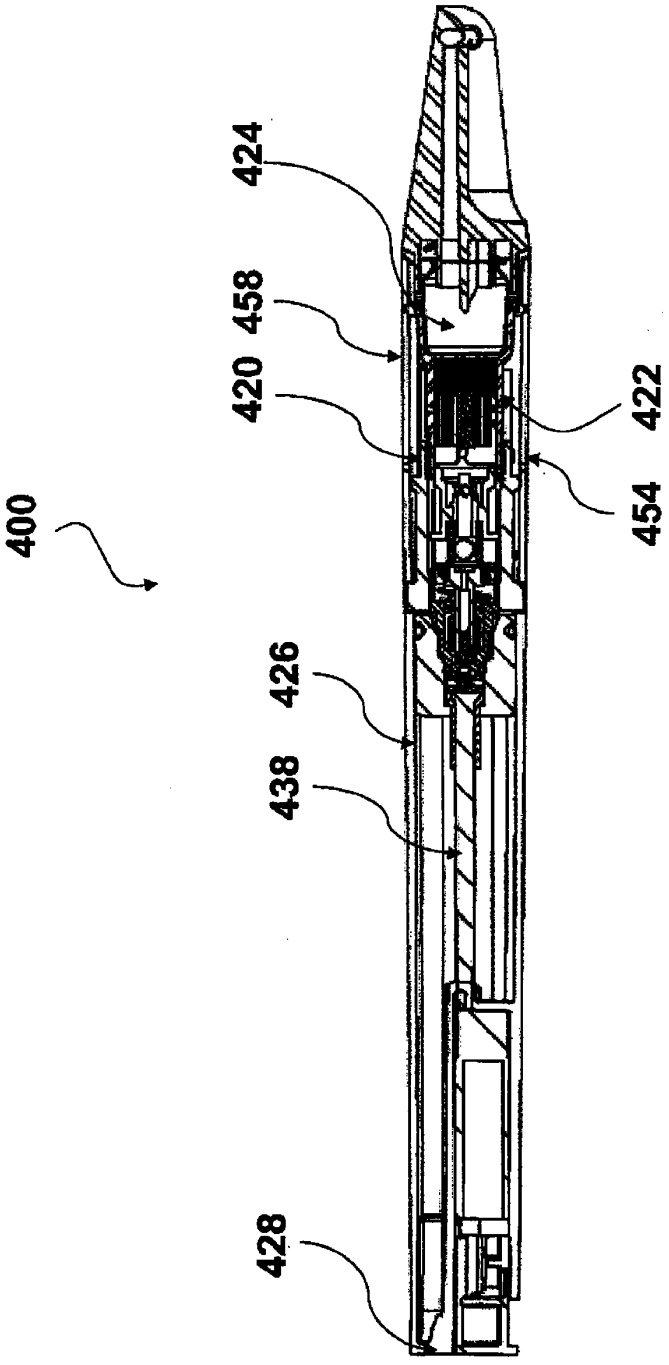

图 4

NJOY Exhibit 1002.476

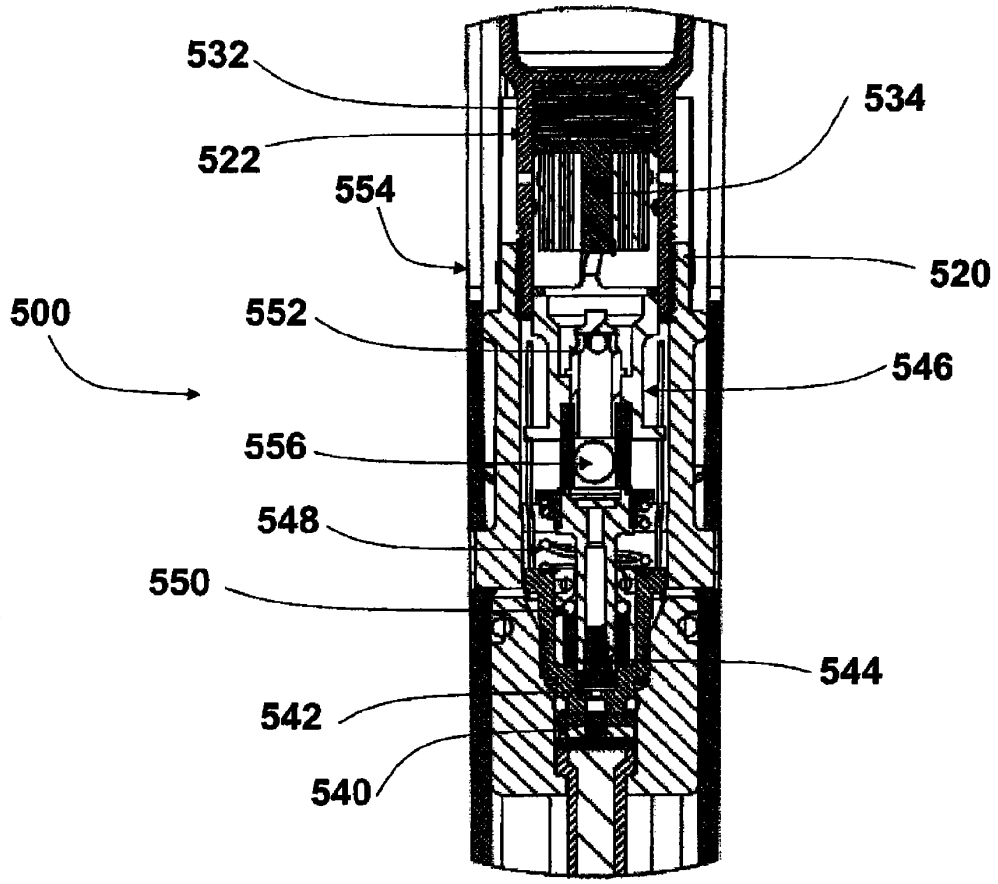

图 5

NJOY Exhibit 1002.477

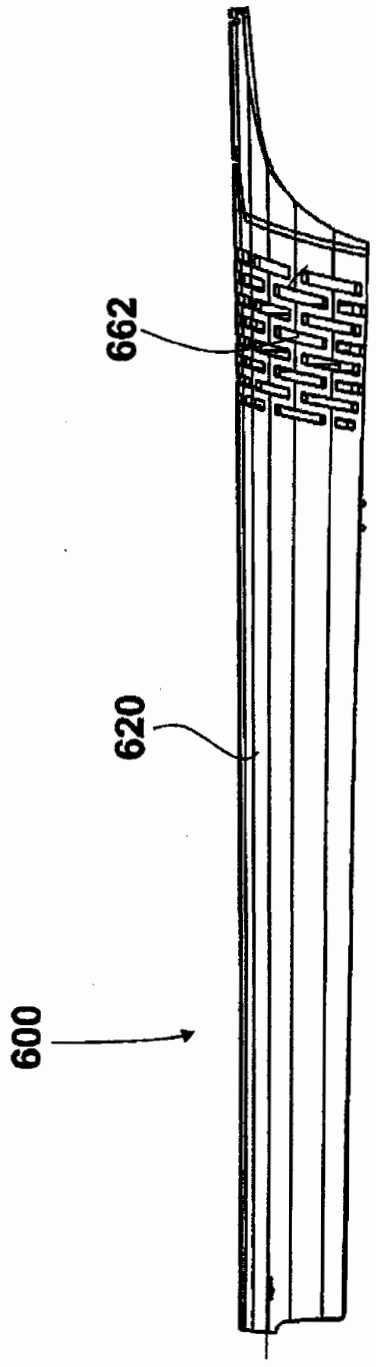

图 6

NJOY Exhibit 1002.478

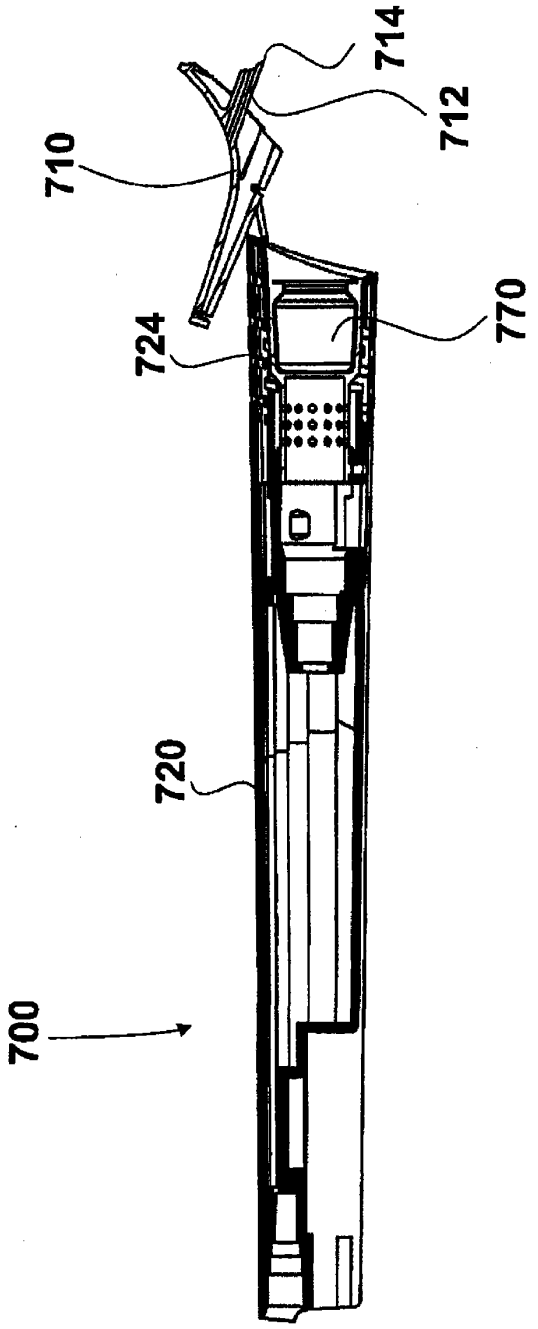

图 7

NJOY Exhibit 1002.479

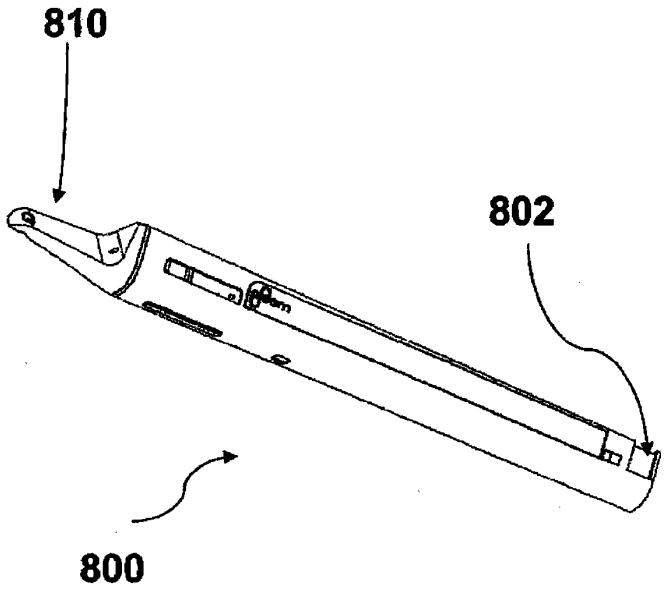

图 8A

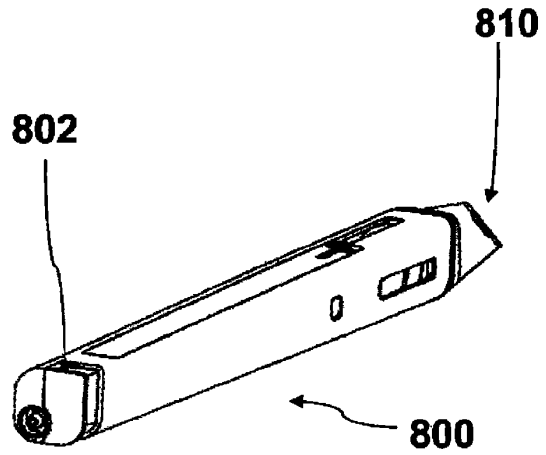

图 8B

NJOY Exhibit 1002.480

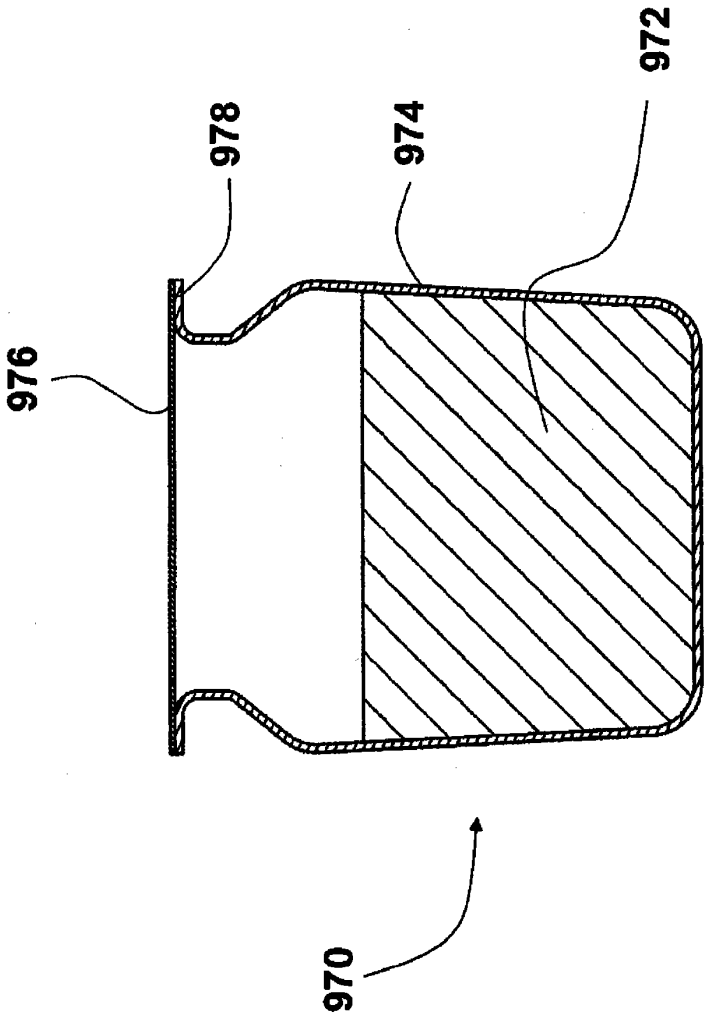

图 9

NJOY Exhibit 1002.481

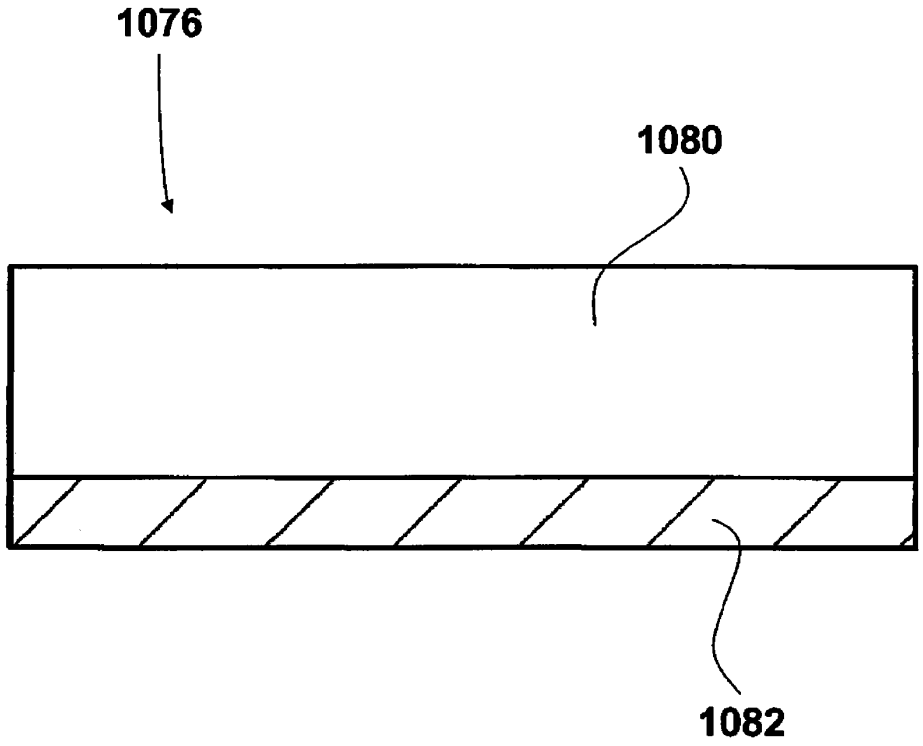

图 10

NJOY Exhibit 1002.482

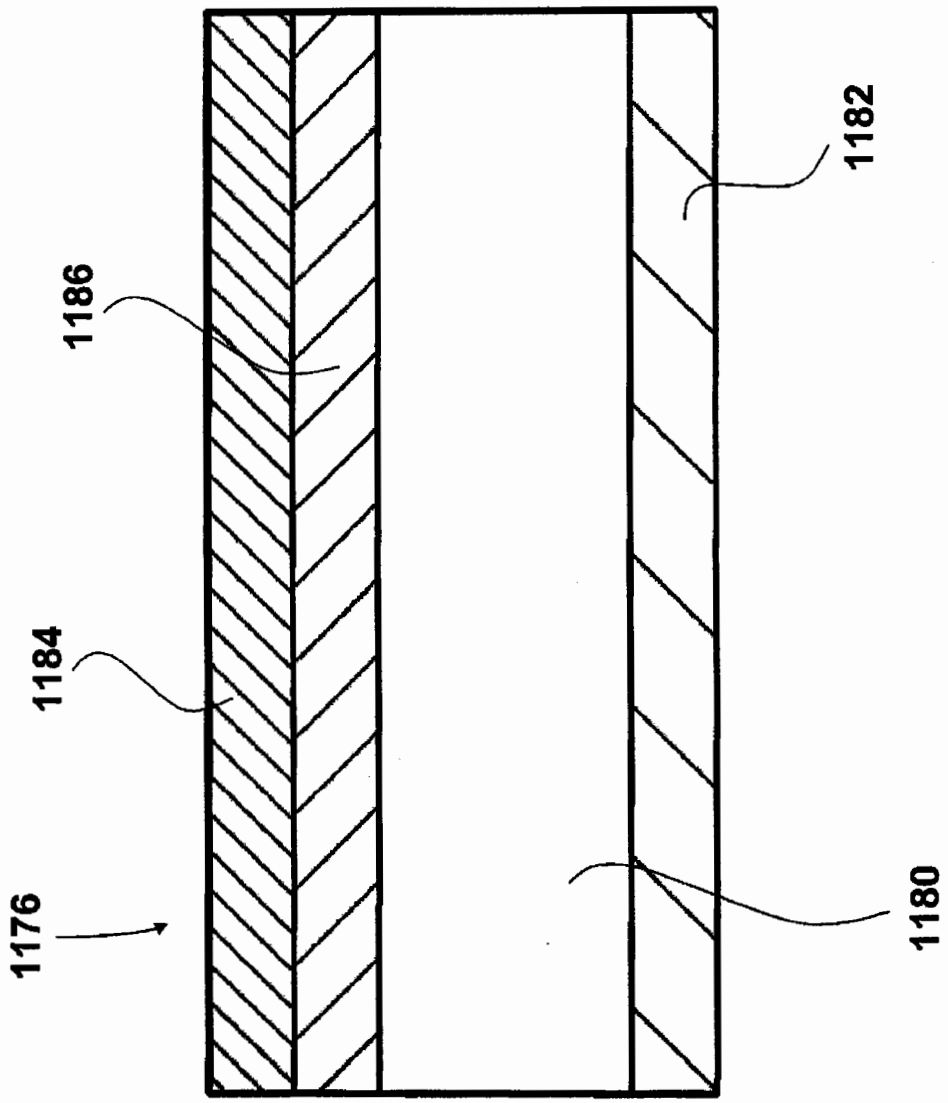

图 11

NJOY Exhibit 1002.483

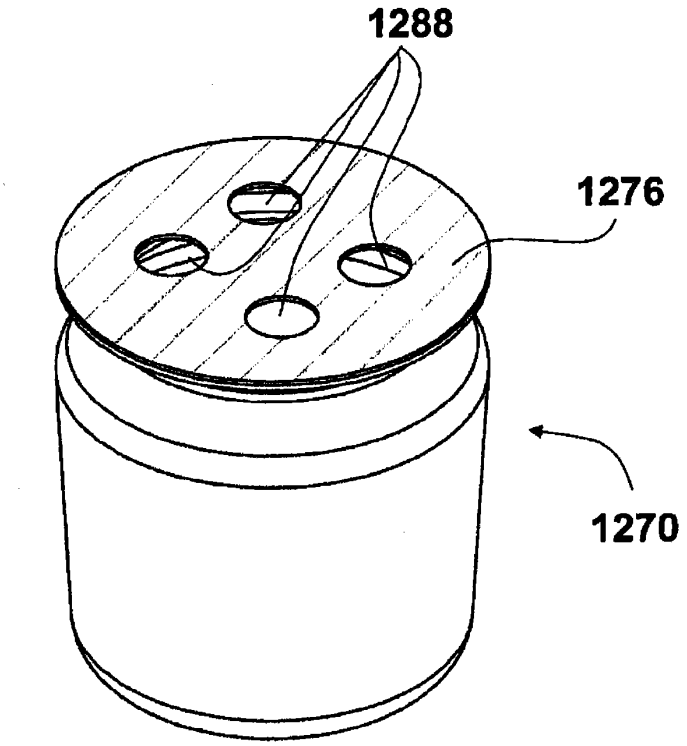

图 12

NJOY Exhibit 1002.484

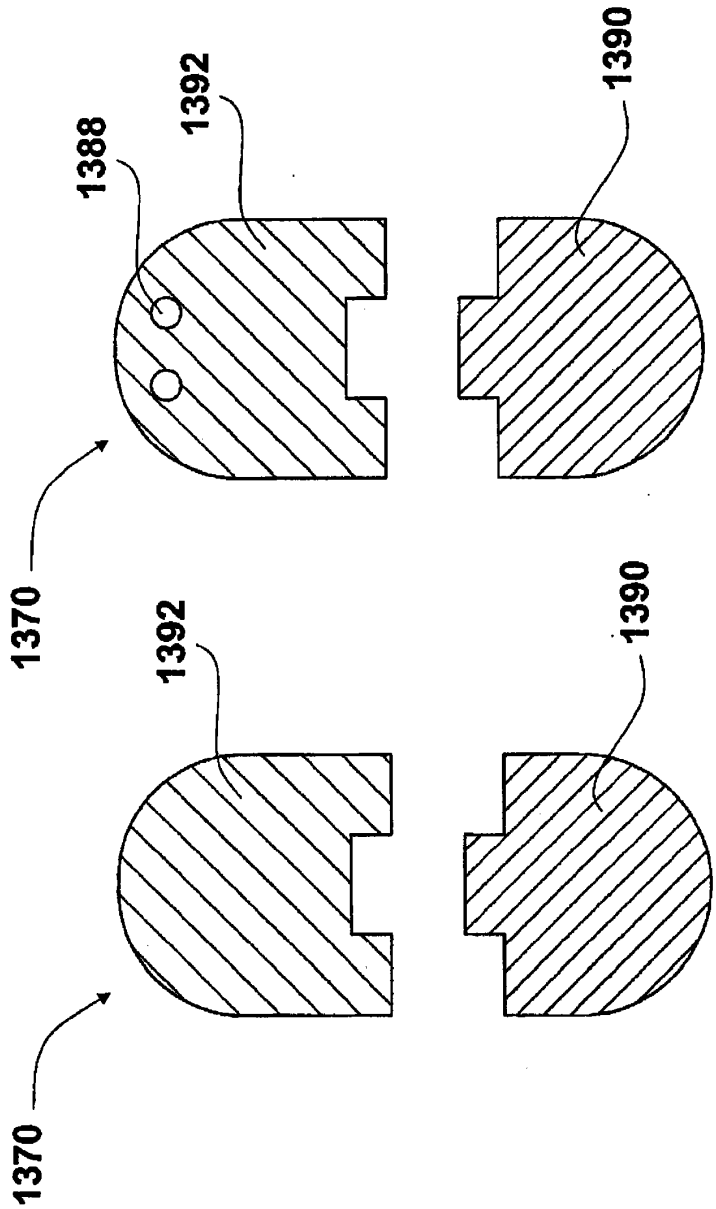

图 13A

图 13B

NJOY Exhibit 1002.485

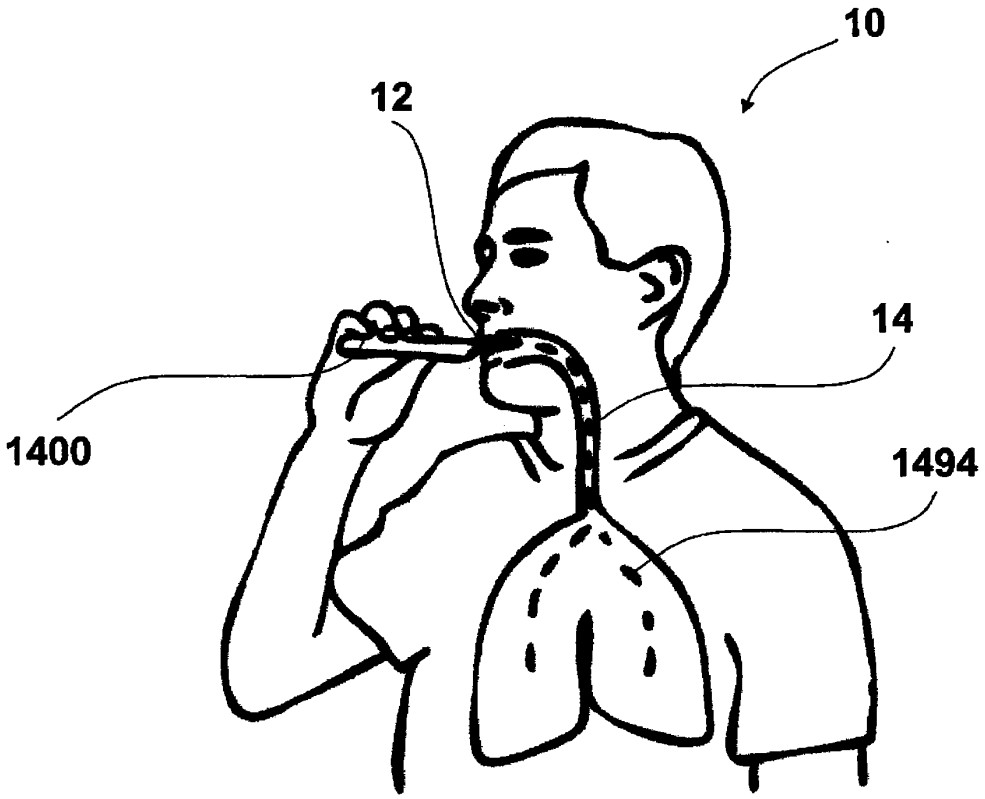

图 14

NJOY Exhibit 1002.486

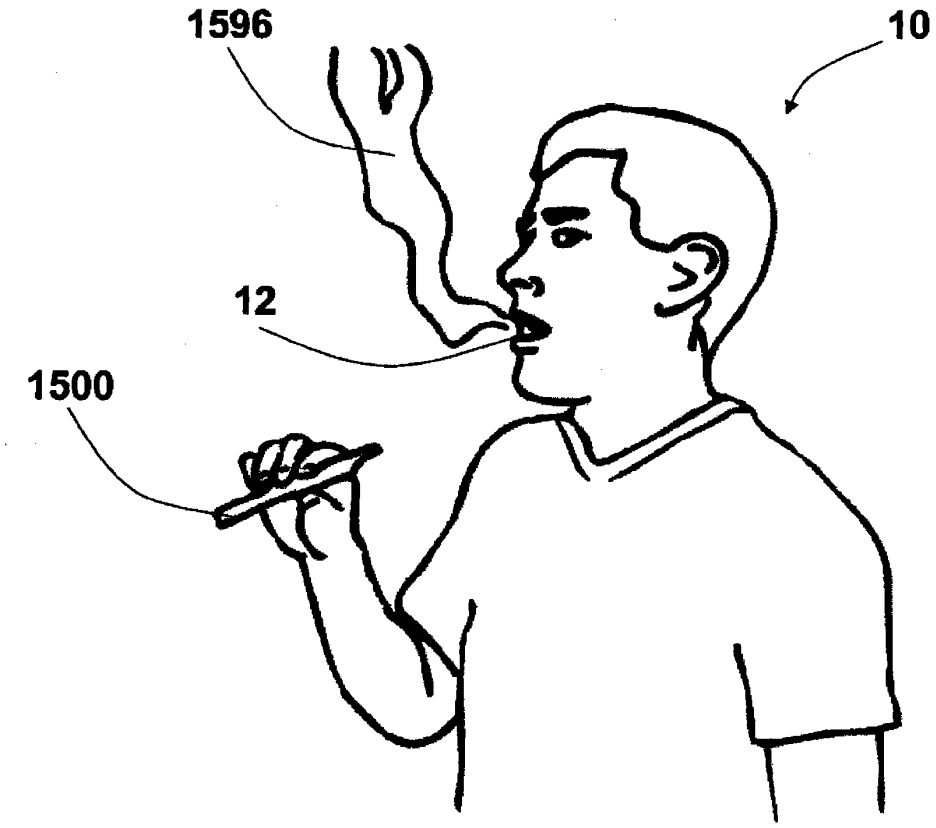

图 15

NJOY Exhibit 1002.487

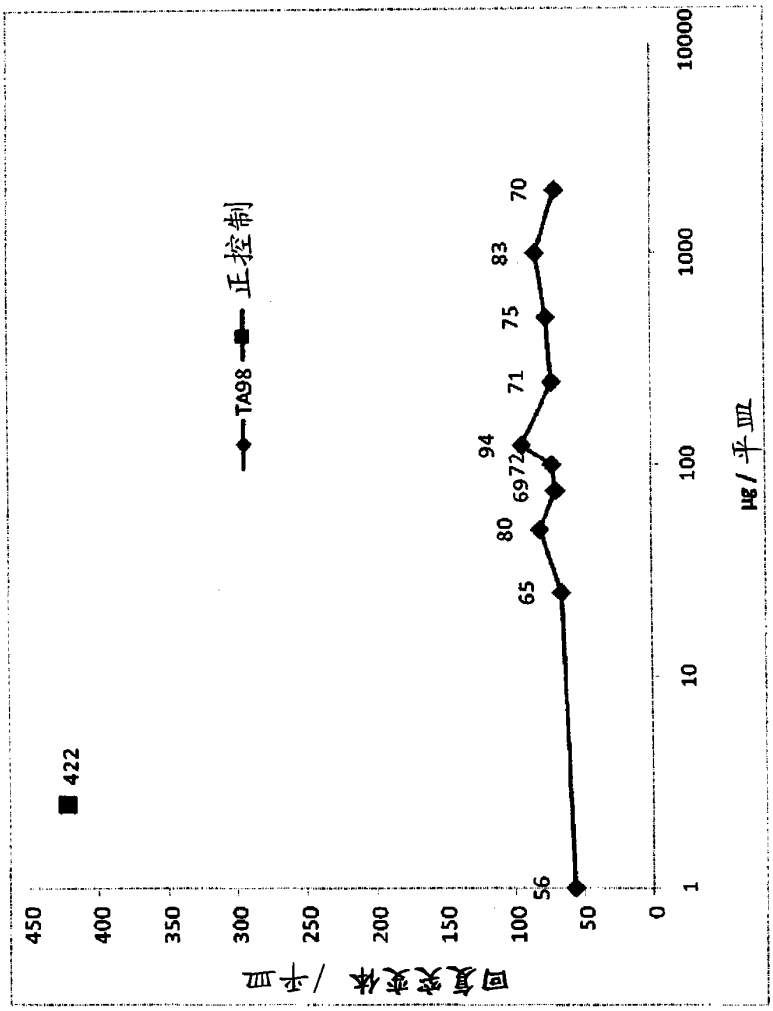

图 16

NJOY Exhibit 1002.488

Espacenet

Bibliographic data: CN102160906 (A) — 2011-08-24

Oral-suction type portable atomizer

Inventor(s): WEIHUA QIU ± (QIU WEIHUA)

Applicant(s): CHANGZHOU FUAI IMP & EXP CO LTD ± (CHANGZHOU FUAI IMPORT & EXPORT CO., LTD)

Classification: - international: ***A61M11/00; A61M15/00***
- cooperative: **A24F47/008**; **A61M11/041**; **A61M11/042**; **A61M15/0081**; **A61M15/06**; A61M11/005; A61M2205/276; A61M2205/3653; A61M2205/70; A61M2205/8268

Application number: CN20101527480 20101101 Global Dossier

Priority number(s): CN20101527480 20101101

Also published as: CN102160906 (B) EP2489391 (A1) EP2489391 (A4) EP2489391 (B1) ES2555410 (T3) more

Abstract of CN102160906 (A)

The invention discloses an oral-suction type portable atomizer. In the atomizer, a nozzle is arranged at one end of a shell; a liquid storage box with a liquid storage cavity is arranged inside the shell, and one end of the liquid storage box is connected with an atomizing device; the atomizing device comprises an atomizing component which comprises a liquid suction nozzle seat and a heat device; one end of the liquid suction nozzle seat is provided with an atomizing cavity, and a vent pore communicated with the atomizing cavity is formed at the other end of the liquid suction nozzle seat; the heat device is fixed in the atomizing cavity, and comprises a liquid guiding component; the liquid guiding component comprises a liquid suction nozzle and a liquid guiding wire; one end of the liquid suction nozzle is inserted in the liquid storage cavity of the liquid storage box, and liquid sealing is formed on the contact part of the liquid suction nozzle and the liquid storage box; the other end of the liquid suction nozzle is communicated with the atomizing cavity of the liquid suction nozzle seat; the liquid guiding wire is wound on the heat device; and two end parts of the liquid guiding wire are introduced into the liquid suction nozzle. By the atomizer, a stored medicinal liquid can be uniformly introduced to the heat device, and a user can use a fresher medicinal liquid.

NJOY Exhibit 1002.489

NJOY Exhibit 1002.490

(19)中华人民共和国国家知识产权局

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(51)Int.Cl.
A61M 11/00(2006.01)
A61M 15/00(2006.01)

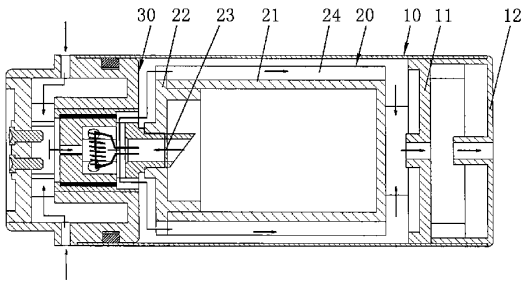
权利要求书 3 页 说明书 6 页 附图 4 页

(54)发明名称

口吸式便携雾化器

(57)摘要

本发明公开了一种口吸式便携雾化器，壳体的一端设置吸嘴，壳体内部设置具有储液空腔的储液盒，该储液盒一端连接一个雾化装置；雾化装置包括雾化组件，雾化组件包括吸液嘴座以及发热装置，所述吸液嘴座一端设有雾化腔，吸液嘴座的另一端设有与雾化腔连通的通气孔，所述发热装置固定在该雾化腔中；雾化装置还包括导液组件，该导液组件包括吸液嘴以及导液绳，吸液嘴的一端插入到储液盒的储液空腔中，吸液嘴与储液盒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，所述导液绳缠绕在发热装置上，导液绳的两个端部被引入到吸液嘴中。本发明能将存储的药液均匀地引导到加热装置上，并且使用者能够使用到较为新鲜的药液。



CN 102160906 A

NJOY Exhibit 1002.491

1. 口吸式便携雾化器，壳体的一端设置吸嘴，壳体内部设置具有储液空腔的储液盒，该储液盒一端连接一个雾化装置；雾化装置包括雾化组件，雾化组件包括吸液嘴座以及发热装置，所述吸液嘴座一端设有雾化腔，吸液嘴座的另一端设有与雾化腔连通的通气孔，所述发热装置固定在该雾化腔中；

其特征在于：雾化装置还包括导液组件，该导液组件包括吸液嘴以及导液绳，吸液嘴的一端插入到储液盒的储液空腔中，吸液嘴与储液盒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，所述导液绳缠绕在发热装置上，导液绳的两个端部被引入到吸液嘴中。

2. 根据权利要求 1 所述的口吸式便携雾化器，其特征在于：所述导液组件还包括可以存储大直径悬浮液滴的导液套，该导液套套在吸液嘴座上，所述吸液嘴座的侧壁上设有与雾化腔连通的导液孔；所述雾化组件还包括一个套管，该套管套在导液套上。

3. 根据权利要求 1 所述的口吸式便携雾化器，其特征在于：储液盒包括盒体以及与盒体连接的盒盖，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，液体隔离膜被吸液嘴刺破后与吸液嘴之间形成液密封。

4. 根据权利要求 1 所述的口吸式便携雾化器，其特征在于：所述储液盒的外侧壁面上设有供气体通过的气流通道。

5. 根据权利要求 1 所述的口吸式便携雾化器，其特征在于：所述吸液嘴包括导液管以及座体，导液管的一端与座体连接，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。

6. 根据权利要求 1 至 5 任意一项所述的口吸式便携雾化器，其特征在于：所述雾化装置还包括固定在壳体另一端的连接组件，该连接组件包括雾化器主体、通过导线连接发热装置的接触导体，所述雾化器主体的位于壳体中的一端形成有容纳并保持雾化组件的腔体，接触导体固定在雾化器主体的外露于壳体的另一端，雾化器主体的侧壁上设有与腔体连通的进气孔。

7. 根据权利要求 6 所述的口吸式便携雾化器，其特征在于：所述雾化器主体的外露于壳体的端部连接一个供电装置，该供电装置包括外壳，以及设置在外壳中的电池、控制电路以及接触顶针，控制电路的输出端连接接触顶针，接触顶针与接触导体插拔连接。

8. 根据权利要求 7 所述的口吸式便携雾化器，其特征在于：所述控制电路包括按键开关，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，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。

9. 根据权利要求 8 所述的口吸式便携雾化器，其特征在于：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，以及用于指示控制电路工作状态的发光二极管，检测器及发光二极管分别与单片机连接。

10. 一种用于雾化器的控制电路，其特征在于：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；

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以及与单片机输出端连接的具有信号放大作用的晶体管。

11. 根据权利要求 10 所述的口吸式便携雾化器，其特征在于：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电压检测器，以及用于指示控制电路工作状态的发光二极管，电压检测器及发光二极管分别与单片机连接。

12. 一种如权利要求 10 所述的雾化器的控制方法，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。

13. 一种如权利要求 12 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，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。

14. 一种如权利要求 13 所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，则通过检测器判电路是否短路，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。

15. 一种如权利要求 14 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。

16. 一种如权利要求 10 所述的雾化器的控制方法，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 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

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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。

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口吸式便携雾化器

技术领域

[0001] 本发明涉及一种雾化装置，具体涉及一种口吸式便携雾化器。

背景技术

[0002] 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。

[0003] 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。

[0004] 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

[0005] 本发明的目的在于提供一种口吸式便携雾化器，本发明能将存储的药液均匀地引导到加热装置上，并且使用者能够使用到较为新鲜的药液。

[0006] 实现本发明目的的技术方案如下：

[0007] 口吸式便携雾化器，壳体的一端设置吸嘴，壳体内部设置具有储液空腔的储液盒，该储液盒一端连接一个雾化装置；雾化装置包括雾化组件，雾化组件包括吸液嘴座以及发热装置，所述吸液嘴座一端设有雾化腔，吸液嘴座的另一端设有与雾化腔连通的通气孔，所述发热装置固定在该雾化腔中；

[0008] 雾化装置还包括导液组件，该导液组件包括吸液嘴以及导液绳，吸液嘴的一端插入到储液盒的储液空腔中，吸液嘴与储液盒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，所述导液绳缠绕在发热装置上，导液绳的两个端部被引入到吸液嘴中。

[0009] 采用了上述方案，由于本发明的储液盒中无填充物，因此，使用者使用的药液较为新鲜。导液绳的两个端部被引入到吸液嘴中，导液绳不但可以封住储液盒中的药液，使药液

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在重力的作用下不会顺着吸液嘴流动到雾化腔中，而且在负压作用下还能将储液盒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。

[0010] 另外，通过导液套，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。

[0011] 本发明的另一目的是：为了避免误操作而使按键开关接通，还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：

[0012] 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；

[0013] 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；

[0014] 以及与单片机输出端连接的具有信号放大作用的晶体管。

[0015] 雾化器的控制方法，包括以下步骤：

[0016] 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；

[0017] 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；

[0018] 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。

[0019] 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

[0020] 图 1 为本发明的雾化器的结构示意图；

[0021] 图 2 为本发明中雾化装置的结构示意图；

[0022] 图 3 为本发明的雾化器与供电装置的装配结构示意图；

[0023] 图 4 为本发明中的控制电路的原理图；

[0024] 图 5 为控制电路的流程图；

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[0025] 附图中，10 为壳体，11 为吸嘴前盖，12 为吸嘴后盖；

[0026] 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；

[0027] 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；

[0028] 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

[0029] 下面结合附图和具体实施方式对本发明作进一步说明。

[0030] 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。

[0031] 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。

[0032] 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。

[0033] 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。

[0034] 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 主要是与大气相互连通，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。

[0035] 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

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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。

[0036] 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。

[0037] 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。

[0038] 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。

[0039] 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。

[0040] 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

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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。

[0041] 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；

[0042] 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；

[0043] 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。

[0044] 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。

[0045] 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。

[0046] 实施方式一：

[0047] 包括以下步骤：

[0048] 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；

[0049] 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。

[0050] 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。

[0051] 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。

[0052] 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

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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；

[0053] 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；

[0054] 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；

[0055] 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；

[0056] 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；

[0057] 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。

[0058] 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；

[0059] 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；

[0060] 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；

[0061] 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。

[0062] 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。

[0063] 实施方式二：

[0064] 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。

[0065] 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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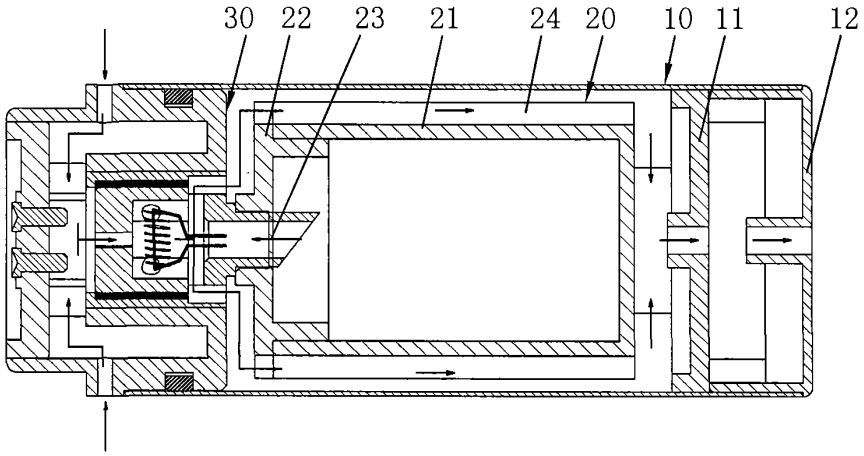

图 1

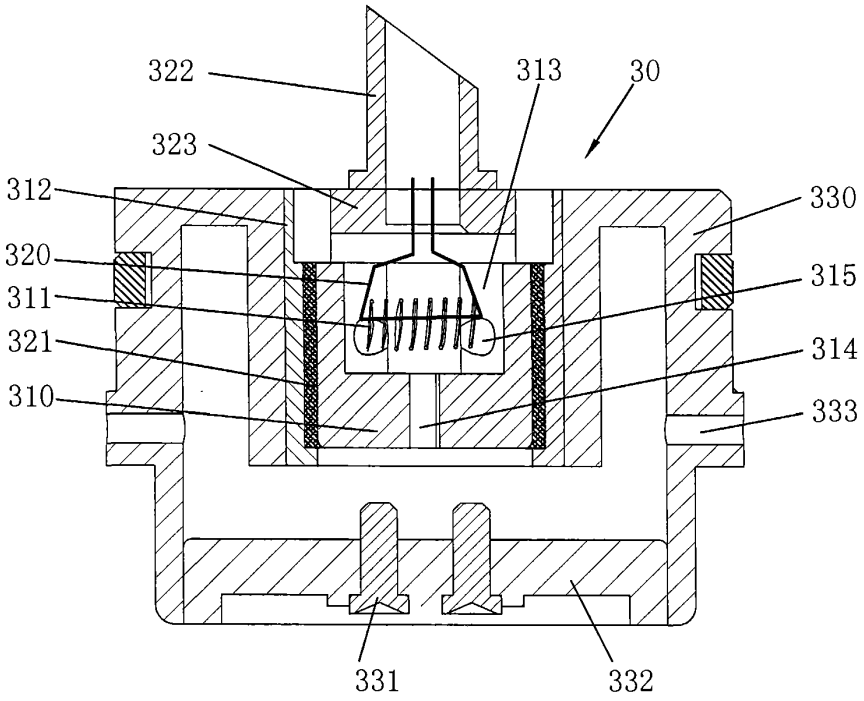

图 2

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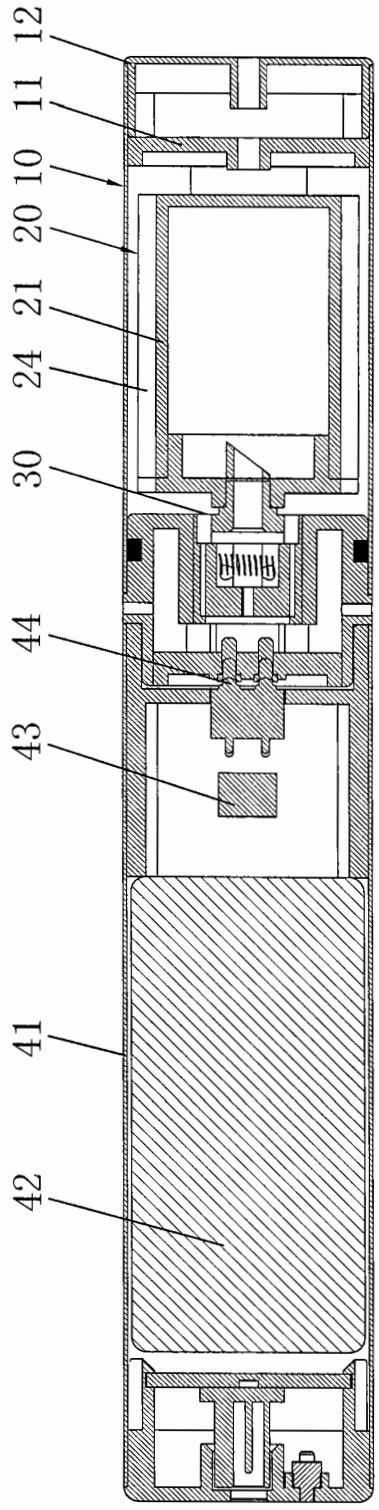

图 3

NJOY Exhibit 1002.502

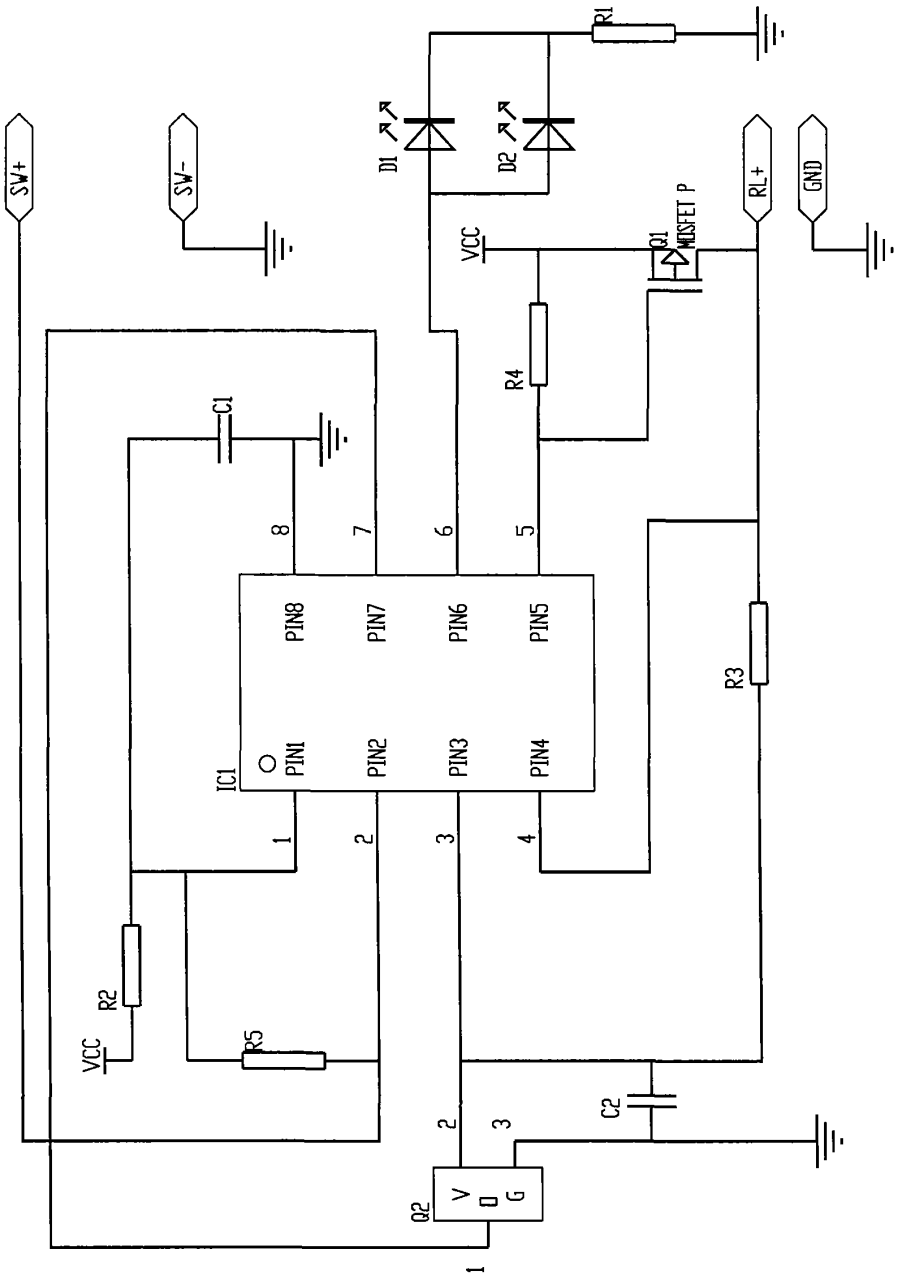

图 4

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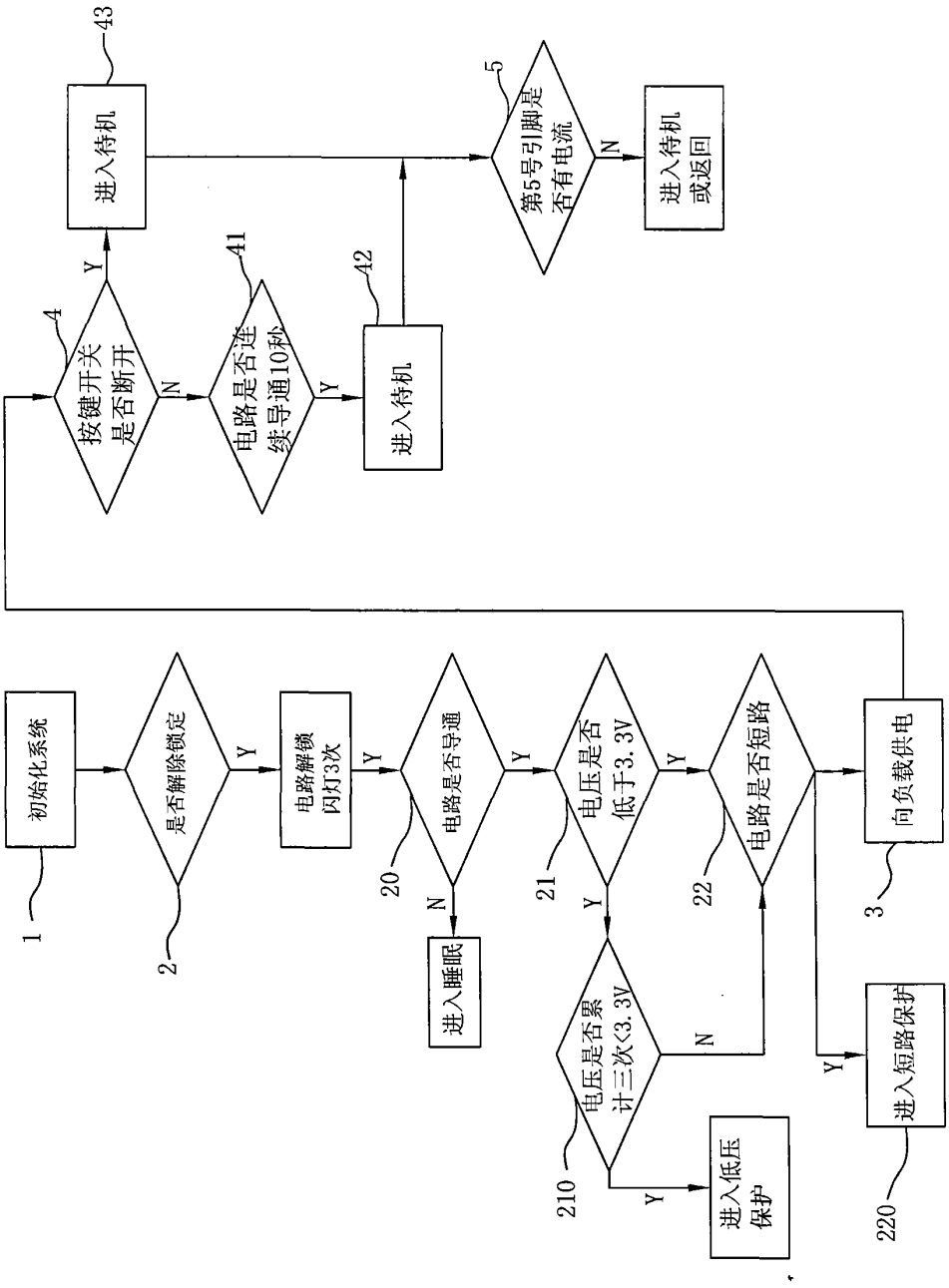

图 5

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Espacenet

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Inhaler

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Applicant(s): VECTURA DELIVERY DEVICES LTD ± (VECTURA DELIVERY DEVICES LTD)

Classification: **- international:** ***A61M15/00***
- cooperative: **A61M11/003**; **A61M15/0021**; **A61M15/0036**; **A61M15/0045**; **A61M15/0051**; A61M2202/064; A61M2206/16

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Abstract of CN102176941 (A)

An inhaler (1) for producing an inhalable aerosol of powdered medicament is disclosed. The inhaler (1) comprises an aerosolising device having a cyclone chamber (45) of substantially circular cross-section, inlet (24) and outlet (25) ports at opposite ends of the chamber (45) for the flow of drug laden air through the chamber (45) between said ports (24, 25) and, a bypass air inlet (46) for the flow of clean air into the chamber (45). The bypass air inlets (46) are configured so that air entering the chamber (45) through said inlet (46) forms a cyclone in the chamber (45) that interacts with the drug laden air flowing between the inlet (24) and outlet (25) ports. The inhaler (1) may have a tapered drug laden air flow conduit (70) to accelerate the flow prior to entry into the chamber (45) and/or an impaction element (81, 84, 92, 105) to deagglomerate drug particles.

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A61M 15/00(2006.01)

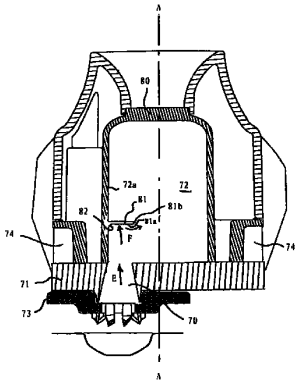
权利要求书 2 页 说明书 24 页 附图 13 页

(54)发明名称

吸入器

(57)摘要

本发明公开了一种用于产生粉末状药物的可吸入气溶胶的吸入器(1)。该吸入器(1)包括气溶胶化装置，该装置具有基本圆形截面的旋风室(45)、位于旋风室(45)两端的入口(24)和出口(25)、以及旁路空气入口(46)，所述进口(24)和出口(25)用于使载药空气流在所述口(24、25)之间通过旋风室(45)，且所述旁路空气入口(46)用于使清洁空气流进入旋风室(45)。旁路空气入口(46)配置为使通过所述旁路空气入口(46)进入旋风室(45)的空气在旋风室(45)中形成气旋，该气旋与在入口(24)和出口(25)之间流动的载药空气相互作用。所述吸入器(1)可具有锥形的载药空气流导管(70)以便在进入旋风室(45)之前和/或在用于解聚药物粒子的撞击元件(81、84、82、105)之前加速气流。



CN 102176941 A

NJOY Exhibit 1002.506

1. 一种产生粉末状药物的可吸入气溶胶的吸入器，所述吸入器包括气溶胶化装置，所述气溶胶化装置具有基本圆形截面的旋风室、位于该旋风室两端的入口和出口、以及旁路空气入口，所述入口和出口用于使载药空气流在所述口之间通过旋风室，且所述旁路空气入口用于使清洁空气流进入旋风室，所述旁路空气入口配置为使通过所述旁路空气入口进入旋风室的空气在旋风室中形成气旋，该气旋与在所述入口和出口之间流动的载药空气相互作用。

2. 根据权利要求 1 所述的吸入器，其中所述旁路空气入口配置为使旁路空气通过基本相切于旋风室壁的所述旁路空气入口进入旋风室。

3. 根据权利要求 1 或 2 所述的吸入器，其中配置两个直接相对的旁路空气入口以使旁路空气通过基本相切于旋风室壁的每个旁路空气入口进入旋风室。

4. 根据前述权利要求中任一项所述的吸入器，其包括通向所述入口的载药空气流导管，且载药空气在旋风室入口之前通过该载药空气流导管流动。

5. 根据权利要求 4 所述的吸入器，其中所述载药空气流导管在朝向所述入口的方向上至少部分为锥形的。

6. 根据权利要求 4 或权利要求 5 所述的吸入器，其中所述入口偏离所述旋风室的纵轴。

7. 根据权利要求 4-6 中任一项所述的吸入器，其包括撞击元件，所述撞击元件定位为使得所述载药空气流中的至少一些药物粒子撞击所述撞击元件。

8. 根据权利要求 7 所述的吸入器，其中所述撞击元件是旋风室。

9. 根据权利要求 8 所述的吸入器，其中所述撞击元件定位于所述入口上方以使药物粒子在所述旋风室的入口处撞击所述撞击元件。

10. 根据权利要求 8 或权利要求 9 所述的吸入器，其中所述撞击元件包括具有撞击表面的板，所述板在与通过入口进入旋风室的载药空气的流动方向基本成直角的平面中延伸。

11. 根据权利要求 10 所述的吸入器，其中所述板包括叶片，所述叶片的边缘具有倒角或锥度以将对旋风室内气流的破坏减到最小。

12. 根据权利要求 7-11 中任一项所述的吸入器，当从属于权利要求 5 时，其中所述撞击元件在所述偏离入口上方从所述旋风室的侧壁向内径向延伸，由此使其直接位于气旋气流内部，所述气旋气流是由进入所述旁路空气入口的旁路空气产生的。

13. 根据权利要求 12 所述的吸入器，其中所述撞击元件包括撞击表面，药物粒子针对该撞击表面进行撞击，所述撞击表面与旋风室的侧壁相汇合，并从该侧壁以平滑曲线延伸。

14. 根据权利要求 7 所述的吸入器，其中所述出口由网眼形成。

15. 根据权利要求 14 所述的吸入器，其中所述撞击元件在所述网眼中形成。

16. 根据前述权利要求中任一项所述的吸入器，其中所述入口由解聚网眼形成，由此使载药空气通过所述网眼流入旋风室。

17. 根据前述权利要求中任一项所述的吸入器，其包括外壳和与所述外壳铰接的促动器，所述外壳容纳了含有用于吸入的药物剂量的可刺穿泡囊，所述促动器具有喷嘴，使用者通过该喷嘴吸入药物剂量，其中所述促动器是可铰接的，以便使泡囊刺穿构件刺穿泡囊的盖子，旋风室位于该促动器中。

18. 根据权利要求 17 所述的吸入器，其中所述外壳配置为容纳泡囊条带，每个泡囊均含有用于吸入的药物剂量，所述促动器也配置为将每个泡囊依次移动为与所述泡囊刺穿构

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件对齐，以使泡囊刺穿构件刺穿所对齐的泡囊的盖子。

19. 根据权利要求 17 所述的吸入器，其包括位于喷嘴内的促动器插入物，所述旋风室和旁路空气入口由所述插入物形成。

20. 根据权利要求 19 所述的吸入器，其中所述出口在所述插入物中形成。

21. 根据权利要求 19 所述的吸入器，其中所述旋风室和旁路空气入口包括在所述插入物中的凹穴，且所述促动器包括位于所述喷嘴中并在所述插入物上延伸以封闭所述凹穴的板。

22. 根据权利要求 21 所述的吸入器，其中所述入口包括在所述板中的孔，其用于使载药空气流入旋风室。

23. 根据权利要求 22 所述的吸入器，其中所述刺穿构件与所述促动器相连，且在所述板上延伸。

24. 根据权利要求 23 所述的吸入器，当从属于权利要求 4-6 中任一项时，其中所述载药空气流导管至少部分在所述刺穿构件中形成。

25. 根据权利要求 24 所述的吸入器，其中所述载药空气流导管在所述刺穿构件中和从所述刺穿构件延伸到所述旋风室的入口的通路中形成。

26. 根据权利要求 24 或权利要求 25 所述的吸入器，其中所述刺穿构件包括具有第一刺穿元件和第二刺穿构件的体部，所述第一刺穿元件在所述板上方延伸，且所述第二刺穿构件在所述板中的孔上方延伸，且所述载药空气流导管通过所述刺穿构件延伸以使载药空气流离开泡囊并通过所述板中的孔。

27. 根据权利要求 22-26 中任一项所述的吸入器，当从属于权利要求 6-10 中任一项时，其中所述撞击元件包括在所述板中的孔上方延伸的构件，所述构件由从该板上竖立的足来支撑。

28. 根据权利要求 22-27 中任一项所述的吸入器，当从属于权利要求 15 时，其中所述解聚网眼在所述板中形成。

29. 根据权利要求 17-28 中任一项所述的吸入器，其包括位于所述促动器上的定位销和位于所述插入物和板上以将该插入物和板定位于喷嘴内部的配合凸缘。

30. 根据权利要求 29 所述的吸入器，其中所述刺穿构件位于所述插入物和板上方的销上以将所述刺穿构件定位于促动器上。

31. 根据权利要求 17-30 中任一项所述的吸入器，其中所述旋风室在所述喷嘴的基本全部高度的轴向中延伸。

32. 根据权利要求 17-30 中任一项所述的吸入器，其中所述促动器在通往所述旋风室的出口处包括扩散器。

33. 根据前述权利要求中任一项所述的吸入器，其包括位于所述旋风室中的解聚元件。

34. 根据权利要求 33 所述的吸入器，其中所述解聚元件包括多个轮叶。

35. 根据权利要求 33 所述的吸入器，其中所述解聚元件包括装有叶片的元件，当使用者在喷嘴上吸气时，所述装有叶片的元件在所述旋风室内旋转。

36. 根据权利要求 33 所述的吸入器，其中所述解聚元件在旋风室内能自由移动。

37. 根据附图的基本如前所述的吸入器。

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吸入器

发明领域

[0001] 本发明涉及吸入器，特别是涉及用于将干粉药物递送到肺部的吸入器。

背景技术

[0002] 使用吸入装置进行的药物的经口或鼻递送是特别有吸引力的药物施用方法，因为对患者来说这些装置相对容易小心地和公开地使用。至于对治疗气道局部疾病及其它呼吸道问题的药物的递送，近年来已将其应用于将药物经肺递送到血流，从而避免了对皮下注射的需要。

[0003] 理想的是提供一种能够容纳多个单独剂量的吸入器，该吸入器能在一段时间内重复使用而无需在该装置每次使用时开启或向其中插入泡囊或胶囊。由公布为 WO 2005/037353A1 的申请人自己的在先申请中可知的装置通过以下方式解决了该问题，即，提供容纳有泡囊条带的外壳，其中每个泡囊均含有一剂药物。当吸入一剂时，转位机构将先前已排空的泡囊移动离开开口机构，由此将一个新的泡囊移动到准备好通过该装置上的刺穿元件开口的位置。在下文中参考附图中的图 1A 到 1E 更详细地描述由该文献可知的装置的一个实施方式。

[0004] 对于颗粒形式的药物，提供可吸入气溶胶需要能生产可重复剂量的微粒的吸入器。为使药物粒子能到达深肺区域（肺泡）并由此被吸收入血流中，所述粒子必须具有约 1 到 3 微米范围内的有效直径。包含该范围粒径的所排出的气溶胶部分被称为“微粒部分”(FPF)。如果粒子大于 5 微米，它们可能不能通过吸入气流而被输送深入肺部，因为它们很可能会在到达深肺之前就在呼吸道中被捕获。例如，10 微米左右的粒子不容易前进到远于气管，且 50 微米左右的粒子在被吸入时倾向于沉积在咽喉背侧。此外，如果粒子的有效直径于 1 微米，则该粒子不能被吸入肺部，因为其小到足以被呼出气流逐出肺部。

[0005] 干粉吸入器的效率可通过微粒量 (fine particles dose，FPD) 或 FPF 进行测量。FPD 是在促动从装置中排出的活性药剂的总质量，所述活性剂以小于规定限制的空气动力粒径存在。这一限制通常设为 5 微米，尽管出于在上面所提的原因优选直径小于 3 微米的粒子。使用冲击器 (impactor) 或碰撞取样器 (impinger) 来测量 FPD，诸如两级碰撞取样器 (TSI)、多级碰撞取样器 (MSI)、安得生级联碰撞计 (Andersen Cascade Impactor，ACI) 或新一代冲击器 (NGI)。每个冲击器或碰撞取样器均已预先测定了每个阶段的空气动力粒径收集分割点。通过以下方式获得 FPD 值：对逐级活性药剂回收率进行实验结果分析，所述逐级活性药剂回收率通过已证实的定量湿化学分析法来量化，在这里使用简单的级分割以测定 FPD 或使用更复杂的逐级沉淀的数学内插法。

[0006] FPF 通常定义为 FPD 除以所排出或递送的剂量，所述的排出或递送的剂量是在促动后从装置中排出的活性药剂的总质量，并且不包括沉积在装置内部或表面上粉末。然而，FPF 也可定义为 FPD 除以计量量 (metered dose)，其是存在于由所讨论的吸入器装置表达的计量量中存在的活性药剂的总质量。例如，计量量可为箔泡囊中存在的活性药剂的质量。

[0007] 在常规吸入器中，喷射量（进入患者气道的药物量）为从该吸入器中逐出的剂量

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的 80)-90％。然而，FPF 可能仅为喷射量的约 50％，但已知吸入器的可吸入剂量的变动可能为 ±20％ -30％。这样的变动在历史上对于哮喘药物等来说是可接受的，但管理机构现在要求对治疗呼吸道疾病产品具有更低的可变性。而且，应理解对于系统性小分子以及蛋白和肽类药物的肺部递送或者对于诸如胰岛素、生长激素或吗啡的药物的施用来说，这样的可吸入剂量变动量是不可接受的。这是因为非常重要的是确保患者在每次施用吸入器时接收到相同预计量的这种类型的药物，由此通过剂与剂之间最小的变动来实现可预期和已知的治疗效果。低可吸入剂量也表示一些剂量被保留在泡囊中，而这代表了对可能为昂贵的药物的明显浪费。

[0008] 因此，应理解对于系统性和局部的肺部递送，提供可吸入气溶胶需要能以高效率、精确和可重复的方式递送药物的吸入器，从而实现更可预期和一致的治疗效果，这使得对患者的任何可能有害的副作用最小化，并且减少了递送治疗剂量所需的昂贵药物的量。

[0009] 为确保粉末状药物以精确受控的粒子尺寸范围递送以使其能有效地在肺部中吸收，必须在这些粒子进入患者气道之前在其流经所述装置时将其解聚。

[0010] 人们已知通过在粒子之间产生剪切力来分离药物粒子，例如，通过在粒子之间提供相当大的速度梯度。实现该目标的一种方法是提供具有带有轴向出口和切向入口的旋风室的吸入器。将药物夹带在气流中并允许其通过切向入口进入旋风室。粒子在气流中绕旋风室旋转时在粒子之间产生的高剪切力足以在粒子聚集体通过出口离开旋风室之前破坏这些粒子聚集体。从申请人自己的已授权在先欧洲专利第 1191966B1 号中可获知具有旋风室 (cyclone chamber) 的吸入器。也可从 EP0477222A1 获知用于磨碎粉末状吸入药物的粒子或聚集体的装置。该文献中所公开的装置包括具有隔开的入口和出口的轴对称涡流室。入口将载药空气沿着与涡流室相切或接近相切的方向导入该涡流室中。

[0011] 也可从申请人共同拥有的待决欧洲专利申请第 08100886.4 号中获知提供一种具有气溶胶化装置的吸入器，所述吸入器具有大致圆柱形的室以及位于该室两端的用于使载药空气流通过该室的入口和出口，所述载药空气流轴向地于入口进入并于出口离开。该吸入器还具有用于使清洁的非载药空气流进入该室的切向旁路空气入口，所述清洁的非载药空气流在室内形成气旋并与在入口和出口之间流动的载药空气相互作用。由于旁路空气在装置内形成气旋，使得载药空气流因气旋对其的影响而旋转并随行一部分朝向出口的螺旋状路程。申请人已发现这种由绕室旋转的旁路空气形成的涡流与沿轴向流入室内的载药空气的相互作用对吸入器的性能提供了改进，因为当载药空气流经室时被加速了，并且经历了提高的剪切力和速度差，这进一步解聚了粒子并提高了喷射量的微粒分数。下面参考附图中的图 2A 和 2B 更详细地描述在 EP08100886.4 中公开的装置的实施方式。

[0012] 本申请提出了对包括上面所述的那些在内的先前公开的装置和原理的多种改进和修改。例如，本发明的一个实施方式提出了如何将由 WO2005/037353A1 可知的吸入器进行修改以便为其提供诸如 EP08100886.4 中所述的气溶胶化装置，从而同时提供由 WO2005/037353A1 可知的吸入器的功能性和剂量递送优点和 EP08100886.4 中描述的气旋技术。结果是泡囊条带型药剂吸入器，其对患者使用来说简单且直观，但其也提供了较高微粒分数的递送药剂。

[0013] 根据本发明，提供了一种用于产生粉末状药物的可吸入气溶胶的吸入器，其包括具有基本圆形截面的旋风室的气溶胶化装置、位于所述室两端的入口和出口、以及旁路空

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气入口，所述入口和出口用于使载药空气流在所述口之间通过旋风室，且所述旁路空气入口用于使清洁空气流进入旋风室，所述旁路空气入口配置为使通过所述入口进入旋风室的空气在该室中形成气旋，该气旋与在入口和出口之间流动的载药空气相互作用。

[0014] 优选地，所述旁路空气入口配置为使旁路空气通过基本相切于旋风室壁的所述旁路空气入口进入旋风室。

[0015] 所述吸入器可包括通向所述入口的载药空气流导管，且载药空气在进入旋风室之前通过该载药空气流导管流动。

[0016] 在一个实施方式中，所述载药空气流导管在朝向入口的方向上至少部分为锥形的以加速气流。替代地或另外地，所述入口可偏离旋风室的纵轴。

[0017] 所述吸入器可包括位于气流中的撞击元件 (impaction element)，从而使载药空气流中的至少一些药物粒子撞击所述撞击元件。

[0018] 在一些实施方式中，所述撞击元件在旋风室中。优选地，所述撞击元件位于入口上方以使药物粒子在进入旋风室之后或之时撞击该撞击元件。

[0019] 所述撞击元件可包括具有撞击表面 (impaction surface) 的板，该板在与通过入口进入旋风室的载药空气的流动方向基本成直角的平面中延伸。所述撞击板也可在相对于载药空气的流动方向成最多 135 度角的平面中延伸。

[0020] 在一个优选实施方式中，所述板包括叶片，所述叶片的边缘具有倒角或锥度或者以另外方式成型以便将对旋风室内气流的破坏减到最小。所述撞击板也可成形为显示相对于载药空气流的凸面。

[0021] 如果通往旋风室的入口是偏离的，则所述撞击元件优选在偏离的入口上方从所述旋风室的侧壁向内径向延伸，从而使其直接位于由进入旁路空气入口的旁路空气所产生的气旋气流内部。

[0022] 所述撞击元件包括撞击表面，药物粒子针对该撞击表面进行撞击。优选地，所述撞击表面与旋风室侧壁相汇合并从该侧壁以平滑曲线延伸。

[0023] 所述撞击元件可位于旋风室的出口处。所述出口可由网眼形成。在这种情况下，位于出口处的撞击元件可与网眼整体成型。通过在旋风室出口处设置撞击元件，当粒子在撞击之前穿过旋风室时，其已具有加速的时机且达到其最大可能速度。如果粒子在撞击时速度更快，则解聚效果会得到提高。

[0024] 在另一个实施方式中，所述入口由解聚网眼 (deagglomerating mesh) 形成以使载药空气通过所述网眼流入旋风室。

[0025] 根据本发明的一个优选实施方式，所述吸入器包括外壳和与所述外壳铰接的促动器，所述外壳容纳了含有用于吸入的药物剂量的可刺穿泡囊，且所述促动器具有喷嘴，使用者通过该喷嘴吸入药物剂量，其中所述促动器是可铰接的，以便使泡囊刺穿构件刺穿泡囊的盖子，旋风室位于该促动器中。

[0026] 优选地，所述外壳配置为容纳泡囊条带，每个泡囊均含有用于吸入的药物剂量，所述促动器也配置为将每个泡囊依次移动为与所述泡囊刺穿构件对齐，以使泡囊刺穿构件刺穿所对齐的泡囊的盖子。

[0027] 在一个优选实施方式中，所述吸入器包括位于喷嘴内的促动器插入物 (actuator insert)，所述旋风室和旁路空气入口由所述插入物形成。

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[0028] 所述旋风室和所述旁路空气入口可包括凹穴。在这种情况下，所述促动器包括位于所述喷嘴内并沿所述插入物延伸以封闭凹穴的板。

[0029] 在一个实施方式中，所述刺穿构件与所述促动器相连，且在所述板上延伸。所述载药空气流导管可在所述刺穿构件中形成。然而，其也可以在所述刺穿构件中和从所述刺穿构件延伸到所述旋风室的入口的通路中形成。

[0030] 所述刺穿构件优选包括具有第一刺穿元件和第二刺穿构件的体部，所述第一刺穿元件在所述板上方延伸，且所述第二刺穿构件在所述板中的孔上方延伸，且所述载药空气流导管通过所述刺穿构件延伸以使载药空气流离开泡囊并通过所述板中的孔。

[0031] 在有于插入物上方延伸的板的实施方式中，所述撞击元件可包括在所述板中的孔上方延伸的构件，所述构件由从该板上竖立的足来支撑。还可以在所述板中提供解聚网眼。

[0032] 在一些实施方式中，所述吸入器包括位于所述促动器上的定位销和位于所述插入物和板上以将该插入物和板定位于喷嘴内部的配合凸缘。优选地，所述刺穿构件位于所述插入物和板上方的销上以将所述刺穿构件定位于促动器上。

[0033] 在一个实施方式中，所述旋风室在喷嘴的基本全部高度上轴向延伸。然而，所述促动器可包括位于旋风室出口处的扩散器以使该旋风室不在喷嘴的全高度上延伸。

[0034] 在其它实施方式中，解聚元件可位于旋风室中。所述解聚元件可包括多个可旋转地安装在旋风室中的轮叶或装有叶片的元件，由此当使用者在喷嘴上吸气时该轮叶或装有叶片的元件旋转。替代地，所述解聚元件可在旋风室内自由移动。例如，其可为球状或多刻面的球体。

附图说明

[0035] 仅通过举例的方式，现在将参考附图中的图 3A-23 对本发明的实施方式进行描述，其中：

[0036] 图 1A 和 1B 是常规吸入装置的侧面剖视图，其显示了如何通过促动器的移动而使条带上的泡囊依次移动到于泡囊刺穿位置对齐，所述促动器的移动为从图 1A 所示的位置到图 1B 所示位置，该促动器的移动驱动了刻度盘”

[0037] 图 1C 是图 1A 和 1B 中所示的促动器的透视图，更清楚地显示了其内表面，即面对吸入器外壳的表面；

[0038] 图 1D 是图 1C 中所示的促动器的分解示意图，显示了刺穿头如何与促动器连接；

[0039] 图 1E 是当刺穿元件已刺穿了泡囊的盖子时穿过图 1C 和 1D 中所示的促动器的总的横截面图，说明了气流通过促动器、刺穿头和泡囊的路径；

[0040] 图 2A 是具有旁路空气气旋的吸入装置的一部分的截面侧视图，所述具有旁路空气气旋的吸入装置如上文中提及的申请人先前的共同待决申请中所述和所解释的那样；

[0041] 图 2B 是图 1 中所示装置的沿 X-X 线的横截面；

[0042] 图 3A 是根据本发明一个实施方式的促动器组件的透视图；

[0043] 图 3B 是图 3A 中所示促动器组件的分解示意图；

[0044] 图 3C 是从图 3A 中所示的已装配好的促动器中截取的纵向截面图；

[0045] 图 3D 是从图 3A 中所示的已装配好的促动器中截取的横向截面图；

[0046] 图 4 是根据本发明的在图 2A 中所示的吸入装置的一部分的修改形式的截面侧视

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图；

[0047] 图 5 是在图 3A-3D 的实施方式中所使用的板的修改形式，其将图 4 中所示原理之一具体化了；

[0048] 图 6 是图 3A-3D 的实施方式中所用的插入物的修改形式；

[0049] 图 7A 是图 3A-3D 的实施方式中所用的插入物的另一种修改形式的透视图；

[0050] 图 7B 是图 7A 中所示插入物的截面图；

[0051] 图 8A 是图 3A-3D 的实施方式中所用的刺穿头的修改形式的透视图；

[0052] 图 8B 是通过图 8A 中所示刺穿头的截面侧视图；

[0053] 图 9 是图 3A-3D 的实施方式中所用的板的另一种修改形式的透视图，其中孔是偏离的；

[0054] 图 10 是图 3A-3D 的实施方式中所用的板的又一个修改形式的透视图，其中孔是偏离的，并且包括撞击元件；

[0055] 图 11 是图 3A-3D 的实施方式中所用的插入物的又一个修改形式的透视图，其包括位于旋风室出口处的解聚网眼；

[0056] 图 12 是图 3A-3D 的实施方式中所用的板的另一种修改形式的透视图，其中板中的孔由解聚网眼形成；

[0057] 图 13A-13C 图解了在图 3A-3D 的实施方式中使用的插入物的可选形式；

[0058] 图 14 图解了固定片 (stator) 形式的旋风室插入物；

[0059] 图 15 图解了转子形式的旋风室插入物，该插入物 (insert) 安装为当患者吸气其在气旋内旋转；

[0060] 图 16 图解了如何可将活动的元件（诸如球）设于由图 3A 到 3D 的实施方式中所用的插入物形成的室中；

[0061] 图 17A 图解了在图 3A-3D 的实施方式中所用的刺穿头的另一种修改形式，其具有偏离的、锥形的载药空气流路径；

[0062] 图 17B 是通过图 17A 中所示板的截面侧视图；

[0063] 图 18A-18C 分别图解了根据图 3A-3D 所述的促动器的修改形式的纵向截面示意图、横向截面示意图和分解示意图，该修改形式配有通往气旋的细长的、偏离的药物流路径；

[0064] 图 19A-19C 分别图解了根据图 3A 到 3D 所述的促动器的另一种修改形式的分解示意图和纵向截面图，其中省略了扩散器，延长了旋风室，且加入到网眼中的撞击元件形成了旋风室的出口；

[0065] 图 20A-20C 分别图解了根据图 3A 到 3D 所述的促动器的另一种修改形式的纵向截面图、横向截面图和分解示意图，其中在刺穿头和插入物之间的板中的孔中形成了解聚网眼，由此使药物剂量在进入旋风室时穿过所述网眼；和

[0066] 图 21A-21C 分别图解了根据图 3A-3D 所述的促动器的另一种修改形式的纵向截面图、横向截面图和分解示意图，其中具有细长的偏离的气旋入口和位于旋风室出口处的网眼中的撞击元件。

[0067] 图 22 是比较了相对于新一代冲击器各阶段的沉淀的图表，显示了对较低阶段的提高的沉淀趋势。

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具体实施方式

[0068] 首先参考附图的图 1A 和 1B，显示了具有包含卷绕的泡囊条带 3 的外壳 2 的已知吸入器 1。当促动器 5 以图 1B 中的箭头“A”的方向转动时，包括单个促动杆 5 的转位机构 4 每次将条带卷 3 解开一个泡囊，由此其在泡囊定位器底盘 6 上通过并依次通过泡囊刺穿位置 7。当促动器 5 每次移动时，位于泡囊刺穿位置 7 上的泡囊在促动器 5 的回程（在图 1B 中的箭头“B”所示的方向）上被刺穿元件 8 刺穿，所述刺穿元件 8 形成于安装在促动器 5 上的刺穿头 10 上（参见图 1D），这样当使用者通过与促动器 5 整体成型的喷嘴 9 吸气时，在泡囊 3a 内产生气流，该气流夹带了泡囊内所含的剂量并使其离开泡囊 3a 经由喷嘴 9 进入使用者的气道。

[0069] 为减少装备的总压差并使其易于令患者吸入药剂，通过轴向延伸的旁通管 11 将外界空气引入出口气流中，如图 1E 中清楚所示。刺穿头 10 具有管状截面 12，所述管状截面 12 位于从喷嘴 9 内的促动器 5 上直立的整体成型的壁 13 内。旁通管 11 由管状截面 12 与壁 13 之间的环形间隙形成，旁路空气通过该旁通管与已穿过泡囊 3a 的气流一起被吸入喷嘴 9 中。沿管 11 流动的旁路空气减少了对吸入气流的总阻力，使得装置较易于使用。如图 1E 中所示，当患者通过喷嘴 9 吸气时，空气通过喷嘴 9 与促动器 5 之间的孔 14 而被从外部吸入，在这里其通过盖子 3b 中的孔 3c 流入泡囊 3a，如标记为“F”的箭头所示。除了通过孔 3c 的进入气流之外，还通过泡囊 3a 的盖子 3b 与泡囊刺穿头 10 的表面 15 之间的空间将空气吸入泡囊 3a 中，如标记为“G”的箭头所示。除了进入泡囊 3a 的气流之外，空气还通过旁通管 11 被吸入（在标记为“H”的箭头方向）并与通过泡囊盖子 3b 中的孔 3c 离开泡囊的引出气流结合（在标记为“I”的箭头方向）。药剂被夹带在引出气流中，且来自泡囊 3a 的这一气流与已经由旁通管 11 流入喷嘴 9 中的空气一起离开装置进入患者的气道中，在标记为“J”的箭头方向。应注意的是，沿旁通管 11 流动的旁路空气与离开泡囊 3a 的载药空气以相同方向移动。因此，旁路空气对载药空气几乎没有或没有影响，并且主要用于减少跨越该装置的压差以以便使其较易于令患者吸气。

[0070] 也已提出了对图 1A-1E 中所示装置的各种修改。例如，在申请人自己的共同待决欧洲申请第 07111998.6 号中，所述装置已被改变为将所有使用过的泡囊保留在装置内部以便使患者不会接触到使用过的泡囊。在该在先提交的申请中所述的一个实施方式中，在外壳内部提供了螺旋卷绕元件以容纳使用过的泡囊条带部分并将其在外壳内卷绕起来。此外，可提供隔离壁以将外壳分隔为未使用泡囊隔室和已使用泡囊隔室，从而将未使用泡囊与残余药物的任何可能的接触减到最小。尽管做出这些修改，该装置仍具有促动器以依次指引泡囊条带并使泡囊刺穿元件刺穿所对齐的泡囊的盖子，因此本文所提出的修改同样适用于这些形式的装置。

[0071] 现在参考图 2A，显示了如申请人自己的在先的共同待决申请中所描述和图解的另一种吸入装置 20 的一部分，该装置改变了旁路气流，因此不仅简单地降低了跨越该装置的压差，而且还有助于药物剂量的解聚。根据图 2A，该装置具有喷嘴 21，其限定了具有室壁 23、载药空气入口 24、出口 25 和旁路空气入口 26 的内室 22。在图 2B 中还显示了沿图 2A 中线 X-X 截取的截面图。

[0072] 装置 20 包括延伸越过喷嘴 21 下端并封闭室 22 的底座 27。载药空气入口 24 在底

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座 27 中形成并穿过其延伸，底座 27 与室 22 的纵轴（图 2A 中的 A-A 线）共轴。

[0073] 尽管底座可与喷嘴 21 整体成型，但其优选作为在装配过程中与喷嘴 21 或室 22 的尾端相连的单个部件形成。

[0074] 如图 2B 所示，旁路或清洁的非载药空气入口 26 优选是在喷嘴 21 的侧面形成的成切线取向的弓形通道，且底座 27 形成最下的壁并封闭室 22 的最下端（远离载药空气入口 24），并且形成通道 26 的底面由此使通道 26 仅在其两端开放。尽管在该实施方式中显示了双通道，应理解一个通道就足够了。

[0075] 当旁路空气入口 26 设置为成切线方向或设置为将旁路空气以基本切线方向导引如室 22 中，则迫使通过这些入口 26 流入室 22 中的清洁空气绕室 22 旋转，从而形成气旋或涡流（如图 2A 中的箭头“B”所示）。

[0076] 出口 25 可具有延伸越过室 22 末端的网眼的形式，通过该网眼被夹带的药物可流出室 22 进入患者气道。优选地，喷嘴 21 包括流动扩散器 28，其延伸超过出口 25 并具有朝向喷嘴 21 的顶部边缘逐渐增大的横截面积。在该区域内扩散器 28 的壁 30 可具有弯曲的形状。

[0077] 刺穿装置 31 设置于底座 27 相对侧上的喷嘴 2 下方，并且可由底座 27 延伸或与底座 27 相连。如可从图 2A 中最清楚可见的，刺穿装置 31 包括刺穿头 32，所述刺穿头 32 具有依托于它的刺穿元件 33、34。泡囊刺穿元件 33、34 配置为刺穿泡囊 3a 的盖子，由此使当患者通过喷嘴 21 吸气时，清洁空气通过由泡囊刺穿元件 34 形成的进气道气流通道进入泡囊 3a 中（在图 2A 中的箭头“C”的方向）并夹带包含在泡囊 3a 中的药剂。然后载药空气通过中心的出口通道 35 流出泡囊 3a（在箭头“D”的方向）。载药空气出口通道 35 与室 22 的载药空气入口 24 相连，由此载药空气以轴向流入室 22 中（以箭头“E”所示的方向）。同时，清洁的旁路空气通过切向的旁路空气入口 26 进入室 22 中并绕室 22 旋转（以箭头“B”的方向）形成涡流或气旋。

[0078] 在图 3A-3D 中图解了本发明的一个实施方式。在该实施方式中，将 EP08100886.4 中描述旁路空气气旋原理与如上所述且在图 1A-1E 中所示的吸入装置的促动器相结合。这是通过对促动器进行修改以使其在喷嘴内包含小型的旁路空气气旋来实现的。

[0079] 图 3A-3D 的实施方式的促动器 40 的总体外观与图 1C-1E 的实施方式相比基本保持不变，并且仍包括与促动器 40 的主体 40a 整体成型的喷嘴 41。然而，泡囊刺穿头 42 不再具有共轴地容纳在喷嘴 9 内部的整体成型的壁 13 内的管状部分 12。而是改为促动器 40 具有座 43，在该座 43 上安装整体容纳在喷嘴 41 内限定的空间之内的模制的插入物 44。模制的插入物 44 限定了具有切向的弓形旁路空气通道 46 的圆柱形旋风室 45，所述旁路空气通道 46 从插入物 44 的相对侧 46a 导向室 45。除了在旋风室 45 的出口处形成的网眼 44a 之外，插入物 44 的上端（距刺穿头 42 最远的一端）是闭合的，但插入物 44 的下端（距刺穿头 42 最近的一端）是开放的，由此使旋风室 45 和旁路空气通道 46 沿插入物 44 的底面开放。插入物 44 与大致椭圆形的凸缘 48 整体模制，所述凸缘仅略小于椭圆形的开口 49，所述开口 49 在喷嘴 41 与促动器 40 相汇合的地方形成，这样当凸缘 48 容纳在喷嘴 41 内时基本充满开口 49。在凸缘的边缘上提供了凸起 50，其围绕销 51 设置，并且从开口 49 的边缘直立以将插入物 44 容纳和定位于喷嘴 41 内。当插入物位于喷嘴内时，每个旁路空气通道 46 的端 46a 接近促动器 40 中的旁路空气入口 14。

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[0080] 从图 3C 和 3D 中清楚可见，用于安装插入物 44 的座 43 在扩散器底部形成，其由大致弯曲的、优选弓形的壁 52 限定。应理解为将插入物 44 嵌入到在喷嘴 41 中形成的空间中，旋风室 45 的轴长相对较短，且旁路空气入口通道 46 的高度与旋风室 45 的轴长相同或仅仅略短。然而，应理解旁路空气入口通道 46 的尺寸可相对于旁路旋风室 45 的轴长发生变化，如下文中根据图 13A 到 13C 所述的那样。还设想了可完全省略扩散器 52，由此使旋风室 45 延长以使其长度轴长基本等同于喷嘴 41 的全高度。

[0081] 再次参考图 3A-3D，能够看出旋风室 45 的开放下端和旁路气流通道 46 由椭圆形板 53 封闭，该椭圆形板 53 在大小与形状方面均对应于插入物 44 的凸缘 48。该板还具有围绕销 51 设置的凸起 54 以将板 53 固定就位，从而使其延伸越过开口 49 并在插入物 44 之上。在旋风室 45 紧下方通过板 53 形成孔 55。

[0082] 刺穿头 42 位于板 53 上方并且具有第一和第二组刺穿元件 57、58 的体部 56。搭襻 (tab)59、60 从体部 56 的下缘伸出，在其中形成孔 61。每个销 51 的上端延伸通过孔 61 以将体部 56 定位于板 53 上，从而将刺穿头 42 连接到促动器 40 上。

[0083] 体部 56 具有外周壁 62，所述外周壁 62 将刺穿元件 57、58 与板 53 隔开。第一组刺穿元件 57 在板 53 上方延伸，如从图 3D 中清楚可见的那样，且在壁 62 中形成开口 63，由此使当泡囊刺穿元件 57、58 被容纳到泡囊中时，第一组刺穿元件 57 使空气经由所述开口 63 并通过所述刺穿元件 57 流入泡囊。

[0084] 第二组刺穿元件 58 位于板中的孔 55 上方，且壁 62 封闭了该刺穿元件与板 53 之间的空间，由此使通过第一组刺穿元件流入泡囊并夹带了其中所含的药剂的空气经由第二组刺穿元件 58 在泡囊中制造的开口流出该泡囊，并导引其通过外周壁 62 所封闭的刺穿头 42 的一部分、通过板 53 中的孔 55 并进入旋风室 45，在这里其与通过旁路空气通道 46 进入旋风室 45 的清洁的非载药空气相互作用，正如上文中已参考图 2A 和 2B 进行解释的那样。

[0085] 应理解，一旦插入物 44 和板 53 已经用围绕销 51 设置的凸起 50、54 和位于穿过刺穿头 42 中的孔 61 的销 51 的顶端设置于喷嘴 41 内，则销 51 的尖端可通过加热或其它方式变形已将刺穿头 42、板 53 和插入物 44 在喷嘴 41 中固定就位。

[0086] 也已提出一些对如上所述参考图 2A 和 2B 的旁路气旋原理的修改，所有这些均具有调节递送药剂的粒度分布的主要意图。在解释如何可将图 3A-3D 的促动器组件修改为在更实际的方面加入这些原则之前，可首先对其中的一些进行大体考虑。

[0087] 现在转向图 4，其图解了图 2A 中所示吸入装置部分的修改的截面图。在该实施方式中，底座 71 中的入口 70 被延长以形成吸入流导管，该导管在载药空气流的方向朝向室 72 成向内的锥形（即在箭头“E”的方向）尽管图 4 显示了如现在在底座 71 中形成的锥形流动路径或导管 70，应理解其可替代性地或另外地在连接在底座 71 之上或之中的刺穿头 73 中形成以实现相同效果。基本上，锥形的载药气流路径 70 确保了当载药空气从泡囊出口到旋风室 72 入口移动时对其进行加速以便使其在进入室 72 时更快地移动。

[0088] 尽管锥形的载药空气流径 70 可于旋风室 72 的纵轴 A-A 共轴设置，但优选载药气流不与室 72 的纵轴是共轴而是与其偏离或偏心。最优选地，且如图 4 所示，入口 70 是偏离的，从而使其邻接于室 72 的壁的内表面 72a。因此，载药空气在进入室 72 时非常接近于其内表面 72a 并且在进入室 72 的入口处直接地与由进入旁路空气入口 74 的旁路空气形成的涡流相互作用。在最接近室壁 72a 处速度差和剪切力最大，因此当载药空气入口 70 的位置

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尽可能地接近旋风室 72 的侧壁 72a 时，载药空气进入室 72 时气旋的效果最大。应理解无论药物气流入口 70 是否偏离轴，药物出口 80 都保持与旋风室的轴共轴。

[0089] 尽管提供了锥形的、尽可能偏离的药物入流路径可以是唯一的修改，替代性地或另外地，还可提供撞击元件。撞击元件的关键利益在于将装置中存在的较大药物粒子解聚，并由此影响该装置所发射的药物剂量的粒度分布。

[0090] 在图 4 中，显示了安装在旋风室 72 内的撞击元件 81，从侧壁 72a 延伸出来并位于载药空气流入口 70 的紧上方，由此时载药空气流靶向撞击元件 81 的下侧（如箭头“F”所示）。尽管进入旋风室 72 的一些较小粒子将在到达撞击元件 81 之前被气旋的旁路气流卷走，但一些较大的粒子将以大致轴向的方向朝向撞击板 81 移动并将撞击撞击元件 81 的下侧。这有助于将粒子解聚并将药物粒子与载体粒子（如果存在的话）分离。这还减少或消除了可能以另外方式在入口和出口 70、80 之间直接移动通过室 72 的药物的量，这些药物几乎没有或没有与气旋气流相互作用。因此，如果不这么做将会离开装置的任何大药物或载体粒子现在立即被驱使卷入气旋气流中。

[0091] 撞击元件 81 通常采用平面的、凹面的、凸面板或叶片样构件的形式，其具有下侧撞击表面 80a，基本与旋风室 72 的壁 72a 成直角并由其径向向内延伸，且与从载药空气入口 70 进入室 72 的载药空气流的方向成直角。当撞击元件由室 72 侧壁 72a 延伸进入室 72 中时，其位于由旁路气流产生的涡流中，在这里力最大且可预期这将有助于清除任何将会沉积在撞击元件 81 上的药物，从而有效地自清洁撞击元件。大于 90 度到最多约 135 度的角度以及相对于载药空气显示凸面也能减少药物沉积在撞击元件上的可能。

[0092] 撞击元件 81 可具有边缘 81b，其朝向尖头顶点大致成锥形，从而产生较平滑的曲线以指引空气在越过其表面时具有最小的阻力，从而有助于防止药物沉积并且还将对气旋气流的破坏最小化。

[0093] 下侧的撞击表面 81a 优选地具有平滑的圆弧形或弯曲的边缘 82，在这里其与室壁 16a 相汇合以将该区域内的粒子沉淀减到最少。向上面对撞击板 81 的表面的相对侧可具有类似的圆形曲线（尽管对于撞击板 81 来说以相对锐的、甚至可能是 90 度的角度与室壁 72a 汇合也是可接受的），从而将对在板 81 上方通过的气旋气流的破坏减到最少。然而，也设想了板 81 的撞击表面 81a 可相对于撞击气流呈现成型表面。例如，其相对于撞击板 81 的位置中的气流方向可具有凸面或形状曲线。也应立军诶撞击板 81 的尺寸和载药空气流必须穿过其中的围绕撞击板 81 的开口面积可以进行修改以改变撞击板对药物剂量的效果。

[0094] 尽管撞击板显示为偏离室 72 的轴，也可设想当入口 70 为共轴时，撞击元件 81 也可共轴地安装室 72 的中心内以将其直接定位于入口 70 上方，从而使其不会与通过室 72 的气旋气流相互作用。正如偏离的板 81 那样，边缘 81b 可以为锥形的以便将对气流的破坏和沉淀减到最少。

[0095] 在图 4 中，撞击元件 81 显示为位于从底座 71 开始的室 72 的约三分之一高度处。然而，应理解撞击元件 81 可位于室 81 内的任何高度处，并且可位于室 72 的顶部处和 / 或与形成室出口 80 的网眼整体成型，如从以下对其它实施方式的描述中将明显可见的那样。

[0096] 已概括地描述了修改，现在将参考图 3A-3D 中所示的本发明的实施方式可如何进行修改以提供撞击元件和 / 或锥形的气流入口。

[0097] 在一个实施方式中，撞击元件可位于旋风室 45 的入口处并位于刚刚离开泡囊处。

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参考图 5，显示了在图 3A 和 3B 的实施方式中所用的板 53 的修改形式。在该实施方式中，撞击元件 84 在药物气流孔 55 上方相隔一小段距离，其由从孔 55 的外围 55a 朝向撞击元件 84 向上延伸的足部 85 所支撑。应理解当板 53 位于喷嘴插入物 44 内时，撞击元件 84 位于旋风室 45 内。

[0098] 替代地，撞击元件可位于气旋出口中或靠近气旋出口。例如，图 6 图解了图 3A-3D 的实施方式中所用的插入物 44 的修改形式。在该实施方式中，撞击元件 86 在形成室出口 44a 的网眼中心形成。

[0099] 在图 7A 和 7B 中所示的实施方式中，显示了对插入物 44 的另一项修改。撞击元件 87 位于出口 44a 的上方，插入物 44 配有额外的圆柱形外壳部分 88，所述外壳部分围绕撞击板 87 并具有出口 89，所述出口 89 用于使载药空气在撞击到撞击板 87 上之后流出外壳部分 88。

[0100] 如上所示，根据本发明实施方式所述点任何撞击板可为平面的、凸面的或具有凹面的形状曲线。

[0101] 现在参考图 8A 和图 8B，显示了根据图 3A 到 3D 所述的刺穿头 42 的修改形式。如图 8B 中明显可见的，流动路径 90 从刺穿元件 58 到板 53 中的孔 55 延伸通过体部 56，其在朝向板 53 的方向上是锥形的，从而在载药空气流进入旋风室 45 之间对其进行加速。刺穿头 42 可进行修改以提高流动路径 90 的长度，以便使药物粒子有更多时间加速以达到气流速度。

[0102] 图 9 显示了在图 3A 和 3B 的实施方式中所用的板 53 的修改形式。在该实施方式中，板 53 具有偏离的较小的孔 91，由此使载药空气在靠近室 45 的侧壁处进入室 45。

[0103] 图 10 显示了在图 3A 和 3B 的实施方式中所用的板 53 的又一个修改形式。在该实施方式中，与图 9 中一样，开口 91 是偏离的，但撞击元件 92 通过从开口 91 外周的一部分上直立的支架 93 与开口 91 隔开，从而使穿过开口 91 进入旋风室 45 的药物粒子直接撞击撞击元件 92 的下侧。

[0104] 也已发现药物路径中的细网眼可进一步解聚药物粒子。在图 11 中所示的实施方式中，在图 3A 到 3D 的实施方式中所用的插入物 44，细网眼 100 遍布于旋风室的出口上。网眼可具有小于 250 微米的孔径，或者可在 30-150 微米的范围内。在特定实施方式中，网眼可例如为细的 (200μm 孔，125μm 丝直径）或粗的 (500μm 孔，160μm 丝直径）。

[0105] 替代地，如图 12 中所示，网眼 101 可形成板 53 中的孔，由此使药物剂量在进入旋风室 45 时必须穿过该网眼。网眼的尺寸可变化以改变孔径尺寸和开口面积总百分数以控制解聚的程度。然而，在一个优选实施方式中，孔为 0.2mm-0.5mm 宽的的正方形，且丝的直径为 0.1mm-0.2mm。

[0106] 如上所述，可通过改变旋风室 415 的高度、直径、入口横截面积和出口横截面积以改变旋风室的尺寸，从而改变喷射剂量的粒度分布。根据图 3A-3D 所述的插入物 44 的可能的修改形式如图 13A-13D 中所示。在图 13A 中，该室具有最大轴长并意图用于不具有扩散器的促动器中。图 13B 显示了具有室 45 的插入物 44，其长度较短并具有相对大直径的出口网眼 44a。图 13C 的插入物 44 与图 13B 的一样，不同之处在于出口网眼 44a 与室 45 的直径相比具有较小直径。

[0107] 也已发现药物解聚作用还可能通过提高旋风室中的气流湍流粒子相互作用来提

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高。例如，可向室中引入固定或活动的元件，诸如具有气流轮叶 94a 的固定片 94（如图 14 所示）、具有成型叶片 95a 的旋转转子 95（诸如图 15 中所示）或自由移动元件（诸如如图 16 所示的球形或刻面的球 96）。

[0108] 应理解可通过结合根据图 4-16 的上述实施方式中的两种或更多种来获得最大效果。

[0109] 图 17A 中显示了在图 3A 到 3D 的实施方式中所用的刺穿头 42 的另一个修改形式。能够看出流动路径 101 是锥形的和偏离的，由此载药空气将在靠近室 45 侧壁并远离其纵轴处进入室 45 中。

[0110] 图 18A-18C 显示了图 3A 到 3D 的实施方式的修改形式，其中从泡囊刺穿头 42 到旋风室 45 的药物流动路径是细长的，由此使药物在泡囊和旋风室之间进一步移动，并且其横截面在朝向旋风室 45 的方向上是减少的以加速气流。药物流动路径也显示为偏离旋风室的纵轴。从图 18A 到 18C 可见，这是通过去除扩散器 52 来实现的，从而是插入物 44 可进一步移动进入喷嘴 41 中以便在刺穿元件 57、58 与旋风室 44 的入口之间留下额外的举例。如图 18 所示，插入物的凸缘 48 与板 53 个看，因此在插入物 44 上设置了中间板 102 以粉封闭旁路空气通路 46 和提供进入旋风室 45 的入口。导管 103 在中间板和板 53 之间延伸以提供细长的药物流动路径。导管 103 是锥形的并且偏离旋风室 45 的纵轴。泡囊刺穿头 42 按惯例位于板 53 的上方，并且也具有延伸穿过其的锥形和偏离的流动路径（如图 17A 和 17B 的实施方式所示），该流动路径与由导管 102 形成的锥形和偏离的流动路径相汇合，从而在泡囊与旋风室 45 之间提供了细长的药物流动路径。

[0111] 图 19A-19C 显示了图 3A-3D 中所示实施方式的又一个修改形式。在该实施方式中，扩散器 52 已被去除，且旋风室 45 已被扩大，由此其有效地在喷嘴 41 的全高度上延伸。撞击元件 105 与插入物 44 一起在旋风室 45 的出口 44a 处形成。

[0112] 图 20A-20C 显示了图 3A-3D 中所示实施方式的另一种修改形式。在该实施方式中，在板 53 中形成解聚网眼 106，由此使载药空气在离开刺穿头 42 并进入旋风室 45 时穿过该网眼。与前述实施方式一样，可在旋风室 45 出口处提供撞击板 105。

[0113] 图 21A-21C 显示了图 3A-3D 中所示实施方式的另一种修改形式。该实施方式类似于图 18A 到 18C 的实施方式，其中其具有由导管 103 提供的细长的流动路径。然而，其也在旋风室 45 的出口处配有由旋风室壁延伸出来的偏离的撞击板 107。

[0114] 图 22 是比较了沉淀相对于粒径的图表，其使用了对于每个阶段具有预先测定的空气动力粒径收集分割点的多级碰撞取样器，比较是分别根据图 3A 到 3D 所述的实施方式、在旋风室出口处具有平面撞击板的装置和在旋风室入口处具有细解聚网眼的装置进行的。从该图表的考虑来看，应理解布置在旋风室出口处的撞击板或布置在旋风室入口处的细网眼有助于将粒径分布向较低阶段移动，从而得到更多的肺部沉积。

[0115] 多种药物可通过使用本发明的吸入器而单独进行施用。这样的药物包括那些适于治疗以下病症的药物：哮喘、慢性阻塞性肺病 (COPD)、呼吸道感染、鼻炎、过敏性鼻炎、鼻部疾病和病症；以肺部或鼻腔作为递送部位的一般和特异性疾病状态和系统性疾病。这样的药物包括但不限于：β2- 激动剂，例如卡莫特罗、非诺特罗、福莫特罗、左旋沙丁胺醇、吡布特罗、茶丙特罗、间羟异丙肾上腺、羟哌甲苯二酚、柳丁氨醇、沙美特罗、茚达特罗、叔丁喘宁、间羟异丙肾上腺素、克喘素、班布特罗、异丙喹喘宁、溴沙特罗、吡库特罗和比托特罗；非

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选择性的 β-兴奋剂，诸如麻黄素和治喘灵；磷酸二酯酶 (PDE) 抑制剂，例如甲基黄嘌呤、茶碱、氨茶碱、茶碱胆碱；以及选择性的 PDE 同工酶抑制剂，PDE 3 抑制剂，例如，米力农、莫他匹酮；PDE4 抑制剂，例如咯利普兰、西洛司特、罗氟司特、oglemilast 和 ONO6126；PDE 3/4 抑制剂，例如扎达维林和托拉芬群；HDAC2 诱导剂，例如茶碱；抗胆碱能药，包括毒蝇碱性受体 (M1、M2 和 M3) 拮抗剂，例如阿托品、天仙子碱、胃长宁、异丙托铵、噻托溴铵、氧托溴铵、NVA237、哌仑西平和替伦折平；肥大细胞稳定剂，例如色甘酸盐和甲哌噻庚酮；支气管消炎药，例如奈多罗米；类固醇，例如倍氯米松、地塞米松、氟替卡松、布地缩松、氟尼缩松、罗氟奈德、氟羟脱氢皮醇、布替可特、莫米松和环索奈德；疾病改性剂，诸如氨甲喋呤、来氟米特、特立氟胺和羟氯奎；组胺 1 型受体拮抗剂，例如西替利嗪、氯雷他定、脱羧氯雷他定、非索非那定、阿伐斯汀、特非那定、阿司咪唑、氮卓斯丁、左卡巴斯汀、扑尔敏、异丙嗪、新止吐嗪和咪唑司汀；用于囊性纤维化和 / 或肺结核治疗的抗菌剂和试剂，例如绿脓杆菌感染疫苗（例如 Aerugen®）、甘露醇、denufosol、谷胱甘肽、N- 乙酰半胱氨酸、氨丁卡霉素、耐久霉素、庆大霉素、托普霉素、链道酶 α 、α1- 抗胰蛋白酶、肝素、右旋糖酐、缠霉素、万古霉素、美罗培南、环丙沙星、哌拉西林和利福平；用于治疗 COPD 和囊性纤维化的溶粘蛋白剂，例如 N- 乙酰半胱氨酸和溴环已胺醇；组胺 2 型受体拮抗剂；速激肽神经激肽拮抗剂；曲普坦类药物，例如阿莫曲坦、利扎曲坦、那拉曲坦、佐米曲普坦、舒马曲坦、依来曲普坦和夫罗曲坦；神经病学药剂，例如阿朴吗啡、屈大麻酚、氢化麦角胺和克塞平；抗病毒药，例如膦甲酸、无环鸟苷、泛昔洛韦、万乃洛韦、丙氧鸟苷、西多福韦；金刚胺、金刚烷乙胺；病毒唑；扎那米韦和奥司他韦和普可那利；蛋白酶抑制剂（例如鲁普林韦、茚地那韦、奈非那韦、利托那韦和沙奎那韦）、核苷逆转录酶抑制剂（例如去羟肌苷、拉米夫定、双脱氧胸苷、扎西他滨和叠氮胸苷）及非核苷逆转录酶抑制剂（例如奈韦拉平和依法韦仑）；α-1/α-2 肾上腺素能受体激动剂，例如六氢脱氧麻黄碱、苯肾上腺素、苯丙醇胺、麻黄素、假麻黄碱、萘唑啉、羟甲唑啉、四氢唑啉、丁下唑啉、曲马唑啉和乙基去甲肾上腺素；血小板聚集抑制剂 / 消炎药，例如贝米肝素、依诺肝素、肝素；抗感染药，例如头孢菌素、青霉素、四环素、大环内酯、β-内酰胺、氟喹诺酮类药、链霉素、磺胺、氨基糖苷类（例如托普霉素）、多利培南、戊烷脒、甲磺酸粘菌素和氨曲南；用于性健康、性功能障碍（包括早泄）的药剂；例如，阿朴吗啡、VR776；在脑中经由 5HT- 调节通道和去甲肾上腺素能调节通道起作用的药剂、亮丙瑞林；和 PDE5 抑制剂，例如昔多芬、他达拉非和伐地那非；白细胞三烯改性剂，例如齐留通、芬留顿、替泊沙林、孟鲁斯特、扎鲁司特、昂唑司特、阿鲁司特、pranlikast、维鲁司特和伊拉司特；诱导性氧化氮合酶 (iNOS) 抑制剂；抗真菌药，例如两性霉素 B、游霉素和制霉菌素；镇痛药，例如可待因、二氢吗啡、麦角胺、芬太尼、大麻素类药和吗啡；抗焦虑 / 抗抑郁药剂，例如苯二氮和苯二氮衍生物、安定、咪达唑仑、利眠宁、氯羟去甲安定、去甲羟基安定、氯巴占、阿普唑仑、氯硝西泮、氟西泮、唑拉西泮；类胰蛋白酶和弹性蛋白酶抑制剂；β-2 整联蛋白拮抗剂；腺苷受体激动剂或拮抗剂，例如腺苷 2α 激动剂；钙通道阻断剂，例如加洛帕米和地尔硫卓；前列环素类似物，例如伊洛前列素；内皮肽 - 受体拮抗剂，例如 LU-135252；细胞因子拮抗剂，例如趋化因子拮抗剂和细胞因子合成的抑制剂和改性剂，包括炎症前转录因子的改性剂和抑制剂，NFkB；白细胞介素和白细胞介素的抑制剂，例如阿地白介素；治疗性蛋白和肽，例如胰岛素、胰岛素 aspart、胰岛素 glulisine；胰岛素 lispro，中性、规则性和可溶性胰岛素、中性精蛋白锌胰岛素、胰岛素锌、精蛋白锌胰岛素、胰岛素类似物、酰化胰岛素、

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胰岛素 glargine、胰岛素 detemir、胰高血糖素、胰高血糖素样肽和促胰岛素分泌肽；酶，例如链道酶 α；系统性活性大分子，例如人生长激素、亮丙瑞林、α-干扰素、生长因子（例如胰岛素样生长因子 1 型）；激素，例如肾上腺素、睾丸激素和甲状旁腺激素及类似物（例如 Ostabolin-C）；骨质疏松症药剂，例如二膦酸盐；抗癌剂，例如蒽环类药、阿霉素、伊达比星、表柔比星、氨甲喋呤、紫杉醇类药、紫杉醇、多烯紫杉醇、顺铂、长春花生物碱、长春新碱和 5- 氟尿嘧啶；抗凝血剂，例如血液因子和血液因子构建物，例如 FVIII-Fc 和 FIX-Fc；免疫调节剂，例如环孢霉素、西罗莫司和他克莫司；抗增生性免疫抑制剂，例如咪唑硫嘌呤和吗替麦考酚酯；细胞因子（例如干扰素、干扰素 β、白细胞介素和白细胞介素拮抗剂和抑制剂）；核酸；疫苗，例如 flumist；抗肥胖症药剂；诊断剂和基因治疗剂。

[0116] 对本领域技术人员来说很清楚的是，当需要时，药物可与载体分子或多种载体分子相连接和 / 或以前体药物、盐的形式、作为酯、或者作为溶剂化物来使用以使药物的活性和 / 或稳定性最优化。

[0117] 根据本发明的吸入器也可用于递送两种或更多种不同的组合。可提及的两种药物的特定组合包括类固醇与 β2- 激动剂的组合。这种组合的例子是倍氯米松与福莫特罗；倍氯米松与沙美特罗；氟替卡松与福莫特罗；氟替卡松与沙美特罗；布地缩松与福莫特罗；布地缩松与沙美特罗；氟尼缩松与福莫特罗；氟尼缩松与沙美特罗；环索奈德与沙美特罗；环索奈德与福莫特罗；莫米松与沙美特罗；以及莫米松与福莫特罗。S 根据本发明的吸入器也可用于递送三种不同药物的组合。

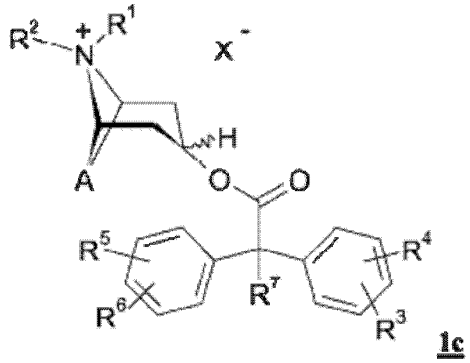
[0118] 对本领域技术人员来说很清楚的是，当需要时，药物可与载体分子或多种载体分子相连接和 / 或以前体药物、盐的形式、作为酯、或者作为溶剂化物来使用以使药物的活性和 / 或稳定性最优化。

[0119] 还设想了药物组合物可包括任选地与可药用赋形剂相结合的一种或多种、优选一种抗胆碱能药 1。所述抗胆碱能药 1 可选自：

[0120] a) 噻托溴铵盐 1a，

[0121] b) 式 1c 的化合物：

[0122]



1c

[0123] 其中

[0124] A 表示选自以下的双重键合基团：

[0125]

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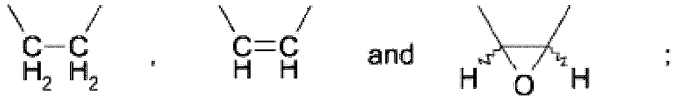


[0126] X^- 表示具有单个负电荷的阴离子，优选为选自下组的阴离子：氟离子、氯离子、溴离子、碘离子、硫酸根、磷酸根、甲磺酸根、硝酸根、醋酸根、柠檬酸根、富马酸根、酒石酸根、草酸根、琥珀酸根、苯甲酸根和对甲苯磺酸根；

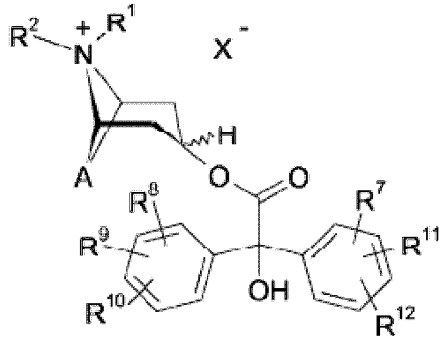
[0127] R^1 和 R^2 可相同或不同，并且表示选自以下的基团：甲基、乙基、正丙基和异丙基，这些基团可任选地被羟基或氟取代，优选未被取代的甲基；

[0128] R^3、R^4、R^5 和 R^6 可相同或不同，并且表示氢、甲基、乙基、甲氧基、乙氧基、羟基、氟、氯、溴、CN、CF_3 或 NO_2；

[0129] R^7 表示氢、甲基、乙基、甲氧基、乙氧基、$-CH_2-F$，$-CH_2-CH_2-F$、$-O-CH_2-F$、$-O-CH_2-CH_2-F$、$-CH_2-OH$、$-CH_2-CH_2-OH$、CF_3、$-CH_2-OMe$、$-CH_2-CH_2-OMe$、$-CH_2-OEt$、$-CH_2-CH_2-OEt$、-O-COMe、-O-COEt、$-Q-COCF_3$、$-Q-COCF_3$、氟、氯或溴；

[0130] c) 式 1d 的化合物：

[0131]



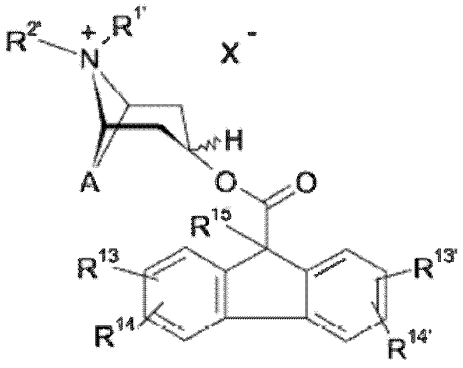
1d

[0132] 其中

[0133] A、X^-、R^1 和 R^2 可具有如上所述的含义，且其中 R^7、R^8、R^9、R^{10}、R^{11} 和 R^{12} 可相同或不同，并且表示氢、甲基、乙基、甲氧基、乙氧基、羟基、氟、氯、溴、CN、CF_3 或 NO_2，条件是基团 R^7、R^8、R^9、R^{10}、R^{11} 和 R^{12} 中的至少一个不是氢；

[0134] d) 式 1e 的化合物：

[0135]



1e

[0136] 其中 A 和 X^- 可具有如上所述的含义，且其中 R^{15} 表示氢、羟基、甲基、乙基、$-CF_3$、CHF_2 或氟；

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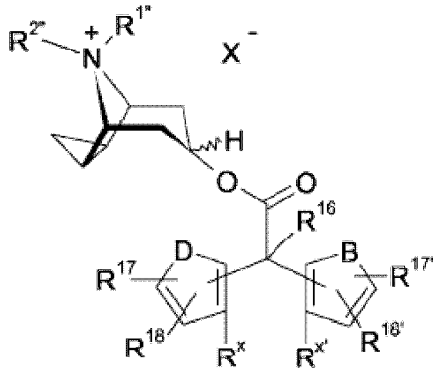
[0137] $R^{1'}$ 和 $R^{2'}$ 可相同或不同，并且表示 C_1-C_5- 烷基，该基团可任选地被 C_3-C_6- 环烷基、羟基或卤素取代；或者

[0138] $R^{1'}$ 和 $R^{2'}$ 共同表示 -C_3-C_5- 亚烷基桥；

[0139] R^{13}、R^{14}、$R^{13'}$ 和 $R^{14'}$ 可相同或不同，并且表示氢、-C_1-C_4- 烷基、-C_1-C_4- 烷氧基、羟基 -CF_3、-CHF_2、CN、NO_2 或氢，

[0140] e) 式 1f 的化合物：

[0141]



1f

[0142] 其中 X^- 可具有如上所述的含义，且其中 D 和 B 可相同或不同，优选相同，并且表示 -O、-S、-NH、-CH_2、-CH = CH 或者 -N(C_1-C_4- 烷基)-；

[0143] R^{16} 表示羟基、-C_1-C_4- 烷基、-C_1-C_4- 烷氧基、-C_1-C_4- 亚烷基 - 卤素、-O-C_1-C_4 亚烷基 - 卤素、-C_1-C_4- 亚烷基 -OH、-CF_3、CHF_2、-C_1-C_4- 亚烷基 -C_1-C_4 烷氧基、-O-COC_1-C_4- 烷基、-O-COC_1-C_4- 亚烷基 - 卤素、-C_1-C_4- 亚烷基 -C_3-C_6- 环烷基、-O-$COCF_3$ 或卤素；

[0144] $R^{1''}$ 和 $R^{2''}$ 可相同或不同，并且表示 -C_1-C_5- 烷基，该基团可任选地被 -C_3-C_6- 环烷基、羟基或卤素取代，或者

[0145] $R^{1''}$ 和 $R^{2''}$ 共同表示 -C_3-C_5- 烷氧基桥；

[0146] R^{17}、R^{18}、$R^{17'}$ 和 $R^{18'}$ 可相同或不同，并且表示氢、C_1-C_4- 烷基、C_1-C_4- 烷氧基、羟基、-CF_3、-CHF_2、CN、NO_2 或卤素；

[0147] R^x 和 $R^{x'}$ 可相同或不同，并且表示氢、C_1-C_4- 烷基、C_1-C_4- 烷氧基、羟基、-CF_3、-CHF_2、CN、NO_2 或卤素；或者

[0148] R^x 和 $R^{x'}$ 共同表示单键或选自以下的桥接基团：-O-、-S-、-NH-、-CH_2-、-CH_2-CH_2-、-N(C_1-C_4- 烷基)、-CH(C_1-C_4- 烷基)- 和 -C(C_1-C_4- 烷基)$_2$；和

[0149] f) 式 1g 的化合物

[0150]

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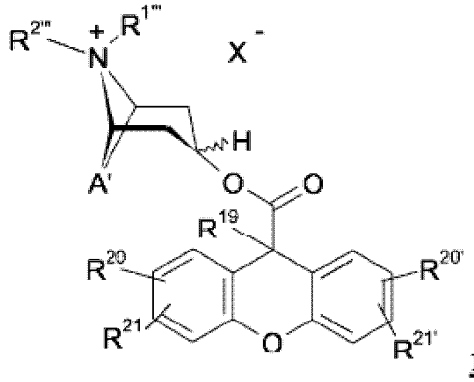
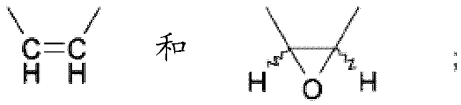


1g

[0151] 其中 X^- 可具有如上所述的含义，且其中 A′ 表示选自以下的双重键合基团：

[0152]



[0153] R^{19} 表示羟基、甲基、羟甲基、乙基、$-CF_3$、CHF_2 或氟；

[0154] $R^{1'''}$ 和 $R^{2'''}$ 可相同或不同，并且表示 C_1-C_5- 烷基，该基团可任选地被 C_3-C_6- 环烷基、羟基或卤素取代，或者

[0155] $R^{1'''}$ 和 $R^{2'''}$ 共同表示 $-C_3$-C_5- 亚烷基 - 桥；

[0156] R^{20}、R^{21}、$R^{20'}$ 和 $R^{21'}$ 可相同或不同，并且表示氢、$-C_1$-C_4- 烷基、$-C_1$-C_4- 烷氧基、羟基、$-CF_3$、$-CHF_2$、CN、NO_2 或卤素。

[0157] 式 1c 的化合物是本领域已知的 (WO 02/32899)。

[0158] 在本发明的一个优选实施方式中，所述方法包括施用式 1c 化合物（任选地与可药用赋形剂一起），其中

[0159] X^- 表示溴；

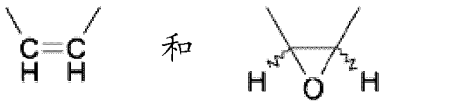
[0160] R^1 和 R^2 可相同或不同，并且表示选自甲基和乙基的基团，优选甲基；

[0161] R^3、R^4、R^5 和 R^6 可相同或不同，并且表示氢、甲基、甲氧基、氯或氟；

[0162] R^7 表示氢、甲基或氟。

[0163] 特别重要的是通式 1c 的化合物，其中 A 表示选自以下的双重键合基团：

[0164]



[0165] 式 1c 的化合物可任选地以单独的光学异构体、单独对映体的混合物或其外消旋物的形式施用。

[0166] 在根据本发明的方法中特别重要的是以下的式 1c 的化合物：

[0167] 脱品醇 (tropenol)2,2- 二苯基丙酸酯甲溴化物，

[0168] 东莨菪醇 (scopine)2,2- 二苯基丙酸酯甲溴化物，

[0169] 东莨菪醇 2- 氟 -2,2- 二苯基乙酸酯甲溴化物，和

[0170] 脱品醇 2- 氟 -2,2- 二苯基乙酸酯甲溴化物。

[0171] 式 1d 的化合物在现有技术中已知 (WO 02/32898)。

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[0172] 在本发明的一个优选实施方式中，所述方法包括施用式 1d 化合物（任选地与可药用赋形剂一起），其中

[0173] A 表示选自以下的双重键合基团：

[0174]

[0175] X^- 表示溴；

[0176] R^1 和 R^2 可相同或不相同，并且表示甲基或乙基，优选甲基；

[0177] R^7、R^8、R^9、R^{10}、R^{11} 和 R^{12} 可相同或不同，并且表示氢、氟、氯或溴，优选氟，条件是基团 R^7、R^8、R^9、R^{10}、R^{11} 和 R^{12} 中的至少一个不是氢。

[0178] 在根据本发明的方法中特别重要的是以下的式 1d 的化合物：

[0179] 脱品醇 3,3′,4,4′-四氟二苯乙醇酸酯甲溴化物，

[0180] 东莨菪醇 3,3′,4,4′-四氟二苯乙醇酸酯甲溴化物，

[0181] 东莨菪醇 4,4′-二氟二苯乙醇酸酯甲溴化物，

[0182] 脱品醇 4,4′-二氟二苯乙醇酸酯甲溴化物，

[0183] 东莨菪醇 3,3′-二氟二苯乙醇酸酯甲溴化物，和

[0184] 脱品醇 3,3′-二氟二苯乙醇酸酯甲溴化物。

[0185] 根据本发明的药物组合物可含有式 1d 化合物，其任选地具有单独的光学异构体、单独对映体的混合物或其外消旋物的形式。

[0186] 式 1e 的化合物是本领域已知的 (WO 03/064419)。在本发明的一个优选实施方式中，所述方法包括施用式 1e 化合物（任选地与可药用赋形剂在一起），其中 A 表示选自以下的双重键合基团：

[0187]

[0188] X^- 表示选自以下的阴离子：氯离子、溴离子和甲磺酸根，优选溴离子；

[0189] R^{15} 表示羟基、甲基或氟，优选甲基或羟基；

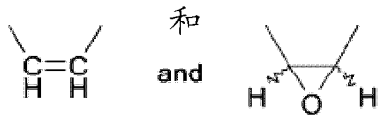
[0190] $R^{1'}$ 和 $R^{2'}$ 可相同或不同，并且表示甲基或乙基，优选甲基；

[0191] R^{13}、R^{14}、$R^{13'}$ 和 $R^{14'}$ 可相同或不同，并且表示氢、$-CF_3$、$-CHF_2$ 或氟，优选氢或氟。

[0192] 在本发明的另一个优选实施方式中，所述方法包括施用式 1e 化合物（任选地与可药用赋形剂在一起），其中

[0193] A 表示选自以下的双重键合基团：

[0194]



[0195] X^- 表示溴；

[0196] R^{15} 表示羟基或甲基，优选甲基；

[0197] $R^{1'}$ 和 $R^{2'}$ 可相同或不同，并且表示甲基或乙基，优选甲基；

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[0198] R^{13}、R^{14}、$R^{13'}$ 和 $R^{14'}$ 可相同或不同，并且表示氢或氟。

[0199] 在根据本发明的方法中特别重要的是以下的式 1e 的化合物：

[0200] 脱品醇 9- 羟基 - 芴 -9- 甲酸酯甲溴化物；

[0201] 脱品醇 9- 氟 - 芴 -9- 甲酸酯甲溴化物；

[0202] 东莨菪醇 9- 羟基 - 芴 -9- 甲酸酯甲溴化物；

[0203] 东莨菪醇 9- 氟 - 芴 -9- 甲酸酯甲溴化物；

[0204] 脱品醇 9- 甲基 - 芴 -9- 甲酸酯甲溴化物；

[0205] 东莨菪醇 9- 甲基 - 芴 -9- 甲酸酯甲溴化物。

[0206] 根据本发明的药物组合物可含有式 1e 化合物，其任选地具有单独的光学异构体、单独对映体的混合物或其外消旋物的形式。

[0207] 式 1f 的化合物是本领域已知的 (WO 03/064418)。

[0208] 在本发明的另一个优选实施方式中，所述方法包括施用式 1f 的化合物（任选地与可药用赋形剂在一起），其中

[0209] X^- 表示氯、溴或甲磺酸根，优选溴；

[0210] D 和 B 可相同或不同，优选相同，其表示 -O-、-S、-NH- 或 -CH = CH-；

[0211] R^{16} 表示氢、羟基、$-C_1-C_4-$ 烷基、$-C_1-C_4$ 烷氧基、$-CF_3$、$-CHF_2$、氟、氯或溴；

[0212] $R^{1''}$ 和 $R^{2''}$ 可相同或不同，并且表示 C_1-C_4- 烷基，该基团可任选地被羟基、氟、氯或溴所取代，或者

[0213] $R^{1''}$ 和 $R^{2''}$ 共同表示 $-C_3-C_4-$ 亚烷基 - 桥；

[0214] R^{17}、R^{18}、$R^{17'}$ 和 $R^{18'}$ 可相同或不同，并且表示氢、C_1-C_4- 烷基、C_1-C_4- 烷氧基、羟基、$-CF_3$、$-CHF_2$、CN、NO_2、氟、氯或溴；

[0215] R^x 和 $R^{x'}$ 可相同或不同，并且表示氢、C_1-C_4- 烷基、C_1-C_4- 烷氧基、羟基、$-CF_3$、$-CHF_2$、CN、NO_2、氟、氯或溴，或者

[0216] R^x 和 $R^{x'}$ 共同表示单键或选自以下的桥接基团：桥 -O-、-S-、-NH- 和 $-CH_2-$。

[0217] 在本发明的另一个优选实施方式中，所述方法包括施用式 1f 的化合物（任选地与可药用赋形剂在一起），其中

[0218] X^- 表示氯、溴或甲磺酸根，优选溴；

[0219] D 和 B 可相同或不同，优选相同，并且表示 -S- 或 -CH = CH-；

[0220] R^{16} 表示氢、羟基或甲基；

[0221] $R^{1''}$ 和 $R^{2''}$ 可相同或不同，并且表示甲基或乙基；

[0222] R^{17}、R^{18}、$R^{17'}$ 和 $R^{18'}$ 可相同或不同，并且表示氢、$-CF_3$ 或氟，优选氢；

[0223] R^x 和 $R^{x'}$ 可相同或不同，并且表示氢、$-CF_3$ 或氟，优选氢；或者

[0224] R^x 和 $R^{x'}$ 共同表示单键或桥接基团 -O-。

[0225] 在本发明的另一个优选实施方式中，所述方法包括施用式 1f 的化合物（任选地与可药用赋形剂在一起），其中

[0226] X^- 表示溴；

[0227] D 和 B 表示 -CH = CH-；

[0228] R^{16} 表示氢、羟基或甲基；

[0229] $R^{1''}$ 和 $R^{2''}$ 表示甲基；

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[0230] R^{17}、R^{18}、$R^{17'}$ 和 $R^{18'}$ 可相同或不同，并且表示氢或氟，优选氢；

[0231] R^x 和 $R^{x'}$ 可相同或不同，并且表示氢或氟，优选氢；或者

[0232] R^x 和 $R^{x'}$ 共同表示单键或桥接基团 -O-。

[0233] 在根据本发明的方法中特别重要的是以下的式 1f 化合物：

[0234] 环丙基莨菪醇二苯乙醇酸酯甲溴化物；

[0235] 环丙基莨菪醇 2,2- 二苯基丙酸甲溴化物；

[0236] 环丙基莨菪醇 9- 羟基 - 呫吨 -9- 甲酸酯甲溴化物；

[0237] 环丙基莨菪醇 9- 甲基 - 芴 -9- 甲酸酯甲溴化物；

[0238] 环丙基莨菪醇 9- 甲基 - 呫吨 -9- 甲酸酯甲溴化物；

[0239] 环丙基莨菪醇 9- 羟基 - 芴 -9- 甲酸酯甲溴化物；

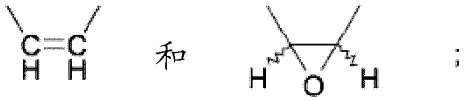
[0240] 环丙基莨菪醇甲基 4,4′ - 二氟二苯乙醇酸酯甲溴化物。

[0241] 根据本发明的药物组合物可含有式 1f 化合物，其任选地具有单独的光学异构体、单独对映体的混合物或其外消旋物的形式。

[0242] 式 1g 的化合物是本领域已知的 (WO 03/064417)。

[0243] 在本发明的另一个优选实施方式中，所述方法包括施用式 1g 的化合物（任选地与可药用赋形剂在一起），其中 A′ 表示选自以下的双重键合基团：

[0244]



[0245] X^- 表示氯、溴或甲磺酸根，优选溴；

[0246] R^{19} 表示羟基或甲基；

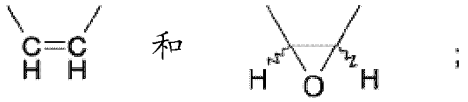
[0247] $R^{1'''}$ 和 $R^{2'''}$ 可相同或不同，并且表示甲基或乙基，优选甲基；

[0248] R^{20}、R^{21}、$R^{20'}$ 和 $R^{21'}$ 可相同或不同，并且表示氢、$-CF_3$、CHF_2 或氟，优选氢或氟。

[0249] 在本发明的另一个优选实施方式中，所述方法包括施用式 1g 的化合物（任选地与可药用赋形剂在一起），其中

[0250] A′ 表示选自以下的双重键合基团：

[0251]



[0252] X^- 表示溴；

[0253] R^{19} 表示羟基或甲基，优选甲基；

[0254] $R^{1'''}$ 和 $R^{2'''}$ 可相同或不同，并且表示甲基或乙基，优选甲基；

[0255] R^3、R^4、$R^{3'}$ 和 $R^{4'}$ 可相同或不同，并且表示氢或氟。

[0256] 在根据本发明的方法中特别重要的是以下的式 1g 化合物：

[0257] 脱品醇 9- 羟基 - 呫吨 -9- 甲酸酯甲溴化物；

[0258] 东莨菪醇 9- 羟基 - 呫吨 -9- 甲酸酯甲溴化物；

[0259] 脱品醇 9- 甲基 - 呫吨 -9- 甲酸酯甲溴化物；

[0260] 东莨菪醇 9- 甲基 - 呫吨 -9- 甲酸酯甲溴化物；

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[0261] 脱品醇 9- 乙基 - 呫吨 -9- 甲酸酯甲溴化物；

[0262] 脱品醇 9- 二氟甲基 - 呫吨 -9- 甲酸酯甲溴化物；

[0263] 东莨菪醇 9- 羟甲基 - 呫吨 -9- 甲酸酯甲溴化物。

[0264] 根据本发明的药物组合物可含有式 1g 的化合物，其任选地具有单独的光学异构体、单独对映体的混合物或其外消旋物的形式。

[0265] 除非另有说明，所使用的烷基是具有 1-5 个碳原子的支链和无支链的烷基。例子包括甲基、乙基、丙基或丁基。基团甲基、乙基、丙基或丁基也可任选地表示为缩写 Me、Et、Prop 或 Bu。除非另有说明，丙基和丁基的定义还包含所讨论的基团的所有可能的异构形式。因此，例如丙基包括正丙基和异丙基，丁基包括异丁基、仲丁基和叔丁基等。

[0266] 除非另有说明，所使用环烷基基团是具有 3-6 个碳原子的脂环基。这些基团是环丙基、环丁基、环戊基和环己基基团。根据本发明，环丙基在本发明的范围内是特别重要的。

[0267] 除非另有说明，所使用的亚烷基基团是具有 1-5 个碳原子的支链和无支链的双重键合的烷基桥。例子包括亚甲基、亚乙基、亚丙基或亚丁基。

[0268] 除非另有说明，所使用的亚烷基 - 卤素基团是具有 1-4 个碳原子的支链和无支链的双重键合的烷基桥，其可被卤素单 -、二 - 或三 - 取代，优选二取代。因此，除非另有说明，术语亚烷基 -OH 基团是具有 1-4 个碳原子的支链和无支链的双重键合的烷基桥，其可被羟基单 -、二 - 或三 - 取代，优选单取代。

[0269] 除非另有说明，所使用的烷氧基 (alkyloxy) 基团是具有 1-5 个碳原子的支链和无支链的烷基，其经由氧原子连接。以下基团可被提及：甲氧基、乙氧基、丙氧基或丁氧基。基团甲氧基、乙氧基、丙氧基或丁氧基也可任选地表示为缩写 MeO、EtO、PropO 或 BuO。除非另有说明，丙氧基和丁氧基的定义中也包含所讨论的基团的所有可能的异构形式。因此，例如丙氧基包括正氧基和异丙氧基，丁氧基包括异丁氧基、仲丁氧基和叔丁氧基等。词语“烷基氧 (alkoxy)”也可用于本发明的范围内代替词语“烷氧基”。基团甲氧基、乙氧基、丙氧基或丁氧基也可称为甲基氧、乙基氧、丙基氧或丁基氧。

[0270] 除非另有说明，所使用的亚烷基 - 烷氧基基团是具有 1-5 个碳原子的支链和无支链的双重键合的烷基桥，其可被烷氧基基团单 -、二 - 或三 - 取代，优选单取代。

[0271] 除非另有说明，所使用的 -O-CO- 烷基基团是具有 1-4 个碳原子的支链和无支链的烷基基团，其经由酯基结合。烷基与酯基的羰基碳直接结合。术语 -O-CO- 烷基 - 卤素基团应类似理解。基团 -O-CO-CF_3 表示三氟乙酸酯。

[0272] 在本发明的范围内，卤素表示氟、氯、溴或碘。除非另有说明，氟和溴是优选的卤素。基团 CO 表示羰基。

[0273] 本发明的一个方面涉及一种吸入装置，在该吸入装置中，多个剂量包含在一个存储器中。在本发明的另一方面，所述吸入装置包括在多剂量泡囊包装中的多个剂量。在本发明的另一方面，所述吸入装置包括泡囊条带形式的多剂量泡囊包装。

[0274] 根据本发明的吸入装置包括式 1 的化合物，其优选与可药用赋形剂混和形成粉末混合物。以下可药用赋形剂可用于制备根据本发明的这些可吸入粉末混合物：单糖（例如，葡萄糖或阿拉伯糖）、二糖（例如，乳糖、蔗糖、麦芽糖、海藻糖）、低聚糖和多糖（例如，右旋糖酐）、多元醇（例如，山梨醇、甘露醇、木糖醇）、盐（例如，氯化钠、碳酸钙）或这些赋形剂彼此的混合物。优选使用单糖或二糖，同时优选使用乳糖或葡萄糖，特别地，但非排他地，以

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其水合物的形式。对于本发明，乳糖和海藻糖是特别优选的赋形剂，同时乳糖（优选以其一水合物或无水形式）是最特别优选的。

[0275] 式 1 的化合物可以其外消旋物、对映体或其混合物的形式使用。从外消旋物中分离对映体可使用本领域已知的方法进行（例如，通过在手性相上进行色谱分离等）。

[0276] 任选地，根据本发明的吸入装置含有多个剂量的粉末形式的药物，所述粉末形式的药物中除了一种式 1 的化合物之外还包含另一种活性成分。

[0277] 优选地，另一种活性成分是 β_2 激动剂 2，其选自舒喘宁、班布特罗、比托特罗、溴沙特罗、脲喘宁、克喘素、非诺特罗、福莫特罗、海索那林、异丁特罗、异他林、治喘灵、左旋沙丁胺醇、马布特罗、美卢君、间羟异丙肾上腺、间羟异丙肾上腺素、吡布特罗、异丙喹喘宁、茶丙特罗、羟哌甲苯二酚、利托君、沙美特罗、沙甲胺醇、soterenot、sulphonterol、噻拉米特、叔丁喘宁、妥布特洛、CHF-1035、HOKU-81、KUL-1248、3-(4-{6-[2-羟基-2-(4-羟基-3-羟甲基-苯基)-乙基氨基]-己氧基}-丁基)-苯磺酰胺、5-[2-(5,6-二乙基-二氢化茚-2-基氨基)-1-羟基-乙基]-8-羟基-1H-喹啉-2-酮、4-羟基-7-[2-{[2-{[3-(2-苯基乙氧基)丙基]磺酰基}乙基]-氨基}乙基]-2(3H)-苯并噻唑酮、1-(2-氟-4-羟苯基)-2-[4-(1-苯并咪唑基)-2-甲基-2-丁基氨基]乙醇、1-[3-(4-甲氧基苄基-氨基)-4-羟苯基]-2-[4-(1-苯并咪唑基)-2-甲基-2-丁基氨基]乙醇、1-[2H-5-羟基-3-氧代-4H-1,4-苯并噁嗪-8-基]-2-[3-(4-N,N-二乙基氨基苯基)-2-甲基-2-丙基氨基]乙醇、1-[2H-5-羟基-3-氧代-4H-1,4-苯并噁嗪-8-基]-2-[3-(4-甲氧基苯基)-2-甲基-2-丙基氨基]乙醇、1-[2H-5-羟基-3-氧代-4H-1,4-苯并噁嗪-8-基]-2-[3-(4-正丁氧基苯基)-2-甲基-2-丙基氨基]乙醇、1-[2H-5-羟基-3-氧代-4H-1,4-苯并噁嗪-8-基]-2-{4-[3-(4-甲氧基苯基)-1,2,4-三唑-3-基]-2-甲基-2-丁基氨基}乙醇、5-羟基-8-(1-羟基-2-异丙基氨基丁基)-2H-1,4-苯并噁嗪-3-(4H)-酮、1-(4-氨基-3-氯-5-三氟甲苯基)-2-叔丁基氨基）乙醇和 1-(4-乙氧基羰基氨基-3-氰基-5-氟苯基)-2-(叔丁基氨基）乙醇，这些物质任选地具有其外消旋物、对映体、非对映体形式，并且任选地作为其可药用的酸加成盐及其水合物。

[0278] 根据本发明的更优选的 β_2 激动剂 2 选自班布特罗、比托特罗、脲喘宁、克喘素、非诺特罗、福莫特罗、海索那林、异丁特罗、吡布特罗、异丙喹喘宁、茶丙特罗、沙美特罗、sulphonterol、叔丁喘宁、妥布特洛、3-(4-{6-[2-羟基-2-(4-羟基-3-羟甲基-苯基)-乙基氨基]-己氧基}-丁基)-苯磺酰胺、5-[2-(5,6-二乙基-二氢化茚-2-基氨基)-1-羟基-乙基]-8-羟基-1H-喹啉-2-酮、4-羟基-7-[2-{[2-{[3-(2-苯基乙氧基)丙基]磺酰基}乙基]-氨基}乙基]-2(3H)-苯并噻唑酮、1-(2-氟-4-羟苯基)-2-[4-(1-苯并咪唑基)-2-甲基-2-丁基氨基]乙醇、1-[3-(4-甲氧基苄基-氨基)-4-羟苯基]-2-[4-(1-苯并咪唑基)-2-甲基-2-丁基氨基]乙醇、1-[2H-5-羟基-3-氧代-4H-1,4-苯并噁嗪-8-基]-2-[3-(4-N,N-二乙基氨基苯基)-2-甲基-2-丙基氨基]乙醇、1-[2H-5-羟基-3-氧代-4H-1,4-苯并噁嗪-8-基]-2-[3-(4-甲氧基苯基)-2-甲基-2-丙基氨基]乙醇、1-[2H-5-羟基-3-OXO-4H-1,4-苯并噁嗪-8-基]-2-[3-(4-正丁氧基苯基)-2-甲基-2-丙基氨基]乙醇、1-[2H-5-羟基-3-氧代-4H-1,4-苯并噁嗪-8-基]-2-{4-[3-(4-甲氧基苯基)-1,2,4-三唑-3-基]-2-甲基-2-丁基氨基}乙醇、5-羟基-8-(1-羟基-2-异丙基氨基丁基)-2H-1,4-苯并噁嗪-3-(4H)-酮、1-(4-氨基-3-氯-5-三氟甲苯基)-2-叔

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丁基氨基）乙醇和 1-(4- 乙氧基羰基氨基 -3- 氰基 -5- 氟苯基)-2-(叔丁基氨基）乙醇，这些物质任选地具有其外消旋物、对映体、非对映体形式，并且任选地作为其可药用的酸加成盐及其水合物。

[0279] 更优选地，在根据本发明的组合物中使用的 β_2 模拟剂选自非诺特罗、福莫特罗、沙美特罗、3-(4-{6-[2- 羟基 -2-(4- 羟基 -3- 羟甲基 - 苯基)- 乙基氨基]- 己氧基 }- 丁基)- 苯磺酰胺、5-[2-(5,6- 二乙基 - 二氢化茚 -2- 基氨基)-1- 羟基 - 乙基]-8- 羟基 -1H- 喹啉 -2- 酮、1-[3-(4- 甲氧基苄基 - 氨基)-4- 羟苯基]-2-[4-(1- 苯并咪唑基)-2- 甲基 -2- 丁基氨基] 乙醇、1-[2H-5- 羟基 -3- 氧代 -4H-1,4- 苯并噁嗪 -8- 基]-2-[3-(4-N, N- 二乙基氨基苯基)-2- 甲基 -2- 丙基氨基] 乙醇、1-[2H-5- 羟基 -3- 氧代 -4H-1,4- 苯并噁嗪 -8- 基]-2-[3-(4- 甲氧基苯基)-2- 甲基 -2- 丙基氨基] 乙醇、1-[2H-5- 羟基 -3- 氧代 -4H-1,4- 苯并噁嗪 -8- 基]-2-[3-(4- 正丁氧基苯基)-2- 甲基 -2- 丙基氨基] 乙醇、1-[2H-5- 羟基 -3- 氧代 -4H-1,4- 苯并噁嗪 -8- 基]-2-{4-[3-(4- 甲氧基苯基)-1,2,4- 三唑 -3- 基]-2- 甲基 -2- 丁基氨基 } 乙醇，这些物质任选地具有其外消旋物、对映体、非对映体形式，并且任选地作为其可药用的酸加成盐及其水合物。在上述 β 模拟剂中，特别优选化合物福莫特罗、沙美特罗、3-(4-{6-[2- 羟基 -2-(4- 羟基 -3- 羟甲基 - 苯基)- 乙基氨基]- 己氧基 }- 丁基)- 苯磺酰胺和 5-[2-(5,6- 二乙基 - 二氢化茚 -2- 基氨基)-1- 羟基 - 乙基]-8- 羟基 -1H- 喹啉 -2- 酮，这些物质任选地具有其外消旋物、对映体、非对映体形式，并且任选地作为其可药用的酸加成盐及其水合物。在上述 β - 模拟剂中，特别优选化合物福莫特罗和沙美特罗，这些物质任选地具有其外消旋物、对映体、非对映体形式，并且任选地作为其可药用的酸加成盐及其水合物。

[0280] 根据本发明的 β - 模拟剂 2 的可药用酸加成盐的例子是选自以下物质的盐的可药用盐 : 盐酸、氢溴酸、硫酸、磷酸、甲磺酸、乙酸、富马酸、琥珀酸、乳酸、柠檬酸、酒石酸、1- 羟基 -2- 萘甲酸、4- 苯基肉桂酸、5-(2,4- 二氟苯基) 水杨酸或马来酸。如果需要，也可使用上述酸的混合物来制备盐 2。

[0281] 根据本发明，优选选自以下的 β - 模拟剂 2 的盐 : 盐酸盐、氢溴酸盐、硫酸盐、磷酸盐、富马酸盐、甲磺酸盐、4- 苯基肉桂酸盐、5-(2,4- 二氟苯基) 水杨酸盐、马来酸盐和昔萘酸酯。对于沙美特罗，特别优选的是选自以下的 2 的盐 : 盐酸盐、硫酸盐、4- 苯基肉桂酸盐、5-(2,4- 二氟苯基) 水杨酸盐和昔萘酸盐，其中 4- 苯基肉桂酸盐、5-(2,4- 二氟苯基) 水杨酸盐、并且尤其是昔萘酸盐是特别重要的。至于福莫特罗，特别优选的是选自以下的 2 的盐 : 盐酸盐、硫酸盐和富马酸盐，其中特别优选盐酸盐和富马酸盐。根据本发明，格外重要的是富马酸福莫特罗。

[0282] 优选使用以下物质的盐作为根据本发明的 β - 模拟剂 : 沙美特罗、福莫特罗、3-(4-{6-[2- 羟基 -2-(4- 羟基 -3- 羟甲基 - 苯基)- 乙基氨基]- 己氧基 }- 丁基)- 苯磺酰胺和 5-[2-(5,6- 二乙基 - 二氢化茚 -2- 基氨基)-1- 羟基 - 乙基]-8- 羟基 -1H- 喹啉 -2- 酮。对本发明来说特别重要的是沙美特罗和福莫特罗盐。任何述及术语 β - 模拟剂 2 之处也包括述及其相关的对映体或混合物。在根据本发明的药物组合物，化合物 2 可以其外消旋物、对映体或其混合物的形式存在。从外消旋物中分离对映体可使用本领域已知的方法进行（例如，通过在手性相上进行色谱分离等）。如果化合物 2 以其对映体的形式使用，则特别优选使用在 C-OH 基团处具有 R 构型的对映体。

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[0283] 任选地，根据本发明的吸入装置含有多个剂量的粉末形式的药物，所述粉末形式的药物中除了一种式 1 的化合物之外还包含作为另一种活性成分的类固醇 3。

[0284] 在这种药物组合中，类固醇 3 优选选自氢化泼尼松、强的松、布替可特丙酸酯、RPR-106541、氟尼缩松、倍氯米松、氟羟脱氢皮醇、布地缩松、氟替卡松、莫米松、环索奈德、罗氟奈德、ST-126、地塞米松、(S)-6α，9α－二氟－17α－[(2-呋喃基羰基）氧基]-11β－羟基－16α－甲基－3-氧代－雄－1,4-二烯－17β－硫代羧酸氟甲基酯、(S)-6α，9α－二氟－11β－羟基－16α－甲基－3-氧代－17α－丙酰氧基－雄－1,4-二烯－17β－硫代羧酸(2-氧代－四氢－呋喃－3S-基）酯和艾泼诺醇二氯乙酸酯 (etiprednol-dichloroacetate，(BNP-166))，这些物质任选地具有其外消旋物、对映体或非对映体的形式，并且任选地具有其盐及其衍生物、溶剂合物和 / 或其水合物的形式。

[0285] 在特别优选的药物组合中，类固醇 3 选自氟尼缩松、倍氯米松、氟羟脱氢皮醇、布地缩松、氟替卡松、莫米松、环索奈德、罗氟奈德、ST-126、地塞米松、(S)-6α，9α－二氟－11α－[(2-呋喃基羰基）氧基]-11β－羟基－16α－甲基－3-氧代－雄－1,4-二烯－17β 硫代羧酸氟甲基酯、(S)-6α，9α－二氟－11β－羟基－16α－甲基－3-氧代－17α－丙酰氧基－雄－1,4-二烯－17β－硫代羧酸 (2-氧代－四氢－呋喃－3S-基）酯和艾泼诺醇二氯乙酸酯，这些物质任选地具有其外消旋物、对映体或非对映体的形式，并且任选地具有其盐及其衍生物、溶剂合物和 / 或其水合物的形式。

[0286] 在特别优选的药物组合中，类固醇 3 选自布地缩松、氟替卡松、莫米松、环索奈德、(S)-6α，9α－二氟－11α－[(2-呋喃基羰基）氧基]-11β－羟基－16α－甲基－3-氧代－雄－1,4-二烯－17β 硫代羧酸氟甲基酯和艾泼诺醇二氯乙酸酯，这些物质任选地具有其外消旋物、对映体或非对映体的形式，并且任选地具有其盐及其衍生物、溶剂合物和 / 或其水合物的形式。

[0287] 任何述及类固醇 3 之处也包括述及其可以存在的任何盐或衍生物、水合物或溶剂化物。类固醇 3 的可能的盐和衍生物的例子可以是：碱金属盐（诸如例如钠或钾盐）、磺基苯甲酸盐、磷酸盐、异烟酸盐、醋酸盐、丙酸酯、磷酸二氢盐、棕榈酸盐、特戊酸盐或 furcates。

[0288] 任选地，根据本发明的吸入装置含有多个剂量的粉末形式的药物，所述药物中除式 1 化合物之外还包含在上文中提及的 β－模拟剂 2 之一和在上文中提及的类固醇 3 之一。

[0289] 因此，在本发明的一个优选实施方式中，涉及一种吸入装置，所述吸入装置包括外壳和泡囊条带以及用于容纳和卷绕所述条带的螺旋盘绕元件，所述条带可移动以依次将每个泡囊与用于打开泡囊以使使用者能吸入所述剂量的装置对齐，其中每个泡囊含有粉末形式的药物组合物，其中所述药物组合物包含一种或多种（优选一种）的式 1 化合物。

[0290] 在另一个实施方式中，本发明涉及一种吸入装置，所述吸入装置包括外壳和泡囊条带，所述条带可移动以依次将每个泡囊与用于打开泡囊以使使用者能吸入所述剂量的装置对齐，所述外壳包括用于容纳泡囊条带的公用室 (common chamber) 和该条带的已破口泡囊的卷，所述室配置为使得当条带的更多泡囊破开时，已破口泡囊的卷占据更多的室内空间，所述室内空间最初是被泡囊条带所占据的，其中每个泡囊含有粉末形式的药物组合物，其中所述药物组合物包含一种或多种（优选一种）的式 1 化合物。

[0291] 在根据本发明的可吸入粉末的范围内，赋形剂的最大平均粒径为至多 250μm，优

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选在 10-150μm 之间，最优选在 15-80μm 之间。有时似乎适合向上述赋形剂中加入平均粒径为 1-9μm 的较细的赋形剂成分。这些较细的赋形剂也选自在上文中列举的可能的赋形剂，但还可包括选自以下的盐：氯化铵、正磷酸铵、硫酸铵、二水合氯化钡、五水合乳酸钙、五水合硫酸铜、四水合水杨酸镁、七水合硫酸镁、硫酸氢钾、溴化钾、铬酸钾、正磷酸二氢钾、三水合乙酸钠、十二水合六溴铱酸钠、十水合碳酸钠、三水合偏磷酸钠、六水合偏磷酸钠、七水合亚硫酸钠、七水合硫酸钠、十水合硫酸钠、五水合硫代硫酸钠、七水合硫酸锌及其组合。优选所述盐是无定形的或无水结晶态的。

[0292] 最后，为制备根据本发明的可吸入粉末，向赋形剂混合物中加入微粒化活性物质 1 以及任选地 2 和 / 或 3，优选平均粒径为 0.5-10μm，更优选 1-6μm。用于通过研磨和微粒化来产生根据本发明的可吸入粉末以及最后将各组分混和在一起的方法可从现有技术中得知。

[0293] 对于制备粉末形式的药物组合物的方法，可参考例如 WO02/30390、WO 03/017970 或 WO 03/017979 的公开内容。WO02/30390、WO 03/017970 和 WO 03/017979 的公开内容通过引用以其整体并入本专利申请中。

[0294] 作为一个例子，根据本发明的药物组合物可通过如下所述的方法获得。

[0295] 首先，将赋形剂和活性物质置于合适的混合容器中。所用的活性物质具有 0.5-10μm 的平均粒径，优选 1-6μm，最优选 2-5μm。优选使用网眼尺寸为 1-2mm（优选 0.3-1 毫米，最优选 0.3-0.6 毫米）的筛子或粒化筛来加入赋形剂和活性物质。优选向混合容器中先加入赋形剂然后加入活性物质。在该混合过程中，优选将两种组分分批加入。特别优选以交替层筛入这两种组分。可在赋形剂与活性物质发生混和的同时继续加入这两种组分。然而，优选地，一旦已逐层筛入这两种组分，则仅进行混和。

[0296] 如果在化学制备之后，在上文所述方法中使用的活性物质并不是已经以具有前文中所提及的粒子尺寸的结晶形式而获得的，则可将其碾碎到符合前述参数的粒子型号（所谓的微粒化）。

[0297] 尽管已经显示和描述了本发明的实施方式，本领域技术人员将会意识到前面的描述应视为仅对优选实施方式进行描述，且落入所附权利要求范围内的其它实施方式应被视为形成本发明公开内容的一部分。

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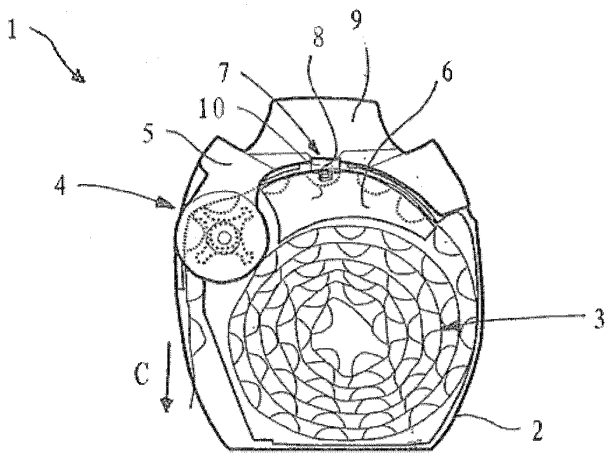
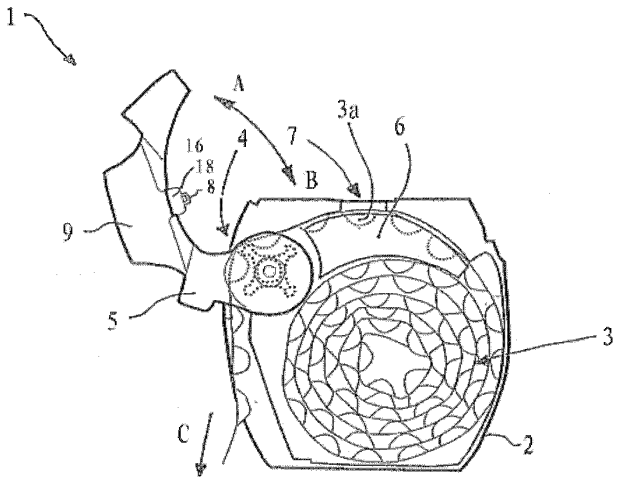


图 1A（现有技术）



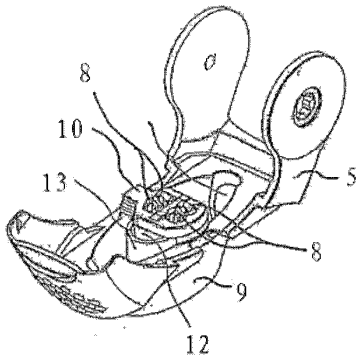


图 1C

图 1B（现有技术）

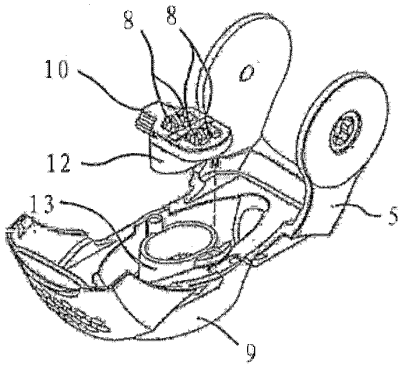


图 1D

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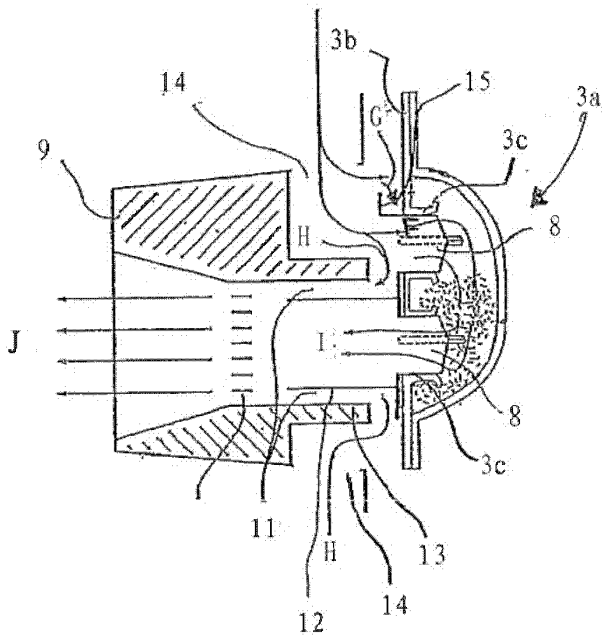

图 1E

NJOY Exhibit 1002.534

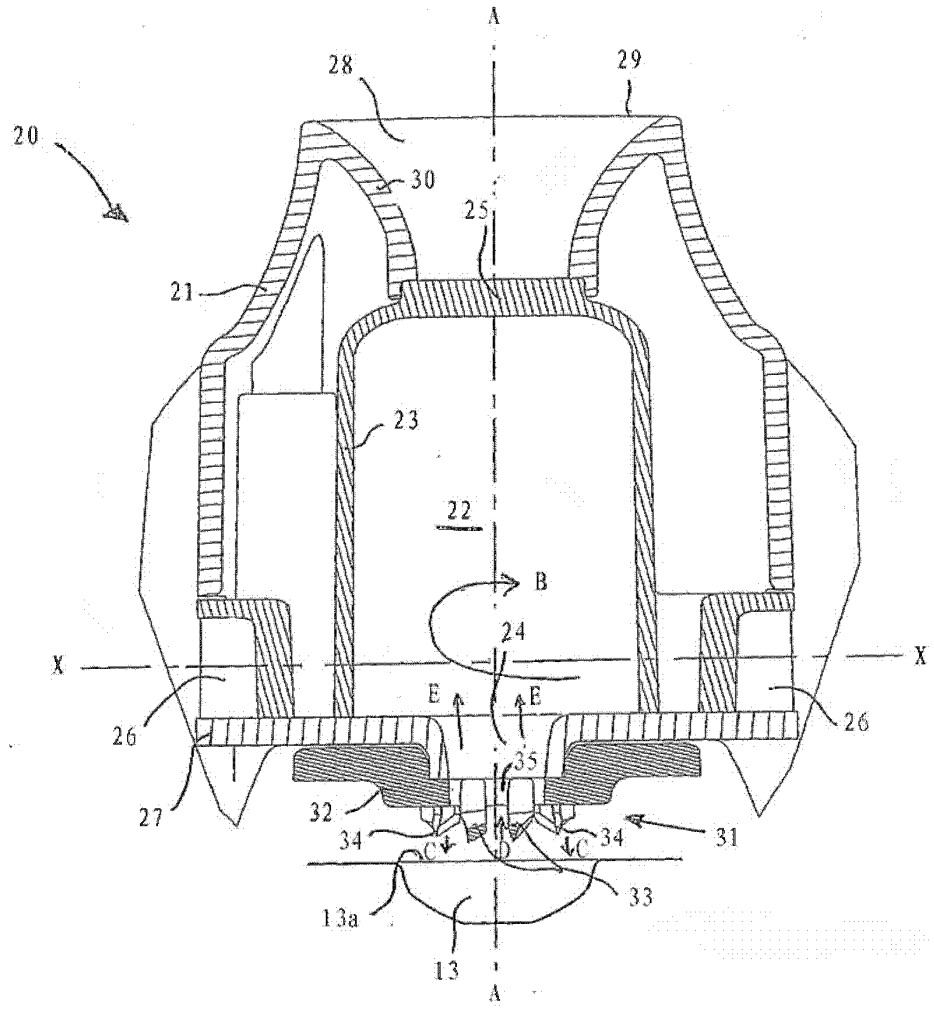

图 2A

NJOY Exhibit 1002.535

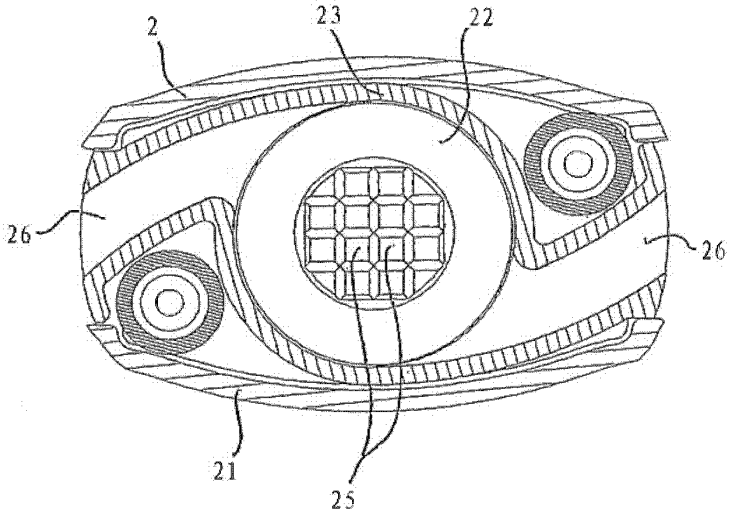

图 2B

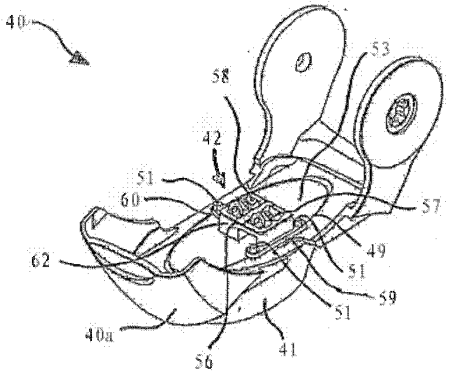

图 3A

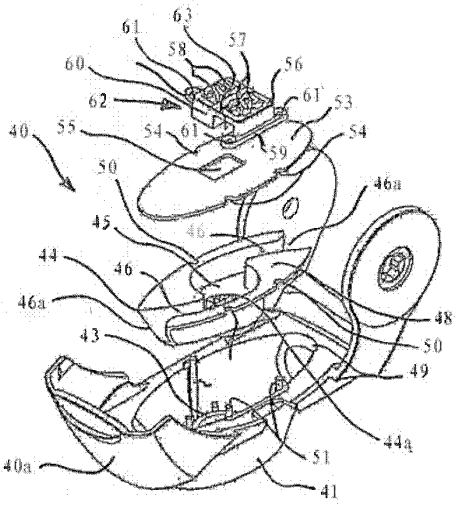

图 3B

NJOY Exhibit 1002.536

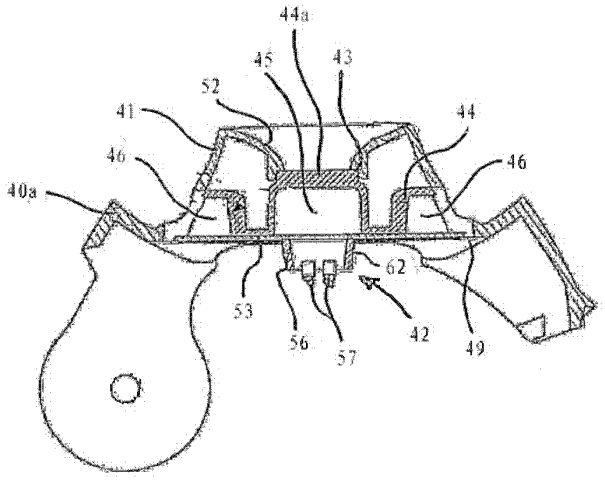

图 3C

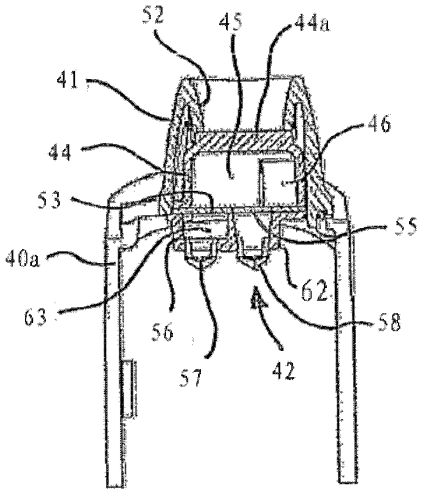

图 3D

NJOY Exhibit 1002.537

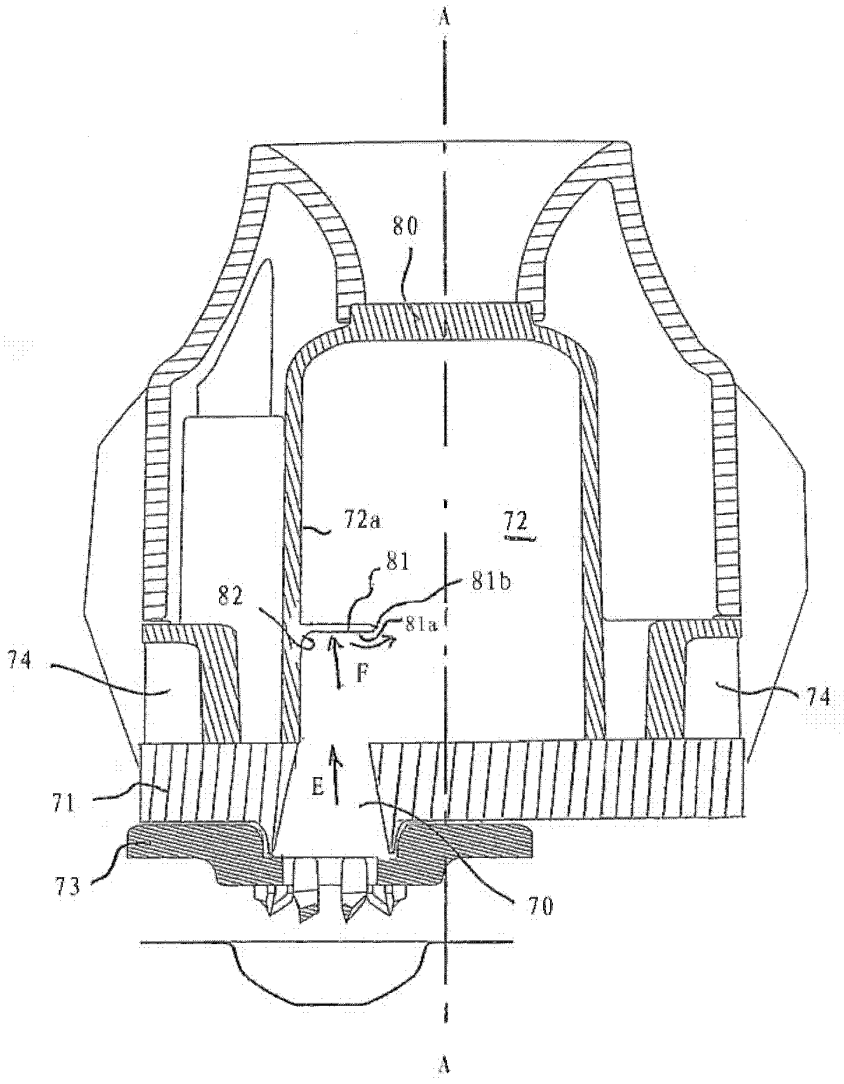

图 4

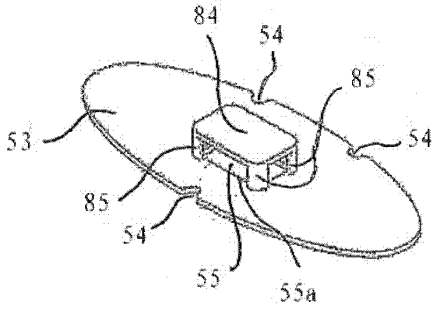

图 5

NJOY Exhibit 1002.538

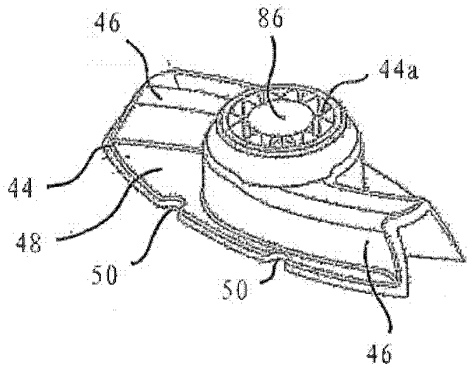

图 6

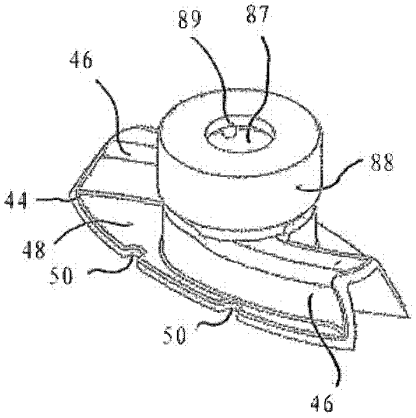

图 7A

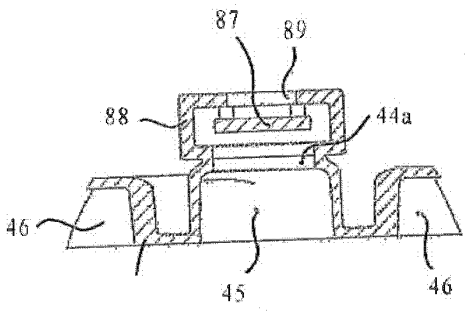

图 7B

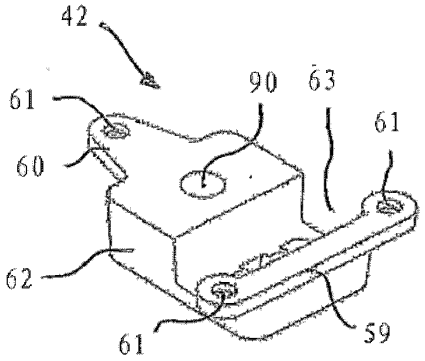

图 8A

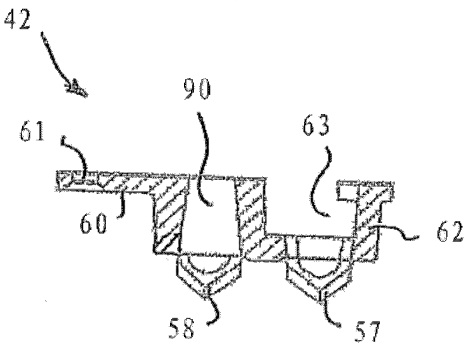

图 8B

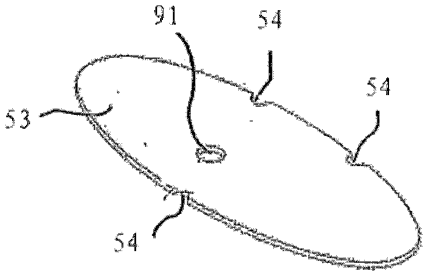

图 9

NJOY Exhibit 1002.539

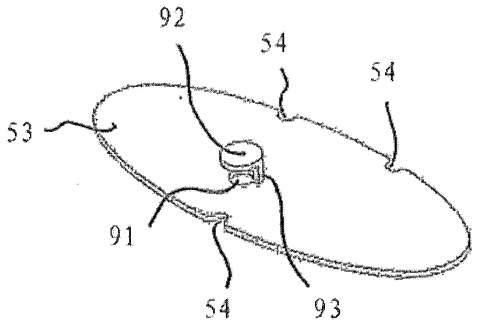

图 10

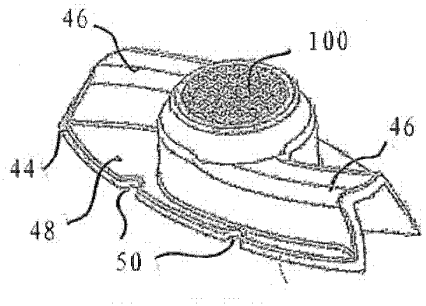

图 11

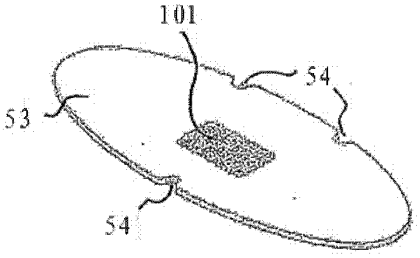

图 12

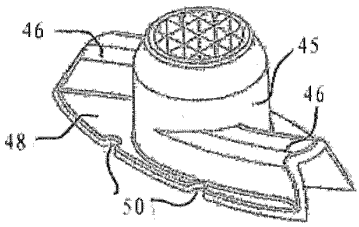

图 13A

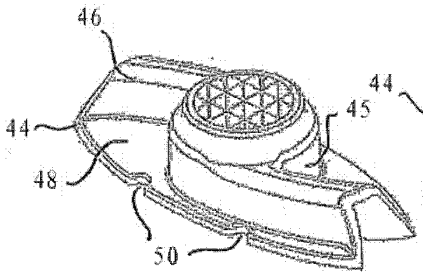

图 13B

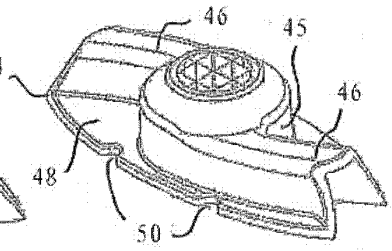

图 13C

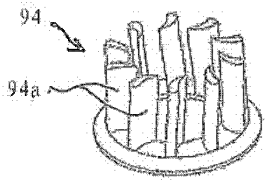

图 14

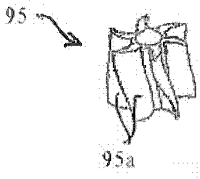

图 15

NJOY Exhibit 1002.540

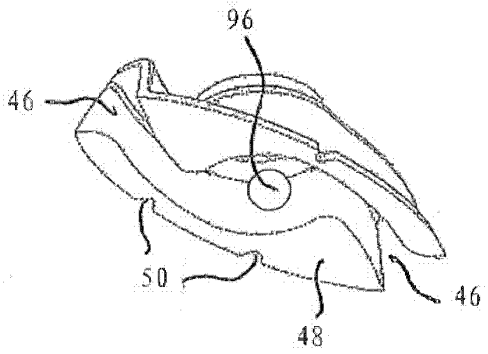

图 16

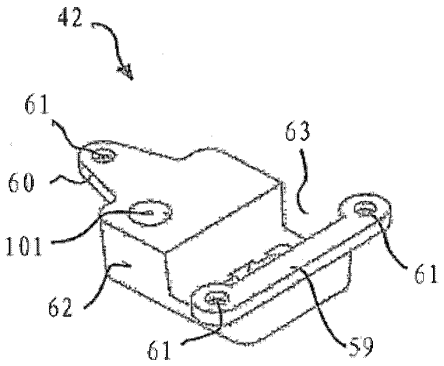

图 17A

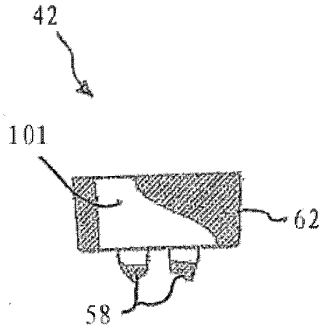

图 17B

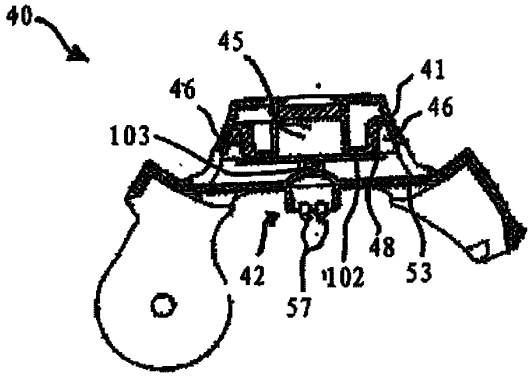

图 18A

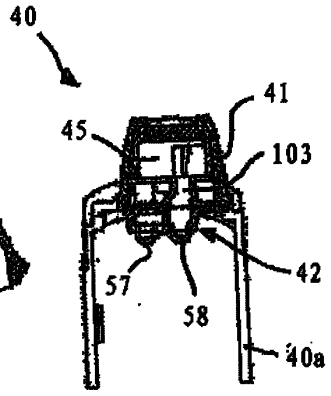

图 18B

NJOY Exhibit 1002.541

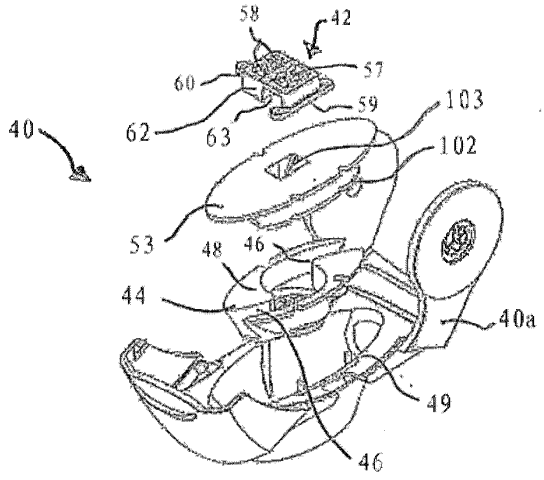

图 18C

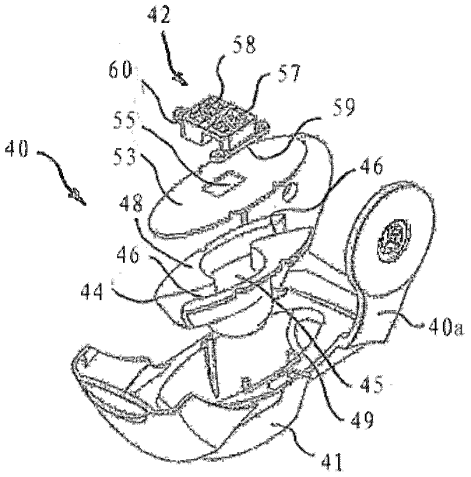

图 19A

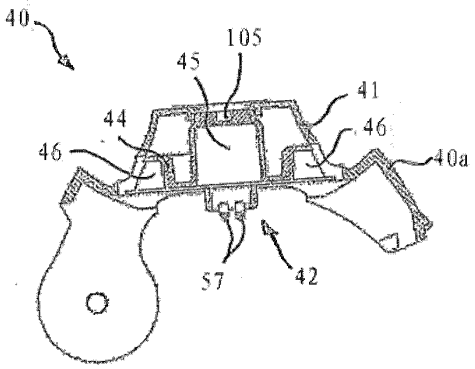

图 19B

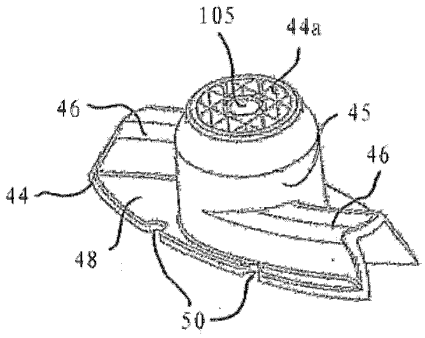

图 19C

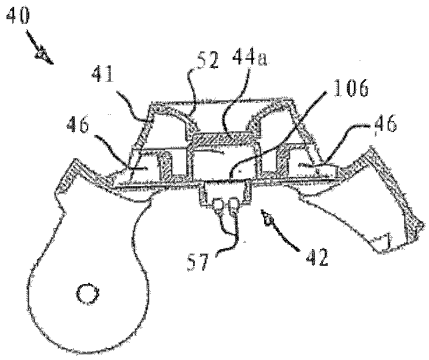

图 20A

NJOY Exhibit 1002.542

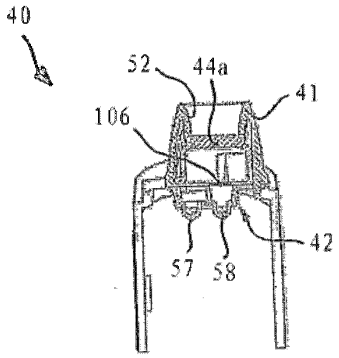

图 20B

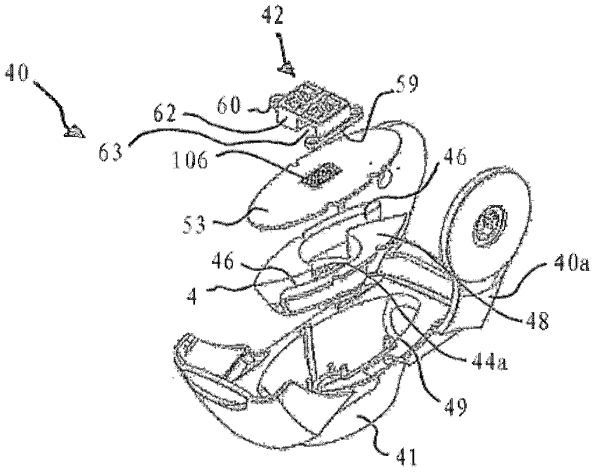

图 20C

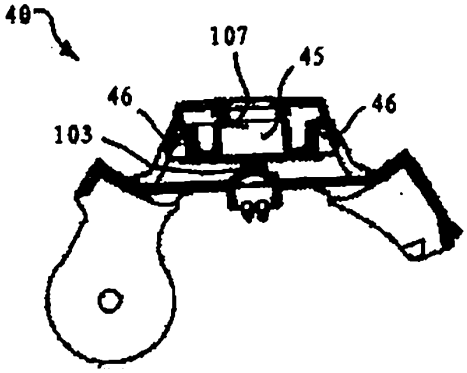

图 21A

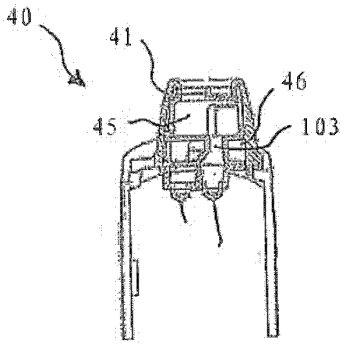

图 21B

NJOY Exhibit 1002.543

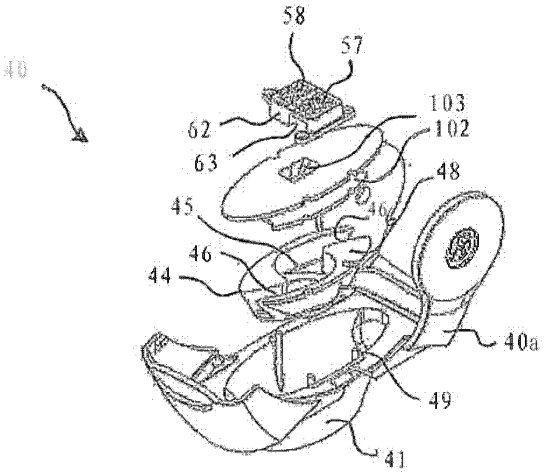

图 21C

NJOY Exhibit 1002.544

图 22

NJOY Exhibit 1002.545

Espacenet

Bibliographic data: CN102920028 (A) — 2013-02-13

Atomizer for electronic cigarette and electronic cigarette

Inventor(s): LI YONGHAI; XU ZHONGLI ± (LI YONGHAI, ; XU ZHONGLI)

Applicant(s): SHENZHEN FIRST UNION TECH CO ± (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD)

Classification: **- international:** ***A24F47/00***
- cooperative: **A24F47/008**

Application number: CN20121458765 20121115 Global Dossier

Priority number(s): CN20121458765 20121115

Also published as: CN102920028 (B) EP2732714 (A1) US2014130817 (A1)

Abstract of CN102920028 (A)

The invention discloses an atomizer for an electronic cigarette, and aims to provide the atomizer for the electronic cigarette, which is few in elements, simple in assembling process and low in cost. The implementation scheme is as follows: the atomizer for the electronic cigarette comprises an atomization sleeve, a suction nozzle cover, a thread bushing, an electrode retaining collar fixedly arranged in the thread bushing, an oil storage substance arranged in the atomization sleeve and a heating wire component, wherein an insulation ring is arranged between the thread bushing and the electrode retaining collar; the suction nozzle cover and the thread bushing are respectively in close fit with two ends of the atomization sleeve; two pins of the heating wire component are respectively connected with the thread bushing and the electrode retaining collar; the oil storage substance is formed by at least two layers with different densities; and the atomizer is exclusive of a glass fiber pipe. The invention further discloses an electronic cigarette comprising the atomizer.

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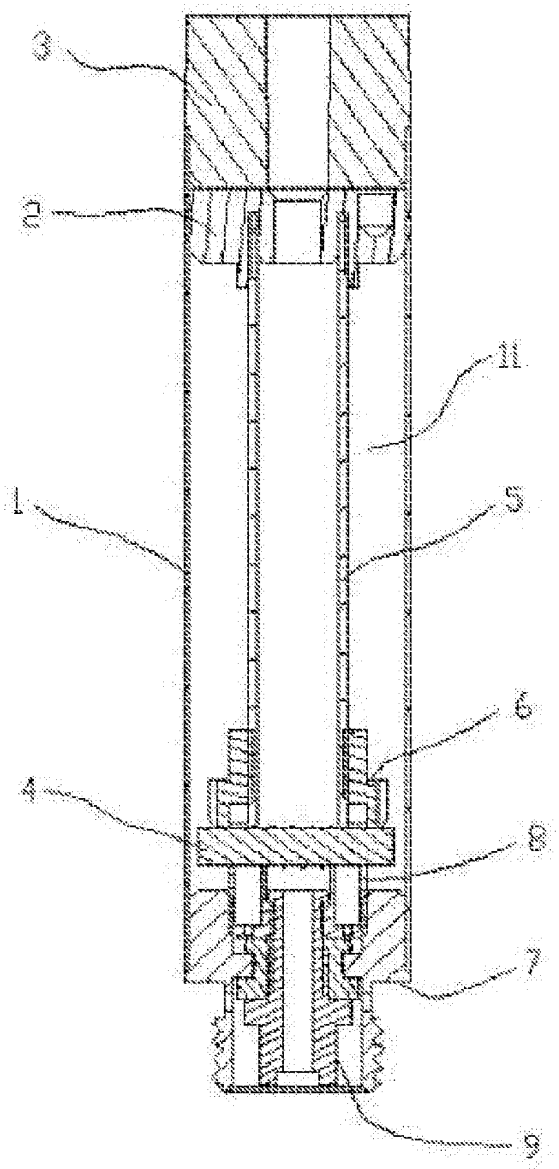

FIG.1

NJOY Exhibit 1002.547

(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)申请公布号 CN 102920028 A
(43)申请公布日 2013.02.13

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(72)发明人 李永海 徐中立

(51)Int.Cl.
A24F 47/00(2006.01)

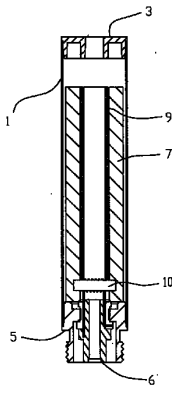
权利要求书 1 页 说明书 5 页 附图 3 页

(54)发明名称

电子烟用雾化器及电子烟

(57)摘要

本发明公开了一种电子烟用雾化器，旨在提供一种部件少，装配工艺简单，成本低的电子烟用雾化器。本发明采用的实施方案是：一种电子烟用雾化器，包括雾化套、吸嘴盖、螺纹套、固定设置在所述螺纹套内的电极环、设置在所述雾化套内的储油物质、电热丝组件，所述螺纹套与电极环之间设置有绝缘环，所述吸嘴盖和螺纹套分别紧配合在所述雾化套的两端，所述电热丝组件的两引脚分别与所述螺纹套和电极环相连接；所述储油物质由密度大小不一的至少两层构成；该雾化器中不包括玻纤管。本发明还公开了一种包含上述雾化器的电子烟。



CN 102920028 A

NJOY Exhibit 1002.548

1. 一种电子烟用雾化器，其特征在于：包括雾化套、吸嘴盖、螺纹套、固定设置在所述螺纹套内的电极环、设置在所述雾化套内的储油物质、电热丝组件，所述螺纹套与电极环之间设置有绝缘环，所述吸嘴盖和螺纹套分别紧配合在所述雾化套的两端，所述电热丝组件的两引脚分别与所述螺纹套和电极环相连接；所述储油物质由密度大小不一的至少两层构成；该雾化器中不包括玻纤管。

2. 根据权利要求 1 所述的电子烟用雾化器，其特征在于：所述螺纹套的外表面设置有滚花，所述滚花的外表面涂有密封胶后紧配合连接在所述雾化套内。

3. 根据权利要求 2 所述的电子烟用雾化器，其特征在于：所述螺纹套与所述雾化套的连接处不设置密封圈。

4. 根据权利要求 1 所述的电子烟用雾化器，其特征在于：所述吸嘴盖与所述雾化套的连接处不设置阻油环。

5. 根据权利要求 1 所述的电子烟用雾化器，其特征在于：还包括玻纤管，所述储油物质包裹在所述玻纤管上，所述储油物质中密度大的一层靠近所述玻纤管。

6. 根据权利要求 5 所述的电子烟用雾化器，其特征在于：所述玻纤管上与所述螺纹套的连接端设有开口，该开口将所述玻纤管分成至少两个连接片，所述螺纹套上设有环形凹槽，所述连接片插接在所述环形凹槽中；所述环形凹槽中过盈配合有楔片，所述楔片压紧在所述连接片的外表面。

7. 根据权利要求 1 所述的电子烟用雾化器，其特征在于：所述储油物质由棉布层和吸油棉构成，所述吸油棉的密度小于所述棉布层，所述吸油棉的厚度大于所述棉布层。

8. 根据权利要求 1 所述的电子烟用雾化器，其特征在于：所述螺纹套由上下两部分构成，上部分为与所述雾化套相连接的滚花结构，下一部分为外螺纹结构。

9. 根据权利要求 1 所述的电子烟用雾化器，其特征在于：所述螺纹套的外表面为滚花结构，内表面设有跟外部连接的内螺纹。

10. 根据权利要求 1 所述的电子烟用雾化器，其特征在于：所述所述螺纹套上设置有进气用的孔或侧槽。

11. 一种电子烟，包括电池组件，其特征在于：还包括权利要求 1 至 10 中任一项所述的电子烟用雾化器。

NJOY Exhibit 1002.549

电子烟用雾化器及电子烟

技术领域

[0001] 本发明涉及一种电子烟用雾化器，还涉及包含该雾化器的电子烟。

背景技术

[0002] 市场上的电子烟在电池组件上都设置有雾化器，雾化器里面设置使烟油雾化的电热丝组件。现有技术中的雾化器，如说明书附图中图 1 所示，该雾化器包括雾化套 1、设置在雾化套 1 中的玻纤管 2、吸嘴盖 3、螺纹套 5、固定设置在所述螺纹套 5 内的电极环 6、包裹在所述玻纤管 2 上的储油物质、电热丝组件 10，所述螺纹套 5 与电极环 6 之间设置有绝缘环 11，所述吸嘴盖 3 和螺纹套 5 分别设置在所述雾化套 1 的两端，所述吸嘴盖 3 与所述雾化套 1 之间设置有阻油环 4，所述螺纹套 5 与所述雾化套 1 之间设置有防止烟油泄漏的密封圈 8，所述电热丝组件 10 的两引脚分别与所述螺纹套 5 和电极环 6 相连接，所述玻纤管 2 固定在所述螺纹套 5 上。

[0003] 由图 1 中所示出的现有技术，其电子烟用雾化器的结构复杂，所包含的部件较多，装配工艺复杂，成本高。

发明内容

[0004] 根据现有技术中所存在的不足，本发明的主要目的是提供一种部件少，装配工艺简单，成本低的电子烟用雾化器。

[0005] 根据现有技术中所存在的不足，本发明还有一目的是提供一种部件少，装配工艺简单，成本低的电子烟。

[0006] 为达到上述目的，本发明所采用的技术方案是：一种电子烟用雾化器，包括雾化套、吸嘴盖、螺纹套、固定设置在所述螺纹套内的电极环、设置在所述雾化套内的储油物质、电热丝组件，所述螺纹套与电极环之间设置有绝缘环，所述吸嘴盖和螺纹套分别紧配合在所述雾化套的两端，所述电热丝组件的两引脚分别与所述螺纹套和电极环相连接；所述储油物质由密度大小不一的至少两层构成；该雾化器中不包括玻纤管。

[0007] 进一步地，本技术方案中所述螺纹套的外表面设置有滚花，所述滚花的外表面涂有密封胶后紧配合连接在所述雾化套内。由于所述螺纹套的外表面设置有滚花，所以在所述滚花的外表面涂上密封胶后，所述滚花的凹槽中就能附着大量的密封胶，从而使所述螺纹套与所述雾化套连接后形成良好的密封。

[0008] 进一步地，本技术方案中所述螺纹套与所述雾化套的连接处不设置密封圈。这样一来，就又少了在所述螺纹套上套接密封圈的装配步骤，优化了本发明的装配工艺。

[0009] 优选地，本技术方案中所述吸嘴盖与所述雾化套的连接处不设置阻油环。这样一来，就又少了在所述吸嘴盖与所述雾化套之间设置阻油环的装配步骤，优化了本发明的装配工艺。

[0010] 进一步地，本技术方案中还包括玻纤管，所述储油物质包裹在所述玻纤管上，所述储油物质中密度大的一层靠近所述玻纤管。这样设置的目的是：由于烟油在密度大的物质

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中的流动性差，所以可以起到防止过多的油浸入所述电热丝组件中，将电热丝湮灭，同时也可以防止发生漏油的现象。

[0011] 进一步地，本技术方案中所述玻纤管上与所述螺纹套的连接端设有开口，该开口将所述玻纤管分成至少两个连接片，所述螺纹套上设有环形凹槽，所述连接片插接在所述环形凹槽中；所述环形凹槽中过盈配合有楔片，所述楔片压紧在所述连接片的外表面。这样设置的目的是，省去了现有技术中，玻纤管固定在所述螺纹套上的点白胶工艺。在进入下一道工序时，节省从点胶到胶干的等待时间，在装配好楔片后可以迅速进入下一道工序，而且楔片的安装也比较简单，所以可以提高电子烟的生产效率。

[0012] 进一步地，本技术方案中所述储油物质由棉布层和吸油棉构成，所述吸油棉的密度小于所述棉布层，所述吸油棉的厚度大于所述棉布层。这样设置的目的是：所述吸油棉密度小，组织结构稀疏，可作为主要的储油物质；所述棉布层的密度大，则作为阻油物质。

[0013] 进一步地，本技术方案中所述螺纹套由上下两部分构成，上部分为与所述雾化套相连接的滚花结构，下一部分为外螺纹结构。这种螺纹连接的结构，可以方便其与其它配合件的拆卸与连接。

[0014] 优选地，本技术方案中所述螺纹套的外表面为滚花结构，内表面设有跟外部连接的内螺纹。

[0015] 进一步地，本技术方案中所述所述螺纹套上设置有进气用的孔或侧槽。

[0016] 一种电子烟，包括电池组件和雾化器，该雾化器包括雾化套、吸嘴盖、螺纹套、固定设置在所述螺纹套内的电极环、设置在所述雾化套内的储油物质、电热丝组件，所述螺纹套与电极环之间设置有绝缘环，所述吸嘴盖和螺纹套分别紧配合在所述雾化套的两端，所述电热丝组件的两引脚分别与所述螺纹套和电极环相连接；所述储油物质由密度大小不一的至少两层构成；该雾化器中不包括玻纤管。

[0017] 进一步地，本技术方案中所述螺纹套的外表面设置有滚花，所述滚花的外表面涂有密封胶后紧配合连接在所述雾化套内。由于所述螺纹套的外表面设置有滚花，所以在所述滚花的外表面涂上密封胶后，所述滚花的凹槽中就能附着大量的密封胶，从而使所述螺纹套与所述雾化套连接后形成良好的密封。

[0018] 进一步地，本技术方案中所述螺纹套与所述雾化套的连接处不设置密封圈。这样一来，就又少了在所述螺纹套上套接密封圈的装配步骤，优化了本发明的装配工艺。

[0019] 优选地，本技术方案中所述吸嘴盖与所述雾化套的连接处不设置阻油环。这样一来，就又少了在所述吸嘴盖与所述雾化套之间设置阻油环的装配步骤，优化了本发明的装配工艺。

[0020] 进一步地，本技术方案中还包括玻纤管，所述储油物质包裹在所述玻纤管上，所述储油物质中密度大的一层靠近所述玻纤管。这样设置的目的是：由于烟油在密度大的物质中的流动性差，所以可以起到防止过多的油浸入所述电热丝组件中，将电热丝湮灭，同时也可以防止发生漏油的现象。

[0021] 进一步地，本技术方案中所述玻纤管上与所述螺纹套的连接端设有开口，该开口将所述玻纤管分成至少两个连接片，所述螺纹套上设有环形凹槽，所述连接片插接在所述环形凹槽中；所述环形凹槽中过盈配合有楔片，所述楔片压紧在所述连接片的外表面。这样设置的目的是，省去了现有技术中，玻纤管固定在所述螺纹套上的点白胶工艺。在进入下一

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道工序时，节省从点胶到胶干的等待时间，在装配好楔片后可以迅速进入下一道工序，而且楔片的安装也比较简单，所以可以提高电子烟的生产效率。

[0022] 进一步地，本技术方案中所述储油物质由棉布层和吸油棉构成，所述吸油棉的密度小于所述棉布层，所述吸油棉的厚度大于所述棉布层。这样设置的目的是：所述吸油棉密度小，组织结构稀疏，可作为主要的储油物质；所述棉布层的密度大，则作为阻油物质。

[0023] 进一步地，本技术方案中所述螺纹套由上下两部分构成，上部分为与所述雾化套相连接的滚花结构，下一部分为外螺纹结构。这种螺纹连接的结构，可以方便其与其它配合件的拆卸与连接。

[0024] 优选地，本技术方案中所述螺纹套的外表面为滚花结构，内表面设有跟外部连接的内螺纹。

[0025] 进一步地，本技术方案中所述所述螺纹套上设置有进气用的孔或侧槽。

[0026] 本发明与现有技术相比，由于本发明中不包括所述玻纤管，所以本发明的结构比现有技术中的雾化器结构更简单，即装配工艺简单，成本低。

[0027] 本发明中的其它有益效果，还将在具体实施例中进一步说明。

附图说明

[0028] 图 1 为雾化器的现有结构示意图；

[0029] 图 2 为本发明具体实施例一中的雾化器的结构示意图；

[0030] 图 3 为图 2 中螺纹套的结构示意图；

[0031] 图 4 是螺纹套的另一种结构示意图；

[0032] 图 5 为本发明具体实施例二中的雾化器的结构示意图；

[0033] 图 6 为具体实施例二中雾化器的分解结构示意图；

[0034] 图 7 是玻纤管固定在所述螺纹套上的结构示意图；

[0035] 图 8 是图 7 中俯视图；

[0036] 图 9 是图 7 中另一种楔片的组合结构示意图。

[0037] 附图中各部分结构的标注说明：

[0038] 1- 雾化套、2- 玻纤管、3- 吸嘴盖、4- 阻油环、5- 螺纹套、6- 电极环、7- 吸油棉、8- 密封圈、9- 棉布层、10- 电热丝组件、11- 绝缘环、12- 楔片、21- 连接片、22- 连接片、51- 滚花、52- 外螺纹、53- 圆孔、54- 侧槽、55- 内螺纹、56- 环形凹槽、121- 压槽、122- 压槽。

具体实施方式

[0039] 为了使本发明所要解决的技术问题、技术方案及有益效果更加清楚明白，以下结合实施例及附图，对本发明进行进一步详细说明。应当理解，此部分所描述的具体实施例仅可用以解释本发明，并不用于限定本发明。

[0040] 具体实施例一

[0041] 如图 2 所示，一种电子烟用雾化器，包括雾化套 1、吸嘴盖 3、螺纹套 5、固定设置在所述螺纹套 5 内的电极环 6、设置在所述雾化套 1 内的储油物质、电热丝组件 10，所述螺纹套 5 与电极环 6 之间设置有绝缘环 11，所述吸嘴盖 3 和螺纹套 5 分别紧配合在所述雾化套 1 的两端，所述电热丝组件 10 的两引脚分别与所述螺纹套 5 和电极环 6 相连接；所述储油

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物质由密度大小不一的至少两层构成；该雾化器中不包括玻纤管 2。

[0042] 所述储油物质中设有一气流通道，所述电热丝组件 10 处于该通道中。工作时，所述电热丝组件 10 吸取所述储油物质中的烟油，并将烟油雾化，最终被雾化的烟油从气流通道中流出。

[0043] 在本实施例中，优选地所述吸嘴盖 3 与所述雾化套 1 的连接处不设置阻油环 4，所述吸嘴盖 3 的底部压在所述储油物质上。这样设置的目的是，防止电子烟在振动环境下，所述储油物质不会在所述雾化套 1 内产生位移。当然，在所述储油物质与所述雾化套 1 配合较好的条件下，即不会产生位移时，所述吸嘴盖 3 可以不压在所述储油物质上。所述储油空间与所述雾化套 1 配合较好时，为减少用户在吸烟时吸到烟油的机率，可以将所述吸嘴盖 3 保持离所述储油物质 3-4mm 的距离。

[0044] 具体地，在本实施例中，所述储油物质由棉布层 9 和吸油棉 7 构成，所述吸油棉 7 的密度小于所述棉布层 9，所述吸油棉 7 的厚度大于所述棉布层 9。此时，所述电热丝组件 10 中的吸油组件（例如：玻纤芯）的两端与所述棉布层 9 相接触。

[0045] 如图 3 所示，具体地，在本实施例中，所述螺纹套 5 的外表面设置有滚花 51，所述滚花 51 的外表面涂有密封胶后紧配合连接在所述雾化套 1 内。由于所述螺纹套的外表面设置有滚花，所以在所述滚花的外表面涂上密封胶后，所述滚花的凹槽中就能附着大量的密封胶，从而使所述螺纹套与所述雾化套连接后形成密封。再如图 3 所示，所述螺纹套 5 由上下两部分构成，上部分为与所述雾化套 1 相连接的滚花 51 结构，下一部分为外螺纹 52 结构。所述所述螺纹套 5 上设置有进气用的圆孔 53，为减小气流从所述圆孔 53 中进入时产生的噪音，所述圆孔 53 的直径设置为 0.6mm-1.0mm 时较适宜。

[0046] 如图 4 所示，图 4 与图 3 中所展示的螺纹套不同的是，该螺纹套 5 的外表面为滚花 51 结构，所述螺纹套 5 内表面设有跟外部连接的内螺纹 55 的结构。具体地，该螺纹套 5 的外表面设有滚花 51，其所述滚花 51 的设置目的与图 3 中的相同，该螺纹套 5 的内部设有内螺纹 55、底部设置有进气用的侧槽 54。当然，当所述雾化器设置为前端进气的机型时，在所述螺纹套 5 上可以不设置圆孔 53 或侧槽 54。

[0047] 在所述螺纹套 5 的外表面设置所述滚花 51 的实例方式下，所述螺纹套 5 与所述雾化套 1 的连接处可以不设置密封圈。

[0048] 具体实施例二

[0049] 如图 5、图 6 所示，本实施例在包含具体实施例一中全部技术特征的基础上，其与实施例一的主要区别是：其还包括玻纤管 2，所述储油物质包裹在所述玻纤管 2 上，其中密度大的一层靠近所述玻纤管 2，即：所述棉布层 9 包裹在所述玻纤管 2 的外表面。

[0050] 如图 7 所示，所述玻纤管 2 上与所述螺纹套 1 的连接端设有开口，该开口将所述玻纤管 2 分成两个连接片 21 和连接片 22（当然也可分成三个、四个连接片，本实施例分成两个连接片的目的是减少楔片的安装数量，使装配变得简单，提高安装工艺的效率。），所述电热丝组件 10 固定设置在所述开口中，即：固定设置在所述连接片 21 和所述连接片 22 的之间。所述螺纹套 1 上设有环形凹槽 56，将所述连接片 21 和所述连接片 22 掰开后插接到所述环形凹槽 56 中。所述环形凹槽 56 中还过盈配合有两楔片 12，两所述楔片 12 分别压紧在所述连接片 22、连接片 21 的外表面。

[0051] 如图 8 所示，所述楔片 12 的设置数量与所述连接片 21、22 的设置数量相同。所述

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楔片 12 的两侧端面分别凸出于所述连接片 22、连接片 21。这样设置的目的是：由于所述楔片 12 的两侧端面分别凸出于所述连接片 22、21，最大限度地加大了所述楔片 12 与所述连接片 22、21 的接触面积，所以可以提供更紧固的力，使所述玻纤管 2 牢固地固定在所述螺纹套 1 上。

[0052] 进一步地，本实施例中所述楔片 12 由塑胶材料制成。

[0053] 优选地，所述楔片 12 还可以由金属材料制成或者硅胶材料制成或者橡胶材料制成。

[0054] 具体实施例三

[0055] 如图 9 所示，本实施例与实施例二的主要区别是：所述楔片 12 为一圆环结构，所述楔片 12 上还设置有压槽 121 和压槽 122。所述压槽 121、122 的设置的目的是：方便所述楔片 12 在装配时的取用。

[0056] 再如图 9 所示，所述楔片 12 的圆环上还设有开口，所述楔片 12 上的所述开口处设置有倒角。

[0057] 具体实施例四

[0058] 一种电子烟，包括电池组件和雾化器，该雾化器可以是实施例一、二、三中任一实施例中所描述的雾化器。

[0059] 上述实施例仅是本发明的优选实施方式，应当指出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，还可以作若干个变形和改进，这些变形和改进也应视为本发明的保护范围之内。

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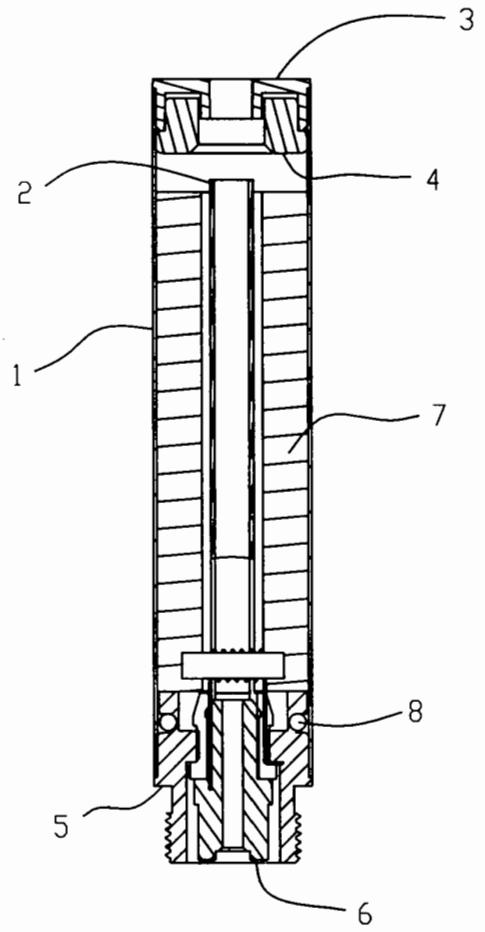

图 1

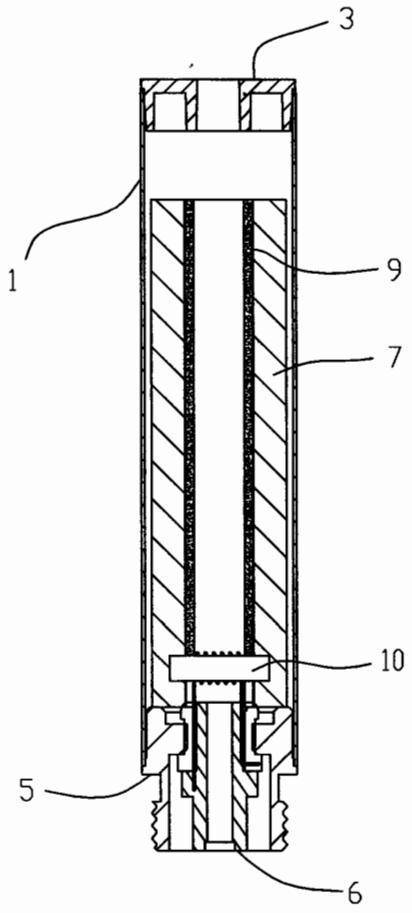

图 2

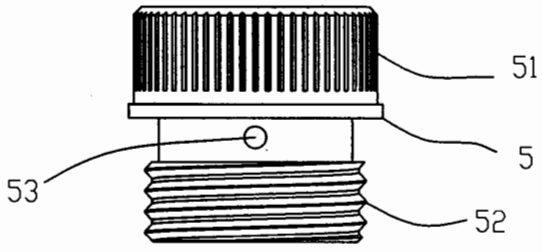

图 3

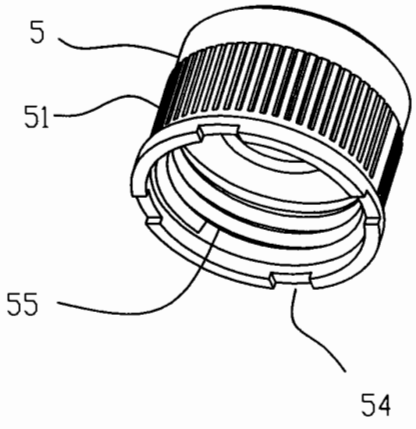

图 4

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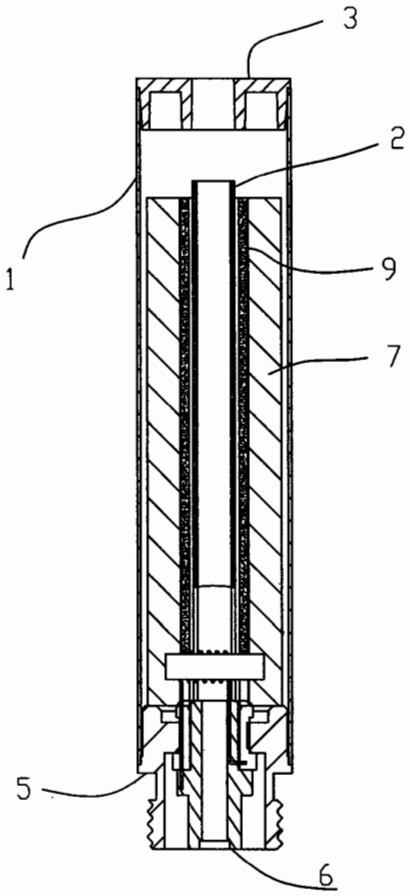

图5

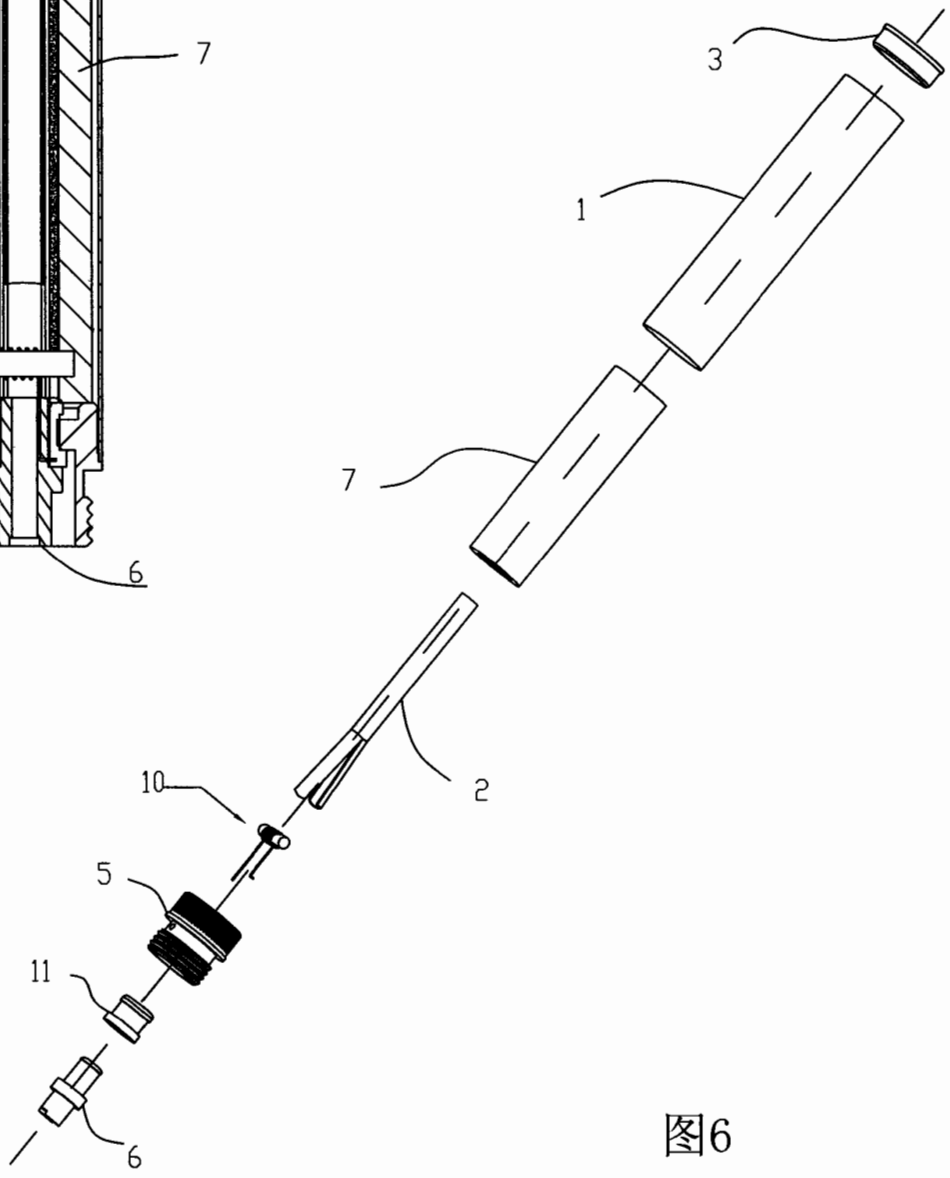

图6

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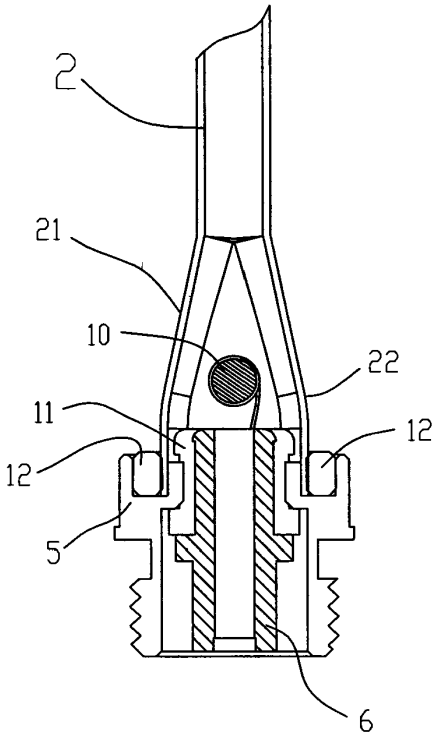

图 7

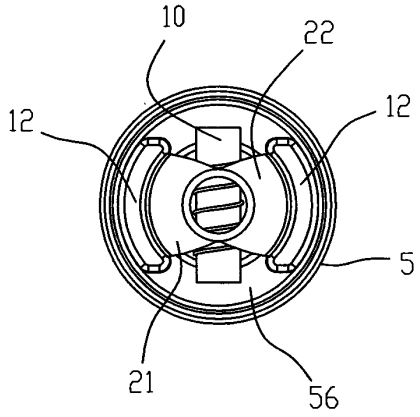

图 8

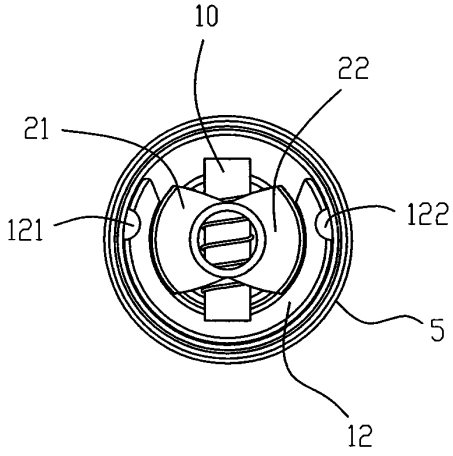

图 9

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Espacenet

Bibliographic data: CN103237470 (A) — 2013-08-07

Aerosol generating system with leakage prevention

Inventor(s): THORENS MICHEL; FLICK JEAN-MARC; COCHAND OLIVIER YVES; DUBIEF FLAVIEN ± (THORENS MICHEL, ; FLICK JEAN-MARC, ; COCHAND OLIVIER YVES, ; DUBIEF FLAVIEN, ; M·托伦斯, ; J-M·弗利克, ; O·Y·科尚, ; F·迪比耶夫)

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Abstract of CN103237470 (A)

There is provided an aerosol generating system for heating a liquid aerosol-forming substrate. The system includes a liquid storage portion (113) for storing the liquid aerosol-forming substrate (115), and a leakage prevention means configured to prevent or reduce leakage of the liquid aerosol-forming substrate from the liquid storage portion. The leakage prevention means may comprise one or more of a porous plug at least partially located within the liquid storage portion, a sealing means between the liquid storage portion and a capillary wick (117), and a sealing means between the liquid storage portion and an electrical connector of an electric heater (119).

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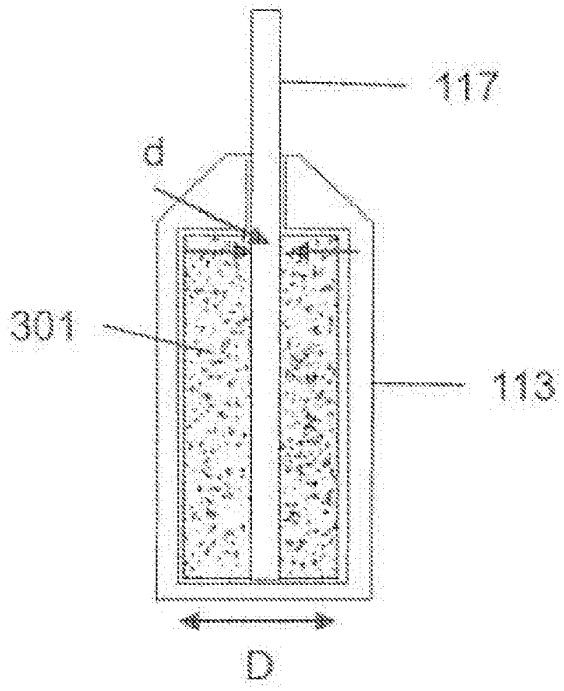

Figure 3

NJOY Exhibit 1002.559

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代理人 王会卿
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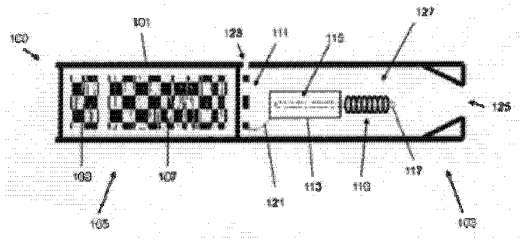
权利要求书2页 说明书10页 附图3页

(54)发明名称

具有防止泄漏装置的气雾剂生成系统

(57)摘要

本发明提供了一种用于加热液体气雾剂形成基体的气雾剂生成系统。该系统包括:液体存储部分(113),所述液体存储部分用于存储液体气雾剂形成基体(115);以及防止泄漏装置,所述防止泄漏装置构造成防止或者减少液体气雾剂形成基体从液体存储部分的泄漏。该防止泄漏装置可包括以下特征中的一个或多个:至少部分地位于液体存储部分内的多孔塞;位于液体存储部分与毛细管芯(117)之间的密封装置;和位于液体存储部分与电加热器(119)的电连接器之间的密封装置。



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1. 一种用于加热液体气雾剂形成基体的气雾剂生成系统，所述系统包括：

液体存储部分，所述液体存储部分用于存储液体气雾剂形成基体；以及

防止泄漏装置，所述防止泄漏装置构造成防止或者减少液体气雾剂形成基体从液体存储部分的泄漏。

2. 如权利要求 1 所述的气雾剂生成系统，其中，所述防止泄漏装置包括至少部分地位于液体存储部分内的多孔塞。

3. 如权利要求 1 或 2 所述的气雾剂生成系统，还包括毛细管芯，用于从液体存储部分传送液体气雾剂形成基体。

4. 如权利要求 3 所述的气雾剂生成系统，其中，所述防止泄漏装置包括位于液体存储部分与毛细管芯之间的密封装置。

5. 如上述权利要求中任一项所述的气雾剂生成系统，其中，所述气雾剂生成系统是电操作的，并且还包括用于加热液体气雾剂形成基体的电加热器。

6. 如权利要求 5 所述的气雾剂生成系统，其中，还包括用于加热器的至少一个电连接器，并且防止泄漏装置包括位于液体存储部分与电连接器中的至少一个之间的密封装置。

7. 如上述权利要求中任一项所述的气雾剂生成系统，还包括蒸发器，该蒸发器连接至液体存储部分，用于蒸发液体气雾剂形成基体，并且防止泄漏装置构造成防止或减少液体气雾剂形成基体从液体存储部分和蒸发器的泄漏。

8. 如上述权利要求中任一项所述的气雾剂生成系统，还包括：

具有嘴件的第一端部；

与第一端部相对的第二端部；

设置于第二端部中的电源和电路；

用于从液体存储部分传送液体气雾剂形成基体的毛细管芯，所述毛细管芯具有延伸到液体存储部分中的第一端部和与第一端部相反的第二端部；和

电加热器，所述电加热器连接到电源，用于加热毛细管芯的第二端部中的液体气雾剂形成基体；

其中液体存储部分、毛细管芯和电加热器设置于气雾剂生成系统的第一端部中。

9. 一种用于存储液体气雾剂形成基体的盒，其与用于加热液体气雾剂形成基体的气雾剂生成系统一起使用，所述盒包括：

用于存储液体气雾剂形成基体的容器；和

构造成防止或减少液体气雾剂形成基体从容器的泄漏的防止泄漏装置。

10. 如权利要求 9 所述的盒，其中，防止泄漏装置包括至少部分地位于容器内的多孔塞。

11. 如权利要求 9 或 10 所述的盒，进一步包括用于从容器传送液体气雾剂形成基体的毛细管芯。

12. 如权利要求 11 所述的盒，其中，防止泄漏装置包括位于容器与毛细管芯之间的密封装置。

13. 如权利要求 9 至 12 中任一项所述的盒，进一步包括用于加热液体气雾剂形成基体的电加热器，电加热器能连接到气雾剂生成系统中的电源。

14. 如权利要求 13 所述的盒，进一步包括用于加热器的至少一个电连接器，并且防止

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泄漏装置包括位于容器与所述电连接器中的至少一个之间的密封装置。

15. 如权利要求 9 至 14 中任一项所述的盒，进一步包括蒸发器，所述蒸发器连接到液体存储部分，用于蒸发液体气雾剂形成基体，并且防止泄漏装置构造成防止或减少液体气雾剂形成基体从液体存储部分和蒸发器的泄漏。

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具有防止泄漏装置的气雾剂生成系统

技术领域

[0001] 本发明涉及一种气雾剂(aerosol)生成系统。尤其是,本发明涉及一种气雾剂生成系统,其中,形成气雾剂的基体是液体。

背景技术

[0002] WO2009/132793A 公开了一种电加热发烟系统。液体存储在液体存储部分中,并且毛细管芯具有第一端部和第二端部,第一端部延伸到液体存储部分中,用于与那里的液体接触,第二部分从液体存储部分延伸出。加热元件加热该毛细管芯的第二端部。加热元件呈螺旋缠绕的电加热元件的形式,其与电源电连接,并且围绕该毛细管芯的第二端部。在使用中,加热元件可通过使用者接通电源启动。使用者在嘴件上的抽吸使得空气被吸入到电加热发烟系统中,经过毛细管芯和加热元件,随后进入到使用者的嘴中。

[0003] 现有技术的气雾剂生成系统,包括如上所涉及的电操作发烟系统,确实存在许多优点,但是也仍存在设计上改进的可能。

发明内容

[0004] 根据本发明的第一方面,提供了一种用于对液体气雾剂形成基体进行加热的气雾剂生成系统,该系统包括:液体存储部分,其用于存储液体气雾剂形成基体;以及防止泄漏装置,其构造成防止或者减少液体气雾剂形成基体从液体存储部分的泄漏。

[0005] 气雾剂生成系统布置为气化气雾剂形成基体,以形成蒸气。气雾剂生成系统可包括气雾剂形成基体,或者可适于接收气雾剂形成基体。正如所属技术领域的技术人员所知晓的,气雾剂是气体例如空气中的固体颗粒或者液滴的悬浮剂。

[0006] 本发明的一个优点是液体从液体存储部分的泄漏被防止或者至少基本上减少。最少化或者优选地防止泄漏对于避免液体气雾剂形成基体的浪费是重要的。而且,液体气雾剂形成基体的泄漏可产生污染,例如当连续地使用不同的气雾剂形成基体时。此外,从液体存储部分泄漏出的液体气雾剂形成基体可从气雾剂生成系统流出,并且导致使用者不便。例如,气雾剂生成系统可变得潮湿或者变粘。

[0007] 液体气雾剂形成基体优选地具有适合于在气雾剂生成系统中使用的物理特性,例如沸点和蒸气压力。如果沸点非常高,不可能将液体气化,但是如果沸点非常低,则液体可能太容易气化。液体优选地包括包含烟草的材料,其包括可挥发的烟草香味剂化合物,这些化合物可在加热时从液体释放出。替代地或者附加地,液体可包括非烟草的材料。液体可包括水,溶剂,乙醇,植物提取物,烟碱溶液和自然或人工香味剂。优选地,液体还包括气雾剂形成物。适当的气雾剂形成物的实施例是甘油和丙二醇。

[0008] 提供液体存储部分的一个优点是液体存储部分中的液体被保护免受环境空气影响(因为空气通常并不能进入液体存储部分),并且,在一些实施方式中免受光影响,从而液体劣化的风险显著降低。此外,可保持高水平的卫生。液体存储部分可以不是可再填充的。因而,当液体存储部分中的液体已经消耗完的时候,气雾剂生成系统被替换。防止泄漏装置

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防止在替换液体存储部分时发生污染。替代地，该液体存储部分可以是可再填充的。在该情况下，气雾剂生成系统可在液体存储器的若干次再填充之后被替换。优选地，液体存储部分布置为将液体保持预定数量的喷吹。

[0009] 在一个实施方式中，防止泄漏装置包括至少部分地位于液体存储部分内的多孔塞。

[0010] 提供至少部分地位于液体存储部分内的多孔塞最少化了自由液体。这根本上减少了液体从液体存储部分泄漏的可能性。多孔塞可包括任何适当的材料或材料组合，其能够保持液体气雾剂形成基体，而且还相对于液体气雾剂形成基体表现为惰性。特别优选的一种或多种材料将取决于液体气雾剂形成基体的物理特性。适当材料的实施例是毛细管材料，例如海绵或者泡沫材料，呈纤维或者烧结粉末形式的陶瓷或者石墨基材料，泡沫金属或塑料材料，纤维材料，例如由自旋或者压纺纤维所制成，例如醋酸纤维素、聚酯、或者结合的聚烯烃、聚乙烯、涤纶或聚丙烯纤维、尼龙纤维或陶瓷。多孔塞可具有任何适当的形状。然而，最优选的，多孔塞基本上填充了液体存储部分的腔以便使得自由液体最少化。

[0011] 气雾剂生成系统可还包括毛细管芯，用于从液体存储部分传送该液体气雾剂形成基体。

[0012] 优选地，毛细管芯布置为与液体存储部分中的液体相接触。优选地，毛细管芯延伸到液体存储部分中。在该情况下，在使用中，液体通过毛细管芯中的毛细管作用而被从液体存储部分迁移。在一个实施方式中，毛细管芯的一个端部中的液体被气化，以形成过饱和蒸气。过饱和蒸气与空气流相混合并且在该空气流中运载。在流动期间，蒸气冷凝以形成气雾剂，并且该气雾剂被运向使用者的嘴。该液体气雾剂形成基体具有允许液体通过毛细管作用被运输通过毛细管芯的物理特性，包括表面张力和粘性。

[0013] 毛细管芯可具有纤维或者海绵结构。毛细管芯优选地包括一束毛细管。例如，毛细管芯可包括多个纤维或者线或者其他精细孔管。纤维或者线可基本上沿气雾剂生成系统的纵向方向对齐。替代地，毛细管芯可包括形成杆状的海绵状或者泡沫状的材料。杆状可沿着气雾剂生成系统的纵向方向延伸。该芯的结构形成了多个小孔或管，液体可由毛细管作用而穿过这些孔或管运输。毛细管芯可包括任何适当的材料或材料组合。适当材料的实施例是毛细管材料，例如海绵或者泡沫材料，呈纤维或者烧结粉末形式的陶瓷或者石墨基材料，泡沫金属或塑料材料，纤维材料，例如由自旋或者压纺纤维所制成的，例如醋酸纤维素、聚酯、或者结合的聚烯烃、聚乙烯、涤纶或聚丙烯纤维、尼龙纤维或陶瓷。毛细管芯可具有任何适当的毛细管作用和孔隙度，从而用于不同液体物理特性。液体具有允许液体通过毛细管作用而运输通过毛细管装置的物理特性，包括但并不限于粘度，表面张力，密度，导热性，沸点和蒸气压力。液体气雾剂形成基体的物理特性还可影响泄漏行为。

[0014] 在一个优选实施方式中，气雾剂生成系统包括至少部分地位于液体存储部分内的多孔塞和用于从液体存储部分传送该液体气雾剂形成基体的毛细管芯。在这种情况下，多孔塞和毛细管芯可包括相同的材料或不同的材料。优选地，毛细管芯设置成延伸入位于液体存储部分内部的多孔塞中。优选地，毛细管芯延伸入基本上多孔塞的中心。毛细管芯和多孔塞优选地处于接触，因为这样保证了良好的液体传送。毛细管芯和多孔塞可设置为单个一体式的毛细管构件，其部分地位于液体存储部分内以保持液体，并且部分地延伸出液体存储部分之外以便通过毛细管作用传送液体气雾剂形成基体。替代地，毛细管芯和多孔

NJOY Exhibit 1002.564

塞可以是分离的。

[0015] 如果气雾剂生成系统包括毛细管芯，则防止泄漏装置可包括位于液体存储部分与毛细管芯之间的密封装置。这种密封装置，特别是与多孔塞相结合，提供了改进的防止泄漏作用。

[0016] 在一个实施方式中，密封装置包括基本上包围毛细管芯的密封材料。优选地，毛细管芯部分地位于液体存储部分内部，以便与液体存储部分中的液体接触。在这种情况下，优选地，密封装置包括在液体存储部分与毛细管芯之间的相接处的密封材料。密封装置可呈密封环的形式。

[0017] 如果设置至少部分地位于液体存储部分内的多孔塞并且多孔塞的毛细作用不同于毛细管芯的毛细作用，密封装置可能特别重要。在这种情况下，在液体存储部分中的多孔塞与毛细管芯之间将形成毛细作用或毛细管强度梯度，这可迫使液体从液体存储部分朝向毛细管芯运动。

[0018] 在一个优选实施方式中，通过将芯放入注射模具中并且将适当的密封材料注射至毛细管芯周围，来形成密封装置。当毛细管芯被放入液体存储部分中时，密封装置置于液体存储部分与毛细管芯之间的相接处。

[0019] 密封装置优选地基本上密封液体存储部分与毛细管芯之间的任何间隙。因此，如果有任何液体确实开始泄漏出液体存储部分，密封装置将防止任何液体离开液体存储部分和毛细管芯或者减少离开液体存储部分和毛细管芯的液体的量。如果除了有多孔塞之外还设置有密封装置，则确实逃出多孔塞的任何液体可被密封装置所容纳。

[0020] 密封装置可包括任何适当的密封材料或密封材料组合。该材料可为与液体存储部分的材料相同或者不同的材料。

[0021] 优选地，气雾剂生成系统是电操作的。电操作的气雾剂生成系统可进一步包括电加热器，其用于加热该液体气雾剂形成基体。

[0022] 电加热器可包括单个加热元件。替代地，电加热器可包括超过一个的加热元件，例如，两个或者三个或者四个或者五个或者六个或者更多加热元件。这一个或多个加热元件可适当的布置，以便最有效地加热气雾剂形成基体。

[0023] 该至少一个电加热元件优选地包括电阻材料。适当的电阻材料包括但并不限于：半导体，例如掺杂陶瓷，“导”电陶瓷(例如二硅化钼)、碳、石墨、金属、金属合金和由陶瓷材料和金属材料制成的复合材料。这些复合材料可包括掺杂或者未掺杂陶瓷。适当掺杂陶瓷的实施例包括掺杂碳化硅。适当金属的实施例包括钛、锆、钽和铂族中的金属。适当金属合金的实施例包括不锈钢、铜镍合金，含镍、含钴、含铬、含铝、含钛、含锆、含铪、含铌、含钼、含钽、含钨、含锡、含镓、含锰、和含铁的合金，基于镍、铁、钴、不锈钢、**Timetal®**、铁铝基合金和铁锰铝基合金的超级合金。**Timetal®**是美国科罗拉多州丹佛 1999 百老汇 Suite4300 的钛金属公司(Titanium Metals Corporation, 1999Broadway Suite4300, Denver Colorado)的注册商标。在复合材料中，电阻材料可以可选择地为嵌入绝缘材料、封装入绝缘材料或者涂覆有绝缘材料，反之亦然(绝缘材料可以可选择地为嵌入电阻材料、封装入电阻材料或者涂覆有电阻材料)，这取决于能量传递运动学和所需要的外部物理化学特性。加热元件可包括金属蚀刻箔，其被隔绝于两层惰性材料之间。在该情况

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下，惰性材料可包括Kapton©,全聚酰亚胺或云母箔。Kapton®是美国特拉华19898的的1007Market Street的E.I.du Pont de Nemours and Company(E.I.du Pont de Nemours and Company,1007Market Street,Wilmington,Delaware19898,United States of America)的注册商标。

[0024] 替代地，至少一个电加热元件可包括红外加热元件，光子源或者感应加热元件。

[0025] 该至少一个加热元件可采取任何适当的形式。例如，该至少一个电加热元件可采取加热片的形式。替代地，该至少一个电加热元件可采取箱或基底的形式，该箱或基底具有不同的导电部分，或者电阻金属管。液体存储部分可包含一次性使用的加热元件。替代地，贯穿液体气雾剂形成基体的一个或多个加热针或杆也可是适当的。替代地，该至少一个电加热元件可以是盘(端)加热器或者盘加热器与加热针或杆的组合。替代地，该至少一个电加热元件可包括弹性薄片材料。其他替换方案包括电加热丝或细丝，例如镍－铬、铂、钨或合金丝，或加热板。可选择地，加热元件可储存在刚性载体材料之中或之上。

[0026] 该至少一个电加热元件可包括散热器，或者储热器，其包括能够吸收和存储热量的材料并且之后随着时间过去把热量释放以加热该气雾剂形成基体。散热器可由任何适当的材料形成，例如适当的金属或陶瓷材料。优选地，该材料具有高热容量(显热储存材料)，或者能够经由可逆过程例如高温相变来吸收然后释放热量的材料。适当的显热储存材料包括硅胶，矾土，碳，玻璃垫，玻璃纤维，矿物质，例如铝、银或者铅的金属或合金，以及例如纸的纤维素材料。经由可逆相变释放热量的其他适当材料包括石蜡，醋酸钠，萘，蜡，聚环氧乙烷，金属，金属盐，共晶盐的混合物或者合金。

[0027] 散热器或者储热器可被布置成使得其直接与液体气雾剂形成基体接触，并且可将所存储的热量直接传递到该基体。替代地，存储在散热器或储热器中的热量可借助于导热体(例如金属管)而传递到气雾剂形成基体。

[0028] 该至少一个加热元件可借助于传导而加热该气雾剂形成基体。加热元件可至少部分地与基体接触。替代地，来自加热元件的热量可借助于导热元件而传导到基体。

[0029] 替代地，该至少一个加热元件可将热量传递到进来的环境空气，这些环境空气在气雾剂生成系统使用期间通过被抽吸通过气雾剂生成系统，其又通过对流加热气雾剂形成基体。环境空气在通过气雾剂形成基体之前可被加热。替代地，环境空气可首先被抽吸通过液体基体，然后被加热。

[0030] 在一个优选的实施方式中，气雾剂生成系统包括电加热器和毛细管芯。在该实施方式中，优选地该毛细管芯布置为与液体存储部分中的液体接触。在使用中，液体通过毛细管芯中的毛细管作用而从液体存储部分朝着电加热器转移。在一个实施方式中，毛细管芯具有第一端部和第二端部，第一端部延伸到液体存储部分中，用于与在其中的液体接触，并且电加热器布置为加热第二端部中的液体。当电加热器被启动的时候，毛细管芯的第二端部处的液体通过加热器而被气化，来形成过饱和蒸气。过饱和蒸气与空气流相混合并且在该空气流中运载。在流动期间，蒸气冷凝以形成气雾剂，并且该气雾剂被运向使用者的嘴。

[0031] 液体存储部分，和任选地毛细管芯和加热器，可作为一个单独元件而从气雾剂生成系统移除。

[0032] 气雾剂生成系统可进一步包括用于加热器的至少一个电连接器。在这种情况下，防止泄漏装置可包括位于液体存储部分与电连接器中的至少一个之间的密封装置。

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[0033] 在一个实施方式中，密封装置包括基本上包围一个或两个电连接器的密封材料。密封装置可呈一个或多个密封环的形式。在一个实施方式中，电连接器位于液体存储部分外侧上。在这种情况下，优选地，密封装置包括在液体存储部分与电连接器之间的接触处的密封材料。在一个优选的实施方式中，通过将每个电连接器放入注射模具中并且将适当的密封材料注射至连接器周围，来形成密封装置。

[0034] 密封装置优选地基本上防止液体沿着电连接器流动。因此，如果有任何液体确实开始泄漏出液体存储部分，密封装置将防止任何液体流入系统中或者减少流入系统中的液体的量。如果除了有在液体存储部分与毛细管芯之间的密封装置之外还设置有在液体存储部分与所述电连接器中的至少一个之间的密封装置，则并未由在液体存储部分与毛细管芯之间的密封装置容纳的任何液体可由在液体存储部分与所述电连接器中之间的密封装置所容纳。如果除了有多孔塞之外还设置有在液体存储部分与所述电连接器中的至少一个之间的密封装置，则确实逃出多孔塞的任何液体可由该密封装置所容纳。

[0035] 密封装置可包括任何适当的密封材料。该材料可为与液体存储部分的材料相同或者不同的材料。

[0036] 气雾剂生成系统可进一步包括蒸发器，该蒸发器连接至液体存储部分，用于蒸发液体气雾剂形成基体，并且防止泄漏装置可构造成防止或减少液体气雾剂形成基体从液体存储部分和蒸发器的泄漏。

[0037] 在一个优选的实施方式中，蒸发器可包括用于从液体存储部分传送液体气雾剂形成基体的毛细管芯，所述毛细管芯具有第一端部和与第一端部相反的第二端部，第一端部延伸到液体存储部分中，并且包括用于加热毛细管芯的第二端部中的液体气雾剂形成基体的电加热器。然而，本发明不限于加热器蒸发器，而是可用于通过机械蒸发器产生蒸气和所得到的气雾剂的气雾剂生成系统中，例如但不限于压电蒸发器或者使用加压液体的喷雾器。

[0038] 气雾剂生成系统可包括至少一个空气进口。气雾剂生成系统可包括至少一个空气出口。气雾剂生成系统可包括气雾剂形成室，该气雾剂形成室位于空气进口与空气出口之间，从而限定了从空气进口经由气雾剂形成室到空气出口的空气流动路线，以便将气雾剂传送到空气出口，并且进入到使用者的嘴中。气雾剂形成室简单地帮助或者促进气雾剂的生成。

[0039] 气雾剂生成系统可以是电操作的，并且可进一步包括电源。气雾剂生成系统可还包括电路。在一个实施方式中，电路包括传感器，以检测表示使用者进行了喷吹的空气流。在该情况下，优选地，电路被布置为当传感器感测到使用者进行了喷吹的时候将电流脉冲提供给电加热器。优选地，电流脉冲的时间周期是预置的，这取决于期望被气化的液体的量。电路优选地可为此而被编程。替代地，电路可包括人工操作开关，用于使用者开始喷吹。电流脉冲的时间周期优选地根据所期望被气化的液体的量预置。电路优选地可为此而被编程。

[0040] 优选地，气雾剂生成系统包括壳体。优选地，该壳体是细长的。如果气雾剂生成系统包括毛细管芯，该毛细管芯的纵向轴线与壳体的纵向轴线是基本上平行的。该壳体可包括罩和嘴件。在该情况下，全部元件可包含在罩或者嘴件中。在一个实施方式中，壳体包括可移除插入件，其包括液体存储部分，毛细管芯和加热器。在该实施方式中，气雾剂生成系

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统的这些部分可作为一个单独元件而从壳体移除。例如，这对于再填充或者替换液体存储部分是有用的。

[0041] 壳体可包括任何适当的材料或材料组合。适当材料的实施例包括金属，合金，塑料或者包含一个或多个这些材料的复合材料，或者热塑性材料，其适用于食品或者药物的应用，例如聚丙烯、聚醚醚酮(PEEK)和聚乙烯。优选地，材料是轻和非易碎的。

[0042] 在一个特别优选的实施方式中，气雾剂生成系统进一步包括：具有嘴件的第一端部；与第一端部相对的第二端部；设置于第二端部中的电源和电路；用于从液体存储部分传送液体气雾剂形成基体的毛细管芯，所述毛细管芯具有延伸到液体存储部分中的第一端部和与第一端部相反的第二端部；和电加热器，所述电加热器连接到电源，用于加热毛细管芯的第二端部中的液体气雾剂形成基体；其中液体存储部分、毛细管芯和电加热器设置于气雾剂生成系统的第一端部中。

[0043] 优选地，气雾剂生成系统是便携的。气雾剂生成系统可以是发烟系统，并且可具有与传统雪茄或者香烟差不多的尺寸。发烟系统可具有介于大约 30mm 和大约 150mm 之间的总长度。发烟系统可具有介于大约 5mm 和大约 30mm 之间的外部直径。

[0044] 优选地，气雾剂生成系统是电操作的发烟系统。

[0045] 根据本发明的第二方面，提供了一种用于存储液体气雾剂形成基体的盒，其与用于加热液体气雾剂形成基体的气雾剂生成系统一起使用，所述盒包括：用于存储液体气雾剂形成基体的容器；和构造成防止或减少液体气雾剂形成基体从容器的泄漏的防止泄漏装置。该盒可与本发明的第一方面的气雾剂生成系统一起使用。

[0046] 在一个实施方式中，防止泄漏装置包括至少部分地位于容器内的多孔塞。这种多孔塞的性能在上文中已经讨论。

[0047] 盒可进一步包括用于从容器传送液体气雾剂形成基体的毛细管芯。这种毛细管芯的性能在上文中已经讨论。

[0048] 如果盒包括毛细管芯，则防止泄漏装置可包括位于容器与毛细管芯之间的密封装置。这种密封装置的性能在上文中已经讨论。

[0049] 盒可进一步包括用于加热液体气雾剂形成基体的电加热器，电加热器可连接到气雾剂生成系统中的电源。这种电加热器的性能在上文中已经讨论。

[0050] 盒可进一步包括用于加热器的至少一个电连接器。在这种情况下，防止泄漏装置可包括位于容器与所述电连接器中的至少一个之间的密封装置。这种密封装置的性能在上文中已经讨论。

[0051] 盒可进一步包括蒸发器，所述蒸发器连接到容器，用于蒸发液体气雾剂形成基体，并且防止泄漏装置可构造成防止或减少液体气雾剂形成基体从容器和蒸发器的泄漏。

[0052] 在一个优选的实施方式中，蒸发器可包括用于从容器传送液体气雾剂形成基体的毛细管芯，所述毛细管芯具有第一端部和与第一端部相反的第二端部，第一端部延伸到容器中，并且包括用于加热毛细管芯的第二端部中的液体气雾剂形成基体的电加热器。

[0053] 相对于本发明的一个方面所描述的特征可适用于本发明的另一方面。

附图说明

[0054] 本发明将结合所附的附图仅示例性地进行进一步描述，其中：

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[0055] 图 1 示出了具有液体存储部分的气雾剂生成系统的一个实施例；

[0056] 图 2 为根据本发明的一个实施方式的液体存储部分的立体图；

[0057] 图 3 为图 2 的液体存储部分的剖面示意图；

[0058] 图 4 为图 3 中所示的多孔塞的立体图；

[0059] 图 5 为根据本发明的另一个实施方式的液体存储部分的立体图；

[0060] 图 6 为图 5 的液体存储部分的剖面示意图；和

[0061] 图 7 为液体存储部分的示意性剖面图，例如沿着图 5 的线 VII-VII 剖开。

具体实施方式

[0062] 图 1 示出了具有液体存储部分的气雾剂生成系统的一个实施例；在图 1 中，该系统是电操作的发烟系统。图 1 的发烟系统 100 包括壳体 101，其具有第一端部和第二端部，第一端部是嘴件端 103，第二端部是本体端 105。在本体端中，提供了呈电池 107 形式的电源以及呈硬件 109 和喷吹（puff）检测系统 111 形式的电路。在嘴件端中，提供了呈盒 113 形式的液体存储部分、毛细管芯 117 和加热器 119，该盒包含液体 115。需要注意的是，加热器在图 1 中仅仅示意性示出。在图 1 中所示的示例性实施方式中，毛细管芯 117 的一端延伸到盒 113 中并且毛细管芯 117 的另一端由加热器 119 所围绕。加热器经由连接件 121 连接到电路，该连接件可沿着盒 113 的外侧经过（未在图 1 中示出）。壳体 101 还可包括空气进口 123、位于嘴件端处的空气出口 125、以及气雾剂形成室 127。

[0063] 在使用中，按如下方式操作。液体 115 通过来自盒 113 的毛细管作用从芯 117 的延伸到盒中的端部传送到芯的由加热器 119 所围绕的另一端部。当使用者在空气出口 125 处在气雾剂生成系统上抽吸的时候，环境空气通过空气进口 123 而被抽吸。在图 1 所示的结构中，喷吹检测系统 111 感测喷吹，并且启动加热器 119。电池 107 将电能提供给加热器 119，来加热芯 117 的由加热器所围绕的端部。芯 117 的该端部中的液体通过加热器 119 而被气化，以产生过饱和蒸气。与此同时，被气化的液体由通过毛细管作用沿着芯 117 运动的其它液体所替代。（这有时候被称为“泵吸作用”。）所产生的该过饱和蒸气与来自空气进口 123 的空气流混合并且在其中运载。在气雾剂形成室 127 中，蒸气冷凝以形成可吸入气雾剂，其被运向出口 125，并且进入到使用者的嘴中。

[0064] 在图 1 中所示的实施方式中，硬件 109 和喷吹检测系统 111 优选地可编程。硬件 109 和喷吹检测系统 111 可用来控制该气雾剂生成系统的操作。

[0065] 图 1 示出了根据本发明的气雾剂生成系统的一个实施例。但是可能有许多其他的实施例。气雾剂生成系统简单地需要包括或者接收在液体存储部分中容纳的液体气雾剂形成基体，以及某些类型的防止泄漏装置（下面将参照图 2 到 7 进行描述），其被构造为防止或者减少液体气雾剂形成基体从液体存储部分泄漏。例如，该系统并不必一定是电动操作的。例如，该系统并不必一定是发烟系统。此外，该系统可并不包括加热器，在该情况下其可包括另一装置，来将液体气雾剂形成基体气化。例如，喷吹检测系统也不是必须设置的。作为替代，该系统可通过手工启动而操作，例如使用者当进行喷吹的时候操作开关。例如，壳体的整体形状和尺寸可以改变。此外，该系统可不包括毛细管芯。在该情况下，该系统可包括另一机构，用于释放液体以便用于气化。

[0066] 然而，在一个优选实施方式中，该系统确是包括用于从液体存储部分传送液体的

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毛细管芯。毛细管芯可由各种多孔材料或者毛细材料制成，并且优选地具有已知且预先确定的毛细管作用。这些实施例包括陶瓷基或石墨基材料，其呈纤维或者烧结粉末的形式。具有不同孔隙度的芯可用来适应不同液体物理特性，例如密度、粘性、表面张力和蒸气压力。芯必须是适当的以便使得需要的液体量可传送到加热器。

[0067] 如上所述，根据本发明，气雾剂生成系统包括防止泄漏装置，其构造为防止或者减少液体气雾剂形成基体从液体存储部分泄漏。现在将参照图 2 到 7 描述本发明的包括防止泄漏装置的本发明的多个实施方式。这些实施方式是基于图 1 中所示的实施例，但是也可适用于气雾剂生成系统的其它实施方式。需要注意的是，图 1 和下面的图 2 到 7 实际上是示意性的。尤其是，所示的元件并不单独地按比例绘制或者相互成比例绘制。

[0068] 图 2 为用于包括于根据本发明的一个实施方式的气雾剂生成系统中的液体存储部分 113、毛细管芯 117 和加热器 119 的立体图。在图 2 中，加热器 119 为包围并支承毛细管芯 117 的加热线圈的形式。电连接片 201 连接至加热线圈的每端。电连接片 201 在沟槽 203 中沿着液体存储部分的外侧延伸。

[0069] 图 3 为图 2 的液体存储部分 113 和毛细管芯 117 的示意性剖面图。(为清楚起见，加热器 119 和电连接片 201 未在图 3 中示出。)从图 3 中可以看到，液体存储部分 113 包含多孔塞 301。多孔塞 301 设置成保持液体存储部分 113 中的液体。按照这种方式，自由液体的量，也就是说自由流动的液体，被减少。设置这种多孔塞降低了液体从液体存储部分泄漏的可能性。其还改进了液体向毛细管芯的输送，从而使得液体的浪费最少化，特别是当液体存储部分中的液体用完并且液体存储部分变空的时候。

[0070] 多孔塞可包括适于保持液体的任何材料。适当材料的实施例是毛细管材料，例如海绵或者泡沫材料，泡沫金属或者塑料材料，纤维材料，例如由自旋或者压纺纤维制成的，例如醋酸纤维素、聚酯、或结合聚烯烃、聚乙烯、涤纶或聚丙烯纤维、尼龙纤维或陶瓷。

[0071] 图 4 为多孔塞 301 的立体图。在这个实施方式中，多孔塞 301 呈圆柱形管的形状。塞的外尺寸 D 基本上与液体存储部分的内尺寸(未示出)相同。D 选择成使得多孔塞基本上充满液体存储部分。这样就使得自由液体的量最少化，可以防止泄漏和改进液体向毛细管芯的输送。然而，多孔塞不需要一定基本上充满液体存储部分。例如，多孔塞可以比液体存储部分更短或更窄。

[0072] 在这种实施方式中，塞的内尺寸 d 基本上与毛细管芯 117 的直径相同，以便使得毛细管芯 117 能以合理的紧配合置于管状多孔塞内。这是有利的，因为多孔塞于是将于毛细管芯接触，这样允许液体从多孔塞良好地传送至毛细管芯。然而，不一定必须要求如此，并且多孔塞的内尺寸 d 可以大于毛细管芯的直径。毛细管芯优选地延伸至液体存储部分的底部，但是不一定必须如此。而且，多孔塞优选地延伸至液体存储部分的底部，但是不一定必须如此

[0073] 如图 3 和 4 所示提供多孔塞，就通过吸收自由液体而减少了从液体存储部分发生泄漏的可能性。换句话说，自由流动的液体的量被最少化，因此防止泄漏或者至少减少泄漏。此外，多孔塞可减少液体的浪费，因为基本上所有液体，甚至液体存储部分底部的液体，都能被多孔塞保持并且传送至毛细管芯。

[0074] 因此，多孔塞减少了从液体存储部分发生液体泄漏的可能性。然而，如果液体气雾剂形成基体确实从液体存储部分泄漏，可提供进一步的防止泄漏的机构。这将参照附图 5、

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6 和 7 描述。图 5、6 和 7 中所示的防止泄漏装置也可与多孔塞分开地提供。

[0075] 图 5 为与图 2 类似的立体图。图 5 为用于包括于根据本发明的第二实施方式的气雾剂生成系统中的液体存储部分 113、毛细管芯 117 和加热器 119 的立体图。如在图 2 中一样，在图 5 中，加热器 119 为包围并支承毛细管芯 117 的加热线圈的形式。电连接片 201 连接至加热线圈的每端。电连接片 201 在沟槽 203 中沿着液体存储部分的外侧延伸。

[0076] 图 6 为图 5 的液体存储部分 113 和毛细管芯 117 的示意性剖面图。(为清楚起见，加热器 119 和电连接片 201 未在图 6 中示出。)从图 5 和 6 中可以看到，进一步提供了呈密封件 501 形式的防止泄漏装置。

[0077] 在图 5 和 6 所示的实施方式中，密封件 501 包括在液体存储部分 113 和毛细管芯 117 之间的相接处的密封材料。密封件 501 可按各种方式形成。例如，密封件可在液体存储部分和毛细管芯组装期间以液体形式应用。替代地，密封件可按由密封材料构成的分离式固体环(类似于 O 形环)的形式应用，其贴合地适配于毛细管芯之上。在一个优选的实施方式中，密封件可通过将芯放入注射模具中并且将适当的密封材料注射至毛细管芯周围来形成。(这有时被称作“包覆成型”。)然后，毛细管芯可被放入液体存储部分中，以便使得密封装置置于液体存储部分与毛细管芯之间的相接处。

[0078] 密封件 501 基本上密封或者堵塞液体存储部分 113 与毛细管芯 117 之间的任何间隙。注意，电连接片 201 优选地位于密封件 501 的外侧上，如图 5 中所示。然而，连接片 201 可替代地位于密封件 501 内部或者直接穿过密封件 501。因此，如果有任何液体确实开始漏出液体存储部分，则密封件 501 将防止液体进入系统和可能漏出嘴件。图 5 和 6 中所示的密封件 501 可作为图 2、3 和 4 中所示的多孔塞的补充或者替代而提供。

[0079] 密封件 501 可包括任何合适的密封材料。优选地，密封材料为软的、柔性的、弹性的和不透液体的。适当的实施例有任何弹性体、塑料或者橡胶。密封件 501 的材料可与液体存储部分 113 的材料相同。替代地，密封件 501 可包括不同的材料。密封件 501 可进一步包括毛细管材料以便用于保持任何所收集的液体。

[0080] 图 7 为液体存储部分的示意性剖面图，例如沿着图 5 的线 VII-VII 剖开。图 7 中所示的实施方式略微不同于图 5 中所示的实施方式。图 7 示出了液体存储部分 113 的肩部。所示的毛细管芯 117 置于液体存储部分 117 中。为清楚起见，加热器 119 和电连接片 201 未示出。如在图 5 中一样，在图 7 中，电连接片在沟槽 203 中沿着液体存储部分的外侧延伸。然而，在图 7 的实施方式中，电连接片延伸穿过液体存储部分的外壳中的孔 701。在图 7 中，防止泄漏装置以密封件 703 的形式提供。

[0081] 密封件 703 包括在液体存储部分 113 和电连接片 201 之间的密封材料。特别是，各个电连接片穿过液体存储部分的外壳中的孔，并且密封材料设置于每个孔中，以便包围穿过孔的电连接片。密封件 703 可按各种方式形成。例如，密封件可在液体存储部分、毛细管芯和加热器组装期间以液体形式应用。替代地，在电连接片固定至液体存储部分之前，密封件可按由密封材料构成的固体环的形式应用，其贴合地适配于每个电连接片之上。替代地，密封件可通过将每个电连接片放入注射模具中并且将适当的密封材料注射至电连接片周围来形成。(这有时被称作“包覆成型”。)然后，电连接片可被放入液体存储部分上，以便使得密封件置于孔周围。

[0082] 在图 7 的实施方式中，密封件基本上包围电连接片。然而，即使电连接片并不延伸

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穿过液体存储部分的外壳中的孔，仍然可以设置密封件 703。例如，如果电连接片简单地在沟槽中延伸(例如，如图 5 中)，可在电连接片与液体存储部分之间提供密封材料。密封材料可以或者可以不基本上包围电连接片。

[0083] 因此，如果有任何液体气雾剂形成基体确实开始在加热器的区域中漏出毛细管芯或漏出液体存储部分，并且顺着电连接片流动，则密封件 703 将防止液体进入系统和可能漏出嘴件。图 7 中所示的密封件 703 可作为图 2、3 和 4 中所示的多孔塞和图 5 和 6 中所示的密封件 501 的补充或者替代而提供。此外，可以只需要一个密封件。

[0084] 每个密封件 703 可包括任何合适的密封材料。该材料可与液体存储部分 113 的材料相同。替代地，密封件 703 可包括不同的材料。如果还设置密封件 501，密封件 501 和 703 可包括相同或不同的材料。如果设置两个密封件 703，则两个密封件 703 可包括相同的或不同的材料。密封件 501 可进一步包括毛细管材料以便用于保持任何所收集的液体。密封件 703 可包括塑料薄板或薄膜材料或者塑料和金属的复合层。

[0085] 因此，根据本发明，气雾剂生成系统包括防止泄漏装置，用于防止或者至少减少液体气雾剂形成基体从液体存储部分泄漏。防止泄漏装置的实施方式参照图 2 到 7 进行了描述。针对一个实施方式描述的特征也适于另一实施方式。

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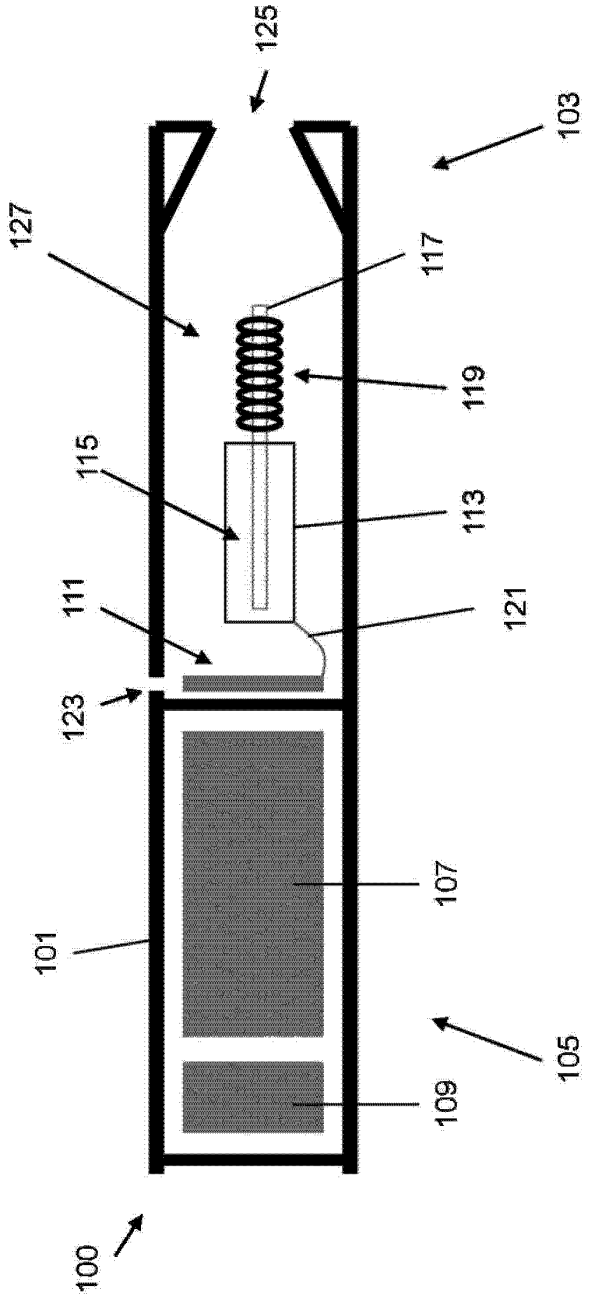

图 1

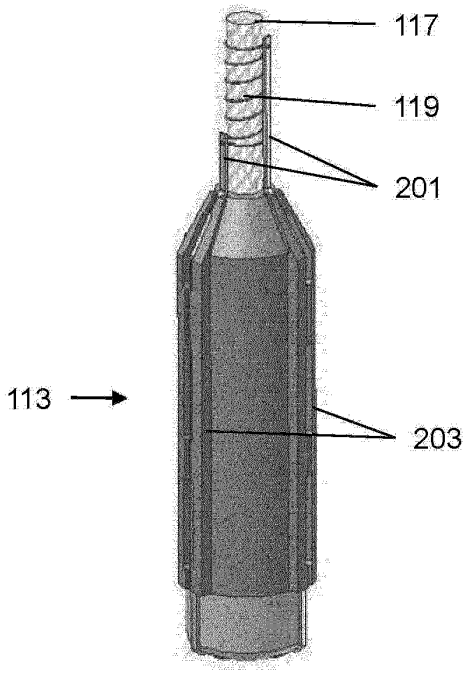

图 2

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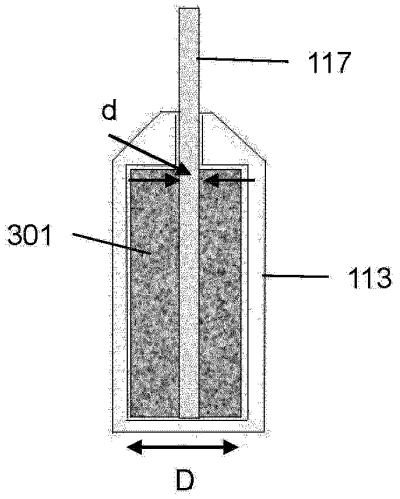

图 3

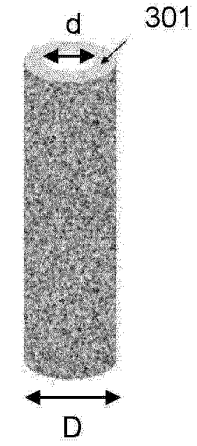

图 4

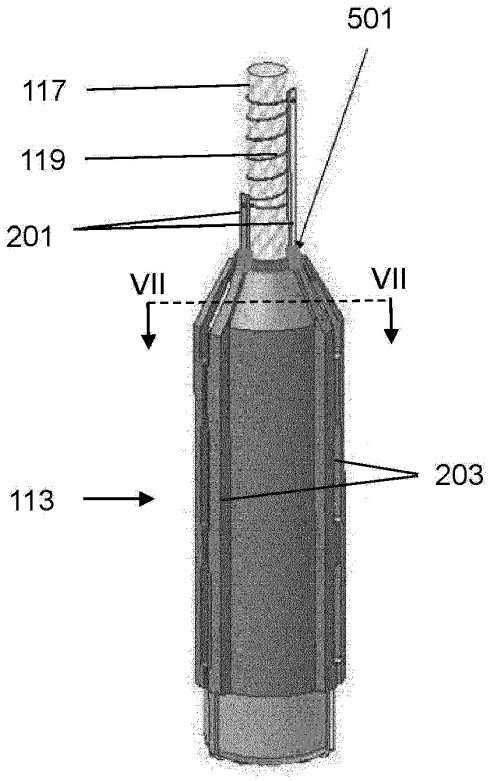

图 5

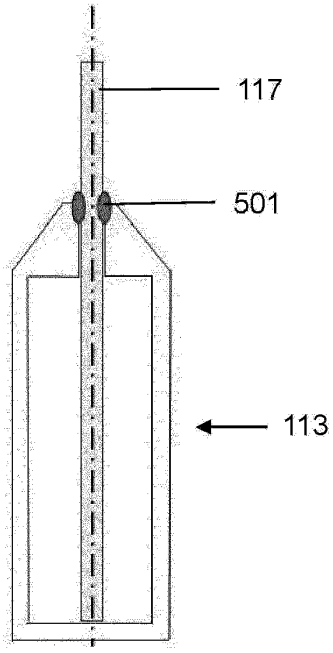

图 6

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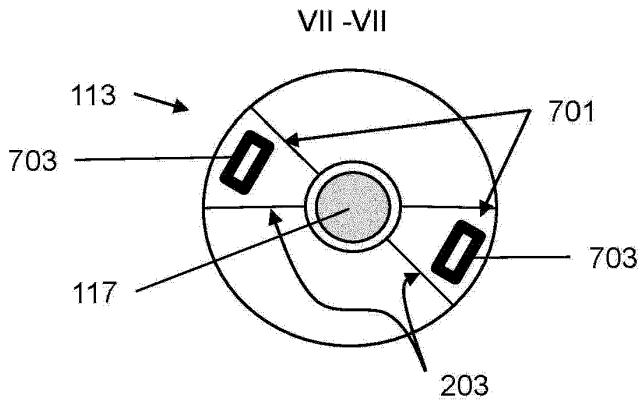

图 7

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Espacenet

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Permeable electrical heat-resistant film for vaporisation of liquids from disposable mouthpieces comprising vaporisation membranes

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Applicant(s): PHILIP MORRIS PRODUCTS SA ± (PHILIP MORRIS PRODUCTS S. A, ; 菲利普莫里斯生产公司)

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Abstract of CN104010529 (A)

A heating device in the form of a metallic film or thin sheet in the shape of a double spiral (101) and/or sinuous line (102) having two ends and with the cross-sectional dimension of a cigarette or small cigar, for vaporising substances containing active and/or aromatic ingredients from a mouthpiece (3) in the form of a hollow cylinder (31) comprising one or more vaporisation membranes (32) and a flange (33) for detachable connection to a controlled or regulated electrical voltage source (4), wherein the intermediate spaces of the double spiral and/or sinuous line of the heating device are open and thus permeable to flowing fluids, and wherein the heating device is in surface contact with at least one vaporisation membrane, which is also permeable to flowing fluids and is wetted or becomes wetted with a substance containing active and/or aromatic ingredients to be vaporised, and wherein the heating device and the at least one vaporisation membrane are arranged orthogonally or at an angle to the fluid stream passing through the mouthpiece, wherein the fluid stream flows through the heating device and the vaporisation membranes completely, wherein the heating device vaporises the substances containing active and/or aromatic ingredients located on the vaporisation membrane or membranes and supplies said substances to the fluid stream.

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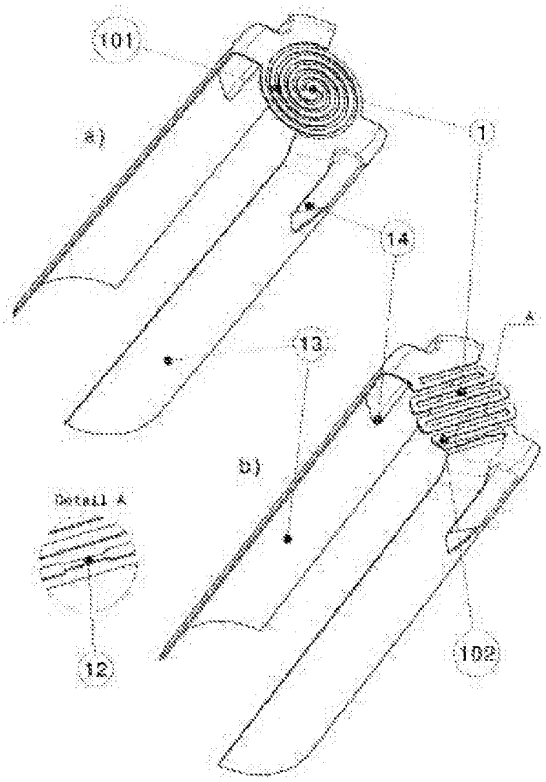
Fig. 1



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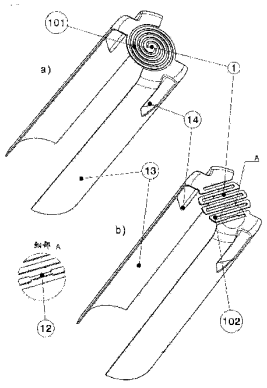
(54)发明名称

用于使来自具有蒸发器膜的单次使用嘴件的流体蒸发的可渗透的热敏电阻箔

(57)摘要

加热装置呈金属膜或薄片的形式，呈具有两个端部并具有香烟或小雪茄的横截面尺寸的双螺旋线(101)和/或蜿蜒式线(102)的形状，用于使包含有活性成分和/或香气成分的物质从呈中空的缸(31)的形式的嘴件(3)蒸发，嘴件包括一个或多个蒸发膜(32)以及用于可分离地连接至受控制的或受调节的电压源(4)的凸缘(33)，其中加热装置的双螺旋线和/或蜿蜒式线的中间间隙为敞开的并因此能透过流动的流体，并且加热装置与至少一个蒸发膜处于表面接触，所述至少一个蒸发膜也能透过流动的流体并且通过要被蒸发的包含有活性成分和/或香气成分的物质而进行湿润，并且所述加热装置和至少一个蒸发膜设置成与经过嘴件的流体流正交或者成一定角度，其中所述流体流完全地流动通过加热装置和蒸发膜，其中加热装置使位于一个或多个蒸发膜上的包含有活性成分和/或香气成分的物质蒸发并将所述物质提供至所述流体流。



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1. 一种加热装置，其包括呈金属箔或薄片的形式的热敏电阻（1），所述热敏电阻被构造为具有两个端部和香烟或小雪茄的横截面尺寸的双线圈（101）和／或蜿蜒式线（102），其中所述热敏电阻（1）的双线圈和／或蜿蜒式线的间隙为敞开的并因此容许流体通过其流动，并且由金属箔或薄片构成的至少一个相应的接触接片（13）连接至热敏电阻（1）的双线圈（101）和／或蜿蜒式线（102）的相应的端部，连接至热敏电阻（1）的双线圈（101）和／或蜿蜒式线（102）的相应的相反端部的接触接片（13）不与彼此直接接触。

2. 根据权利要求 1 所述的加热装置，其特征在于，所述热敏电阻（1）和接触接片（13）由一片金属箔或薄片制成。

3. 根据权利要求 1 或 2 所述的加热装置，其进一步包括至少一个带尖端和／或带锋利边缘的打开接片（14）。

4. 根据权利要求 1 至 3 中的一项所述的加热装置，其特征在于，热敏电阻（1）、接触接片（13）以及可选地一个或多个打开接片（14）由一片金属箔或薄片制成。

5. 根据权利要求 1 至 4 中的一项所述的加热装置，其特征在于，所述热敏电阻（1）的、接触接片（13）的和／或一个或多个打开接片（14）的金属箔或薄片包括纯铝、铝锰合金或不锈钢。

6. 根据权利要求 1 至 5 中的一项所述的加热装置，其特征在于，所述热敏电阻（1）涂有绝缘层（11），优选地涂有一层聚酰亚胺、层合云母板或硅树脂。

7. 根据权利要求 1 至 6 中的一项所述的加热装置，其特征在于，所述热敏电阻（1）包括在双线圈（101）和／或蜿蜒式线（102）中的呈收缩部的形式的保险丝（12）。

8. 一种用于使包含有活性材料和／或香气材料的物质蒸发的蒸发器装置，所述蒸发器装置被构造为呈具有流体进口（311）和流体出口（312）的中空的缸（31）的形式的嘴件（3），所述蒸发器装置包括根据权利要求 1 至 7 中的一项或多项所述的加热装置以及至少一个蒸发器膜（32），所述至少一个蒸发器膜（32）与热敏电阻（1）大面积接触，所述至少一个蒸发器膜（32）还能透过流动的流体并且使用或者能使用要被蒸发的包含有活性材料和／或香气材料的物质进行湿润。

9. 根据权利要求 8 所述的蒸发器装置，进一步包括凸缘（33），用于通过电极（41）能释放地连接受控制的或受调节的电压源（4），连接至热敏电阻（1）的双线圈（101）和／或蜿蜒式线（102）的相应的相反端部的接触接片（13）不与彼此直接接触并且适于经由凸缘（33）连接至受控制的或受调节的电压源（4）的电极（41）。

10. 根据权利要求 8 或 9 所述的蒸发器装置，其特征在于，所述热敏电阻（1）和所述至少一个蒸发器膜（32）设置成与经过嘴件（3）的流体的方向正交或者相对于经过嘴件（3）的流体的方向成一定角度。

11. 根据权利要求 9 或 10 所述的蒸发器装置，其特征在于，所述嘴件（3）进一步包括填充有包含有活性材料和／或香气材料的物质的存储筒（36），并且由金属箔或薄片构成的至少一个带尖端和／或带锋利边缘的打开接片（14）首先以它的带尖端和／或带锋利边缘的侧沿嘴件（3）的凸缘（33）的方向从热敏电阻（1）轴向地延伸并且被实施为使得，当将嘴件（3）和电压源（4）连接时，在热敏电阻（1）和凸缘（33）之间的存储筒（36）的密封箔（361）被所述打开接片（14）刺穿和／或切开。

12. 根据权利要求 9 至 11 中的一项所述的蒸发器装置，其通过电极（41）能释放地连

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接至受控制的或受调节的电压源(4),其中绝缘箔(2)朝向嘴件(3)的中空的缸(31)的内侧上的凸缘区(331)覆盖接触接片(13),并且,在所述凸缘区(331)的区域中,所述绝缘箔(2)设置有轴向地移位的至少两个接触开口(21),将所述接触开口(21)构造为使得它们被轴向地设置于一个平面中并且均仅暴露一个接触接片(13),并且所述受控制的或受调节的电压源(4)的电极(41)为轴向地移位的两个环,并且,在嘴件(3)和电压源(4)的连接状态中,电压源(4)的相应电极(41)经由接触开口(21)连接至接触接片(13)并经由接触接片(13)连接至热敏电阻(1)的双线圈(101)和/或蜿蜒式线(102)的相应端部。

13. 根据权利要求 12 所述的蒸发器装置,其特征在于,所述接触接片(13)和/或凸缘区(331)包括至少一个定位槽(34)和/或定位突起(35),所述定位槽(34)和/或定位突起(35)具有在受控制的或受调节的电压源(4)上被构造为至少一个定位突起(35)和/或定位槽(34)的互补配对物,其中,在嘴件(3)和电压源(4)的连接状态中,电压源(4)的相应电极(41)连接至接触接片(13)并经由接触接片(13)连接至热敏电阻(1)的双线圈(101)和/或蜿蜒式线(102)的相应端部。

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用于使来自具有蒸发器膜的单次使用嘴件的流体蒸发的可渗透的热敏电阻箔

技术领域

[0001] 本发明总体上涉及一种用于使用电子香烟而实现尼古丁和/或添加剂的优化的无烟吸入的装置。

背景技术

[0002] 在抽传统香烟时，烟草燃烧并且在此燃烧期间所产生的烟气被吸入(主流烟气)或者被排放至周围环境中(侧流烟气)。

[0003] 主流烟气是损害消费者的健康的关键因素，但却是带给消费者所期望的快乐之物。侧流烟气是损害被动吸烟者的健康的关键因素并且既不是被动吸烟者也不是消费者所期望的。

[0004] 已经在香烟烟气中鉴定出了超过4800种不同的物质，其中大约70种明显为致癌的。

[0005] 以其为基础的用于尼古丁和/或添加剂的无烟吸入的方法和装置的目标是为消费者提供传统香烟的替代品，其对消费者和第三方造成明显较少的伤害，优选地对消费者和第三方根本不造成伤害，然而同时保留传统香烟的消费者体验。

[0006] 目前，所谓的电子-香烟(电子香烟)在市场上将它们自身建立为传统香烟的替代品。在不同的方法中，在下文中所描述的方法由于它的相对简单的技术上的可实现性结合它的令人信服的功能性(蒸发速率、尼古丁输出)而已经被人们所接受。

[0007] 早达1990年的专利DE6901737IT2描述了一种发烟制品，所述发烟制品包括香味-产生介质、电加热元件以及用于应用电能的工具，能将所述香味-产生介质从所述电加热元件释放，其特征在于，所述电加热元件与香味-产生介质处于热接触，所述用于应用电能的工具将电能应用至加热元件，从而使加热元件加热所述香味-产生介质并释放香味成分，以及设置控制工具，以控制由所述用于应用电能的工具所应用的电能的量。

[0008] 如下所述，在最近的二十年里这一基本原理已经发展为推向市场并且得到优化。

[0009] 由于金属编织物或玻璃纤维芯的毛细管效应，要被蒸发的流体从储存器被提供至小的加热线圈。当从电子香烟进行抽吸时，通常由真空开关或真空调节器启动所述加热线圈，由此流体(液体)蒸发。

[0010] 电子香烟的主要构件为以下几个：具有真空开关或真空调节器以及用于光学地模仿点燃的香烟的发光的端部的LED的电池单元、具有加热线圈和毛细管的蒸发器单元(雾化器)以及具有流体储存器的嘴件。

[0011] 所述三个构件通常为圆柱形的并且，在组装时，它们的形状如同香烟。在这些构件的内部形成流动通道，所述流动通道延伸通过所有这三个构件。当从电子香烟进行抽吸时，气流被抽吸至电池单元中，由此使真空开关或真空调节器运行。这样做的效果是启动设置于下游蒸发器单元中的加热线圈。

[0012] 围绕纤维束缠绕螺旋状加热线圈，所述纤维束通过毛细管直接地连接至或经由金

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属编织网连接至位于嘴件中下游的流体储存器并且浸渍有流体，将所述纤维束布置为与流动方向正交。由于加热线圈的启动，流体被蒸发并被传递至所述气流。

[0013] 填充有要被蒸发的流体的储存器本身并不直接暴露至流动通道中的流动，而是布置于嘴件的侧向囊中。因此通过金属编织网和玻璃纤维束的毛细管供应纤维束，而不存在未蒸发的流体从储存器不可避免地到达消费者的口中的情况。储存器通常由一小片无纺布组成。

[0014] 除了储存器之外，嘴件仅包括流动通道和在它的端面中的呈小孔的形式的空气出口。已经添加有所蒸发的流体的气流通过所述空气出口流入消费者的口腔中。

[0015] 电池单元和蒸发器单元经由螺纹能释放地连接至彼此。所述螺纹的端面和带有螺纹的表面为导电的并且彼此绝缘，以使得，当已经经由螺纹将电池单元和蒸发器单元连接时，电流可以在它们之间流动并且当真空开关或真空调节器已经被启动时可以由电池供应加热线圈。在拆卸状态中，电池单元可以经由同一螺纹连接至电池充电器。

[0016] 嘴件经由圆柱形凸缘附接至与所述螺纹相对的设置的蒸发器单元端部。嘴件中的储存器因此与蒸发器单元的金属编织网接触并且开始从储存器向加热线圈的内部所进行的流体的输送。

[0017] 具有分离的可重复使用的蒸发器单元的电子香烟的此实施例的一大缺点是，蒸发器单元在它的使用寿命期间将日益受到污染。由于各包括有 200 次抽吸的很多储存器通常在更换蒸发器单元之前就被消耗了并且由于未对毛细管进行清洗，存在气化的微生物和非期望的有害物质的潜在风险。蒸发器单元可能使用多达六个月。

[0018] 蒸发器单元的日益增长的污染的另一个缺陷是在使用期间内的品质的潜在损失。例如，当更换嘴件时，新嘴件中所盛装的要被蒸发的流体将会与毛细管中仍然所含有的流体残留物混合。若消费者想要使用一个蒸发器来消费不同的香气，这是特别不利的。

[0019] 另一个不利的方面是，在更换附接至蒸发器的嘴件时流体会泄漏，由此消费者的皮肤常常会与包含有尼古丁的流体接触。取决于相应的尼古丁含量，皮肤接触可能导致轻微中毒。

[0020] 最后但并不是最不重要的，此三重设计具有的缺陷是，所得到的长度几乎不能被进一步减小，并且这与不要超过特大尺寸香烟的总长度太多的目标相反。

[0021] 当将蒸发器单元集成于嘴件中时可以部分地对以上所提到的缺点进行补救，因为可以避免流体的泄漏以及由此而产生的皮肤接触的风险并且可以更容易地实现将总长度大约限制为特大尺寸香烟的总长度的目标。

[0022] 然而，已经与蒸发器一同被传递至嘴件的螺纹连接现在被证明为是不利的，并且，除了螺纹连接不便于操作以外，鉴于螺纹的区域中的相对较厚的金属壁以及组合产品的现在所具有的单次使用特征，特别是由于它是大批量生产的产品而由此过量的材料的使用以指数方式增加，所以这还会导致废物处理问题。

[0023] 对于以上所提到的两种变型，亦即包括有分离的蒸发器的变型以及具有集成于嘴件中的蒸发器的变型，鉴于可能由包含有尼古丁的流体而引起的潜在风险，相应的储存器的可再填充性以及由此而产生的已经被广泛地采用的再填充实践构成一个大问题。再填充瓶可能包含可能对儿童致命的一定量的尼古丁。

[0024] 另外，包含有集成于嘴件中的蒸发器的系统的所声称的卫生优点是无效的，因为

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在实践中通常也对这些系统进行再填充，尽管它们常常将纤维用作毛细管(它们被长时间使用时所述纤维碳化)，而不是使用玻璃纤维毛细管。

[0025] 最后，鉴于所使用的构件(例如螺钉凸缘，螺钉凸缘是通过金属切削过程而生成的并且它的外环和它的端面被电分离)以及几乎不可自动化的安装(例如通过导线焊接至螺钉凸缘的加热线圈的安装以及通过加热线圈所进行的玻璃纤维束或天然纤维束的安装)，因此包含有集成于嘴件中的蒸发器的系统的一大缺点为不可能在快速运行的机器上生产此产品(其为大批量生产的产品)。

[0026] WO2011/009920 描述了为了释放可吸入气雾剂的目的而使活性材料和 / 或香气材料蒸发的方法，其中受到热能的作用时，流体流动通过优选地呈中空的圆柱体的流动通道并且在此流动通道中的流体完全地或部分地流动通过至少一个蒸发器膜，其中已经使用了和 / 或使用要被蒸发的包含有活性材料和 / 或香气材料的物质对所述至少一个蒸发器膜进行湿润并且另外地包含有热能(亦即受到热能的作用)的流体在流动通过蒸发器膜时使此物质或这些物质蒸发并将它或它们提供至流体流。

[0027] 以其为基础的前文最后所提到的方法和装置容许包含有活性材料和 / 或香气材料的物质的最佳蒸发，而不具有以上所提到的缺陷，例如在市场上可以买到的电系统的卫生问题、由特定的设计而产生的高制造成本以及过长的消费时间，亦即所述装置在原理上适合用作无烟香烟的嘴件，但是所述方法使用的流体流已经受到通过液化气体的燃烧而产生的热的作用并且是通过在 WO2008/113420 中所描述的过程而提供，然而由于没有用于热交换器的足够的空间，因此不可能在香烟或小雪茄中的可用空间中实现足够热的流体流的纯电力方式生成。

[0028] WO2008/113420 描述了为了释放可吸入气雾剂的目的而使活性物质和 / 或香气物质蒸发的方法，其中使可燃气体的燃烧气体(其优选地与过量的空气一同燃烧)部分地或完全地(可选择地与环境空气混合)通过活性物质和 / 或香气物质的储存器并且能通过燃烧气体的比例和可选择地通过所述燃烧气体与环境空气的混合比率来选择所期望的温度。

[0029] 此方法的一个主要的缺点是液化气体的使用，液化气体具有的影响是，由于在消费者脸部附近可能具有爆炸危险(即使此危险仅仅为假设的并且可通过故障安全设计来控制)，因而一方面在潜在的顾客一方会存在安全问题，另一方面会存在不容许基于此原理的产品登机的较高的可能性。

发明内容

[0030] 因此本发明的一个目的是提供一种用于电子香烟的装置，其在不具有与要被蒸发的流体接触的可重复使用的构件的情况下保证了尼古丁和 / 或添加剂的蒸发，以及优选地通过减少所使用的材料的量和通过使机械加工性能优化而同时实现成本和生态损害的明显减少。

[0031] 根据本发明，通过在权利要求 1 中所描述的类型的加热装置和用于使流体从可渗透的蒸发器膜(与在 WO2011/009920 中所描述的那些类似)蒸发的并包括有这样的加热装置的蒸发器装置来实现此目的，所述加热装置包括 :

[0032] ➢可渗透的热敏电阻箔，所述可渗透的热敏电阻箔被构造为具有两个端部和香烟或小雪茄的横截面尺寸的双线圈和 / 或蜿蜒式线，其中所述热敏电阻(1)的双线圈和 / 或

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蜿蜒式线的间隙为敞开的(可渗透的)并因此容许流体通过其流动。

[0033] ➢ 至少两个电触点(接触接片),所述至少两个电触点在它的一侧上固定地连接至热敏电阻箔的相应的相反端部并且在它的另一侧上被暴露,这容许它们能释放地连接至受控制的或受调节的电压源,热敏电阻箔和电触点优选地由一个片制造而成。

[0034] 从本发明的意义上说,对于热敏电阻箔以及对于蒸发器膜而言术语可渗透的意味着它们容许气体沿它们的表面法线的方向通过它们(能透过气体)。

[0035] 根据本发明,可渗透的热敏电阻箔由导电箔构成,优选地使所述导电箔经受冲压或激光切割以便获得双线圈形状或蜿蜒式线形状或者双线圈形状和蜿蜒式线形状的组合。在双线圈形状和蜿蜒式线形状的组合的情况下,热敏电阻可包括,例如,两个局部区域,其中蜿蜒式线形状具有呈双线圈的形式的插入式局部区域或者其中双线圈具有呈蜿蜒式线的形式的中心局部区域。具有另外的、不同的局部区域的其它组合也是可能的。

[0036] 根据本发明的热敏电阻箔由导电材料构成,优选地由铝或高质量的合金钢组成,并且更优选地由食品安全级的纯铝、铝锰合金或例如 X5CrNi18-10 的不锈钢组成。

[0037] 根据本发明的可渗透的热敏电阻箔的壁厚度介于 0.01mm 至 0.2mm 之间,然而优选地,它介于 0.02mm 至 0.08mm 之间。

[0038] 取决于要被蒸发的流体的导电性,热敏电阻箔可以涂有抗热的电绝缘塑料层,优选地涂有一层聚酰亚胺、层合云母板或硅树脂,从而在要被蒸发的流体的电阻与热敏电阻箔的电阻相比可能过低的情况下避免短路。从本发明的意义上说层合云母板一般指的是人造云母,亦即包括有云母碎片(层状硅酸盐碎片)和作为矩阵系统的人造树脂的复合材料。示例性产品:柔性的层合云母板 FLM M&P(由浸渍有抗高温的硅树脂粘合剂的至少 92% 的白云母或者,替代地,金云母组成),柔性的层合云母板 FLM521P 等等。

[0039] 这样的加热装置可以用作例如用于使包含有活性材料和/或香气材料的物质蒸发的蒸发器装置中的(例如电子香烟的一次性的、单次使用的嘴件中的)热敏电阻。通过简单地将加热装置附接至包括有真空开关或真空调节器的电池单元,电子香烟将即可使用。当真空开关或真空调节器闭合电流电路时,热敏电阻箔将加热流体并使流体从蒸发器膜蒸发。

[0040] 另一个方面因此涉及用于使包含有活性材料和/或香气材料的物质蒸发的蒸发器装置,所述蒸发器装置优选地被构造为呈具有流体进口和流体出口的中空的缸的形式的嘴件。所述蒸发器装置包括本文所描述的类型的加热装置以及至少一个蒸发器膜,所述至少一个蒸发器膜与热敏电阻大面积接触。所述蒸发器膜也能透过流动的流体并且使用或者可以使用要被蒸发的包含有活性材料和/或香气材料的物质进行湿润。优选地所述热敏电阻和一个或多个蒸发器膜设置成与经过嘴件的流体的方向正交或者相对于经过嘴件的流体的方向成一定角度。

[0041] 由于本发明提供热敏电阻箔与一个蒸发器膜或多个蒸发器膜之间的最大可能的接触面积,因此蒸发器装置的上述结构设计不仅获得了非常高的蒸发效率而且获得了最高可能的蒸发均匀度。

[0042] 本发明的另一个主要的优点是,通过改变热敏电阻箔的几何构造,例如通过改变线圈绕组的数量、绕组的宽度和/或箔的或薄片的壁厚度,可以以尽可能最好的方式来使热敏电阻的功率适于要被蒸发的各种物质(其包含不同的材料)。

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[0043] 通过选择热敏电阻箔的适当的几何参数以及适当的材料，可以在 1-10Ω (Ohm) 的范围内调整热敏电阻箔的电阻，由此可以使用 1.2V(NiCd)-3.7V(Li-ion) 的附接电池单元的可能的标称电压来覆盖香烟嘴件的横截面中的 0.1 - 13.7 瓦特的加热功率的范围。

[0044] 本发明的另一个重要的优点是，通过提供局部收缩(变窄)，可以将保险丝集成于热敏电阻箔的轮廓中。当流体已经被消耗时，由于不再存在的冷却此保险丝将被热破坏，并且嘴件将变得无用，由此可以按照特别简单的方式获得具有每 20 - 50ml 抽吸 5 - 20 次的、然而优选地具有每 35ml 抽吸 8 - 12 次的特定消费时间的单次使用的嘴件。

[0045] 根据另一实施例，蒸发器装置另外地包括凸缘，用于通过电极、接触接片能释放地连接受控制的或受调节的电压源，连接至热敏电阻的双线圈和 / 或蜿蜒式线的相应的相反端部的接触接片不与彼此直接接触，亦即它们仅经由热敏电阻与彼此接触。这些接触接片适于经由凸缘连接至受控制的或受调节的电压源的电极。

[0046] 优选地，绝缘箔朝向在嘴件的中空的缸的内侧上的凸缘区覆盖接触接片。所述绝缘箔优选地在所述凸缘区的区域中包括轴向地移位的至少两个接触开口，优选地将所述接触开口构造为使得它们被轴向地设置于一个平面中并且均仅暴露一个接触接片。受控制的或受调节的电压源的电极例如为轴向地移位的两个环，并且，在嘴件和电压源的连接状态中，电压源的相应电极经由接触开口连接至接触接片并经由接触接片连接至热敏电阻的双线圈和 / 或蜿蜒式线的相应端部。

[0047] 根据又一实施例，接触接片和 / 或凸缘区优选地包括至少一个定位槽和 / 或定位突起，所述定位槽和 / 或定位突起具有在受控制的或受调节的电压源上被构造为至少一个定位突起和 / 或定位槽的互补配对物。在嘴件和电压源的连接状态中，电压源的相应电极连接至接触接片并经由接触接片连接至热敏电阻的双线圈和 / 或蜿蜒式线的相应端部。

[0048] 根据另一优选实施例，由金属箔或薄片、优选地(但并非强制性地)由与热敏电阻相同的金属箔、相应地相同的薄片构成的至少一个带尖端和 / 或带锋利边缘的打开接片，首先以它的带尖端和 / 或带锋利边缘的侧沿嘴件的凸缘的方向从热敏电阻轴向地延伸并且被实施为使得，当将嘴件和电压源连接时，在热敏电阻和凸缘之间的存储筒的密封箔被所述打开接片刺穿和 / 或切开，所述存储筒填充有包含有活性材料和 / 或香气材料的物质。

[0049] 因此，本发明不仅容许在单次使用的嘴件中提供存储和蒸发功能的组合，而且它还提供精确地限定的、暂时有限的消费者体验，与此类型的已知的装置相比，所述单次使用的嘴件提供更有效的蒸发并且所消耗的资源的量减少。

[0050] 由于上述热敏电阻箔优选地是通过冲压或模具压弯而生产的，因此可以极好地将此产品集成于快速运行的制造过程中，并且这构成本发明的另一个主要的优点。

附图说明

[0051] 在下文中，将参考附图对本发明的优点和另外的有利进展进行描述。

[0052] 图 1 示出在本发明中所描述的加热装置的一个优选实施例的两个变型，在此情况下，热敏电阻 1、接触接片 13 和两个打开接片 14 由单片金属箔生产而成。

[0053] a) 双线圈 101 作为热敏电阻 1。

[0054] b) 蜿蜒式线 102 作为热敏电阻 1，其另外地集成有保险丝 12。

[0055] 图 2 示出如何将根据本发明的一个优选实施例的嘴件 3 连接至电压源 4，其中电压

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源 4 的两个环形电极 41 经由设置于绝缘箔 2 中的接触开口 21 与接触接片 13 接触，由此可以为热敏电阻 1 提供电流，通过电压源 4 的凸缘 33 的端面使存储筒 36 朝向缓冲存储器 321 在中空的缸 31 内轴向地移位，由此存储筒 36 的密封箔 361 被打开接片 14 撕开，于是包含有活性材料和 / 或香气材料的物质流入缓冲存储器 321 中并从那里流入蒸发器膜 32 中。

[0056] a)嘴件处于不活动的存储状态中，密封箔 361 完好，存储筒 36 处于原始位置处，还未附接电压源 4。

[0057] b)嘴件处于使用活动状态中，密封箔 361 被破坏，存储筒 36 在最终位置处，其中附接了电压源 4。

具体实施方式

[0058] 根据本发明的一个优选实施例，将根据本发明的装置用作例如在 WO2011/009920 中所描述的装置中的热敏电阻 1，亦即将根据本发明的装置与其中流体在流动通道 31 中流动通过至少一个蒸发器膜 32 的装置相结合，其中已经使用和 / 或使用要被蒸发的包含有活性材料和 / 或香气材料的物质对所述至少一个蒸发器膜进行湿润，根据本发明所述的装置将热能提供至包含有活性材料和 / 或香气材料的物质，由此此物质被蒸发并被提供至流体流。

[0059] 根据此实施例，根据本发明所述的装置包括 ：

[0060] ➢ 由塑料膜、纸板以及封面纸组成的中空的缸 31，所述封面纸围绕纸板的外表面缠绕并优选地对应于香烟过滤嘴的所谓的软木纸并且所述纸板在它的内表面上涂有塑料膜，

[0061] ➢ 呈由铝箔冲压而形成的双线圈 101 的形式的可渗透的热敏电阻箔 1，所述可渗透的热敏电阻箔 1 涂有由聚酰亚胺构成的绝缘层 11，

[0062] ➢ 在热敏电阻箔 1 上的呈接触接片 13 的形式的两个电触点 13，所述两个电触点 13 在中空的缸 31 内沿它的内表面从热敏电阻箔 1 纵向地延伸一直到凸缘 33 并延伸至凸缘 33 中，所述触点中的每一个都具有对应于四分之一圆的横截面形状，

[0063] ➢ 两个可渗透的蒸发器膜 32，所述两个可渗透的蒸发器膜 32 被布置为使得，在轴向方向中，一个蒸发器膜 32 被设置于可渗透的热敏电阻箔 1 的上游而另一个蒸发器膜 32 被设置于可渗透的热敏电阻箔 1 的下游，以与其直接地大面积接触，所述蒸发器膜的一部分与彼此直接接触，

[0064] ➢ 呈由吸收性的无纺布构成的环的形式的蒸发器缓冲存储器 321，蒸发器膜 32 像鼓膜一样跨过所述蒸发器缓冲存储器 321，

[0065] ➢ 呈刺穿物的形式的两个打开接片 14，所述两个打开接片 14 从接触接片 13 突出至流动通道 31 中并从热敏电阻箔 1 朝向凸缘 33 轴向地延伸，

[0066] ➢绝缘箔 2，所述绝缘箔 2 在中空的缸 31 内并在接触接片 13 内沿其内表面从热敏电阻箔 1 纵向地延伸一直到凸缘 33 并延伸至凸缘 33 中，具有轴向地移位的两个接触开口 21，绝缘箔 2 的内表面以及通过接触开口 21 所暴露的接触接片的区域代表凸缘 33 的位于嘴件的侧上的凸缘区 331，

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[0067] ➢能在中空的缸 31 的绝缘箔 2 内轴向地运动的环形存储筒 36，所述存储筒 36 盛装有包含有活性材料和 / 或香气材料的物质并由密封箔 361 密封，并且当存储筒 36 朝向热敏电阻箔 1 运动至使得打开接片 14 刺穿密封箔 361 的程度时，所述密封箔 361 被破坏。

[0068] 将本发明的上述优选实施例与在电压源 - 侧的凸缘 33 的外表面上具有两个环形电极 41 的杆状电压源 4 结合使用，电压源具有空气排放开口，所述空气排放开口位于凸缘 33 的端面上并且流体流通过其流入嘴件 3 中，电压源的流动通道具有设置于其中的真空调节器，所述真空调节器在连接状态中通过嘴件 3 的热敏电阻箔 1 和接触接片 13 经由环形电极 41 控制来自电压源的电流。

[0069] 表 1 :参考列表

[0070]

符号	一般名称	特定名称
1	热敏电阻	可渗透的热敏电阻箔
101	双线圈	
102	蜿蜒式线	
11	绝缘层	电绝缘塑料层
12	保险丝	
13	接触接片	电触点
14	打开接片	
2	绝缘箔	
21	接触开口	
3	嘴件	
31	中空的缸	流动通道
311	流体进口	
312	流体出口	
313	流动通道	
32	蒸发器膜	可渗透的蒸发器膜
321	缓冲存储器	蒸发器缓冲存储器

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33	凸缘	
331	凸缘区	
34	定位槽	
35	定位突起	
36	存储筒	
361	密封箔	
4	电压源	具有真空开关的电池单元
41	电极	电极

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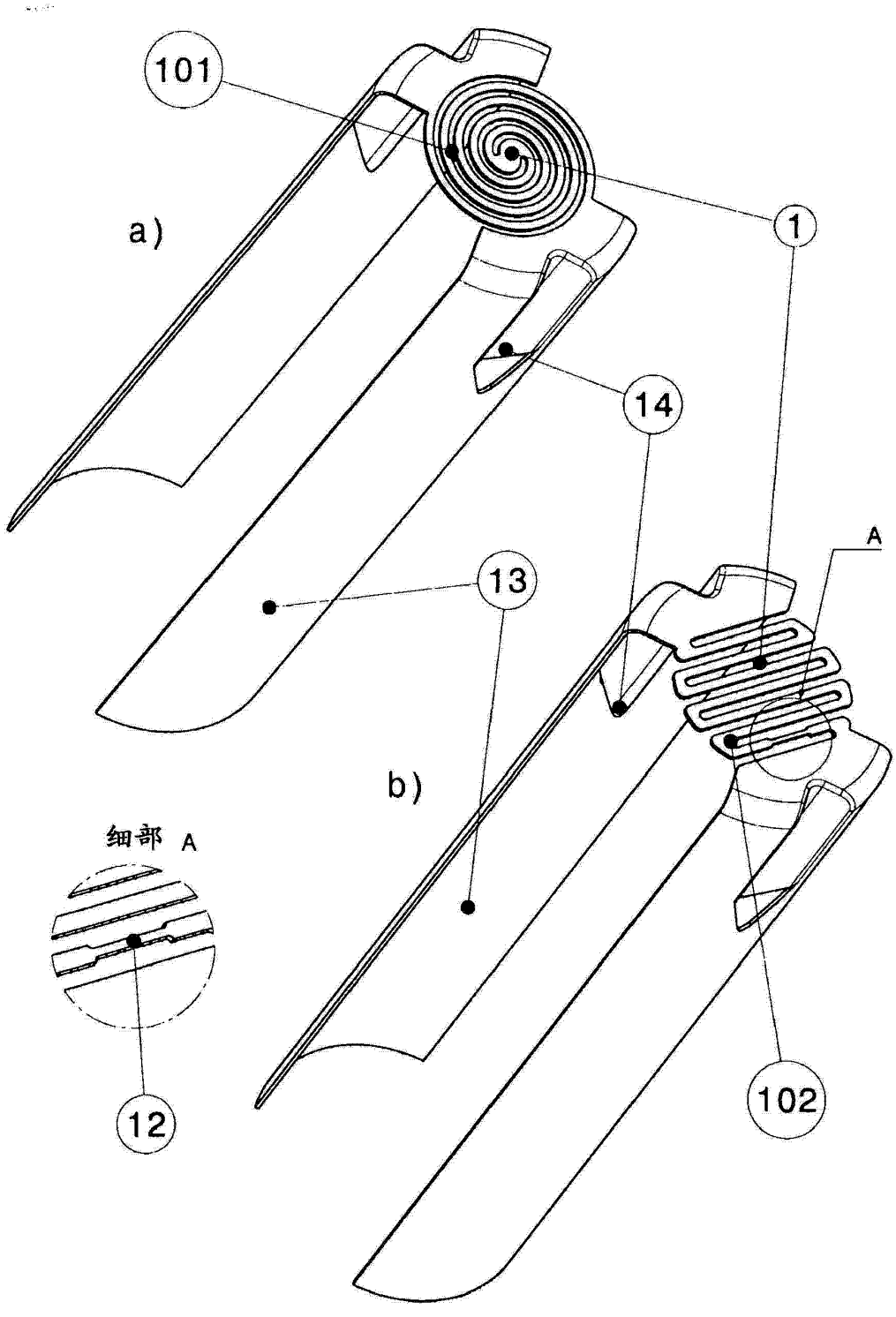

图 1

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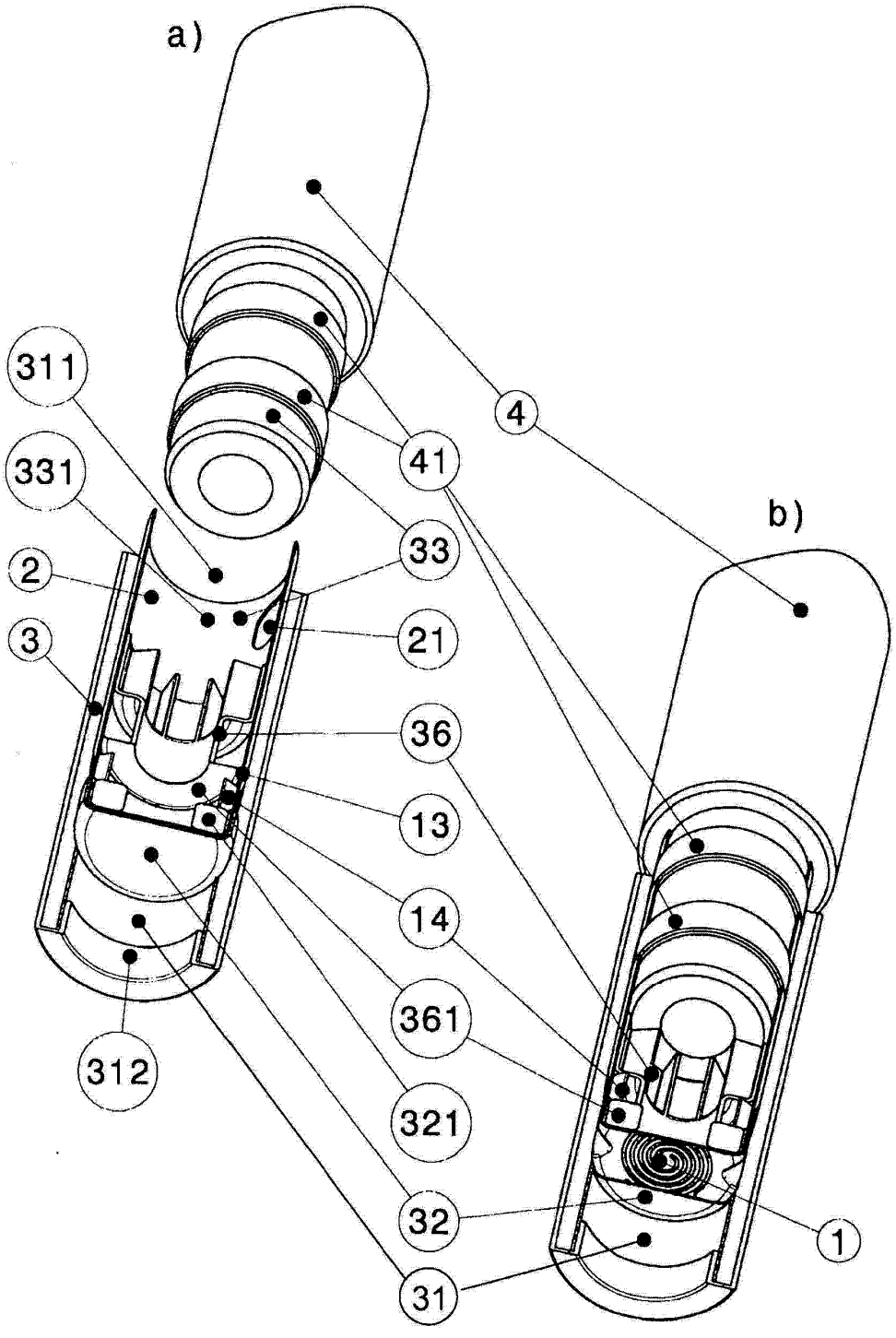

图 2

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Espacenet

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Electronic cigarette

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The invention relates to an electronic cigarette. The electronic cigarette comprises a cigarette tube and an atomization component, wherein the atomization component is fixed inside the cigarette tube; the atomization component comprises a liquid storage device, a liquid guiding medium and a heating component; the liquid storage device is provided with a liquid storage cavity used for storing cigarette liquid and a liquid outlet; the outlet is communicated with the liquid storage cavity; the liquid guiding medium is a porous liquid guiding material and is connected with the liquid outlet; the heating component is fixed inside the cigarette, and a gap is formed between the heating component and the liquid guiding medium. According to the electronic cigarette provided by the invention, the liquid guiding medium guides the cigarette liquid in the liquid storage device via the liquid outlet for storage; the gap is formed between the heating component and the liquid guiding medium, so that the heating component is not in contact with the liquid guiding medium when heating the liquid guiding medium, the atomized cigarette liquid is not polluted by the heating component, and the health of a user is not influenced.

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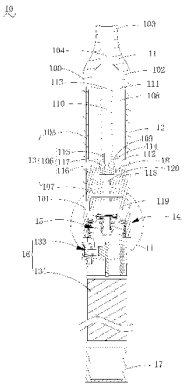
(54)发明名称

电子烟

(57)摘要

本发明涉及一种电子烟，其包括烟弹管及雾化组件。该雾化组件固定在该烟弹管中。该雾化组件包括储液器、导液介质及发热元件。该储液器具有用于存储烟液的储液腔和出液口，该出液口与该储液腔相通。该导液介质为多孔导液材料并连接在该出液口。该发热元件固定于该烟弹管中且与该导液介质之间存在间隙。上述电子烟中，导液介质自出液口将储液器中的烟液导出并存储，发热元件与导液介质之间存在间隙，使得发热元件加热导液介质时不需要与导液介质直接接触，从而避免了发热元件污染雾化后的烟液，有利于使用者的身体健康。



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1. 一种电子烟，其特征在于，包括：

烟弹管；

固定在该烟弹管中的雾化组件，该雾化组件包括：

储液器，该储液器具有用于存储烟液的储液腔和出液口，该出液口与该储液腔相通；

导液介质，该导液介质为多孔导液材料并连接在该出液口；及

发热元件，该发热元件固定于该烟弹管中且与该导液介质之间存在间隙。

2. 根据权利要求 1 所述的电子烟，其特征在于，该储液器呈筒状且开设有通气管道，该储液器包括第一端及与该第一端相背的第二端，该出液口开设在该第二端，该通气管道在该第一端形成第一开口及在该第二端形成第二开口。

3. 根据权利要求 2 所述的电子烟，其特征在于，该导液介质通过该第二开口部分地收容于该通气管道。

4. 根据权利要求 3 所述的电子烟，其特征在于，该发热元件具有加热腔，该导液介质包括插入端及与该插入端相背的受热端，该插入端位于该通气管道，该受热端位于该加热腔内。

5. 根据权利要求 4 所述的电子烟，其特征在于，该插入端呈阶梯状，该出液口开设在该第二端及该通气管道的内壁，该插入端连接在该出液口。

6. 根据权利要求 2 所述的电子烟，其特征在于，该出液口为呈围绕该通气管道的环状的出液口，该导液介质为呈与该出液口匹配的环状的导液介质，且该导液介质收容在该出液口中。

7. 根据权利要求 6 所述的电子烟，其特征在于，该发热元件包括反射罩及固定在该反射罩上的加热管，该加热管与该导液介质之间存在间隙。

8. 根据权利要求 1 所述的电子烟，其特征在于，该烟弹管包括第一连接端及与该第一连接端相背的第二连接端，该电子烟还包括烟嘴盖及电源组件，该烟嘴盖连接在该第一连接端，该第二连接端连接有第一连接结构，该电源组件连接有第二连接结构，该第二连接结构与该第一连接结构连接，该发热元件通过该第一连接结构及该第二连接结构与该电源组件电连接。

9. 根据权利要求 8 所述的电子烟，其特征在于，该第一连接结构包括：

固定在该第二连接端上且导电的螺纹套；及

第一电极管，收容在该螺纹套内且与该螺纹套绝缘。

10. 根据权利要求 9 所述的电子烟，其特征在于，该第二连接结构包括：

固定在该电源组件上且导电的螺纹柱，该螺纹柱位于该螺纹套内且与该螺纹套螺接，该螺纹柱开设有轴孔及具有固定在该轴孔内的凸环部；

第二电极管，收容在该轴孔内且与该第一电极管连接；及

绝缘套，设置在该凸环部与该第二电极管之间使该螺纹柱与该第二电极管绝缘。

11. 根据权利要求 8 所述的电子烟，其特征在于，该第一连接结构包括：

固定在该第二连接端上且导电的螺纹柱，该螺纹柱包括相连的第一筒体和第二筒体，该第一筒体的外侧面间隔设置有第一凸缘和第二凸缘，该第一凸缘和该第二凸缘之间形成有第一环形槽；

第一电极管，收容在该螺纹柱内；

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第一绝缘套，设置在该螺纹柱与该第一电极管之间使该螺纹柱与该第一电极管绝缘；及

弹性件，设置在该螺纹柱与该烟弹管的内壁之间，该弹性件包括圈体和与该圈体相连的折弯部，该圈体收容在该第一环形槽中，该折弯部位于该内壁与该螺纹柱之间。

12. 根据权利要求 11 所述的电子烟，其特征在于，该第二连接结构包括：

固定在该电源组件上且导电的螺纹套，该螺纹套包括相连的螺纹部和凸环部，该螺纹部与该第二筒体连接；

第二电极管，收容在该螺纹套内且与该第一电极管连接；及

第二绝缘套，设置在该凸环部与该第二电极管之间使该螺纹套与该第二电极管绝缘。

13. 根据权利要求 11 所述的电子烟，其特征在于，该圈体靠近该烟弹管的一侧具有用于引导安装的斜面。

14. 根据权利要求 11 所述的电子烟，其特征在于，该圈体嵌入该第一环形槽中与该螺纹柱的部分侧壁紧密贴合使该烟弹管与该螺纹柱紧密结合。

15. 根据权利要求 11 所述的电子烟，其特征在于，该第一绝缘套包括环形的绝缘基底和设置在该绝缘基底上的绝缘管，该第一筒体的部分内侧壁与该绝缘管的部分外壁紧密贴合。

16. 根据权利要求 1 所述的电子烟，其特征在于，该储液器包括储液腔体及导液管，该储液腔体具有第一端、与该第一端相背的第二端及用于存储烟液的储液腔，该导液管自该第二端伸出并与该导液介质连接。

17. 根据权利要求 16 所述的电子烟，其特征在于，该储液器开设有通气管道，该通气管道贯穿该储液腔体及该导液管，该通气管道的内壁开设有出液口，该出液口与该储液腔相通。

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电子烟

技术领域

[0001] 本发明涉及电子雾化领域，尤其涉及一种电子烟。

背景技术

[0002] 电子烟又名虚拟香烟、电子雾化器。电子烟作为替代香烟用品，多用于戒烟。电子烟具有与香烟相似的外观和味道，但一般不含香烟中的焦油、悬浮微粒等其它有害成分。

[0003] 电子烟主要由雾化器和电源组件构成。雾化器作为电子烟产生雾化气体的核心装置，其雾化效果决定了烟气的质量与口感。传统的雾化器的发热体为发热丝，发热丝缠绕在一固定轴上。当电源组件给发热丝通电时，存储在存储介质上的烟液吸附在固定轴上，经发热丝的加热作用将烟液雾化。然而，发热丝一般为合金电阻丝，如镍铬合金电阻丝，这样的发热丝直接与烟液接触，雾化过程中有可能会产生少量的金属元素（如：铬）或其它微量元素（如磷、碳、硫等），这样使用者在使用时会吸入铬、硫等有害物质，不利于使用者的身体健康。

发明内容

[0004] 基于此，有必要提供一种有利于使用者身体健康的电子烟。

[0005] 一种电子烟，包括烟弹管及雾化组件。该雾化组件固定在该烟弹管中。该雾化组件包括储液器、导液介质及发热元件。该储液器具有用于存储烟液的储液腔和出液口，该出液口与该储液腔相通。该导液介质为多孔导液材料并连接在该出液口。该发热元件固定于该烟弹管中且与该导液介质之间存在间隙。

[0006] 在其中一个实施例中，该储液器呈筒状且开设有通气管道，该储液器包括第一端及与该第一端相背的第二端，该出液口开设在该第二端，该通气管道在该第一端形成第一开口及在该第二端形成第二开口。

[0007] 在其中一个实施例中，该导液介质通过该第二开口部分地收容于该通气管道。

[0008] 在其中一个实施例中，该发热元件具有加热腔，该导液介质包括插入端及与该插入端相背的受热端，该插入端位于该通气管道，该受热端位于该加热腔内。

[0009] 在其中一个实施例中，该插入端呈阶梯状，该出液口开设在该第二端及该通气管道的内壁，该插入端连接在该出液口。

[0010] 在其中一个实施例中，该出液口为呈围绕该通气管道的环状的出液口，该导液介质为呈与该出液口匹配的环状的导液介质，且该导液介质收容在该出液口中。

[0011] 在其中一个实施例中，该发热元件包括反射罩及固定在该反射罩上的加热管，该加热管与该导液介质之间存在间隙。

[0012] 在其中一个实施例中，该烟弹管包括第一连接端及与该第一连接端相背的第二连接端，该电子烟还包括烟嘴盖及电源组件，该烟嘴盖连接在该第一连接端，该第二连接端连接有第一连接结构，该电源组件连接有第二连接结构，该第二连接结构与该第一连接结构连接，该发热元件通过该第一连接结构及该第二连接结构与该电源组件电连接。

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[0013] 在其中一个实施例中，该第一连接结构包括：

[0014] 固定在该第二连接端上且导电的螺纹套；及

[0015] 第一电极管，收容在该螺纹套内且与该螺纹套绝缘。

[0016] 在其中一个实施例中，该第二连接结构包括：

[0017] 固定在该电源组件上且导电的螺纹柱，该螺纹柱位于该螺纹套内且与该螺纹套螺接，该螺纹柱开设有轴孔及具有固定在该轴孔内的凸环部；

[0018] 第二电极管，收容在该轴孔内且与该第一电极管连接；及

[0019] 绝缘套，设置在该凸环部与该第二电极管之间使该螺纹柱与该第二电极管绝缘。

[0020] 在其中一个实施例中，该第一连接结构包括：

[0021] 固定在该第二连接端上且导电的螺纹柱，该螺纹柱包括相连的第一筒体和第二筒体，该第一筒体的外侧面间隔设置有第一凸缘和第二凸缘，该第一凸缘和该第二凸缘之间形成有第一环形槽；

[0022] 第一电极管，收容在该螺纹柱内；

[0023] 第一绝缘套，设置在该螺纹柱与该第一电极管之间使该螺纹柱与该第一电极管绝缘；及

[0024] 弹性件，设置在该螺纹柱与该烟弹管的内壁之间，该弹性件包括圈体和与该圈体相连的折弯部，该圈体收容在该第一环形槽中，该折弯部位于该内壁与该螺纹柱之间。

[0025] 在其中一个实施例中，该第二连接结构包括：

[0026] 固定在该电源组件上且导电的螺纹套，该螺纹套包括相连的螺纹部和凸环部，该螺纹部与该第二筒体连接；

[0027] 第二电极管，收容在该螺纹套内且与该第一电极管连接；及

[0028] 第二绝缘套，设置在该凸环部与该第二电极管之间使该螺纹套与该第二电极管绝缘。

[0029] 在其中一个实施例中，该圈体靠近该烟弹管的一侧具有用于引导安装的斜面。

[0030] 在其中一个实施例中，该圈体嵌入该第一环形槽中与该螺纹柱的部分侧壁紧密贴合使该烟弹管与该螺纹柱紧密结合。

[0031] 在其中一个实施例中，该第一绝缘套包括环形的绝缘基底和设置在该绝缘基底上的绝缘管，该第一筒体的部分内侧壁与该绝缘管的部分外壁紧密贴合。

[0032] 在其中一个实施例中，该储液器包括储液腔体及导液管，该储液腔体具有第一端、与该第一端相背的第二端及用于存储烟液的储液腔，该导液管自该第二端伸出并与该导液介质连接。

[0033] 在其中一个实施例中，该储液器开设有通气管道，该通气管道贯穿该储液腔体及该导液管，该通气管道的内壁开设有出液口，该出液口与该储液腔相通。

[0034] 上述电子烟中，导液介质自出液口将储液器中的烟液导出并存储，发热元件与导液介质之间存在间隙，使得发热元件加热导液介质时不需要与导液介质直接接触，从而避免了发热元件污染雾化后的烟液，有利于使用者的身体健康。

附图说明

[0035] 图 1 为第一实施例提供的一种电子烟的剖面示意图。

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[0036] 图 2 为图 1 的电子烟 II 部的放大示意图。

[0037] 图 3 为第二实施例提供的一种电子烟的剖面示意图。

[0038] 图 4 为第三实施例提供的一种电子烟的剖面示意图。

[0039] 图 5 为第四实施例提供的一种电子烟的剖面示意图。

[0040] 图 6 为第五实施例提供的一种电子烟的剖面示意图。

[0041] 图 7 为第六实施例提供的一种电子烟的剖面示意图。

[0042] 图 8 为第七实施例提供的一种电子烟的剖面示意图。

[0043] 图 9 为图 8 的电子烟 IX 部的放大示意图。

[0044] 图 10 为第八实施例提供的一种电子烟的剖面示意图。

[0045] 图 11 为第九实施例提供的一种电子烟的剖面示意图。

具体实施方式

[0046] 为了便于理解本发明，下面将参照相关附图对本发明进行更全面的描述。附图中给出了本发明的较佳的实施例。但是，本发明可以以许多不同的形式来实现，并不限于本文所描述的实施例。相反地，提供这些实施例的目的是使对本发明的公开内容的理解更加透彻全面。

[0047] 需要说明的是，当元件被称为“固定在”另一个元件，它可以直接在另一个元件上或者也可以存在居中的元件。当一个元件被认为是“连接”另一个元件，它可以是直接连接到另一个元件或者可能同时存在居中元件。本文所使用的术语“垂直的”、“水平的”、“左”、“右”以及类似的表述只是为了说明的目的。

[0048] 除非另有定义，本文所使用的所有的技术和科学术语与属于本发明的技术领域的技术人员通常理解的含义相同。本文中在本发明的说明书中所使用的术语只是为了描述具体的实施例的目的，不是旨在于限制本发明。本文所使用的术语“及 / 或”包括一个或多个相关的所列项目的任意的和所有的组合。

[0049] 请参阅图 1 和图 2，第一实施例提供的一种电子烟 10 包括依次设置的烟嘴盖 11、烟弹管 12、雾化组件 13、第一连接结构 14、第二连接结构 15、电源组件 16 和底盖 17。本实施例的电子烟 10 大致为圆柱体状。在其它实施例中，电子烟 10 也可以为棱柱形等其它形状。

[0050] 该烟弹管 12 包括第一连接端 100 及与该第一连接端 100 相背的第二连接端 101，烟嘴盖 11 设置在该第一连接端 100。

[0051] 烟嘴盖 11 大致呈漏斗状，烟嘴盖 11 的较大端 102 连接在第一连接端 100，较小端 103 供使用者吸吮。漏斗状的烟嘴盖 11 可向使用者提供更方便的吸食。烟嘴盖 11 采用塑料制成，优选为硅胶。烟嘴盖 11 上开设有出气孔 104 供气流流出。第一连接结构 14 连接在该第二连接端 101。

[0052] 该雾化组件 13 固定在该烟弹管 12 中。该雾化组件 13 包括储液器 105、导液介质 106 及发热元件 107。

[0053] 该储液器 105 具有用于存储烟液的储液腔 108 和出液口 109，该出液口 109 与该储液腔 108 相通以使烟液能够从该出液口 109 中导出。该储液器 105 可采用耐高温塑胶，如 PPS、PPA 或 LCP，PC 等或玻璃材料。本实施例中，储液器 105 大致呈圆筒状。在其它实施例

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中，储液器 105 也可以为棱柱形等其它形状。

[0054] 储液器 105 开设有通气管道 110。储液器 105 包括第一端 111 及与第一端 111 相背的第二端 112，出液口 109 开设在第二端 112 及通气管道 110 的内壁，即出液口 109 处于第二端 112 端壁与通气管道 110 的内壁的交界处，通气管道 110 在该第一端 111 形成第一开口 113 及在该第二端 112 形成第二开口 114。第一开口 113 比第二开口 114 靠近烟嘴盖 11。

[0055] 导液介质 106 为多孔导液材料并连接在该出液口 109。本实施方式中，导液介质 106 为多孔陶瓷材料，优先地为多孔高导热陶瓷材料。该导液介质 106 通过该第二开口 114 部分地收容于该通气管道 110。具体地，该导液介质 106 包括插入端 115 及与插入端 115 相背的受热端 116，插入端 115 位于通气管道 110，插入端 115 呈阶梯状且连接在该出液口 109 以使插入端 115 能够从出液口 109 中将储液器 105 内的烟液导入至导液介质 106 中并储存。导液介质 106 内部开设有 T 形通气孔 117，该 T 形通气孔 117 与通气管道 110 相通。可以理解，在其它实施例中，导液介质 106 可为耐高温的多孔玻璃、多孔石墨、多孔纤维等其它多孔材料。由于储液器 105 采用耐高温塑胶或玻璃材料替换防火棉制成储液介质，多孔陶瓷材料替代高硅氧纤维绳作为导液介质。这样避免了防火棉及高硅氧纤维绳因与烟液长期接触而产生细菌的问题，而且防火棉及高硅氧纤维绳在电子烟生产过程中容易吸附其它杂物，造成导液不顺畅。本实施例的电子烟 10 则能够避免这样的问题，能够使导液顺畅，卫生。

[0056] 发热元件 107 固定于该烟弹管 12 中且与该导液介质 106 之间存在间隙 18，该发热元件 107 用于非接触式地加热该导液介质 106。在本实施例中，该发热元件 107 为电子脉冲加热装置，其具有加热腔 118 及电极部 119。该加热腔 118 与电极部 119 位于该发热元件 107 相背的两端。导液介质 106 的受热端 116 位于该加热腔 118 内。电极部 119 与第一连接结构 14 电性连接。发热元件 107 内部开设有供气流通过的通孔 120。T 形通气孔 117 通过加热腔 118 与通孔 120 连通。在本实施例中，由于没有使用发热丝作为发热体，这样避免了因工人生产时每个工人的手法不一样，在绕发热丝时圈数和圈与圈之间的间隔不一样，而导致电子烟最后抽吸口感不一样。

[0057] 本实施例中，该第一连接结构 14 包括导电的螺纹套 121 及第一电极管 122。该螺纹套 121 固定在烟弹管 12 的第二连接端 101 上。第一电极管 122 收容在该螺纹套 121 内且与该螺纹套 121 绝缘。本实施例中，第一电极管 122 的外侧面开设有环形的卡入槽 123。可以理解，第一电极管 122 能够利用一些固定元件（如固定杆或固定块等，图未示）固定在第二连接端 101 的内壁上。电极部 119 的电极分别与螺纹套 121 及第一电极管 122 电性连接。在本实施例中，螺纹套 121 的材质为黄铜镀金，采用该材质的螺纹套 121 的导电性能较好，且具有良好的塑性，易加工塑形。在其它实施例中，螺纹套 121 也可以采用其它导电材质制成。第一电极管 122 的材质与螺纹套 121 的材质可以相同，也可不相同。

[0058] 第二连接结构 15 连接在电源组件 16，第二连接结构 15 与第一连接结构 14 连接 14。发热元件 107 通过该第一连接结构 14 及该第二连接结构 15 与电源组件 16 电连接。

[0059] 本实施例中，第二连接结构 15 包括导电的螺纹柱 124、第二电极管 125 及绝缘套 126。螺纹柱 124 固定在该电源组件 16 上，螺纹柱 124 位于螺纹套 121 内且与螺纹套 121 螺接。螺纹柱 124 开设有轴孔 127 及具有第一筒体 128 及与第一筒体 128 连接的第二筒体

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129。该轴孔 127 贯穿第一筒体 128 及第二筒体 129。第一筒体 128 在该轴孔 127 内设置有凸环部 130，第一筒体 128 的最大直径小于第二筒体 129 的最大直径。第二电极管 125 收容在位于第一筒体 128 的轴孔部分内且与该第一电极管 122 连接。本实施例中，第二电极管 125 开设有插入孔 131，插入孔 131 内形成有环形凸肋 132，该环形凸肋 132 卡入第一电极管 122 的卡入槽 123 内。这样的连接方式保证了第一电极管 122 与第二电极管 125 的更佳电连接性能及结构稳定性。第一电极管 122 与第二电极管 125 沿电子烟 10 的轴向均开设通气孔（图未示）。在本实施例中，螺纹柱 124 的材质与螺纹套 121 的材质相同，即为黄铜镀金。在其它实施例中，螺纹柱 124 也可以采用其它导电材质制成。第二电极管 125 的材质与螺纹柱 124 的材质可以相同，也可以不相同。

[0060] 绝缘套 126 设置在该凸环部 130 与该第二电极管 125 之间使该螺纹柱 124 与该第二电极管 125 绝缘，并使螺纹柱 124 和第二电极管 125 形成了紧密连接。这样可以提高螺纹柱 124 和第二电极管 125 的结构稳定性。绝缘套 126 可以采用绝缘材质制成，如硅胶、橡胶等。

[0061] 电源组件 16 包括开关 133 及电池 134。该开关 133 设置在位于该第二筒体 129 的轴孔部分。该开关 133 包括按钮 135、接触垫 136 及导电板 137。第二筒体 129 开设有与该轴孔 127 连通的按钮开口 138，按钮 135 从该按钮开口 138 露出以方便使用者按压。按钮 135 具有与接触垫 136 相对的第一接触点 139，该第一接触点 139 与螺纹柱 124 电性连接。接触垫 136 与电池 134 的一个电极电性连接。该接触垫 136 具有与该第一接触点 139 相对的第二接触点 140。当按钮 135 被按下时，第一接触点 139 与第二接触点 140 接触形成电性连接，使得螺纹柱 124 与电池 134 的一个电极形成电连接。当按下按钮 135 的外力撤消时，按钮 135 能够通过开关 133 的弹性元件（图未示）回复到被按下前的位置，使得第一接触点 139 与第二接触点 140 分离。

[0062] 导电板 137 连接第二电极管 125 及电池 134 的另一个电极进而达成了第一电极管 122 与电池 134 的另一个电极的电性连接。本实施例中，该电池 134 为可控 IC 集成电池。

[0063] 底盖 17 与该第二连接结构 15 设置在电源组件 16 相背的两端。底盖 17 开设有进气孔（图未示）以让气流进入电子烟 10 内。气流可以从底盖 18 的进气孔进入，通过螺纹柱 124 的轴孔 127，第一电极管 122 及第二电极管 125 的通气孔及发热元件的通孔 120 进入 T 形通气孔 117 内并能够携带被雾化的烟液通过通气管道 110 从烟嘴盖 11 的出气孔 104 流出，供使用者吸食。

[0064] 上述电子烟 10 中，导液介质 106 自出液口 109 将储液器 105 中的烟液导出并存储，发热元件 107 与导液介质 106 之间存在间隙 18，使得发热元件 107 加热导液介质 106 时不需要与导液介质 106 直接接触，从而避免了发热元件 107 污染被雾化后的烟液，有利于使用者的身体健康。

[0065] 请参图 3，第二实施例提供的一种电子烟 20。本实施例的电子烟 20 的结构与第一实施例的电子烟 10 的结构大致相同，不同之处在于：本实施例中，电子烟 20 的储液器 201、导液介质 202 及发热元件 203 不同。

[0066] 储液器 201 的出液口 205 开设在储液器 201 的第二端 206 且为呈围绕通气管道 207 的环状的出液口，该导液介质 202 为呈与该出液口 205 匹配的环状的导液介质，且该导液介质 202 收容在该出液口 205 中。

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[0067] 该发热元203件包括反射罩208、加热管209及电极部210，该加热管209与电极部210分别固定在该反射罩208相背的两侧，加热管209与导液介质202之间存在间隙200。

[0068] 反射罩208呈球冠状，能够将加热管209产生的热辐射至导液介质202，反射罩208固定在烟弹管22内壁的凸环211上。在凸环211上开设有通气孔（图未示），气流可以从反射罩208与烟弹管22之间的间隔经该通气孔进入加热管209与导液介质202之间的间隙200，从而可以携带被雾化的烟液进入通气管道207。在其它实施例中，反射罩208可为其它形状，只要反射罩208能够将加热管209产生的热辐射至导液介质202即可。本实施例中，反射罩208能够将热量集中辐射至导液介质202，进而提高了热量的利用率。。电极部210与电源组件23的连接方式与第一实施例的电极部119与电源组件16的连接方式相类似，在此不再赘述。

[0069] 本实施例中，该加热管209为红外线加热管。在其它实施例中，该加热管可为光电加热管等其它加热管。

[0070] 请参图4，第三实施例提供的一种电子烟30。本实施例的电子烟30的结构与第一实施例的电子烟10的结构大致相同，不同之处在于：本实施例中，电子烟30的储液器301、导液介质302及发热元件303不同。

[0071] 储液器301包括储液腔体304及导液管305。储液腔体304具有第一端306、与第一端306相背的第二端307及用于存储烟液的储液腔308。导液管305自第二端307伸出。储液器301开设有通气管道309。通气管道309贯穿储液腔体304及导液管305。通气管道309的内壁开设有出液口，出液口316与储液腔308相通。

[0072] 导液介质302大致呈柱状。导液介质302开设有中间通孔310。导液管305的末端固定在该中间通孔310中。

[0073] 本实施方式中，发热元件303为微波加热装置。发热元件303固定在烟弹管32中并与储液器301连接。发热元件303具有加热腔311、线圈部312及电极部313。该加热腔311及该电极部313位于线圈部312相背的两侧。电极部313的一个电极与螺纹套314电连接，电极部313的另一个电极与第一电极管315电连接。

[0074] 导液介质302及导液管305位于该加热腔311内且与发热元件303之间存在间隙300。由于该发热元件303连接在储液器301上，使得加热腔311能够很好被围住，热量散失少，能够使导液介质302吸收更多的热量，提高了电热量的使用效率，同时也能提高雾化效果。进一步地，该导液介质302整体位于加热腔311内，使得整个导液介质302直接吸收热量，有助于提升雾化效果。

[0075] 请参图5，第四实施例提供的一种电子烟40。该电子烟40包括依次设置的烟嘴盖41、烟弹管42、雾化组件43、电源组件44及底盖45。本实施例中，烟弹管42的管体及电源组件44的管体为一整体结构，即为电子烟的外壳45，外壳45大致为长条形的空心圆筒。烟嘴盖41和底盖45分别安装在外壳45相背的两端。

[0076] 雾化组件43固定在烟弹管42中。雾化组件43包括储液器401、导液介质402及发热元件403。

[0077] 储液器401包括储液腔体404及导液管405。储液腔体404具有第一端406、与第一端406相背的第二端407及用于存储烟液的储液腔408。导液管405自该第二端407伸出并与该导液介质402连接。储液器401开设有通气管道409。通气管道409贯穿储液腔

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体 404 及导液管 405。储液器 401 可采用耐高温塑胶，如 PPS、PPA 或 LCP，PC 等或玻璃材料。本实施例中，储液腔体 404 及导液管 405 均大致呈圆柱体状。在其它实施例中，储液腔体 404 及导液管 405 也可以为棱柱形等其它形状。

[0078] 通气管道 409 的内壁开设有出液口 410，该出液口 410 与该储液腔 408 相通。

[0079] 导液介质 402 为多孔导液材料并连接在导液管 405 上以连接在该出液口 410。在本实施例中，导液介质 402 为多孔陶瓷材料，优先地为多孔高导热陶瓷材料。该导液介质 402 包括插入端 411 及与插入端 411 相背的受热端 412，插入端 411 位于通气管道 409，插入端 411 呈阶梯状且连接在该出液口 410 以使插入端 411 能够从出液口 410 中将储液器 401 内的烟液导入至导液介质 402 中并储存。导液介质 402 内部开设有 T 形通气孔 413，该 T 形通气孔 413 与通气管道 409 相通。可以理解，在其它实施例中，该导液介质 402 可为耐高温的多孔玻璃、多孔石墨、多孔纤维等其它多孔材料。

[0080] 发热元件 403 固定于该烟弹管 42 中且与该导液介质 402 之间存在间隙 400，该发热元件 403 用于非接触式地加热该导液介质 402。本实施例中，发热元件 403 为电子脉冲加热装置，其具有加热腔 414 及电极部 415。加热腔 414 与电极部 415 位于发热元件 403 相背的两端。导液介质 402 的受热端 412 位于加热腔 414 内。该发热元件 403 内部开设有供气流通的通孔 416。T 形通气孔 413 通过加热腔 414 与通孔 416 连通。

[0081] 电源组件 44 包括电池 417。本实施例中，该电池 417 为可控 IC 集成电池，电极部 415 的一个电极与电池 417 的一个电极连接，电极部 415 的另一个电极与电池 417 的另一个电极连接。

[0082] 底盖 45 开设有进气孔（图未示）以让气流进入电子烟 40 内。气流可以从底盖 45 的进气孔进入，通过电源组件 44 的间隙及发热元件 403 的通孔 416 进入 T 形通气孔 413 内并能够携带被雾化的烟液从烟嘴盖 41 的出气孔 418 流出，供使用者吸食。

[0083] 电子烟 40 还包括气流传感器组件（图未示），气流传感器组件能够控制发热元件 403 与电源组件 44 间电性连接的开路及闭路。当使用者在烟嘴盖 41 吸气时，外界气流通过进气孔进入电子烟 40，气流传感器组件通过感知气流的大小，从而控制发热元件 403 开始工作或停止工作。气流传感器可以根据使用者的吸气的不同力度达到不同程度的雾化效果，可以提高使用者的体验感。

[0084] 本实施例的电子烟 40 省略了连接烟弹管及电源组件的连接结构，使电子烟的结构简单及成本降低。

[0085] 请参图 6，第五实施例提供的一种电子烟 50。本实施例的电子烟 50 的结构与第四实施例的电子烟 40 的结构基本相同，不同之处在于：本实施例中，电子烟 50 的储液器 501、导液介质 502 及发热元件 503 不同。

[0086] 该储液器 501 具有用于存储烟液的储液腔 504 和出液口 505，出液口 505 与储液腔 504 相通以使烟液能够从出液口 505 中导出。该储液器 501 可采用耐高温塑胶，如 PPS、PPA 或 LCP，PC 等或玻璃材料。本实施例中，储液器 501 呈大致呈圆柱体状。在其它实施例中，储液器 501 也可以为棱柱形等其它形状。

[0087] 储液器 501 开设有通气管道 506。储液器 501 包括第一端 507 及与第一端 507 相背的第二端 508，出液口 505 开设在该第二端 508。通气管道 506 在第一端 507 形成第一开口 509 及在第二端 508 形成第二开口 510。具体的，出液口 505 开设在第二端 508 且为呈围

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绕通气管道 506 的环状的出液口，导液介质 502 为呈与出液口 505 匹配的环状的导液介质，且导液介质 502 收容在该出液口中。导液介质 502 为多孔导液材料。本实施例中，导液介质 502 为多孔陶瓷材料，优先地为多孔高导热陶瓷材料。可以理解，在其它实施例中，该导液介质 502 可为耐高温的多孔玻璃、多孔石墨、多孔纤维等其它多孔材料。

[0088] 该发热元件 503 包括反射罩 511、加热管 512 及电极部 513，加热管 512 与电极部 513 分别固定在反射罩 511 相背的两侧，加热管 512 与导液介质 502 之间存在间隙 500。

[0089] 该反射罩 511 呈球冠状，能够将加热管 512 产生的热辐射至导液介质 502，该反射罩 511 固定在烟弹管 52 内。在其它实施例中，反射罩 511 可为其它形状，只要反射罩 511 能够将加热管 512 产生的热辐射至导液介质 502 即可。电极部 513 的一个电极与电源组件 54 的电池 514 的一个电极连接，电极部 513 的另一个电极与电源组件 54 的电池 514 的另一个电极连接。本实施例中，反射罩 511 能够将热量集中辐射至导液介质 502，进而提高了热量的利用率。

[0090] 本实施例中，512 加热管为红外线加热管。在其它实施例中，加热管 512 可为光电加热管等其它加热管。

[0091] 请参图 7，第六实施例提供的一种电子烟 60。本实施例的电子烟 60 的结构与第五实施例的电子烟 50 的结构基本相同，不同之处在于：本实施例中，电子烟 60 的储液器 601、导液介质 602 及发热元件 603 不同。

[0092] 本实施例中，储液器 601 的出液口 604 开设在储液器 601 的第二端 605 及通气管道 606 的内壁，即出液口 604 处于第二端 605 端壁与通气管道 606 的内壁的交界处，该通气管道 606 在储液器 601 的第一端 607 形成第一开口 608 及在第二端 605 形成第二开口 609。

[0093] 导液介质 602 为多孔导液材料并连接在该出液口 604。本实施例中，导液介质 602 为多孔陶瓷材料，优先地为多孔高导热陶瓷材料。该导液介质 602 通过第二开口 609 部分地收容于通气管道 606。具体地，导液介质 602 包括插入端 610 及与插入端 610 相背的受热端 611，插入端 610 位于通气管道 606，插入端 610 呈阶梯状且连接在该出液口 604 以使插入端 610 能够从出液口 604 中将储液器 601 内的烟液导入至导液介质 602 中并储存。该导液介质 602 内部开设有直线形通气孔 612，直线形通气孔 612 贯穿导液介质 602 相背的两端面。直线形通气孔 612 与通气管道 606 相通。直线形通气孔 612 与发热元件 603 的通孔及通气管道 606 为直接轴向相通，使得气流流动更顺畅，而且导液介质 602 内部的烟液更多地被雾化，进一步提升了雾化效果及效率。可以理解，在其它实施例中，导液介质 602 可为耐高温的多孔玻璃、多孔石墨、多孔纤维等其它多孔材料。

[0094] 发热元件 603 为微波加热装置，发热元件 603 固定在烟弹管 62 中并与储液器 601 连接。发热元件 603 具有加热腔 613、线圈部 614 及电极部 615。加热腔 613 与电极部 615 位于线圈部 614 相背的两端。导液介质 602 的受热端 611 位于加热腔 613 内且与发热元件 603 之间存在间隙 600。由于发热元件 603 连接在储液器 601 上，使得加热腔 613 能够很好被围住，热量散失少，能够使导液介质 602 吸收更多的热量，提高了热量的使用效率，同时也能提高雾化效果。

[0095] 线圈部 614 与电极部 615 电性连接。电极部 615 的一个电极与电源组件 64 的电池 616 的一个电极连接，电极部 615 的另一个电极与电源组件 64 的电池 616 的另一个电极连接以使电源组件 64 通过电极部 615 向线圈部 614 供电并产生微波进而加热导液介质 602。

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[0096] 请参图 8 和图 9，第七实施例提供的一种电子烟 70。本实施例的该电子烟 70 的结构与第一实施例的电子烟 10 的结构大致相同，不同之处在于：本实施例中，电子烟 70 的烟嘴盖 71、第一连接结构 72、第二连接结构 73 及电源组件 74 不同。

[0097] 烟嘴盖 71 大致呈柱状。第一连接结构 72 包括导电的螺纹柱 701、第一电极管 702、第一绝缘套 703 及弹性件 704。

[0098] 弹性件 704 设置在螺纹柱 701 和烟弹管之间使螺纹柱 701 和烟弹管形成紧密结合。第一绝缘套 703 设置在螺纹柱 701 和第一电极管 702 之间使螺纹柱 701 和第一电极管 702 相互绝缘且形成紧密结合。

[0099] 螺纹柱 701 固定在烟弹管的第二连接端上且与发热元件的一个电极连接。螺纹柱 701 包括相连的第一筒体 705 和第二筒体 706。第一筒体 705 最大外径与烟弹管的内径大致相等，即第一筒体 705 的外壁与烟弹管的内壁贴合形成紧密结合。第二筒体 706 的外侧面设有外螺纹，用于与第二连接结构 73 配合。第二筒体 706 的外径小于烟弹管的内径。通过弹性件 704 使第一筒体 705 与烟弹管形成紧密结合。

[0100] 第一筒体 705 上间隔设置有第一凸缘 707 和第二凸缘 708。第一凸缘 707 的外径大于第二凸缘 708 的外径。第一凸缘 707 和第二凸缘 708 之间形成第一环形槽 709。第二凸缘 708 和烟弹管的内壁之间形成的第二环形槽 710 中。螺纹柱 701 具有导电性。在本实施中，螺纹柱 701 的材质为黄铜镀金，采用该材质的螺纹柱 701 的导电性能较好，且具有良好的塑性，易加工塑形。在其它实施例，螺纹柱 701 也可以采用其它导电材质制成。

[0101] 弹性件 704 包括圈体 711 与圈体 711 相连的折弯部 712。圈体 711 大致为圆环形，折弯部 712 从圈体 711 的边缘向一侧垂直折弯延伸。圈体 711 收容在第一凸缘 707 和第二凸缘 708 之间的第一环形槽 709 中。圈体 711 靠近烟弹管的一侧具有用于引导安装的斜面 713。斜面 713 与烟弹管的内壁形成夹角，该夹角可以为 5° ～ 30° 。由于弹性件 704 与烟弹管的内壁具有一定的角度，从而使得弹性件 704 与烟弹管的内壁之间存在一定的空隙，可以引导安装。在本实施例中，圈体 711 嵌入第一环形槽 709 中与螺纹柱 701 的部分侧壁紧密贴合，使烟弹管与螺纹柱 701 形成紧密结合。折弯部 712 位于在烟弹管和第一筒体 705 之间。在安装弹性件 704 的时候，弹性件 704 经挤压产生一定的形变，形变后的部分折弯部 712 收容在烟弹管的内壁和第二凸缘 708 之间形成的第二环形槽 710 中。弹性件 704 采用橡胶材质制成。具体地，弹性件 704 可以采用硅橡胶、氟橡胶或氟硅橡胶制成。

[0102] 第一绝缘套 703 包括环形的绝缘基底 714 设置在绝缘基底 714 上的绝缘管 715。第一筒体 705 的部分内侧壁与绝缘管 715 和绝缘基底 714 的部分外壁贴合。第一绝缘套 703 设置在螺纹柱 701 和第一电极管 702 之间使螺纹柱 701 与第一电极管 702 绝缘，且使螺纹柱 701 和第一电极管 702 形成了紧密结合，可以提高螺纹柱 701 和第一电极管 702 的结构稳定性。第一绝缘套 703 可以采用绝缘材质制成，如硅胶、橡胶等。

[0103] 第一电极管 702 包括第一导电管 716 及设置在第一导电管 716 上的环部 717。第一导电管 716 具有第一接触端 718 及第二接触端 719，第一接触端 718 及第二接触端 719 位于该环部 717 相背的两侧。第一接触端 718 与发热元件的另一个电极连接。第一绝缘套 703 的内壁与第一电极管 702 的部分外壁贴合。环部 717 较第一导电管 716 具有更大的横截面积，可增大与第一绝缘套 703 的接触面积，有利于增强第一电极管 716 与第一绝缘套 703 之间的稳定性。螺纹柱 701 作为一个电极端，第一电极管 716 为另一个电极端，用于电

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连接电子烟 70 的电源组件 74 和发热元件。在本实施例中，第一电极管 716 的材质与螺纹柱 701 的材质相同，即为黄铜镀金。在其它实施例，第一电极管 716 也可以采用其它金属材质制成。

[0104] 第二连接结构 73 包括导电的螺纹套 720、第二电极管 721 及第二绝缘套 722。

[0105] 螺纹套 720 固定在该电源组件 74 上且与电源组件 74 的一个电极连接。该螺纹套 720 包括相连的螺纹部 723 和凸环部 724，螺纹部 723 具有内螺纹，内螺纹与第二筒体 706 的外螺纹结合使螺纹部 723 与第二筒体 706 连接，进而螺纹柱 701 与螺纹套 720 结合以达成电性连接。螺纹套 720 的材质为黄铜镀金，采用该材质的螺纹套 720 的导电性能较好，且具有良好的塑性，易加工塑形。在其它实施例，螺纹套 720 也可以采用其它导电材质制成。

[0106] 第二电极管 721 与电源组件 74 的另一个电极连接。第二电极管 721 收容在螺纹套 720 内且与第二接触端 719 连接以形成与第一电极管 716 的电性连接。具体地，第二电极管 721 包括环形的底座 725 和与底座 725 相连的第二导电管 726。第二导电管 721 穿过第二绝缘套 722。底座 725 较第二导电管 726 具有更大的横截面积，可增大与第二绝缘套 722 的接触面积，有利于增强第二电极管 721 与第二绝缘套 722 之间的稳定性。在本实施例中，第二电极管 721 的材质与螺纹套 720 的材质相同，即为黄铜镀金。在其它实施例，第二电极管 721 也可以采用其它金属材质制成。

[0107] 第二绝缘套 722 设置在凸环部 724 与第二电极管 721 之间使螺纹套 720 与第二电极管 721 绝缘。第二绝缘套 722 开设有沿其外周缘的卡槽 727，卡槽 727 与凸环部 724 的凸环紧密结合从而进一步加强第二电极管 721 与螺纹套 720 的结合稳定性。

[0108] 在本实施例中，螺纹套 720 与第一筒体 705 间还形成有进气孔 728，第一连接结构 72 还开设有与进气孔 728 相通的过气孔（图未示，例如，径向贯穿第二筒体 706 及第一电极管 716 的过气孔）。该过气孔与发热元件的通孔 729 相通。

[0109] 在本实施例中，由于弹性件 704 的圈体 711 收容在螺纹柱 701 的第一环形槽 709 中，折弯部 712 从圈体的边缘向一侧垂直折弯延伸至挤压在螺纹柱 701 和烟弹管之间，弹性件 704 与螺纹柱 701 的部分侧壁紧密贴合。最大限度地加大了弹性件 704 与螺纹柱 701 的接触面积，提供了更紧固的挤压力，使螺纹柱 701 稳定地与烟弹管连接。

[0110] 电源组件 74 省略了开关使电子烟 70 的结构简单，成本降低。进一步，该电子烟 70 还包括气流传感器组件（图未示），气流传感器组件能够控制发热元件与电源组件 74 间电性连接的开路及闭路。当使用者在烟嘴盖吸气时，外界气流通过进气孔 728 进入电子烟 70，气流传感器组件通过感知气流的大小，从而控制发热元件开始工作或停止工作。气流传感器可以根据使用者的吸气的不同力度达到不同程度的雾化效果，可以提高使用者的体验感。

[0111] 请参图 10，第八实施例提供的一种电子烟 80。本实施例的电子烟 80 的结构与第七实施例的电子烟 70 的结构基本相同，不同之处在于：本实施例中，电子烟 80 的储液器 801、导液介质 802 及发热元件 803 不同。

[0112] 储液器 801 的出液口 804 开设在储液器 801 的第二端 805 且为呈围绕通气管道 806 的环状的出液口，导液介质 802 为呈与该出液口匹配的环状的导液介质，且导液介质 802 收容在出液口 804 中。

[0113] 发热元件 803 包括反射罩 807、加热管 808 及电极部 809，加热管 808 与电极部 809

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