UTILITY PATENT APPLICATION TRANSMITTAL	Attorney Docket No. R60999 1400US.C3 (0830.9)
	First Inventor: John Howard Robinson
	Title: TOBACCO-CONTAINING SMOKING ARTICLE
	FILED VIA EFS

ADDRESS TO: **COMMISSIONER FOR PATENTS**
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Transmitted herewith for filing in the United States Patent Office is a utility patent application.

Inventors: John Howard Robinson, David William Griffith, Jr., Billy Tyrone Conner, Evon Llewellyn Crooks and Dempsey Bailey Brewer, Jr.

Applicant / Assignee: R.J. Reynolds Tobacco Company

1. ☒ The Filing Fee has been calculated as shown below:
2. ☐ Applicant claims Small Entity Status. See 37 CFR 1.27.

	No. Filed	No. Extra	Small Entity Rate	Small Entity Fee 0	Large Entity Rate	Large Entity Fee 1
BASIC FEE				$ 0		$ 280
SEARCH FEE				$ 0		$ 600
EXAMINATION FEE				$ 0		$ 720
TOTAL CLAIMS:	25- 20 =	5	X 40 =	$ 0	x 80 =	$ 400
INDEP CLAIMS:	2 - 3 =	0	X 210 =	$ 0	x 420 =	$ 0
APPLICATION SIZE FEE	If the specification, drawings, and sequence listing exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof.					
[☐]MULTIPLE DEPENDENT CLAIMS PRESENTED			+390 =	$	+780 =	$
*If the difference in Column 1 is less than zero, enter "0" in Column 2.			TOTAL	$	TOTAL	$ 2000

The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Acct. No. 09-0528.

a. ☒ Fees required under 37 CFR 1.16 (National filing fees).
b. ☒ Fees required under 37 CFR 1.17 (National application processing fees) including any extension of time fees under 37 CFR § 1.136(a) that are required for consideration of papers filed during prosecution.

☐ A check in the amount of $ ___ for the filing fee is enclosed.
☒ The filing fees are being authorized when e-filing.

☐ The above filing fee will be paid along with Applicant(s) Response to the Notice to File Missing Parts.

3. ☒ Specification; Total Pages 52

4. ☒ 5 Sheets of Drawing(s) (35 USC 113)

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5. ☐ Declaration and Power of Attorney; *[Total Pages ___]*
   a. ☐ Newly executed (original or copy)
   b. ☐ Copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) & 1.33(b).

6. ☒ Application Data Sheet. See 37 CFR 1.76

7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
   ☐ Landscape Table on CD

8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
   a. ☐ Computer Readable Form (CRF)
   b ☐ Request for Transfer of Computer Readable Form of Sequence Listing under 37 CFR § 1.821(e) and MPEP 2422.05 (must be compliant with new rules)
   c. ☐ Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
      iii. ☐ Electronic Text File Submission
   d. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s)
   Name of Assignee ___

10. ☐ 37 CFR 3.73(b) Statement and General Power of Attorney by Assignee. OR
    ☐ Application Specific Power of Attorney by Assignee

11. ☐ English Translation Document *(if applicable)*

12. ☐ Information Disclosure Statement (IDS)/PTO-1449; IDS Coversheet

13. ☒ Preliminary Amendment

14. ☐ Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
    ☐ Foreign Priority is claimed as ___ Application No. ___, filed ___

16. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i).
    Applicant **must** attach form PTO/SB35 or its equivalent.

17. ☐ Request for Early Publication Under 37 CFR § 1.219. Fee of $300.00 is enclosed.

18. **If a CONTINUING APPLICATION,** *check appropriate box and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:*
    ☒ Continuation ☐ Divisional ☐ Continuation in Part (CIP)

    of prior Application No: 13/297,983; Filed: November 16, 2011

    Prior Application Information: Examiner Phu Hoang Nguyen Group/Art Unit: 1747

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. **CORRESPONDENCE ADDRESS** **CUSTOMER NUMBER 26158**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE PATENT APPLICATION OF:	Robinson et al.
SERIAL NO.:	Not Yet Assigned
FILING DATE:	Concurrently Herewith
DOCKET NO.:	R60999 1400US.C3 (0830.9)
ART UNIT:	TBD
EXAMINER:	TBD
CON. NO.:	TBD
FOR:	TOBACCO-CONTAINING SMOKING ARTICLE

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

PRELIMINARY AMENDMENT

Dear Sir:

Prior to the initial examination of the patent application being filed herewith, Applicants respectfully request that the application be amended as set forth herein.

In accordance with 37 C.F.R. 1.121, the present amendment is submitted in separate sections as follows:

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

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

Remarks begin on page 7 of this paper.

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AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph in the section entitled "CROSS REFERENCE TO RELATED APPLICATIONS" on page 1 with the following paragraph:

This application is a continuation of U.S. Application Serial No. 13/297,983, filed November 16, 2011, which is a continuation of U.S. Application Serial No. 12/763,890, filed April 20, 2010 and issued on December 20, 2011 as U.S. Patent No. 8,079,371, which is a continuation of U.S. Application Serial No. 11/550,634, filed on October 18, 2006 and issued on June 1, 2010 as U.S. Patent No. 7,726,320, which are each incorporated by reference herein in their entirety.

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AMENDMENTS TO THE CLAIMS

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

1. (Original) A tobacco-containing, electrically-powered smoking article comprising:

(a) a tubular outer housing having a mouth-end and an end distal to the mouth-end, the housing comprising an opening adapted for intake of air into the smoking article;

(b) an electrical power source within the outer housing;

(c) at least one electrical resistance heater within the outer housing, the heater being configured to allow air flow therethrough and being powered by said electrical power source;

(d) a controller adapted for regulating current flow through the heater; and

(e) a rod-shaped carrier device removably engaged with the mouth-end of the outer housing and comprising a tubular mouth-end piece and a tubular cartridge with two open ends allowing air to flow therethrough, wherein the cartridge includes a substrate that comprises a tobacco material and an aerosol-generating material, wherein the cartridge is operatively positioned within the outer housing and adjacent to the heater such that the electrical resistance heater is adapted for heating at least a portion of the tobacco and the aerosol-generating material and such that air drawn into the outer housing passes through at least a portion of the heater, through the cartridge, and through the mouth-end piece.

2. (Original) The smoking article of claim 1, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

3. (Original) The smoking article of claim 1, wherein the substrate comprises an absorbent material.

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4. (Original) The smoking article of claim 3, wherein the absorbent material comprises a paper material.

5. (Original) The smoking article of claim 3, wherein the absorbent material comprises a paper-type reconstituted tobacco.

6. (Original) The smoking article of claim 1, wherein the substrate comprises a paper material with a tobacco extract and the aerosol-generating material absorbed thereon.

7. (Original) The smoking article of Claim 1, wherein the substrate comprises polyethylene terephthalate fibers.

8. (Original) The smoking article of claim 7, wherein polyethylene terephthalate fibers are blended with tobacco cut filler.

9. (Original) The smoking article of claim 1, wherein the substrate further comprises a flavoring agent.

10. (Original) The smoking article of claim 1, wherein the substrate further comprises carbon particles or calcium carbonate particles therein.

11. (Original) The smoking article of claim 1, wherein the substrate further comprises a fibrous carbonaceous material.

12. (Original) The smoking article of claim 1, wherein the substrate is a laminate of metallic foil and paper.

13. (Original) The smoking article of claim 12, wherein the paper comprises reconstituted tobacco.

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14. (Original) The smoking article of claim 12, wherein the paper includes a tobacco extract and the aerosol-generating material absorbed thereon.

15. (Original) The smoking article of claim 14, wherein the paper further includes a flavoring agent absorbed thereon.

16. (Original) The smoking article of claim 1, further comprising a sensor adapted for sensing draw on the smoking article.

17. (Original) The smoking article of claim 1, wherein the heater is tubular in shape and positioned around the cartridge.

18. (Original) The smoking article of claim 1, wherein the heater comprises at least one elongated portion extending downstream therefrom.

19. (Original) The smoking article of claim 1, wherein at least a portion of the cartridge is circumscribed by a wrapping material.

20. (Original) The smoking article of claim 1, wherein the cartridge is conductive and in electrical contact with an electrical circuitry within the smoking article such that electrical resistance heating can be provided by the cartridge.

21. (Original) The smoking article of claim 20, wherein the substrate incorporates a conductive material that conducts heat produced by electrical resistance heating.

22. (Original) The smoking article of claim 21, wherein the conductive material comprises aluminum or copper.

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23. (Original) A tobacco-containing, electrically-powered smoking article comprising:

(a) a tubular outer housing having a mouth-end and an end distal to the mouth-end, the housing comprising an opening adapted for intake of air into the smoking article;

(b) an electrical power source within the outer housing;

(c) at least one electrical resistance heater within the outer housing, the heater being configured to allow air flow therethrough and being powered by said electrical power source, and wherein the heater comprises at least one elongated portion extending downstream therefrom;

(d) a puff-actuated controller adapted for regulating current flow through the heater during draw, the controller comprising a sensor adapted for sensing draw by the user on the smoking article; and

(e) a rod-shaped carrier device removably engaged with the mouth-end of the outer housing and comprising a tubular mouth-end piece and a tubular cartridge with two open ends allowing air to flow therethrough, wherein the cartridge includes a tobacco-containing absorbent material with an aerosol-generating material absorbed thereon, wherein the cartridge is operatively positioned within the outer housing and adjacent to the heater such that the heater is adapted for heating at least a portion of the tobacco and the aerosol-generating material and such that air drawn into the outer housing passes through at least a portion of the heater, through the cartridge, and through the mouth-end piece.

24. (Original) The smoking article of claim 23, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

25. (Original) The smoking article of claim 23, wherein the tobacco-containing absorbent material is a paper material.

26 – 56. (Cancelled)

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REMARKS

Claims 26-56 are cancelled herewith. Claims 1-25 are now pending in this application. The Specification has been amended to add additional continuity information.

Applicants respectfully requests that the above Preliminary Amendment be entered into the above-referenced application prior to examination thereof on the merits and prior to the calculation of the claim fees.

Date: October 29, 2014

Respectfully submitted,

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TOBACCO-CONTAINING SMOKING ARTICLE

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. Application Serial No. 12/763,890, filed April 20, 2010, which is a continuation of U.S. Application Serial No. 11/550,634, filed on October 18, 2006, which are each incorporated by reference herein in their entirety.

FIELD OF THE INVENTION

The present invention relates to tobacco products, such as tobacco-containing smoking articles.

BACKGROUND OF THE INVENTION

Popular smoking articles, such as cigarettes, have a substantially cylindrical rod shaped structure and include a charge, roll, or column of smokable material, such as shredded tobacco (e.g., in cut filler form), surrounded by a paper wrapper, thereby forming a so-called "smokable rod" or "tobacco rod." Normally, a cigarette has a cylindrical filter element aligned in an end-to-end relationship with the tobacco rod. Preferably, a filter element comprises plasticized cellulose acetate tow circumscribed by a paper material known as "plug wrap." Certain filter elements can incorporate polyhydric alcohols. See, for example, UK Pat. Spec. 755,475. Certain cigarettes incorporate a filter element having multiple segments, and one of those segments can comprise activated charcoal particles. See, for example, US Pat. Nos. 5,360,023 to Blakley et al. and 6,537,186 to Veluz. Preferably, the filter element is attached to one end of the tobacco rod using a circumscribing wrapping material known as "tipping paper." It also has become desirable to perforate the tipping material and plug wrap, in order to provide dilution of drawn mainstream smoke with ambient air. Descriptions of cigarettes and the various components thereof are set forth in *Tobacco Production, Chemistry and Technology,* Davis et al. (Eds.) (1999).

Traditionally, a cigarette of the most popular type is employed by a smoker by lighting one end thereof and burning the tobacco rod. The smoker then receives mainstream smoke produced by the burning tobacco into his/her mouth by drawing on the opposite end (e.g., the filter end) of the cigarette.

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Through the years, various methods for altering the composition of mainstream tobacco smoke have been proposed. In PCT Appl. Pub. No. WO 02/37990 to Bereman, it has been suggested that metallic particles and/or carbonaceous particles can be incorporated into the smokable material of a cigarette in an attempt to reduce the amounts of certain compounds in the smoke produced by that cigarette. In US Patent Appl. Pub. No. 2005/0066986 to Nestor et al., it has been suggested that a smokable rod possessing tobacco wrapped in paper can incorporate tobacco filler combined with an aerosol-forming material, such as glycerin. US Pat. No. 6,874,508 to Shafer et al. proposes a cigarette having a paper wrapped tobacco rod having a tip portion that is treated with an additive, such as potassium bicarbonate, sodium chloride or potassium phosphate.

Various tobacco substitute materials have been proposed, and substantial listings of various types of those materials can be found in US Pat. Nos. 4,079,742 to Rainer et al. and 4,771,795 to White et al. Certain cigarette-type products that employ non-tobacco materials (e.g., dried vegetable leaves, such as lettuce leaves) as filler that is burned to produce smoke that resembles tobacco smoke have been marketed under the trade names "Cubebs," "Triumph," "Jazz," and "Bravo." See, for example, the types of materials described in US Pat. No. 4,700,727 to Torigian. Furthermore, tobacco substitute materials having the trade names "Cytrel" and "NSM" were introduced in Europe during the 1970s. Representative types of proposed synthetic tobacco substitute materials, smokable materials incorporating tobacco and other components, and cigarettes incorporating those materials, are described in British Pat. No. 1,431,045; and US Pat. Nos. 3,738,374 to Bennett; 3,844,294 to Webster; 3,878,850 to Gibson et al.; 3,931,824 to Miano et al.; 3,943,941 to Boyd et al.; 4,044,777 to Boyd et al.; 4,233,993 to Miano et al.; 4,286,604 to Ehretsmann et al.; 4,326,544 to Hardwick et al.; 4,920,990 to Lawrence et al.; 5,046,514 to Bolt; 5,074,321 to Gentry et al.; 5,092,353 to Montoya et al.; 5,778,899 to Saito et al.; 6,397,852 to McAdam; and 6,408,856 to McAdam. Furthermore, various types of highly processed smokable materials incorporating tobacco and other ingredients are set forth in US Pat. Nos. 4,823,817 to Luke; 4,874,000 to Tamol et al.; 4,977,908 to Luke; 5,072,744 to Luke et al.; 5,829,453 to White et al.; and 6,182,670 to White et al.

Certain types of coaxial or concentric-type smoking articles have been proposed. There have been proposed cigarette-type smoking articles including tobacco smokable materials surrounding longitudinally extending cores of other materials. UK Pat. Appl. 2,070,409

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proposes a smoking article having a rod of smoking material having at least one filament extending over at least a major portion of the length of the rod. US Pat. No. 3,614,956 to Thornton proposes a smoking article having an annular outer portion made of tobacco smoking material and a central cylindrical core of absorbent material. US Pat. No. 4,219,031 to Rainer et al. proposes a smoking article having a central core of carbonized fibers circumscribed by tobacco. US Pat. No. 6,823,873 to Nichols et al. proposes a cigarette including an ignition element surrounded by tobacco, which is in turn surrounded by a composite outer wrapper. One type of cigarette-type smoking article has included a rod of tobacco smokable material surrounded a longitudinally extending annulus of some other material. For example, US Pat. No. 5,105,838 to White et al. proposes a rod of smokable material, normally circumscribed by a layer of wrapping material, which is in turn circumscribed by an insulating material (e.g., glass filaments or fibers). PCT Appl. Pub. No. WO 98/16125 to Snaidr et al. proposes a smoking device constructed from a very thin cigarette designed to fit into a tubular ceramic cartridge.

Numerous references have proposed various smoking articles of a type that generate flavored vapor, visible aerosol, or a mixture of flavored vapor and visible aerosol. Some of those proposed types of smoking articles include tubular sections or longitudinally extending air passageways. See, for example, those types of smoking articles described in US Pat. Nos. 3,258,015 to Ellis et al.; 3,356,094 to Ellis et al.; 3,516,417 to Moses; 4,347,855 to Lanzellotti et al.; 4,340,072 to Bolt et al.; 4,391,285 to Burnett et al.; 4,917,121 to Riehl et al.; 4,924,886 to Litzinger; and 5,060,676 to Hearn et al. Many of those types of smoking articles have employed a combustible fuel source that is burned to provide an aerosol and/or to heat an aerosol-forming material. See, for example, the background art cited in US Pat. Nos. 4,714,082 to Banerjee et al. and 4,771,795 to White et al.; which are incorporated herein by reference. See, also, for example, those types of smoking articles described in US Pat. Nos. 4,756,318 to Clearman et al.; 4,714,082 to Banerjee et al.; 4,771,795 to White et al.; 4,793,365 to Sensabaugh et al.; 4,917,128 to Clearman et al.; 4,961,438 to Korte; 4,966,171 to Serrano et al.; 4,969,476 to Bale et al.; 4,991,606 to Serrano et al.; 5,020,548 to Farrier et al.; 5,033,483 to Clearman et al.; 5,040,551 to Schlatter et al.; 5,050,621 to Creighton et al.; 5,065,776 to Lawson; 5,076,296 to Nystrom et al.; 5,076,297 to Farrier et al.; 5,099,861 to Clearman et al.; 5,105,835 to Drewett et al.; 5,105,837 to Barnes et al.; 5,115,820 to Hauser et al.; 5,148,821 to Best et al.; 5,159,940 to Hayward et al.; 5,178,167 to Riggs et al.; 5,183,062 to Clearman et al.; 5,211,684 to Shannon et al.; 5,240,014 to

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Deevi et al.; 5,240,016 to Nichols et al.; 5,345,955 to Clearman et al.; 5,551,451 to Riggs et al.; 5,595,577 to Bensalem et al.; 5,819,751 to Barnes et al.; 6,089,857 to Matsuura et al.; 6,095,152 to Beven et al; 6,578,584 Beven; and 6,730,832 to Dominguez; which are incorporated herein by reference. Furthermore, certain types of cigarettes that employ carbonaceous fuel elements have been commercially marketed under the brand names "Premier" and "Eclipse" by R. J. Reynolds Tobacco Company. See, for example, those types of cigarettes described in *Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco,* R. J. Reynolds Tobacco Company Monograph (1988) and *Inhalation Toxicology,* 12:5, p. 1-58 (2000).

Certain proposed cigarette-shaped tobacco products purportedly employ tobacco in a form that is not intended to be burned. See, for example, US Pat. Nos. 4,836,225 to Sudoh; 4,972,855 to Kuriyama et al.; and 5,293,883 to Edwards; which are incorporated herein by reference. Yet other types of smoking articles, such as those types of smoking articles that generate flavored vapors by subjecting tobacco or processed tobaccos to heat produced from chemical or electrical heat sources, are described in US Pat. Nos. 4,848,374 to Chard et al.; 4,947,874 to Brooks et al.; 5,060,671 to Counts et al.; 5,146,934 to Deevi et al.; 5,224,498 to Deevi; 5,285,798 to Banerjee et al.; 5,357,984 to Farrier et al.; 5,593,792 to Farrier et al.; 5,369,723 to Counts; 5,692,525 to Counts et al.; 5,865,185 to Collins et al.; 5,878,752 to Adams et al.; 5,880,439 to Deevi et al.; 5,915,387 to Baggett et al.; 5,934,289 to Watkins et al.; 6,033,623 to Deevi et al.; 6,053,176 to Adams et al.; 6,164,287 to White; 6,289,898 to Fournier et al.; 6,615,840 to Fournier et al.; and U.S. Patent Appl. Pub. Nos. 2003/0131859 to Li et al.; 2005/0016549 to Banerjee et al.; and 2006/0185687 to Hearn et al.; each of which is incorporated herein by reference. One type of smoking article that has employed electrical energy to produce heat has been commercially marketed by Philip Morris Inc. under the brand name "Accord."

Certain attempts have been made to deliver vapors, sprays or aerosols, such as those possessing or incorporating flavors and/or nicotine. See, for example, the types of devices set forth in US Pat. Nos. 4,190,046 to Virag; 4,284,089 to Ray; 4,635,651 to Jacobs; 4,735,217 to Gerth et al.; 4,800,903 to Ray et al.; 5,388,574 to Ingebrethsen et al.; 5,799,663 to Gross et al.; 6,532,965 to Abhulimen et al.; and 6,598,607 to Adiga et al; and EP 1,618,803 to Hon; which are

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incorporated herein by reference. See also, US Pat. No. 7,117,867 to Cox et al. and the devices set forth on the website, www.e-cig.com, which are incorporated herein by reference.

Smoking articles that employ tobacco substitute materials and smoking articles that employ sources of heat other than burning tobacco cut filler to produce tobacco-flavored vapors or tobacco-flavored visible aerosols have not received widespread commercial success. Thus, it would be highly desirable to provide a smoking article that provides a smoker with an ability to enjoy using tobacco without the necessity of burning any significant amount of tobacco. In particular, it would be highly desirable to provide a tobacco-containing smoking article, such as an article having the general appearance of a cigarette, cigar, or pipe, that possesses the ability to provide to a smoker many of the benefits and advantages of conventional tobacco smoking without necessarily delivering considerable quantities of incomplete combustion and pyrolysis products.

SUMMARY OF THE INVENTION

The present invention relates to smoking articles for providing tobacco enjoyment, as well as manners and methods for providing tobacco enjoyment using such smoking articles. That is, the present invention relates to articles that produce aerosols incorporating components derived from, or provided by, tobacco. Preferred articles produce aerosols that are not necessarily produced as a result of burning of tobacco, but rather, produce an aerosol incorporating components derived from, or provided by, tobacco as a result of the application of heat upon tobacco or materials that are in contact with tobacco. Preferred articles produce visible aerosols that are "smoke-like" in nature, and exhibit many of the sensory characteristics associated with those types of smoking articles that burn tobacco. As a result, the present invention relates to tobacco smoking articles that produce aerosols without experiencing any necessary burning of tobacco or other component materials during periods in which the articles are used. Thus, the present invention relates to smoking articles, and in particular, to smoking articles that incorporates tobacco in some form. Of particular interest is generally rod-shaped smoking articles (e.g., a cigarette, a cigarillo, or a cigar), or smoking articles having shapes comparable to other traditional types of smoking products (e.g., pipes).

A preferred smoking article of the present invention, when smoked, is capable of providing mainstream aerosol that may be characterized as being flavorful and satisfying.

Highly preferred cigarettes provide certain of the flavors, sensations and satisfaction of popular cigarettes that burn tobacco cut filler, because those preferred cigarettes generate mainstream aerosol, at least in part, by the action of heat upon some form of tobacco.

In one embodiment, the present invention relates to a cigarette that is smoked by coupling that cigarette to an electrically powered aerosol generating device that acts as a holder for that cigarette. The cigarette possesses at least one form of tobacco, and that tobacco is wrapped in a paper wrapper. If desired, various forms of tobacco, or various forms of tobacco containing compositions, can be positioned at specific locations within the cigarette. The cigarette also incorporates aerosol-forming material, and that aerosol-forming material can be an ingredient that is employed in addition to the tobacco. The cigarette may also possess a mouth-end piece that is used by the smoker to inhale components of tobacco, components derived from tobacco, and other components, preferably in the form of a visible aerosol, generated at least in part by the action of heat upon components of that cigarette. A representative device possesses a source of electrical power (e.g., a battery), a controller mechanism including a sensor that is capable of selectively powering certain components of the device (e.g., electrical resistance heating elements) at least during periods of draw, and at least one heating device (e.g., an electrical resistance heating unit) for forming a thermally generated aerosol that incorporates components of tobacco. During use, the cigarette is positioned within the outer housing of the smoking article, and after use, the used cigarette is removed from the smoking article. When desired, another cigarette is positioned within the device for further use.

In another embodiment, the present invention relates to a smoking article that is smoked by incorporating that tobacco within an electrically-powered, aerosol-generating device. At least one form of tobacco can be positioned at one or more specific locations within the cigarette. Aerosol-forming material is employed in addition to the tobacco. A mouth-end piece is used by the smoker to inhale components of tobacco that are generated by the action of heat upon components of that smoking article. A representative smoking article possesses a source of electrical power (e.g., a battery), a controller mechanism including a sensor that is capable of selectively powering certain components of the device (e.g., electrical resistance heating elements) at least during periods of draw, and at least one heating device (e.g., an electrical resistance heating unit) for forming a thermally generated aerosol that incorporates components of tobacco. During use, a cartridge containing some form of tobacco is positioned within the

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smoking article, and after use, the used cartridge is removed from the outer housing of the device. When desired, another cartridge is positioned within the device for further use.

In one preferred embodiment, a tobacco-containing, electrically-powered smoking article is provided, the smoking article comprising:

(a) an outer housing having a mouth-end and an end distal to the mouth-end, wherein the mouth-end comprises an opening adapted for egress of an aerosol generated within the smoking article and the distal end comprises an opening adapted for intake of air into the smoking article;

(b) an electrical power source within the outer housing and operatively positioned downstream of the opening in the distal end of the outer housing such that air entering the smoking article passes the electrical power source;

(c) a first electrical resistance heating element within the outer housing, powered by said electrical power source, and operatively positioned for heating air drawn through the opening in the distal end of the outer housing;

(d) a tobacco material positioned within the outer housing;

(e) an aerosol-forming material positioned within the outer housing in fluid communication with said tobacco material such that air can be drawn through both the tobacco material and the aerosol-forming material;

(f) a second electrical resistance heating element within the outer housing, powered by said electrical power source, and operatively positioned for heating the aerosol-forming material and tobacco material; and

(g) a puff-actuated controller adapted for regulating current flow through at least one of said first and second electrical resistance heating elements during draw, the controller comprising a sensor adapted for sensing draw by the user on the smoking article.

The aerosol-forming material and tobacco can be positioned within a cartridge within the outer housing, the cartridge having an opening facing the second electrical resistance heating element such that aerosol generated within the cartridge initially flows in the direction of the second electrical resistance heating element. The cartridge containing the tobacco material and the aerosol-forming material can be positioned between the second resistance heating element and the mouth-end of the outer housing, and the aerosol generated in the cartridge would initially flow in the direction of the second electrical resistance heating element and then flow towards the mouth-end of the outer housing.

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In one further embodiment, the tobacco material is in the form of a tobacco rod circumscribed by a wrapping material and positioned between the second resistance heating element and the mouth-end of the outer housing. A cartridge comprising an aerosol-generating material circumscribed by a wrapping material can be positioned between the tobacco rod and the second resistance heating element. Preferably, a filter element is attached to the end of the tobacco rod closest to the mouth-end of the outer housing.

The smoking article can further include, in certain embodiments, a third resistance heating element within the outer housing, powered by the electrical power source, and operatively positioned to heat the tobacco rod. The third heating element can be, for example, a tubular heating element circumscribing all or a portion of the tobacco rod. When a third heating element is present, current through this heating element can also be selectively controlled and regulated by the puff-actuated controller.

In yet another preferred embodiment, a tobacco-containing, electrically-powered smoking article is provided which comprises:

(a) an outer housing having a mouth-end and an end distal to the mouth-end, wherein the mouth-end comprises an opening adapted for egress of an aerosol generated within the smoking article and the distal end comprises an opening adapted for intake of air into the smoking article;

(b) an electrical power source within the outer housing and operatively positioned downstream of the opening in the distal end of the outer housing such that air entering the smoking article passes the electrical power source;

(c) a first electrical resistance heating element within the outer housing, powered by said electrical power source, and operatively positioned for heating air drawn through the opening in the distal end of the outer housing;

(d) a cigarette rod (which is preferably removable so that the rod can be replaced within the smoking article) within the outer housing and comprising a tobacco rod circumscribed by a wrapping paper and an adjacent filter element, the cigarette rod being positioned downstream of the second resistance heating element;

(e) an aerosol-forming material positioned within the outer housing in fluid communication with said cigarette rod such that air can be drawn through both the cigarette rod and the aerosol-forming material;

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(f) a second electrical resistance heating element within the outer housing, powered by said electrical power source, and operatively positioned for heating the aerosol-forming material and the tobacco rod; and

(g) a puff-actuated controller adapted for regulating current flow through at least one of said first and second electrical resistance heating elements during draw, the controller comprising a sensor adapted for sensing draw by the user on the smoking article.

The aerosol-generating material may be in intimate contact with the tobacco in the tobacco rod, or the smoking article may further include a cartridge comprising the aerosol-generating material circumscribed by a wrapping material, the cartridge positioned between the tobacco rod and the second resistance heating element. In this embodiment also, the device may further include a third resistance heating element within the outer housing, powered by said electrical power source, and operatively positioned to heat the tobacco rod.

In a still further embodiment, the invention provides a tobacco-containing, electrically-powered smoking article comprising:

(a) an outer housing having a mouth-end and an end distal to the mouth-end, wherein the mouth-end comprises an opening adapted for egress of an aerosol generated within the smoking article and the distal end comprises an opening adapted for intake of air into the smoking article;

(b) a mouthpiece through which air can be drawn from the mouth-end of the outer housing, the mouthpiece being removably attached to the outer housing;

(c) an electrical power source within the outer housing and operatively positioned downstream of the opening in the distal end of the outer housing such that air entering the smoking article passes the electrical power source;

(d) a first electrical resistance heating element within the outer housing, powered by said electrical power source, and operatively positioned for heating air drawn through the opening in the distal end of the outer housing;

(e) a removable carrier device within the outer housing comprising a tobacco material and an aerosol-forming material in fluid communication with the tobacco material such that air can be drawn through both the tobacco material and the aerosol-forming material;

(f) a second electrical resistance heating element within the outer housing, powered by said electrical power source, and operatively positioned for heating the aerosol-forming material and the tobacco material; and

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(g) a puff-actuated controller adapted for regulating current flow through at least one of said first and second electrical resistance heating elements during draw, the controller comprising a sensor adapted for sensing draw by the user on the smoking article.

An exemplary removable carrier device is a cigarette rod as described above, the cigarette comprising a tobacco rod circumscribed by a wrapping paper and an adjacent filter element, the cigarette rod being positioned between the second resistance heating element and the removable mouthpiece. Another example of a removable carrier device is a removable cartridge enclosing the aerosol-forming material and tobacco material as described above, the cartridge having an opening facing the second electrical resistance heating element such that aerosol generated within the cartridge initially flows in the direction of the second electrical resistance heating element. The removable carrier device can be heated by a third resistance heating element within the outer housing, the third heating element being powered by the electrical power source.

In any of the above embodiments, at least a portion of the tobacco in the tobacco rod can be in the form of tobacco cut filler, and the cut filler can be in intimate contact with the aerosol-forming material. In certain embodiments, at least a portion of the tobacco in the tobacco rod is in the form of an extract. In any embodiment, at least a portion of the tobacco in the tobacco rod and the aerosol-forming material can be in the form of an intimate mixture, or the two components can be separately-located within the smoking article, such as in separate, adjacent regions in the cigarette rod or in a cartridge. Exemplary aerosol-forming materials include glycerin, propylene glycol, and mixtures thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to assist the understanding of embodiments of the invention, reference will now be made to the appended drawings, which are not necessarily drawn to scale. The drawings are exemplary only, and should not be construed as limiting the invention.

FIG. 1 through FIG. 3 depict longitudinal cross-sectional views of various embodiments of an electrically powered, tobacco-containing smoking article; and

FIG. 4 and FIG. 5 each are representative schematic diagrams of electronic circuits for smoking articles.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present inventions now will be described more fully hereinafter with reference to the accompanying drawings. The invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout. As used in this specification and the claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise.

A smoking article of the present invention incorporates tobacco. The type of tobacco can vary. One type of tobacco can be employed, or combinations or blends of various types of tobacco can be employed. Furthermore, different types of tobaccos, or different blends of tobaccos, can be employed at different locations within the smoking article.

The tobacco that is employed can include, or can be derived from, tobaccos such as flue-cured tobacco, burley tobacco, Oriental tobacco, Maryland tobacco, dark tobacco, dark-fired tobacco and *Rustica* tobacco, as well as other rare or specialty tobaccos, or blends thereof. See, also, for example, the types of tobaccos set forth in U.S. Pat. Nos. 6,730,832 to Dominguez et al.; and 7,025,066 to Lawson et al.; and US Pat. Appl. Serial No. 60/818,198, filed June 30, 2006, to Stebbins et al.; each of which is incorporated herein by reference. Descriptions of various types of tobaccos, growing practices, harvesting practices and curing practices are set for in *Tobacco Production, Chemistry and Technology,* Davis et al. (Eds.) (1999). Most preferably, the tobacco that is employed has been appropriately cured and aged. Especially preferred techniques and conditions for curing flue-cured tobacco are set forth in Nestor et al., Beitrage Tabakforsch. Int., 20 (2003) 467-475 and U.S. Pat. No. 6,895,974 to Peele, which are incorporated herein by reference. Representative techniques and conditions for air curing tobacco are set forth in Roton et al., Beitrage Tabakforsch. Int., 21 (2005) 305-320 and Staaf et al., Beitrage Tabakforsch. Int., 21 (2005) 321-330, which are incorporated herein by reference.

The tobacco that is incorporated within the smoking article can be employed in various forms; and combinations of various forms of tobacco can be employed, or different forms of tobacco can be employed at different locations within the smoking article. For example, the tobacco can be employed in the form of cut or shredded pieces of lamina or stem; in a processed form (e.g., reconstituted tobacco sheet, such as pieces of reconstituted tobacco sheet shredded into a cut filer form; films incorporating tobacco components; extruded tobacco parts or pieces;

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expanded tobacco lamina, such as cut filler that has been volume expanded; pieces of processed tobacco stems comparable to cut filler in size and general appearance; granulated tobacco; foamed tobacco materials; compressed or pelletized tobacco; or the like); as pieces of finely divided tobacco (e.g., tobacco dust, tobacco powder, agglomerated tobacco powders, or the like); or in the form of a tobacco extract. See, for example, US Pat. App. Ser. Nos. 11/194,215 filed August 1, 2005, to Cantrell et al. and 11/377,630 filed March 16, 2006 to Crooks et al.; which are incorporated herein by reference.

The smoking article can employ tobacco in the form of lamina and/or stem. As such, the tobacco can be used in forms, and in manners, that are virtually identical in many regards to those traditionally used for the manufacture of tobacco products, such as cigarettes. Traditionally, cut or shredded pieces of tobacco lamina and stem have been employed as so-called "cut filler" for cigarette manufacture. Pieces of water extracted stems also can be employed. As such, the tobacco in such a form introduces mass and bulk within the smoking article. Manners and methods for curing, de-stemming, aging, moistening, cutting, reordering and handling tobacco that is employed as cut filler will be apparent to those skilled in the art of tobacco product manufacture.

Processed tobaccos that can be incorporated within the smoking article can vary. Exemplary manners and methods for providing reconstituted tobacco sheet, including casting and paper-making techniques, are set forth in US Pat. Nos. 4,674,519 to Keritsis et al.; 4,941,484 to Clapp et al.; 4,987,906 to Young et al.; 4,972,854 to Kiernan et al.; 5,099,864 to Young et al.; 5,143,097 to Sohn et al.; 5,159,942 to Brinkley et al.; 5,322,076 to Brinkley et al.; 5,339,838 to Young et al.; 5,377,698 to Litzinger et al.; 5,501,237 to Young; and 6,216,707 to Kumar; each of which is incorporated herein by reference. Exemplary manners and methods for providing extruded forms of processed tobaccos are set forth in US Pat. Nos. 4,821,749 to Toft et al.; 4,880,018 to Graves, Jr. et al.; 5,072,744 to Luke et al.; 4,874,000 to Tamol et al.; 5,551,450 to Hemsley; 5,649,552 to Cho et al.; 5,829,453 to White; 6,125,855 to Nevett et al.; and 6,182,670 to White; each of which is incorporated herein by reference. Extruded tobacco materials can have the forms of cylinders, strands, discs, or the like. Exemplary expanded tobaccos (e.g., puffed tobaccos) can be provided using the types of techniques set forth in US Pat. Nos. Re 32,013 to de la Burde et al.; 3,771,533 to Armstrong et al.; 4,577,646 to Ziehn; 4,962,773 to White; 5,095,922 to Johnson et al.; 5,143,096 to Steinberg; 5,172,707 to Zambelli; 5,249,588 to

Brown et al.; 5,687,748 to Conrad; and 5,908,032 to Poindexter; and US Pat. Pub. 2004/0182404 to Poindexter et al.; each of which is incorporated herein by reference. One particularly preferred type of expanded tobacco is dry ice expanded tobacco (DIET). Exemplary forms of processed tobacco stems include cut-rolled stems, cut-rolled-expanded stems, cut-puffed stems and shredded-steam expanded stems. Exemplary manners and methods for providing processed tobacco stems are set forth in US Pat. Nos. 4,195,646 to Kite; 5,873,372 to Honeycutt et al.; each of which is incorporated herein by reference. Manners and methods for employing tobacco dust are set forth in US Pat. Nos. 4,341,228 to Keritsis et al.; 4,611,608 to Vos et al.; 4,706,692 to Gellatly; and 5,724,998 to Gellatly et al.; each of which is incorporated herein by reference. Yet other types of processed tobaccos are of the type set forth in US Pat. Pub. No. 2006/0162733 to McGrath et al.

The tobacco can be used in a blended form. Typically, the blends of various types and forms of tobaccos are provided in a blended cut filler form. For example, certain popular tobacco blends for cigarette manufacture, commonly referred to as "American blends," comprise mixtures of cut or shredded pieces of flue-cured tobacco, burley tobacco and Oriental tobacco; and such blends, in many cases, also contain pieces of processed tobaccos, such as processed tobacco stems, volume expanded tobaccos and/or reconstituted tobaccos. The precise amount of each type or form of tobacco within a tobacco blend used for the manufacture of a particular smoking article can vary, and is a manner of design choice, depending upon factors such as the sensory characteristics (e.g., flavor and aroma) that are desired. See, for example, the types of tobacco blends described in *Tobacco Encyclopedia,* Voges (Ed.) p. 44-45 (1984), Browne, *The Design of Cigarettes,* 3rd Ed., p.43 (1990) and *Tobacco Production, Chemistry and Technology,* Davis et al. (Eds.) p. 346 (1999). See, also, the representative types of tobacco blends set forth in US Pat. Nos. 4,836,224 to Lawson et al.; 4,924,888 to Perfetti et al.; 5,056,537 to Brown et al.; and 5,220,930 to Gentry; U.S. Patent Appl. Pub. Nos. 2004/0255965 to Perfetti et al.; and 2005/0066986 to Nestor et al.; PCT Appl. Pub. No. WO 02/37990 to Bereman; and Bombick et al., *Fund. Appl. Toxicol.,* 39, p. 11-17 (1997); each of which is incorporated herein by reference.

Certain processed tobaccos can incorporate ingredients other than tobacco. However, it is preferred that processed tobaccos be composed predominantly of tobacco of some form, based on the dry weights of those processed tobaccos. That is, the majority of the dry weight of those processed tobaccos, and the majority of the weight of a mixture incorporating those processed

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tobaccos (including a blend of materials, or materials having additives applied thereto or otherwise incorporated therein), are provided by tobacco of some form. For example, those materials can be processed tobaccos that incorporate minor amounts of non-tobacco filler materials (e.g., calcium carbonate particles, spongy or absorbent materials, carbonaceous materials including carbon particles and graphite fibers, grains or wood pulp) and/or binding agents (e.g., guar gum, sodium alginate or ammonium alginate); and/or a blend of those materials can incorporate tobacco substitutes or extenders. Exemplary types of tobacco substitutes or extenders are set forth in US Pat. Appl. Serial No. 11/489,334, filed July 19, 2006, to Fagg et al., which is incorporated herein by reference. The foregoing materials, and blends incorporating those materials, frequently include greater than about 70 percent tobacco, often are greater than about 80 percent tobacco, and generally are greater than about 90 percent tobacco, on a dry weight basis, based on the combined weights of the tobacco, non-tobacco filler material, and non-tobacco substitute or extender. However, those processed tobaccos also can be made of virtually all tobacco, and not incorporate any non-tobacco fillers, substitutes or extenders.

The tobacco can be treated with tobacco additives of the type that are traditionally used for the manufacture of tobacco products. Those additives can include the types of materials used to enhance the flavor and aroma of tobaccos used for the production of cigars, cigarettes, pipes, and the like. For example, those additives can include various cigarette casing and/or top dressing components. See, for example, US Pat. Nos. 3,419,015 to Wochnowski; 4,054,145 to Berndt et al.; 4,887,619 to Burcham, Jr. et al.; 5,022,416 to Watson; 5,103,842 to Strang et al.; and 5,711,320 to Martin. Preferred casing materials include water, sugars and syrups (e.g., sucrose, glucose and high fructose corn syrup), humectants (e.g. glycerin or propylene glycol), and flavoring agents (e.g., cocoa and licorice). Those added components also include top dressing materials (e.g., flavoring materials, such as menthol). See, for example, US Pat. No. 4,449,541 to Mays et al. Additives also can be added to the tobacco using the types of equipment described in US Pat. No. 4,995,405 to Lettau, or that are available as Menthol Application System MAS from Kohl Maschinenbau GmbH. The selection of particular casing and top dressing components is dependent upon factors such as the sensory characteristics that are desired, and the selection and use of those components will be readily apparent to those skilled in the art of cigarette design and manufacture. See, Gutcho, *Tobacco Flavoring Substances and Methods,* Noyes Data Corp. (1972) and Leffingwell et al., *Tobacco Flavoring for*

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Smoking Products (1972). The tobacco also may be treated, for example, with ammonia or ammonium hydroxide or otherwise treated to incorporate ammonia (e.g., by addition of ammonia salts such as, for example, diammonium phosphate). Preferably, the amount of ammonia optionally incorporated into the smokable tobacco is less than about 5 percent, and generally about 1 to about 3 percent, based on the dry weight of the tobacco.

Tobacco can be incorporated with the smoking article in a form other than cut filler form. For example, tobacco leaf and/or reconstituted tobacco sheet can be used as a wrapper for a tobacco-containing component having the form of a cigar or an inner wrapper of a double wrapped cigarette rod. Alternatively, processed tobaccos, such as certain types of reconstituted tobaccos, can be employed as longitudinally extending strands. See, for example, the type of configuration set forth in US Pat. No. 5,025,814 to Raker, which is incorporated herein by reference. In addition, certain types of reconstituted tobacco sheets can be formed, rolled or gathered into a desired configuration. In addition, molded, compressed or extruded segments or pieces of tobacco-containing materials that are formed into desired shapes (e.g., strands, tubes, cylinders, pellets, or the like) can be incorporated within the aerosol delivery article. See, for example, US Pat. Nos. 4,836,225 to Sudoh; 4,893,639 to White; 4,972,855 to Kuriyama et al.; and 5,293,883 to Edwards; each of which is incorporated herein by reference. If desired, finely milled tobacco or tobacco dust can be incorporated within other types of processed tobaccos, such as extrudate formulations, reconstituted tobacco sheets, or the like. Furthermore, finely milled tobacco or tobacco dust can be contained on substrates, such as membranes or screens. If desired, at least a portion of the tobacco can be heat treated prior to use within the smoking article (e.g., have the form of high temperature dried, toasted, pre-pyrolyzed, condensed volatiles collected after tobacco is heated, condensed tobacco smoke components, or the like).

At least a portion of the tobacco incorporated with the smoking article can be provided in the form of a tobacco extract. As used herein, the term "tobacco extract" means components separated from, removed from, or derived from, tobacco using tobacco extraction processing conditions and techniques. Typically, tobacco extracts are obtained using solvents, such as solvents having an aqueous nature (e.g., water) or organic solvents (e.g., alcohols, such as ethanol or alkanes, such as hexane). As such, extracted tobacco components are removed from tobacco and separated from the unextracted tobacco components; and for extracted tobacco components that are present within a solvent, (i) the solvent can be removed from the extracted

tobacco components, or (ii) the mixture of extracted tobacco components and solvent can be used as such. For example, tobacco can be subjected to extraction conditions using water as a solvent; the resulting aqueous extract of tobacco then is separated from the water insoluble pulp; and then (i) the mixture of aqueous extract of tobacco within water can be used as such, or (ii) substantial amounts of the water can be removed from extracted tobacco components (e.g., using spray drying or freeze drying techniques) in order to provide a tobacco extract in powder form. Preferred tobacco extracts incorporate numerous components that are separated from, removed from, or derived from, tobacco; and are not obtained using tobacco extraction processes conditions that are highly selective to a single component (e.g., preferred extracts are not high nicotine content extracts, or extracts that can be characterized as relatively pure nicotine compositions). As such, exemplary preferred tobacco extracts possess less than 45 percent nicotine, often less than 35 percent nicotine, and frequently less than 25 percent nicotine, on the basis of the total extract weight with solvent removed (e.g., on a dry weight basis when the solvent is water). In addition, highly preferred tobacco extracts are highly aromatic and flavorful, and hence introduce desirable sensory characteristics to the aerosol produced by the smoking articles incorporating those extracts. Exemplary types of tobacco extracts, tobacco essences, solvents, tobacco extraction processing conditions and techniques, and tobacco extract collection and isolation procedures, are set forth in Australia Pat. No. 276,250 to Schachner; US Pat. Nos. 2,805,669 to Meriro; 3,316,919 to Green et al.; 3,398,754 to Tughan; 3,424,171 to Rooker; 3,476,118 to Luttich; 4,150,677 to Osborne; 4,131,117 to Kite; 4,506,682 to Muller; 4,986,286 to Roberts et al.; 5,005,593 to Fagg; 5,065,775 to Fagg; 5,060,669 to White et al.; 5,074,319 to White et al.; 5,099,862 to White et al.; 5,121,757 to White et al.; 5,131,415 to Munoz et al.; 5,230,354 to Smith et al.; 5,235,992 to Sensabaugh; 5,243,999 to Smith; 5,301,694 to Raymond; 5,318,050 to Gonzalez-Parra et al.; 5,435,325 to Clapp et al.; and 5,445,169 to Brinkley et al.; each of which is incorporated herein by reference.

Tobacco extracts typically are carried by a substrate, or are otherwise contained within a carrier or material. The substrate for the tobacco extract can be provided by generally solid substances, such as alumina beads, pieces of carbonaceous materials, paper or paper-type materials (e.g., shredded or gathered pieces of porous paper, papers incorporating tobacco materials such as tobacco stems or stalks, papers incorporating pieces of absorbent carbon particles, or the like), pieces of tobacco lamina and/or stem, pieces of processed tobacco,

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synthetic fibers, or the like. Alternatively, the tobacco extract can be mixed with generally liquid or fluid substances, such as solvents, aerosol-forming materials, flavor carrying agents, and the like. Mixtures of tobacco extracts and generally liquid or fluid substances, in turn, can be carried by generally solid substrate materials or can be contained within suitable containers, vials, cartridges, or the like.

Various manners and methods for incorporating tobacco into smoking articles, and particularly smoking articles that are designed so as to not purposefully burn virtually all of the tobacco within those smoking articles, are set forth in US Pat. No. 4,947,874 to Brooks et al.; U.S. Patent Application Pub. No. 2005/0016549 to Banerjee et al.; and US Pat. App. Ser. Nos. 11/194,215 filed August 1, 2005, to Cantrell et al. and 11/377,630 filed March 16, 2006 to Crooks et al.; which are incorporated herein by reference. In addition, tobacco has been incorporated with cigarettes that have been marketed commercially under the brand names "Premier" and "Eclipse" by R. J. Reynolds Tobacco Company. See, for example, those types of cigarettes described in *Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco,* R. J. Reynolds Tobacco Company Monograph (1988) and *Inhalation Toxicology,* 12:5, p. 1-58 (2000). Tobacco also has been incorporated within a smoking article that has been marketed commercially by Philip Morris Inc. under the brand name "Accord."

The smoking article of the present invention further includes an aerosol-generating material, which can be in intimate contact with the tobacco material (e.g., in the form of an intimate mixture), or can be carried by a non-tobacco substrate and segregated from the tobacco in the smoking article (e.g., positioned in an adjacent region of the device). The aerosol-generating material is positioned in fluid communication with the tobacco material such that air can be drawing through both the tobacco and the aerosol-generating material, thereby generating an aerosol that includes volatilized portions of the aerosol-generating material and volatilized components derived from the tobacco. The aerosol-forming material can vary, and mixtures of various aerosol-forming materials can be used. Representative types of aerosol-forming materials are set forth in US Pat. Nos. 4,793,365 to Sensabaugh, Jr. et al.; and 5,101,839 to Jakob et al.; PCT Appl. Pub. No. WO 98/57556 to Biggs et al.; EPO 1,618,803 to Hon; and *Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco,* R. J. Reynolds Tobacco Company Monograph (1988); which are incorporated herein by reference.

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A preferred aerosol-forming material produces a visible aerosol upon the application of sufficient heat thereto, or otherwise through the action of aerosol forming conditions using components of the smoking article. A highly preferred aerosol-forming material produces an aerosol that can be considered to be "smoke-like." A preferred aerosol-forming material is chemically simple, relative to the chemical nature of the smoke produced by burning tobacco. A preferred aerosol-forming material is a polyol; and exemplary preferred aerosol-forming materials include glycerin, propylene glycol, and mixtures thereof. If desired, aerosol-forming materials can be combined with other liquid materials, such as water. For example, aerosol-forming material formulations can incorporate mixtures of glycerin and water, or mixtures of propylene glycol and water. Exemplary aerosol-forming materials also include those types of materials incorporated within devices available through Atlanta Imports Inc., Acworth, Georgia, USA., as an electronic cigar having the brand name E-CIG, which can be employed using associated Smoking Cartridges Type C1a, C2a, C3a, C4a, C1b, C2b, C3b and C4b; and as Ruyan Atomizing Electronic Pipe and Ruyan Atomizing Electronic Cigarette from Ruyan SBT Technology and Development Co., Ltd., Beijing, China.

The aerosol-forming material can be maintained within the smoking article in a variety of ways. For example, the aerosol-forming material can be contained within a container in liquid form, or soaked within absorbent fibrous materials or sponge-like materials. Exemplary absorbent materials can be composed of synthetic polymeric materials, such as fibers of polyethylene terephthalate. Alternatively, the aerosol-forming material can be incorporated within, or carried by, a material that acts as a substrate. For example, the substrate can be, at least in part, a material that incorporates tobacco. Exemplary substrate materials, and exemplary formulations incorporating aerosol-forming materials, are set forth in US Pat. Nos. 4,793,365 to Sensabaugh et al.; 4,893,639 to White; 5,099,861 to Clearman et al.; 5,101,839 to Jakob et al.; 5,105,836 to Gentry et al.; 5,159,942 to Brinkley et al.; 5,203,355 to Clearman et al.; 5,271,419 to Arzonico et al.; 5,327,917 to Lekwauwa et al.; 5,396,911 to Casey, III et al.; 5,533,530 to Young et al.; 5,588,446 to Clearman; 5,598,868 to Jakob et al.; and 5,715,844 to Young et al.; and U.S. Patent Application Pub. No. 2005/0066986 to Nestor et al.; which are incorporated herein by reference. See, also, *Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco,* R. J. Reynolds Tobacco Company Monograph (1988). Exemplary substrate materials have been incorporated within the types of cigarettes

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commercially marketed under the trade names "Premier" and "Eclipse" by R. J. Reynolds Tobacco Company.

The substrate material can incorporate tobacco of some form, normally is composed predominantly of tobacco, and can be provided by virtually all tobacco material. The form of the substrate material can vary; but most preferably that material is employed in an essentially traditional cigarette, cigar or pipe filler form (e.g., as cut filler). The substrate material can be otherwise formed into desired configurations. The substrate material can be used in the form of a gathered web or sheet, using the types of techniques generally set forth in US Pat. No. 4,807,809 to Pryor et al. The substrate material can be used into the form of a web or sheet that is shredded into a plurality of longitudinally extending strands, using the types of techniques generally set forth in US Pat. No. 5,025,814 to Raker. The substrate material can have the form of a loosely rolled sheet, such that a spiral type of air passageway extends longitudinally through the aerosol-generation segment. Representative types of tobacco containing substrate materials can be manufactured from mixtures of tobacco types; or from one predominant type of tobacco (e.g., a cast sheet-type or paper-type reconstituted tobacco composed primarily of burley tobacco, or a cast sheet-type or paper-type reconstituted tobacco composed primarily of Oriental tobacco).

The substrate material also can be treated with tobacco additives of the type that are traditionally used for the manufacture of cigarettes, such as casing and/or top dressing components. The substrate material optionally can be ammoniated (e.g., by treatment with anhydrous ammonia, aqueous ammonium hydroxide, or ammonium salts such as diammonium phosphate). Alternatively those materials can be absent, or virtually absent, of any type of added ammonia (e.g., whether by treatment with anhydrous ammonia, aqueous ammonium hydroxide, or ammonium salts such as diammonium phosphate). Those materials also can be treated with other additives, such as potassium carbonate or sodium bicarbonate. Other materials, such as catalytic agents, nanoparticle compositions, and the like, also can be incorporated within any of the smokable materials of the smokable rod. See, for example, the types of components set forth in US Pat. Publication 2004/0173229 to Crooks et al. Preferably, the material is not treated with more that about 10 percent of any of those types of additive agents other than aerosol-forming materials, based on the dry weight of tobacco material within that substrate material.

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The manner by which the aerosol-forming material is contacted with the substrate material (e.g., the tobacco) can vary. The aerosol-forming material can be applied to a formed tobacco material, or can be incorporated into processed tobaccos during manufacture of those tobaccos. The aerosol-forming material can be dissolved or dispersed in an aqueous liquid, or other suitable solvent or liquid carrier, and sprayed onto that substrate material. See, for example, U.S. Patent Appl. Pub. No. 2005/0066986 to Nestor et al. The amount of aerosol-forming material employed relative to the dry weight of substrate material can vary. Materials including exceedingly high levels of aerosol-forming material can be difficult to process into cigarette rods using conventional types of automated cigarette manufacturing equipment.

Cast sheet types of processed tobaccos preferably can incorporate relatively high levels aerosol-forming material. Reconstituted tobaccos manufactured using paper-making types of processes preferably can incorporate moderate levels of aerosol-forming material. Tobacco lamina strip and tobacco cut fuller can incorporate lower amounts of aerosol-forming material. For processed materials, such as cast sheet materials and paper-type reconstituted tobaccos, tobacco pulp materials that are extracted with aqueous liquids can be used as components thereof. The removal of some fraction or essentially all of the water soluble components of tobacco can assist in providing a processed material that is capable of acting as an effective substrate for higher levels of aerosol-forming material. In addition, dusting processed tobaccos with dry tobacco powders can assist in providing processed materials having relatively high levels of glycerin while not demonstrating overly tacky or sticky characteristics. Alternatively, relatively high levels of aerosol-forming materials can be applied to, or incorporated within, tobacco substrate materials; and those resulting materials can be considered to be somewhat moist, wet, tacky, sticky or gooey in nature.

Cast sheet processes tobaccos, and particularly cast sheet tobaccos incorporating certain amounts of tobacco pulp that have been extracted with water, often can comprise up to about 65 percent, often up to about 60 percent, and frequently up to about 55 percent, aerosol-forming material, based on the dry weight of the tobacco and aerosol-forming material in the processed material so produced. Paper-type reconstituted tobaccos, and particularly those forms of tobacco incorporating certain amounts of tobacco pulp materials that have been extracted with water, and not reapplying some or all of the water soluble extract components back to that pulp, often can comprise up to about 55 percent, often up to about 50 percent, and frequently up to about 45

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percent, aerosol-forming material, based on the dry weight of the tobacco and aerosol-forming material in the material so produced. A tobacco material produced by spraying tobacco strip or cut filler with aerosol-forming material often does not comprise more than about 20 percent, and frequently does not comprise more than about 15 percent, aerosol-forming material, based on the dry weight of the tobacco and aerosol-forming material of the material so produced. Materials having relatively high loading levels of aerosol-forming material can be dried (e.g., by being subjected to a flow of hot air) to a moisture content of about 4 percent to about 5 percent, by weight; the dried material then can be processed to form the components of the designed configuration; and then those components can be re-equilibrated to a moisture content of about 12 to about 13 weight percent. Alternatively, those materials can be used in a somewhat moist or wet form.

Other types of materials incorporating relatively high levels of aerosol-forming material can be incorporated in the smoking article. Formed, encapsulated or microencapsulated materials can be employed. Such types of materials preferably include primarily of aerosol-forming material, and those materials most preferably incorporate some amount and form of tobacco. An example of such a type of material is a film produced by casting and drying an aqueous solution of about 65 to about 70 weight parts glycerin, and about 25 to about 30 weight parts binder (e.g., citrus pectin, ammonium alginate, sodium alginate or guar gum), and about 5 weight parts flavoring agent (e.g., vanillin, coffee, tea, cocoa and/or fruit flavor concentrates); and then surface-coating that film with about 2 to about 10 weight parts of a finely divided powder that is provided by milling tobacco lamina.

The amount of aerosol-forming material that is used within the smoking article is such that the cigarette exhibits acceptable sensory and organoleptic properties, and desirable performance characteristics. For example, it is highly preferred that sufficient aerosol-forming material, such as glycerin and/or propylene glycol, be employed in order to provide for the generation of a visible mainstream aerosol that in many regards resembles the appearance of tobacco smoke. Typically, the amount of aerosol-generating material incorporated into the smoking article is in the range of less than about 1.5 g, often less than about 1 g, and sometimes less than about 0.5 g. The amount of aerosol-forming material is dependent upon factors such as the number of puffs desired per tobacco-containing cartridge or cigarette incorporated within the smoking article. The amount of aerosol-forming material also can be dependent upon factors

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such as the position or location of that material relative to the heat-producing components of the smoking article, the ability of that material to wick or transfer to heating regions within the smoking article, the desired concentration of that material in the aerosol generated by the smoking article, and the like.

It is desirable for the aerosol-generating composition not to introduce significant degrees of unacceptable off-taste, filmy mouth-feel, or an overall sensory experience that is significantly different from that of a traditional type of cigarette that generates mainstream smoke by burning tobacco cut filler. The selection of the particular aerosol-generating material and substrate material, the amounts of those components used, and the types of tobacco material used, can be altered in order to control the overall chemical composition of the mainstream aerosol produced by the cigarette.

Other types of flavoring agents, or materials that alter the sensory or organoleptic character or nature of the mainstream aerosol of the smoking article, can be employed. Such flavoring agents can be provided from sources other than tobacco, can be natural or artificial in nature, and can be employed as concentrates or flavor packages. Of particular interest are flavoring agents that are applied to, or incorporated within, those regions of the smoking article where aerosol is generated. Exemplary flavoring agents include vanillin, ethyl vanillin, cream, tea, coffee, fruit (e.g., apple, cherry, strawberry, peach and citrus flavors, including lime and lemon), maple, menthol, mint, peppermint, spearmint, wintergreen, nutmeg, clove, lavender, cardamom, ginger, honey, anise, sage, cinnamon, sandalwood, jasmine, cascarilla, cocoa, licorice; and flavorings and flavor packages of the type and character traditionally used for the flavoring of cigarette, cigar and pipe tobaccos. Syrups, such as high fructose corn syrup, also can be employed. Flavoring agents also can include acidic or basic characteristics (e.g., organic acids, such as levulinic acid). Preferably, such flavoring agents constitute less than about 10 percent, and often less than about 5 percent of the total weight of tobacco, on a dry weight basis. The flavoring agents can be added to the tobacco material or to the aerosol-generating material or both.

The amount of tobacco incorporated within each smoking article can vary. For certain embodiments, the amount of tobacco cut filler incorporated within each smoking article is at least about 20 mg, generally at least about 50 mg, often at least about 75 mg, and frequently at least 100 mg, on a dry weight basis. For certain embodiments, the amount of tobacco cut filler

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incorporated within each smoking article does not exceed about 400 mg, generally does not exceed about 350 mg, often does not exceed about 300 mg, and frequently does not exceed about 250 mg, on a dry weight basis. For segments or sections incorporating tobacco cut filler or processed tobacco in cut filler form, the packing density of the material within those segments or sections typically is less than about 400 mg/cm^3, and generally is less than about 350 mg/cm^3; while the packing density of the material within those segments or sections can exceed about 100 mg/cm^3, and often can exceed about 150 mg/cm^3. Preferably, each such segment or section is composed entirely of tobacco and/or processed tobacco. Alternatively, each such segment or section can be composed of tobacco and/or processed tobacco mixed or blended with a non-tobacco substrate material. In either case, the tobacco material, and optional non-tobacco substrate material, can act as a substrate for aerosol-forming materials, flavoring agents, and the like.

The moisture content of the tobacco that is used within the smoking article can vary. Typically, the moisture content of the tobacco exceeds about 12 weight percent, and often can exceed about 15 weight percent. In certain circumstances, moist tobacco can be employed; and that tobacco can have a moisture content in excess of about 20 weight percent, often in excess of about 30 weight percent, and even in excess of about 40 weight percent.

Certain embodiments of the smoking article of the invention incorporate a cigarette rod as a necessary component. That is, the smoking article of the invention can incorporate a tobacco rod wrapped in paper or other wrapping material. The wrapping material used as a wrapper for containing the tobacco, and hence used for cigarette manufacture, can vary. Exemplary types of wrapping materials are set forth in US Pat. Nos. 4,938,238 to Barnes et al. and 5,105,837 to Barnes et al. Wrapping materials, such as those set forth in U.S. Patent Appl. Pub. No. 2005/0005947 to Hampl, Jr. et al. and PCT Appl. Pub. No. WO 2005/039326 to Rasouli et al., can be employed as inner wrapping materials of a so-called "double wrap" configuration. An exemplary type of heat conductive wrapping material is set forth in US Pat. No. 5,551,451 to Riggs et al.; and other suitable wrapping materials are set forth in US Pat. Nos. 5,065,776 to Lawson et al. and 6,367,481 to Nichols et al.; each of which is incorporated herein by reference. Exemplary wrapping materials, such as laminates of paper and metal foil, and papers used as the outer circumscribing wrapper of the heat generation segment, have been incorporated within the types of cigarettes commercially marketed under the trade names

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"Premier" and "Eclipse" by R. J. Reynolds Tobacco Company. Other representative wrapping materials, and processed wrapping materials, suitable for use for cigarette manufacture are set forth in US Pat. Nos. 5,220,930 to Gentry; 6,976,493 to Chapman et al.; and 7,047,982 to Seymour et al.; and US Pat. Application Ser. No. 11/377,630 filed March 16, 2006 to Crooks et al.; each of which is incorporated herein by reference. Paper materials can be composed of materials, or treated with films, in order to provide resilience, particularly when the paper material is used to contain tobacco materials that are substrates for relatively high amounts of liquid materials (e.g., aerosol-forming materials). For example, such papers can be treated with coatings of nitrocellulose or ethylcellulose. Alternatively, paper materials can be highly absorbent in nature, and can act as substrates for liquid materials (e.g., aerosol-forming materials, liquid flavoring agents, or mixture of aerosol-forming materials and tobacco extracts).

The tobacco can be wrapped in at least one layer of tobacco lamina and/or reconstituted tobacco sheet. As such, the tobacco that is incorporated within the smoking article is configured in a type of form characteristic of a cigar. Outer wrappers for cigar type tobacco segments or sections can act as substrates for liquid materials (e.g., aerosol-forming materials, liquid flavoring agents, tobacco extracts, or mixtures thereof).

The tobacco can be wrapped in moisture permeable and air permeable pouches, sachets, packets, or the like. For example, finely divided tobacco pieces can be sealed in mesh-type pouches. Suitable pouches are of the type traditionally used for containment of certain types of smokeless tobacco products. See, for example, the types of pouches and types of contents of those pouches that are set forth in US Pat. Appl. Serial Nos. 11/233,399, filed September 22, 2005, to Holton et al.; 11/351,919, filed February 10, 2006, to Holton et al.; and 11/461,633, filed August 1, 2006, to Mua et al.; which are incorporated herein by reference. Such pouches and the contents thereof can act as substrates for significant amounts of aerosol-forming materials, flavoring agents and tobacco extracts. For example, relatively high levels of liquid materials can be applied to, or incorporated within, those substrates; and those resulting materials can be considered to be moist, wet, tacky, sticky or gooey in nature. If desired, those substrates can be soaked in liquid mixtures of aerosol-forming material and other components that provide tobacco flavor characteristics to the aerosol produced by the smoking article. The number of such types of pouches that are incorporated within a representative smoking article can vary, and typically can range, for example, from 1 to about 5.

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The smoking article typically possesses a mouth-end piece. Representative types of filter elements, such as those employed for cigarettes, including segmented cigarette filter elements, are set forth in US Pat. Appl. Serial No. 11/461,941, filed August 2, 2006, to Nelson et al., which is incorporated herein by reference. Mouth-end pieces also can be fashioned into desired shapes using plastic materials such as nylon, polypropylene, polystyrene, poly(butadiene/styrene/acrylonitrile), or the like.

Representative smoking articles can possesses certain components comparable to, and operate in a manner generally comparable to, that type of device set forth in EPO 1,618,803 to Hon. Representative smoking articles, and exemplary components thereof, also can be provided using components of those nicotine aerosol delivery systems available through Atlanta Imports Inc., Acworth, Georgia, USA., as an electronic cigar having the brand name E-CIG, which can be employed using associated Smoking Cartridges Type C1a, C2a, C3a, C4a, C1b, C2b, C3b and C4b. Exemplary components for representative smoking articles also have been available components of those devices available as Ruyan Atomizing Electronic Pipe and Ruyan Atomizing Electronic Cigarette from Ruyan SBT Technology and Development Co., Ltd., Beijing, China.

Aspects and embodiments of the present invention relating to various smoking articles now are described with reference to the illustrations contained in FIGS. 1-3. Referring to FIG. 1, an embodiment of a representative smoking article 10 is shown. The smoking article 10 has an overall shape that is generally rod-like or tubular in nature, generally akin to a cigarette-type or cigar-type smoking article. The smoking article 10 includes a distal end 13 and a mouth-end 15.

The smoking article 10 possesses an outer container or housing 20. Although the dimensions and shape of the outer container 20 can vary, a representative outer housing is generally tubular in shape (e.g., having an overall length of about 11 cm and an outer diameter of about 1.5 cm). The outer housing 20 can be provided using a variety of materials. For example, the outer housing 20 can be provided from metal (e.g., aluminum or stainless steel), heat-resistant plastic (e.g., polycarbonate), treated paperboard material, or the like. If desired, the outer housing can possess an aesthetically pleasing cover (not shown). A representative outer housing can be of the type possessed by the Ruyan Atomizing Electronic Cigarette available from Ruyan SBT Technology and Development Co., Ltd. As shown, the outer housing 20 includes a mouth-end 15 and an end 13 distal to the mouth-end, wherein the mouth-end

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comprises an opening adapted for egress of an aerosol generated within the smoking article and the distal end comprises an opening adapted for intake of air into the smoking article 10.

The distal end 13 of the outer container 20 of the smoking article 10 can possess an end cover or cap 35. The end cover or cap 35 can be maintained in place by friction fit, a threaded screw mechanism that cooperates with a complementing threaded mechanism 28 that is secured to the distal region of the outer container, or the like. The end cover 35 can act to assist in maintaining various components of the smoking article contained within the outer container. The end cover preferably possesses at least one air passageway 32 to allow drawn air to enter the inner region of the outer container 20. A representative end cover or cap 35 can be of the type possessed by the Ruyan Atomizing Electronic Cigarette available from Ruyan SBT Technology and Development Co., Ltd.

Within the outer container 20 is located an electric power source 36, such as at least one battery. The battery typically is maintained in place by a generally tubular battery holder 40 that is positioned and secured in place within the outer container 20. Typically, at least one longitudinally extending air passageway 45 allows for drawn air to pass by the battery towards the mouth-end 15 of the smoking article 10. As shown, the passageway 45 can be created by incorporation of one or more grooves in the battery holder 40 or, alternatively, by incorporating ribs (not shown) extending into the interior of the battery holder in order to prevent the power source 36 from entering the passageway. The battery holder 40 also can act as a container for relevant electrical wiring (not shown) that passes from the battery to downstream regions of the smoking article 10. Representative types of power sources, and representative arrangements thereof within the outer container, are of the type incorporated within a device available as Ruyan Atomizing Electronic Cigarette from Ruyan SBT Technology and Development Co., Ltd. If desired, higher power electrical power sources can be employed.

The smoking article 10 incorporates various electrically powered control components 50. For a representative embodiment, the control components 50 are positioned within the tubular battery holder 40 in a region downstream from the battery 36. Typically, the electrically-powered control components 50 include microchips that provide control of time of operation, control of current, control of electrical resistance heat generation, and the like. Exemplary circuits that can be included in the controller 50 are set forth in FIGS. 4-5. The electrically-powered components 50 are powered by the battery 36. Representative types of electronic

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control components are of the type can be of the type possessed by the Ruyan Atomizing Electronic Cigarette available from Ruyan SBT Technology and Development Co., Ltd. See, also, the types of electronic systems set forth in US Pat. No. 4,947,874 to Brooks et al.

The representative smoking article 10 incorporates suitably adapted sensing mechanism 60 in order to provide for operation of the electrically powered components during desired periods of time. Representative types of sensing mechanism components are incorporated within a device available as Ruyan Atomizing Electronic Cigarette from Ruyan SBT Technology and Development Co., Ltd. See, also, those types of airflow sensing mechanisms proposed in EPO 1,618,803 to Hon; and US Pat. Nos. 4,735,217 to Gerth et al.; 4,947,874 to Brooks et al.; and 5,388,574 to Ingebrethsen. The sensing mechanism 60 also can be powered by the battery 36. Typically, the sensing mechanism components 60 are positioned within the outer container 20 in a location downstream from the electrically powered control components 50. The sensor 60, in concert with certain control circuitry within the controller 50, is preferably part of a puff-actuated controller adapted for regulating current flow through one or more of the resistance heating elements discussed below. The sensor 60 is preferably adapted for sensing draw (i.e., intake of air from the smoking article) by the user of the smoking article. Representative types of draw sensors are set forth in US Pat. No. 4,947,874 to Brooks et al., wherein pressure sensitive switches are discussed, such as pressure sensitive differential switches available from Micro Pneumatic Logic, Inc. of Ft. Lauderdale, Florida, pressure sensitive transducers, airflow-deflected vanes with motion sensors, and the like. See also, US Pat. No. 7,117,867 to Cox et al. The sensor 60 is configured to allow airflow through or around the sensor. In the embodiment shown, the sensor 60 is configured in an annular shape with a passageway through the center thereof. Other configurations are also possible, such as configurations with multiple passageways through or around the sensor 60.

The representative smoking article 10 also incorporates at least one electrical resistance heating element 70, 72. An optional first resistance heating element 70 can be located upstream from the sensing mechanism 60, and as such, can act to heat drawn air passing through the smoking article from the distal end 13 of the outer housing 20. A second resistance heating element 72 can be located downstream from the sensing mechanism 60. The resistance heating elements 70, 72 also can be powered by the battery 36, and control of the operation of those heating elements can be controlled by the electrically powered control components 50. The

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heating elements 70, 72 are configured to allow airflow therethrough. The heating element 70 upstream of the sensor 60 is configured in the same manner as the sensor (i.e., in an annular shape); however, other configurations are possible as noted above.

Typically, the second resistance element 72 can be formed from relatively high surface area absorbent or wicking-type materials, such as graphite yarn, high surface area metallic cloth or screen, or the like. Resistance elements of such type are useful for supporting or holding sufficient aerosol-forming material for aerosol generation, as well as for wicking additional aerosol-forming material for aerosol generation during subsequent puffs. Alternatively, the second resistance element 72 can be employed in close proximity to an absorbent wicking material such that aerosol-forming material can be wicked or otherwise transferred so as to contact the second resistance element or contact an area in close proximity to the second resistance element (e.g., a region that is exposed to a the heat produced by the second resistance element). Representative types of resistance heating elements are incorporated within a device available as Ruyan Atomizing Electronic Cigarette from Ruyan SBT Technology and Development Co., Ltd. If desired, each of the heating elements 70, 72 can be arranged to have current pass therethrough (and hence provide heat) in response to a signal provided by a puff-actuated controller that regulates current through one or more of the heating elements in response to signals from the sensor 60. For example, each heating element 70, 72 can be turned "on" and "off" in response to a signal provided in response to the sensing mechanism 60 and related control circuitry. Alternatively, current flow through the first heating element 70 can be controlled during periods of normal use of the smoking article 10, and current flow through the second heating element 72 can be controlled only during periods of draw (i.e., the second heating element will be energized when the sensor 60 detects draw by the user).

The representative smoking article 10 of FIG. 1 incorporates a cartridge 85. The cartridge can be manufactured from a variety of materials, such as metal (e.g., aluminum or stainless steel), paper (e.g., paperboard or paper coated with a hydrophobic film or coating), plastic (e.g., polyester, polypropylene, nylon, polycarbonate, or the like). The cartridge 85 contains tobacco 89 in some form. The cartridge 85 also most preferably contains aerosol-forming material. The tobacco 89 and the aerosol-forming material can be in the form of an intimate mixture or provided in separate regions of the cartridge 85. Representative types of cartridges are of the type incorporated within a device available as Ruyan Atomizing Electronic

Cigarette from Ruyan SBT Technology and Development Co., Ltd. can be modified by adding tobacco extract thereto, or by removing at least a portion of the substrate and nicotine-containing material incorporated therein and replacing that removed portion with a tobacco composition. For example, for the embodiment shown in FIG. 1, the cartridge 85 can contain an upstream segment 95 composed of tobacco filler or processed tobacco filler material 89 incorporating aerosol-forming material, and a downstream segment 98 composed of a substrate 101, such as fibers of polyethylene terephthalate carrying flavors and/or aerosol-forming material. The representative smoking article 10 is assembled such that a certain amount of aerosol-forming material and tobacco components can be wicked or otherwise transferred to heating element 72 or the region in close proximity to the heating element. Optionally, as shown, the extreme mouth end region of the cartridge 85 is sealed, and as such, tobacco components and aerosol-forming material have a tendency to travel upstream towards the resistance heater 72. Typically, at least one air passageway 115 extends longitudinally between the inner surface of the outer container 20 and the outer surface of the cartridge 85. This air passageway 115 can be created using the same techniques noted above in connection with the passageway 45 in the batter holder 40.

A representative cartridge 85 is provided by modifying the components of a cartridge employed in a device available as Ruyan Atomizing Electronic Cigarette from Ruyan SBT Technology and Development Co., Ltd. For example, the section or segment of the fibrous substrate and aerosol-forming material is removed from that cartridge and discarded, and that portion is replaced by a section or segment composed of tobacco cut filler saturated with a mixture of glycerin and spray dried tobacco extract. As another example, a web of reconstituted tobacco sheet that is gathered so as to possess a plurality of longitudinally extending passageways can be treated with a mixture of propylene glycol, flavoring agent and tobacco extract. As still another example, the whole section or segment of the fibrous substrate and aerosol-forming material is removed from that cartridge and discarded, and all of that material is replaced by a section or segment composed of aqueous extracted tobacco cut filler pulp saturated or nearly saturated with a mixture of glycerin, flavoring agent and spray dried tobacco extract. As a further example, the fibrous substrate and aerosol-forming material can be positioned in the upstream end of the cartridge, and the downstream end of the cartridge can be provided by a plurality of formed tobacco pieces or pellets that act as a substrate for aerosol-forming material and flavoring agent.

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The amount of aerosol-forming material, tobacco extract, flavoring agent, and the like that is carried by the substrate can vary; and the weight of those ingredients typically can be as much as at least equal to, often can be at least about twice that, and frequently can be at least about three times that, of the dry weight of the substrate. As such, the cartridge can be adapted to provide components, of types and in amounts, sufficient to provide aerosols demonstrating acceptable visual characteristics, acceptable mouthfeel and other organoleptic effects, acceptable tobacco flavor, and the like.

In a further embodiment, tobacco can be incorporated within a cartridge 85 having the ability to act as a type of liquid storage container of the smoking article. For example, powdered spray dried tobacco extract can be incorporated within the liquid storage container 85, or liquid tobacco extracts or essences can be combined within components contained within the liquid storage container (e.g., aerosol-forming materials) so as to be intimately combined with those components. In another embodiment, pieces of tobacco lamina, stems, or processed tobacco can be incorporated within the liquid storage container 85. For example, pieces of tobacco lamina cut filler, tobacco dust, or pieces of reconstituted tobacco sheet, can be incorporated within the liquid storage container. As such, the tobacco can be mixed with, or be part of, the aerosol-forming mixture within the cartridge 85. Most preferably, essentially pure nicotine, extracts composed predominantly of nicotine, or formulations composed predominantly of nicotine, are not incorporated within the liquid storage container 85 or elsewhere within the smoking article.

In another embodiment, the tobacco can be located within the smoking article 10 in a region that is physically separate from the cartridge 85. For example, the tobacco can be positioned so as to abut the cartridge 85, or positioned in a spaced apart relationship relative to the cartridge. As such, the tobacco is not mixed with the aerosol-forming mixture within the cartridge 85. In one embodiment, a charge or roll of tobacco cut filler wrapped in paper (e.g., so as to provide a generally cylindrical charge of tobacco) can be positioned either upstream or downstream from the cartridge 85. In another embodiment, tobacco-containing reconstituted tobacco sheet (e.g., a formed cast sheet or reconstituted tobacco paper) can be used as wrapping materials of various components (e.g., including the cartridge 85) within the smoking article 10. In another embodiment, tobacco cut filler can surround the cartridge 85 or other components located within the smoking article 10. In another embodiment, tobacco extract can be carried by a substrate or positioned within a cartridge that is located within the smoking article 10

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physically separate from the aforementioned cartridge 85 that contains the aerosol-forming material.

The number of puffs during the use of a single cartridge 85 can vary, depending upon factors such as the amount of aerosol-forming material, tobacco, and other associated components that is employed, the form of those components, the positioning of those components within the smoking article 10 relative to the resistance heating elements, and the like. The amount of those components can be sufficient to provide, for example, about 10 to about 15 puffs per cartridge, when that cartridge is employed within a smoking article and smoked under FTC smoking conditions. However, amount of those components can be sufficient to provide, for example, greater than about 200 puffs per cartridge, often greater than about 400 puffs per cartridge, and frequently greater than about 600 puffs per cartridge, when that cartridge is employed within a smoking article and smoked under FTC smoking conditions. For smoking articles employing cartridges containing sufficient components to provide a relatively large number of puffs, those smoking articles can be employed in conjunction with removable caps, or other suitable sealing means, in order that the smoking article can be sealed during periods of non-use. The smoking article 10 can be configured such that the cartridge 85 can be removed from the smoking article and replaced as needed.

The smoking article 10, at its mouth-end 15, possesses a mouth-end piece 120. The mouth-end piece 120, which is typically removable, can be maintained in place by friction fit, a threaded screw mechanism that cooperates with a complementing threaded mechanism that is secured to the outer container, or the like. A representative mouth-end piece can be of the type incorporated within a device available as Ruyan Atomizing Electronic Cigarette from Ruyan SBT Technology and Development Co., Ltd. Alternatively, the mouth-end piece 120 can have the form of other types of holders that have been proposed for use with smoking articles. See, also, for example, the types of mouth-end pieces and cigarette-type filter elements set forth in US Pat. Appl. Serial No. 11/377,630 filed March 16, 2006 to Crooks et al.

During use, the mouth-end 15 of the smoking article 10 is placed in the lips of the smoker. Air is drawn through the air passageways or openings 32 in the cap 35 located at the distal end 13 of the smoking article, and into the outer container 20. Drawn air passes through air passageway 45 that extends along the length of the power source 36 and the electronic control components 50, through an air passageway area within the first heating element 70, through the

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air flow sensing region 60, past or through the second heating element 72, through air passageway 115 that extends along the length of the cartridge 85, and into the mouth-end piece 120. Typically, resistance heating elements provide surface region temperatures, and hence the ability to heat aerosol-forming materials and tobacco materials in surrounding regions in the vicinity of those heating elements. Typically, during relevant periods of use, those heating elements can provide surface region temperatures of at least about 200°C, and often at least about 300°C. Typically, those temperatures do not exceed about 600°C, often do not exceed about 500°C, and frequently do not exceed about 400°C. Aerosol that is formed by the action of drawn air passing heated tobacco components and aerosol-forming material in the region occupied by the second heating element 72 is drawn through the mouth-end piece 120, and into the mouth of the smoker. That is, when used, the smoking article 10 yields visible mainstream aerosol that preferably resembles the mainstream tobacco smoke of traditional cigarettes that burn tobacco cut filler. The aerosol may also contain flavors and other components provided by, or derived from, tobacco.

Referring to FIG. 2, another embodiment of a representative smoking article 10 is shown. The smoking article 10 has a rod-like shape, and includes a distal end 13 and a mouth-end 15. The smoking article 10 possesses certain components comparable to, and in certain regards operates in a manner generally comparable to, that smoking article described previously with reference to FIG. 1. However, the smoking article is adapted to incorporate a cigarette 150.

An exemplary type of cigarette 150 possesses a charge or roll of tobacco 89 (e.g., tobacco cut filler or processed tobacco material) wrapped in wrapping material 160 (e.g., paper). The length of the resulting tobacco rod can vary; with a typical tobacco rod having a length of at least about 30 mm, often at least about 40 mm, while a typical tobacco rod has a length that does not exceed about 60 mm, and often does not exceed about 50 mm. The circumference of the tobacco rod can vary; with a typical tobacco rod having a circumference of about 20 mm to about 35 mm, and often about 25 mm to about 30 mm. Depending upon factors such as the ingredients incorporated within the cigarette 150, the number of puffs of aerosol per cigarette than are expected, the configuration of the holder into which the cigarette is inserted, the amount of heat generated by the resistance heating element, and the like, the physical dimensions of the cigarette can be smaller than those of conventional, commercially available cigarettes that burn tobacco.

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Typically, the wrapping material 160 is wrapped around the tobacco 89 so as to form a generally cylindrical rod-shaped cigarette rod or tobacco rod. That is, the wrapping material 160 is formed into a generally tubular shape, and the tobacco is positioned within the hollow region within that tube. Preferably, the wrapping material 160 is formed such that each end of the tobacco rod is open to expose the tobacco contained therein, and to allow the passage of drawn air therethrough.

The wrapping material 160 can vary. The wrapping material 160 can be a paper wrapping material of the type traditionally used for cigarette manufacture. The wrapping material 160 also can be composed of a laminate of metallic foil and paper, and as such, heat generated by the second heating element can heat the metallic foil of the laminate and hence heat the tobacco contained within that laminate. See, for example, the types of wrapping materials, wrapping material laminates and wrapping material configurations set forth US Pat. Appl. Ser. No. 11/377,630 filed March 16, 2006 to Crooks et al.

For the embodiment shown, the cigarette 150 possesses a type of cartridge 85 at its distal end within the wrapping material 160 and in fluid communication with the tobacco rod. That optional cartridge 85 contains an aerosol-generating material composition 101 therein. The components of the composition 101 can include a substrate material (e.g., polyethylene terephthalate fibers) that can be mixed or blended with tobacco filler. Typically, the substrate materials act as carriers for tobacco components and other aerosol-forming materials that can be delivered to the mouth of the smoker. The cartridge 85 can have a generally tubular shape with open ends such that air may flow therethrough. Cartridges can be manufactured from a variety of materials, such as paper or plastic, or heat conductive materials (e.g., metal foil, metal mesh or screen, ceramic non-woven web, or the like). Typically, when present, the length of the cartridge 85 does not exceed about 30 mm, and often does not exceed about 20 mm. Typically, when present, the cartridge 85 has a length of at least about 5 mm, and often at least about 10 mm. Optionally, an air passageway or gap (not shown) can exist downstream from the cartridge 85, or the cartridge 85 can abut the tobacco rod as shown in FIG. 2 such that some migration of material between the tobacco rod and the cartridge is possible. Such an air passageway, when present, typically has a length of up to about 10 mm.

In one embodiment, the cartridge 85 and/or the wrapping material 160 of the tobacco rod can be manufactured from materials that, to some degree, conduct electricity. As such,

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depending upon the positioning of the cigarette 150 within the smoking article 10, the cartridge 85 and/or the wrapping material 160 can be in electrical contact with the electrical circuitry associated with the electrical resistance heating element 72. As a result, it is possible that some degree of electrical resistance heating also can be provided by the cartridge 85 and/or the wrapping material 160.

In one embodiment, the cartridge 85 can be virtually devoid or free of nicotine. For example, the cartridge 85 can contain aerosol-forming materials, non-tobacco flavoring agents, and optionally, tobacco (e.g., as pieces of tobacco or as an extract) that has been de-nicotinized (e.g., using de-nicotinization processes or by using tobaccos virtually devoid of nicotine). As such, visible aerosol or flavored visible aerosol that is produced solely using components incorporated within the container 85 possesses virtually no nicotine. Rather, nicotine provided to the smoker of the smoking article within the mainstream aerosol delivered by the smoking article is provided by action upon tobacco 89 located in another region of the smoking article 10 rather than from nicotine incorporation within the cartridge 85.

In one embodiment, the cartridge 85 can contain a gathered web of paper that incorporates carbon particles (e.g., about 10 to about 60 weight parts carbon and about 40 to about 90 weight parts wood pulp or flax fiber). See, for example, the types of carbon-containing papers set forth in US Pat. No. 5,360,023 to Blakley et al., which is incorporated herein by reference. For example, a gathered sheet of carbon paper weighing about 40 mg, and having a length of about 10 mm to about 20 mm, can be saturated with a liquid mixture of glycerin, tobacco extract, and flavoring agent (e.g., with about 40 mg to about 120 mg of liquid mixture).

In a further embodiment, the cartridge 85 can contain a gathered web of paper that incorporates calcium carbonate particles (e.g., about 10 to about 40 weight parts calcium carbonate and about 60 to about 90 weight parts wood pulp or flax fiber). For example, a gathered sheet of carbon paper weighing about 40 mg, and having a length of about 10 mm to about 20 mm, can be saturated with a liquid mixture of glycerin, tobacco extract, and flavoring agent (e.g., with about 40 mg to about 100 mg of liquid mixture).

In yet another embodiment, the cartridge 85 can contain a fibrous carbonaceous material (e.g., graphite fibers). For example, a segment formed from about 40 mg to about 100 mg of those fibers, and having a length of about 10 mm to about 20 mm, can be saturated with a liquid

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mixture of glycerin, tobacco extract, and flavoring agent (e.g., in an amount of about 3 times of the dry weight of those fibers).

In a still further embodiment, the cartridge 85 can contain a reconstituted tobacco material (e.g., a cast sheet type material, an extruded material, or a paper-type reconstituted tobacco material) that incorporates particles or pieces of highly heat conductive materials (e.g., a matrix of aluminum wires, aluminum foil, copper wire, copper tubing, metal beads, or the like). Representative pieces or beads can have lengths, thicknesses or diameters of about 0.01 micrometers to about 1 mm. That material can act as a substrate for aerosol-forming material, tobacco extract, flavoring agents, and the like, and also can act as a conductor of heat produced by electrical resistance heating to regions within the cigarette 150.

If desired, the region of the cigarette 150 that is wrapped in the paper wrapper 160 can be composed entirely of tobacco material, processed tobacco material, or a blend of tobacco material and other substrate material, and those materials is treated in such a manner so as to act as substrates for aerosol-forming materials. For such an embodiment, the previously described cartridge 85 is not incorporated within the cigarette 150, and the components contained within the wrapping material 160 are not necessarily positioned or arranged therein in a segmented fashion.

The cigarette 150 also can possess an optional filter element 200 located at the downstream end of the tobacco rod. The filter element can be composed of filter material 215 (e.g., cellulose acetate tow, gathered polypropylene web, plasticized cellulose acetate tube, or the like) wrapped in circumscribing plug wrap 218. The filter element can be attached to the tobacco rod using a tipping material 222 that circumscribes the length of the filter element 200 and an adjacent region of the tobacco rod.

The mouth-end piece 120 of the smoking article 10 can be adapted to act as a support for the filter element 200 of the cigarette 150, and can be removably attached to the outer housing 20 of the smoking article. That is, the mouth-end piece 120 can be removed from the outer housing 20 of the smoking article 10, the filter element 200 of the cigarette 150 can be secured within the mouth-end piece (e.g., by friction fit), and the cigarette can be inserted into the downstream end of the outer housing. In such a circumstance, the mouth-end piece 120 can have a generally tubular shape. As such, the mouth-end piece can act as a type of support for the cigarette 120 while that cigarette is positioned within the outer housing 20 for use.

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During use, the mouth-end 15 of the smoking article 10 is placed in the lips of the smoker. Air is drawn through the through the air passageways or openings 32 in the cap 35 located at the distal end 13 of the smoking article, and into the outer container 20. Draw air passages through air passageway 45 that extends along the length of the power source 36 and the electronic control components 50, through an air passageway area within the first optional heating element 70, through the air flow sensing region 60, past or through the second heating element 72, through the cigarette 150 (including through cartridge 85), and into the mouth-end piece 120. Heat generated by the heating elements acting upon the tobacco and components thereof acts to volatilize components of the tobacco or otherwise cause components of tobacco to be entrained in drawn air. As such, the resulting aerosol incorporating tobacco components or tobacco-derived components is drawn into the mouth of the smoker. After use, the spent cigarette 150 is removed from the outer container 20 and disposed of, and when desired, a new cigarette is replaced within the outer container.

Referring to FIG. 3, yet another embodiment of a representative smoking article 10 is shown. The smoking article possesses a distal end 13 and a mouth-end 15. The smoking article 10 possesses certain components comparable to, and in certain regards operates in a manner generally comparable to, that smoking article described previously with reference to FIG. 1. The smoking article 10 is adapted to incorporate a type of cigarette 150. The tobacco segment 89, circumscribed with a wrapping material 160, can be provided so as to provide tobacco components or tobacco derived components by the action of heat. Components of the tobacco segment 89 can be treated (e.g., by contact with metal salts, moisture, or other suitable materials) in order that the tobacco (e.g., as cut filler, reconstituted tobacco sheet, or the like) that is subjected to heating by the action of the electrically generated heat exhibits desirable heat resistance, does not burn to an undesirable extent, experiences a controlled smolder, or the like. The tobacco segment 89 can also incorporate an aerosol-generating material. As shown, the cigarette 150 may include a filter element 200 as noted in connection with FIG. 2.

The smoking article 10 possesses a third optional resistance heating element 300 that is powered by the power source 36. The third resistance heating element is operated in essentially the same manner as the first and second resistance heating elements 70, 72 that have been described previously with reference to FIG. 1. As such, the third resistance heating element 300 is powered by the power source 36 and controlled by the electrically powered control

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components 50, through suitable electrical connections, such as conductive wires, or the like (not shown). The third resistance heating element 300 can be provided by a suitable conductive material that can be suitably used as a resistance heating element, such as non-woven graphite yarn or web, ceramic material, metallic cloth or screen, metal alloy sheet, or the like. The physical size and shape of the third resistance heating element is such that the heating element can provide heat to at least a portion of the tobacco 89 of the cigarette 150. For example, the third resistance heating element 300 can have the general shape of a tube that is adapted to fit snuggly around a portion of a tobacco rod 89 inserted therein. Alternatively, the third resistance heating element 300 can have a form so that aerosol-forming material and extracted tobacco components can be wicked from a tobacco substrate or a substrate paper material that is wrapped around that tobacco 89. If desired, at least one of the resistance heating elements (e.g., the first and/or third resistance elements) can be equipped with a separate on/off timing mechanisms and/or switching mechanisms in order that the cigarette 150 can be pre-heated or heating can be otherwise controlled during certain desired periods of use of the smoking article 10. In other words, each heating element can be selectively and separately controlled in certain embodiments. If desired, each of the heating elements can be arranged to have current pass therethrough (and hence provide heat) in response to a signal provided by response to the sensing mechanism component 60. For example, each heating element can be turned "on" and "off" in response to a signal provided by response to the sensing mechanism 60. Alternatively, current flow through the first heating element 70 can be controlled during periods of normal use of the smoking article 10, and current flow through the second heating element 72 can be controlled only during periods of draw. Thus, each resistance heating element can provide differing amounts of heat, and can be operated to provide heat during differing periods.

Optionally, the size and shape of the second resistance heating element 72 can be altered. For example, as shown in FIG. 3, at least a portion of the second resistance heating element can be elongated, and at least a portion thereof can extend downstream within the outer container 20. As such, at least a portion of the second resistance heating element can extend into the tobacco segment 89, and hence be in close contact with a significant amount of substrate and aerosol-forming material within the tobacco.

Preferably, a thermally insulated region 400 circumscribes the resistance heating element 300 of the smoking article 10 as shown, although the insulation can extend further down the

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smoking article and circumscribe, for example, the first and second heating elements as well. Representative types and configurations of insulation are set forth in US Pat. Appl. Ser. Nos. 11/194,215 filed August 1, 2005, to Cantrell et al. and 11/377,630 filed March 16, 2006 to Crooks et al. As such, there is provided a way to prevent the outer regions of the outer container 20 from becoming unduly hot to the touch during use of the smoking article 10. In addition, a series of substantially non-permeable walls or like structural regions 420 can assist in ensuring that drawn air has a tendency to pass through the tobacco 89 during use of the smoking article 10. The insulating material 400 also can be positioned elsewhere within the smoking article 10. For example, insulating material 400 can be used as a substrate material for tobacco extract, tobacco dust, aerosol-forming material, flavoring agent, and the like. In addition, insulating material 400 can be positioned at the locations or regions near the distal end 13 of the smoking article 10, around the power source 36, around the electronic and/or puff control components of the smoking article 10, or elsewhere.

During use, the mouth-end 15 of the smoking article 10 is placed in the lips of the smoker. Air is drawn through the air passageways or openings 32 in the cap 35 located at the distal end 13 of the smoking article, and into the outer container 20. Draw air passages through air passageway 45 that extends along the length of the power source 36 and the electronic control components 50, through an air passageway area within the first heating element 70, through the air flow sensing region 60, past or through the second heating element 72, through the cigarette 150, and into the mouth-end piece 120. Heat generated by the three heating elements 70, 72, 300 acting upon the tobacco and components thereof act to volatilize components of the tobacco or otherwise cause components of tobacco to be entrained in drawn air. Typically, resistance heating elements provide surface region temperatures, and hence the ability to heat aerosol-forming materials and tobacco materials in surrounding regions in the vicinity of those heating elements. Typically, during relevant periods of use, those heating elements can provide surface region temperatures of at least about 200°C, and often at least about 300°C. Those temperatures typically do not exceed about 600°C, often do not exceed about 500°C, and frequently do not exceed about 400°C. As such, the resulting aerosol incorporating tobacco components or tobacco derived components is drawn into the mouth of the smoker. After use, the spent cigarette 150 is removed from the outer container 20 and disposed of, and when desired, a new cigarette is replaced within the outer container. Removal of the cigarette 150 can be

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accomplished by removing the mouthpiece 120, which is typically removably attached to the outer housing 20.

For all the embodiments described above, the selection of battery and resistance heating elements can vary, and can be a matter of design choice. For example, the battery voltage, amount of electrical current and resistance provided by the various resistance heating elements can be selected to provide sufficient power for initial heating (e.g., sufficient to provide virtually immediate aerosol formation and delivery of tobacco derived components upon draw), adequate heating of relevant components within the smoking article (i.e., sufficient heat to generate aerosol formation), adequate power source lifetime, and the like. Typically, the various components of the various control circuitry acts to ensure that current is controlled in order that resistance heating heats relevant components to a desired temperature or within a desired temperature range (i.e., a preferred smoking article does not overheat). Selection of the power source and resistance heating elements can be a matter of design choice, and will be readily apparent to one skilled in the art of design and manufacture of electrical resistance heating systems.

If desired, the smoking articles 10 of the present invention optionally can be air diluted. For smoking articles 10 that optionally are air diluted or ventilated, the amount or degree of air dilution or ventilation can vary. Frequently, the amount of air dilution for an air diluted cigarette is greater than about 10 percent, generally is greater than about 20 percent, often is greater than about 30 percent, and sometimes is greater than about 40 percent. Preferably, the upper level for air dilution for an air diluted cigarette is less than about 80 percent, and often is less than about 70 percent. As used herein, the term "air dilution" is the ratio (expressed as a percentage) of the volume of air drawn through the air dilution means to the total volume and air and aerosol drawn through the cigarette and exiting the mouth end portion of the cigarette. Higher air dilution levels can act to reduce the transfer efficiency of aerosol-forming material into mainstream aerosol.

Preferred smoking articles 10 of the present invention exhibit desirable resistance to draw. For example, an exemplary smoking article exhibits a pressure drop of between about 50 and about 200 mm water pressure drop at 17.5 cc/sec. air flow. Preferred smoking articles exhibit pressure drop values of between about 60 mm and about 180, more preferably between about 70 mm to about 150 mm, water pressure drop at 17.5 cc/sec. air flow. Preferably, pressure

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drop values of smoking articles are measured using a Filtrona Cigarette Test Station (CTS Series) available form Filtrona Instruments and Automation Ltd.

Aerosols that are produced by smoking articles of the present invention are those that comprise air-containing components such as vapors, gases, suspended particulates, and the like. Aerosol components can be generated by the action of heat upon tobacco of some form; and in certain circumstances, by thermally decomposing tobacco caused by heating tobacco, smoldering tobacco, and charring tobacco; and by vaporizing aerosol-forming agent. As such, the aerosol can contain volatilized components, combustion products (e.g., carbon dioxide and water), incomplete combustion products, and products of pyrolysis. Aerosol components may also be generated by the action of heat from burning tobacco of some form (and optionally other components that are burned to generate heat), upon substances that are located in a heat exchange relationship with tobacco material that is burned and other components that are burned. Aerosol components may also be generated by the aerosol generation system as a result of the action of heat of the heat generation system. Most preferably, components resulting from the aerosol generation system have an overall composition, and are positioned within the smoking article, such that those components have a tendency not to undergo a significant degree of thermal decomposition (e.g., as a result of combustion, smoldering or pyrolysis) during conditions of normal use.

Referring to FIG. 4, there is shown a diagram of an embodiment of an electronic circuit 500 that can be incorporated within a smoking article of the present invention. The control circuitry for the smoking articles of the invention can be assembled as discrete electronic components or functionally as an integrated microprocessor device. The representative circuit includes a power source 36, an actuation mechanism 510 (e.g., an actuation switch), and at least one resistance heating element; and for the embodiment shown, a first resistance heating element 70, a second resistance heating element 72, and a third resistance heating element 300. Such a circuit that incorporates three resistance heating elements can be incorporated within the type of smoking article described previously with reference to FIG. 3. It is noted that the circuit 500 of FIG. 4 can be readily adapted for use in a smoking article comprising two heating elements by simply removing the circuit pathways involving heating element 300, and thus would be suitable for use in the embodiments of FIGS. 1 and 2.

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The actuation mechanism 510 typically is a switching mechanism that can be engaged by activity of the smoker. That is, such a switch can be activated by pressing or other type of movement by the smoker using his/her finger, by activation by contact with the lips of the smoker, or by at least one other type of sensing mechanism located at an appropriate location on the smoking article. A representative switch can be manually operated by the smoker.

The circuit preferably incorporates a timing mechanism 520. Such a timing mechanism can be programmed to provide for a controlled period of operation. For example, after the circuit has been activated by activity resulting in the switching of the current actuation mechanism 510 to an "on" position, the timing mechanism operates for a selected period of time (e.g., 1 minute, 2 minutes, 4 minutes, or the like). In the event that the remaining portion of the circuit is reactivated within the selected period of time, the timing mechanism 520 is reset and begins operating again. In the event of the occurrence a certain period of inactivity or non-use, the timing mechanism then can act to turn the circuit "off," until reactivation of the cycle.

During operation of the circuit, current passes through the first resistance heating element 70 and the third resistance heating element 300, and as such, those resistance heating elements produce heat. Control of the temperatures generated by each resistance heating element is provided by control mechanisms 530, 540, respectively.

A puff control mechanism 550, such as a suitable air flow sensing switch, acts to complete the circuit that provides current to the second resistance heating element 72. That is, during periods of draw, the circuit that provides current through the second resistance heating element is closed, and hence that heating element produces heat. A predetermined quantity of heat can be produced by current controlled by a timer (e.g., a fixed pulse set at about 0.5 second to about 2 seconds in duration). Alternatively, a series of "on/off" types of pulses can be provided during draw periods. When draw is complete, that circuit is broken. A control mechanism 560, such as a timer, acts to provide for control of the current passing through the circuit, and hence the amount of heat generated by heating element. For example, for longer puff periods, current supplied to the heating element, and hence power for aerosol generation, can be provided by a controlled sequential "on" and "off" signal provided by the timer. Typically, the timed period for current flow ranges from about 0.1 second to about 1 second, and about 0.2 second to about 0.6 second generally can be employed; while the "off" period for between periods of periodic current flow often can range from about 0.1 second to about 0.6 second.

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Referring to FIG. 5, there is shown a diagram of another embodiment of an electronic circuit 500 that can be incorporated within a smoking article of the present invention. It is again noted that the control circuitry for the smoking articles of the invention can be assembled as discrete electronic components or as an integrated microprocessor device. The representative circuit includes a power source 36, an actuation mechanism 510, and at least one resistance heating element; and for the embodiment shown, a first resistance heating element 70, a second resistance heating element 72, and a third resistance heating element 300. Such a circuit that incorporates three resistance heating elements can be incorporated within the type of smoking article described previously with reference to FIG. 3. Again, simply removing the third heating element 300 could produce a circuit useful in other smoking article embodiments set forth herein.

The circuit preferably incorporates a timing mechanism 520. Such a timing mechanism can be programmed to provide for a controlled period of operation. For example, after the circuit has been activated by activity resulting in the switching of the current actuation mechanism 510 to an "on" position, the timing mechanism operates for a selected period of time. In the event that the remaining portion of the circuit is activated, the timing mechanism is reset and begins operating again. In the event of the occurrence a certain period of inactivity or non-use, the timing mechanism then can act to turn the circuit "off."

During operation, current passes through the first resistance heating element 70 and the third resistance heating element 300, and as such, those resistance heating elements produce heat. Control of the temperatures generated by each resistance heating element is provided by control mechanisms 530, 540, respectively.

A puff control mechanism 590 acts to complete the circuit that provides current to the second resistance heating element 72. That is, during periods of draw, the circuit that provides current through the second resistance heating element is closed, and hence that heating element produces heat. When draw is complete, that circuit is broken. In the embodiment shown, the puff control mechanism 590 is provided by a pressure sensor 570 and a threshold detector 580 (e.g., a Schmitt trigger), which can provide for control of the current passing through the second resistance heating element 72, and hence for heat generation by heating element 72 that is proportional to the period and magnitude of the draw. For example, for longer puff periods, current supplied to the heating element 72, and hence power for aerosol generation, can be

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provided for longer periods of time. As another example, for deeper or more rigorous puffs, a sensing of stronger draw can be used to provide for greater current flow to the appropriate resistance heating element, and hence provide for a correspondingly greater aerosol generation. Alternatively, a separate switch (not shown) can be selected by the smoker to provide control of current to at least one of the resistance heating elements; and as such, during periods of draw (e.g., whether or not the draw or puff is intense, long, short, deep, shallow, large in volume, small in volume, or the like) the conditions associated with heat generation for aerosol formation are controlled, and hence, consistent aerosol formation can be provided during each puff.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing description; and it will be apparent to those skilled in the art that variations and modifications of the present invention can be made without departing from the scope or spirit of the invention. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

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What is claimed is:

1. A tobacco-containing, electrically-powered smoking article comprising:

(a) a tubular outer housing having a mouth-end and an end distal to the mouth-end, the housing comprising an opening adapted for intake of air into the smoking article;

(b) an electrical power source within the outer housing;

(c) at least one electrical resistance heater within the outer housing, the heater being configured to allow air flow therethrough and being powered by said electrical power source;

(d) a controller adapted for regulating current flow through the heater; and

(e) a rod-shaped carrier device removably engaged with the mouth-end of the outer housing and comprising a tubular mouth-end piece and a tubular cartridge with two open ends allowing air to flow therethrough, wherein the cartridge includes a substrate that comprises a tobacco material and an aerosol-generating material, wherein the cartridge is operatively positioned within the outer housing and adjacent to the heater such that the electrical resistance heater is adapted for heating at least a portion of the tobacco and the aerosol-generating material and such that air drawn into the outer housing passes through at least a portion of the heater, through the cartridge, and through the mouth-end piece.

2. The smoking article of claim 1, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

3. The smoking article of claim 1, wherein the substrate comprises an absorbent material.

4. The smoking article of claim 3, wherein the absorbent material comprises a paper material.

5. The smoking article of claim 3, wherein the absorbent material comprises a paper-type reconstituted tobacco.

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6. The smoking article of claim 1, wherein the substrate comprises a paper material with a tobacco extract and the aerosol-generating material absorbed thereon.

7. The smoking article of Claim 1, wherein the substrate comprises polyethylene terephthalate fibers.

8. The smoking article of claim 7, wherein polyethylene terephthalate fibers are blended with tobacco cut filler.

9. The smoking article of claim 1, wherein the substrate further comprises a flavoring agent.

10. The smoking article of claim 1, wherein the substrate further comprises carbon particles or calcium carbonate particles therein.

11. The smoking article of claim 1, wherein the substrate further comprises a fibrous carbonaceous material.

12. The smoking article of claim 1, wherein the substrate is a laminate of metallic foil and paper.

13. The smoking article of claim 12, wherein the paper comprises reconstituted tobacco.

14. The smoking article of claim 12, wherein the paper includes a tobacco extract and the aerosol-generating material absorbed thereon.

15. The smoking article of claim 14, wherein the paper further includes a flavoring agent absorbed thereon.

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16. The smoking article of claim 1, further comprising a sensor adapted for sensing draw on the smoking article.

17. The smoking article of claim 1, wherein the heater is tubular in shape and positioned around the cartridge.

18. The smoking article of claim 1, wherein the heater comprises at least one elongated portion extending downstream therefrom.

19. The smoking article of claim 1, wherein at least a portion of the cartridge is circumscribed by a wrapping material.

20. The smoking article of claim 1, wherein the cartridge is conductive and in electrical contact with an electrical circuitry within the smoking article such that electrical resistance heating can be provided by the cartridge.

21. The smoking article of claim 20, wherein the substrate incorporates a conductive material that conducts heat produced by electrical resistance heating.

22. The smoking article of claim 21, wherein the conductive material comprises aluminum or copper.

23. A tobacco-containing, electrically-powered smoking article comprising:

(a) a tubular outer housing having a mouth-end and an end distal to the mouth-end, the housing comprising an opening adapted for intake of air into the smoking article;

(b) an electrical power source within the outer housing;

(c) at least one electrical resistance heater within the outer housing, the heater being configured to allow air flow therethrough and being powered by said electrical power source, and wherein the heater comprises at least one elongated portion extending downstream therefrom;

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(d) a puff-actuated controller adapted for regulating current flow through the heater during draw, the controller comprising a sensor adapted for sensing draw by the user on the smoking article; and

(e) a rod-shaped carrier device removably engaged with the mouth-end of the outer housing and comprising a tubular mouth-end piece and a tubular cartridge with two open ends allowing air to flow therethrough, wherein the cartridge includes a tobacco-containing absorbent material with an aerosol-generating material absorbed thereon, wherein the cartridge is operatively positioned within the outer housing and adjacent to the heater such that the heater is adapted for heating at least a portion of the tobacco and the aerosol-generating material and such that air drawn into the outer housing passes through at least a portion of the heater, through the cartridge, and through the mouth-end piece.

24. The smoking article of claim 23, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

25. The smoking article of claim 23, wherein the tobacco-containing absorbent material is a paper material.

26. The smoking article of claim 25, wherein the tobacco-containing absorbent material is a paper material with a tobacco extract absorbed thereon.

27. The smoking article of claim 23, wherein the tobacco-containing absorbent material is a paper-type reconstituted tobacco.

28. The smoking article of Claim 23, wherein the tobacco-containing absorbent material comprises polyethylene terephthalate fibers.

29. The smoking article of claim 28, wherein the polyethylene terephthalate fibers are blended with tobacco cut filler.

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30. The smoking article of claim 23, wherein the tobacco-containing absorbent material further comprises a flavoring agent absorbed thereon.

31. The smoking article of claim 23, wherein the tobacco-containing absorbent material is a laminate of metallic foil and a tobacco-containing absorbent paper material.

32. The smoking article of claim 31, wherein the tobacco-containing absorbent paper material is a paper-type reconstituted tobacco.

33. The smoking article of claim 31, wherein the tobacco-containing absorbent paper material is an absorbent paper with a tobacco extract and the aerosol-generating material absorbed thereon.

34. The smoking article of claim 33, wherein the absorbent paper further includes a flavoring agent absorbed thereon.

35. The smoking article of claim 23, wherein the at least one heater comprises an electrical resistance heater that is tubular in shape and positioned around the cartridge.

36. The smoking article of claim 23, wherein at least a portion of the cartridge is circumscribed by a wrapping material.

37. The smoking article of claim 23, wherein the cartridge is conductive and in electrical contact with an electrical circuitry within the smoking article such that electrical resistance heating can be provided by the cartridge.

38. A tobacco-containing, electrically-powered smoking article comprising:

(a) a tubular outer housing having a mouth-end and an end distal to the mouth-end, the housing comprising an opening adapted for intake of air into the smoking article;

(b) an electrical power source and associated electrical circuitry within the outer housing;

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(c) a puff-actuated controller including a sensor capable of selectively powering electrical components of the smoking article; and

(d) a rod-shaped carrier device removably engaged with the mouth-end of the outer housing and comprising a tubular mouth-end piece and a tubular cartridge with two open ends allowing air to flow therethrough, wherein the cartridge includes a substrate that comprises a tobacco material and an aerosol-generating material, wherein the cartridge is operatively positioned within the outer housing such that air drawn into the outer housing passes through the cartridge and through the mouth-end piece, and wherein the cartridge is conductive and in electrical contact with the electrical circuitry such that electrical resistance heating can be provided by the cartridge.

39. The smoking article of claim 38, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

40. The smoking article of claim 38, wherein the substrate comprises an absorbent material.

41. The smoking article of claim 40, wherein the absorbent material comprises a paper material.

42. The smoking article of claim 40, wherein the absorbent material comprises a paper-type reconstituted tobacco.

43. The smoking article of claim 38, wherein the substrate comprises a paper material with a tobacco extract and the aerosol-generating material absorbed thereon.

44. The smoking article of Claim 38, wherein the substrate comprises polyethylene terephthalate fibers.

45. The smoking article of claim 44, wherein polyethylene terephthalate fibers are blended with tobacco cut filler.

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46. The smoking article of claim 38, wherein the substrate further comprises a flavoring agent.

47. The smoking article of claim 38, wherein the substrate further comprises carbon particles or calcium carbonate particles therein.

48. The smoking article of claim 38, wherein the substrate further comprises a fibrous carbonaceous material.

49. The smoking article of claim 38, wherein the substrate is a laminate of metallic foil and paper.

50. The smoking article of claim 49, wherein the paper comprises reconstituted tobacco.

51. The smoking article of claim 49, wherein the paper includes a tobacco extract and the aerosol-generating material absorbed thereon.

52. The smoking article of claim 51, wherein the paper further includes a flavoring agent absorbed thereon.

53. The smoking article of claim 38, further comprising a sensor adapted for sensing draw on the smoking article.

54. The smoking article of claim 38, wherein at least a portion of the cartridge is circumscribed by a wrapping material.

55. The smoking article of claim 38, wherein the substrate incorporates a conductive material that conducts heat produced by electrical resistance heating.

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56. The smoking article of claim 55, wherein the conductive material comprises aluminum or copper.

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ABSTRACT OF THE DISCLOSURE

A smoking article may include a cigarette incorporated within an electrically powered aerosol generating device that acts as a holder for that cigarette. The smoking article possesses at least one form of tobacco. The smoking article also possesses a mouth-end piece that is used by the smoker to inhale components of tobacco that are generated by the action of heat upon components of the cigarette. A representative smoking article possesses an outer housing incorporating a source of electrical power (e.g., a battery), a sensing mechanism for powering the device at least during periods of draw, and a heating device (e.g., at least one electrical resistance heating element) for forming a thermally generated aerosol that incorporates components of tobacco. During use, the cigarette is positioned within the device, and after use, the used cigarette is removed from the device and replaced with another cigarette.

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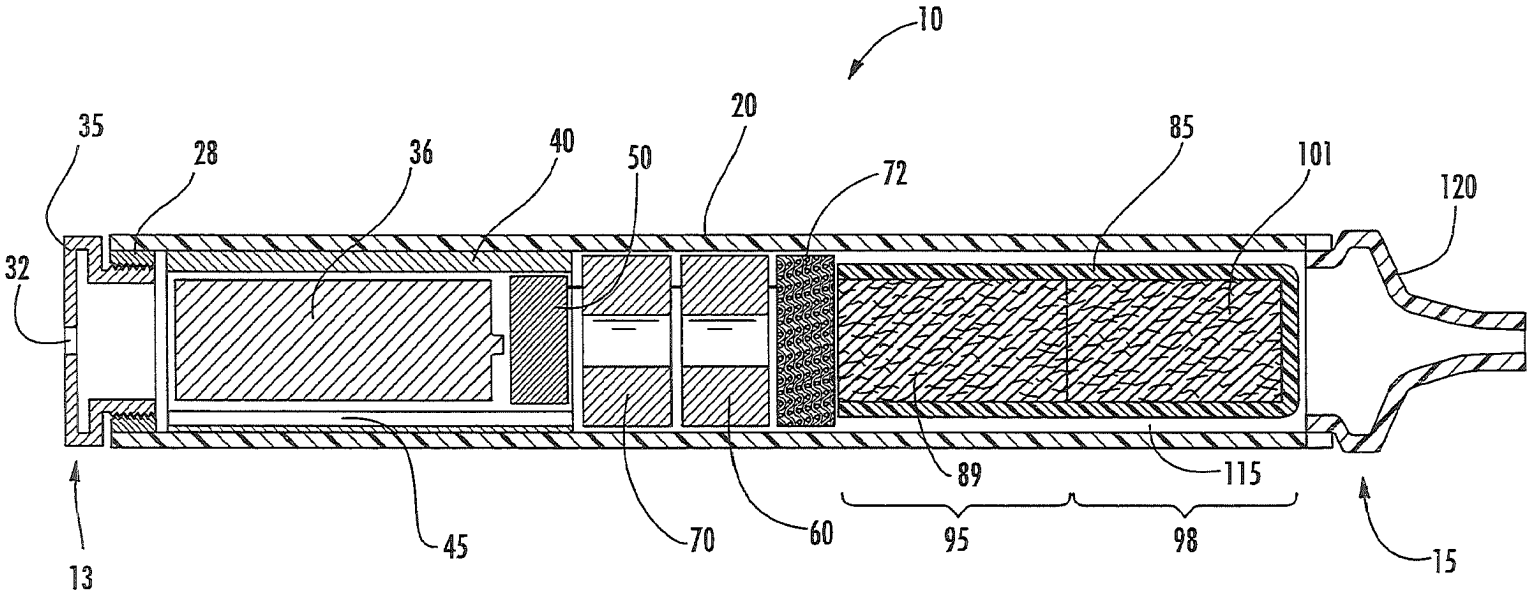


FIG. 1

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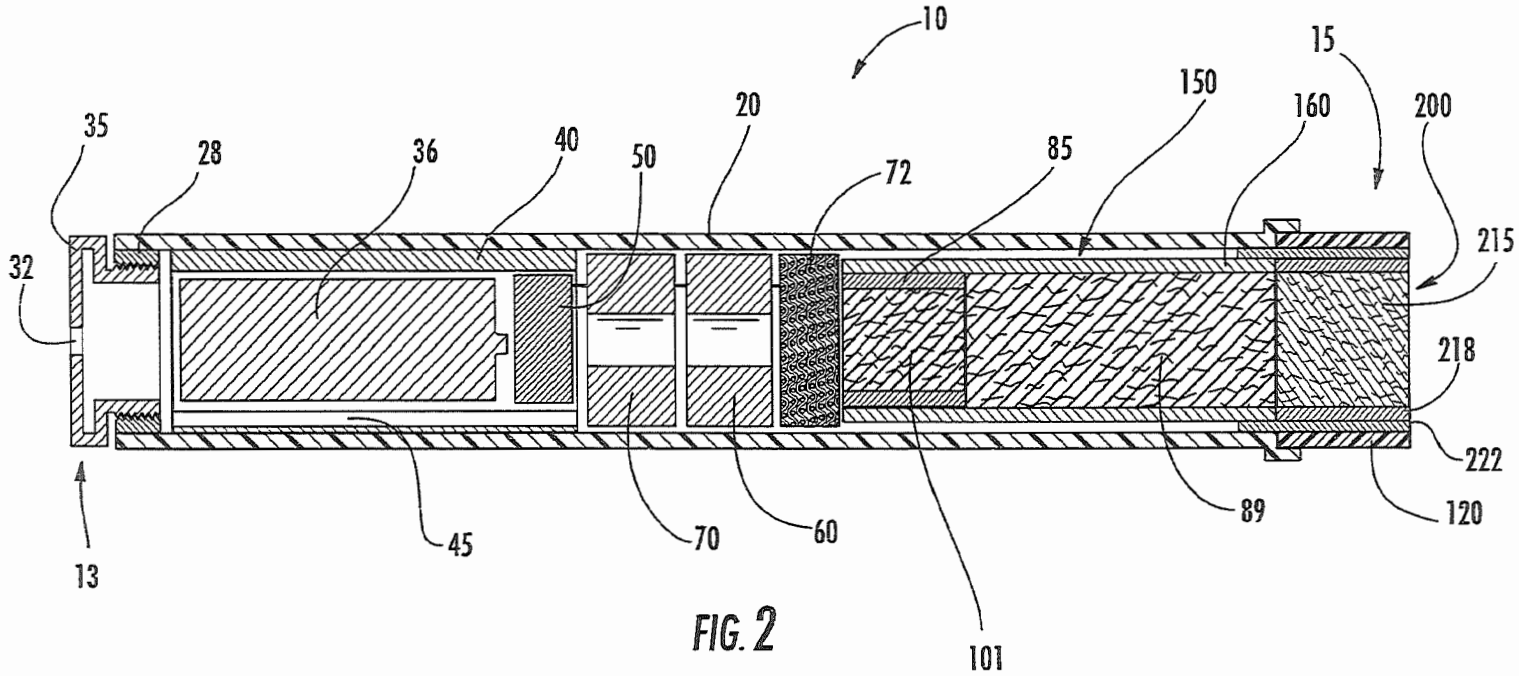


FIG. 2

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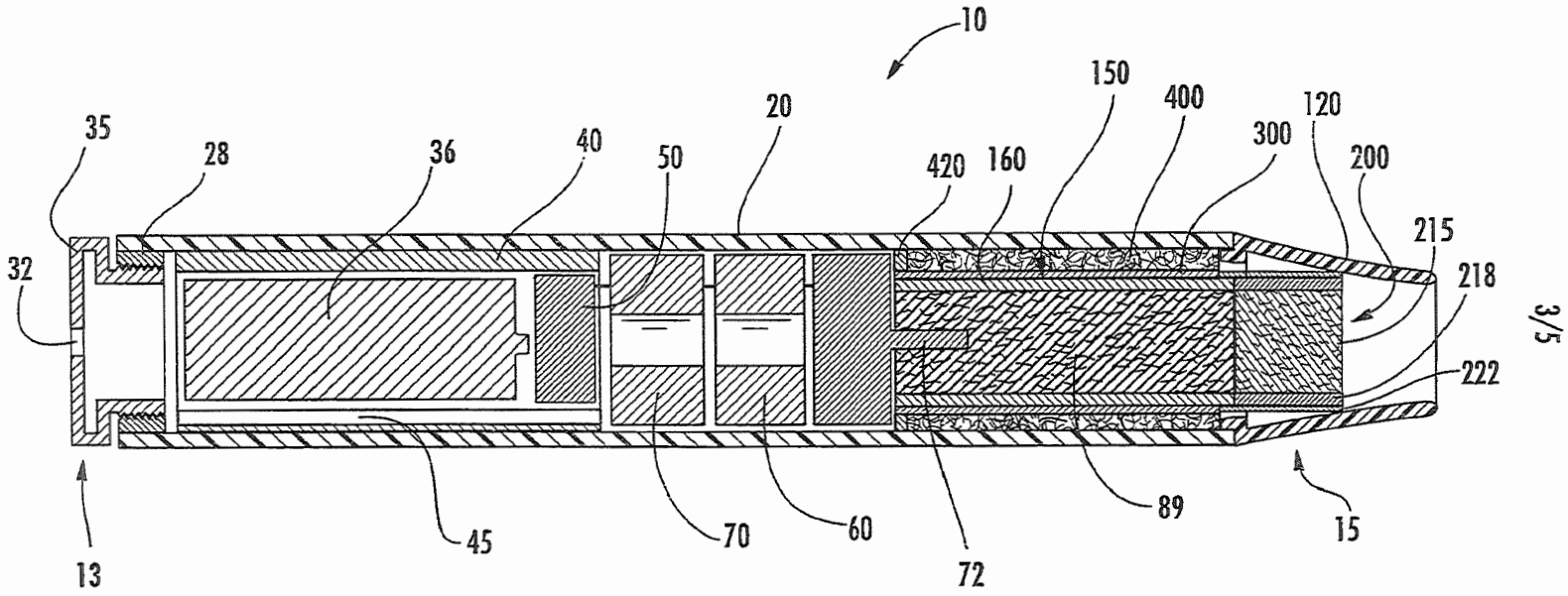


FIG. 3

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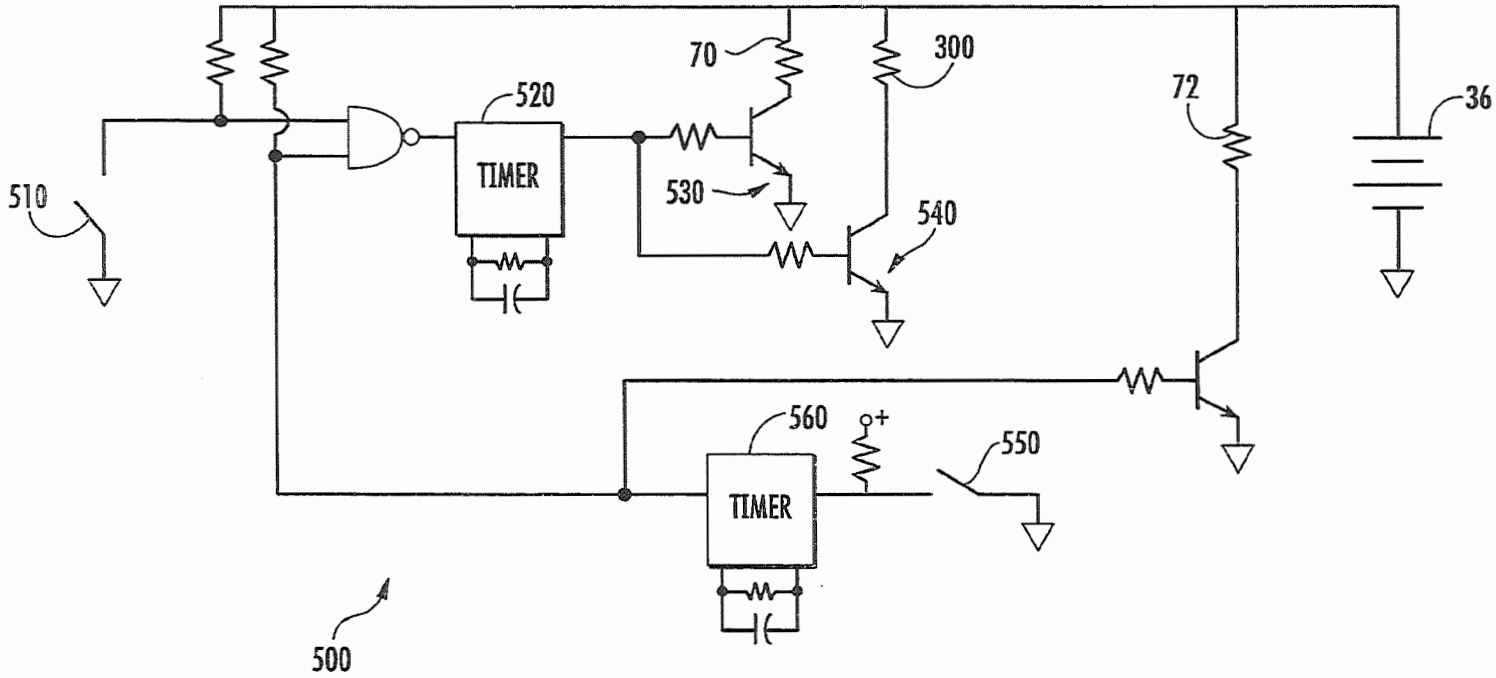


FIG. 4

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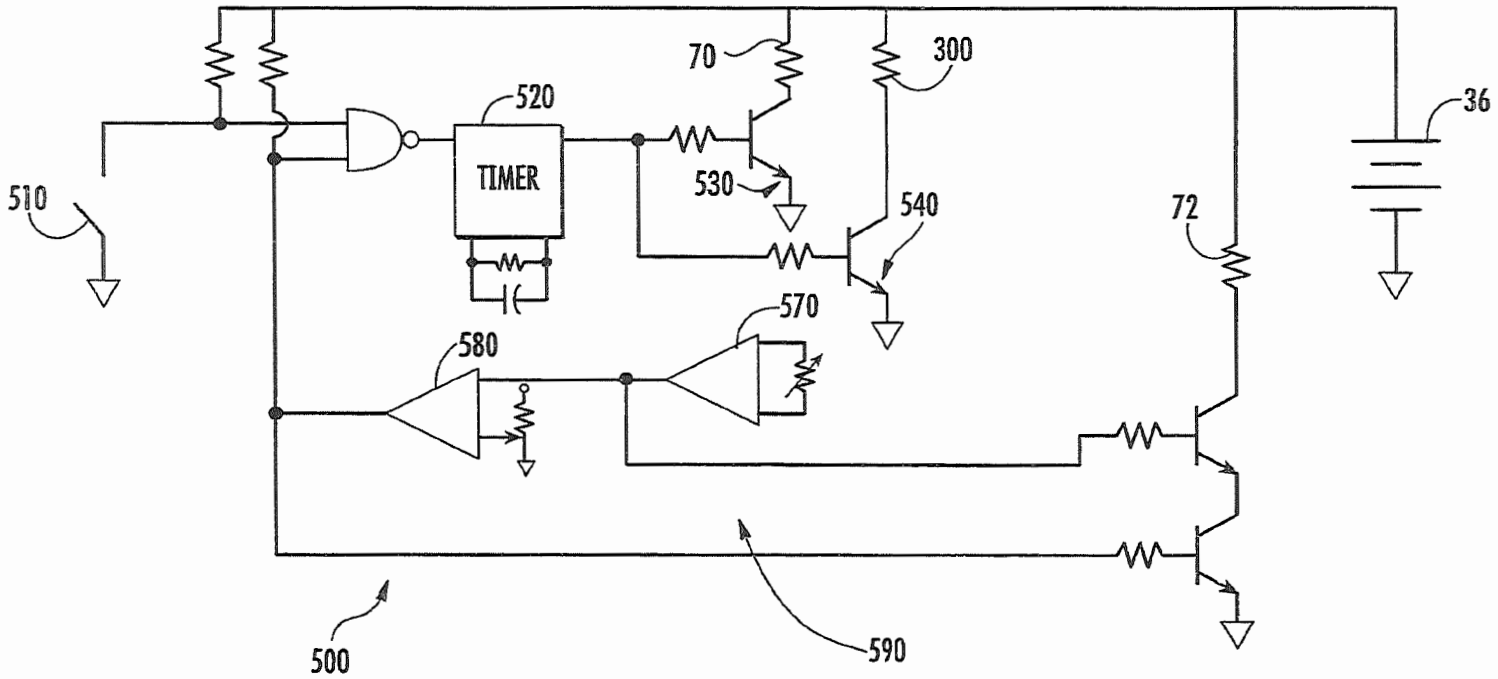


FIG. 5

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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	TOBACCO-CONTAINING SMOKING ARTICLE
First Named Inventor/Applicant Name:	JOHN HOWARD ROBINSON
Filer:	Christopher Harrison Orders/Sheila Rogers
Attorney Docket Number:	R60999 1400US.C3 (0830.9)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Claims in Excess of 20	1202	5	80	400
Miscellaneous-Filing:				
Late Filing Fee for Oath or Declaration	1051	1	140	140

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2140**

Electronic Acknowledgement Receipt

EFS ID:	20552015
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	TOBACCO-CONTAINING SMOKING ARTICLE
First Named Inventor/Applicant Name:	JOHN HOWARD ROBINSON
Customer Number:	26158
Filer:	Christopher Harrison Orders/Sheila Rogers
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3 (0830.9)
Receipt Date:	29-OCT-2014
Filing Date:	
Time Stamp:	16:34:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2140
RAM confirmation Number	3170
Deposit Account	090528
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Application Data Sheet	R60999_1400USC3_ApplDataSheet.pdf	1561859 a2e14892d9863ec8c0ce88ec7e3911f7cd706bf6	no	8
Warnings:					
Information:					
2		R60999_1400USC3_ConAppl.PDF	1044370 48e5a852eba6b74eb6175567c15f3b3e75e5b913	yes	67

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal of New Application	1	3
Preliminary Amendment	4	4
Specification	5	5
Claims	6	9
Applicant Arguments/Remarks Made in an Amendment	10	10
Specification	11	53
Claims	54	61
Abstract	62	62
Drawings-only black and white line drawings	63	67

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38246 c3ee433a99081a57fe6ec6d709cfba87a037c65d	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	2644475	

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/AIA/14 (12-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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
	John	Howard	Robinson	

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

City	Kernersville	State/Province	NC	Country of Residence i	US

Mailing Address of Inventor:

Address 1	604 Antler Court		
Address 2			
City	Kernersville	State/Province	NC
Postal Code	27284	Country i	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	David	William	Griffith	Jr.

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

City	Winston-Salem	State/Province	NC	Country of Residence i	US

Mailing Address of Inventor:

Address 1	4130 White Hawk Lane		
Address 2			
City	Winston-Salem	State/Province	NC
Postal Code	27106	Country i	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Billy	Tyrone	Conner	

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	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

City	Clemmons	State/Province	NC	Country of Residence i	US

Mailing Address of Inventor:

Address 1	180 Scott Farm Road		
Address 2			
City	Clemmons	State/Province	NC
Postal Code	27012	Country i	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Evon	Llewellyn	Crooks	

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

City	Mocksville	State/Province	NC	Country of Residence i	US

Mailing Address of Inventor:

Address 1	749 Howell Road		
Address 2			
City	Mocksville	State/Province	NC
Postal Code	27028	Country i	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Dempsey	Bailey	Brewer	Jr.

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

City	East Bend	State/Province	NC	Country of Residence i	US

Mailing Address of Inventor:

Address 1	2853 Davis Road		
Address 2			
City	East Bend	State/Province	NC
Postal Code	27018	Country i	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.**

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Customer Number	26158		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	Tobacco-Containing Smoking Article		
Attorney Docket Number	R60999 1400US.C3	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	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 i

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	26158		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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 blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	13297983	2011-11-16

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13297983	Continuation of	12763890	2010-04-20	8079371	2011-12-20

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12763890	Continuation of	11550634	2006-10-18	7726320	2010-06-01

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(d). 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(h)(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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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. [X]

Organization Name	R.J. Reynolds Tobacco Company

Mailing Address Information:

Address 1	401 North Main Street		
Address 2			
City	Winston-Salem	**State/Province**	NC
Country [i]	US	Postal Code	27101
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 subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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. [ ]

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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 form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

Signature	/christopher h. orders/			Date (YYYY-MM-DD)	2014-10-29
First Name	Christopher H.	Last Name	Orders	Registration Number	57151

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

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 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.

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Ecto World v. RAI
IPR2024-01280

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE PATENT APPLICATION OF:	Robinson et al.
SERIAL NO.:	14/527,287
FILING DATE:	October 29, 2014
DOCKET NO.:	R60999 1400US.C3 (0830.9)
ART UNIT:	TBD
EXAMINER:	TBD
CON. NO.:	6397
FOR:	TOBACCO-CONTAINING SMOKING ARTICLE

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

SECOND PRELIMINARY AMENDMENT

Dear Sir:

Prior to the initial examination of the patent application being filed herewith, Applicants respectfully request that the application be amended as set forth herein.

In accordance with 37 C.F.R. 1.121, the present amendment is submitted in separate sections as follows:

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

Remarks begin on page 7 of this paper.

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AMENDMENTS TO THE CLAIMS

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

1 – 56. (Cancelled)

57. (New) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract and an aerosol-forming material absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

58. (New) The smoking article of claim 57, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

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59. (New) The smoking article of claim 57, wherein the mixture further comprises a flavoring agent.

60. (New) The smoking article of claim 59, wherein the flavoring agent comprises menthol.

61. (New) The smoking article of claim 57, wherein the mixture further comprises an organic acid.

62. (New) The smoking article of claim 57, wherein the mixture comprises essentially pure nicotine, extracts composed predominantly of nicotine, or formulations composed predominantly of nicotine.

63. (New) The smoking article of claim 57, wherein the absorbent fibrous material comprises a synthetic polymeric material.

64. (New) The smoking article of claim 57, wherein the amount of aerosol-forming material is sufficient to provide greater than about 200 puffs per cartridge.

65. (New) The smoking article of claim 57, wherein the cartridge is made from paper, plastic, or heat conductive materials.

66. (New) The smoking article of claim 57, wherein the cartridge has a length that does not exceed about 30 mm.

67. (New) The smoking article of claim 57, wherein the cartridge is electrically conductive.

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68. (New) The smoking article of claim 57, wherein the rod-shaped carrier device is removably engaged with the mouth-end of the tubular outer housing.

69. (New) The smoking article of claim 57, wherein the mixture comprises glycerin, tobacco extract, and a flavoring agent.

70. (New) The smoking article of claim 57, wherein the absorbent fibrous material is in contact with the electrical resistance heater.

71. (New) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

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72. (New) The smoking article of claim 71, wherein the mixture further comprises a flavoring agent.

73. (New) The smoking article of claim 72, wherein the flavoring agent comprises menthol.

74. (New) The smoking article of claim 71, wherein the mixture further comprises an organic acid.

75. (New) The smoking article of claim 71, wherein the mixture comprises essentially pure nicotine, extracts composed predominantly of nicotine, or formulations composed predominantly of nicotine.

76. (New) The smoking article of claim 71, wherein the amount of the aerosol-forming material is sufficient to provide greater than about 200 puffs per cartridge.

77. (New) The smoking article of claim 71, wherein the cartridge is made from paper, plastic, or heat conductive materials.

78. (New) The smoking article of claim 71, wherein the cartridge has a length that does not exceed about 30 mm.

79. (New) The smoking article of claim 71, wherein the cartridge is electrically conductive.

80. (New) The smoking article of claim 71, wherein the absorbent fibrous material is in contact with the electrical resistance heater.

81. (New) An electrically-powered, aerosol-generating smoking article comprising:

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an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the absorbent fibrous material is in contact with the electrical resistance heater and, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

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REMARKS

Claims 1-56 are now cancelled. Claims 57-81 are new. Support for the new claims is provided throughout the specification and the drawings. Claims 57-81 are now pending in this application.

Applicants respectfully requests that the above Preliminary Amendment be entered into the above-referenced application prior to examination thereof on the merits.

Date: October 31, 2014

Respectfully submitted,

/christopher h. orders/

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Ecto World v. RAI
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Electronic Acknowledgement Receipt

EFS ID:	20577118
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Christopher Harrison Orders/Sheila Rogers
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	31-OCT-2014
Filing Date:	
Time Stamp:	15:22:56
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		R60999_1400USC3_2ndPrelAmend.PDF	72069 b985c1e7533e64af855cf69290d1611714991fb8	yes	7

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	7
Warnings:			
Information:			
	Total Files Size (in bytes):	72069	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/527,287	Filing Date 10/29/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

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

APPLICATION AS AMENDED – PART II

AMENDMENT **10/29/2014**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT **10/31/2014**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

* 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 number found in the appropriate box in column 1.

LIE
/VERONICA DAY EVERETT/

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

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

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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
14/527,287	10/29/2014	1747	2140	R60999 1400US.C3	25	3

CONFIRMATION NO. 6397

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

FILING RECEIPT



Date Mailed: 11/12/2014

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)

John Howard Robinson, Kernersville, NC;
David William Griffith JR., Winston-Salem, NC;
Billy Tyrone Conner, Clemmons, NC;
Evon Llewellyn Crooks, Mocksville, NC;
Dempsey Bailey Brewer JR., East Bend, NC;

Applicant(s)

R.J. Reynolds Tobacco Company, Winston-Salem, NC

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 13/297,983 11/16/2011
which is a CON of 12/763,890 04/20/2010 PAT 8079371
which is a CON of 11/550,634 10/18/2006 PAT 7726320

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

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 11/10/2014

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IPR2024-01280
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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 14/527,287**

Projected Publication Date: 02/19/2015

Non-Publication Request: No

Early Publication Request: No

Title

Tobacco-Containing Smoking Article

Preliminary Class

131

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3

CONFIRMATION NO. 6397

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

NOTICE

OC000000071782838

Date Mailed: 11/12/2014

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  John Howard Robinson
  David William Griffith JR.
  Billy Tyrone Conner
  Evon Llewellyn Crooks
  Dempsey Bailey Brewer JR.

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/527,287

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	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	25 minus 20 =	* 5			OR	x 80 =	400
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 420 =	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
			TOTAL			TOTAL	2000

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

		(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($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	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	

		(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($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	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.

Attorney Docket No. 030627/316313

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

Tobacco-Containing Smoking Article,

the specification of which

☐ is attached hereto
OR
☒ was filed on October 18, 2006 as United States Application No. 11/550,634.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				Yes	No
			☐	☐	☐
			☐	☐	☐

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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Ecto World v. RAI
IPR2024-01280
Page 96

Full name of (first/sole) inventor: John Howard Robinson
Inventor's Signature: _____ Date: 11/09/06
Residence: Kernersville, NC
Citizenship: United States of America
Mailing Address: 604 Antler Court
Kernersville, NC 27284

Full name of second inventor: David William Griffith, Jr.
Inventor's Signature: _____ Date: 11/09/2006
Residence: Winston-Salem, NC
Citizenship: United States of America
Mailing Address: 4130 White Hawk Lane
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Full name of third inventor: Billy Tyrone Conner
Inventor's Signature: _____ Date: 11/09/2006
Residence: Clemmons, NC
Citizenship: United States of America
Mailing Address: 180 Scott Farm Road
Clemmons, NC 27012

Full name of fourth inventor: Evon Llewellyn Crooks
Inventor's Signature: _____ Date: 11/9/2006
Residence: Mocksville, NC
Citizenship: United States of America
Mailing Address: 749 Howell Road
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Full name of fifth inventor: Dempsey Bailey Brewer, Jr.
Inventor's Signature: _____ Date: 11/09/2006
Residence: East Bend, NC
Citizenship: United States of America
Mailing Address: 2853 Davis Road
East Bend, NC 27018

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Electronic Acknowledgement Receipt

EFS ID:	21178737
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Christopher Harrison Orders/Evelyn Casey
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	12-JAN-2015
Filing Date:	29-OCT-2014
Time Stamp:	10:58:12
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	Oath or Declaration filed	R60999_1400_0830_9_Declaration.pdf	102589 435b511f74aa24620c789449d088c31ce1bf7f72	no	2

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

New International Application Filed with the USPTO as a Receiving Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3

CONFIRMATION NO. 6397

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

PUBLICATION NOTICE

OC00000073476319

Title: Tobacco-Containing Smoking Article

Publication No.US-2015-0047656-A1
Publication Date:02/19/2015

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The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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				First Named Inventor	John Howard Robinson
(Use as many sheets as necessary)				Group Art Unit	
				Examiner Name	
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U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear
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Substitute for form 1449/PTO (Revised 07/2005)				Complete if Known	
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				First Named Inventor	John Howard Robinson
				Group Art Unit	
				Examiner Name	
Sheet	4	of	13	Attorney Docket Number	R60999 1400US.C3 (0830.9)

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Examiner Signature		Date Considered	

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				Group Art Unit	
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	162	US-4,907,606	03-13-1990	Lilja et al.	
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				First Named Inventor	John Howard Robinson
				Group Art Unit	
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特許協力条約に基づいて公開された国際出願

(51) 国際特許分類6 **A24F 47/00 // A61M 15/06**	**A1**	(11) 国際公開番号	**WO97/48293**
		(43) 国際公開日	1997年12月24日(24.12.97)

(21) 国際出願番号 PCT/JP97/01953

(22) 国際出願日 1997年6月9日(09.06.97)

(30) 優先権データ
特願平8/155636 1996年6月17日(17.06.96) JP

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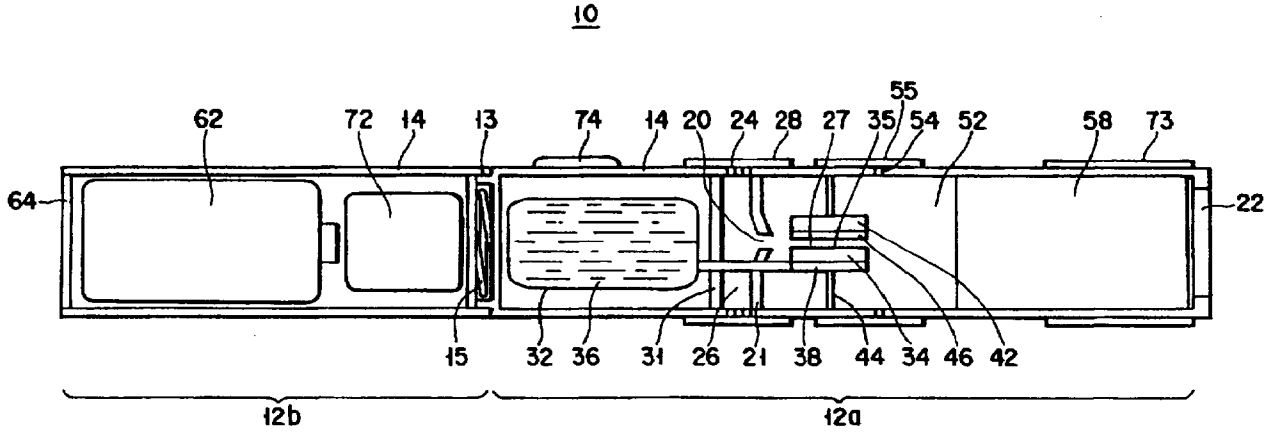
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(81) 指定国 CN, JP, KR, US, 欧州特許 (DE, FR, GB).

添付公開書類
国際調査報告書

(54)Title: **FLAVOR PRODUCING ARTICLE**

(54)発明の名称 香味生成物品



(57) Abstract

A flavor producing article (10) has a casing (12) comprising first and second portions (12a, 12b) connected removably. A gas flow passage (26) extending from an air inlet port (24) to a suction port (22) is formed inside the casing first portion (12a). A material container (32) of a liquid material (36) containing a flavor material is built in the first portion (12a). A discharge port (35) of the material container (32) is disposed inside the gas flow passage (26) and a ceramic heater (42) is so disposed as to oppose the discharge port (35). The liquid material (36) is supplied from the discharge port (35) on the ceramic heater (42), heated by this heater and gasified inside the gas flow passage (26). A control circuit (72) and a power source (62) are built in the casing second portion (12b).

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（５７）要約

香味生成物品（１０）は着脱可能に接続された第１及び第２部分（１２ａ、１２ｂ）からなるケーシング（１２）を有する。ケーシング第１部分（１２ａ）内には空気取込口（２４）から吸引口（２２）に至るガス流路（２６）が形成される。第１部分（１２ａ）にはまた、香味物質を含む液体状原料（３６）の原料容器（３２）が内蔵される。原料容器（３２）の吐出口（３５）はガス流路（２６）内に配置され、これに対向してセラミックヒーター（４２）が配設される。液体状原料（３６）は、吐出口（３５）からセラミックヒーター（４２）上に供給されて加熱され、ガス流路（２６）内でガス化される。ケーシング第２部分（１２ｂ）には制御回路（７２）及び電源（６２）が内蔵される。

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ＰＣＴに基づいて公開される国際出願のパンフレット第一頁に記載されたＰＣＴ加盟国を同定するために使用されるコード

AL アルバニア
AM アルメニア
AT オーストリア
AU オーストラリア
AZ アゼルバイジャン
BA ボズニア・エルツェゴビナ
BB バルバドス
BE ベルギー
BF ブルギナ・ファソ
BG ブルガリア
BJ ベナン
BR ブラジル
BY ベラルーシ
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LC セントルシア
LI リヒテンシュタイン
LK スリランカ
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LS レソト
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TJ タジキスタン
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TR トルコ
TT トリニダード・トバゴ
UA ウクライナ
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US 米国
UZ ウズベキスタン
VN ヴィェトナム
YU ユーゴスラビア
ZW ジンバブエ

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明　細　書

香味生成物品

［技術分野］

本発明は香味の吸引や疑似喫煙を楽しむための香味生成物品に関し、より具体的には、燃焼によることなく、電気ヒーターで液体状原料を加熱して吸引対象物である香味を生成する香味生成物品に関する。

［背景の技術］

たばこを燃焼させずに、たばこの香味や煙を楽しむための疑似喫煙物品は既に公知であり、種々のタイプのものが提案されている。

特開平３－２３２４８１には、従来の疑似喫煙物品の典型的なコンセプトが開示される。この公報の物品においては、例えば棒状の固体状原料が使用され、同固体状原料が加熱素子により加熱されることにより、香味等の吸引対象物が生成される。このタイプの物品の問題点は、固体状原料が継続的に加熱される場合は原料の無駄が多くなり、反対に使用者の吸込みを待って固体状原料が加熱される場合は、使用者の吸込み（１パフ）開始と香味の生成との間に大きな時間のずれが生じるということである。

上述の問題に対応するための物品の１例として、特開平３－２７７２６５には、多数の部分に分割された固体状原料を

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有するフレーバー送出物品が開示される。この公報の物品においては、固体状原料の各部分は、使用者の１パフごとに順に加熱され、香味等の吸引対象物が生成される。この物品の問題点は、固体状原料と加熱素子とが一体の香味発生媒体を構成することである。このため、原料の消費後、加熱素子を原料と共に交換或いは廃棄する必要があり、経済的にも環境的にも不都合となる。

使用者の１パフを検出するための機構の１例は特開平５－２１２１００に開示される。この公報の物品においては、香味原料を加熱するための加熱素子が、使用者の唇の動作から得られた信号により駆動制御される。

米国特許第４，９４５，９３１号には、加圧エアロゾル容器を使用した疑似喫煙物品が開示される。この公報の物品においては、使用者の吸込み動作により羽板が揺動して容器の出口が機械的に開放され、エアロゾルが放出される。また、同公報には、変更例として、気化熱により冷却されたエアロゾルを温めるための加熱素子が容器出口に配設された物品が開示される。この公報の物品の問題点は、使用者の吸込み動作程度で開閉する弁により、加圧状態のエアロゾルが容器内に閉込められているため、一旦弁が開くとエアロゾルが大量に漏れ出してしまうということである。即ち、この公報の物品においては、１パフ分に適当な一定量のエアロゾルを継続的に放出することはできず、寧ろ、２、３回吸込み動作で、加圧分のエアロゾルが全て放出されてしまう虞がある。

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［発明の開示］

本発明は上述のような問題点に鑑みてなされたものであり、香味原料の無駄が生じ難く且つ使用者の１パフと香味の生成とのタイミングを合わせ易い香味生成物品を提供することを目的とする。

本発明の第１の視点は、香味生成物品において、

内部に空気を取込むための空気取込口と使用者が香味を吸引するための吸引口とを有すると共に、前記取込口と前記吸引口との間にガス流路を規定するケーシングと、

少なくとも香味物質を含む液体状原料を貯蔵すると共に前記原料の吐出口を有する、前記ケーシングに取付けられた原料容器と、

前記吐出口を通して前記容器から前記原料を液滴として吐出させるための吐出駆動手段と、

前記ガス流路内に配設され、前記容器から吐出される前記原料の前記液滴を受取ると共にこれを電気的に加熱することによりガス化するためのガス化手段と、

前記ガス化手段に電気エネルギーを供給するための電源と、を具備することを特徴とする。

本発明の第２の視点は、第１の視点の香味生成物品において、使用者の吸引動作を検出するセンサーと、前記センサーからの信号に基づいて、前記容器から前記原料を吐出させるように前記吐出駆動手段を制御するための制御手段と、を更に具備することを特徴とする。

本発明の第３の視点は、第２の視点の香味生成物品におい

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て、前記センサーが、前記吸引口の周りで前記ケーシング上に配設された感圧センサーを具備することを特徴とする。

本発明の第４の視点は、第２または第３の視点の香味生成物品において、前記制御手段が、前記センサーからの信号に基づいて、前記ガス化手段が発熱するように前記ガス化手段を制御することを特徴とする。

本発明の第５の視点は、第４の視点の香味生成物品において、前記制御手段が、前記原料の吐出に先立って、前記ガス化手段を予熱するように、前記ガス化手段及び前記吐出駆動手段を制御することを特徴とする。

本発明の第６の視点は、第１の視点の香味生成物品において、前記電源が前記ケーシング内に配設されることを特徴とする。

本発明の第７の視点は、第６の視点の香味生成物品において、前記ケーシングがケーブルを介して電気的に接続された第１及び第２部分からなり、前記ガス流路、前記容器、前記吐出駆動手段、及び前記ガス化手段が前記第１部分内に配設され、前記電源が前記第２部分内に配設されることを特徴とする。

本発明の第８の視点は、第７の視点の香味生成物品において、前記ケーシングの前記第１及び第２部分が接続部を介して着脱可能であることを特徴とする。

本発明の第９の視点は、第１の視点の香味生成物品において、前記吐出駆動手段を手動で操作するための操作レバーを更に具備することを特徴とする。

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本発明の第１０の視点は、第１乃至第９のいずれかの視点の香味生成物品において、前記ガス化手段が多孔質層を具備し、前記多孔質層上に前記原料の前記液滴が供給されることを特徴とする。

本発明の第１１の視点は、第１乃至第１０のいずれかの視点の香味生成物品において、前記ガス化手段が前記吐出口に対向するように配置され、前記吐出口と前記ガス化手段との間の間隙に対して前記空気取込口からの空気を指向けるための絞り孔が前記ガス流路内に配設されることを特徴とする。

本発明の第１２の視点は、第１乃至第１１のいずれかの視点の香味生成物品において、前記ガス化手段と前記吸引口との間で前記ガス流路内に外気を導入するため、前記ケーシングに外気導入孔が形成されることを特徴とする。

本発明の第１３の視点は、第１乃至第１２のいずれかの視点の香味生成物品において、前記ガス化手段と前記吸引口との間に位置するように前記ガス流路内に配設された、少なくとも香味物質を含む固体状原料の成形体を更に具備することを特徴とする。

本発明の第１４の視点は、第１３の視点の香味生成物品において、前記成形体を加熱するための加熱手段を更に具備することを特徴とする。

本発明によれば、香味原料の無駄が生じ難く且つ使用者の１パフと香味の生成とのタイミングを合わせ易い香味生成物品を提供することが可能となる。特に、使用者の吸引動作を検出するセンサーからの信号に基づいて、吐出駆動手段を制

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御することにより、原料の無駄がなくなるだけでなく、常に安定した香味を提供することが可能となる。また、ケーシングを、電源を内蔵する部分と口に咥える部分とに着脱可能に分割することにより、香味生成物品をより使いやすい態様で使用することができるようになる。

[図面の簡単な説明]

図１は本発明の実施の形態に係る香味生成物品を示す概略図。

図２は図１図示の香味生成物品の吐出ヘッドを示す平面図。

図３は図２のIII －III 線に沿った切断した吐出ヘッド及び吐出駆動部を示す拡大概略図。

図４は図１図示の香味生成物品の制御系を示すダイアグラム。

図５は図１図示の香味生成物品の１つの使用態様を示す図。

図６は図１図示の香味生成物品のセラミックヒーターの通電及び吐出駆動部の作動の動作タイミングの例を示す図。

図７は図１図示の香味生成物品のセラミックヒーターの通電及び吐出駆動部の作動の動作タイミングの別の例を示す図。

図８は本発明の別の実施の形態に係る香味生成物品を示す概略図。

図９は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

図１０は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

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図１１は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

図１２は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

図１３は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

図１４は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

図１５は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

図１６は本発明の更に別の実施の形態に係る香味生成物品を示す概略図。

［発明を実施するための最良の形態］

図１は本発明の実施の形態に係る香味生成物品を示す概略図である。

香味生成物品１０は、使用者が口に咥えることができる程度の外径を有する円筒形のケーシング１２を具備する。ケーシング１２は、使用者が口に咥えるための第１部分１２ａと、電源などを内蔵するための第２部分１２ｂとからなる。２つの部分１２ａ、１２ｂはケーシング本体１４に形成された接続部１３を介して着脱可能に接続される。２つの部分１２ａ、１２ｂは、接続部１３に対応してケーシング本体１４内に形成された空間内に収納されたケーブル１５を介して電気的に接続される。接続部１３としては、捩子或いは嵌着対偶等の

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公知の構造を採用することができる。ケーシング１２の本体１４はプラスチック、金属、セラミックス、木材等の材料から形成される。

ケーシング１２の第１部分１２ａの端部には、使用者が香味を吸引するための吸引口２２が形成される。これに対して、第１部分１２ａの中間部には、ケーシング１２の内部に空気を取込むための複数の空気取込口２４が形成される。空気取込口２４と吸引口２２との間でケーシング１２内にガス流路２６が規定される。空気取込口２４は予め決めた空気取込み量に対応する開口面積を有するように設定することができる。また、図示の如く、空気取込口２４の周囲で、ケーシング１２に、複数の開口を有する調節リング２８を配設することもできる。この場合、空気取込口２４に対して調節リング２８の位置を調節することにより、ケーシング１２内への空気流入量を調節することができる。

ガス流路２６内に位置するように、ケーシング１２には、絞り孔２０を中心に有する絞り板２１が配設される。絞り孔２０は、空気取込口２４からの空気を、後述するセラミックヒーター４２の表面に沿って流れるように規制する役割を果たす。

ケーシングの第１部分１２ａの奥の、ガス流路２６から壁３１により仕切られた空間内には、使用者が吸引する香味等を生成するための液体状原料３６を貯蔵する原料容器３２が着脱可能に固定される。原料容器３２は、使用者の複数パフ分の吐出量に対応する量の液体状原料３６を貯蔵する。なお、

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原料容器３２は、ケーシング本体１４の外側に取付けるようにすることができる。この場合、原料容器３２の頭部をケーシング本体１４中へ差込むようにすることもできるし、後述の吐出口３５のみをケーシング本体１４中へ差込むようにすることもできる。

液体状原料３６は少なくとも香味物質を含む。例えば、メンソール、カフェイン等の香味のみを喫味するための物品とする場合は、液体状原料３６は香味のみを発生させるための原料とすることができる。しかしまた、液体状原料３６は、香味に煙を加えるため、加熱時にエアロゾルを生成する物質を含むことができる。エアロゾルを生成する物質としては、アルコール類、糖類、水、或いはこれらの２種類以上の混合物を使用することができる。ここで使用されるアルコール類は、例えば、グリセンリン、プロピレングリコール、これらの混合物である。

即ち、液体状原料３６は、用途に応じて種々の天然物からの抽出物質及び／またはそれらの構成成分を含むことができる。例えば、本物品を疑似喫煙物品とする場合は、たばこ抽出物成分やたばこ煙凝縮物成分等のたばこ成分を液体状原料３６に含有させることとなる。

原料容器３２には、ケーシング１２を横断する方向に液体状原料３６を吐出するための複数の吐出口３５を有する吐出ヘッド３４が付設される。吐出ヘッド３４は絞り孔２０よりも吸引口２２側に位置するように配置される。吐出口３５を通して原料容器３２から液体状原料３６を吐出させるため、

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吐出口３５に隣接して吐出駆動部３８が配設される。吐出ヘッド３４及び吐出駆動部３８は、圧電素子を利用した液体吐出機構（特公昭５３－４５６９８及び米国特許第３，５９６，２７５号に開示の方式と同じ原理）からなる。

例えば、図２図示の如く、吐出口３５は、吐出ヘッド３４の上面の幅Ｗが約２ｍｍ、長さＬが約５ｍｍの領域に１０個ずつ２列に、合計２０個配列される。吐出口３５の配列中心は、後述するセラミックヒーター４２の中心と概ね一致する。

図３は図２のIII －III 線に沿って切断した吐出ヘッド３４及び吐出駆動部３８を示す拡大概略図である。即ち、図３は一方の吐出口３５の列に対応する断面を示すもので、他方の吐出口３５の列に対応する断面は、図３図示の断面に対して左右対称の位置関係となる。

図示の如く、配線基板１３２上に、液体状原料３６を流すための凹部や孔を形成するため、複数のパーツからなるフレーム１３４が積層される。フレーム１３４により形成された凹部は、複数の吐出口３５を除いてフィルム１３６により被覆される。また、液体状原料３６を一時的に溜めるため、吐出口３５の下に液溜１４６が形成される。液溜１４６の底板は振動板として機能する電極１３８からなる。

原料容器３２からの液体状原料３６は先ず狭い流路１４２を通して送られ、吐出口３５よりも小径の複数の吸入孔１４４から液溜１４６に至る。制御回路７２の制御下で、電極１３８が振動操作されると、液体状原料３６は、流れに対する抵抗が低い吐出口３５から選択的に吐出される。吐出された

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液体状原料３６は、液滴ＬＤとしてセラミックヒーター４２上に供給される。

この他、液体状原料３６の吐出機構としては、特公昭６１－５９９１１等に開示される処理液を加熱して発生させた気泡によって押し出す方式や、米国特許第３，０６０，４２９号等に開示される処理液の粒子を荷電して電界制御する方式等、公知のプリンタのインク吐出機構を応用して用いることができる。更に、液体状原料３６を加圧液体とし、吐出口３５に配設した弁を開閉することにより制御する吐出機構を用いることもできる。

吐出口３５に対向するようにガス流路２６内にセラミックヒーター４２が配設される。セラミックヒーター４２は、支持部材４４によって、ケーシング本体１４の内面上に固定される。吐出ヘッド３４の吐出口３５とセラミックヒーター４２との間の間隙２７は、絞り孔２０からの空気が通るように設定される。従って、空気取込口２４からの空気は絞り孔２０により、吐出口３５とセラミックヒーター４２との間の間隙２７に指向けられる。

セラミックヒーター４２上には、吐出駆動部３８により駆動されて吐出口３５から放出された１パフ分に相当する原料が、液体飛沫或いは液滴として供給される。セラミックヒーター４２はセラミック板とその上にコーティングされた抵抗発熱体とからなり、従って、原料の飛沫を受取るための受皿とこの受皿を加熱するための加熱手段とが一体となったものである。しかし、受皿と加熱手段とは夫々別体として配設す

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ることも可能である。

セラミックヒーター４２の原料の液体飛沫を受取る側の面、即ち受皿として機能する側の面上には、０．０１ｍｍ～２．０ｍｍの厚さを有する吸液性の多孔質層４６、例えば、厚さ約０．５ｍｍの活性炭素層が配設される。多孔質層４６は、セラミックヒーター４２の表面を保護するだけでなく、原料の飛沫を保持すると共にヒーター４２からの熱伝達を緩和することにより、原料の飛沫のガス化を安定化させる役割を果たす。多孔質層４６は、天然セルロース、セルロース誘導体、アラミド樹脂等の有機化合物や、炭素（活性炭素を含む）、アルミナ、炭化けい素等の無機化合物から形成することができる。多孔質層４６は任意の形態をとることができ、例えば、これらの化合物を予めフィルム、シート、板、織物、不織布等の成形物として形成して使用することもできるし、これらの化合物の粉末をヒーター４２上に直接塗工することにより形成することもできる。

セラミックヒーター４２と吸引口２２との間には、ガス流路２６の一部を構成するように配置された冷却室５２が形成される。冷却室を規定するケーシング本体１４の側壁には、外気導入孔５４が形成される。セラミックヒーター４２で加熱された、香味を含むガスは冷却室５２で外気と混合されて冷却され、吸引口２２に至る。外気導入孔５４は予め決めた外気導入量に対応する開口面積を有するように設定することができる。また、図示の如く、外気導入孔５４の周囲で、ケーシング１２に、複数の開口を有する調節リング５５を配設

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することもできる。この場合、外気導入孔５４に対して調節リング５５の位置を調節することにより、冷却室５２内への外気流入量を調節することができる。

冷却室５２と吸引口２２との間には、吸引口２２を覆うようにガス流路２６内にフィルター５８が配設される。フィルター５８を配設することにより、適度な吸いやすさとなるように圧力損失を調整することができる。フィルター５８は、セルロースアセテート、パルプ等からなる通常のたばこフィルターの素材から形成することができる。

一方、ケーシング１２の第２部分１２ｂ内には電源６２が着脱可能に固定され、電源６２は、吐出駆動部３８、セラミックヒーター４２及び後述する制御回路７２に電気エネルギーを供給するために使用される。電源６２は、ケーシング本体１４の背部開口を閉鎖するキャップ６４を開閉することにより、ケーシング本体１４に対して着脱可能となる。電源６２は望ましくは直流電源、例えば市販の乾電池、充電池からなる。しかし、電源６２は交流電源とすることもできる。また、電源６２はケーシング本体１４の外側に取付けるか、或いは、別に設けて配線でケーシング本体１４に接続するようにすることもできる。

電源６２と原料容器３２との間には、吐出駆動部３８及びセラミックヒーター４２の駆動を制御するための制御回路７２が設置される。図４図示の如く、制御回路７２は信号回路７２ａ、駆動回路７２ｂ及び電源回路７２ｃを有する。信号回路７２ａには、使用者の吸引動作を検出するためのセンサ

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－７３と、ＯＮ／ＯＦＦ用の手動スイッチ７４とが接続される。駆動回路７２ｂには吐出駆動部３８及びセラミックヒーター４２が接続される。電源回路７２ｃには電源６２が接続される。

使用者の吸引動作を検出するためのセンサー７３は、吸引口２２に隣接するように、ケーシング本体１４の周囲に配設される。センサー７３は、抵抗変化、容量変化、圧電起電力等を検出する一般的な歪み式感圧センサーと同じ原理からなり、使用者が口に咥えた圧力を検出して電気信号を発生する。代わりに、センサー７３として、後述する揺動羽板型センサー、接点型センサー、或いは特開平５－２１２１００に開示の唇センサー等を用いることができる。

制御回路７２は、ＯＮ／ＯＦＦ用の手動スイッチ７４からの信号により、或いはセンサー７３からの信号に基づいて使用者の吸引動作に合わせて、吐出駆動部３８及びヒーター４２を始動させ、液体状原料を吐出させ且つガス化する。制御回路７２における信号処理及び制御の態様は、例えば公知のアナログ制御、二位置制御、或いはこれらの組合わせとすることができる。

ＯＮ／ＯＦＦ用の手動スイッチ７４は、ケーシング１２の第１部分１２ａの側面に配設される。本物品の不使用時には、スイッチ７４を手動でオフ状態に切替えることにより、吐出駆動部３８及びヒーター４２を強制的に停止させておくことができる。手動スイッチ７４は、電気接点を有したマイクロリミットスイッチなどの一般的な小型の押下式スイッチと同

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じ機構からなる。

なお、本物品の使用時、即ちスイッチ７４をオン状態に切替えている間、ヒーター４２を加熱したままにすることもできる。この場合、制御回路７２は、液体状原料の吐出を司る吐出駆動部３８の動作のみを制御すればよい。

次に、図１図示の香味生成物品１０の操作態様を説明する。

図１図示の香味生成物品１０を用いて喫味する場合、使用者は、先ず、手動スイッチ７４をオンし、ケーシング１２の第１部分１２ａを咥えて吸引口２２から吸引動作を行なう。この動作により、センサー７３から制御回路７２に吸引動作信号が送出され、従って、制御回路７２の制御下にセラミックヒーター４２への通電が開始され、また、これと同時かまたは一定時間経過後に吐出駆動部３８が作動する。

このため、吐出口３５から液体状原料３６が吐出され、セラミックヒーター４２で加熱されてガス化される。ガス化された原料は、使用者の吸引動作に伴い、空気取込口２４から絞り孔２０を通過して吐出口３５とセラミックヒーター４２との間に導かれた主吸引空気と混合され、吸引口２２へと搬送される。

セラミックヒーター４２の通電及び吐出駆動部３８の作動は、例えば、図６或いは図７図示の動作タイミングにより行なわれる。図６は、センサー７３からの信号によりセラミックヒーター４２の通電加熱及び液体状原料３６の吐出が同時に行われる場合を示す。図７は、センサー７３からの信号により、セラミックヒーター４２が先行して通電予熱され、一

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定時間経過後即ちヒーター温度がある程度上昇した後に液体状原料３６が吐出される場合を示す。

必要であれば、吸引中、調節リング２８、６０を調節することにより、空気取込口２４からの主吸引空気量及び外気導入孔５４からの導入空気量を変えることができる。これにより、吸引口２２に至る香味を含む空気の味を変え、使用者の吸引感覚の好みに合わせた喫味を行なうことが可能となる。

また、前述の如く、ケーシング１２は、液体状原料３６、吐出ヘッド３４、セラミックヒーター４２等を収納した第１部分１２ａと、制御回路７２、電源６２等を収納した第２部分１２ｂとが、接続部１３を介して着脱可能に接続された構造をなす。第１及び第２部分１２ａ、１２ｂはケーブル１５を介して電気的に接続される。このため、本香味生成物品１０は第１及び第２部分１２ａ、１２ｂを接続部１３を介して一体的に接続した状態で使用することもできるし、図５図示の如く、第１及び第２部分１２ａ、１２ｂを分離して使用することもできる。図５図示の状態において、第１及び第２部分１２ａ、１２ｂは、ケーブル１５が許容する範囲で引き離すことができるため、例えば、第２部分１２ｂをポケットに入れ、第１部分１２ａのみを口に咥えるというような使用態様をとることができる。また、第１部分１２ａから離した第２部分１２ｂを既存の電源に繋いで、即ち据付けて使用することもできる。

次に、図１図示の香味生成物品１０を用いた幾つかの実験について説明する。

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先ず、香味物質として若干の天然ペパーミントオイルを使用し、香味に煙を加えるためのエアロゾル生成物質としてグリセリンを使用し、これらに更に水を加えることにより、水とグリセリンとの濃度比にして約２：９８から約９０：１０の範囲で異なる複数の液体状原料３６を調製した。そして、図１図示の香味生成物品を用いて、各液体状原料３６を加熱して得られる、香味物質を含んだエアロゾルを、約５８秒間のインターバルで１回に約２秒をかけて３５ｃｃから５０ｃｃ喫煙する１サイクル約１分間の標準的な喫煙条件で吸引した。

その結果、水とグリセリンとの濃度比が５０：５０で若干の天然ペパーミントオイルを添加して調製したものを液体状原料３６とすると、吐出の安定性が十分確保でき、且つ、吸引したときの官能的満足感及び視覚的煙量感もある程度達成できたため、以下の実験ではこれを液体状原料３６として使用した。なお、以下の実験においても、約５８秒間のインターバルで１回に約２秒をかけて３５ｃｃから５０ｃｃ喫煙する１サイクル約１分間の標準的な喫煙条件で吸引し、また、約２．５ｍｇ／秒の吐出速度を使用した。

このような条件で、図６及び図７図示の動作タイミングの比較を行なった。先ず、図６図示のタイミングでヒーター温度を２秒間で室温から約４００℃に立ち上げた。この場合、気化できる温度に到達するまでの立ち上がり途中でヒーター面に蓄積した液体状原料３６が一気に気化し、急激な膨張により吐出口３５近傍へ凝縮したり或いは突沸により液滴で飛

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散し、歩留まりの低下を生じた。次に、図７図示のタイミングで予熱の時間にヒーターの温度を約１４０℃～２２０℃に予熱した後に２秒間で４２０℃～４４０℃まで立ち上げた。この場合、液体状原料３６は吐出に連動して効率的に気化した。

使用者の吸引時間は、図６ではヒーター通電及び吐出の開始から終了までに相当し、図７では予熱時間を含んだヒーター通電開始から終了までに相当すべきである。従って、予熱の時間は、標準的な喫煙時間において、使用者が吸引に際して違和感を覚えないように約０．１秒から１秒までの範囲で設定することが望ましく、また、予熱の温度はあまり高すぎないことが必要である。

例えば、予熱時間２秒間でヒーターを約４００℃まで予熱したところ、その後吐出された原料が急激に気化して膨張し、吐出口３５近傍に凝縮する割合が増加し、かえって歩留まりが低下する傾向となった。また、吸引口２２のセンサー７３を口に咥える動作から２秒経過した後に吸引動作に入るという時間的なずれに対して違和感が生じた。この実験では、図７図示の動作タイミングにおいて、室温から温度１４０℃までの予熱には約０．５秒を、温度２２０℃までの予熱には約１秒の予熱時間を費やすようにした。

また、セラミックヒーター４２の表面に多孔質層４６がなく、平滑な場合には、液体状原料３６がヒーター面に捕捉されにくく、弾ける等現象が見られた。この場合、図６及び図７図示のいずれのタイミングにおいても、歩留まりは低下す

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る傾向が見られた。

一方、絞り孔２０を通って間隙２７を通過する主吸引空気は、流速がある程度速い方が、液体状原料のガス化効率を向上させた。この点に関し、標準的な１回あたり３５ｃｃ～５０ｃｃ／２秒の喫煙条件において、絞り孔２０の位置が間隙２７の中心から約３０ｍｍ以内にあり、絞り孔２０を通過する空気速度が約６ｍ／秒以上の場合に、望ましい結果が得られた。これは、絞り孔２０の開口断面積にして約３mm^2以下に相当する。しかし、使用者が口で吸引するのが無理なほど開口断面積を小さく（流速を速く）することは無意味である。以上の点を考慮すると、絞り孔２０の開口断面積の下限は約０．６mm^2程度が望ましいと考えられる。

間隙２７の大きさ、即ち吐出口３５とセラミックヒーター４２との間の垂直方向距離もまた、液体状原料３６のガス化効率に影響を与えた。吐出口３５近傍へのガスの凝縮による歩留まりの低下を抑制するためには、セラミックヒーター４２と吐出口３５とを約２ｍｍ以上の距離で対向させる必要があった。

次に、本発明の別の実施の形態に係る香味生成物品を幾つか説明する。これらの実施の形態を示す図において先行する図と共通する部分には同一の符号を付してそれらの詳細な説明を省略する。

図８は本発明の別の実施の形態に係る香味生成物品を示す概略図である

この実施の形態の香味生成物品は図１図示の香味生成物品

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と類似するが、吐出ヘッド３４の吐出口３５の配向が、図１図示の構造とは角度にして９０度異なり、吸引口２２に向くように設定されている。従ってまた、吐出口３５に対向するセラミックヒーター４２も図１図示の構造とは９０度向きが異なるように設定される。また、吐出ヘッド３４が、絞り孔２０内に配置されるため、ガス流路２６として機能する絞り孔２０の実質的開口は、絞り孔２０及び吐出ヘッド３４の双方の寸法により規定される。

図９は本発明の更に別の実施の形態に係る香味生成物品を示す概略図である。

この実施の形態の香味生成物品が特徴とする点は、第１に、ケーシング１２が第１及び第２部分１２ａ、１２ｂ（図１参照）に分離することができず、液体状原料３６、吐出ヘッド３４、セラミックヒーター４２、電源６２、制御部７２等が１つのケーシング本体１４内に内蔵されていることである。しかし、ケーシング本体１４には、接続部１８を介してマウスピース１６が着脱可能に取付けられ、ここに吸引口２２が形成される。マウスピース１６はプラスチック、木材等の材料から形成される。接続部１８としては、捩子或いは嵌着対偶等の公知の構造を採用することができる。マウスピース１６に代え、ケーシング本体１４にフィルターを挿入して使用することもできる。

また、原料容器３２に付設された吐出ヘッド３４の吐出口３５は１つで、吸引口２２に向けて、液体状原料３６を吐出するように配向される。従って、吐出口３５に対向するセラ

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ミックヒーター４２は、図８図示の構造と同じ向きに配向される。また、ガス流路２６内には絞り板２１（図１参照）が配設されておらず、セラミックヒーター４２を支持する支持部材４４による規制により、流入空気がセラミックヒーター４２上を流れるようになっている。

図１０は本発明の更に別の実施の形態に係る香味生成物品を示す概略図である。

この実施の形態の香味生成物品は図９図示の香味生成物品と類似するが、原料容器３２が手動で吐出操作する構造を有する点で大きく異なる。このため、原料容器３２には、ケーシング本体１４の外側に突出する操作レバー７６が接続される。レバー７６を押下げることにより、吐出口３５から１パフ分に相当する原料が放出され、液体飛沫或いは液滴としてセラミックヒーター４２上に供給される。また、制御回路７２はレバー７６の押下げ動作を信号として受け、この信号に基づいてセラミックヒーター４２を給電加熱し、原料の飛沫をガス化させる。即ち、レバー７６は、図１図示の香味生成物品の吐出駆動部３８と、使用者の吸引動作を検出するセンサー７３との両者に代わる役割を果たす。

図１０図図示の香味生成物品においては、また、原料容器３２に液体状原料３６を補給するための注入ポート８２が接続される。注入ポート８２の端部はケーシング本体１４の外側に露出し、ここから、液体状原料を原料容器３２を注入補給することができる。前述の如く、原料容器３２は、使用者の複数パフ分の吐出量に対応する量の液体状原料３６を貯蔵

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する容量を有する。しかし、原料を補給可能とすることにより、原料容器３２を交換せずに本香味生成物品を更に継続的に使用することが可能となる。

また、原料容器３２内の残量を見るため、ケーシング本体１４の側壁には、原料容器３２に対応して、透明な覗き窓８４が形成される。従って、ここでは、原料容器３２自体も透明或いは半透明の容器からなる。覗き窓８４を通して原料容器３２内の液体状原料３６の残量を監視することにより、原料の補給のタイミングを知ることができる。

原料容器３２内の残量を監視するため、図１０図示の構成に代え、電気的残量検出手段と電気的表示手段との組合わせを用いることができる。電気的残量検出手段の例は、原料容器３２の導電性の変化を検出する手段であり、電気的表示手段の例は、ケーシング本体１４の外面上に配設された発光ダイオードを用いた手段である。また、原料容器３２内の残量を監視する機構として、プリズムを用いて残量を光学的に検出する方式を用いることもできる。

図１０図図示の香味生成物品においては、更に、電源６２が、接続部６８を介してケーシング本体１４に着脱可能に取付けられた電源ホルダー６６内に収納される。接続部６８としては、捩子或いは嵌着対偶等の公知の構造を採用することができる。電源６２の大きさに対応する長さの電源ホルダー６６を用いることにより、電源６２の交換が容易となると共に、ケーシング本体１４内の部材の修理や交換も容易となる。

図１１は本発明の更に別の実施の形態に係る香味生成物品

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を示す概略図である。

この実施の形態の香味生成物品は図１０図示の香味生成物品と類似するが、吐出操作レバー７６が、吐出口３５に付設されたアトマイザー８６に接続されている点で異なる。アトマイザー８６により、１パフ分に相当する原料を、液体飛沫或いは液滴状態でセラミックヒーター４２上に供給することが可能となる。

また、図１１図示の香味生成物品においては、冷却室５２内に充填物５６が配設される。充填物５６を配設することにより、ガス化された香味成分の冷却効果を促進できると共に、適度な吸いやすさとなるように圧力損失を調整することができる。充填物５６としては、例えば、セルロースアセテート、パルプ等からなる繊維成形体や、ガラス、アルミ粒子のような粒状物を用いることができる。

図１２は本発明の更に別の実施の形態に係る香味生成物品を示す概略図である。

この実施の形態の香味生成物品が特徴とする点は、セラミックヒーター４２と冷却室５２との間でガス流路２６内に、使用者が吸引する香味等を生成するための固体状原料の成形体９２が、着脱可能に配設されることにある。

固体状原料の成形体９２は用途に応じて種々の天然物からの抽出物質及び／またはそれらの構成成分を含むことができる。成形体９２が含有する香味物質としては、例えば、メンソール、カフェイン、或いはたばこ抽出物成分やたばこ煙凝縮物成分等のたばこ成分を用いることができる。

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固体状原料の成形体９２がケーシング本体１４の内面との間に隙間を生じさせないような寸法を有する場合、成形体９２は良好な通気性を有する成形体９２を使用する。この場合、空気取込口２４と吸引口２２との間のガス流路２６は成形体９２の内部を通るように形成される。他方、後述するように、成形体９２の寸法が、成形体９２とケーシング本体１４の内面との間に隙間が形成されるように設定される場合は、通気性の低い或いは通気性のない成形体９２を使用することができる。この場合、空気取込口２４と吸引口２２との間のガス流路２６は、成形体９２とケーシング本体１４の内面との間の隙間を通るように形成される。

図１３は本発明の更に別の実施の形態に係る香味生成物品を示す概略図である。

この実施の形態の香味生成物品が図１２図示の香味生成物品と相違する点は、成形体９２を加熱するためのコイルヒーター９４が成形体９２の周囲に配設されていることにある。なお、成形体９２を加熱するためのヒーターは、成形体９２に孔を形成し、同孔内に配置するようにしてもよい。

コイルヒーター９４は、セラミックヒーター４２と共に、使用者の吸引動作に合わせて給電するように制御回路７２により制御することができる。しかし、成形体９２の熱容量が大きい場合、使用者の吸引動作の開始に合わせてコイルヒーター９４に給電しても、香味の生成がかなり遅れる虞がある。従って、この様な場合、コイルヒーター９４は、本物品の使用時、即ちスイッチ７４をオン状態に切替えている間、加熱

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したままとなるように設定してもよい。

なお、成形体９２は、ケーシング本体１４の内面との間に十分な隙間が形成されるような寸法を有する。従って、空気取込口２４と吸引口２２との間のガス流路２６の主部分は同隙間を通るように形成されることとなる。

図１４は本発明の更に別の実施の形態に係る香味生成物品を示す概略図である。

この実施の形態の香味生成物品の特徴は、使用者の吸引動作を検出するために揺動羽板型センサーが用いられていることにある。より具体的には、セラミックヒータ４２と冷却室５２との間でガス流路２６内に揺動羽板１０２が配設される。また、セラミックヒータ４２と羽板１０２との間で、ガス流路２６内には、羽板１０２に対向して開口１１４を有するオリフィス１１２が配設される。羽板１０２はセンサー回路のスイッチレバーとなる導電性レバー１０４と一体的に接続される。導電性レバー１０４に対向してケーシング本体１４の内面上にセンサー回路の電気接点１０８が配設される。

羽板１０２及びレバー１０４は、ケーシング本体１４の内面上の支持部１０６に一体的に揺動可能に枢支され、且つ支持部１０６に内蔵されたばねにより、図中反時計方向に付勢される。従って、通常時、羽板１０２はオリフィス１１２に当接し、またレバー１０４と接点１０８とは非接触状態にある。しかし、使用者が吸引動作を開始すると、オリフィス１１２で流速が高められたガス流が、羽板１０２を図中時計方向に旋回させ、レバー１０４と接点１０８とを接触させる。

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この様にして揺動羽板型センサーにより検出された使用者の吸引動作信号は制御回路７２に伝達され、この検出信号に基づいて吐出駆動部３８やセラミックヒーター４２が制御可能となる。

図１５は本発明の更に別の実施の形態に係る香味生成物品を示す概略図である。

この実施の形態の香味生成物品の特徴は、使用者の吸引動作を検出するために接点型センサーが用いられていることにある。より具体的には、、ケーシング１２の外面の中央と吸引口側端部とに、夫々環状の導電性板からなる電気接点１２２、１２４が配設される。電気接点１２２、１２４はセンサー回路のスイッチを構成し、接点１２２、１２４が導電体で接続されると、センサーが検出信号を発生するようになっている。この様な状態は、例えば、使用者が中央の接点１２２を把持し且つ吸引口側の接点１２４を口で咥えるという２つの条件が同時に満足された時である。この様にして接点型センサーにより検出された使用者の吸引動作信号は制御回路７２に伝達され、この検出信号に基づいて吐出駆動部３８やセラミックヒーター４２が制御可能となる。

図１６は本発明の更に別の実施の形態に係る香味生成物品を示す概略図である。

この実施の形態の香味生成物品は、図１図示の香味生成物品と同じ向きに配向された、吐出ヘッド３４の吐出口３５及び吐出口３５に対向するセラミックヒーター４２を有する。しかし、ケーシング１２は第１及び第２部分１２ａ、１２ｂ

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（図１参照）に分離することができず、液体状原料３６、吐出ヘッド３４、セラミックヒーター４２、電源６２、制御部７２等が１つのケーシング本体１４内に内蔵されている。

また、ガス流路２６内には絞り板２１（図１参照）が配設されていないが、セラミックヒーター４２の支持部材４４が吐出ヘッド３４に対応する中央部のみにスリットを有するように形成される。従って、空気取入口２６からの空気は全て吐出口３５とセラミックヒーター４２との間のギャップを通過することとなる。

以上、内容の理解を容易にするため、本発明の各部分の特徴を幾つかの実施の形態に分けて説明したが、これらの特徴は、目的に応じて適宜組合わせることが可能である。即ち、本発明は、その思想の範囲において、図示の実施の形態以外の種々態様で実施することが可能である。

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請求の範囲

1. 内部に空気を取込むための空気取込口と使用者が香味を吸引するための吸引口とを有すると共に、前記取込口と前記吸引口との間にガス流路を規定するケーシングと、

少なくとも香味物質を含む液体状原料を貯蔵すると共に前記原料の吐出口を有する、前記ケーシングに取付けられた原料容器と、

前記吐出口を通して前記容器から前記原料を液滴として吐出させるための吐出駆動手段と、

前記ガス流路内に配設され、前記容器から吐出される前記原料の前記液滴を受取ると共にこれを電気的に加熱することによりガス化するためのガス化手段と、

前記ガス化手段に電気エネルギーを供給するための電源と、を具備することを特徴とする香味生成物品。

2. 使用者の吸引動作を検出するセンサーと、前記センサーからの信号に基づいて、前記容器から前記原料を吐出させるように前記吐出駆動手段を制御するための制御手段と、を更に具備することを特徴とする請求項1に記載の香味生成物品。

3. 前記センサーが、前記吸引口の周りで前記ケーシング上に配設された感圧センサーを具備することを特徴とする請求項2に記載の香味生成物品。

4. 前記制御手段が、前記センサーからの信号に基づいて、前記ガス化手段が発熱するように前記ガス化手段を制御

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することを特徴とする請求項２または３に記載の香味生成物品。

５．　前記制御手段が、前記原料の吐出に先立って、前記ガス化手段を予熱するように、前記ガス化手段及び前記吐出駆動手段を制御することを特徴とする請求項４に記載の香味生成物品。

６．　前記電源が前記ケーシング内に配設されることを特徴とする請求項１に記載の香味生成物品。

７．　前記ケーシングがケーブルを介して電気的に接続された第１及び第２部分からなり、前記ガス流路、前記容器、前記吐出駆動手段、及び前記ガス化手段が前記第１部分内に配設され、前記電源が前記第２部分内に配設されることを特徴とする請求項６に記載の香味生成物品。

８．　前記ケーシングの前記第１及び第２部分が接続部を介して着脱可能であることを特徴とする請求項７に記載の香味生成物品。

９．　前記吐出駆動手段を手動で操作するための操作レバーを更に具備することを特徴とする請求項１に記載の香味生成物品。

１０．　前記ガス化手段が多孔質層を具備し、前記多孔質層上に前記原料の前記液滴が供給されることを特徴とする請求項１乃至９のいずれかに記載の香味生成物品。

１１．　前記ガス化手段が前記吐出口に対向するように配置され、前記吐出口と前記ガス化手段との間の間隙に対して前記空気取込口からの空気を指向けるための絞り孔が前記ガ

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ス流路内に配設されることを特徴とする請求項１乃至１０のいずれかに記載の香味生成物品。

１２．　前記ガス化手段と前記吸引口との間で前記ガス流路内に外気を導入するため、前記ケーシングに外気導入孔が形成されることを特徴とする請求項１乃至１１のいずれかに記載の香味生成物品。

１３．　前記ガス化手段と前記吸引口との間に位置するように前記ガス流路内に配設された、少なくとも香味物質を含む固体状原料の成形体を更に具備することを特徴とする請求項１乃至１２のいずれかに記載の香味生成物品。

１４．　前記成形体を加熱するための加熱手段を更に具備することを特徴とする請求項１３に記載の香味生成物品。

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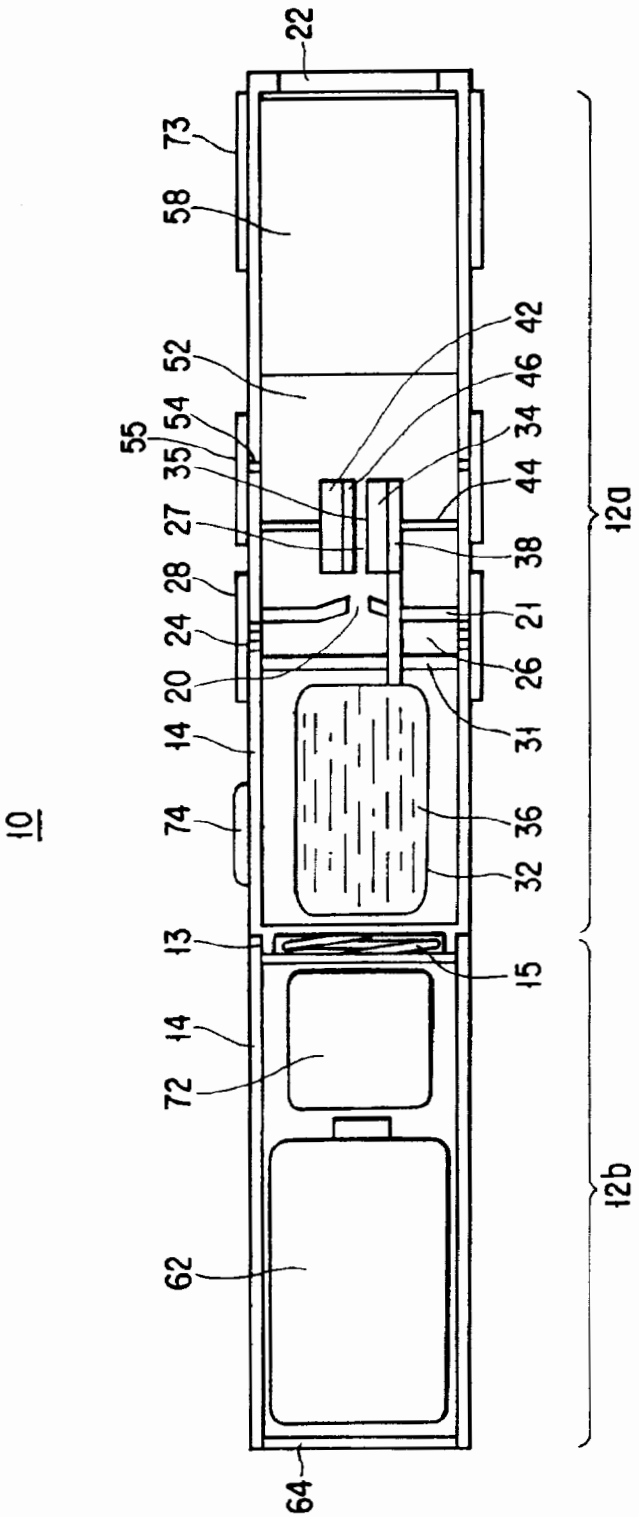


FIG. 1

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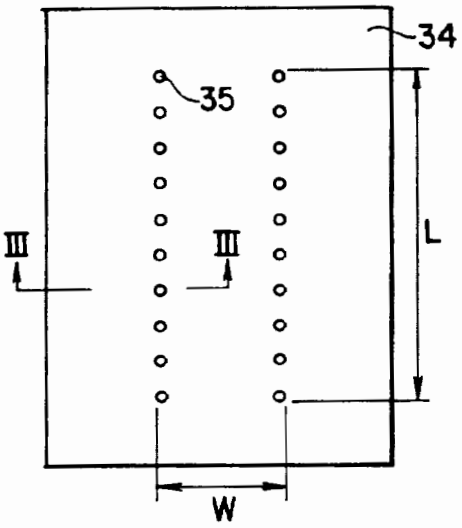


FIG. 2

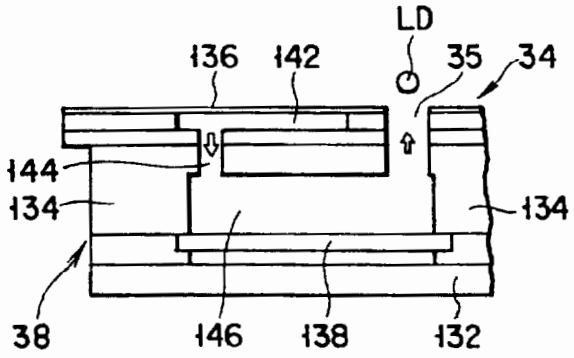


FIG. 3

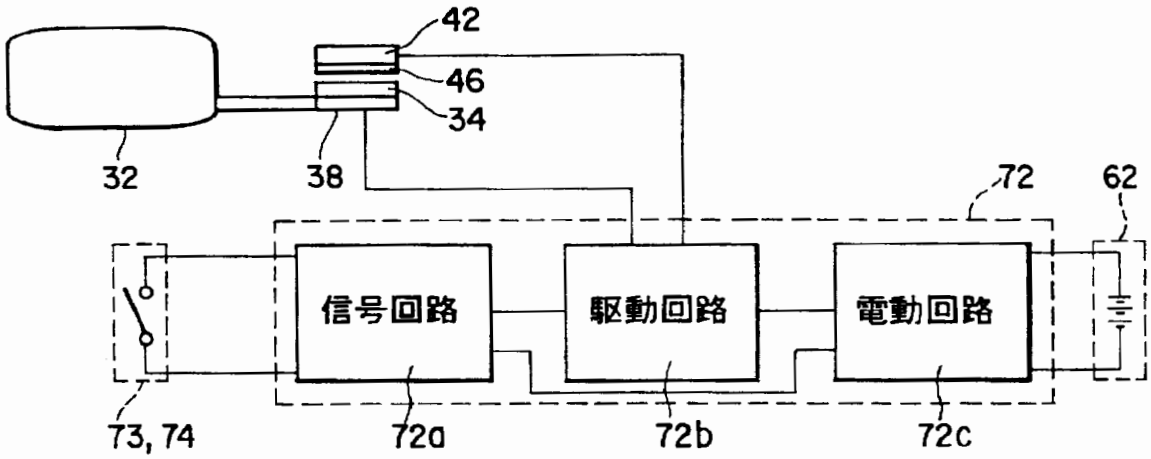


FIG. 4

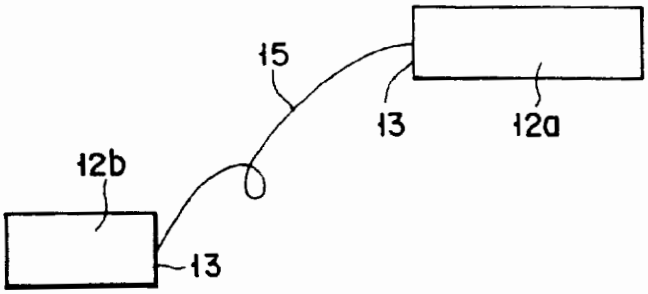


FIG. 5

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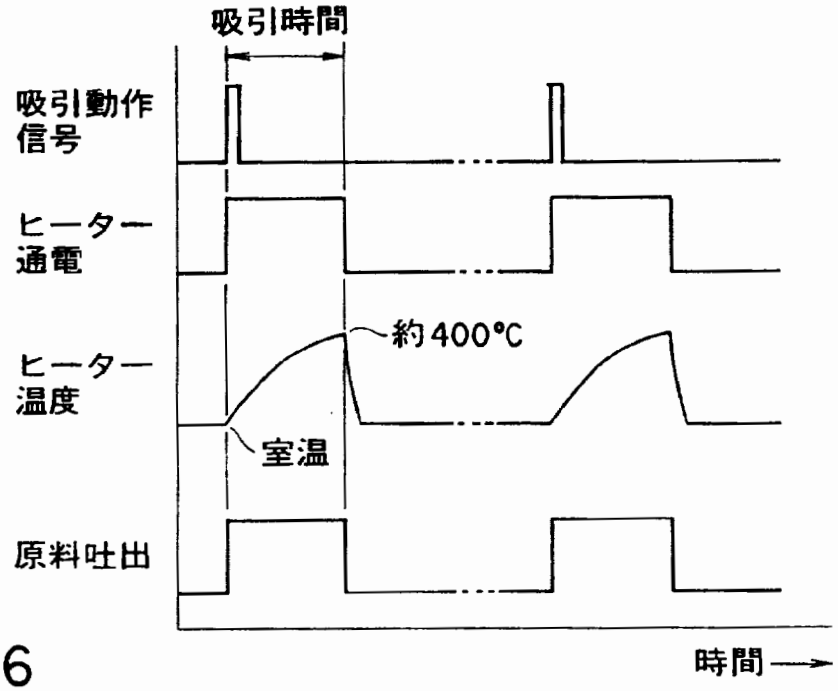


FIG. 6

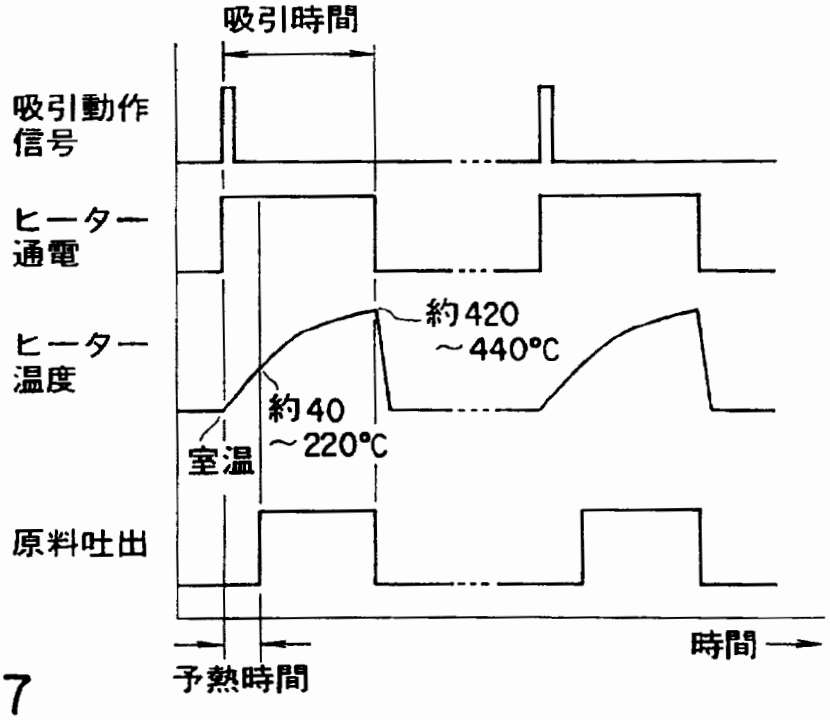


FIG. 7

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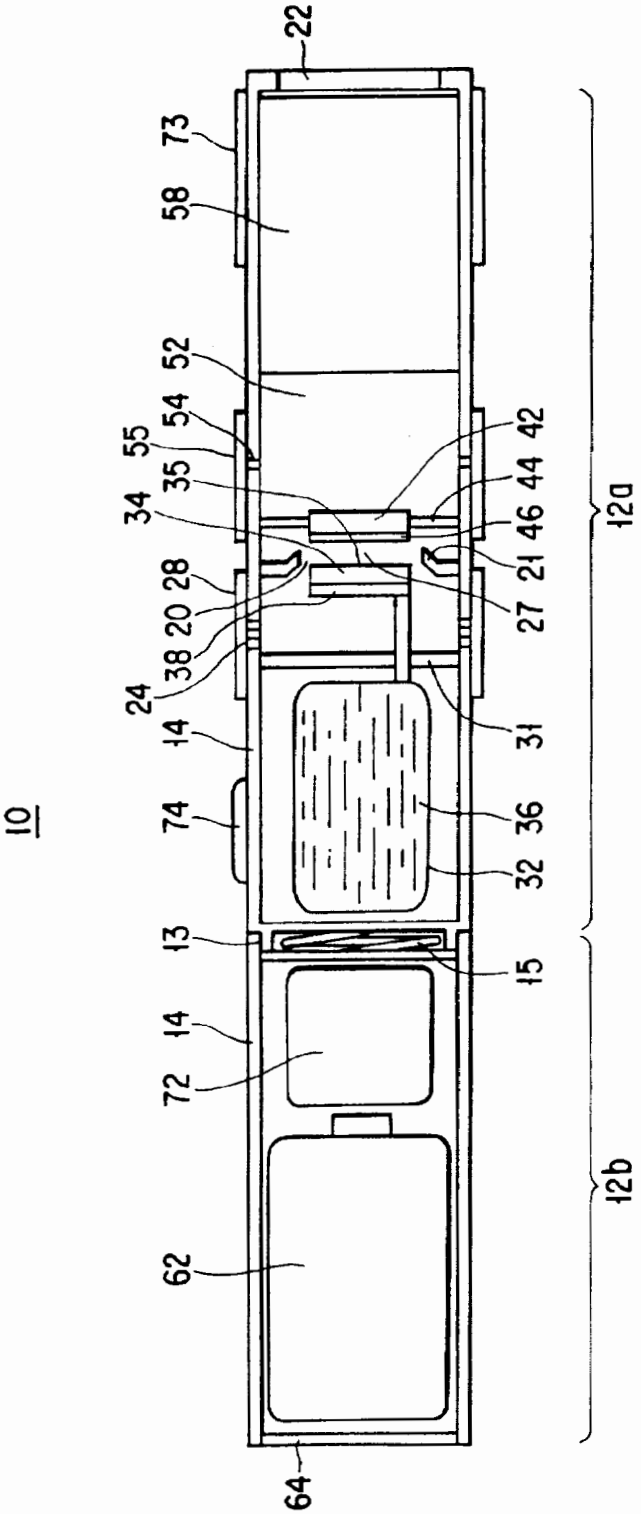


FIG. 8

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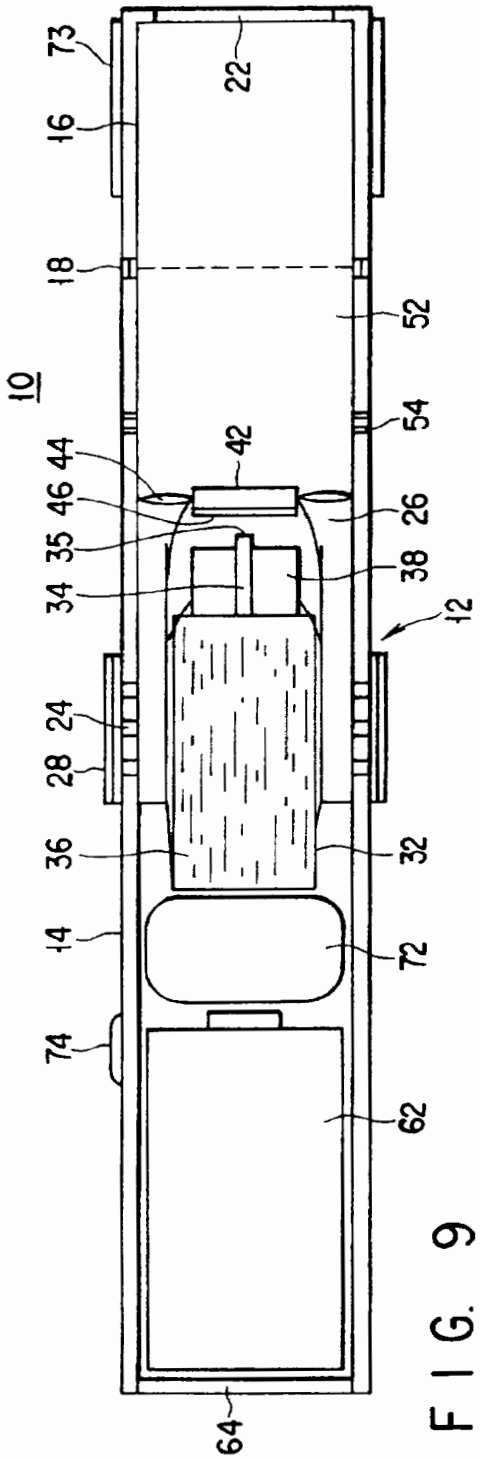


FIG. 9

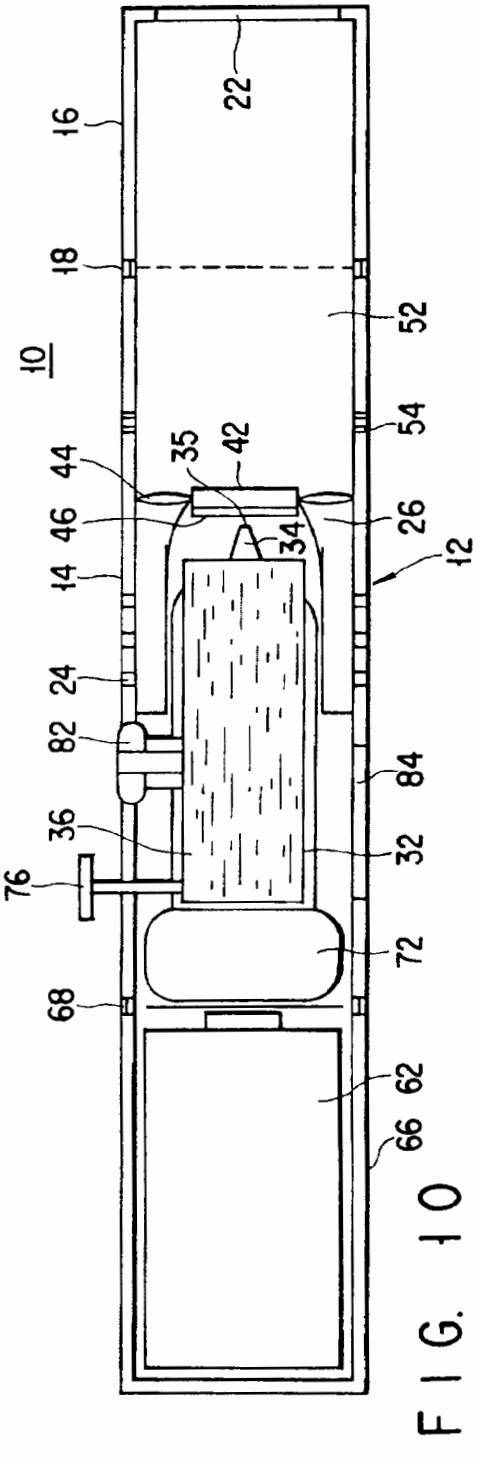


FIG. 10

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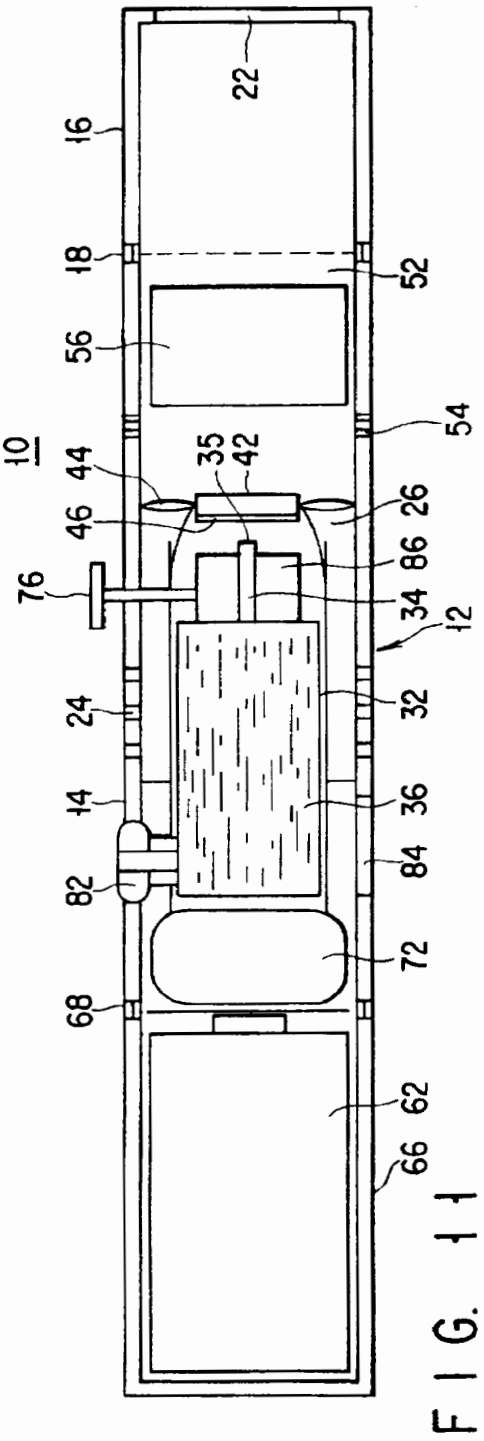


FIG. 11

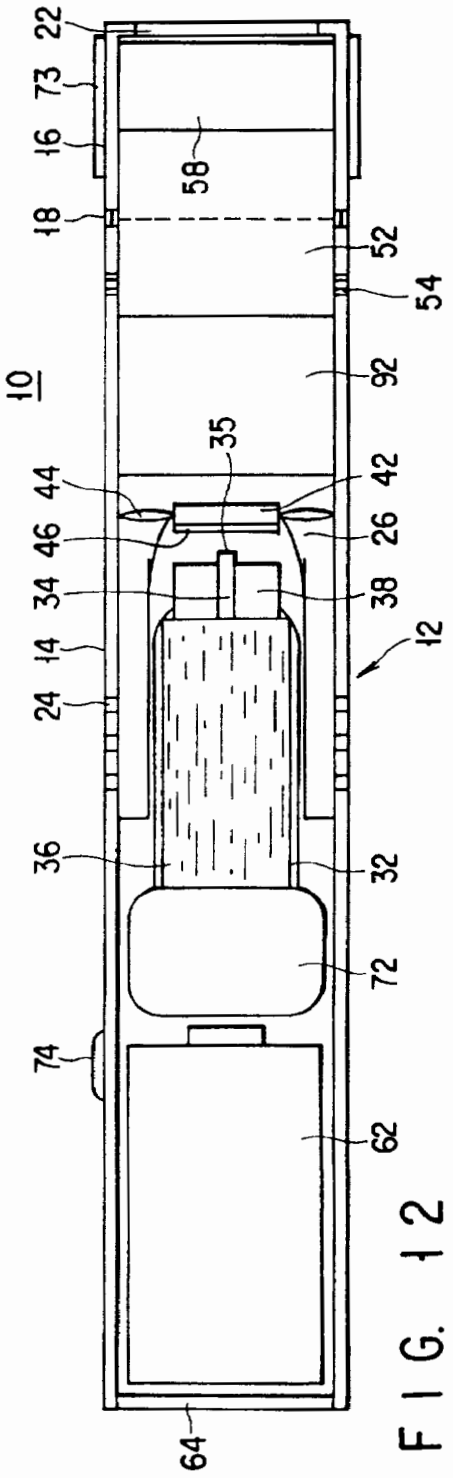


FIG. 12

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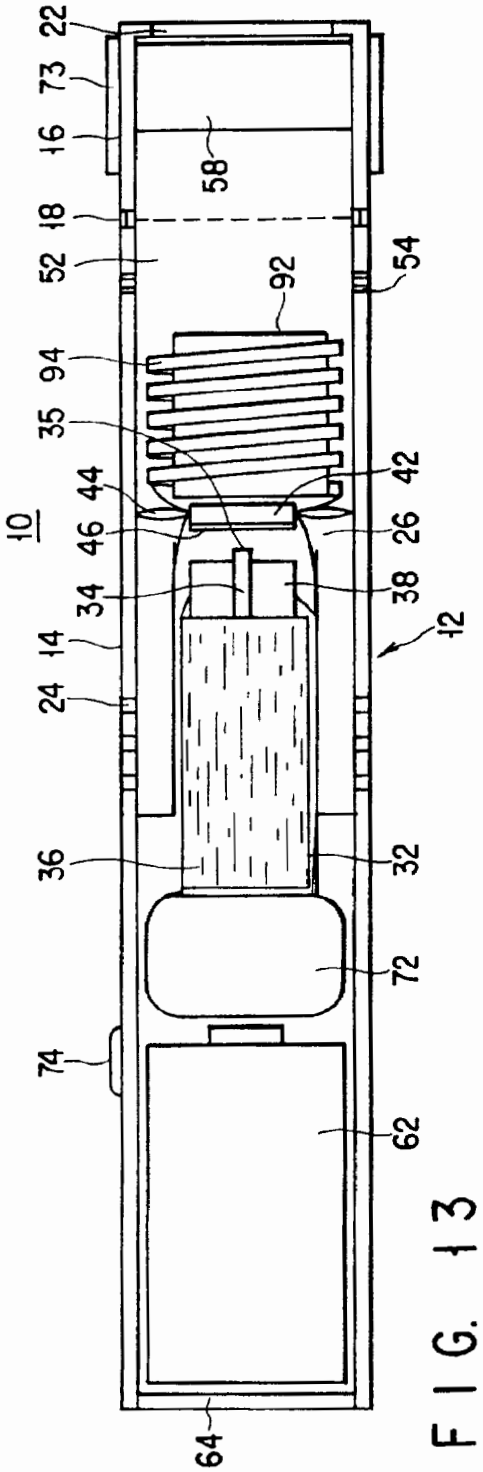


FIG. 13

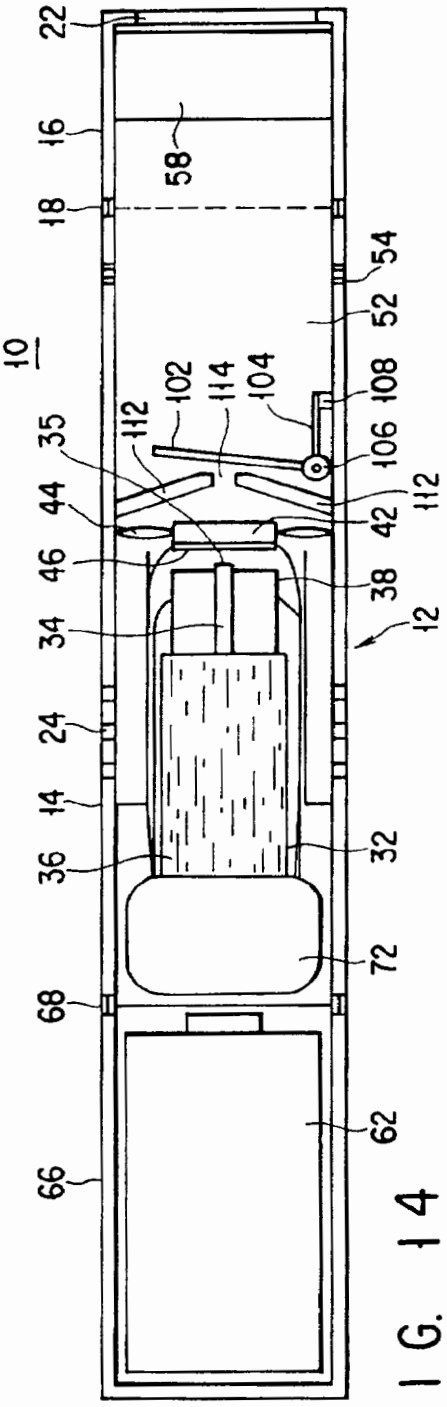


FIG. 14

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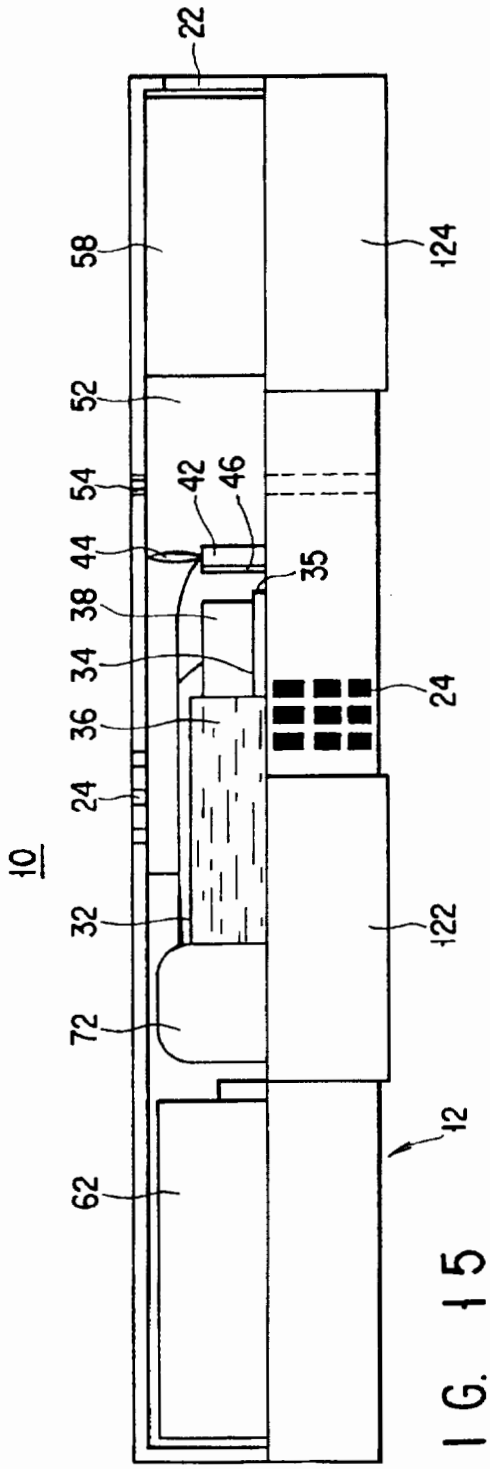


FIG. 15

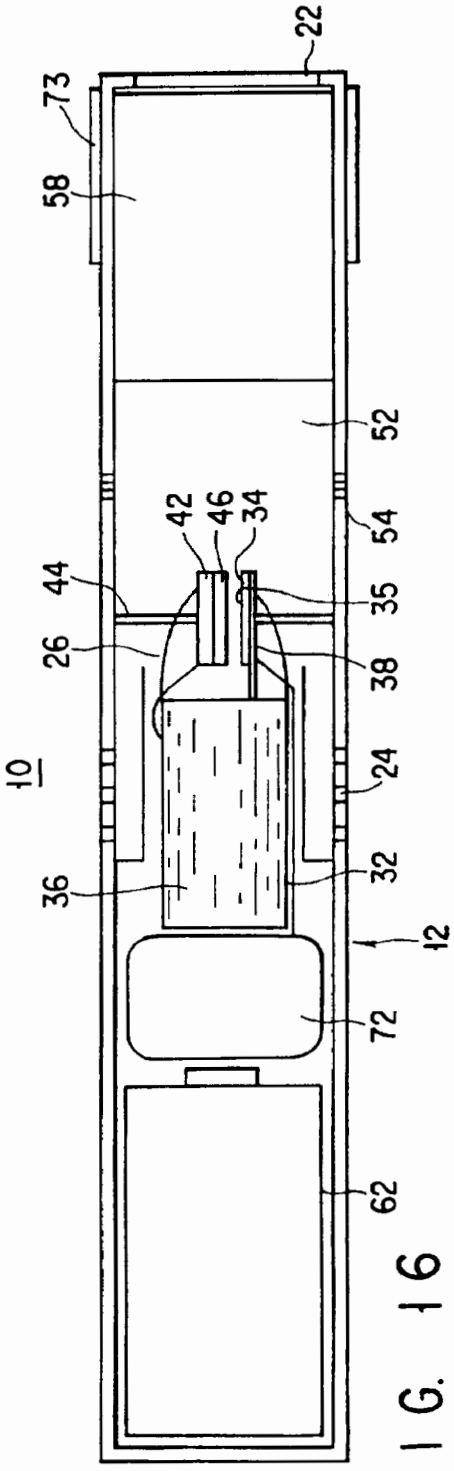


FIG. 16

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/01953

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl^6 A24F47/00 // A61M15/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
Int. Cl^6 A24F47/00, A61M15/06

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 48-8231, B1 (Kikuo Takeda), March 12, 1973 (12. 03. 73)(Family: none)	1 - 14
A	US, 4303083, A (Robert P. Burruss, Jr.), December 1, 1981 (01. 12. 81)(Family: none)	1 - 14
A	US, 4735217, A (The Procter & Gamble Co.), April 5, 1988 (05. 04. 88)(Family: none)	1 - 14
A	US, 4846199, A (The Regents of the University of California), July 11, 1989 (11. 07. 89) & US, 4945928, A & US, 5316759, A	1 - 14
A	JP, 2-124081, A (R.J. Reynolds Tobacco co.), May 11, 1990 (11. 05. 90) & US, 4922901, A & US, 4947875, A & EP, 358114, A2	1 - 14
A	JP, 2-124082, A (R.J. Reynolds Tobacco Co.), May 11, 1990 (11. 05. 90),	1 - 14

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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

Date of the actual completion of the international search	Date of mailing of the international search report
July 30, 1997 (30. 07. 97)	August 12, 1997 (12. 08. 97)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/01953

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	& US, 4947874, A & EP, 358002, A2	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

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国際調査報告

国際出願番号　ＰＣＴ／ＪＰ９７／０１９５３

A.　発明の属する分野の分類（国際特許分類（ＩＰＣ））
Int.Cl[6]　Ａ２４Ｆ４７／００ // Ａ６１Ｍ１５／０６

B.　調査を行った分野

調査を行った最小限資料（国際特許分類（ＩＰＣ））
Int.Cl[6]　Ａ２４Ｆ４７／００，Ａ６１Ｍ１５／０６

最小限資料以外の資料で調査を行った分野に含まれるもの

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

C.　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
A	ＪＰ，４８－８２３１，Ｂ１（武田　紀久雄） １２．３月．１９７３（１２．０３．７３） （ファミリーなし）	１－１４
A	ＵＳ，４３０３０８３，Ａ（Robert P.Burruss,Jr.） １．１２月．１９８１（０１．１２．８１） （ファミリーなし）	１－１４
A	ＵＳ，４７３５２１７，Ａ（The Procter & Gamble Company） ５．４月．１９８８（０５．０４．８８） （ファミリーなし）	１－１４

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「Ｌ」優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献（理由を付す）
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国際調査を完了した日	国際調査報告の発送日
３０．０７．９７	１２.０８９７

国際調査機関の名称及びあて先	特許庁審査官（権限のある職員）		
日本国特許庁（ＩＳＡ／ＪＰ） 郵便番号１００ 東京都千代田区霞が関三丁目４番３号	近　東明　印	４Ｂ	７２２９
	電話番号　０３－３５８１－１１０１　内線　３４４８		

様式ＰＣＴ／ＩＳＡ／２１０（第２ページ）（１９９２年７月）

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Ｃ（続き）．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
Ａ	ＵＳ，４８４６１９９，Ａ（The Regents of the University of California） １１．７月．１９８９（１１．０７．８９） &ＵＳ，４９４５９２８，Ａ&ＵＳ，５３１６７５９，Ａ	１－１４
Ａ	ＪＰ，２－１２４０８１，Ａ（アール・ジエイ・レノルズ・タバコ・カンパニー） １１．５月．１９９０（１１．０５．９０） &ＵＳ，４９２２９０１，Ａ&ＵＳ，４９４７８７５，Ａ &ＥＰ，３５８１１４，Ａ２	１－１４
Ａ	ＪＰ，２－１２４０８２，Ａ（アール・ジエイ・レノルズ・タバコ・カンパニー） １１．５月．１９９０（１１．０５．９０） &ＵＳ，４９４７８７４，Ａ&ＥＰ，３５８００２，Ａ２	１－１４

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 845 220 A1

(12) EUROPEAN PATENT APPLICATION

published in accordance with Art. 158(3) EPC

(43) Date of publication:
03.06.1998 Bulletin 1998/23

(21) Application number: **97925295.4**

(22) Date of filing: **09.06.1997**

(51) Int. Cl.[6]: **A24F 47/00**
// A61M15/06

(86) International application number:
PCT/JP97/01953

(87) International publication number:
WO 97/48293 (24.12.1997 Gazette 1997/55)

(84) Designated Contracting States:
DE FR GB

(30) Priority: **17.06.1996 JP 155636/96**

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(54) FLAVOR PRODUCING ARTICLE

(57) A flavor generation article (10) has a casing (12) constituted by first and second portions (12a, 12b) that are detachably connected to each other. A gas flow path (26) is formed in the casing first portion (12a) to extend from an air intake port (24) to reach a suction port (22). The first portion (12a) incorporates a material container (32) of a liquid material (36) containing a flavor substance. A discharge port (35) of the material container (32) is arranged in the gas flow path (26), and a ceramic heater (42) is disposed to oppose it. The liquid material (36) is supplied from the discharge port (35) onto the ceramic heater (42) and is heated, so that it is gasified in the gas flow path (26). The casing second portion (12b) incorporates a control circuit (72) and a power supply (62).

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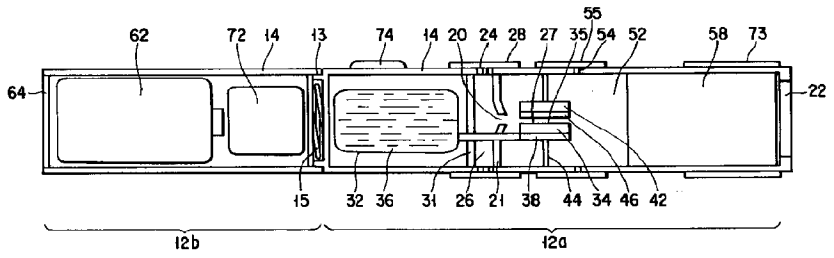


FIG. 1

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Description

Technical Field

The present invention relates to a flavor generation article employed for enjoying inhalation of a flavor and simulated smoking and, more particularly, to a flavor generation article used for generating the flavor as an inhalation target by heating a liquid material with an electric heater.

Background Art

A simulated smoking article employed for enjoying the flavor and smoke of tobacco without burning tobacco is already known, and various types of simulated smoking articles have been proposed.

Jpn. Pat. Appln. KOKAI Publication No. 3-232481 discloses a typical concept of a conventional simulated smoking article. The article of this reference uses, e.g., a rod-like solid material. When the solid material is heated by a heating element, an inhalation target, e.g., a flavor, is generated. The drawbacks of the article of this type are as follows. When the solid material is continuously heated, the material is largely wasted. Inversely, when the solid material is heated in accordance with inhalation of the user, a large time lag occurs between the start of inhalation (one puffing operation) of the user and generation of the flavor.

As an example of an article that copes with the above drawbacks, Jpn. Pat. Appln. KOKAI Publication No. 3-277265 discloses a flavor emitting article having a solid material divided into a large number of portions. In the article of this reference, the respective portions of the solid material are sequentially heated in units of puffing operations of the user to generate an inhalation target, e.g., a flavor or the like. The drawback of this article is that the solid material and a heating element constitute an integral flavor generation medium. Therefore, when the material is consumed, the heating element must be exchanged or disposed of together with the material, which is not preferable both in terms of economy and environment.

Jpn. Pat. Appln. KOKAI Publication No. 5-212100 discloses an example of a mechanism that detects one puffing operation of the user. In the article of this reference, the driving operation of a heating element for heating the flavor material is controlled by a signal obtained from the motion of the lips of the user.

U.S.P. No. 4,945,931 discloses a simulated smoking article using a pressurized aerosol container. In the article of this reference, the puffing operation of the user swings the vanes to mechanically open the outlet port of the container, and the aerosol is emitted. As a modification, this reference also discloses an article in which a heating element for heating aerosol cooled by the heat of evaporation is disposed in the outlet port of the container. The drawback of this reference is as follows. Since the pressurized aerosol is closed in the container with a valve which is opened/closed merely by the puffing operation of the user, once the valve is opened, a large amount of aerosol leaks undesirably. More specifically, in the article of this reference, a predetermined amount of aerosol appropriate for one puffing operation cannot be continuously emitted, and rather all of the pressurized flavor gas may undesirably be emitted until a puffing operation is complete twice or three times.

Disclosure of Invention

The present invention has been made in view of the above problems, and has as its object to provide a flavor generation article in which waste of a flavor material does not occur easily and the timing of one puffing operation of the user and that of generation of a flavor can be matched easily.

According to the first aspect of the present invention, there is provided a flavor generation article characterized by comprising:

a casing having an air intake port for taking in air therein and a suction port through which a user inhales a flavor, and forming a gas flow path between the intake port and the suction port;
a material container for storing a liquid material which contains at least a flavor substance and having a discharge port for the material, the material container being mounted on the casing;
discharge driving means for discharging the material from the container through the discharge port in the form of a liquid drop;
gasifying means disposed in the gas flow path to receive the liquid drop of the material discharged from the container and gasify the material by electrically heating the liquid drop; and
a power supply for supplying electric energy to the gasifying means.

According to the second aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized by further comprising a sensor for detecting an inhaling operation of the user and control means for controlling, based on a signal from the sensor, the discharge driving means so as to discharge the material from the container.

According to the third aspect of the present invention, there is provided a flavor generation article in the second aspect, characterized in that the sensor comprises a pressure-sensitive sensor mounted on the casing around the suction port.

According to the fourth aspect of the present invention, there is provided a flavor generation article in the second or third aspect, characterized in that the control means controls the gasifying means based on the signal from the sensor so that the gasifying means generates heat.

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According to the fifth aspect of the present invention, there is provided a flavor generation article in the fourth aspect, characterized in that the control means controls the gasifying means and the discharge driving means so as to preheat the gasifying means prior to discharge of the material.

According to the sixth aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized in that the power supply is disposed in the casing.

According to the seventh aspect of the present invention, there is provided a flavor generation article in the sixth aspect, characterized in that the casing is constituted by first and second portions that are electrically connected to each other through a cable, the gas flow path, the container, the discharge driving means, and the gasifying means being disposed in the first portion, and the power supply being disposed in the second portion.

According to the eighth aspect of the present invention, there is provided a flavor generation article in the seventh aspect, characterized in that the first and second portions of the casing are detachably connected to each other through a connecting portion.

According to the ninth aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized by further comprising an operation lever for manually operating the discharge driving means.

According to the 10th aspect of the present invention, there is provided a flavor generation article in any one of first to ninth aspects, characterized in that the gasifying means comprises a porous layer, and the liquid drop of the material is supplied onto the porous layer.

According to the 11th aspect of the present invention, there is provided a flavor generation article in any one of the first to 10th aspects, characterized in that the gasifying means is arranged to oppose the discharge port, and a throttle hole for directing air flowing from the air intake port toward a gap between the discharge port and the gasifying means is disposed in the gas flow path.

According to the 12th aspect of the present invention, there is provided a flavor generation article in any one of first to 11th aspects, characterized in that the casing is formed with an outer air inlet hole to supply an outer air into the gas flow path between the gasifying means and the suction port.

According to the 13th aspect of the present invention, there is provided a flavor generation article in any one of first to 12th aspects, characterized by further comprising a formed body of a solid material containing at least a flavor substance and disposed in the gas flow path so as to be located between the gasifying means and the suction port.

According to the 14th aspect of the present invention, there is provided a flavor generation article in the 13th aspect, characterized by further comprising heating means for heating the formed body.

According to the present invention, a flavor generation article can be provided in which waste of a flavor material does not occur easily and the timing of one puffing operation of the user and that of generation of a flavor can be matched easily. In particular, when the discharge driving means is controlled based on a signal from a sensor that detects the inhaling operation of the user, not only waste of the material is eliminated, but also a stable flavor can constantly be provided. When the casing is divided into a portion incorporating a power supply and a portion to be held by the mouth such that the two portions are detachable from each other, the flavor generation article can be used more conveniently.

Brief Description of Drawings

FIG. 1 is a schematic view showing a flavor generation article according to an embodiment of the present invention;

FIG. 2 is a plan view showing the discharge head of the flavor generation article shown in FIG. 1;

FIG. 3 is an enlarged schematic view showing the discharge head and discharge drive portion taken along the line III - III of FIG. 2;

FIG. 4 is a diagram showing the control system of the flavor generation article shown in FIG. 1;

FIG. 5 is a view showing the state of use of the flavor generation article shown in FIG. 1;

FIG. 6 is a graph showing an example of operation timing of energization of the ceramic heater and that of actuation of the discharge drive portion, of the flavor generation article shown in FIG. 1;

FIG. 7 is a graph showing another example of operation timing of energization of the ceramic heater and that of actuation of the discharge drive portion, of the flavor generation article shown in FIG. 1;

FIG. 8 is a schematic view showing a flavor generation article according to another embodiment of the present invention;

FIG. 9 is a schematic view showing a flavor generation article according to still another embodiment of the present invention,.

FIG. 10 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 11 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 12 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 13 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 14 is a schematic view showing a flavor gener-

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ation article according to still another embodiment of the present invention;

FIG. 15 is a schematic view showing a flavor generation article according to still another embodiment of the present invention; and

FIG. 16 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

Best Mode of Carrying Out the Invention

FIG. 1 is a schematic view showing a flavor generation article according to an embodiment of the present invention.

A flavor generation article 10 has a cylindrical casing 12 having such an outer diameter that the user can hold the casing 12 in his mouth. The casing 12 comprises a first portion 12a to be held by the user's mouth, and a second portion 12b for incorporating a power supply and the like. The two portions 12a and 12b are detachably connected to each other through a connecting portion 13 formed on a casing main body 14. The two portions 12a and 12b are electrically connected to each other through a cable 15 stored in a space formed in the casing main body 14 to correspond to the connecting portion 13. As the connecting portion 13, a known structure, e.g., a screw or a fitting pair, can be employed. The main body 14 of the casing 12 is made of a material, e.g., a plastic, metallic, ceramic, or wooden material.

A suction port 22 through which the user inhales the flavor is formed in the end portion of the first portion 12a of the casing 12. In contrast to this, a plurality of air intake ports 24 for taking in air into the casing 12 are formed in the intermediate portion of the first portion 12a. A gas flow path 26 is defined in the casing 12 between the air intake ports 24 and the suction port 22. The air intake ports 24 can be formed to have an open area corresponding to a predetermined air intake amount. As shown in FIG. 1, an adjusting ring 28 having a plurality of openings can be disposed on the casing 12 around the air intake ports 24. In this case, the amount of air flowing into the casing 12 can be adjusted by adjusting the position of the adjusting ring 28 with respect to the air intake ports 24.

A throttle plate 21 having a throttle hole 20 at its center is disposed in the casing 12 to be located in the gas flow path 26. The throttle hole 20 serves to regulate air from the air intake ports 24 to flow along the surface of a ceramic heater 42 (to be described later).

A material container 32 for storing a liquid material 36 for generating a flavor or the like to be inhaled by the user is detachably fixed in a space which is deep in the first portion 12a of the case and partitioned from the gas flow path 26 by a wall 31. The material container 32 stores the liquid material 36 in an amount corresponding to the discharge amount of a plurality of puffing operations of the user.

The material container 32 can be mounted on the outer side of the casing main body 14. In this case, the head portion of the material container 32 may be inserted in the casing main body 14, or only discharge ports 35 (to be described later) may be inserted in the casing main body 14.

The liquid material 36 contains at least a flavor substance. For example, if the liquid material 36 is an article used for enjoying only the flavor, e.g., menthol or caffeine, it can be a material that generates only the flavor. Also, in order to add smoke to the flavor, the liquid material 36 can contain a material which generates aerosol when heated. As the material that generates aerosol, alcohols, saccharide, or water, or a mixture of at least two of these components can be used. The alcohols used in this case are, e.g., glycerin or propylene glycol, or their mixture.

More specifically, the liquid material 36 can contain an extracted material and/or the constituent components of various types of natural materials in accordance with the application purpose. For example, if this article is used as a simulated smoking article, a tobacco component, e.g., a tobacco extracted component or a tobacco smoke condensate component, may be contained in the liquid material 36.

The material container 32 is formed with a discharge head 34 having the plurality of discharge ports 35 for discharging the liquid material 36 in a transverse direction of the casing 12. The discharge head 34 is arranged to be located closer to the suction port 22 than the throttle hole 20. A discharge drive portion 38 is disposed adjacent to the discharge ports 35 to discharge the liquid material 36 from the material container 32 through the discharge ports 35. The discharge head 34 and the discharge drive portion 38 comprise a liquid discharge mechanism (having the same principle as that of the method shown in Jpn. Pat. Appln. KOKOKU Publication No. 53-45698 and U.S.P. No. 3,596,275) utilizing a piezoelectric element.

For example, as shown in FIG. 2, 10 discharge ports 35 are arranged for two rows, leading to a total of 20 discharge ports 35 in a region with a width W of about 2 mm and a length L of about 5 mm of the upper surface of the discharge head 34. The center of arrangement of the discharge ports 35 almost coincides with the center of the ceramic heater 42 (to be described later).

FIG. 3 is an enlarged schematic view showing the discharge head 34 and discharge drive portion 38 taken along the line III - III of FIG. 2. More specifically, FIG. 3 shows a section corresponding to one row of the discharge ports 35. A section corresponding to the other row of the discharge ports 35 and the section shown in FIG. 3 are horizontally symmetrical.

As shown in FIG. 3, a frame 134 constituted by a plurality of components is stacked on a wiring board 132 to form recessed portions and holes to be filled with the liquid material 36. The recessed portions formed by the

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frame 134, excluding the plurality of discharge ports 35, are covered with a film 136. A liquid reservoir 146 is formed under the discharge ports 35 to temporarily store the liquid material 36. The bottom plate of the liquid reservoir 146 is constituted by an electrode 138 that serves as a vibration plate.

The liquid material 36 from the material container 32 is supplied first through a narrow flow path 142, and flows from a plurality of suction holes 144, having a smaller diameter than that of the discharge ports 35, to reach the liquid reservoir 146. Under the control of a control circuit 72, when the electrode 138 is operated to vibrate, the liquid material 36 is selectively discharged through the discharge ports 35 having a low resistance against the flow. The discharged liquid material 36 is supplied onto the ceramic heater 42 as a liquid drop LD.

Other than this, as the discharge mechanism of the liquid material 36, a known printer ink discharge mechanism can be modified and employed, e.g., a method disclosed in Jpn. Pat. Appln. KOKOKU Publication No. 61-59911 and the like wherein the process liquid is injected by bubbles generated by heating it, or a method disclosed in U.S.P. No. 3,060,429 and the like wherein the particles of the process liquid are electrified to perform electric field control. Alternatively, a discharge mechanism in which a liquid material 36 is a pressurized liquid and is controlled by opening/closing a valve disposed in a discharge ports 35 may be employed.

The ceramic heater 42 is disposed in the gas flow path 26 to oppose the discharge ports 35. The ceramic heater 42 is fixed on the inner surface of the casing main body 14 through a support member 44. A gap 27 between the discharge ports 35 of the discharge head 34 and the ceramic heater 42 is set such that air from the throttle hole 20 can flow through it. Accordingly, air from the air intake ports 24 is directed by the throttle hole 20 to the gap 27 between the discharge ports 35 and ceramic heater 42.

A material corresponding to one puffing operation, which is driven by the discharge drive portion 38 and emitted from the discharge ports 35 is supplied onto the ceramic heater 42 in the form of a liquid splash or liquid drop. The ceramic heater 42 is constituted by a ceramic plate and a coated resistance heater on the ceramic plate, and is accordingly an integral member of a catch pan for receiving the splash of the material and a heating means for heating the catch pan. However, the catch pan and the heating means can be disposed as separate components.

A liquid-absorbing porous layer 46 having a thickness of 0.01 mm to 2.0 mm, e.g., an activated carbon layer having a thickness of about 0.5 mm, is formed on a surface of the ceramic heater 42 that receives the liquid splash of the material, i.e., a surface of the ceramic heater 42 that serves as the catch pan. The porous layer 46 not only protects the surface of the ceramic heater 42 but also relaxes heat conduction from the ceramic heater 42, thereby stabilizing gasification of the splash of the material. The porous layer 46 can be formed of an organic compound, e.g., natural cellulose, a cellulose derivative, or an aramid resin, or an inorganic compound, e.g., carbon (including activated carbon), alumina, or silicon carbide. The porous layer 46 can have an arbitrary shape. For example, the compound mentioned above may be formed as a formed body in advance, e.g., a film, a sheet, a plate, fabric, or unwoven fabric, and be used as the porous layer 46. Alternatively, the porous layer 46 may be formed by directly applying the powder of the component mentioned above on the ceramic heater 42.

A cooling chamber 52 is formed between the ceramic heater 42 and the suction port 22 to constitute part of the gas flow path 26. Outer air inlet holes 54 are formed in the side wall of the casing main body 14 defining the cooling chamber. The gas heated by the ceramic heater 42 and containing a flavor is mixed with the outer air and cooled in the cooling chamber 52, and reaches the suction port 22. The outer air inlet holes 54 can be formed to have an open area corresponding to a predetermined air inlet amount. As shown in FIG. 1, an adjusting ring 55 having a plurality of openings can be disposed on the casing 12 around the outer air inlet holes 54. In this case, the amount of outer air flowing into the cooling chamber 52 can be adjusted by adjusting the position of the adjusting ring 55 with respect to the outer air inlet holes 54.

A filter 58 is disposed in the gas flow path 26 between the cooling chamber 52 and suction port 22 to cover the suction port 22. When the filter 58 is disposed, the pressure loss can be adjusted so that the flavor component can be inhaled with an appropriate pressure. The filter 58 can be made of a normal tobacco filter material made of cellulose acetate, pulp, or the like.

A power supply 62 is detachably fixed in the second portion 12b of the casing 12. The power supply 62 is used to supply electric energy to the discharge drive portion 38, the ceramic heater 42, and the control circuit 72 (to be described later). The power supply 62 can be mounted in and removed from the casing main body 14 by opening/closing a cap 64 that closes the rear opening of the casing main body 14. The power supply 62 is preferably a DC power supply, e.g., a commercially available dry cell or rechargeable cell. However, the power supply 62 can be an AC power supply. The power supply 62 can be mounted on the outer side of the casing main body 14, or can be provided separately and connected to the casing main body 14 with a wire.

The control circuit 72 for controlling the driving operation of the discharge drive portion 38 and the ceramic heater 42 is arranged between the power supply 62 and material container 32. As shown in FIG. 4, the control circuit 72 has a signal processing circuit 72a, a drive circuit 72b, and a power circuit 72c. The signal processing circuit 72a is connected to a sensor 73 for detecting the inhaling operation of the user and a manual ON/OFF switch 74. The drive circuit 72b is con-

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nected to the discharge drive portion 38 and the ceramic heater 42. The power circuit 72c is connected to the power supply 62.

The sensor 73 for detecting the inhaling operation of the user is disposed around the casing main body 14 to be adjacent to the suction port 22. The sensor 73 has the same principle as that of a general strain type pressure-sensitive sensor for detecting a change in resistance or capacitance, a piezoelectric electromotive force, or the like, and generates an electrical signal upon detection of a pressure with which the user holds the casing 12 in his mouth. Alternatively, as the sensor 73, a swing vane type sensor (to be described later), a contact type sensor, a lip sensor disclosed in Jpn. Pat. Appln. KOKAI Publication No. 5-212100, or the like can be used.

Upon reception of a signal from the manual ON/OFF switch 74, or based on a signal from the sensor 73, the control circuit 72 starts the discharge drive portion 38 and the ceramic heater 42 at a timing to match the inhaling operation of the user, so that the liquid material is discharged and gasified. For example, signal processing of the control circuit 72 and the way of control of the control circuit 72 can be known as analog control or two-position control, or their combination.

The manual ON/OFF switch 74 is disposed on the side surface of the first portion 12a of the casing 12. When this article is not in use, the switch 74 may be manually switched to the OFF state, thereby forcibly stopping the discharge drive portion 38 and the heater 42. The manual switch 74 has the same mechanism as that of a general compact push switch, e.g., a micro limit switch having an electric contact.

When this article is in use, i.e., while the switch 74 is set in the ON state, the heater 42 may be kept heated. In this case, the control circuit 72 need only control the operation of the discharge drive portion 38 that controls discharge of the liquid material.

How the flavor generation article 10 shown in FIG. 1 is operated will be described.

When the user performs simulated smoking or inhales the flavor by using the flavor generation article 10 shown in FIG. 1, first, the user turns on the manual switch 74, holds the first portion 12a of the casing 12 with his mouth, and performs an inhaling operation through the suction port 22. By this operation, the sensor 73 outputs an inhaling operation signal to the control circuit 72. Accordingly energization of the ceramic heater 42 is started under the control of the control circuit 72. Simultaneously, or with a lapse of a predetermined period after the start of energization, the discharge drive portion 38 is actuated.

The liquid material 36 is then discharged from the discharge ports 35 and gasified as it is heated by the ceramic heater 42. As the user performs an inhaling operation, the gasified material is mixed with main suction air which has been taken in from the air intake ports 24, passed through the throttle hole 20, and guided to a portion between the discharge ports 35 and ceramic heater 42, and is guided to the suction port 22.

Energization of the ceramic heater 42 and actuation of the discharge drive portion 38 are performed, e.g., at the operation timings shown in FIG. 6 or 7. FIG. 6 shows a case wherein, in response to a signal from the sensor 73, the ceramic heater 42 is energized and heated and the liquid material 36 is discharged simultaneously. FIG. 7 shows a case wherein, in response to a signal from the sensor 73, the ceramic heater 42 is energized and preheated in advance, and with a lapse of a predetermined period of time, i.e., when the heater temperature has increased to a certain degree, the liquid material 36 is discharged.

If necessary, the amount of main suction air taken in from the air intake ports 24 and the amount of inlet air supplied from the outer air inlet holes 54 can be changed by adjusting the adjusting rings 28 and 60 during inhalation. Then, the taste of air containing the flavor and reaching the suction port 22 can be changed, so that the user can perform simulated smoking or inhalation of the flavor in accordance with the taste of his inhalation feeling.

As described above, the casing 12 has a structure in which the first portion 12a storing the liquid material 36, the discharge head 34, the ceramic heater 42, and the like, and the second portion 12b storing the control circuit 72, the power supply 62, and the like are detachably connected to each other through the connecting portion 13. The first and second portions 12a and 12b are electrically connected to each other through the cable 15. Therefore, this flavor generation article 10 may be used with its first and second portions 12a and 12b being integrally connected to each other through the connecting portion 13, or may be used with its first and second portions 12a and 12b being separated from each other, as shown in FIG. 5. In the state shown in FIG. 5, since the first and second portions 12a and 12b can be separated within a range allowed by the cable 15, for example, the user can place the second portion 12b in his pocket and hold only the first portion 12a in his mouth. Alternatively, the second portion 12b separated from the first portion 12a may be connected to an existing power supply, i.e., may be installed.

Several experiments using the flavor generation article 10 shown in FIG. 1 will be described.

First, as the flavor substance, some natural peppermint oil was used, and as the aerosol generation material to add smoke to the flavor, glycerin was used. Water was added to the natural peppermint oil and glycerin, thereby preparing a plurality of liquid materials 36 in which the water to glycerin concentration ratio changed in a range of about 2 : 98 to about 90 : 10. Aerosol containing a flavor substance obtained by heating each liquid material 36 was inhaled, by using the flavor generation article shown in FIG. 1, with a standard smoking condition of one cycle for about one minute in which 35 cc to 50 cc of aerosol were inhaled in one

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inhaling operation for about 2 seconds with an interval of about 58 seconds.

As a result, when a liquid material having a water to glycerin concentration ratio of 50 : 50 and prepared by adding some natural peppermint oil was employed as the liquid material 36, sufficiently high discharge stability was ensured, and physical satisfaction and requirement for a visually observed smoke amount upon inhalation were achieved to a certain degree. Therefore, in the following experiments, this liquid material was used as the liquid material 36. In the following experiments as well, inhalation was performed with the standard smoking condition of one cycle for about one minute in which 35 cc to 50 cc of aerosol were inhaled in one inhaling operation for about 2 seconds with an interval of about 58 seconds, and a discharge speed of about 2.5 mg/second was employed.

With this condition, the operation timings shown in FIGS. 6 and 7 were compared. First, at the timing shown in FIG. 6, the heater was heated from room temperature to about 400°C within 2 seconds. In this case, the liquid material 36 accumulated on the heater surface while the heater increased to the temperature that enabled gasification was gasified at once, and was condensed near the discharge ports 35 because of rapid expansion or flied in the form of a liquid drop because of bumping, thus decreasing the yield. Subsequently, the heater was preheated to about 140°C to 220°C during the preheat time at the timing shown in FIG. 7, and was thereafter heated to 420°C to 440°C within 2 seconds. In this case, the liquid material 36 was effectively gasified in an interlocked manner with discharge.

The inhalation time of the user should correspond to a time period between the start and end of energization of the heater and discharge in FIG. 6, and should correspond to a time period between the start and end of energization of the heater, including the preheat time, in FIG. 7. Accordingly, the preheat time is preferably set within a range of about 0.1 second to 1 second in the standard smoking time, so that the user will not feel discomfort during inhalation, and it is required that the preheat time is not so high.

For example, when the heater was preheated to about 400°C with a preheat time of 2 seconds, the material discharged after that was rapidly gasified and expanded. Then, the proportion of the material that was condensed near the discharge ports 35 increased, inversely decreasing the yield. Also, since the inhalation operation was allowed with the lapse of 2 seconds after the user held the sensor 73 of the suction port 22 in his mouth, a time lag occurred to make the user feel discomfort. In this experiment, with the operation timings shown in FIG. 7, preheat from room temperature to 140°C spent a preheat time of about 0.5 second, and preheat to 220°C spent a preheat time of about 1 second.

When the surface of the ceramic heater 42 had no porous layer 46 but was flat, a phenomenon in which the liquid material 36 was not easily caught by the heater surface but was bounded was observed. In this case, at either timings shown in FIG. 6 or 7, the yield tended to decrease.

Regarding the main inhalation air which flowed through the throttle hole 20 and passed through the gap 27, the higher the flow velocity to a certain degree, the better the gasification efficiency of the liquid material. Concerning this, under the standard smoking condition of 35 cc to 50 cc per inhalation for 2 seconds, a desired result was obtained when the position of the throttle hole 20 was within about 30 mm from the center of the gap 27 and the velocity of air passing through the throttle hole 20 was equal to or higher than about 6 m/second. This corresponds to the sectional area of the opening of the throttle hole 20 of about 3 mm^2 or less. However, it is nonsense to decrease the sectional area of the opening (to increase the flow velocity) to such a degree that it becomes impossible for the user to perform inhalation with his mouth. Considering the above respects, the lower limit of the sectional area of the opening of the throttle hole 20 is supposed to be preferably about 0.6 mm^2.

The size of the gap 27, i.e., the vertical distance between the discharge ports 35 and ceramic heater 42 also influenced the gasification efficiency of the liquid material 36. In order to suppress a decrease in yield caused by condensation of the gas near the discharge ports 35, the ceramic heater 42 and discharge ports 35 must oppose each other through a distance equal to or larger than about 2 mm.

Several flavor generation articles according to other embodiments of the present invention will be described. In the drawings indicating these embodiments, portions that are common to the preceding drawings are denoted by the same reference numerals, and a detailed description thereof will be omitted.

FIG. 8 is a schematic view showing a flavor generation article according to another embodiment of the present invention.

The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 1, but the orientation of discharge ports 35 of a discharge head 34 is different from that of the structure shown in FIG. 1 by 90° , so that the discharge ports 35 may be directed to a suction port 22. Accordingly, a ceramic heater 42 opposing the discharge ports 35 is set such that its direction is different from that of the structure shown in FIG. 1 by 90° . Since the discharge head 34 is arranged in a throttle hole 20, the substantial opening of the throttle hole 20 that serves as a gas flow path 26 is regulated by the size of both the throttle hole 20 and discharge head 34.

FIG. 9 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article of this embodiment resides in that, first, a casing

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12 cannot be separated into first and second portions 12a and 12b (see FIG. 1), and a liquid material 36, a discharge head 34, a ceramic heater 42, a power supply 62, a control unit 72, and the like are incorporated in one casing main body 14. However, a mouthpiece 16 is detachably mounted on the casing main body 14 through a connecting portion 18, and a suction port 22 is formed in the mouthpiece 16. The mouthpiece 16 is made of a material, e.g., a plastic or wood. As the connecting portion 18, a known structure, e.g., a screw or a fitting pair can be employed. In place of the mouthpiece 16, a filter may be inserted in the casing main body 14 and served for use.

The discharge head 34 provided to a material container 32 has one discharge port 35 which is oriented to discharge the liquid material 36 toward the suction port 22. Accordingly, the ceramic heater 42 opposing the discharge port 35 is oriented in the same direction as that of the structure shown in FIG. 8. No throttle plate 21 (see FIG. 1) is disposed in a gas flow path 26. Air that has flowed into the article flows on the ceramic heater 42 because it is regulated by a support member 44 supporting the ceramic heater 42.

FIG. 10 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 9 but is largely different from it in that its material container 32 is manually operated to discharge. For this reason, the material container 32 is connected to an operation lever 76 projecting outside a casing main body 14. When the lever 76 is depressed, a material corresponding to one puffing operation is emitted from a discharge port 35, and is supplied onto a ceramic heater 42 in the form of a liquid splash or liquid drop. A control circuit 72 receives a signal indicating a depressing operation of the lever 76, and supplies power to the ceramic heater 42 based on this signal to heat it, thereby gasifying the material splash. In fine, the lever 76 serves as both the discharge drive portion 38 for the flavor generation article and the sensor 73 for detecting the inhaling operation of the user that are shown in FIG. 1.

In the flavor generation article shown in FIG. 10, the material container 32 is also connected to an injection port 82 for replenishing the material container 32 with a liquid material 36. The end portion of the injection port 82 is exposed outside the casing main body 14, and the liquid material can be injected and replenished to the material container 32 through this end portion. As described above, the material container 32 has a capacity sufficient for storing the liquid material 36 in an amount corresponding to the total discharge amount of a plurality of puffing operations of the user. However, if the material can be replenished, the material container 32 need not be exchanged, but this flavor generation article can be used further continuously.

In order to observe the remaining amount in the material container 32, a transparent inspection window 84 is formed in the side wall of the casing main body 14 to correspond to the material container 32. Accordingly, in this case, the material container 32 itself is also a transparent or translucent container. When the remaining amount of the liquid material 36 in the material container 32 is monitored through the inspection window 84, the user can know the timing at which the container should be replenished with the material.

In place of the arrangement shown in FIG. 10, a combination of an electric remaining amount detection means and an electric display means can be used to monitor the remaining amount in the material container 32. An example of the electric remaining amount detection means includes a means for detecting a change in conductivity of the material container 32, and an example of the electric display means includes a means for using a light-emitting diode disposed on the outer surface of the casing main body 14. As the mechanism for monitoring the remaining amount in the material container 32, a method that optically detects the remaining amount by using a prism may also be employed.

In the flavor generation article shown in FIG. 10, furthermore, a power supply 62 is stored in a power supply holder 66 which is detachably mounted on the casing main body 14 through a connecting portion 68. As the connecting portion 68, a known structure, e.g., a screw or a fitting pair, can be employed. When the power supply holder 66 having a length corresponding to the size of the power supply 62 is used, exchange of the power supply 62 is facilitated, and repair and exchange of members in the casing main body 14 are also facilitated.

FIG. 11 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 10 but is different from it in that a discharge operation lever 76 is connected to an atomizer 86 provided to a discharge port 35. The atomizer 86 can supply a material corresponding to one puffing operation onto a ceramic heater 42 in the form of a liquid splash or liquid drop.

In the flavor generation article shown in FIG. 11, a filler 56 is disposed in a cooling chamber 52. When the filler 56 is disposed, the cooling effect of the gasified flavor component can be promoted, and the pressure loss can be adjusted so that the flavor component can be inhaled with an appropriate pressure. As the filler 56, for example, a fiber formed body made of cellulose acetate or pulp, or a particulate matter, e.g., glass or aluminum particles, can be used.

FIG. 12 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article of this embodiment resides in that a formed body

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92 of a solid material that generates a flavor or the like to be inhaled by the user is detachably disposed in a gas flow path 26 between a ceramic heater 42 and a cooling chamber 52.

The formed body 92 of the solid material can contain an extracted material and/or the constituent components of various types of natural materials in accordance with the application purpose. As the flavor material to be contained by the formed body 92, for example, menthol, caffeine, or a tobacco component, e.g., a tobacco extracted component or a tobacco smoke condensate component can be employed.

If the formed body 92 of the solid material has such a size that no gap is formed between it and the inner surface of a casing main body 14, a formed body 92 having good air permeability is used as the formed body 92. In this case, the gas flow path 26 between air intake ports 24 and a suction port 22 is formed to extend through the formed body 92. On the other hand, if the size of the formed body 92 is set such that a gap is formed between the formed body 92 and the inner surface of the casing main body 14, a formed body 92 having poor or no air permeability can be used. In this case, the gas flow path 26 between the air intake ports 24 and suction port 22 is formed to extend through the gap between the formed body 92 and the inner surface of the casing main body 14.

FIG. 13 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment is different from the flavor generation article shown in FIG. 12 in that a coil heater 94 for heating a formed body 92 is disposed around the formed body 92. The heater for heating the formed body 92 may be arranged in a hole formed in the formed body 92.

The coil heater 94, together with a ceramic heater 42, can be controlled by a control circuit 72 so that power is supplied to them in accordance with the inhaling operation of the user. When the formed body 92 has a large heat capacity, however, even if power is supplied to the coil heater 94 in accordance with the start of the inhaling operation of the user, generation of the flavor may be retarded considerably. In such a case, the coil heater 94 may be kept heated when this article is in use, i.e., while a switch 74 is set in the ON state.

The formed body 92 has such a size that a sufficiently large gap is formed between it and the inner surface of a casing main body 14. Accordingly, the major portion of a gas flow path 26 between air intake ports 24 and a suction port 22 extends through this gap.

FIG. 14 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article according to this embodiment resides in that a swing vane type sensor is used to detect the inhaling operation of the user. More specifically, a swing vane 102 is disposed in a gas flow path 26 between a ceramic heater 42 and a cooling chamber 52. An orifice 112 having an opening 114 opposing the vane 102 is disposed in the gas flow path 26 between the ceramic heater 42 and the vane 102. The vane 102 is integrally connected to a conductive lever 104 which serves as the switch lever of the sensor circuit. An electric contact 108 of the sensor circuit is disposed on the inner surface of a casing main body 14 to oppose the conductive lever 104.

The vane 102 and lever 104 are integrally, swingably, and axially supported on a support 106 on the inner surface of the casing main body 14, and is biased counterclockwise in FIG. 14 by a spring incorporated in the support 106. Accordingly, in an ordinary state, the vane 102 abuts against the orifice 112, and the lever 104 and contact 108 are not in contact with each other. However, when the user starts an inhaling operation, the gas flow, the flow velocity of which is increased by the orifice 112, pivots the vane 102 clockwise in FIG. 14, so that the lever 104 and contact 108 come into contact with each other. The inhaling operation signal of the user which is detected in this manner by the swing vane type sensor is transmitted to a control circuit 72. Based on this detection signal, a discharge drive portion 38 and the ceramic heater 42 can be controlled.

FIG. 15 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article according to this embodiment resides in that a contact sensor is used in order to detect the inhaling operation of the user. More specifically, electric contacts 122 and 124 each made of an annular conductive plate are disposed at the center and the suction port-side end portion, respectively, of the outer surface of a casing 12. The electric contacts 122 and 124 constitute the switch of a sensor circuit. When the electric contacts 122 and 124 are connected to each other through a conductor, the sensor generates a detection signal. This state occurs when, e.g., two conditions that the user holds the electric contact 122 at the center with his hand and holds the suction port-side electric contact 124 in his mouth are satisfied simultaneously. The inhaling operation signal of the user which is detected by the contact sensor in this manner is transmitted to a control circuit 72. A discharge drive portion 38 and a ceramic heater 42 can be controlled based on this detection signal.

FIG. 16 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment has discharge ports 35 of a discharge head 34 that are oriented in the same direction as that of the flavor generation article shown in FIG. 1, and a ceramic heater 42 opposing the discharge ports 35. However, a casing 12 cannot be separated into first and second portions 12a and 12b (see FIG. 1), and a liquid material 36, the dis-

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charge head 34, the ceramic heater 42, a power supply 62, a control unit 72, and the like are incorporated in one casing main body 14.

Although no throttle plate 21 (see FIG. 1) is disposed in a gas flow path 26, a support member 44 of the ceramic heater 42 is formed to have a slit only at its central portion corresponding to the discharge head 34. Accordingly, air flowing through air intake ports 26 entirely passes through the gap between the discharge port 35 and the ceramic heater 42.

The characteristic features of the respective portions of the present invention have been described divisionally by way of several embodiments in order to facilitate understanding of the present invention. These characteristic features can be appropriately combined in accordance with the object. More specifically, the present invention can be practiced in various embodiments other than those shown in the drawings within the spirit and scope of the invention.

Claims

1. A flavor generation article characterized by comprising:

   a casing having an air intake port for taking in air therein and a suction port through which a user inhales a flavor, and forming a gas flow path between said intake port and said suction port;
   a material container for storing a liquid material which contains at least a flavor substance and having a discharge port for said material, said material container being mounted on said casing;
   discharge driving means for discharging said material from said container through said discharge port in the form of a liquid drop;
   gasifying means disposed in said gas flow path to receive the liquid drop of said material discharged from said container and gasify said material by electrically heating the liquid drop; and
   a power supply for supplying electric energy to said gasifying means.

2. A flavor generation article according to claim 1, characterized by further comprising a sensor for detecting an inhaling operation of the user and control means for controlling, based on a signal from said sensor, said discharge driving means so as to discharge said material from said container.

3. A flavor generation article according to claim 2, characterized in that said sensor comprises a pressure-sensitive sensor mounted on said casing around said suction port.

4. A flavor generation article according to claim 2 or 3, characterized in that said control means controls said gasifying means based on the signal from said sensor so that said gasifying means generates heat.

5. A flavor generation article according to claim 4, characterized in that said control means controls said gasifying means and said discharge driving means so as to preheat said gasifying means prior to discharge of said material.

6. A flavor generation article according to claim 1, characterized in that said power supply is disposed in said casing.

7. A flavor generation article according to claim 6, characterized in that said casing is constituted by first and second portions that are electrically connected to each other through a cable, said gas flow path, said container, said discharge driving means, and said gasifying means being disposed in said first portion, and said power supply being disposed in said second portion.

8. A flavor generation article according to claim 7, characterized in that said first and second portions of said casing are detachably connected to each other through a connecting portion.

9. A flavor generation article according to claim 1, characterized by further comprising an operation lever for manually operating said discharge driving means.

10. A flavor generation article according to any one of claims 1 to 9, characterized in that said gasifying means comprises a porous layer, and the liquid drop of said material is supplied onto said porous layer.

11. A flavor generation article according to any one of claims 1 to 10, characterized in that said gasifying means is arranged to oppose said discharge port, and a throttle hole for directing air flowing from said air intake port toward a gap between said discharge port and said gasifying means is disposed in said gas flow path.

12. A flavor generation article according to any one of claims 1 to 11, characterized in that said casing is formed with an outer air inlet hole in order to supply an outer air into said gas flow path between said gasifying means and said suction port.

13. A flavor generation article according to any one of claims 1 to 12, characterized by further comprising a formed body of a solid material containing at least

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a flavour substance and disposed in said gas flow path so as to be located between said gasifying means and said suction port.

14. A flavor generation article according to claim 13, characterized by further comprising heating means for heating said formed body.

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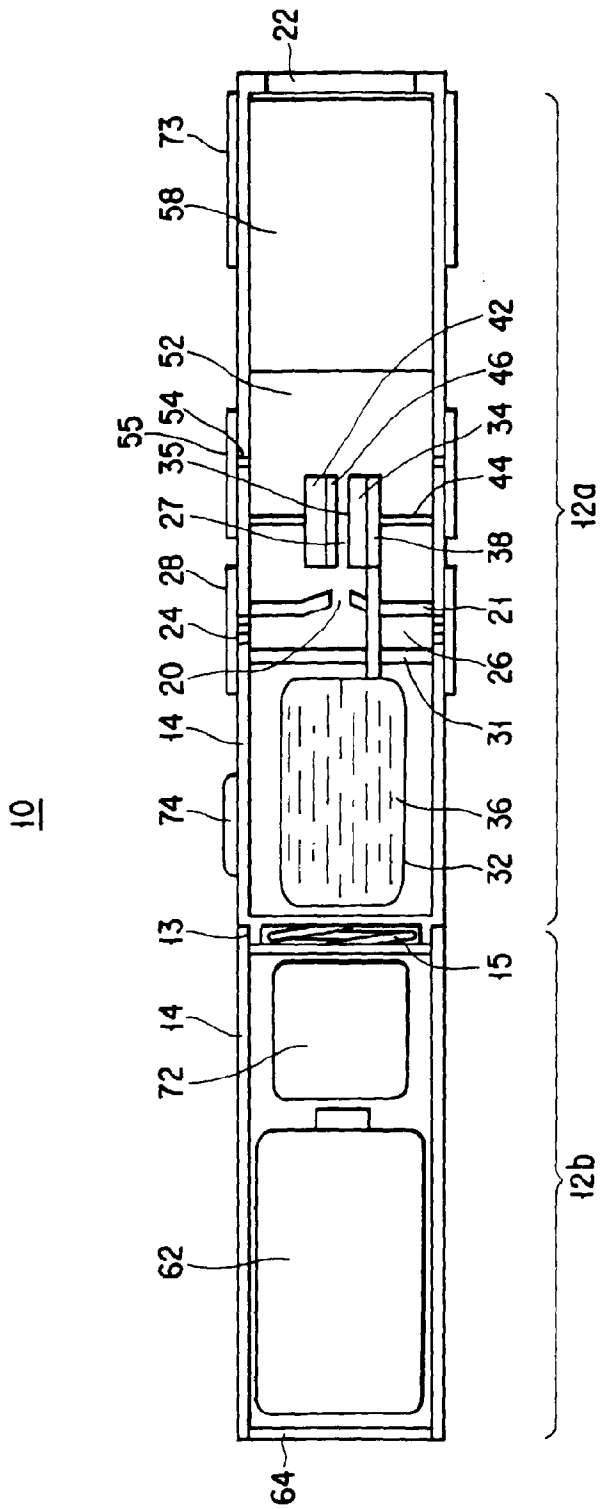


FIG. 1

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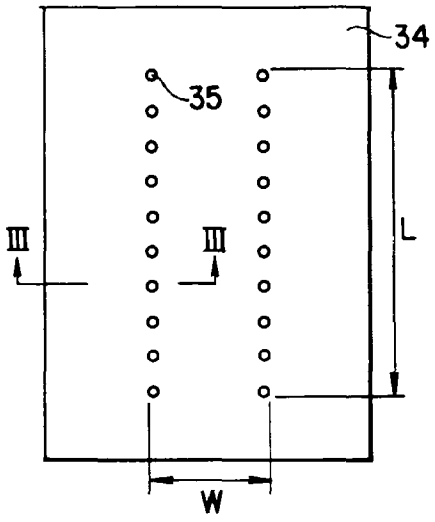


FIG. 2

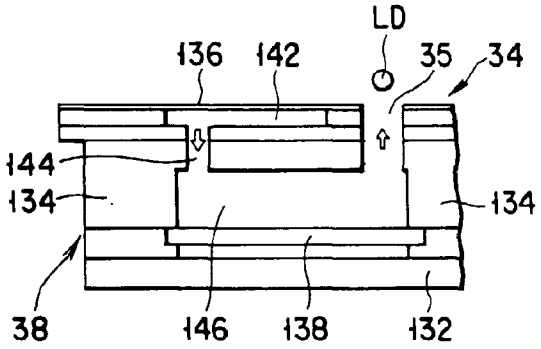


FIG. 3

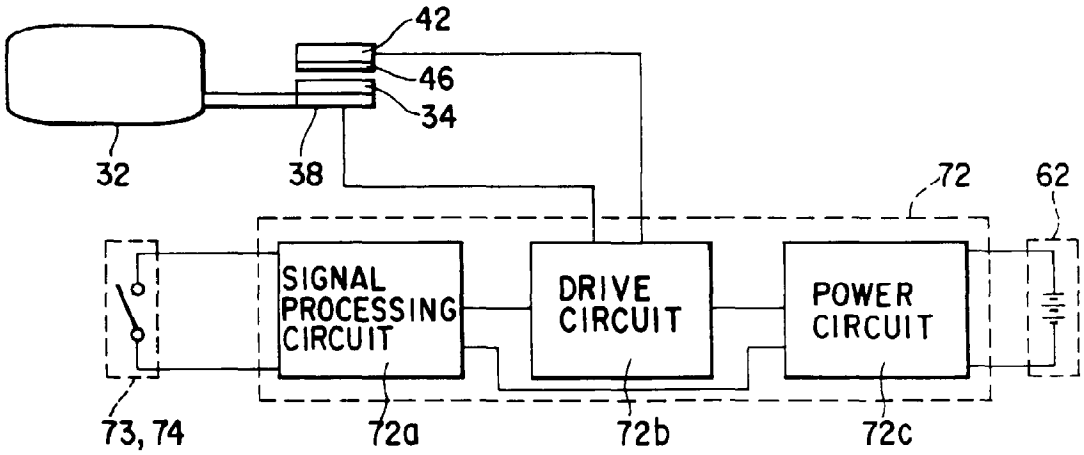


FIG. 4

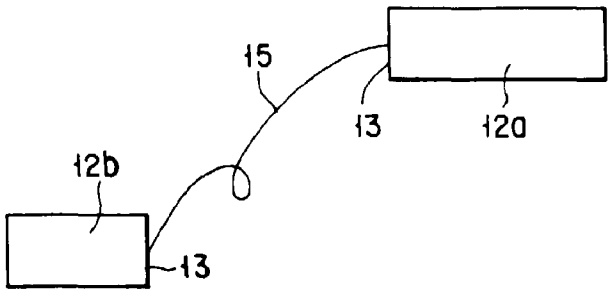


FIG. 5

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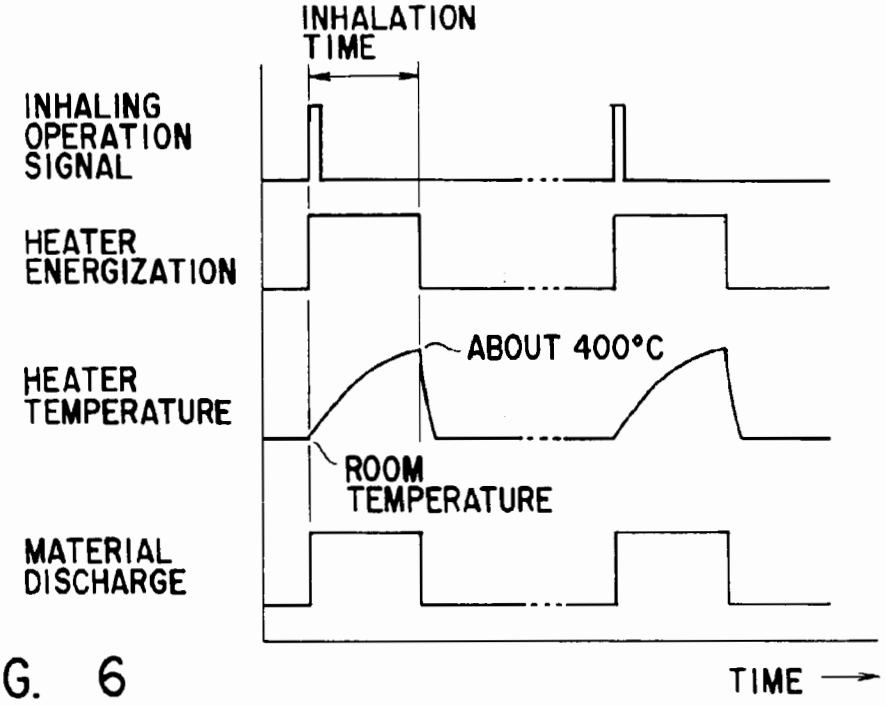


FIG. 6

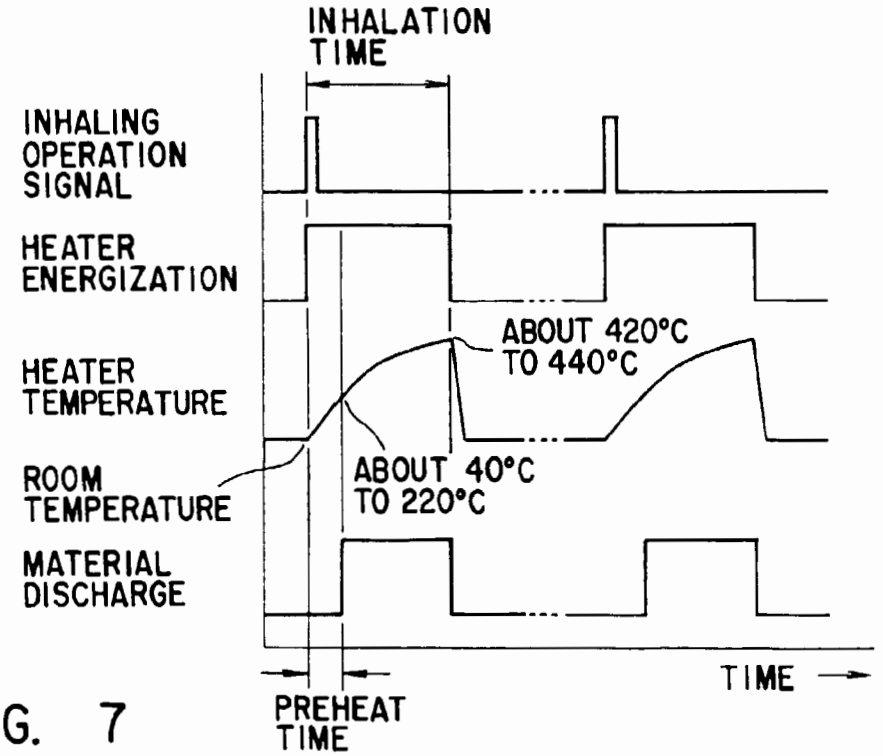


FIG. 7

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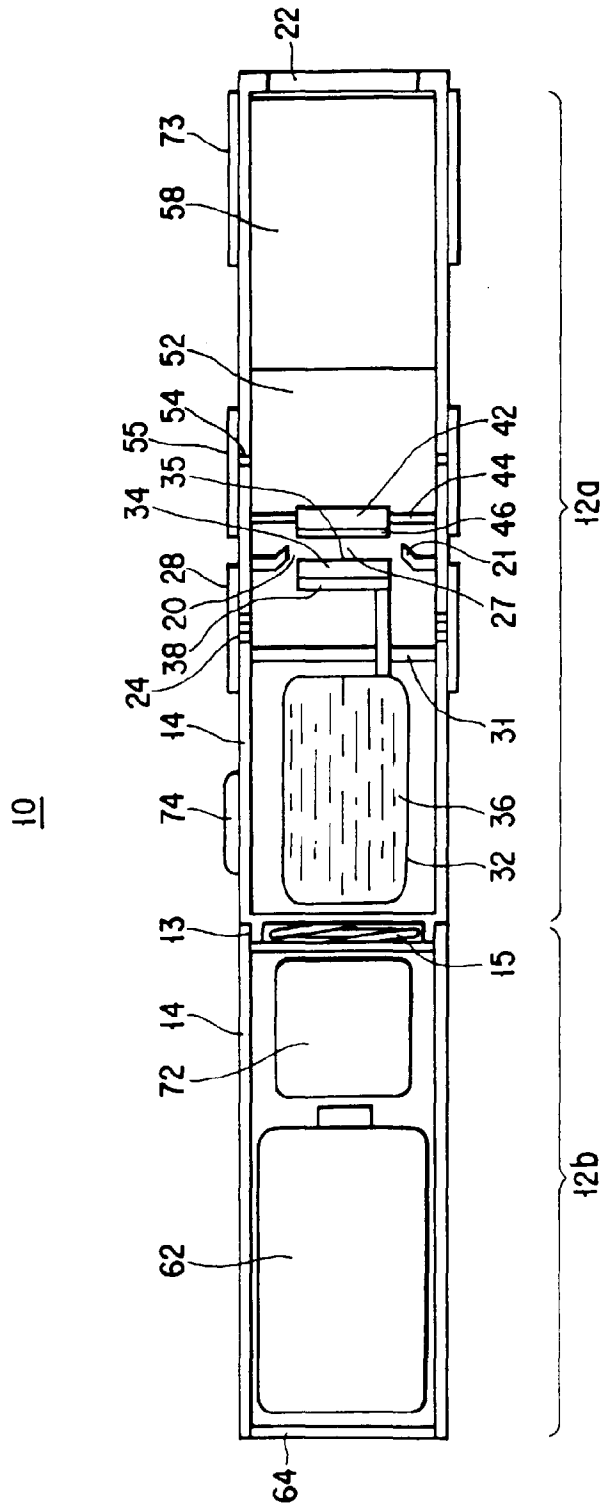


FIG. 8

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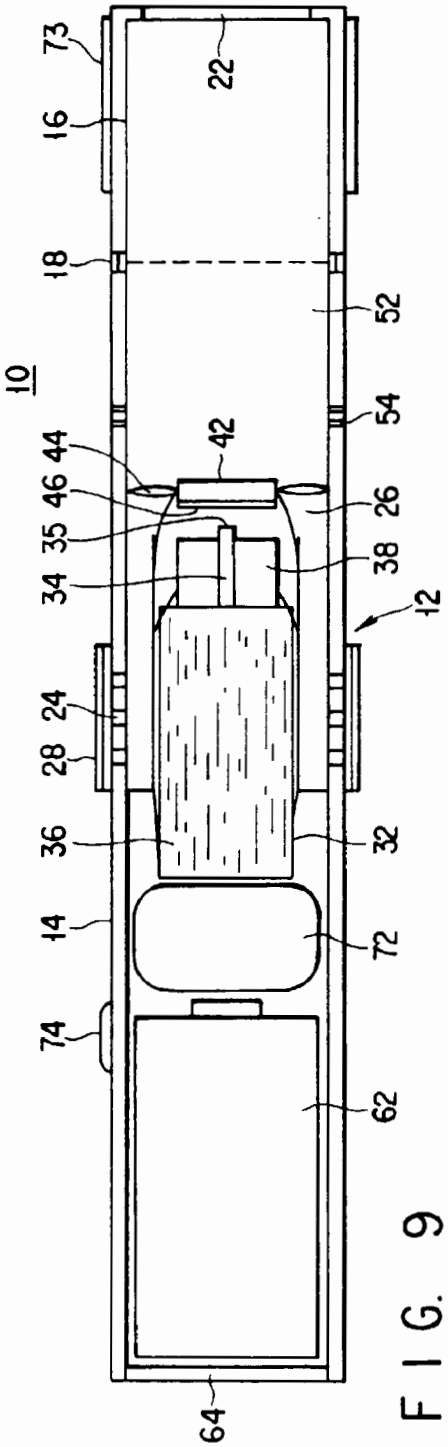


FIG. 9

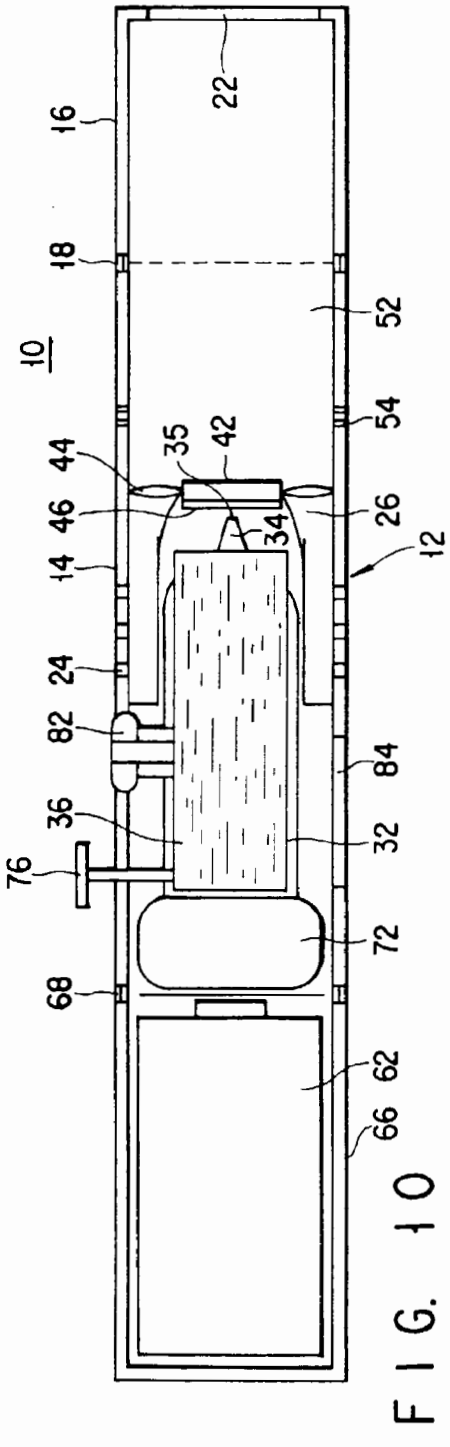


FIG. 10

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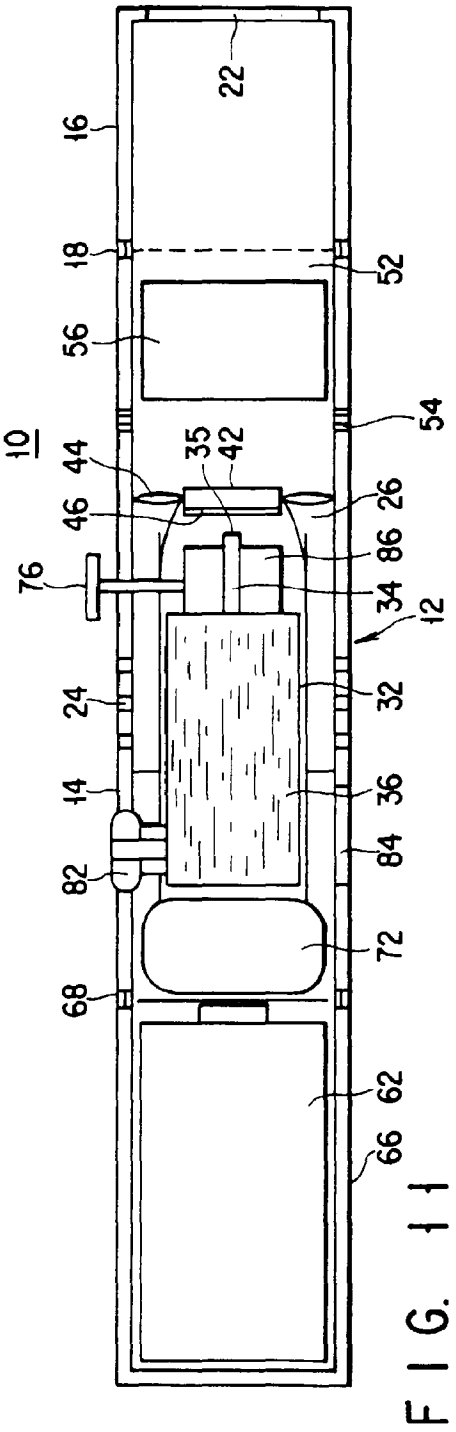


FIG. 11

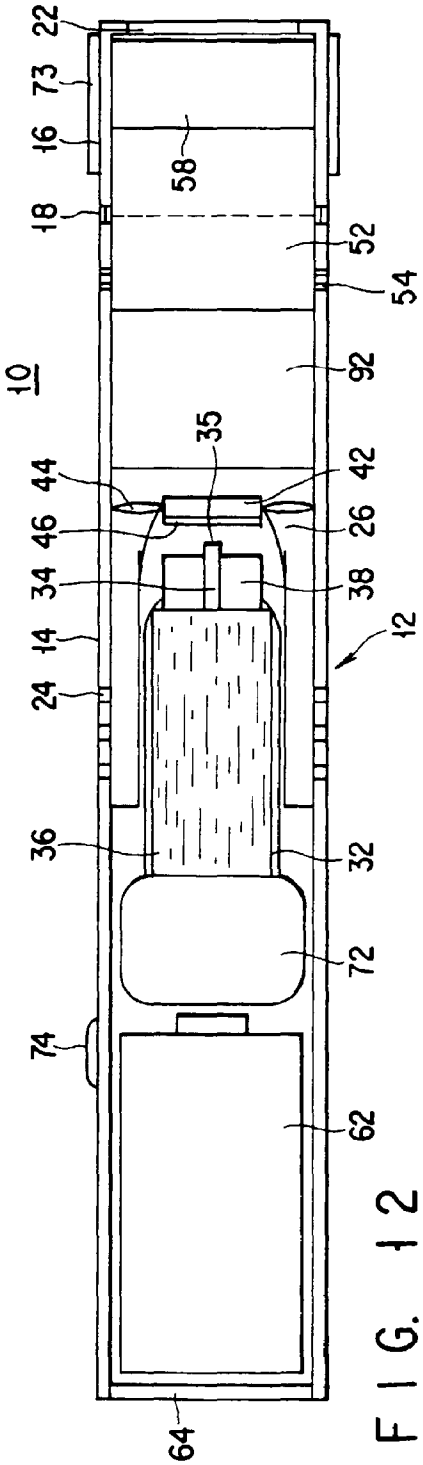


FIG. 12

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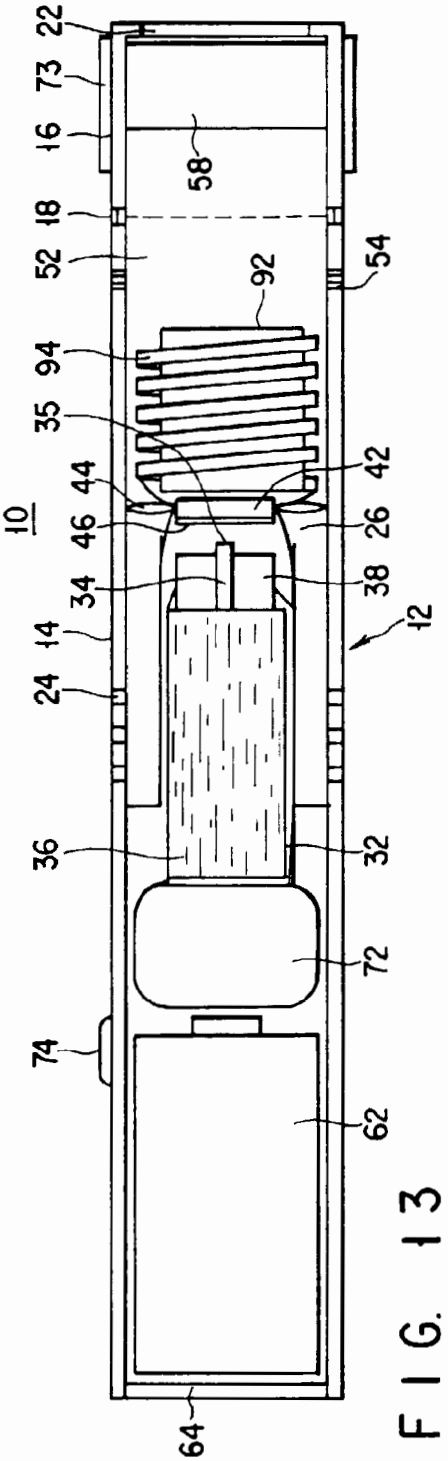


FIG. 13

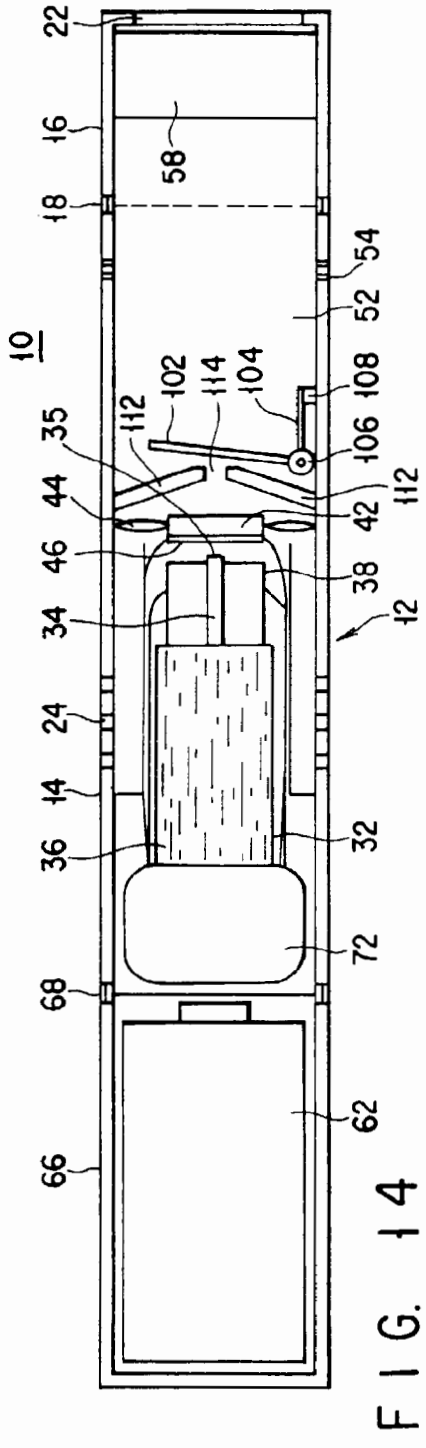


FIG. 14

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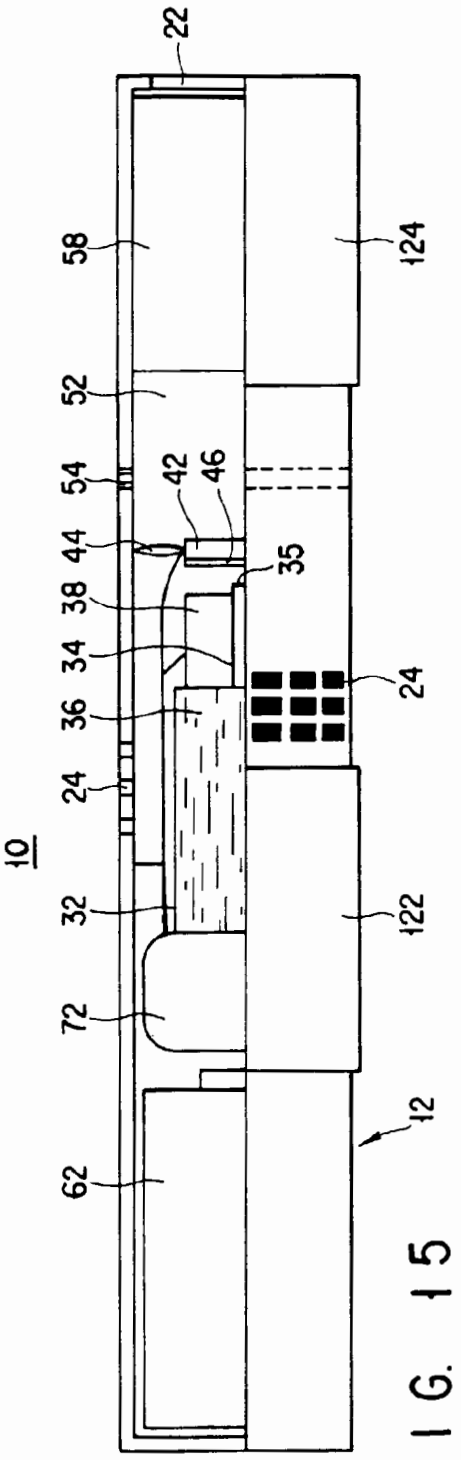


FIG. 15

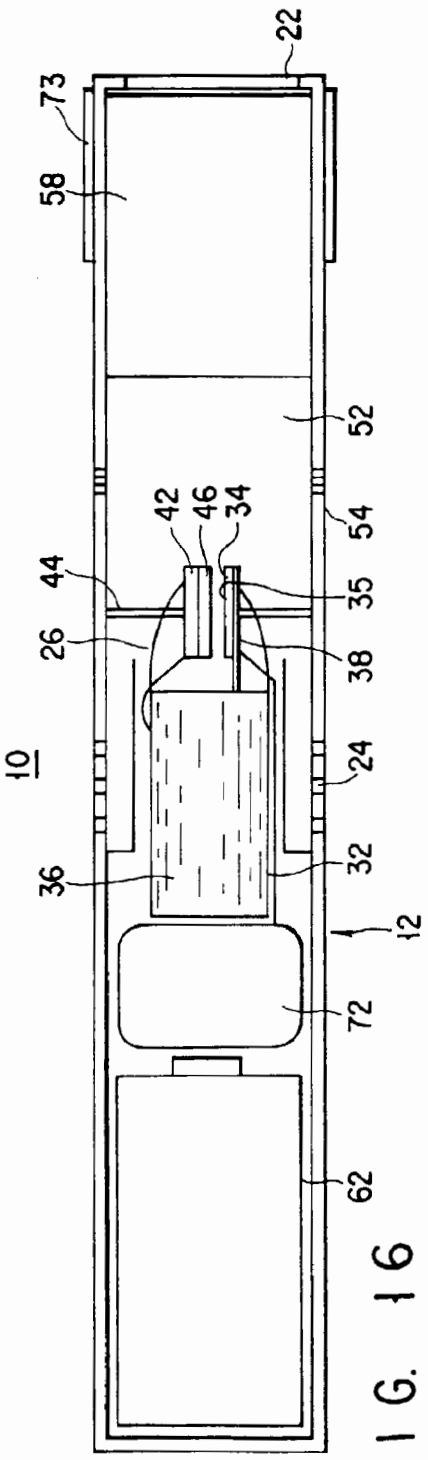


FIG. 16

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/01953

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl^6 A24F47/00 // A61M15/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
Int. Cl^6 A24F47/00, A61M15/06

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 48-8231, B1 (Kikuo Takeda), March 12, 1973 (12. 03. 73)(Family: none)	1 - 14
A	US, 4303083, A (Robert P. Burruss, Jr.), December 1, 1981 (01. 12. 81)(Family: none)	1 - 14
A	US, 4735217, A (The Procter & Gamble Co.), April 5, 1988 (05. 04. 88)(Family: none)	1 - 14
A	US, 4846199, A (The Regents of the University of California), July 11, 1989 (11. 07. 89) & US, 4945928, A & US, 5316759, A	1 - 14
A	JP, 2-124081, A (R.J. Reynolds Tobacco co.), May 11, 1990 (11. 05. 90) & US, 4922901, A & US, 4947875, A & EP, 358114, A2	1 - 14
A	JP, 2-124082, A (R.J. Reynolds Tobacco Co.), May 11, 1990 (11. 05. 90),	1 - 14

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search	Date of mailing of the international search report
July 30, 1997 (30. 07. 97)	August 12, 1997 (12. 08. 97)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/01953

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	& US, 4947874, A & EP, 358002, A2	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

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Espacenet

Bibliographic data: WO2004080216 (A1) — 2004-09-23

A NON-SMOKABLE ELECTRONIC AEROSOL CIGARETTE

Inventor(s): HON LIK [CN] ± (HON, LIK)

Applicant(s): BEST PARTNERS WORLDWIDE LTD [VG]; HON LIK [CN] ± (BEST PARTNERS WORLDWIDE LIMITED, ; HON, LIK)

Classification: - international: ***A24F47/00;*** (IPC1-7): A24B15/16
- cooperative: **A24F47/002; B05B17/0638**

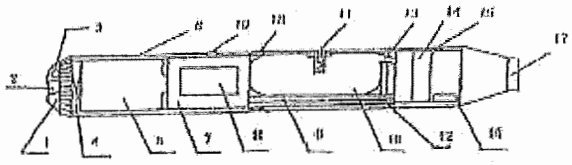
Application number: WO2004CN00183 20040308

Priority number (s): CN2003111173 20030314

Also published as: WO2004080216 (A8) TW200529773 (A) TWI316847 (B) RU2005115957 (A) RU2336002 (C2) more

Abstract of WO2004080216 (A1)

The invention relates to a non-smokable electronic aerosol cigarette which only comprises nicotine without harmful tar.The féatures of the invention are: the air flow sensor which is located in the smoking-mouth of the cigarette end is connected to the circuit -plate to start the atomiser high frequency vibrator which connects with the nicotine solution storaging via the spray pipes, the high frequency vibrator is connected to the count routes and the display screen, there is an end shield in the front of the cigarette with cells and light diodes.This device may imitate the traditional smoking pattern and effect, the smokers would feel smoking, and it has no side effect, it realizes "smoking without harm".



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(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日：
2004年9月23日(23.09.2004)

PCT

(10) 国际公布号：
WO 2004/080216 A1

(51) 国际分类号[7]: A24B 15/16

(21) 国际申请号: PCT/CN2004/000183

(22) 国际申请日: 2004年3月8日(08.03.2004)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
03111173.4 2003年3月14日(14.03.2003) CN

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(81) 指定国(除另有指明, 要求每一种可提供的国家保护): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

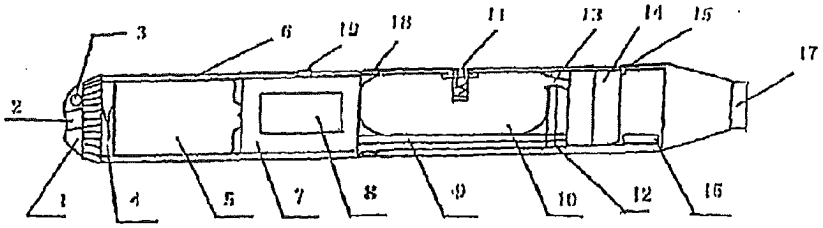
(84) 指定国(除另有指明, 要求每一种可提供的地区保护): ARIPO(BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), 欧亚专利(AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), 欧洲专利(AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

本国际公布:
— 包括国际检索报告。

所引用双字母代码和其它缩写符号，请参考刊登在每期PCT公报期刊起始的"代码及缩写符号简要说明"。

(54) Title: A NON-SMOKABLE ELECTRONIC AEROSOL CIGARETTE

(54) 发明名称: 一种非可燃性电子雾化香烟



(57) Abstract: The invention relates to a non-smokable electronic aerosol cigarette which only comprises nicotine without harmful tar.The features of the invention are: the air flow sensor which is located in the smoking-mouth of the cigarette end is connected to the circuit -plate to start the atomiser high frequency vibrator which connects with the nicotine solution storaging via the spray pipes, the high frequency vibrator is connected to the count routes and the display screen, there is an end shield in the front of the cigarette with cells and light diodes.This device may imitate the traditional smoking pattern and effect, the smokers would feel smoking, and it has no side effect, it realizes "smoking without harm".

[见续页]

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(57) 摘要

本发明涉及一种不含有害焦油，只含烟碱(尼古丁)的非可燃性电子雾化香烟。本发明的特点是，构成香烟尾端烟嘴处设置的气流传感器连至电路板上用于启动经供液管与贮存烟碱溶液相接的雾化器高频振荡器，高频振荡器接计数线路和显示屏，香烟前端为装有电池并带有发光二极管的端罩。该装置可逼真的模拟传统的吸烟方式和效果，使吸烟者有吸烟的感觉，而且无副作用，可实现“吸烟无害健康”。

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一种非可燃性电子雾化香烟

技术领域

本发明涉及一种不含有害焦油，只含烟碱(尼古丁)的非可燃性电子雾化香烟。

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，要吸烟者完全戒烟是一桩极端困难的事。

香烟的有效成分是烟碱(尼古丁)，吸烟时烟碱随着香烟燃烧时产生的大量焦油雾滴进入肺泡后迅速吸收，烟碱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，烟草焦油是由数百种成分组成。 其中有数种成分内是致癌物。目前证实二次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

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是用较纯的烟碱制成诸如“戒烟贴”、“烟碱含漱水”、“包装有抛射剂的高压气罐喷雾剂”、“烟碱口香糖”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，不能解决需要烟碱“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

本发明的目的是克服避免了上述缺点，提供一种可模拟吸烟并有吸烟效果,更接近真实的人性化电子雾化香烟。

本发明的特点是，构成香烟的尾端烟嘴初设置的气流传感器连至电路板上用于启动经供液管与贮存烟碱溶液相接的雾化器高频振荡器，高频振荡器接计数电路和显示屏，香烟前端为装有电池并带有发光二极管的端罩。它的基本工作原理是当把烟嘴放在嘴上吸气时，气流传感器输出电信号启动电路，装置在电路板上的高频振荡电路启动向雾化器提供驱动电压，另一组直流渐变信号供给红色发光二极管发出渐变的红光。雾化器上的双压电片发射超声波用于雾化，贮存于塑胶容器中的烟碱溶液经供液管输入雾化器中，经微喷雾化成直径为 1-15μm 的液滴，其中 75%的液滴直径在 6μm 以下，与进气孔的空气流混合后，能到达细支气管和肺泡中，每次的供液量在 3-50μl 之间，这样就能在 10 分钟之内使烟碱在血液中的浓度达到 30ng/ml 左右，通过液晶显示屏可分别显示出烟碱溶液的消耗量，每

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天吸烟的次数，对使用者提供警示信息。使用者可通过单向阀补充烟碱溶液。

该装置可逼真的模拟传统的吸烟方式和效果，使吸烟者有吸烟的感觉，而且还无副作用，可实现“吸烟无害健康”。

附图说明

图 1 为本发明的结构示意图。

图 2 为本发明的结构框图。

图 3 为本发明的雾化器结构示意图。

具体实施方式

本发明将烟碱的水、醇溶液微喷雾化，经口吸入肺中吸收，该装置包括壳体、高频发生器、烟碱贮液及容器、微喷雾化器、气流传感器及附件组成的整体。壳体外形是直管状，也可以略有曲线形,还可以是通常的烟嘴形，笔形或其他艺术品形象。壳体一端装有红色塑料帽状装饰物，内置红色二极发光管，电池是可充电锂电池，也可是镍氢电池。高频振荡器是集成电路与功放管组成的三点式电容振荡器、三点式电感振荡器或变压器式振荡电路，频率在 35KHZ 至 2.2MHZ，电路中带有频率自动微调电路与压电片谐振，液晶显示器显示该装置启动次数和贮液量。塑胶容器由硅橡胶制成，不被烟碱浸入的高分子化合物也可使用。注液单向阀是由球状物或锥状物在弹簧压力下密封的。气流传感器是由薄膜状热敏电阻阵列或硅芯片制成的。该装置包

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含一片粘合了一个环形径向极化压电片的中间有微喷孔阵列的雾化膜片，微喷孔阵列的外周有一圆形波纹环。与该雾化膜片对应的振动膜片上粘合一个圆形单层或多层纵向极化压电片，此振动膜片上开有凹槽或加入垫圈以同雾化膜片组成液体腔。该液体腔边缘开一小孔以连接具有阻尼作用的供液管。该装置是由交流电信号分别驱动两个压电片形成纵向压力波和径向振动波将液体从微喷孔处挤出并雾化。两个压电片各有两个压电信号输入端，压电信号的频率可以不同或一致。两个压电片是同 PZT、PMN、PNN、PSN、PMN-PT、PNN-PT、PSN-PT、PZN-PT 之一，并具有单层结构或者是不同成分的叠层结构。振动膜片和雾化膜片是由单晶硅片加工成的，也可用耐腐蚀金属或合金制成，如镍片、镍钴合金片、镍钯合金片、镍镉钴铑合金片等。振动膜片和雾化膜片粘合后组成液体腔，液体腔中有由天然纤维或合成纤维制作的供液纤维团。烟碱（尼古丁）溶液是由烟碱、水、乙醇、丙三醇、薄荷醇、烟草香精、抗氧剂、氨水组成。烟碱来自烟草总提取物中的 4 种烟碱的混合物，也可称为烟草总生物碱，尼古丁是最多的一种，所以用纯尼古丁也可代替烟碱。烟碱（尼古丁）浓度在 0.1%-30%之间。该装置可用于经口腔和鼻腔对肺内输送药物或药物前体，提供一种便携式雾化给药装置。

图 1 是这种电子香烟的结构图。图中的 1 是红色有机玻璃，2 是充电插孔，3 是红色发光二极管，4 是弹簧，5 是锂电池，6 是带有旋口 18 的壳体，7 是电路板，8 是液晶显示屏，9 是信号传输导线，10 是塑胶容器，11 是连接到塑胶容器口的注液单向阀，12 是密封

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隔板，13 是供液管，14 是雾化器，15 是进气孔，16 是气流传感器，17 是烟嘴，19 是电源开关。

参照图 1 所示组装各部件成为总体，其中电路板 7 中的电路设计方框图在图 2 中标出，其高频振荡器中带有频率自动微调的目的是使压电片始终处于谐振点,雾化器 14 是由双压电片构成的微喷和雾化两种作用，其结构在图 3 中示出，其工作原理是利用两个压电片分别驱动组成供液腔的振动膜片和雾化膜片，圆形压电片与振动膜片粘合后组成压电换能器，在液体喷出方向提供高速纵向压力波以使液体经微喷孔处高速喷出。环行压电片与带有微喷孔的雾化膜片粘合组成另一压电换能器。向即将离开微喷孔的液滴提供径向振动波，使液滴进一步破碎。在振动膜片与雾化膜片组成的供液腔中加入一疏松纤维团可改善微喷孔阵列中各微喷孔的能量及液体分配，使之趋于平均，振动膜片和雾化膜片可用单晶硅片或耐腐蚀金属合金制成。改变环行压电片和圆形压电片的驱动电压和频率可获得不同直径的雾滴分布曲线。在微喷孔直径在 4-10μm 时，雾滴直径在 1-15μm 的范围内，经调试后充入烟碱溶液即可使用。

图 3 中的 141 为环型压电片，142 为雾化膜片，143 为波纹槽，144 为纤维团，145 为振动膜片，146 为圆形压电片，147 为供液腔，148 为微喷口，149 为压电片引线，1410 为供液管，1411 为垫圈，1412 为凹槽。

烟碱溶液的配制:

用在烟草中提取的 95%以上的液态烟碱依次加入水、乙醇、丙三醇、薄荷醇、烟草香精、抗氧剂后加氨水调整 PH 值在 7.5-11 之间，烟

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碱浓度可在 1%-30%之间变动，浓度太高使误差增大，水的加入量可在 20%-80%之间变动，乙醇的加入量可在 20%-80%之间变动，丙三醇的最高浓度应在 45%以下，抗氧剂为丁基化的羟基茴香醚。

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权利要求书

1．一种非可燃性电子雾化香烟，其特征是构成香烟的尾端烟嘴处设置的气流传感器连至电路板上用于启动经供液管与贮存烟碱溶液相接的雾化器高频振荡器，高频振荡器接计数电路和显示屏，香烟前端为装有电池并带有发光二极管的端罩。

2．按照权利要求 1 所述的电子雾化香烟，其特征是壳体外形是直管状，也可以略有曲线形，还可以是通常的烟嘴形,笔形或其他艺术品形象。

3．按照权利要求 1 所述的电子雾化香烟，其特征是高频振荡器的振荡频率在 35KHZ 至 2.2MHZ，电路中带有频率自动微调电路与压电片谐振。

4．按照权利要求 1 所述的电子雾化香烟，其特征是塑胶容器由硅橡胶制成，注液单向阀是由球状物或锥状物在弹簧压力下密封的，气流传感器是由薄膜状热敏电阻阵列或硅芯片制成的。

5．按照权利要求 1 所述的电子雾化香烟，其特征是与该雾化膜片对应的振动膜片上粘合一个圆形单层或多层纵向极化压电片，此振动膜片上开有凹槽或加入垫圈以同雾化膜片组成液体腔，该液体腔边缘开一个小孔以连接具有阻尼作用的供液管。

6．按照权利要求 1 所述的电子雾化香烟，其特征是两个压电片各有两个压电信号输入端，压电信号的频率可以不同或一致。

7．按照权利要求 1 所述的电子雾化香烟，其特征是振动膜片和

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雾化膜片是由单晶硅片加工成的，也可以用耐腐蚀金属或合金制成，如镍片、镍钴合金片、镍钯合金片、镍铬钴镍铑合金片。

8．按照权利要求 1 所述的电子雾化香烟，其特征是振动膜片和雾化膜片粘合后组成液体腔，液体腔中有由天然纤维或合成纤维制作的供液纤维团。

9．按照权利要求 1 所述的电子雾化香烟，其特征是烟碱(尼古丁)溶液是由烟碱、水、乙醇、丙三醇、薄荷醇、烟草香精、抗氧剂、氨水组成。

10．按照权利要求 1 所述的电子雾化香烟，其特征是烟碱(尼古丁)浓度在 0.1%-30%之间。

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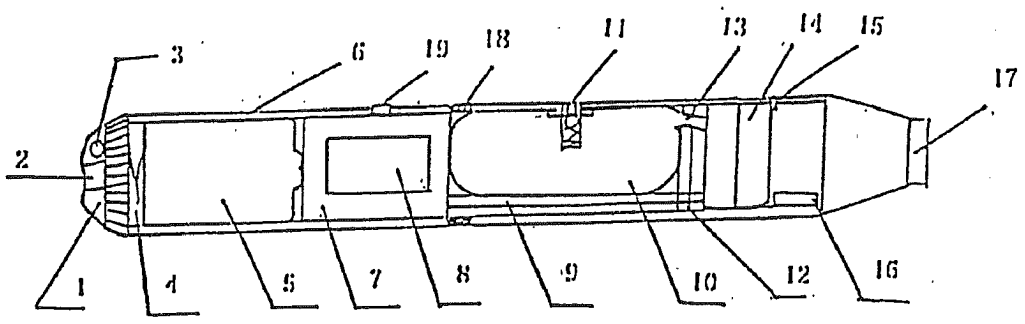


图 1.

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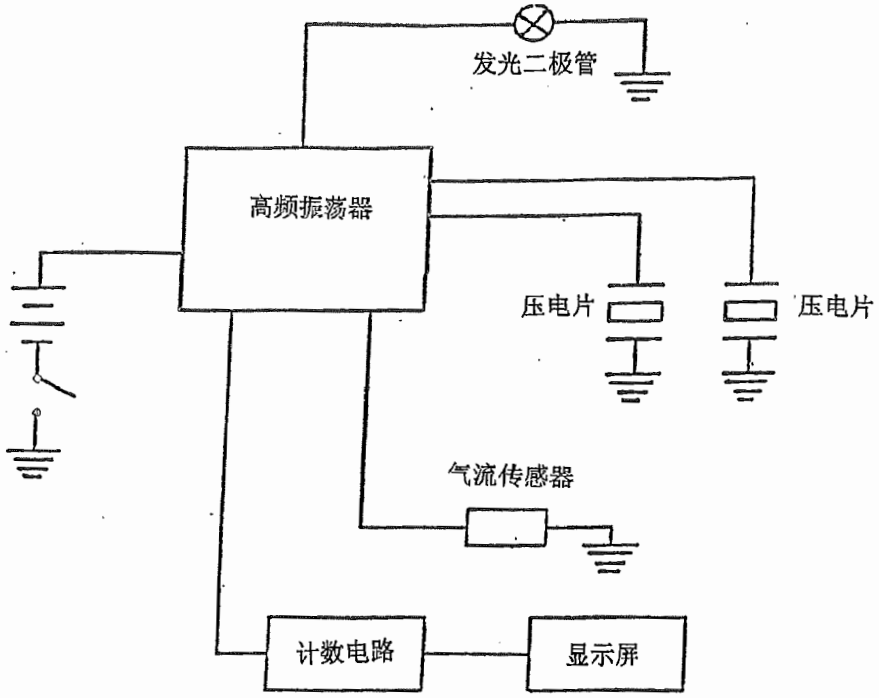


图 2

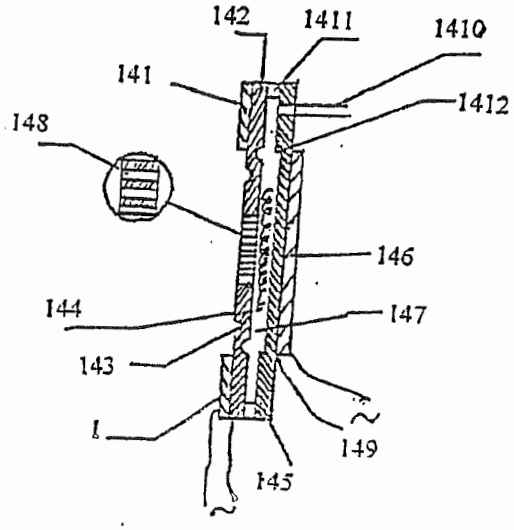


图 3

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2004/000183

A. CLASSIFICATION OF SUBJECT MATTER

IPC7:A24815/16

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7:A24B15/16

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

IPC7:A24B+,A24C+,A24D+,A24F+

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC,PAJ,WPI,CNPAT nicotine,cigarette+,electronic+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO,A2,00/49901(WEBER-QUITZAU,et al),31.Aug .2004,the whole document	1-10
A	US,A,5190060(B.A.Cigarettenfabriken GmbH),02.Mar.1993,the whole document	1-10
A	CN,U,2047485(ZHAO yuzhong),15.Nov.1989,the whole document	1-10

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25.May 2004(25.05.2004)	10 · JUN 2004 (10 · 06 · 2004)
Name and mailing address of the ISA/CN 6 Xitucheng Rd.,Jimen Bridge,Haidian District, 100088 Beijing ,China Facsimile No. (86-10)62019451	Authorized officer Bianxin Telephone No. (86-10)62-85763

Form PCT/ISA /210 (second sheet) (January 2004)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2004/000183

Cited documents	published date	families	published date
WO0049901A2	31.Aug. 2000	CA2360852A	31.Aug. 2000
		EP1178741A	13.Feb. 2002
		JP2003500008T	07.Jan. 2003
US5190060A	02.Mar. 1993	DE3910899A	11.Oct. 1990
CN2047485U	15.Nov. 1989	None	

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国际检索报告

国际申请号
PCT/CN2004/000183

A. 主题的分类

IPC7：A24B15/16

按照国际专利分类表(IPC)或者同时按照国家分类和IPC两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC7：A24B15/16

包含在检索领域中的除最低限度文献以外的检索文献

IPC7：A24B+,A24C+,A24D+,A24F+

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

EPODOC,CNPAT,WPI,PAJ

Nicotine,cigarette+,electronic+

C. 相关文件

类　型*	引用文件，必要时，指明相关段落	相关的权利要求
A	WO,A2,00/49901(WEBER-QUITZAU,et al) ,2000年8月31日，全文	1－10
A	US,A,5190060(B.A.T.Cigarettenfabriken GmbH),1993年3月2日，全文	1－10
A	CN,U,2047485(赵玉忠)，1989年11月15日，全文	1－10

☐ 其余文件在C栏的续页中列出。　　☒ 见同族专利附件。

* 引用文件的具体类型：
"A" 认为不特别相关的表示了现有技术一般状态的文件
"E" 在国际申请日的当天或之后公布的在先申请或专利
"L" 可能对优先权要求构成怀疑的文件，为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件
"O" 涉及口头公开、使用、展览或其他方式公开的文件
"P" 公布日先于国际申请日但迟于所要求的优先权日的文件
"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件
"X" 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性
"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性
"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
25.5月 2004（25.05.2004）	10·6月·2004（10·06·2004）
中华人民共和国国家知识产权局(ISA/CN) 中国北京市海淀区蓟门桥西土城路6号 100088 传真号：　(86-10)62019451	授权官员 边昕 辽 电话号码：(86-10)62085763

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国际检索报告
关于同族专利的信息

国际申请号
PCT/CN2004/000183

检索报告中引用的专利文件	公布日期	同族专利	公布日期
WO0049901A2	31.8 月 2000	CA2360852A	31.8 月 2000
		EP1178741A	13.2 月 2002
		JP2003500008T	07.01 月 2003
US5190060A	02.03 月 1993	DE3910899A	11.10 月 1990
CN2047485U	15.11 月 1989	None	

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Espacenet

Bibliographic data: WO2005099494 (A1) — 2005-10-27

AN AEROSOL ELECTRONIC CIGARETTE

Inventor(s): HON LIK [CN] ± (HON, LIK)

Applicant(s): HON LIK [CN] ± (HON, LIK)

Classification: - international: ***A24D1/18; A24F47/00; A61M15/00; A61M15/06; C01B39/06;*** (IPC1-7): A24F47/00
- cooperative: **A24F47/002; A24F47/008; A61M15/0085; A61M15/06**

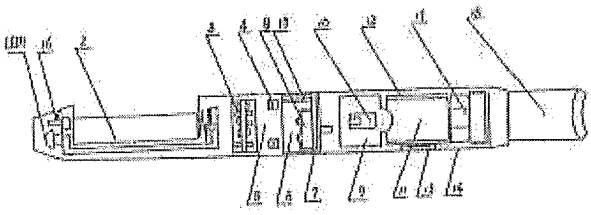
Application number: WO2005CN00337 20050318

Priority number (s): CN2004231182U 20040414

Also published as: EP1736065 (A1) EP1736065 (A4) EP1736065 (B1) US2013213420 (A1) US2012285476 (A1) more

Abstract of WO2005099494 (A1)

This 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 are an electronic circuit board, a constant pressure cavity, a sensor, a gasliquid 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 duct. A negative pressure cavity is located in the 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 duct. The air orifice, the constant pressure, the sensor, the gasliquid separator, the atomizer, and the mirage duct connect orderly and throughout. Without tar, this invention reduces the risk of suffering cancer, meets the requirement of the smoker, need no ignition, and has no endanger of fire.



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Espacenet

Description: WO2005099494 (A1) — 2005-10-27

AN AEROSOL ELECTRONIC CIGARETTE

Description not available for WO2005099494 (A1)
Description of corresponding document: EP1736065 (A1)

The EPO does not accept any responsibility for the accuracy of data and information originating from other authorities than the EPO; in particular, the EPO does not guarantee that they are complete, up-to-date or fit for specific purposes.

Technical Field

[0001] The present invention relates to an electronic cigarette, in particular to an electronic atomization cigarette that contains only nicotine without tar.

Background Art

[0002] Despite it is commonly known that "smoking is harmful to your health", the number of smokers worldwide is up to 1 billion, and the number is increasing every year, On March 1, 2003, the World Health Organization (WHO) concluded a global Framework Convention on Tobacco Control. According to the statistical data from WHO, about 4.9 million people die of diseases caused by smoking each year. Although smoking may cause serious respiratory diseases and cancer, it remains extremely difficult for smokers to quit smoking completely.

[0003] The active ingredient in a cigarette is nicotine. During smoking, nicotine, along with a lot of tar aerosol droplets produced in the cigarette burning, enters smoker's alveolus and is rapidly absorbed. After being absorbed into the blood of a smoker, nicotine then produces its effect on the receptors of the smoker's central nervous system, which makes him/her relax and enjoy an inebriety similar to that produced by an exhilarant.

[0004] Nicotine is a kind of alkaloid with low molecular weight, a small dose of nicotine is essentially harmless to human body and its half-life in blood is quite short. Actually the major harmful substance in tobacco is tar, tar in tobacco is composed of thousands of ingredients, tens of which are cancerogenic substances. At present it has been proven that passive smoking can be more harmful on non-smokers.

[0005] Some cigarette substitutes that contain only nicotine without tar have been proposed, many of them, such as "nicotine patch", "nicotine mouthwash", "spray agent packaged in high pressure gas tank with propellant", "nicotine chewing gum", "nicotine

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drink" etc., are made of pure nicotine. Although these cigarette substitutes are free from tar, their major disadvantage is that an effective peak concentration can not be reached in the blood of a smoker due to slow absorption of nicotine and thus it can not make a smoker get real fun, in addition, these cigarette substitutes can not satisfy habitual smoking actions of a smoker, for example, inhaling action or sucking action, and thus are not likely to be widely accepted as effective substitutes for quitting smoking or cigarette substitutes.

The Summary of the Invention

[0006] To overcome the above-mentioned drawbacks, an objective of the present invention is to provide an electronic atomization cigarette that functions as substitutes for quitting smoking and cigarette substitutes.

[0007] The objective of the present invention is achieved by the following technical solution.

[0008] The present invention includes a shell; a mouthpiece; an air inlet provided in the external wall of the shell; an electronic circuit board, a normal pressure cavity, a sensor, a vapor-liquid separator, an atomizer, a liquid-supplying bottle arranged sequentially within the shell; a stream passage provided on one side of the sensor; a negative pressure cavity provided in the sensor; an atomization cavity arranged in the atomizer; a retaining ring for locking the liquid-supplying bottle provided between one side of the liquid-supplying bottle and the shell; and an aerosol passage provided on the other side of the liquid-supplying bottle, wherein the electronic circuit board comprises an electronic switching circuit and a high frequency generator; the liquid-supplying bottle is in contact with the atomizer; and the air inlet, normal pressure cavity, vapor-liquid separator, atomizer, aerosol passage, gas vent and mouthpiece are sequentially interconnected. A LED and a cell are provided at the front end within the shell, collectively constituting an integrity like a cigarette holder, cigar or a pipe.

[0009] Furthermore, a display screen is additionally provided on the inner wall of the shell; a microswitch for manually cleaning is connected to the sensor in parallel connection within the shell; a ripple film is provided between the sensor and the negative pressure cavity inside the sensor; a first magnetic steel, a second magnetic steel and a Reed switch connected between them provided within the sensor, wherein the second magnetic steel is attached to the ripple film; a silicon gel check valve is provided within the sensor, a third magnetic steel is provided the silicon gel check valve, and a Reed switch is provided outside the valve, on the side close to the magnetic steel; a through hole is arranged on the vapor-liquid separator, a silicon gel check valve covers the through hole on the vapor-liquid separator; a overflow hole is provided on the atomization cavity wall of the atomization cavity, a heating element is provided within the atomization cavity, a long stream ejection hole is provided on one side of the heating element, the porous body is arranged outside around the atomization cavity wall, the first piezoelectric element is provided on one side of the atomizer, and a bulge is provided on the other side; the second piezoelectric element is additionally provided in the atomizer; the porous body in the atomizer can be made of foam nickel, stainless steel fiber felt, high molecule polymer foam and foam ceramic; the heating element can be made of platinum wire, nickel chromium alloy or iron chromium aluminum alloy wire with rare earth element, or may be made into a sheet form with conductive ceramics or PTC ceramics; the atomization cavity wall can be made of aluminum oxide or ceramic; the vapor-liquid separator can be made of plastic

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or silicon rubber; the solution storage porous body is included in the liquid-supplying bottle, and can be filled with polypropylene fiber, terylene fiber or nylon fiber, or be filled with plastics that are shaped by foaming; alternatively, it may be modeled into a column with laminated layers by polyvinyl chloride, polypropylene, polycarbonate; the Reed switch, the first magnetic steel, the second magnetic steel, the ripple film can be replaced by a semiconductor strain gauge with sealed film, which is mounted in the place of the sensor ripple film.

[0010] The present invention also discloses an electronic atomization cigarette with another structure, wherein the atomizer is postposed within the shell, the liquid-supplying bottle is arranged between the vapor-liquid separator and the atomizer, and a spring piece for pressing the liquid-supplying bottle on the atomizer is arranged at one end of the liquid-supplying bottle.

[0011] The advantages of the present invention include smoking without tar, significantly reducing the cancerogenic risk. Furthermore users still feel as if they are smoking and experiencing the same excitement, and the cigarette is no need to be lit and is no fire risk.

[0012] With slight modification of the solution storage container, the device and connecting structures of the present invention can be filled with conventional drug for pulmonary administration apparatus.

Description of the Drawings

[0013]
Fig. 1 is a schematic diagram of an overall structure according to the present invention;
Fig. 2 is a schematic diagram of another overall structure according to the present invention;
Fig. 3 is a schematic diagram of a overall structure with a display screen according to the present invention;
Fig. 4 is a structural diagram of a sensor according to the present invention;
Fig. 5 is a structural diagram of a sensor with a silicon gel check valve according to the present invention;
Fig. 6 is a structural diagram of an atomizer according to the present invention;
Fig. 7 is a structural diagram of the ceramic member in an atomizer according to the present invention;
Fig. 8 is a structural diagram of another atomizer according to the present invention;
Fig. 9 is a structural diagram of a vapor-liquid separator according to the present invention;
Fig. 10 is a structural diagram of another vapor-liquid separator according to the present invention;
Fig. 11 is a structural diagram of the connection of a liquid-supplying bottle and a mouthpiece according to the present invention;
Fig. 12 is a functional diagram of a circuit according to the present invention.

Detailed Description of the Invention

[0014] The present invention is further described below with reference to the accompanying drawings.

Embodiment 1

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[0015] As shown in Fig. 1, the present invention can form an integrity like a cigarette holder, a cigar or a pipe. An air inlet 4 is provided on the external wall of the shell 14. A LED 1, a cell 2, an electronic circuit board 3, a normal pressure cavity 5, a sensor 6, a vapor-liquid separator 7, an atomizer 9, a liquid-supplying bottle 11 and a mouthpiece 15 are sequentially provided within the shell 14. The electronic circuit board 3 comprises an electronic switching circuit and a high frequency generator. As shown in Fig. 4, a negative pressure cavity 8 is provided in the sensor 6 and is separated from the sensor 6 by a ripple film 22. A first magnetic steel 20, a second magnetic steel 21and a Reed switch 19 arranged between them is also provided within the sensor 6, and the second magnetic steel 21 is attached to the ripple film 22. The atomizer 9 is in contact with the liquid-supplying bottle 11 via the bulge 36, and the atomization cavity 10 is provided in the atomizer 9. As shown in Fig. 6 and 7, the overflow hole 29 is provided on the atomization cavity wall 25 of the atomization cavity 10. A heating element 26, which can be made of platinum wire, nickel chromium alloy or iron chromium aluminum alloy wire with rare earth element, is provided within the cavity, and can also be made into a sheet form with conductive ceramics or PTC ceramics. An ejection hole is provided on the side opposite to the heating element 26 and the ejection hole can be determined to select either the long stream ejection hole 24 or the short stream ejection hole 30, depending on the material used for the atomization cavity wall 25. The long stream ejection hole 24 can employ slot structure of 0.1 mm-1.3 mm or circular hole structure of ¦0.2 mm-1.3 mm with a single and multiple holes. The short stream ejection hole 30 has the diameter of about 0.3 mm-1.3 mm. The atomization cavity wall 25 is surrounded with the porous body 27, which can be made of foam nickel, stainless steel fiber felt, high molecule polymer foam and foam ceramic. A first piezoelectric element 23 is also provided on the atomizer 9. The atomization cavity wall 25 can be made of aluminum oxide or ceramic. As shown in Fig. 9, a through hole is provided on the vapor-liquid separator 7, and can be made of plastic or silicon rubber. As shown in Fig. 11, a retaining ring 13 for locking the liquid-supplying bottle 11 is provided between one side of the liquid-supplying bottle 11 and the shell 14, an aerosol passage 12 is provided on the other side of the liquid-supplying bottle. The solution storage porous body 28 is provided in the liquid-supplying bottle, and can be filled with polypropylene fiber, terylene fiber or nylon fiber, or be filled with plastic that are shaped by foaming, such as polyamine resin foam column or polypropylene foam column; alternatively, it may be made of a column formed by molding polyvinyl chloride, polypropylene, polycarbonate into a stack of laminated layers. The air inlet 4, normal pressure cavity 5, vapor-liquid separator 7, atomizer 9, aerosol passage 12, gas vent 17, mouthpiece 15 are sequentially interconnected.

[0016] As shown in the functional diagram of the circuit in Fig. 12, K1 refers to the Reed switch 19, RL refers to the heating element 26, LED1 refers to the Light Emitting Diode 1, U2 refers to the low voltage detecting element used for the over-discharging protection of the lithium cell, M1 refers to the first piezoelectric element 23, and C1, C2, R3, L1, C3, BG, M1 collectively constitute a Colpitts oscillator. The operating principle of the circuit is as follows: when K1 is closed, U1, i.e., the field effect power transistor, is turned on, RL starts, and the Colpitts oscillator starts oscillating, M1 will provide the high frequency mechanical oscillatory wave to the atomizer 9 to achieve the result of atomization.

[0017] When a smoker smokes, the mouthpiece 15 is under negative pressure, the air pressure difference or high speed stream between the normal pressure cavity 5 and the negative pressure cavity 8 will cause the sensor 6 to output an actuating signal, the

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electronic circuit board 3 connected therewith goes into operation. Now the ripple film 22 in the sensor 6 is deformed to take the second magnetic steel 21 away from the Reed switch 19, and the Reed switch 19 is then closed (i.e., K1 is closed) under the effect of the excessive magnetic line of force from the first magnetic steel 20, starting the field effect power transistor electronic switch (i.e., U1 is opened). The high frequency oscillator may uses the Colpitts oscillator with the frequency of 550KHz-8MHz, the automatic fine-adjusting element in the circuit resonates with the first piezoelectric element 23 in the form of a ring to supply power to liquid molecule, and the LED 1 can be lit under the supply of the rechargeable battery 2. The air enters the normal pressure cavity 5 through the air inlet 4, passes through the air passage 18 of the sensor and then the through hole in the vapor-liquid separator 7, and flows into the atomization cavity 10 in the atomizer 9. The high speed stream passing through the ejection hole drives the nicotine solution in the porous body 27 to eject into the atomization cavity 10 in the form of droplet, where the nicotine solution is subjected to the ultrasonic atomization by the first piezoelectric element 23 and is further atomized by the heating element 26. After the atomization, the droplets with large diameter stick to the wall under the action of eddy flow and are reabsorbed by the porous body 27 via the overflow hole 29, whereas the droplets with small diameter float in stream and forms aerosols, which are sucked out via the aerosol passage 12, gas vent 17 and mouthpiece 15. The solution storage porous body 28 in the liquid-supplying bottle 11 will be in contact with the bulge 36 on the atomizer 9, thereby achieving the capillary infiltration liquid-supplying.

[0018] The mouthpiece 15 is threaded. When the nicotine solution in the liquid-supplying bottle 11 is used up, users can screw the mouthpiece 15 out to take the liquid-supplying bottle 11 out, refill the liquid-supplying bottle 11 with the nicotine solution, put the liquid-supplying bottle 11 into the shell 14 again, and then screw the mouthpiece 15.

[0019] The Reed switch 19, the first magnetic steel 20, the second magnetic steel 21, the ripple film 22 can be replaced by a semiconductor strain gauge with sealed film, which is mounted in the place of the sensor ripple film.

[0020] To simplify the design, the first piezoelectric element 23 on the atomizer 9 can be omitted, and the atomization of the nicotine solution will be made only by the heating element 26. The size of such an atomizer can be made smaller, and the structure of the connection of the whole electronic atomization cigarette is the same as the embodiment 1. In addition, as shown in Fig. 8, the first piezoelectric element 23 and the heating element 26 in the atomizer 9 can be omitted, an additional second piezoelectric element 35 in the form of platen with a single layer or multiple laminated layers can be arranged in the atomization cavity, and the stream passing through the ejection hole vibrates the focus at the center of the second piezoelectric element 35 to achieve the effect of strong ultrasonic atomization.

[0021] As shown in Fig. 10, a silicon gel check valve 31 may cover the outside of the through hole on the vapor-liquid separator 7. During smoking, a stream reaches the through hole, as the air pressure in the through hole increases, the silicon gel check valve 31 is opened and the stream passes; otherwise, the silicon gel check valve 31 is closed.

[0022] As shown in Fig. 5, the sensor 6 may also be designed into a structure with the silicon gel check valve 31. During smoking, the stream comes into the silicon gel check

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valve 31, the air pressure increases and the air expands, the third magnetic steel 34 in the valve approaches the Reed switch 19 gradually until the Reed switch is closed and the circuit is turned on, and the air outlet of the silicon gel check valve 31 is opened with the increment of the air pressure difference. The Reed switch 19 can also be made of Hall device or magneto diode or magneto triode instead.

Embodiment 2

[0023] As shown in Fig. 2, to improve the liquid-supplying state, the atomizer 9 is postposed within the shell 14, and the liquid-supplying bottle 11 is arranged between the vapor-liquid separator 7 and the atomizer 9. A spring piece 33 for pressing the liquid-supplying bottle 11 on the atomizer 9 is provided on one end of the liquid-supplying bottle 11. Other components and their functions are the same as those in the embodiment 1.

[0024] On the inner wall of the shell 14 of the electronic atomization cigarette described in the embodiment 1 and 2, a digital display screen 32 for showing the smoking times per day and the cell capacity can be also provided. The sensor 6 uses a linear signal output, which is proportional to the suction force (i.e., the stronger one sucks, the longer the time of operation is), the atomizer 9 operates in the linear mode, thereby simulating a humanized cigarette that looks like a normal cigarette.

[0025] Within the shell 14, the microswitch 16 is connected to the sensor 6 in parallel and used for manually cleaning, When users do not smoke, they press the microswitch 16 to start the sensor 6 connected therewith in parallel, or clean the residue or other impurity substance within the shell 14.

[0026] The nicotine solution for atomization contains 0.4-3.5% nicotine, 0.05-2% cigarette essence, 0.1-3.1% organic acid, 0.1-0.5% anti-oxidation agent, and the rest is 1,2-propylene glycol.

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Espacenet

Claims: WO2005099494 (A1) — 2005-10-27

AN AEROSOL ELECTRONIC CIGARETTE

Claims not available for WO2005099494 (A1) WO2005099494 (A1)
Claims of corresponding document: EP1736065 (A1)

The EPO does not accept any responsibility for the accuracy of data and information originating from other authorities than the EPO; in particular, the EPO does not guarantee that they are complete, up-to-date or fit for specific purposes.

1. An electronic atomization cigarette, including a shell and a mouthpiece, characterized in that:
an air inlet (4) is provided on the external wall of the shell (14);
an electronic circuit board (3), a normal pressure cavity (5), a sensor (6), a vapor-liquid separator (7), an atomizer (9), a liquid-supplying bottle (11) are arranged sequentially within the shell (14),
wherein the electronic circuit board (3) comprises an electronic switching circuit and a high frequency oscillator;
a stream passage (18) is provided on one side of the sensor (6) and leading to the inner wall of the shell (14), in which sensor(6) is provided a negative pressure cavity (8);
an atomization cavity (10) is arranged in the atomizer (9) which atomizer (9) is in contact with the liquid-supplying bottle (11) and kept apart from the shell (14);
a retaining ring (13) for locking the liquid-supplying bottle (11) is provided between the shell (14) and one side of the liquid-supplying bottle (11), on the other side of which liquid-supplying bottle (11) is provided an aerosol passage (12);
the air inlet (4), normal pressure cavity (5), sensor (6), vapor-liquid separator (7), atomizer (9), aerosol passage (12), gas vent (17) and mouthpiece (15) are sequentially interconnected; and
a light emitting diode (LED1) and a battery(2) are provided at the front end within the shell (14), together forming the shape of a cigarette holder, a cigar or a pipe.

2. The electronic atomization cigarette according to claim 1, characterized in that:
the atomizer (9) is postposed within the shell (14);
the liquid-supplying bottle (11) is arranged between the vapor-liquid separator (7) and the atomizer (9); and
a spring piece (33) is arranged at one end of the liquid-supplying bottle (11) for pressing the bottle (11) onto the atomizer (9) tightly.

3. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
a display screen (32) is arranged on the inner wall of the shell (14) and connected to

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the electronic circuit board (3).

4. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
a microswitch (16) for manually cleaning is connected in parallel to the sensor (6) within the shell (14).

5. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
a ripple film (22) is provided between the sensor (6) and its inner negative pressure cavity (8), and
a first magnetic steel (20), a second magnetic steel (21) and a reed switch(KI) connected between the first and second magnetic steels are provided within the sensor (6), wherein the second magnetic steel (21) is attached to the ripple film (22).

6. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
a silicon gel check valve (31) is provided within the sensor (6);
a third magnetic steel (34) is provided in the silicon gel check valve (31); and
a reed switch (K1) is provided outside the valve, on the side close to the third magnetic steel.

7. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
a through hole is arranged in the vapor-liquid separator (7).

8. The electronic atomization cigarette according to claim 7, characterized in that:
a silicon gel check valve (31) covers the outside of the through hole of the vapor-liquid separator (7).

9. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
an overflow hole (29) is arranged on an atomization cavity wall (25) of the atomization cavity (10).
a heating element (RL) is provided within the atomization cavity (10);
a first air stream ejection hole (24) is provided on one side of the heating element (RL); and
a porous body (27) is arranged outside around the atomization cavity wall (25);
a first piezoelectric element (M1) is provided on one side of the atomizer (9) ; and
a bulge (36) is provided on the other side of the atomizer (9).

10. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
a second piezoelectric element (35) is additionally provided in the atomizer (9).

11. The electronic atomization cigarette according to claim 9, characterized in that:
the porous body (27) in the atomizer (9) can be made of foam nickel, stainless steel fiber felt, high molecule polymer foam and foam ceramic;
the heating element (RL) can be made of platinum wire, nickel chromium alloy or iron chromium aluminum alloy wire with rare earth elements, and can be made into the shape of a sheet;
the atomization cavity wall (25) can be made of aluminum oxide or ceramics.

12. The electronic atomization cigarette according to claim 7, characterized in that:
the vapor-liquid separator (7) is made of plastics or silicon rubber.

13. The electronic atomization cigarette according to claim 1 or 2, characterized in that:
a solution storage porous body (28) is provided in the liquid-supplying bottle (11),

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wherein the porous body (28) is filled with polypropylene fiber, terylene fiber or nylon fiber, or with plastics that are shaped by foaming, or is molded into a column with laminated layers by polyvinyl chloride, polypropylene, polycarbonate.

14. The electronic atomization cigarette according to claim 5, characterized in that: the reed switch(K1), the first magnetic steel (20) and the second magnetic steel (21) and the ripple film (22) may be replaced with a semiconductor strain gauge, wherein the strain guage possesses a sealed film and is installed at the position of the ripple film of the sensor.

15. The electronic atomization cigarette according to claim 1 or 2, characterized in that: a nicotine solution that is injected into the liquid-supplying bottle (11) and used for atomization contains 0.4-3.5% nicotine, 0.05-2% cigarette essence, 0.1-3.1% organic acid, 0.1-0.5% anti-oxidation agent, the rest being 1,2-propylene glycol.

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(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日:
2005年10月27日(27.10.2005)

PCT

(10) 国际公布号:
WO 2005/099494 A1

(51) 国际分类号[7]: A24F 47/00

(21) 国际申请号: PCT/CN2005/000337

(22) 国际申请日: 2005年3月18日(18.03.2005)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
200420031182.0 2004年4月14日(14.04.2004) CN

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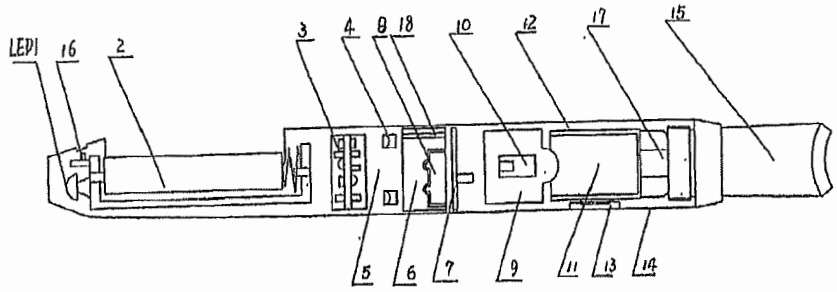
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(54) Title: AN AEROSOL ELECTRONIC CIGARETTE

(54) 发明名称: 雾化电子烟



(57) Abstract: This 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 are an electronic circuit board, a constant pressure cavity, a sensor, a gasliquid 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 duct. A negative pressure cavity is located in the 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 duct. The air orifice, the constant pressure, the sensor, the gasliquid separator, the atomizer, and the mirage duct connect orderly and throughout. Without tar, this invention reduces the risk of suffering cancer, meets the requirement of the smoker, need no ignition, and has no endanger of fire.

[见续页]

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(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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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、

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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，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；

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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；

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

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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

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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。

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权 利 要 求 书

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），阀内设有第三磁钢（34），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

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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（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；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；雾化腔壁（25）可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）可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。

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）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。

15．按照权利要求 1 或 2 所述的雾化电子烟，其特征在于：注入供液瓶（11）内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。

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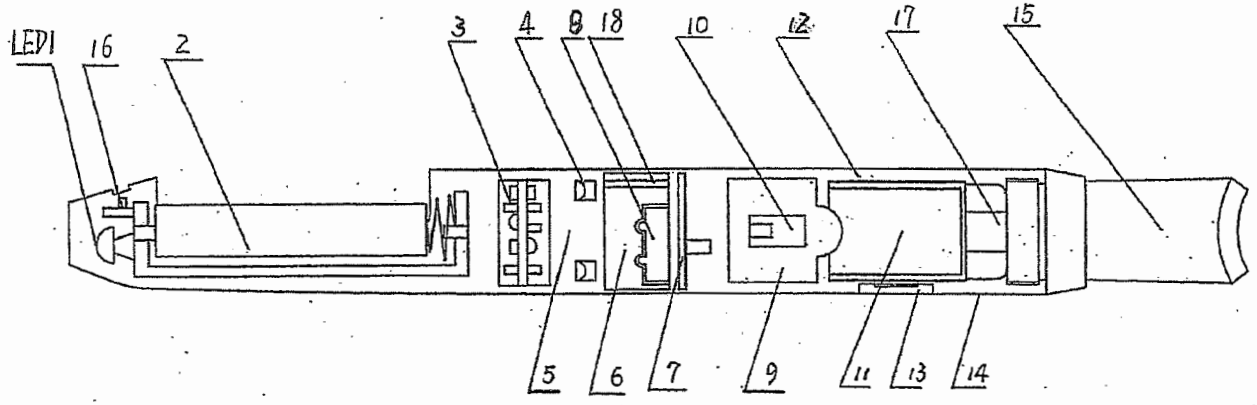


图 1

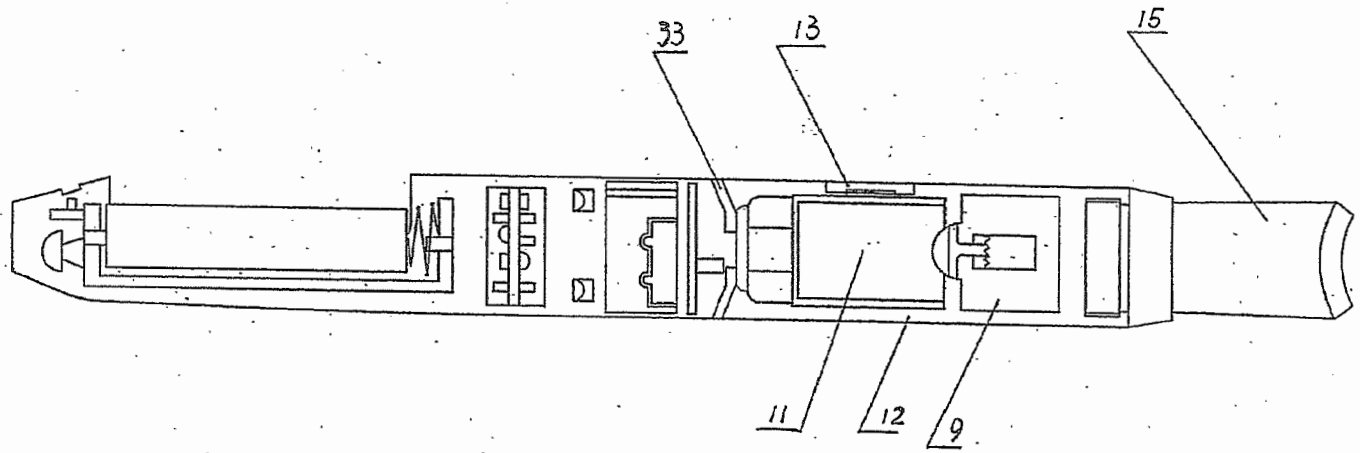


图 2

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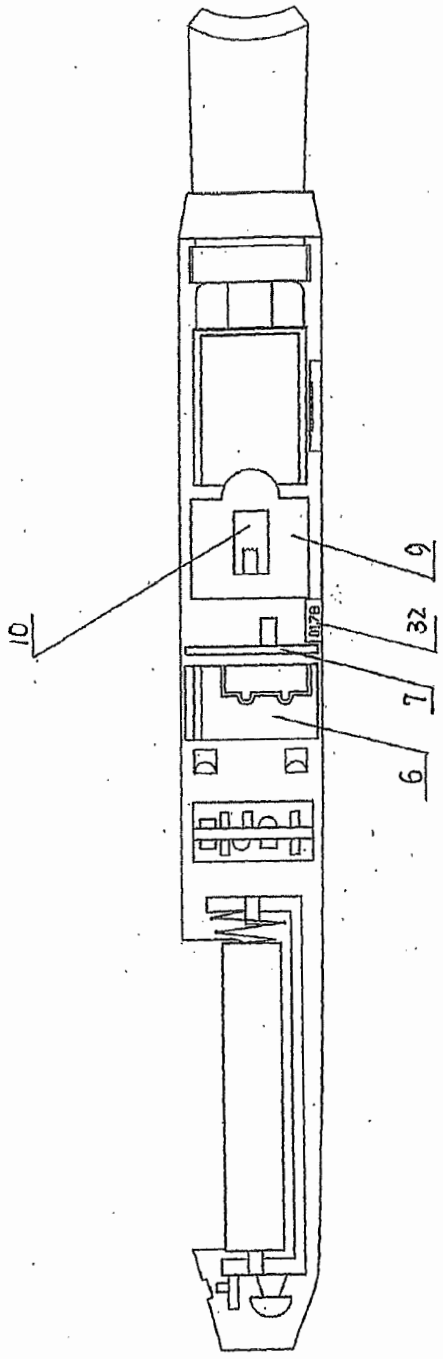


图 3

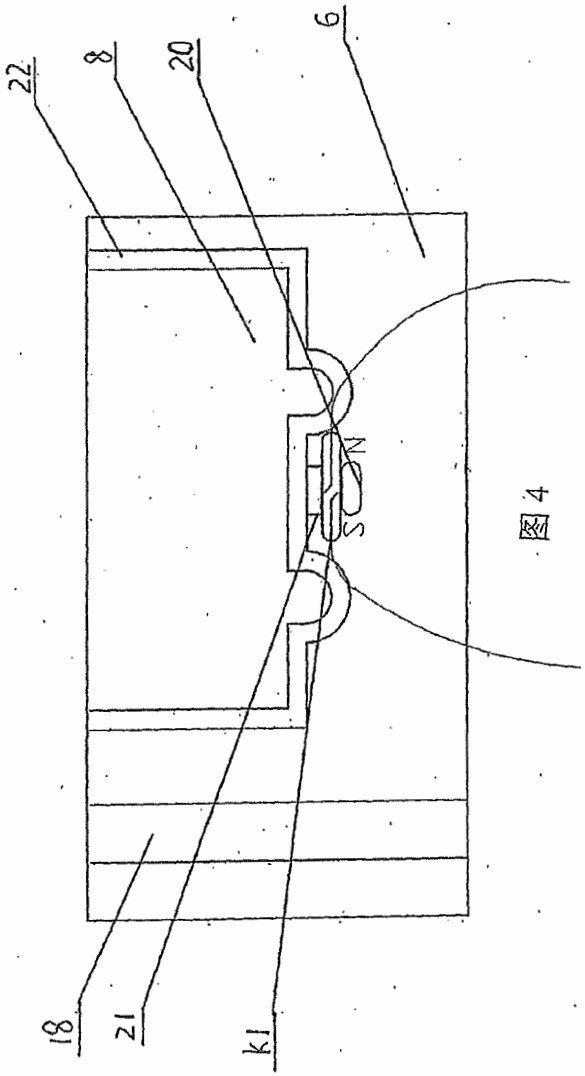


图 4

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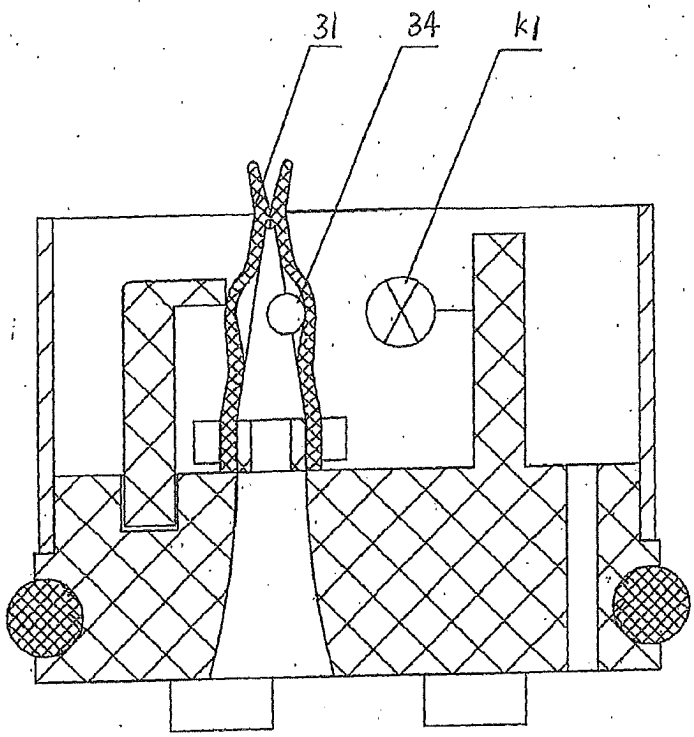


图 5

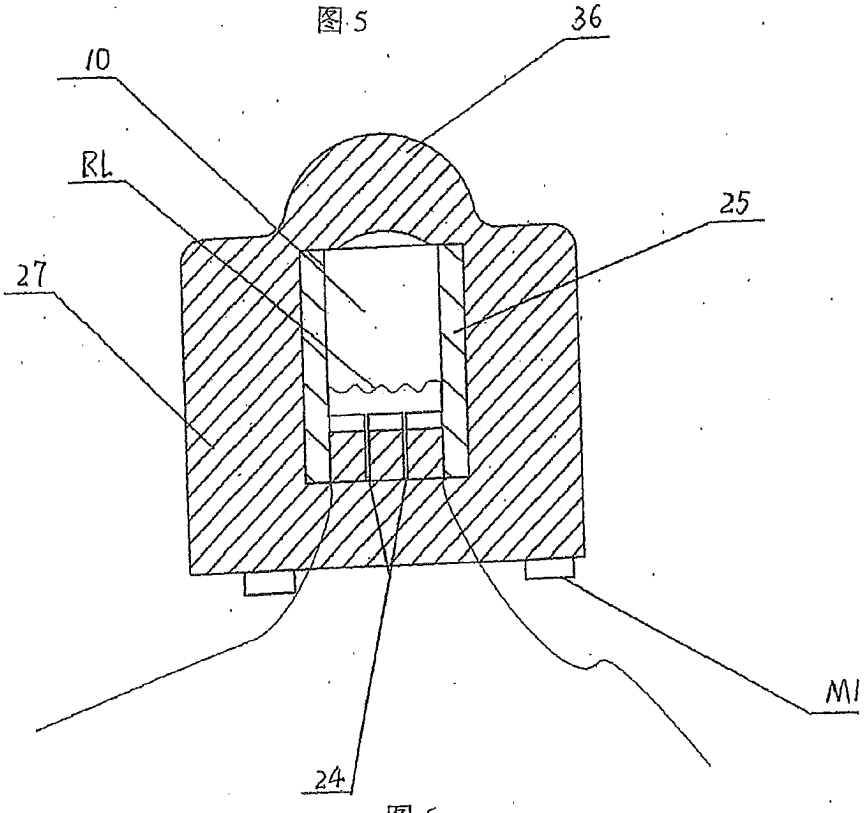


图 6

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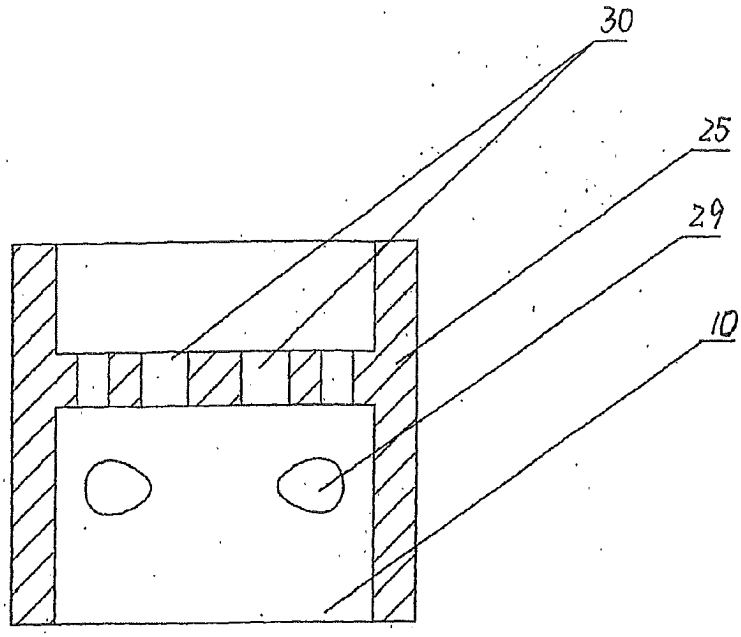


图 7

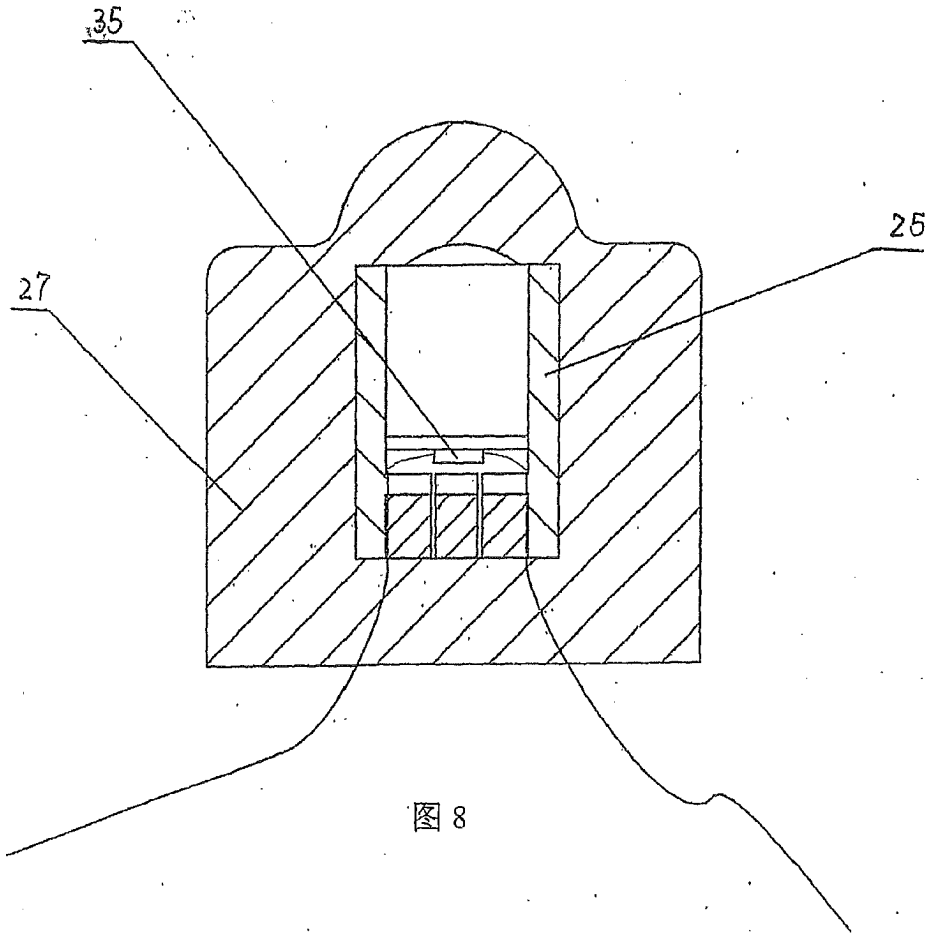


图 8

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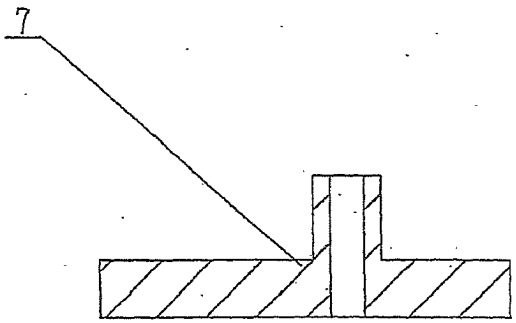


图 9

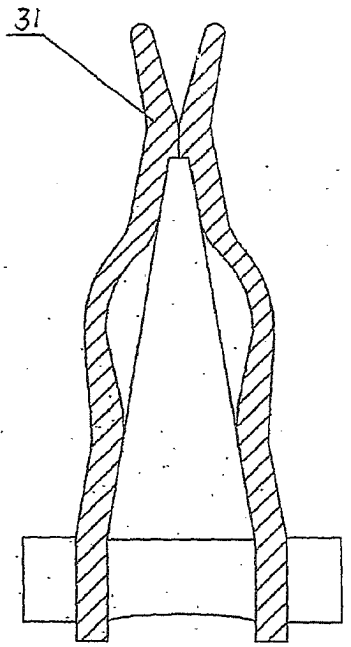


图 10

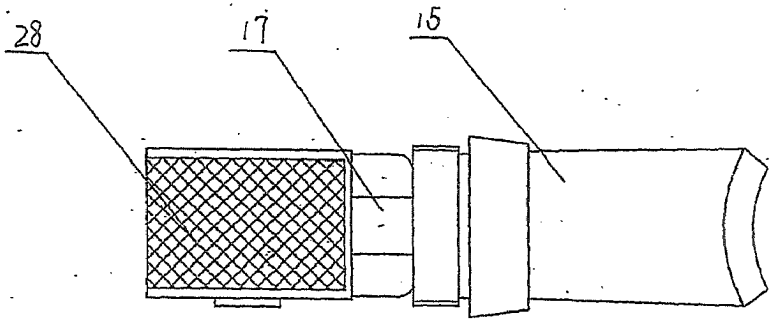


图 11

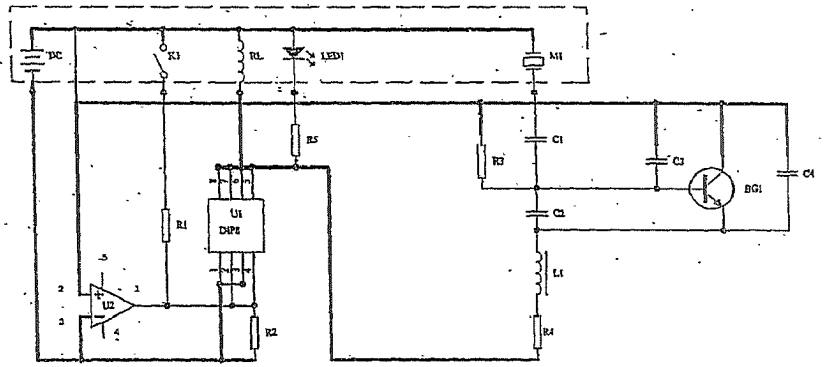


图 12

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2005/000337

A. CLASSIFICATION OF SUBJECT MATTER

A24F47 / 00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A24F+

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

Chinese document patent:(1985-)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, EPO, WPI, PAJ: atomiz+ aerosol cigar or cigarette electronic nicotine or nicotinamide

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN1135860A(XU Du) 20.Nov.1996(20.11.1996)page 2, line 13 to page 4, line 3	1—15
A	CN1252961A (SONG Huoqiang) 17.May 2000 (17.05.2000) page 1, line 26—38	1—15
A	EP0342538A (REYNOLDS TOBACCO CO R J) 23.Nov 1989(23.11.1989)page 5, line 10 to page 12, line 38	1—15
A	EP0545186A (REYNOLDS TOBACCO CO R J) 09.Jun 1993(09.06.0993)page 5, line 43to page 24, line 57	1—15
A	US4945929 (BOC GROUP PLC & BRITISH AMERICAN TOBACCO CO LTD) 07.Aug 1990(07.08.1990) column 2, line 63 to column 4, line 6	1—15

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16.Jun.2005(16.06.2005)	14 JUL 2005 (14.07.2005)
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer NI Xiaohong Telephone No. 86-10-62085753

Form PCT/ISA /210 (second sheet) (April 2005)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2005/000337

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Form PCT/ISA /210 (patent family annex) (April 2005)

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国际检索报告

国际申请号
PCT/CN2005/000337

A. 主题的分类

A24F47 / 00

按照国际专利分类表(IPC)或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC7：A24F47+

包含在检索领域中的除最低限度文献以外的检索文献

中国专利文献（1985－）

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

EPO，WPI，PAJ： atomiz+ aerosol cigar or cigarette electronic nicotine or nicotinamide

CNPAT：雾化+喷雾 烟 电 尼古丁+烟碱

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
A	CN1135860A(徐度) 20.11 月.1996(20.11.1996)第 2 页第 13 行至第 4 页第 3 行	1－15
A	CN1252961A（宋国强）17.05 月 2000（17.05.2000）说明书第 1 页第 26－38 行	1－15
A	EP0342538A（REYNOLDS TOBACCO CO R J ）23.11 月 1989（23.11.1989）说明书第 5 页第 10 行至第 12 页第 38 行	1－15
A	EP0545186A（REYNOLDS TOBACCO CO R J ）09.06 月 1993（09.06.1993）说明书第 5 页第 43 行至第 24 页第 57 行	1－15
A	US4945929A（BOC GROUP PLC 和 BRITISH AMERICAN TOBACCO CO LTD ）07.8 月 1990（07.08.1990）说明书第 2 页第 63 行至第 4 栏第 6 行	1－15

☐ 其余文件在 C 栏的续页中列出。 ☒ 见同族专利附件。

* 引用文件的具体类型：

"A" 认为不特别相关的表示了现有技术一般状态的文件

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"L" 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件

"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

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"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
16.6 月.2005(16.06.2005)	14 · 7月 2005 (14 · 07 · 2005)
中华人民共和国国家知识产权局(ISA/CN) 中国北京市海淀区蓟门桥西土城路 6 号 100088 传真号： (86-10)62019451	受权官员 电话号码：(86-10)62085753

PCT/ISA/210 表(第 2 页) (2005 年 4 月)

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检索报告中引用的专利文件	公布日期	同族专利	公布日期
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国际申请号
PCT/CN2005/000337

检索报告中引用的专利文件	公布日期	同族专利	公布日期
		CA2081283A	28.05 月 1993
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		HU215694B	01.02 月.1999
		KR270913B	01.11 月.2000
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		DE3719718A	23.12 月 1987

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 618 803 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
25.01.2006 Bulletin 2006/04

(21) Application number: **04718242.3**

(22) Date of filing: **08.03.2004**

(51) Int Cl.:
A24B 15/16 *(1980.01)*

(86) International application number:
PCT/CN2004/000182

(87) International publication number:
WO 2004/095955 (11.11.2004 Gazette 2004/46)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **29.04.2003 CN 03111582**

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(54) A FLAMELESS ELECTRONIC ATOMIZING CIGARETTE

(57) The invention relates to a non-smokable electronic spray cigarette which only comprises nicotine without harmful tar. The cigarette includes a smoke mouth integer comprised with a shell, a cell, a high frequency ionzer, nicotine solution storage and its container, control circuit, a display screen, a human contact sensor, a piezoelectric supersound atomizer, a high temperature vaporization nozzle and attachments, an electro-thermal vaporization nozzle installed in the air suction end of the shell goes through an electric control pump or a valve with a measuring chamber and a liquid storage container which contains nicotine solution and is connected to the electric control pump or a valve with a one-way flow valve, the control circuit plate has four export ends individually connected with the high frequency ionizer, electric heater, pump or valve and the display screen, a human resistence sensor and an air flow sensor are connected to the input end of the control circuit. The advantages of the present invention are smoking without tar, reducing the cancerogenic risk, the user still feel smoking and experiercing the excitement, the cigarette is no need to be lit and is no fire danger.

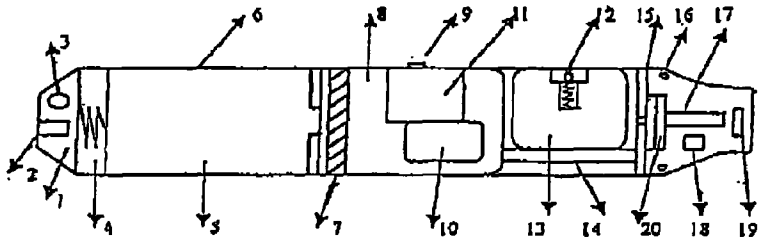


FIG. 1

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Description

Technical Field

[0001] The invention relates to a non-smokable electronic spray cigarette which contains only nicotine without tar.

Background Art

[0002] Despite it is commonly known that "smoking is harmful to your health", the number of smokers worldwide is up to 1 billion, and the number is increasing every year. On March 3, 2003, the World Health Organization (WHO) concluded a global Framework Convention on Tobacco Control. According to the statistical data from WHO, about 4.9 million people die of diseases caused by smoking each year. Although smoking may cause serious respiratory diseases and cancer, it remains extremely difficult for smokers to quit smoking completely.

[0003] The active ingredient in a cigarette is nicotine. During smoking, nicotine, along with a lot of tar aerosol droplets produced in the cigarette burning, enters smoker's alveolus and is rapidly absorbed. After being absorbed into the blood of a smoker, nicotine then produces its effect on the receptors of the smoker's central nervous system, which makes him/her relax and enjoy an inebriety similar to that produced by an exhilarant.

[0004] Nicotine is a kind of alkaloid with low molecular weight, a small dose of nicotine is essentially harmless to human body and its half-life in blood is quite short. The major harmful substance in tobacco is tar, and the tar in tobacco is composed of thousands of ingredients, tens of which are cancerogenic substances. At present, it has been proven that passive smoking can be more harmful on non-smokers.

[0005] Some cigarette substitutes that contain only nicotine without tar have been proposed, and many of them, such as "nicotine patch", "nicotine mouthwash", "spray agent packaged in high pressure gas tank with propellant", "nicotine chewing gum", "nicotine drink" etc., are made of pure nicotine. Although these cigarette substitutes are free from tar, their major disadvantage is that an effective peak concentration can not be reached in the blood of a smoker due to slow absorption of nicotine and thus it can not make a smoker get real fun, in addition, these cigarette substitutes can not satisfy habitual smoking actions of a smoker, for example, inhaling action or sucking action, and thus are not likely to be widely accepted as effective substitutes for quitting smoking or cigarette substitutes.

Summary of the Invention

[0006] An objective of the present invention is to provide a non-smokable electronic spray cigarette that functions as substitutes for quitting smoking and cigarette substitutes, overcomes the above-mentioned disadvantages and provides a humanized cigarette that looks like a normal cigarette. The non-smokable electronic spray cigarette, which is an integrated assembly resembling a cigarette holder, includes a shell, a cell, a high frequency generator, nicotine solution and its container, a control circuit, a display screen, an airflow sensor, a body sensitive sensor, a piezoelectric ultrasonic atomizer, a high temperature vaporization nozzle and accessories, wherein an electro-thermal vaporization nozzle arranged within an air suction end of the shell is connected with a liquid storage container which contains nicotine solution and has an one-way valve for liquid injection, via an electronic pump or a valve connected with a metering cavity; an ultrasonic piezoelectric element attached on the outside of the vaporization nozzle is connected to the high frequency generator in the control circuit board; four outputs of the control circuit are connected to the high frequency generator, an electric heater, the pump or valve, and the display screen respectively; a body sensitive resistance sensor and an airflow sensor are connected to the inputs of the control circuit; the front end of the shell also includes a cell and a red LED. The control circuit provides starting current to the electric heater and the pump within the vaporization nozzle, so as to pump the nicotine solution in the solution storage container into the vaporization nozzle. Under the high temperature and the high frequency oscillation wave in the vaporization nozzle, the liquid is rapidly vaporized, ejected out and then condensed to form a puff of smoke. The control circuit is activated by the resistance sensor and the airflow sensor connected to the control circuit. A liquid crystal display screen is also provided to indicate the operating conditions and the times of initiation numerically or graphically. The cell which provides power to the pump, the high frequency generator and the electric heater via the control circuit can be a disposable battery or a rechargeable battery.

[0007] The present invention also provides a simple non-smokable electronic spray cigarette. The cigarette includes an electro-thermal vaporization nozzle. The vaporization nozzle is connected to an electro-thermal drive pump with a metering cavity, and further connected to a solution storage container that is filled with nicotine solution and made of tear-resistant silicon gel. Alternatively, the pump with a metering cavity can be replaced by a meter and an electromagnetic valve or an electro-thermal valve. With the provision of compression air or a super elastic member on the solution storage container, the stored liquid flows out automatically. The super elastic member made of nickel-titanium memory alloy is preferably used. It includes a control circuit, which provides operating current to the electric heater and the pump or the valve. The control circuit is activated by the resistance sensor connected with the control circuit. The supply power connected with the control circuit is a rechargeable battery.

[0008] The advantages of the present invention include smoking without tar, significantly reducing the can-

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cerogenic risk. Furthermore, users still feel as if they are smoking and experiencing the same excitement, and the cigarette has no need to be lit and has no fire risk.

[0009] With slight modification of the solution storage container, the device and connection structure according to the present invention can be filled with conventional drug for pulmonary administration apparatus.

Description of the Drawings

[0010]

FIG. 1 is a structural diagram of the device in the first example in accordance with the present invention.

FIG. 2 is a block diagram of the circuit structure in accordance with the present invention.

FIG. 3 is a schematic diagram of the structure of the high temperature vaporization nozzle and the electric-thermal element in accordance with the present invention.

Fig. 4 is a schematic diagram of the valve made of memory alloy in accordance with the present invention.

Fig. 5 is a schematic diagram of the peristaltic pump made of memory alloy in accordance with the present invention.

Fig. 6 is a schematic diagram of the peristaltic pump in accordance with the present invention.

Fig. 7 is a structural diagram of the electronic cigarette in the second example in accordance with the present invention.

Fig. 8 is a structural diagram of the electronic cigarette of pressure type in the third example in accordance with the present invention.

Fig. 9 is a structural diagram of the simplified electronic cigarette of pressure type in the fourth example in accordance with the present invention.

Fig. 10 is a structural diagram of the metering cavity in the fourth example in accordance with the present invention.

Detailed Description of the Invention

[0011] The high frequency generator of a control circuit board 8 is composed of a capacitance connecting three point type oscilltor, an inductance connecting three point type oscillator, or a transformer-type oscillating circuit, which has the frequency of 35 KHz to 3.3 MHz. The circuit includes a automatic frequency fine-adjusting circuit resonating with a piezoelectric element 20. A nicotine solution storage container 13 is made of silicon rubber, alternatively, other polymers that can be protected against the penetration of nicotine can be used. An one-way valve for liquid injection 12 is sealed by a ball or cone member under the pressure of a spring. An airflow sensor 18 can be comprised of an array of integrated thermal sensitive resistors in the shape of film. The electrode of a resistance or capacitance sensor 19, which is sensitive to touches of human body, is composed of an upper metal film and a lower metal film and located at the end of the cigarette holder. The changes of the resistance or capacitance parameters due to human touch are inputted into the control circuit to perform the operation of a body sensitive switch. The electric controlled pump 11, driven by a motor or a linear motor, drives a retarder that has a large speed ratio, via a shaft coupling, to revolve at a low speed but with large torque. The pump can be a peristaltic pump, a plunger pump, an eccentric pump or a screw pump. Alternatively, the liquid pump can use piezoelectric pump, a super magnetostrictive pump, a thermal expansion drive pump, a thermal contraction drive pump, a thermal bubble pump. The electric control pump or valve may be thermal contractible. The valve is formed on a silicon rubber tube by nickel-titanium memory alloy or copper-based memory alloy under the force of electro-thermal contractions. The electro-thermal vaporization nozzle 17 is made of high-temperature-resistant materials with low thermal conductivity. The nozzle 17 is a tubule, with the internal diameter of 0.05-2mm and the effective working length of 3-20mm. An electric heating element is provided within the nozzle, and the shapes of the electric heating element and the cavity of the nozzle are designed to facilitate vaporization and ejection of liquid. The vaporization nozzle 17 may be made of conventional ceramics, or be made of aluminum silicate ceramics, titanium oxide, zirconium dioxide, yttrium oxide ceramics, molten silicon, silicon dioxide, molten aluminum oxide. The vaporization nozzle 17 may be in the shape of straight tube or spiral, and may also be made from polytetrafluoethylene, carbon fiber, glass fiber or other materials with similar properties. The electric heating element arranged within the vaporization nozzle 17 may be made of wires of nickel chromium alloy, iron chromium aluminum alloy, stainless steel, gold, platinum, tungsten molybdenum alloy, etc., and may be in the shape of straight line, single spiral, double spiral, cluster or spiral cluster, wherein the straight line and cluster are preferred. The heating function of the electric heating element may be achieved by applying a heating coating on the inner wall of the tube, and the coating may be made from electro-thermal ceramic materials, semiconductor materials, corrosion-resistant metal films, such as gold, nickel, chromium, platinum and molybdenum. The method for coating can include a coat sintering process, a chemical deposition sintering process and an ion spraying process. The materials mentioned above can be provided within the inner wall of vaporization nozzle in any of the processes mentioned above. The nozzle with high resistance, made of metal, can have no electric heating element being attached, and can be directly applied with heating current. Alternatively, the materials mentioned above can be arranged outside of the nozzle in any of the ways mentioned above, and an appropriate response time can also be achieved in the power supply mode of short-term preheating. Nicotine solution used in the atomization process comprises nicotine, propylene glycol,

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glycerol, organic acids, anti-oxidation agents, essence, water and alcohol, in which the nicotine content is 0.1 %-6%, propylene glycol content 80%-90%, organic acids 0.2%-20%, the rest is glycerol, essence, anti-oxidation agents, water and alcohol.

Example 1: the structural diagram of the device in accordance with the present invention is shown in Fig. 1.

[0012] The fundamental principle of the device is that, when a smoker puts the cigarette holder on his/her mouth, the resistance sensor 19 activates the control circuit board 8. The control circuit board 8 then outputs two driving voltages respectively, one used to supply power to the electric heating element of the vaporization nozzle 17 and the other used to activate the micro pump 11 (shown in Fig. 6). The stored solution is then pumped to the nozzle 17 by the solution storage container 13. On the electric heating element of the nozzle 17, the nicotine solution is then vaporized into high temperature vapor which is subsequently ejected from the opening end. In the air, the vapor ejected out is then expanded and condensed into micro aerosol droplets. The effect of the ultrasonic piezoelectric element 20 mounting on the nozzle is that, firstly, the large liquid droplets in the unstable thermal airflow under high pressure will be in sufficient contact with the electric heating element, and thereby be vaporized; secondly, the liquid droplets in the nozzle 17 is directly fragmented and atomized; thirdly, possible bumping occurred when the liquid is above a boiling point will be avoided. The effect of integrated atomization will allow the aerosol droplets with diameters of 0.2-3 um to enter into the alveolus easily and be absorbed. The airflow sensor 18 is sensitive to the diluted air which enters through air inlet 16 when a "suction" action take places. The sensed signals are transmitted to the control circuit, and the control circuit then stop to supply power to the micro pump and the electric heater after a certain time delay. The relay relationship between the time delays of the micro pump and electric heater is as follows: after the electric heater is activated, the micro pump is activated after a time delay of 0.1-0.5 seconds; the electric heater is then turned off after a time delay of 0.2-0.5 seconds when the control circuit of the micro pump is turned off, so as to guarantee a complete vaporization of the liquid after quantitative liquid injection without any leftovers. The nicotine solution container may be designed to be different sizes as required. The nicotine solution may be refilled once a day, or once a couple of days. The liquid crystal display screen 10 can show operating state parameters, such as cell capacity, smoking times per day, average using cycle and warnings for over smoking. A red LED 3 blinks for each smoking action, and a sawtooth wave signal that lasts for 1.2 seconds is given by the control circuit for blinking signals, which provides a gradual change of luminance to imitate the ignition and combustion process of a conventional cigarette. The charger 1, charging jack 2, spring 4, shell 6, threads 7, switch 9, passage tube 14 and baffle plate 15 are shown in Fig. 1. The silicon gel tube 601, pinch roller 602, worm 603 and motor 604 are shown in Fig. 6.

[0013] The design of the present invention will not exclude the possibility of integrating the control circuit and the ultrasonic micro pump on one single chip by using a Micro Electronic Mechanical System (MEMS).

Example 2; the simplified electronic cigarette

[0014] Fig. 7 is a structural diagram of the simplified device in accordance with the present invention, in which the ultrasonic atomization high frequency generator and the piezoelectric ceramic element 20 are omitted. To achieve a desirable atomization effect, tiny heating wires are used in combination with the nozzle (see Fig. 3), so that the maximum diameters of one or more vaporization cavities formed between the heating wire and the inner wall of the nozzle range from 0.02mm to 0.6mm. The function of the airflow sensor 18 omitted is replaced by the manner that the initial signal of the resistance or capacitance sensor 119 is delayed a certain time via the control circuit and acts as the ending signal. The electronic cigarette is configured as follow: the vaporization nozzle 117, the thermal drive pump III (see Fig. 5) made of nickel titanium memory alloy wire, and the liquid storage container 113 connected to the thermal drive pump consitute a liquid transmission system, two outputs of the control circuit board 108 are respectively connected to the electric heater and the pump or valve, and a body sensitive resistance sensor 119 is connected to the input of the control circuit; the cell 105 and red LED 103 are provided in the front end within the shell, and constitute an integrity resembling a cigarette holder, a pipe or a pen. The thermal drive pump is an electro-thermal shrinkable peristaltic pump, made of wires of nickel titanium memory alloy or copper based alloy, with gel tube which is pressed at three points respectively during the process of electro-thermal contraction to form a pressure cavity for pumping out liquid. The change of volume of the cavity within the thermal drive pump determines the quantity of the solution to be atomized each time. Upon contacting with user's mouth, the resistance sensor 119 activates the control circuit 108, the control circuit 108 then provides operating current to the thermal drive pump and the electric heater, and the output of the control circuit is turned off after the delay of 2 seconds for reactivation at the next smoking action. Alternatively, a thermal expansion drive pump or a thermal bubble. pump is also applicable. The thermal expansion drive pump forms a pressure cavity for pumping out liquid by allowing a micro hydrogen container with an embedded electric heating element to block the liquid inlet and open the liquid outlet at the time of thermal expansion. The charging jack 102, LED 103, cell 105, switch 109, liquid-refilling valve 112 and air hole 116 are shown in Fig. 7.

[0015] The electrode lead wire 401, heating wire 402, thread 403, base 404 and nozzle 405 are shown in Fig.

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3. The support 501, extension spring 502, pumping-out pressure plate 503, silicon gel tube 504, stop pressure plate 505, supporting spring 506, memory alloy wire 507, electrode A 508, electrode B 509 and electrode C 510 are shown in Fig. 5.

Example 3: the electronic cigarette made of a Ni-Ti memory alloy

[0016] Fig. 8 is a structural diagram of the electronic cigarette. The electro-thermal vaporization nozzle 217 of the device is connected to the liquid storage container 213 via a pneumatic valve 220, the super elastic member 210 is connected to the pressure plate 211 which is connected to the liquid storage container 213 by pressure, the pneumatic valve is composed of a pneumatic film 214, a magnetic steel ring 218, a steel valve needle 220 and a reset spring 221. The super elastic member 210, which is made of Ni-Ti memory alloy, is used to apply a constant pressure on the liquid storage container via the pressure plate 211. When the pneumatic valve opens, the liquid with nicotine enters the vaporization nozzle from the liquid storage container via the pneumatic valve and is vaporized and condensed subsequently to form a puff of smoke at high temperature. Upon contacting with user's mouth, the resistance sensor activates the control circuit to supply power to the electric heater. When the user performs suction action, the Nd-Fe-B permanent magnetic alloy ring attracts the valve needle to move in response to the pneumatic film being subjected to negative pressure. Liquid is supplied when the valve needle opens, and after the pneumatic valve is reset, power supply to the electric heater is turned off after the delay of 0.5 seconds by the control circuit. The LED 203, charging jack 202, cell 205, control circuit 208, switch 209, refilling valve 212, baffle plate 215, air hole 216 and resistance sensor 219 are shown in Fig. 8.

Example 4: the electronic spray cigarette utilizing the pressure of a container

[0017] In the device (see Fig. 9), the electro-thernnal vaporization nozzle 317, the electronic valve 311 connected with the metering cavity 320, and the liquid storage container 313 form a liquid transmission passage. A gas vessel filled with high-pressure nitrogen is arranged around the periphery of the liquid storage container to exert pressure thereon to facilitate the transmission of the liquid. When a control signal is applied to the electronic valve, the electronic valve is activated, and the solution with nicotine enters the metering cavity from the liquid storage container under pressure and pushes a piston so as to allow a constant volume of liquid at the other side of the piston to enter the vaporization nozzle via the electronic valve and be vaporized and condensed to form aerosols. The metering cavity provided at the valve is a cylinder having a liquid inlet and a liquid outlet. Located within the cylinder are the piston micro holes and the reset spring connected onto the piston. The control circuit which is activated by the resistance sensor 319 controls the states of the electronic valve and the electric heater respectively. Due to slow infiltration of the micro hole of the piston in the metering cavity and the force of the reset spring, the piston returns to its original position within 5-8 seconds after each atomization process. The cell 305, pressure vessel 321, pressure chamber 322, seal threaded-opening 323, control circuit board 308 and air hole 316 are showed in Fig. 9.

[0018] The silicon gel tube 406, pressure-stopping plate 407, memory alloy wires 408, support 409, electrode lead wire 410 and pressure spring 411 are shown in Fig. 4. The inlet 701, piston 702, micro hole of the piston 703, metering cavity 704, reset spring 705 and outlet 706 are shown in Fig. 10.

[0019] The recipes of nicotine solution used for the electronic spray cigarette in accordance with the present invention are as follows:

1. 6% nicotine, 85% propylene glycol, 2% glycerol, 2% essence, 1% organic acid and 1% anti-oxidation agent;
2. 4% nicotine, 80% propylene glycol, 5% glycerol, 1% butyl valerate, 1% isopentyl hexonate, 0.6% lauryl laurate, 0.4% benzyl benzoate, 0-5% methyl octynicate, 0.2% ethyl heptylate, 0.3% hexyl hexanoate, 2% geranyl butyrate, 0.5% menthol, 0.5% citric acid and 4% tobacco essence;
3. 2% nicotine, 90% propylene glycol, 2.5% citric acid, 1% essence and 4.5% tobacco essence;
4. 0.1% nicotine, 80% propylene glycol, 5% glycerol, 8% alcohol, 2.9% water, 1% essence, 1% tobacco essence and 2% organic acid.

Claims

1. A non-smokable electronic spray cigarette, includes a shell, a battery, a high frequency generator, a container for nicotine solution, a control circuit, a display screen, an airflow sensor, a body sensitive sensor, a piezoelectric ultrasonic atomizer, an electro-thermal vaporization nozzle and accessories as an integrated assembly, wherein
a liquid storage container (13), which contains nicotine solution and has one-way valve for liquid injection (12), being connected with the electro-thermal vaporization nozzle (17) arranged in the air suction end of the shell (6), via the electronic pump (11) or the valve with a metering cavity,
an ultrasonic piezoelectric element (20) attached on the outside of the vaporization nozzle (17) being connected to the high frequency generator in the control circuit board (8),
four outputs of the control circuit board (8) being connected to the high frequency generator, an electric heater, the pump or valve and the display screen

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respectively,
a body sensitive resistance sensor (19) and an airflow sensor (18) are connected to the inputs of the control circuit, and
a cell and a red LED are provided in the front end of the shell (6),
together constituting an integrity resembling a cigarette holder, a pipe or a pen.

2. A non-smokable electronic spray cigarette, includes a liquid transmission system formed by a vaporization nozzle (117), a thermal drive pump (111) made of nickel titanium memory alloy wire, and a liquid storage container (113) connected with the thermal drive pump,
two outputs of a control circuit board (108) being connected to an electric heater and a pump or valve respectively,
a body sensitive resistance sensor (119) being connected to inputs of the control circuit, and
a cell (105) and a red LED (103) being arranged within the front end of a shell,
together constituting an integrity resembling a cigarette holder, a pipe or a pen.

3. A non-smokable electronic spray cigarette, wherein an electro-thermal vaporization nozzle (217) is connected to the liquid storage container (213) via a pneumatic valve,
a super elastic member (210) is connected to a pressure plate (211) which is connected to the liquid storage container by pressure, and
the pneumatic valve is composed of a pneumatic film (214), a magnetic steel ring (218), a steel valve needle (220) and a reset spring (221).

4. A non-smokable electronic spray cigarette, wherein an electro-thermal vaporization nozzle (317), an electronic valve (311) which is connected with a metering cavity (320), and a liquid storage container (313) forms a liquid transmission passage, and
a gas vessel filled with high pressure nitrogen is arranged around the periphery of the liquid storage container.

5. The non-smokable electronic spray cigarette according to claim 1, wherein
the high frequency generator on the control circuit board (8) is a capacitance connecting three point type oscilltor, an inductance connecting three point type oscillator, or a transformer-type oscillating circuit,
the high frequency generator has the frequency of 35 KHz to 3.3 MHz, and
the circuit includes a automatic frequency fine-adjusting circuit resonating with a piezoelectric element (20).

6. The non-smokable electronic spray cigarette according to claim 1, wherein the nicotine solution storage container (13) is made of silicon rubber or other polymers that can be protected against the penetration of nicotine.

7. The non-smokable electronic spray cigarette according to claim 1, wherein the one-way valve for liquid injection (12) is sealed by a ball or cone member under the pressure of a spring.

8. The non-smokable electronic spray cigarette according to claim 1, wherein the airflow sensor (18) is composed of an array of integrated thermal sensitive resistors in the shape of film.

9. The non-smokable electronic spray cigarette according to claim 1, wherein the electrode of resistance or capacitance sensor (19) which is located at the end of the non-smokable electronic spray cigarette for human body contacting is composed of an upper metal film and a lower metal film, and a body sensitive switch is formed by inputting of changes of resistance or capacitance parameters caused by contacting human body into the control circuit.

10. The non-smokable electronic spray cigarette according to claim 1, wherein
the electronic pump (11) is driven by a motor or a linear motor, via a shaft coupling, the electronic pump drives a retarder which has a large speed ratio, to revolve at a low speed but with large torque,
the pump can be a peristaltic pump, a plunger pump, an eccentric pump or a screw pump, and
the pump can be a piezoelectric pump, a super magnetostrictive pump, a thermal expansion drive pump, a thermal contraction drive pump, or a thermal bubble pump.

11. The non-smokable electronic spray cigarette according to claim 1, wherein the electro-thermal vaporization nozzle (17) is a tubule with an internal diameter of 0.05-2mm and an effective working length of 3-20mm, made of materials which are high temperature resistant and of low thermal conductivity,
an electric heating element is provided within the tube,
the electric heating element and the shape of the tube are designed to facilitate vaporization and ejection of the liquid,
the vaporization nozzle (17) may be made of conventional ceramics, aluminum silicate ceramic, titanium oxide, zirconium oxide, yttrium oxide ceramic, molten silicon or molten aluminum oxide,
the shape of the nozzle is a straight tube or a spiral, and
the nozzle (17) may also be made from polytetrafluoethylene, carbon fiber, glass fiber or other

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materials with similar properties.

12. The non-smokable electronic spray cigarette according to claim 11, wherein
the electric heating element within the vaporization nozzle (17) can be made of wires of nickel chromium alloy, iron chromium aluminum alloy, stainless steel, gold, platinum, tungsten molybdenum alloy, in the shape of linear configuration, single spiral configuration, cluster configuration or spiral cluster configuration, among them, the linear configuration and cluster configuration are preferred,
the electric heating element is a coating applied on the inner wall of the nozzle, and the coating may be made from electro-thermal ceramic materials, semiconductor materials or corrosion resistant metal film, such as gold, nickel, chromium, platinum and molybdenum,
the coating can be applied in a coat sintering process, a chemical deposition sintering process and an ion spraying process,
the heating method of the vaporization nozzle is provided with the material mentioned above within its inner wall in the processes mentioned above,
the vaporization nozzle is made of a metal with high resistance, and the nozzle is directly provided with heating current without any electric heating wire being provided, and
the vaporization nozzle made of the materialmentioned above can also be provideded on the outside of the nozzle in the way mentioned above, achieving appropriate response time from the power supply mode of a short-term preheat.

13. The non-smokable electronic spray cigarette according to claim 1, wherein the nicotine solution used for atomization is composed of nicotine, propylene glycol, glycerol, organic acid, anti-oxidation agent, essence, water and alcohol, in which the nicotine content is 0.1%-6%, propylene glycol content is 80%-90%, the content of organic acids is 0.2%-20%, the rest is glycerol, essence, anti-oxidation agent, water and alcohol.

14. The non-smokable electronic spray cigarette according to claim 10, wherein the thermal drive pump is an electro-thermal shrinkable peristaltic pump, made of wires of nickel titanium memory alloy or copper based alloy, with gel tube which is pressed at three points respectively during the process of electro-thermal contraction to form a pressure cavity for pumping out liquid.

15. The non-smokable electronic spray cigarette according to claim 10, wherein the thermal expansion drive pump forms a pressure cavity for pumping out liquid by allowing a micro hydrogen container with an embedded electric heating element to block a liquid inlet and open a liquid outlet at the time of thermal expansion.

16. The non-smokable electronic spray cigarette according to claim 10, wherein the thermal bubble pump forms a pressure cavity for pumping out liquid by rapidly vaporizing liquid on a electric heating film.

17. The non-smokable electronic spray cigarette according to claim 1, wherein the electronic pump or valve is a thermal contractible valve made of nickel-titanium memory alloy or copper-based memory alloy wires on the silicon gel tube which is pressed by the nickel-titanium memory alloy or copper-based memory alloy wires under the force of electro-thermal contractions.

18. The non-smokable electronic spray cigarette according to claim 1, wherein the metering cavity provided at the valve connected with the metering cavity is a cylinder configured with a liquid inlet and a liquid outlet, and the cylinder comprises a piston with micro holes and a reset spring connected to the piston.

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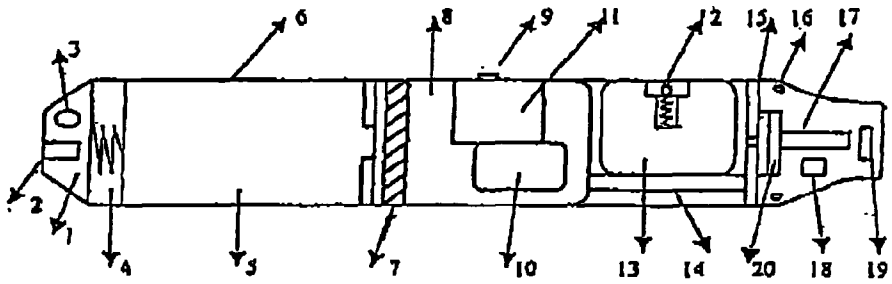


FIG. 1

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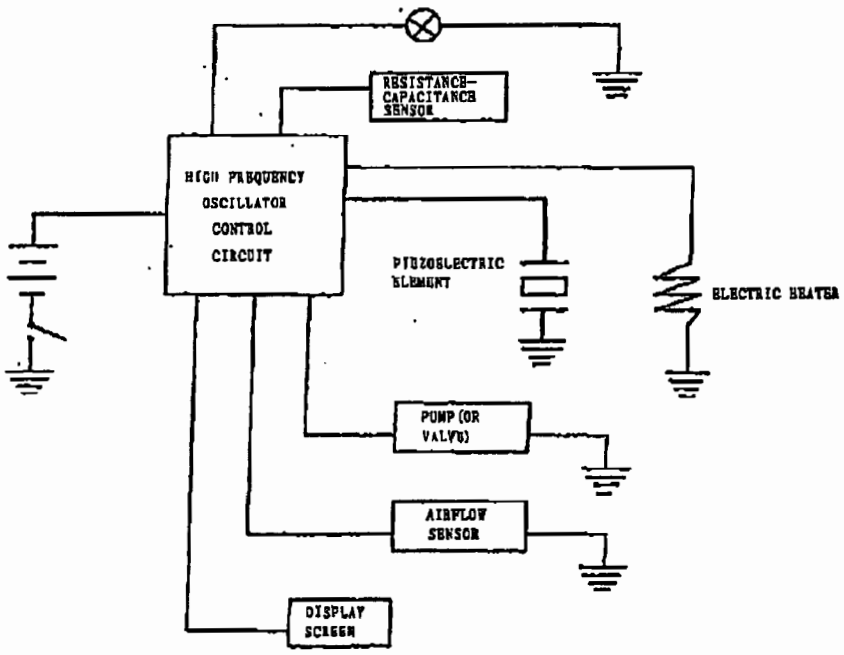


FIG. 2

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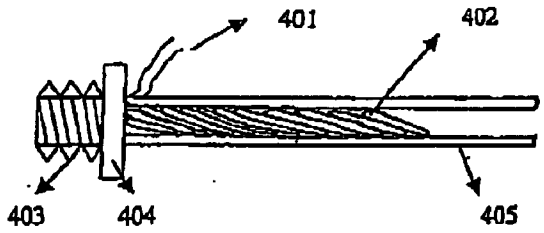


FIG. 3

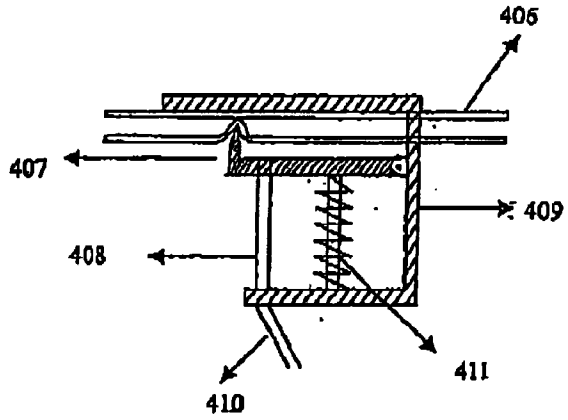


FIG. 4

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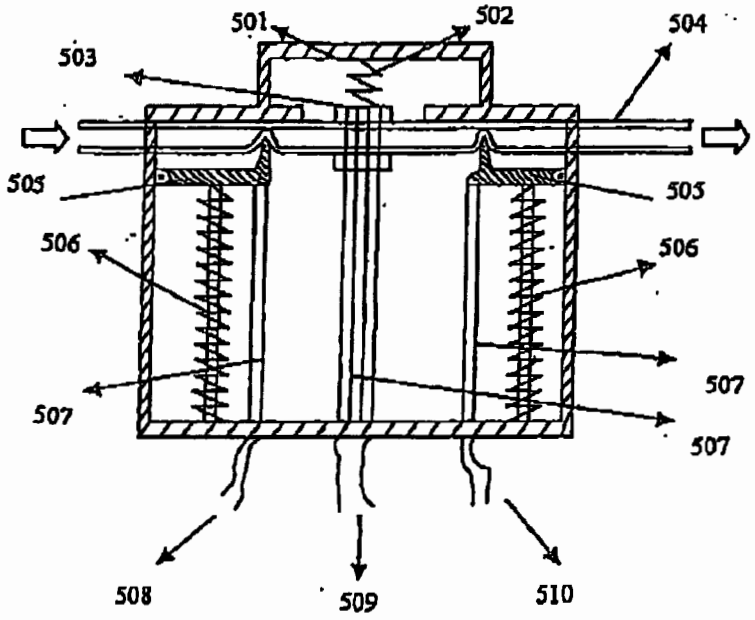


FIG. 5

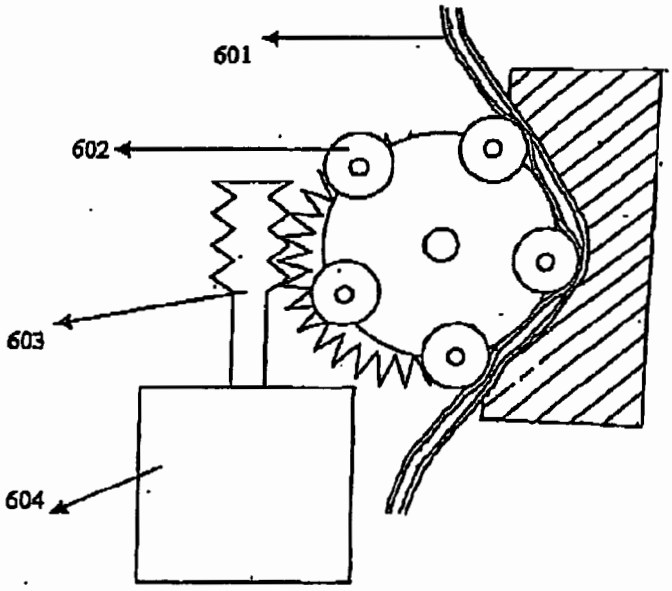


FIG. 6

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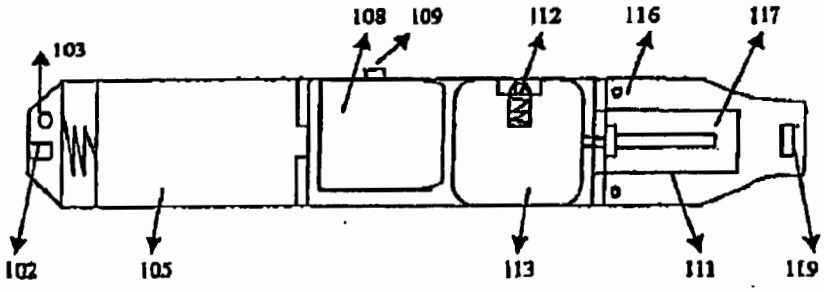


FIG. 7

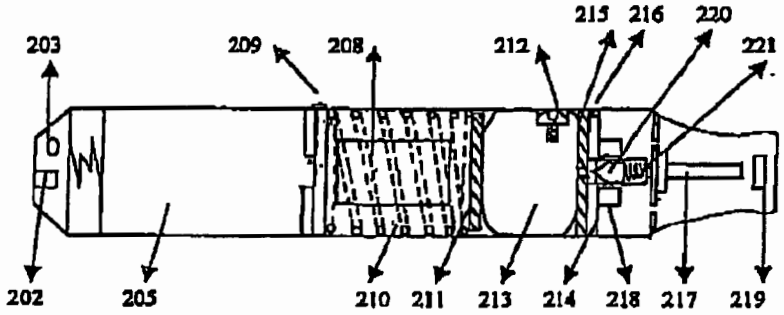


FIG. 8

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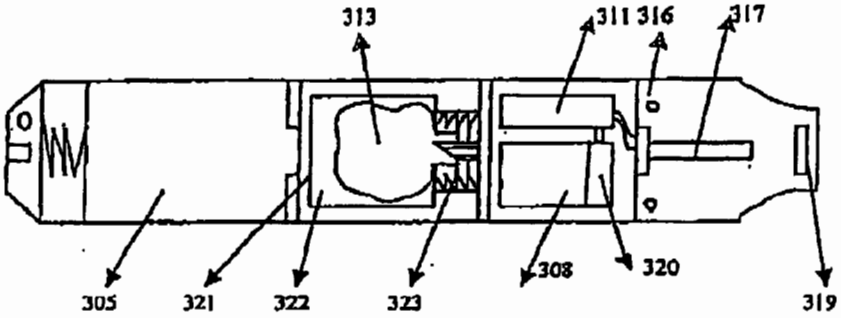


FIG. 9

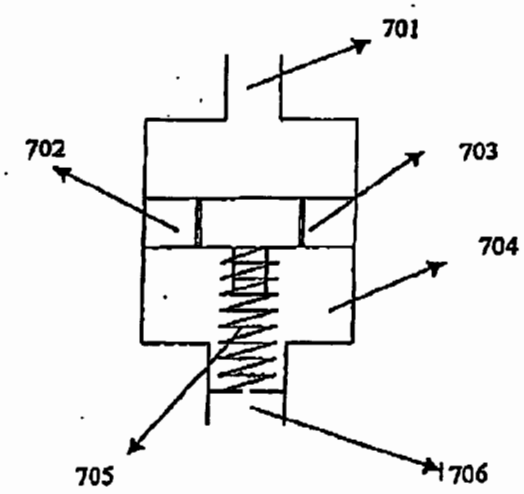


FIG. 10

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2004/000182

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A24B 15/16

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7:A24B15/16

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

IPC7:A24B+,A24C+,A24D+,A24F+

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC,PAJ,WPI,CNPAT nicotine,cigarette+,electronic+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO,A2,00/49901(WEBER-QUITZAU,et al),31.Aug .2004,the whole document	1-18
A	US,A,5080114(B.A.Cigarettenfabriken GmbH),14.Jan.1992,the whole document	1-18
A	CN,U,2047485(ZHAO yuzhong),15.Nov.1989,the whole document	1-18

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25.May 2004(25.05.2004)	10 · JUN 2004 (10 · 06 · 2004)
Name and mailing address of the ISA/CN 6 Xitucheng Rd.,Jimen Bridge,Haidian District, 100088 Beijing ,China Facsimile No. (86-10)62019451	Authorized officer Bianxin Telephone No. (86-10)62-85763

Form PCT/ISA /210 (second sheet) (January 2004)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2004/000182

Cited documents	published date	families	published date
WO0049901A2	31.Aug. 2000	CA2360852A	31.Aug. 2000
		EP1178741A	13.Feb. 2002
		JP2003500008T	07.Jan. 2003
US5080114A	14.Jan.1992	DE3908160A	27.Sep. 1990
CN2047485U	15.Nov. 1989	None	

Form PCT/ISA /210 (patent family annex) (January 2004)

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276250
39,525/64

COMMONWEALTH OF AUSTRALIA

PATENT SPECIFICATION

		Class	Int. Cl.
Application Number Lodged	39,525/64. 7th January, 1964.	33.5; 33.4.	A24f; A24c.

Complete Specification
Entitled IMPROVEMENTS RELATING TO SMOKING DEVICES.

Lodged 7th January, 1964.
Accepted 29th June, 1967.
Published 8th July, 1965.

Convention Priority 17th January, 1963, Great Britain, 2177/63.

Applicant BATTELLE MEMORIAL INSTITUTE.

Actual Inventors HERBERT SCHACHNER, DAVID WILLIAMSON and CHARLES DRUMMOND ELLIS.

Related Art:

58,274/65	33.5.
58,674/65	33.5.

The following statement is a full description of this invention, including the best method of performing it known to us :

Printed for the Government of the Commonwealth by A. J. Arthur, Commonwealth Government Printer, Canberra
98-2D-20/7/67-10P.C.

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This invention concerns improvements relating to smoking devices, especially such of a nature similar to cigarettes.

A particular object of the invention is to provide a device by which a smoke of a controlled character can be obtained, giving to the smoker the pleasure and/or beneficial results of smoking without the necessity for inhaling undesired substances, especially products of combustion. A further object is to enable this result to be achieved with a form of device which has to a large extent the psychological and social attributes of a conventional smoking device and which allows the enjoyment of required tobacco aromas and pleasant-tasting flavours, whether natural or added. In particular, the invention seeks to provide such a device which simulates a cigarette in appearance and in the manner in which it is smoked and handled.

According to the invention, a smoking device comprises a mouthpiece, a container or carrier provided with a source material capable of releasing nicotine vapour and aerosol-forming vapour, for example water vapour, when heated, a material, separated from or other than the said source material, which by its combustion or other exothermal reaction, is adapted for heating the said source material to a temperature below the ignition point of the latter material to cause the release therefrom of the said vapours, and an aerosol-nucleating space communicating with the said mouthpiece and either communicating with or formed by part of the said container or carrier in such a manner that air can be drawn through or over

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the heated source material and through the said space to the mouthpiece.

The source material for the nicotine vapour and aerosol-forming vapour, particularly water vapour, may comprise natural or reconstituted tobacco, enriched or similarly treated tobacco, a tobacco extract or extracts or a synthetic substance or substances containing nicotine ~~nicotine~~ compounds or a combination of two or more such substances. Particularly when a nicotine extract is employed, it will generally be advisable to mix with the source material an additive comprising a pulverulent material, for example silica, which is inert in relation to the source material and to the aforesaid vapours and which preferably has a high specific surface area. The specific surface area should preferably be at least $10m^2/gm.$, a value between 100 and $250m^2/gm.$ being suitable in the case of silica, but materials of low specific surface-area have some effect. The source material may also contain an addition of flavouring agents, for instance essential oils. The source material may be provided in the form of a coating of powder on the inside of a tube or a coating deposited from a liquid or may be in the form of a filling or packing in or around a tube.

As source material, use may also be made of tobacco or nicotine extract impregnated or deposited upon fibrous or filamentary material such as fibrous asbestos or silica or steel wool or mesh.

The heating may be effected by the combustion, particularly the smouldering combustion, of a material separated from or additional to the source material.

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Preferably, in this case, the heat is provided by smouldering tobacco contained within a wrapper in proximity with the source material, for example around a tube containing the latter material. The device as a whole can then readily be made to simulate a cigarette of conventional kind in appearance as well as social habit. Other similarly smouldering material, for example sawdust may be used.

Alternatively, the heating or heat evolving material may comprise an otherwise inert substance which reacts exothermally on contact with another substance, such for example as air or moisture. In some cases, the heating material may then be mixed with the source material. Generally, however, the arrangement will be such that the heating material is contained in a space separated from the space containing the source material and from the nucleating space, so that the said heating material does not lie in the path of air passing through or over the source material and through the nucleating space to the mouthpiece. Products of combustion escape to the open air otherwise than by this path.

The temperature to which the source material is heated should be below the ignition point of the said material and significantly below a temperature at which major decomposition of the nicotine would occur. The heating temperature should accordingly lie between 200° and 400°C. and preferably between 250° and 350°C. The heating may be arranged to heat all of the source material at one time or to produce a moving zone of heat which progresses along the source material.

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The nucleating space should be capable of cooling, as by thermal conduction and/or expansion, the vapours at a rate and in a manner appropriate for aerosol particles to be formed from potentially aerosol-forming vapour and, moreover, for the nicotine vapour to condense on the aerosol particles on contact therewith. The said space may accordingly be bounded by a material having good thermal conductivity, for example aluminium or copper. It may be an open space occupying a length of the device intermediate of the mouthpiece and a length which is occupied by, or parts of which are occupied by, source material and heating material. If these materials are separated by a tube, the nucleating space may be formed by an enlargement or extension of the tube or by a portion of the said tube.

A smoking device such as has been set forth permits of control of the amount of nicotine delivered, i.e. the amount delivered per puff. It also permits generally of wide freedom in the selection and proportioning of flavour, aroma and other smoke components which are required and the exclusion of those components, including combustion products, which are not required. Thus carbon monoxide, oxides of nitrogen and tarry substances, for example, can be substantially excluded or reduced to small amounts only.

The smoking of the device involves drawing air into the mouth over or through the heated source material. From a practical standpoint, it would be difficult, if not impossible, to transfer nicotine to the mouth, from the point of its release by heat, in a molecular form, since

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the molecules will remain attached to any surface on which they impinge. Thus molecular nicotine vapour entering a cool tube will be found to be almost completely condensed on the walls and very little will emerge from even a short length of such tube. If, on the other hand, the molecular nicotine on release is immediately brought in contact with particles of an aerosol, this same phenomenon of deposition will ensure the capture of the nicotine by the aerosol particles. The transferability of the nicotine will be that of the aerosol which, as is well known, can be high. The condensation on a surface of the aerosol from the airstream will be much slower than that of the vapour, because an aerosol particle, according to its size, diffuses much more slowly than a nicotine molecule. If the nicotine released in a heated region is condensed as an aerosol, therefore, it can be transported in the airstream to the mouth with little loss. The device according to the invention therefore seeks to ensure that the nicotine will be delivered to the mouth as a component of aerosol particles. A further advantageous factor in this connection is that nicotine is absorbed less rapidly by human tissue from aerosol particles than from free nicotine vapour. The rate of absorption of nicotine and, possibly, other physiologically active substances can, moreover, be more carefully controlled.

In general, aerosol formation can be achieved by self-condensation in the gas phase of highly supersaturated vapour or by so-called "seeding", that is the condensation of supersaturated vapour with the assistance

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of aerosol nuclei introduced into the vapour. Both of these methods of forming a nicotine-containing aerosol or smoke can be used in the smoking device. To form an aerosol by self-condensation in the gas phase, a high level of supersaturation of the vapour should be ensured and the cooling should be rapid in order to minimise losses by condensation on surfaces, which might otherwise be faster than aerosol formation at low degrees of supersaturation. With "seeding" by an additional component, for example moisture, the nicotine vapour can condense at lower degrees of supersaturation than with self-condensation alone. In the formation of nicotine-containing smoke from heated tobacco, the presence of moisture is in any case beneficial or in some cases even essential.

In either case, volatile substances liberated from the source material may also be caused or permitted to nucleate and so present the smoker with selected substances in a form similar to that obtained from conventional smoking.

Various ways of carrying the invention into effect will now be more fully described with reference to the accompanying drawings, in which Figures 1 to 9 are longitudinal sections through examples of different smoking devices, each of which may have approximately the form and appearance of a conventional cigarette and may be of circular or oval cross section.

Referring to Figure 1, a tube 1, for example of paper, contains the components of the device, namely an aerosol-nucleating or smoke-forming chamber 2

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communicating at one end with a thin-walled non-porous non-inflammable tube 3 containing a nicotine source material 4 and surrounded by a heating material 5. The material 5 is contained in the annular space between the tubes 1 and 3, which space is cut off from communication with the chamber 2 by the end wall 2a of the latter. Generally the tube 3 will be made of material of good thermal conductivity, suitably aluminium or copper. The chamber 2 will likewise be made of a material of good conductivity, not less than 0.2, for example aluminium or copper. As shown in Figure 1, the chamber 2 is of larger diameter than the tube 3 and has substantially the diameter of the tube 1. It may be formed by a separate part connected to the tube 3 or by an enlarged part of the said tube. Alternatively, the nucleating chamber may be formed wholly, Figure 2, or partly, Figure 3, by an extension of the tube 3. With the devices of Figures 2 and 3, which are otherwise similar to that of Figure 1, support may be afforded to the paper tube 1 in the region 5a either by additional heating material or by a filling of inert material. Fitted at the end of the chamber 2 is a mouthpiece 6 which may be a conventional cigarette mouthpiece, with or without a filter.

The nicotine source material 4 may be natural or reconstituted tobacco, a tobacco extract, preferably with an additive hereinafter described, or another of the source materials referred to above. The heating material is preferably tobacco, but other materials, also referred to above, may be employed. The use of tobacco is attractive, because the device then further resembles a

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conventional cigarette and the smoking habits of the user need be little altered. When the device is to be smoked, the heating material is lit at its free extremity and air is drawn through the tube 3, chamber 2 and mouthpiece 6 at intervals by the smoker. This air becomes loaded with vapour, including nicotine and water vapour, from the heated source material 4 and an aerosol smoke is formed on cooling of the airstream in the chamber 2.

The diameters of the tubes 1 and 3 and their ratios will be selected to provide required heat development and transfer conditions to suit the combination of source and heating materials. The dimensions, particularly the length, of the chamber 2 will be designed to ensure aerosol formation, having regard to the volatility range of the vapour to be condensed. The length will preferably be between 5 and 15 mm., but may be up to 30 mm. The diameter of the chamber 2 will be not less than that of the tube 4 and will preferably be between 3 and 10 mm., but may be up to 20 mm. The design of the device will also be such as to afford appropriate draw resistance and to favour puffs being taken at a frequency customary in smoking cigarettes.

If the source material 4 is tobacco, it will generally be essential to enrich the tobacco with a tobacco extract in order to ensure that sufficient nicotine will be provided per puff. Preferably, the extract employed will be one having a high content of nicotine and a low content of tobacco or other solids. If possible, moreover, the pH value of the extract should be on the acid side in order to avoid loss of nicotine

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on standing and during preparation of the smoking device.

A preferred extract has been prepared in the following fashion:-

30 gm. of tobacco (nicotine content 2.7% on a dry weight basis) was placed in a mixer together with 600 ml. of petroleum ether (boiling point 50 to 70°C.). Mixing was carried out for six 10-minute periods with intervals of 30 minutes between each mixing.

The mixture was then filtered, the petroleum-ether filtrate, which contains the waxes and some of the resins, was discarded and the extracted tobacco re-extracted with 600 ml. of chloroform, using the same mixing sequence as above. The mixture was filtered and the tobacco cake washed with chloroform until the filtrate was colourless, approximately 50 ml. of chloroform being used for the washing.

The chloroformic solution was concentrated by evaporation to a volume below 50 ml., transferred to a graduated 50 ml. flask and made up to that volume. Analysis showed the nicotine concentration to be 8.7 mgm. per ml. of solution. The solution, which was rich in acids as well as nicotine, was then ready for use.

Depending upon concentration requirements, the solution may be evaporated to dryness, when the nicotine content is approximately 25% of the dry weight of the residue, and may be re-dissolved in any suitable volume.

Less advantageously, an extract may be obtained by ~~macerating~~ percolating tobacco with an aqueous mixture containing 50% acetone. Depending upon the type of tobacco, the resultant extract, representing 20 to 30% of the

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weight of the tobacco, will contain the resins, sugars and waxes, as well as the nicotine. Alternatively, tobacco may be macerated with acetone alone. In this case, the extract, representing 15 to 20% of the weight of the tobacco, will contain the nicotine, but less of the resins sugars and waxes.

The device shown in Figure 4 consists of a tube 1, for example of paper, containing a nucleating chamber 2 between a mouthpiece 6 and an intimate mixture 7 of a nicotine source material, of one of the kinds referred to above, and a heating material. The latter may be an active metal, such as the finely divided catalytic nickel or iron known as Raney nickel or Raney iron, of moderate activity which reacts exothermically with air without producing harmful or unpleasant gases, or some other similar pyrophoric substance. In this case, the device may be kept in an airtight envelope which is only removed immediately before the device is to be used. Alternatively the tube 1 may be closed at the ends, the closure being punctured or removed when the device is to be used. In either case, it is then only necessary to draw air through the device, lighting being unnecessary, as the active metal generates heat on contact with the air. The air drawn through the mixture 7 becomes loaded with warm nicotine and water vapours which condense to a smoke in the cool nucleating chamber 2.

With the device of Figure 4, use may alternatively be made of a mixture 7 of tobacco and a substance such that the mixture is by itself inert, but that, on the application or access of a third substance, sufficient heat is generated to liberate nicotine and water vapour

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from the tobacco. The following reactive substances may be mixed with tobacco for this purpose, the appropriate third substance being indicated in brackets in each case: A fully activated molecular sieve substance (water), lithium-boron hydride or lithium-aluminium hydride (water), calcium oxide (water), rare metals (alcohol), and finely divided zinc or iron (air). In this case also, the tube 1 will be kept closed until the device is to be smoked. The two ends are then pierced and, in the case of the six substances first mentioned, the end remote from the mouthpiece 6 is moistened with the liquid named.

The device shown in Figure 5 consists of an external tube 1, for example of paper, containing a concentric non-porous non-inflammable tube 3, for example of thin aluminium or ceramic material, on whose interior surface, which may be rough or smooth, a nicotine source material 4 has been deposited in evenly distributed manner. For instance, a tobacco extract may be deposited on the said surface from a liquid drawn into the tube 3. The tube may alternatively be made partially porous or selectively porous, for instance of pipe clay with the outer surface rendered impervious to products of combustion or other gases by a coating of, say, tobacco tar or condensate. The inner porous surface may then provide a suitable holder for the source material. The tube 3, but not the annular space between it and the tube 1, communicates with the mouthpiece 6. Heating material 5, for example tobacco, is contained between the tubes 1 and 3.

With this form of device, the function of a nucleating or smoke-forming chamber is served by the free

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space 2b in the tube 3 or, more precisely, that part of the said space which is between the advancing localised heating zone, produced by the progressive smouldering of the tobacco 5, and the mouthpiece. However, a distinct additional chamber section 2c may also be provided, as shown in Figure 6, or there may be a tubular section 2d not furnished with source material 4, as shown in Figure 7. The section 2c or 2d may be an extension of the tube 3 or may be made separately of a thermally conducting or non-conducting material. To smoke devices of the kind shown in Figures 5 to 7, the heating material 5 is lit at the end, after which it burns slowly along the length of the device, air being drawn through the tube 3 by the smoker. This air becomes loaded with nicotine and water vapour in the hot region of the tube 3, but cools quickly as it passes through the space 2b, 2c, 2d to the mouthpiece, so that condensation of the vapours occurs to form nicotine-containing smoke.

Instead of being deposited on the tube 3 in devices such as are shown in Figures 5 to 7, the source material, for example tobacco extract, may be coated upon flat aluminium foil which is then rolled up into fine tubular form. Alternatively, laminar reconstituted tobacco or processed cigarette leaf, preferably enriched with tobacco extract, may be rolled to cylindrical form and inserted into a tube 3 of aluminium or ceramic material so that it lies against the wall of the said tube.

The length of the tube 3 in devices such as have been described with reference to Figures 5 to 7 will preferably be between 60 and 70 mm. and not more than 85 mm.

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The internal diameter of the tube 3 is of importance, for although the efficiency with which the nicotine is released in the tube increases with decreasing diameter, for example down to 2 mm. with a tube of aluminium foil, the efficiency of transfer, that is the proportion of the nicotine which reaches the mouthpiece 6, decreases. Accordingly, it is recommended that the internal diameter should be between 0.5 and 5 mm. and preferably between 1.5 and 3 mm. For practical purposes, a diameter of 3 mm. is suitable. In the device of Figure 6, the length of the chamber section 2c may be between 5 and 20 mm. and its diameter up to 20 mm.

Figure 8 illustrates a device comprising a central tube 3 of metal or ceramic material surrounded by heating material 5 and containing a series of sections 8 filled with source material, preferably tobacco enriched with tobacco extract, alternating with empty aerosol-forming spaces 9. The length of the sections 8 may suitably be 10 mm. and the length of the spaces 9 not less than this. It is believed that the provision for aerosol formation immediately behind each tobacco section 8 assists in ensuring that the nicotine liberated in any section will pass the remaining tobacco sections and reach the mouthpiece.

As an alternative for devices in which the heating material is outside the source material, the heating material may be disposed inside and the source material outside a tube separating them. One example of a device of this kind is shown in Figure 9. The tube 1, of paper or synthetic plastic material, contains an annular filling

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4 of tobacco, or other nicotine source material, surrounding a thermally conducting tube 3, filled with heating material, for example Raney ~~metal~~ nickel or iron or one of the reactive substances previously referred to, but not mixed with tobacco. The tube 3 is closed at its inner end 10 at least. A filter plug 11 or one or more thin porous discs serves to prevent the tobacco 4 from entering the nucleating chamber 2, while permitting the vapours to pass. The device may be externally ignited at the end 12 of the tube 5 or, with reactive material, a seal at the said end may be pierced or broken.

In practice, it will generally be advantageous to add to the nicotine source material proper a substance which will facilitate liberation of the nicotine, as it may not otherwise be feasible to provide acceptable quantities of nicotine in the smoke. If the source material comprises a tobacco extract, the additive may serve as an inert support for the extract. For this purpose, any solid powder is effective as long as it does not melt, disintegrate, decompose or react chemically with the nicotine or act catalytically to decompose the latter. Examples of suitable additives are silica, magnesium trisilicate, chalk, sodium chloride, aluminium oxide, calcium carbonate, tobacco and mixtures thereof. However, for ensuring a high efficiency of transfer of the nicotine, the specific surface area of the additive is an important factor. The specific surface area should be greater than 10 $m^2/gm.$ and a value between 100 and 250 $m^2/gm.$ has been found to be suitable in the case of silica. The following table illustrates the effect, as additives, of various materials ranging between sodium chloride with a low and silica with a high specific surface

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area:-

Additive	Amount of Additive	Efficiency of Transfer of Nicotine
Sodium chloride	50%	50%
Tobacco	30%	32%
Calcium carbonate	50%	33%
Magnesium trisilicate	50%	32-45%
Silica	7.5%	40-50%
Silica	15%	40-45%

Provided that it is sufficient, the proportion of additive used is not critical. Thus, in the case of silica, with a given amount of nicotine in the device, the efficiency of transfer is substantially independent of the proportion of silica present, and is near the maximum value, over the range of 7.5 to 25% of silica. For materials of high specific surface area, the proportion should be between 5 and 25%, but for materials of lower such area, the proportion should be greater and may have to be 60 to 70%, if reasonable transfer efficiency is to be attained. In the case of silica, it has been found that with a given proportion present, the efficiency of release of nicotine is substantially independent of the quantity of nicotine in the tobacco extract employed, at least within a range of nicotine contents in the device between 5 mgm. and 15 mgm.

More particularly with devices of the kinds shown in Figures 2 and 3, the source material may alternatively be tobacco extract impregnated or deposited upon steel wool or upon fibrous asbestos or silica. For example, such a source material may comprise 14.7 mgm. of extract, containing

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4 mgm. of nicotine, which is deposited upon 60 mgm. of steel wool.

Additives such as have been referred to above, or other additives, may be of assistance also in either facilitating the nucleation of the vapour or in providing nuclei on which such vapour may condense. Additives may also contribute to the operation of the device by modifying in a beneficial manner the physiological effects of the nicotine or by modifying the flavour or improving the taste of the smoke. Such additives may comprise essential oils or oil extracts, for example orange oil, or the oils of lemon, mandarin, angelica or bergamot, or tobacco or teasel oils, or paraffin oil. Use may also be made as additives of agents intended to modify the rate of physiological nicotine absorption and/or the rate of nicotine evaporation, nucleation or capture by other nuclei. Although one additive may perform two or more of the above functions, it may prove advantageous to use two or more additives.

Specific factors to be considered in the practical design of smoking devices such as have been described above will now be discussed more fully:

The temperature to which the nicotine source material is heated, that is the temperature within the tube 3 of devices such as are shown in Figures 1 to 3 and 5 to 8, affects materially the proportion of the nicotine released, the said proportion increasing steadily to a substantially constant maximum between 300 and 360°C. On the other hand, the temperature appears to have little influence upon the efficiency of transfer of the nicotine released. Good results can be obtained with temperatures

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above 200°C. and not exceeding 400°C., but for practical purposes the preferred range is 250 to 350°C. If the source of heat outside the tube 3 is a wrapping of evenly burning tobacco, the external temperature will be about 600° to 700°C. With this large temperature difference, particularly in the case of devices such as are shown in Figures 5 to 7, it is desirable that the tube 3 should be made of a material or materials affording good thermal insulation but a high rate of heat loss from the inside of the tube at any given temperature. A tube of ceramic material, such as that known by the Trade Mark "Agalain", or of asbestos is suitable for this purpose. Alternatively, a tube of aluminium foil may be employed, preferably in conjunction with an outer sheath of thermal insulating material. Aluminium alone tends, due to its conductivity, to extinguish the smouldering tobacco by carrying the heat away from the zone of combustion. If, however, a tube of aluminium is wrapped in asbestos or inserted in an outer ceramic tube, this difficulty can be avoided.

For a tube 3 made of a single material, particularly in the case of the devices of Figures 5 to 7, the optimum ratio between the external and internal diameters for achieving reduction of the internal temperature is between 1.5:1 and 3:1. It is also desirable that the external diameter should be as large as possible within the practical limits imposed by the diameter of the outer wrapping of tobacco. The ratio of the diameter of the wrapping to the external diameter of the tube should be between 1.5:1 and 4:1. For a tube 3 made of ceramic material or asbestos, an external diameter of 4 to 6 mm.

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and an internal diameter of 1.5 to 3 mm. are practical dimensions for a device with a wrapping of highly combustible tobacco in a paper tube of 8-20 mm. diameter. As a particular example, these dimensions may be 5, 3 and 10 mm. respectively.

For a composite tube comprising an outer tube of asbestos or ceramic material with an external diameter of 4.0 to 4.5 mm., an inner tube of aluminium with a diameter of 1.0 to 2.5 mm. and a thickness of 0.1 mm. or less may be employed. In one practical combination, the aluminium tube has an internal diameter of 1.4 mm. and a thickness of 0.075 mm. and is enclosed in an outer tube of asbestos paper with internal and external diameters of 1.5 mm. and between 4.0 and 4.5 mm. respectively, the diameter of the outer wrapping being again 10 mm. Another combination is an inner tube of aluminium with an internal diameter of 1.9 mm. and a thickness of 0.1 mm. enclosed in an outer tube of the aforesaid ceramic material "Agalain" with internal and external diameters of 2.0 and 3.0 mm. respectively. For these examples, the tobacco may suitably be cut to 100 to 200 cuts per inch and packed to a density of about 0.3 gm. per cc., the burning rate being 3.5 to 6 mm. per minute. The burning rate can be increased as hereinafter explained.

As it is desired that the smoking device should reproduce the psychological and social attributes of cigarettes and, in particular, that the smoking act of puffing should be similar, it is important that the devices should have a draw resistance similar to that of normal cigarettes. The devices such as have been described above

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have a low resistance, this can be increased by the incorporation of either a conventional filter, whose filtration efficiency is determined by the amount of nicotine to be passed, or a series of baffle or turbulence devices. For example, use may be made for the purpose of one or more baffle discs with pinhole passages for the smoke, the diameter of the holes being selected to cover a range of acceptable draw resistances. The provision of such baffle devices also has the effect of preventing violent inhalation, as the draw resistance offered increases rapidly with increase of air velocity. Moreover, for a given draw resistance, these baffle devices have low filtration efficiency, which will be advantageous in cases in which it is desired to increase the draw resistance without considerable loss of aerosol-borne nicotine.

The preferred source of heat is an external wrapping of smouldering tobacco, since the device is then very similar to a normal cigarette. It is important that the tobacco used should have good smouldering properties, that is it should burn smoothly and evenly, and that it should afford thermal insulation, the object being that the tobacco should continue to smoulder along the length of the device and ensure a temperature of about 350°C. inside the tube 3. Finely cut flue-cured tobacco having good smouldering properties may be employed. If necessary, tobaccos may be impregnated with known promoters of burning, for example with 5% of sodium chlorate, or with potassium nitrate or chlorate. Also paper of more than normally high porosity may be used for the tube 1 to assist even burning. The thermal insulation afforded by

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the tobacco will depend upon such physical parameters as the circumference of the tube 1, the fineness of cut of the tobacco and the density of its packing. With this consideration in mind, it is recommended that the circumference should be between 30 and 50 mm., the fineness of cut between 80 and 250 and certainly not less than 40 cuts per inch, and the packing density not less than 0.3 gm.per cc. Instead of cut tobacco, a wrapping of either tobacco leaf or laminar reconstituted tobacco may be used. Tobacco leaf may be either cigar leaf or slow-burning flue-cured leaf. The use of leaf or laminar tobacco affords an additional means of controlling the temperature in the tube 3.

The amount of nicotine delivered per puff should preferably be within the range of 0.1 to 0.2 mgm., but higher yields, say up to 0.4 or 0.6 mgm., or lower yields may be provided to give stronger or milder smokes. The yield per puff can be readily controlled by selection of the amount and the type of tobacco extract and additive used. By way of practical example, if the source material in a device such as is shown in Figure 5 is tobacco extract coated upon aluminium foil 0.01 mm. thick and the amount of extract, which contains 15% of silica (specific surface area 175 $m^2/gm.$), is such that the tube 3 contains 5 to 6 mgm. of nicotine, then, with a temperature in the tube of 280 to 300°C., ten 35 ml. puffs of 2 seconds duration will yield approximately 2 mgm. of nicotine.

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The claims defining the invention are as follows:-

1. A smoking device comprising a mouthpiece, a container or carrier provided with a source material capable of releasing nicotine vapour and aerosol-forming vapour when heated, a material, separated from or other than the said source material, which by its combustion or other exothermal reaction is adapted for heating the said source material to a temperature below the ignition point of the latter material to cause the release therefrom of the said vapours, and an aerosol-nucleating space communicating with the said mouthpiece and either communicating with or formed by part of the said container or carrier in such a manner that air can be drawn through or over the heated source material and through the said space to the mouthpiece. (priority 17.1.1963)

2. A device according to claim 1, wherein the source material comprises natural tobacco, reconstituted tobacco and/or tobacco extract. (priority 17.1.1963)

3. A device according to claim 2, wherein the source material has mixed with it an additive comprising a pulverulent material which is inert to the said material and to the said vapours and which preferably has a high specific surface area. (priority 17.1.1963)

4. A device according to claim 3, wherein the additive comprises silica, magnesium tri-silicate, chalk, sodium chloride, aluminium oxide, calcium carbonate, tobacco or a mixture of two or more of the said substances.

(17 JAN 1963)

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5. A device according to any one of claims 1 to 4, wherein the source material contains an additive comprising one or more flavouring agents. (priority 17.1.1963)

6. A device according to any one of claims 1 to 5, wherein the source material contains an additive comprising one or more essential oils. (priority 17.1.1963)

7. A device according to any one of claims 1 to 6, wherein the heating material comprises tobacco which can be ignited to smoulder in proximity with the source material so as to heat the latter. (priority 17.1.1963)

8. A device according to any one of claims 1 to 6, wherein the heating material comprises an otherwise inert substance which reacts exothermally on exposure to the air, for example Raney nickel or iron ~~metal~~ or finely divided zinc, ~~iron, nickel~~ or lead. (priority 17.1.1963)

9. A device according to any one of claims 1 to 6, wherein the heating material comprises an otherwise inert substance which reacts exothermally on exposure to water ~~moisture~~, for example a fully activated molecular-sieve substance, lithium boron or lithium-aluminium ~~or boron, aluminium~~ hydride or calcium oxide, or to alcohol, for example rare metals.

(17 JAN 1963)

10. A device according to claim 8 or 9, wherein the said substance is mixed with tobacco. (priority 17.1.1963)

11. A device according to any one of the preceding claims, wherein the device is an elongated body of a size to be carried in the hand. (priority 17.1.1963)

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12. A device according to any one of the preceding claims, wherein the device has the general ~~proportions~~ size and shape of a cigarette. (priority 17.1.1963)

13. A device according to claim 11 or 12, wherein the nucleating space is an open space occupying a length of the device between the mouthpiece and a length which is occupied by, ~~or parts of which are occupied by,~~ the source material and the heating material. (priority 17.1.1963)

14. A device according to any one of the preceding claims, wherein the nucleating space is bounded by a material having good thermal conductivity, for example aluminium or copper. (priority 17.1.1963)

15. A device according to any one of the preceding claims, wherein the source material and the heating material are contained in co-axial regions located inside and outside a tube and separated by the latter ~~separated by a tube~~, the region containing the source material being in open communication at one end through the aerosol-nucleating space with the mouthpiece and at the other with the air, whereas the region containing the heating material is cut off from communication with the said mouthpiece but is in communication with, or can be put in communication with, the air at the said other end. (priority 17.1.1963)

16. A device according to claim 15, wherein the tube is made of or comprises a material having good thermal conductivity, such as aluminium or copper. (priority 17.1.1963)

17. A device as claimed in claim 16, wherein the tube is made of or comprises rolled aluminium foil. (17 JAN 1963)

18. A device according to claim 15, wherein the tube is made of or comprises a material having poor thermal conductivity, for example a ceramic material or asbestos. (priority 17.1.1963)

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19. A device according to claim 15, wherein the tube is composite, presenting a material of poor thermal conductivity, for example a ceramic material or asbestos, towards the heating material, and a material of good thermal conductivity, for example aluminium, towards the source material. (17 JAN 1963)

20. A device as claimed in any one of claims 15 to 19, wherein the source material, in the form of tobacco extract, is applied as a thin coating to the tube. (priority 17.1.1963)

21. A device as claimed in any one of claims 15 to 19, wherein the source material, in the form of rolled tobacco leaf or lamina, is inserted in the tube. (17 JAN 1963)

22. A device according to claim 16, wherein the tube, which is open to the air at its outer end and to the nucleating space at its inner end, contains the source material and is surrounded by the heating material enclosed by a wrapper. (priority 17.1.1963)

23. A device according to claim 16, wherein the tube, which is open to the air at its outer end and to the mouth-piece at its inner end, contains the source material for the outer portion of its length, which is surrounded by the heating material, and is empty for the inner part of its length which forms the whole or a part of the nucleating space and is surrounded by further heating material or an inert material, the surrounding material or materials being enclosed by a wrapper. (17 JAN 1963)

24. A device according to any one of claims 1 to 14, wherein the source material and the heating material, for

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example Raney nickel or iron ~~metal~~, are mixed together and contained within a sealed wrapper in a region of the device communicating with the mouthpiece by way of the nucleating space, piercing or removal of the seal permitting access to the mixture of air drawn through the same and through the said space to the mouthpiece. (priority 17.1.1963)

25. A device as claimed in any one of claims 15 to 19, wherein the source material is coated upon the inside of the tube for the whole length or an outer part of the length thereof, leaving a free opening through the middle of the tube, and the heating material surrounds the said tube and is enclosed by a wrapper, the nucleating space being formed wholly or partially by an inner part of the length of the said tube or opening. (priority 17.1.1963)

26. A device as claimed in any one of the preceding claims 15 to 23, wherein the source material occupies sections of the tube separated by empty spaces.

(17 JAN 1963)

27. A device as claimed in any one of claims 15 to 19, wherein the tube, which is closed at its inner end, contains the heating material and is surrounded by the source material which is enclosed by a wrapper and is in communication with the mouthpiece through the nucleating space. (priority 17.1.1963)

28. A device as claimed in any one of the preceding claims, wherein the source material comprises tobacco extract impregnated or deposited upon fibrous or filamentary material, such as steel wool or fibrous asbestos or silica.

(17 JAN 1963)

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29. A device as claimed in any one of the preceding claims, wherein the draw resistance is increased by means of one or more baffle or turbulence devices, for example discs pierced with pinholes in the path of the air drawn through the device to the mouthpiece. (priority 17.1.1963).

30. A smoking device substantially as hereinbefore described with reference to any one of Figures 1 to 9 of the accompanying drawings. (priority 17.1.1963).

DATED this SIXTH day of JANUARY 1964

BATTELLE MEMORIAL INSTITUTE

Patent Attorneys for the Applicant
SPRUSON & FERGUSON

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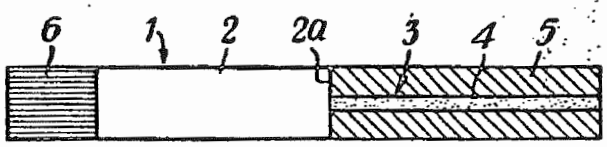


FIG.1

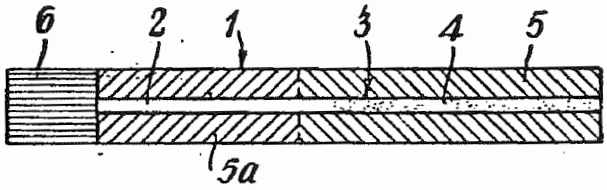


FIG.2

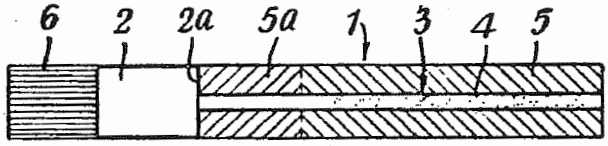


FIG.3

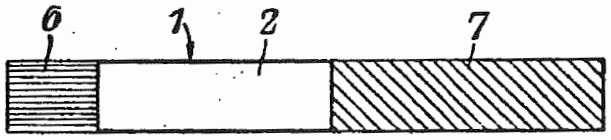


FIG.4

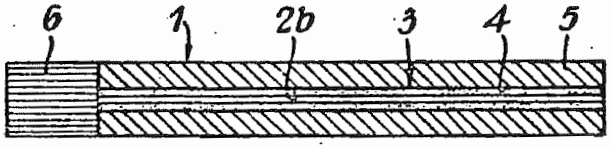


FIG.5

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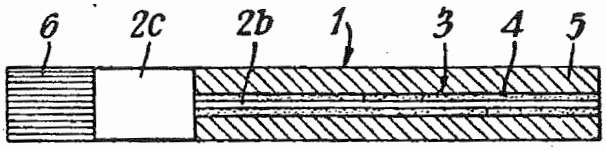


FIG.6

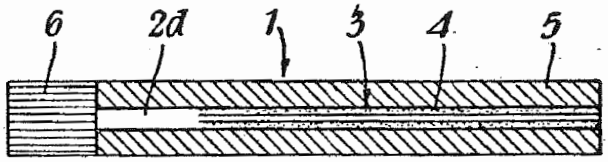


FIG.7

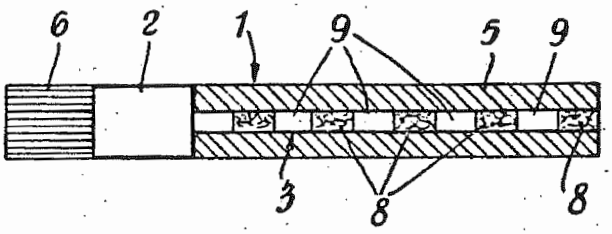


FIG.8

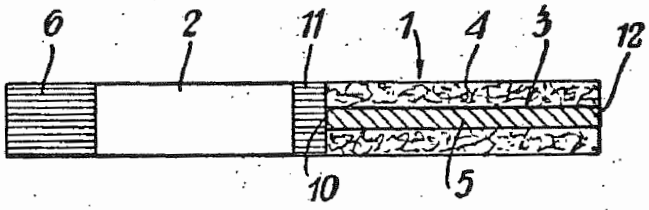


FIG.9

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 295 122 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88305318.3**

(51) Int. Cl.4: **A 24 F 47/00**

(22) Date of filing: **10.06.88**

(30) Priority: **11.06.87 GB 8713645**

(43) Date of publication of application:
14.12.88 Bulletin 88/50

(84) Designated Contracting States: **BE DE FR NL**

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(54) Smoking device.

(57) A smoking device (10) for releasing an aerosol into the mouth of a smoker comprises in combination, a chamber (28) into which a mixture of air and a liquid aerosol precursor is introduced, a heat source (30) surrounding the chamber (28), a first duct (20) providing communication between the chamber (28) and a smoker's mouth, whereby the contents of the chamber (28) may be drawn into the smoker's mouth, a container (36) for the aerosol precursor, a second duct means (38) leading from the aerosol precursor container (36) into the chamber (28) whereby aerosol precursor may pass from said container (36) into the chamber (28), and a third duct (32) means providing communication between ambient air and the chamber (28) whereby ambient air may be drawn into the chamber (28) by the smoker, the arrangement being such that in operation liquid aerosol precursor entering the chamber (28) is converted into a condensation aerosol.

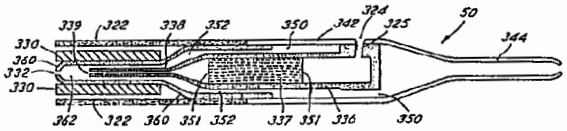


Fig.3

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Description

SMOKING DEVICE

The present invention concerns a smoking device.

Among the reasons why many people smoke conventional cigarettes or a tobacco pipe is that they wish to inhale an aerosol that contains nicotine. However, when a cigarette is smoked, some nicotine is lost to the smoker by pyrolysis and some is lost in sidestream smoke, mainly during smoulder between puffs.

The present invention provides a smoking device in which the loss of nicotine to the smoker by pyrolysis and in sidestream smoke is substantially avoided.

A prior art smoking device which aims at minimising the above-mentioned disadvantage is described in United States Patent 3356094 in the name of C.D. Ellis et al. This smoking device comprises a tube formed of tobacco having a mouthpiece attached at one end. An axial inner tube of material which is frangible under heat is contained within the tobacco tube and is coated on its inner surface with nicotine. Thus, on smoking, hot gases are drawn up the inner tube and, acting on the nicotine, release the nicotine in the form of an aerosol for inhalation by the smoker, However, appreciable loss of nicotine and other desirable compounds such as flavourants during smoking is not entirely prevented.

A further prior art smoking device described in British Patent 2064296 (Imperial Tobacco Limited) has an annular fuel rod with longitudinal bore in gaseous communication with a mouth-end chamber. The chamber contains a quantity of inhalant material which, when contacted by hot gases during smoking forms an aerosol for inhalation by the smoker.

Also, a smoking device described in European Patent Application 174645 (R.J. Reynolds Tobacco Company), which is believed to be the closest prior art, comprises a short combustible carbonaceous fuel element, a heat stable substrate bearing an aerosol forming substance (aerosol generating means), a heat conducting member which contacts a portion of the fuel element and the substrate, and an insulating jacket surrounding at least a portion of the fuel element, the object being to provide a smoke-like aerosol which is chemically simple, consisting essentially of air, oxides of carbon, water, and the aerosol which carries any desired flavourants or other desired volatile materials.

These devices do not suffer the disadvantages of USP 3356094 in that nicotine and other desirable compounds such as flavourants are not substantially lost during smoulder. However, yields of mainstream aerosol available to the smoker are generally not as high as in conventional cigarettes.

It is an objective of the present invention to provide a smoking device that attains the above-mentioned objectives of the prior art while affording scope to generate relatively higher yields of mainstream aerosol. A particular feature of the present invention is that heat required to vaporise aerosol precursor, an event which precedes condensation to mainstream aerosol, is essentially transferred to the aerosol precursor by contact with heated surfaces rather than with hot gases as in the devices of the prior art.

According to the present invention there is provided a smoking device for releasing an aerosol into the mouth of a smoker, the device comprising in combination, a chamber into which a mixture of air and an aerosol precursor is introduced, a heating means external of the chamber for heating internal surfaces of the chamber, a first duct providing communication between the chamber and a smoker's mouth, whereby the contents of the chamber may be drawn into the smoker's mouth, a container for an aerosol precursor, a second duct means leading from the aerosol precursor container into the chamber whereby aerosol precursor may pass from said container into the chamber, and a third duct means providing communication between ambient air and the chamber whereby ambient air may be drawn into the chamber by the smoker, the arrangement being such that in operation aerosol precursor entering the chamber is converted into a condensation aerosol.

The aerosol precursor is preferably a liquid.

The second and third duct means may have separate entrances into the chamber. The second and third duct means may alternatively be provided by coaxial second and third ducts respectively having a common entrance into the chamber.

The third duct may be provided with a constricted region thereby to provide a pressure drop in air passing therethrough.

The third duct means may be a capillary.

There may be provided a fourth duct means between the container and the ambient air whereby pressure within the container may be equalised with that of the ambient air.

The means for heating the internal surfaces of the chamber is preferably provided by a heat source surrounding the chamber into which said mixture is introduced.

The invention will now be described by way of example only with reference to the following schematic non-scale sectional drawings in which Figures 1, 2 and 3 respectively show first, second and third embodiments of a smoking device according to the invention.

Referring to the first embodiment illustrated in Figure 1 there is shown in longitudinal cross-section a pipe-like smoking device 10 comprising a cylindrical bowl member 12 divided into upper and lower compartments 14, 16 respectively by a partition 18, and a cylindrical mouthpiece 20 extending radially from the upper compartment through the cylindrical wall of the upper compartment. The upper end of the upper compartment 14 is provided with a protective fireproof cover 22 of porous or perforated material. The lower compartment 16 is closed at its lower end except for an air inlet 24.

A tube 26 extends axially between the upper and lower compartments 14, 16 through the partition 18.

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A further tube 27 provides communication between the interior of the upper end 28 of the tube 26, which is otherwise closed, and the mouthpiece 20. The upper end of the tube 26 is further surrounded by a heat-generating device 30, to be described hereinafter, adapted to heat the internal surfaces of the tube and consequently the contents of the tube. The lower end 32 of the tube 26, within the lower compartment 16, is open so that air may enter from the inlet 24, and is further provided with a constriction or venturi 34 so as to increase the velocity of air passing through the lower part of the tube and thereby decrease the air pressure within the tube upstream of the venturi.

Within the lower compartment 16 there is provided a flexible container 36 containing a liquid aerosol precursor the composition of which will be discussed in greater detail below. The container 36 is provided with an outlet duct, in the form of a capillary tube 38, leading into the tube 26 upstream of the venturi 34 at an inlet 39. The optimum diameter of the capillary 38 depends upon both the pressure drop across the venturi 34 and the viscosity of the aerosol precursor.

Referring to the second embodiment illustrated in Figure 2 there is shown in longitudinal cross-section a cylindrical smoking device 40 resembling externally a traditional cigarette holder. The device 40 comprises an outer cylindrical pipe 242 open at both ends, one end tapering to a mouthpiece portion 244. That end of the outer cylindrical pipe 242 opposed to the mouthpiece 244 is provided with a protective tubular cover 222 of porous or perforated fireproof material. An aperture 224 is provided in the wall of the pipe 242 near the mouthpiece portion 244 so as to permit a flow of ambient air into the pipe.

An inner tubular member 226 supported by barrier 218, extends within the device 40 axially from the open end of the pipe 242 towards the mouthpiece 244. A further tube 227 provides communication between the interior of an end chamber portion 228 of the tube 226 distal to the mouthpiece 244, and the mouth end of the mouthpiece.

Accordingly, when a smoker draws on the device 40 through the mouthpiece 244 he is drawing on the contents of the end chamber 228 of tube 226. The barrier 218 may be porous or have holes, whence aperture 224 is not required.

The end chamber portion 228 is further surrounded by a heat-generating device 230, to be described hereinafter, adapted to heat the internal surfaces of the tube, and thereby the contents of the tube. The other end 232 of the tube 226 is open so that air may enter from the inlet 224 or through barrier 218 and is provided with a constriction or venturi 234 so as to increase the velocity of air passing through the tube and thereby decrease the air pressure within the tube upstream of the venturi.

Within the pipe 242 there is provided a flexible container 236 containing a liquid aerosol precursor the composition of which will be discussed in greater detail below. The container 236 is provided with an outlet duct, in the form of a capillary tube 238, leading into and through the tube 226 at its open end 232 to terminate upstream of the venturi 234 at an inlet 239 within end chamber 228. The diameter of the capillary 238 is chosen to match the pressure drop across the venturi 234 and the viscosity of the aerosol precursor.

Referring to the third embodiment there is shown in Figure 3 in longitudinal cross-section a cylindrical smoking device 50 resembling in its external features a traditional cigarette holder. The device 50 comprises an outer cylindrical pipe 342 open at both ends, one end tapering to a mouthpiece portion 344. That end of the outer cylindrical pipe 342 opposed to the mouthpiece 344 is provided with a protective tubular extension or cover 322 of porous or perforated fireproof material. Located axially within the pipe 342 but spaced therefrom by a cylindrical air channel 350 is a rigid cylindrical chamber 336 made of an incombustible and gas-impervious material closed at the end nearest the mouthpiece portion 344. An aperture 324 is provided in the wall of the pipe 342 near the mouthpiece portion 344. The aperture 324 permits equalisation of air pressure within the rigid cylindrical chamber 336 with ambient air and is typically of small radial dimensions, e.g. 1mm diameter. The rigid cylindrical chamber 336 is provided at the end nearest the mouthpiece portion 344 with a duct 325 communicating with the aperture 324 in the wall of the pipe. The end of the chamber 336 distal to the mouthpiece portion 344 tapers to a capillary passage 338 terminating in an exit aperture 339 lying within the overall length of the pipe 342 and its protective extension 322.

Within the chamber 336, positioned between the duct 325 and the capillary passage 338 is a means 337 for providing an aerosol precursor, such as a porous body impregnated with volatilisable liquid aerosol precursor.

Surrounding the capillary passage 338 and a portion of the chamber 336 but spaced therefrom by a cylindrical airway 352 communicating with air channel 350 is an incombustible and gas-impervious chamber 360 which follows generally the contours of the chamber 336 and the constricted passage 338 so that that portion of chamber 360 which surrounds said portion of chamber 336 is in sealing contact with the inner face of the pipe 342 and its protective extension 322 whereas that portion of the chamber 360 surrounding the capillary passage 338 is spaced from the inner face of the extension 322. The chamber 360 is open at the end nearest the mouthpiece 344 and is provided at the end distal to the mouthpiece with an aperture 332 of about 0.84mm diameter open to ambient air. That portion of the chamber 360 surrounding the capillary passage 338 provides a section 362 into which the exit aperture 339 discharges.

That end of the chamber 360 surrounding the capillary passage 338 is surrounded by a cylindrical heat generating device 330, to be described below, located within the protective extension 322 and adapted to heat the internal surfaces of that portion of the chamber 360 surrounding the capillary passage 338 and the capillary passage itself.

In operation of the embodiment of Figure 3 the smoker draws on the mouthpiece 344 thereby creating a reduced pressure in chamber 362 with

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which the mouthpiece is in communication. The reduced pressure causes aerosol precursor to be drawn through the heated capillary passage 338 and to be propelled from the exit aperture 339 on to the heated internal surfaces of chamber 362. Aerosol precursor is thereby vaporised and the vapour is synchronously mixed with air that is caused by the reduced pressure in chamber 362 to be drawn into said chamber through aperture 332. The vapour and air mixture is drawn through the air way 352 into channel 350 and into mouthpiece 344 where cooling results in formation of a condensation aerosol. Hence aerosol is drawn into the smoker's mouth.

In the above embodiments the heat-generating device 30, 230, 330 is an exothermic material such as a mixture of inorganic solids which generate heat exothermically on ignition. Examples of such exothermic mixtures are mixtures of iron oxide and calcium silicide and mixtures of iron and sulphur.

The heat-generating device 30, 230, 330 may alternatively consist of a substance that relies on air oxidation for continued generation of heat after ignition. One example of such a substance is a carbonaceous mixture containing carbon, a binder such as xanthan gum, and an inorganic oxidizing agent such as potassium nitrate. One composition of the mixture contemplated is 2% potassium nitrate, 10% xanthan gum and 88% carbon.

Other examples of heat-generating substances include hydrogen, and gaseous or volatile hydrocarbons. Ambient air will be available through the open end of the device or through perforations or regions of porosity in the respective protective cover 22, 222, 322, or, in the case of the first embodiment, through an aperture or apertures in the external wall of the upper compartment 14.

The aforesaid exothermic mixture, carbonaceous material, hydrogen or gaseous or volatile hydrocarbons may be adapted to be ignited by a heat source provided by the user.

The heat-generating device may include a primer or a friction element. Hydrogen may be ignited catalytically (by platinum/palladium catalyst), as may the gaseous or volatile hydrocarbons on warming.

An alternative embodiment of the heat-generating device 30, 230, 330 may be an electric heater powered by a battery. The electric heater, hydrogen and gaseous or volatile hydrocarbons may have puff actuated ignition.

The aerosol precursor within the flexible containers 36, 236 of respective Figures 1 and 2 comprises a liquid base having a boiling point in the range 100° - 300°C, e.g. glycerol, propylene glycol, or sebacate esters such as di-2-ethylhexyl sebacate. The liquid base may also contain water, flavouring agents, nicotine or salts thereof.

When nicotine is incorporated in the aerosol precursor its concentration is chosen such that the level of nicotine in an aerosol produced from the precursor is similar to that attained by smokers when smoking conventional smoking products containing tobacco, e.g. in the range 20 - 200 micrograms per puff.

Claims

1. A smoking device (10) for releasing an aerosol into the mouth of a smoker, the device comprising in combination,

(a) a chamber (28) into which a mixture of air and an aerosol precursor is introduced,

(b) a first duct (20) providing communication between the chamber (28) and a smoker's mouth, whereby the contents of the chamber may be drawn into the smoker's mouth,

(c) a container (36) for an aerosol precursor,

(d) a second duct means (38) leading from the aerosol precursor container (36) into the chamber (28) whereby aerosol precursor may pass from said container into the chamber, and

(e) a third duct means (32) providing communication between ambient air and the chamber (28) whereby ambient air may be drawn into the chamber by the smoker, the arrangement being such that in operation aerosol precursor entering the chamber is converted into a condensation aerosol,

CHARACTERISED IN THAT there is provided a heating means (30) external of the chamber (28) for heating internal surfaces of the chamber (28).

2. A smoking device as claimed in claim 1 CHARACTERIZED IN THAT the aerosol precursor is a liquid.

3. A smoking device as claimed in claim 1 CHARACTERIZED IN THAT the container (36) for the aerosol precursor is a flexible container.

4. A smoking device as claimed in claim 1 CHARACTERIZED IN THAT the second and third duct means (38,32) are provided by second and third ducts respectively, having separate entrances into the chamber(28).

5. A smoking device as claimed in claim 1 CHARACTERIZED IN THAT the second and third duct means are provided by coaxial second and third ducts (238,232) respectively having a common entrance into the chamber (228).

6. A smoking device as claimed in claim 1 CHARACTERIZED IN THAT the third duct (32) is provided with a constricted region (34) to provide a pressure drop in air passing therethrough.

7. A smoking device as claimed in claim 1 CHARACTERIZED IN THAT a fourth duct means (324) is provided between the container and the ambient air whereby pressure within the container may be equalised with that of the ambient air.

8. A smoking device as claimed in claim 1 CHARACTERIZED IN THAT the means for heating the mixture of aerosol precursor and air is provided by a heat source surrounding the chamber containing said mixture.

9. A smoking device as claimed in claim 1

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CHARACTERIZED IN THAT the aerosol precursor comprises a liquid base having a boiling point in the range 100° - 300°C.

10. A smoking device as claimed in claim 9 CHARACTERIZED IN THAT the liquid base is selected from the group consisting of glycerol, propylene glycol, and sebacate esters.

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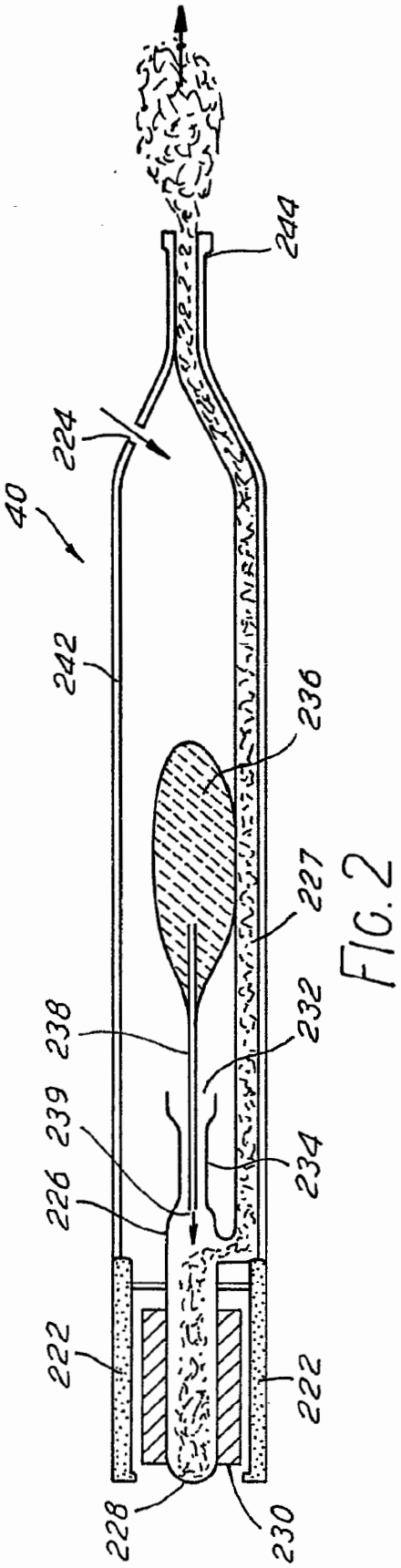


FIG. 2

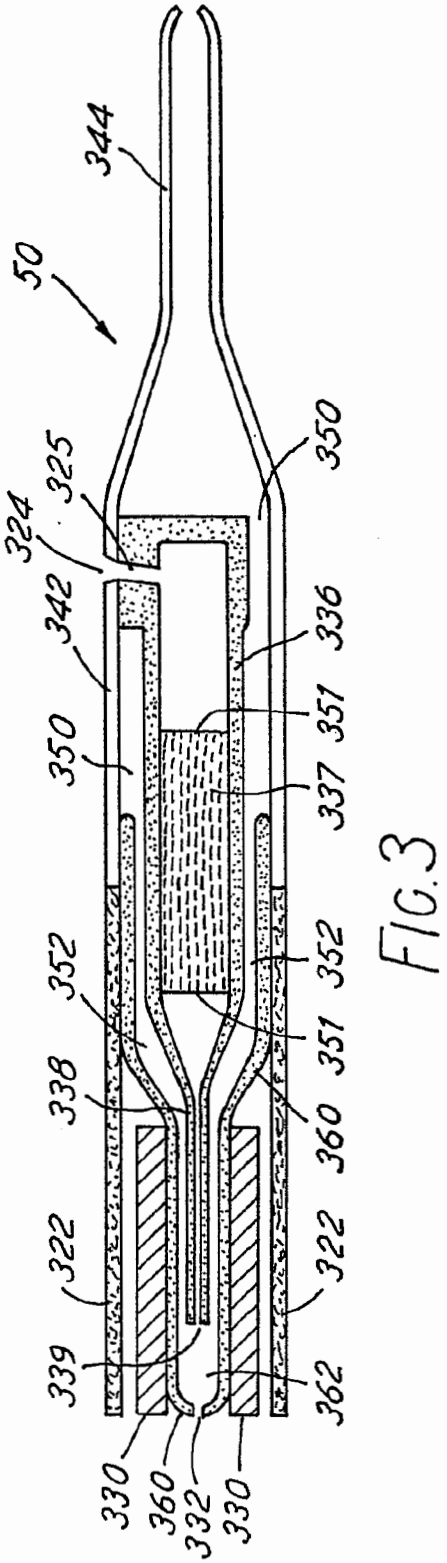


FIG. 3

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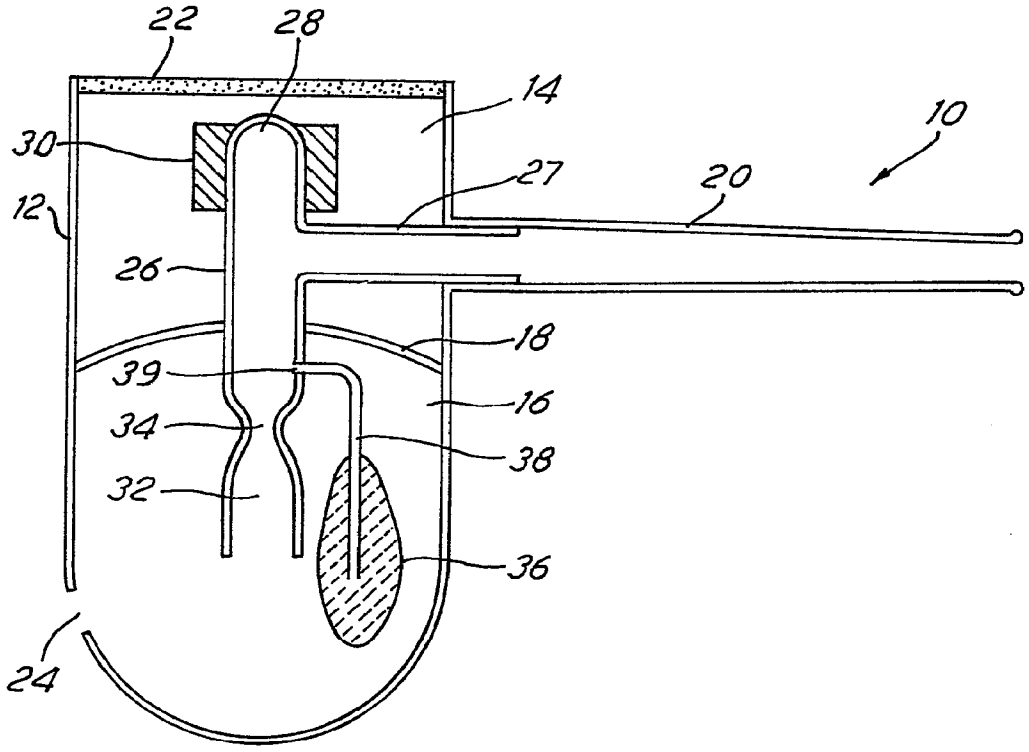


FIG. 1

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 430 566 A2**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **90312672.0**

(51) Int. Cl.5: **A24F 47/00**

(22) Date of filing: **20.11.90**

(30) Priority: **01.12.89 US 444746**

(43) Date of publication of application:
05.06.91 Bulletin 91/23

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI NL SE
Bulletin 00/2

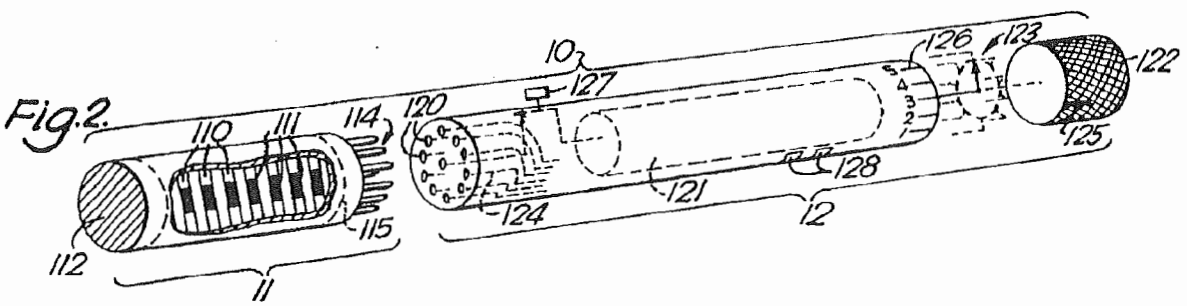
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(54) **Flavor delivering article.**

(57) An article (10) is provided in which a flavor generating medium (111) is electrically heated by heaters (110) to evolve inhalable flavors such as tobacco or other components in vapor or aerosol form. The article has a plurality of charges (111) of the flavor generating medium which are heated sequentially to provide individual puffs. The charges are located in a portion (11) of the article detachable from a second second (12) in which is located a power source (121). The heaters are connected to the power source by fingers (114) on the first section which are received in recesses (120) on the second second. A mouthpiece may be provided on the first section through which vapor may be inhaled.



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FLAVOR DELIVERING ARTICLE

This invention relates to articles in which flavor generating media are heated but not burned to release flavors. More particularly, this Invention relates to electrically heated articles which produce tobacco flavors on heating.

It is known to provide smoking articles in which a flavor bed of tobacco or tobacco-derived material is heated, without combustion or tobacco, to release tobacco flavors without producing all the normal products of tobacco combustion. For example, it is known to provide a smoking article having a bed of tobacco-derived material and a combustible heat source. A smoker draws air through or around the heat source, heating it, and the heated air passes through the flavor bed, releasing tobacco flavors that are drawn into the smoker's mouth. The heat source temperature, is dependent on how the smoker uses the article, so that the flavor release rate varies widely from user to user and from article to article for a particular user.

Articles that produce the taste and sensation of smoking by heating tobacco electrically are also known. However, in some known electrically heated articles the temperature was not consistent because the output of the electrical power source was not well regulated, so that the release of flavors also was not consistent. In other known electrically heated articles the power source was external to the article and inconvenient.

The present invention aims to produce improved articles which do not suffer from the above mentioned disadvantages.

According to the invention, there is provided an article for delivering to a consumer an inhalable flavor-containing substance, said article comprising: a plurality of pre-measured charges of flavor generating medium; electrical heating means for individually heating each of said plurality of charges; a source of electrical energy for powering said electrical heating means; and control means for applying said electrical energy to said electrical heating means to heat, at any one time, at least one but less than all of said plurality of charges, each of said charges, when heated, delivering a predetermined quantity of flavor-containing substance to said consumer.

An article embodying the invention may operate at a controlled temperature to produce a consistent release of flavor with each puff. Furthermore, the article may consistently for each puff quickly reach its operating temperature and remain at that temperature long enough to release the desired flavors, without overheating and causing burning of its flavor source, while at the same time minimizing energy consumption.

An embodiment of the invention has the further advantage that it is self-contained.

An article embodying the invention has the further advantage that it may have the appearance of a conventional cigarette, without producing sidestream smoke ash, or be hot between puffs.

Embodiments of the invention will be described, by way of example only, and with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a first embodiment of an article embodying the present invention;

FIG.2 is a partially fragmentary exploded perspective view of the article of FIG. 1;

FIG.3 is a perspective view of a second embodiment of an article embodying the present invention;

FIG.4 is an exploded perspective view of the article of FIG. 3;

FIG.5 is a perspective view of a further embodiment of the invention;

FIG.6 is an exploded perspective view of the articles of FIG.5;

FIG.7A-7K are perspective views of various embodiments of heaters for use in embodiments of the present invention;

FIG.8A-8C are views of one further heater for use in embodiments of the present invention;

FIG.9 is a schematic diagram of a power source for use in embodiments of the present invention; and

FIG.10 is a schematic diagram of a control circuit for use in embodiments of the present invention.

The basic article embodying the present invention includes a source of electrical energy, an electrical heater or heaters, electrical or electronic controls for delivering electrical energy from the source of electrical energy to the heaters in a controlled manner, and a flavor generating medium in contact with the heater. When the heater heats the flavor generating medium, flavor-containing substance -- i.e., a vapor or aerosol, or mixture thereof, containing flavored vapors or aerosols or other vapor or aerosol components -- is generated or released and can be drawn in by the consumer. (In the discussion that follows, either of the words "generate" or "release", when used alone, includes the other, and the word "form", when used in connection with the phrase "flavor-containing substance", means "generate or release".)

The flavor generating medium can be any material that, when heated, releases a flavor-containing substance. Such materials can include tobacco condensates or fractions thereof (condensed components of the smoke produced by the combustion

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of tobacco, leaving flavors and, possibly, nicotine), or tobacco extracts or fractions thereof, deposited on an inert substrate. These materials when heated generate or release a flavor-containing substance (which may include nicotine) which can be drawn in by the consumer. The flavor generating medium can also be unburned tobacco or a composition containing unburned tobacco that, when heated to a temperature below its burning temperature, generates or releases a flavor-containing substance. Any of these flavor generating media can also include an aerosol-forming material, such as glycerine or water, so that the consumer has the perception of inhaling and exhaling "smoke" as in a conventional cigarette. A particularly preferred material is a composition such as that described in copending, commonly-assigned United States patent application Serial No. 222,831, filed July 22, 1988, hereby incorporated by reference in its entirety, which describes pelletized tobacco containing glycerine (as an aerosol-forming ingredient) and calcium carbonate (as a filler). As used in the present invention, the composition, instead of being formed into pellets, would be deposited as a coating, in conjunction with adhesion agents such as citrus pectin, on a heater or on an inert substrate in contact with a heater.

The flavor generating medium is divided into individual charges, each representing one puff of the article. It is possible to mimic a conventional cigarette by providing a number of charges of flavor generating medium equal to an average number of puffs per cigarette, e.g., eight to ten puffs. Although the article does not decrease in length like a conventional cigarette as it is operated, it is possible to make the article in varying lengths, with different numbers of puffs. By providing individual charges for each puff, one reduces the total amount of flavor generating medium that must be provided, as compared with a single larger charge that would be electrically heated or reheated once for each of several puffs. The amount of electrical energy needed to heat a number of individual charges is also less than the amount needed to heat an entire larger bed several times while also maintaining a controlled lower bed temperature between puffs, as necessary.

The portion of an article embodying the present invention that contains the heater and the flavor generating medium is preferably a replaceable plug-in unit, so that when all the charges have been heated, the spent plug-in unit can be discarded and a new one inserted. The controls and power source could be retained.

One embodiment of article 10 embodying to the invention is shown in Figs. 1 and 2. Article 10 includes heater/flavor/mouthpiece section 11 and power and control section 12. Section 11 includes a plurality of heaters 110, each having deposited on its surface a quantity of flavor generating medium 111. The heater configuration shown in Fig. 2 is illustrative only. Different possible heater configurations will be discussed below. Preferably, there is a segment of filter material 112, such as conventional cellulose acetate or polypropylene cigarette filter material, possible in consideration with paper-wrapped tobacco rod sections, at the mouth end of section 11, both for aesthetic purposes as well as to provide appropriate filtration efficiency and resistance-to-draw to the system. In addition, mouthpiece 113 can optionally be included.

As shown in FIG. 2, there are ten heaters 110 in section 11. There are also eleven contact pins 114 extending from section 11 remote from its mouth end --one common pin and ten pins connected to individual heaters 110 -- that fit into eleven sockets 120 on section 12 to make electrical contact between heaters 110 and power source 121, the nature of which will be discussed in more detail below.

A knurled knob 122 is provided at the remote end of section 12 to allow the consumer to select one of the heaters 110. Knob 122 controls a single-pole ten position rotary switch 123 connected by wires 124 to sockets 120. Index mark 125 on knob 122 and graduations 126 on the body of section 12 assist the consumer in selecting the next heater 110. To operate article 10, the consumer selects a heater 110 using knob 122 and presses momentary-on pushbutton switch 127 to complete the circuit and energize the selected heater 110 to initiate heating. Flavor generating medium 111, thus heated, can release or generate a flavor-containing substance. The consumer draws in the flavor-containing substance along with air drawn through perforations 115 in the outer wrapper of section 11 or 12, which could be conventional cigarette paper or tipping paper. Air may also enter through the end of section 12 remote from the mouth end through channels that may be provided for that purpose, carrying the air around power source 121 and around other internal components of section 12. What is important is that the air enter section 11 at a point at which it can fully sweep heaters 110 to carry the maximum amount of flavor-generating substance to the mouth of the consumer.

When all ten charges in section 11 have been heated, section 11 is spent, and can be unplugged from article 10 and a new section 11 can be plugged in. Section 12 as envisioned is reusable.

In article 10, it is possible that the consumer will select a particular heater 110 more than once, giving rise to the possibility of reheating the flavor generating medium and producing less preferred vapor or aerosol compounds, unless knob 122 is

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designed so that it can only be rotated in one direction and only for one complete revolution. But in that case, its ability to rotate would have to be restored when section 11 is replaced, which is mechanically complex to achieve. Therefore, a more preferred embodiment 30 of an article according to the present invention, shown in FIGS. 3 and 4, includes controls that automatically select which charge will be heated, as well as the duration of heating.

Article 30 includes a heater/flavor/ mouthpiece section 11 identical to section 11 of article 10. However, power and control section 31 contains electronic control circuit 32 (described in more detail below) in place of mechanical switch 123 of power and control section 12 of article 10. Control circuit 32, in response to depression of pushbutton 127, selects one of charges 111 that has not previously been used, and supplies power from power source 121 to the associated heater 110 for a predetermined duration. After all ten charges 111 have been used, circuit 32 no longer supplies power to any heater until spent section 11 is replaced by a fresh unit. Optionally, control circuit 32 also locks out pushbutton 127 for a predetermined lockout period after each depression, so that heaters 110 are not energized too soon one after the other.

Articles embodying the present invention do not decrease in length like conventional cigarettes do as they are smoked, because they do not burn. Therefore, in order to provide some indication to a consumer of how much of an article 30 has been used or remains to be used, visual indicators 33, which can be a series of ten light emitting diodes or a bar graph or similar indicator, under the control of circuit 32, are preferably provided to display either how many of charges 111 have been used or how many remain. Similarly, there is no glowing coal as in a conventional cigarette to indicate to the consumer that the article is operating. Optionally, an additional light emitting diode 34 or similar indicator, also under the control of circuit 32, can be provided to show when one of heaters 110 is energized. An additional Indicator or indicators (not shown) may also be provided to show that the lockout period is in effect or that it is over.

In one preferred embodiment, an article does not have a pushbutton 127, but is responsive to the consumer's drawing on the article, similarly to a conventional cigarette. Therefore, article 50, shown in Figs. 5 and 6, is identical to article 30, except that section 52 lacks pushbutton 127. Pushbutton 127 is replaced by a switch 53 in section 52 that is sensitive either to pressure changed or air flow changes as the consumer draws on article 50. It has been found been found that when a Model 163PC01D36 silicon sensor, manufacutured by the MicroSwitch division of Honeywell, Inc., Freeport, Illinois, is used in an embodiment of the invention, the appropriate heater is activated sufficiently rapidly by the change in pressure when the consumer draws on article 50. In addition, flow sensing devices, such as those using hot-wire anemometry principles, have been successfully demonstrated to actuate the appropriate heater 110 sufficiently rapidly after sensing a change in air flow.

The heater 110 used in embodiments of the present invention would have to heat the flavor generating medium to a temperature in the range of from about 100° C to about 600° C, and preferably from about 200° C to about 500° C, and more preferably from about 300° C to about 400° C, to release the desired flavors from the flavor generating medium. To release or generate the desired flavors from the flavor generating medium, heater 110 should be energized for a duration of from about 0.1 second to about 4 seconds, preferably from about 0.5 second to about 1.5 seconds, and more preferably from about 0.8 second to about 1.2 seconds. The optimum temperature and total heating time depend on the heater mass, the mass of the flavor generating medium 111 on heater 110, the configuration of heater 110 and flavor generating medium 111 thereon, and the thermal/physical properties of heater 110 and flavor generating medium 111. The heating conditions are most preferably chosen to prevent burning of flavor generating medium 111. At the same time, heaters 110 are preferably part of replaceable heater/flavor/mouthpiece section 11, and therefore they need not be capable of more than one use.

The linear array of heaters 110 shown in Figs. 2, 4 and 6 is shown for ease of illustration only, and does not necessarily represent the preferred embodiment of heaters to be used in the present invention. Possible heaters for use in the present invention are described in copending, commonly-assigned United States patent application Serial Ho. 07/444,569, filed 1 December 1989 and hereby incorporated by reference in its entirety. A number of different possible additional heater configurations are shown in Figs. 7A-7K. The different configurations reflect both mechanical considerations -- e.g., ease of manufacture -- and materials considerations -- e.g., the effect of the heater material on the composition of the flavor-containing substance.

For example, linear heaters 110 shown in FIGS. 2, 4 and 6 could be bars or mesh of stainless steel or other suitable metals or ceramics, although the flavor generating medium would adhere more readily to a mesh.

A preferred material for the heaters is graphite. Graphite heaters, possibly compounded with other forms of carbon to provide the desired electrical resistance and therefore the desired heating, are stable and non-reactive, and can be molded, ex-

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truded or machined into many forms and attached, by suitable contacts, to power source 121. For example, a cylindrical graphite structure 70 as shown in FIG. 7A can be formed with a number of inwardly directed vanes 701 equal to the desired number of puffs. The inner surfaces 702 of structure 70 can be coated with the flavor generating medium. By connecting one pole of power source 121 to the outer surface 703 of structure 70, and sequentially connecting the other pole to the inwardmost edge 704 of each vane 701, one can heat each vane 701 to the desired temperature. Inwardmost edge 704 of each vane 701 is increased in thickness as compared to the body of vane 701 for added strength and to provide a conductive pathway to improve the unformity of electrical flow and heating across the vane to maximize the use of available heater surface area. Covering both surfaces of each vane 701 with flavor generating medium also maximizes the use of available heater area and, thus, heater energy. Concentrating the flavor-generating medium further increases the amount of flavor-containing substance generated or released per unit of expended electrical energy.

Similarly, graphite structure 71 can be provided which functions like structure 70, except that vanes 711 radiate outwardly from a central core 713, as shown in FIG. 7B. The flavor generating medium is deposited on the surfaces 712 between vanes 711. Power can be applied between core 713 and the outer edge 714 of the appropriate vane 711. outer edge 714 of each vane is increased in thickness as compared to the body of vane 711 for added strength and to provide a conductive pathway as discussed above.

Each of structures 70 and 71 has eight vanes 701, 711, representing eight charges of flavor generating medium which provide eight puffs. The structures shown below would provide ten puffs.

Structure 72 shown in FIG. 7C is a hollow cylinder of graphite, divided by nine opposed pairs of slits 720, 721 into ten opposed pairs of segments 722, 723. The flavor generating medium is coated on the inner or outer surface 724 of cylinder 72. When one pole of power source 121 is connected to each of opposed segments 722, 723, heat is generated predominantly in that pair only, heating the flavor generating medium coated onto that pair. Although all ten pairs are interconnected at midline 725, at most a low current flows along midline 725 outside the pair being heated.

Structure 73 shown in FIG. 7D is a solid or hollow (not shown) cylinder of graphite, with ten grooves 730 formed in its surface, separating eleven lands 731. Grooves 730 are coated with flavor generating medium 732. By applying power source 121 across two adjacent lands 731, one heats structure 73 between those two lands 731 along with flavor generating medium 732 in groove 730 therebetween.

Structure 74 shown in FIG. 7E is a graphite ring divided by two interleaved sets of ten slots each, one set of slots 740 extending from one side 741 of the ring, and the other set of slots 742 extending from the other side 743 of the ring, forming ten U-shaped fingers 744 that are coated inside or outside with flavor generating medium 746 adjacent side 741, and ten uncoated bases 745 adjacent side 743, each base 745 connected to one leg each of two adjacent fingers 744 so that two adjacent bases 745 contact opposite ends of one finger 744. By applying power from source 121 across two adjacent bases 745 heat is generated predominantly in that the finger 744 that they contact in common, heating the flavor generating medium thereon.

Structure 75 shown in FIG. 7F is similar to structure 74, except that it has only five each of slots 740 and 742, and the flavor generating medium 750 is confined to the band of overlap of slots 740 and 742, thus forming ten separate areas of tobacco-derived material 750, as well as five bases 751 and five fingers 752. Bases 751 and fingers 752 are arranged so that when one pole of power source 121 is applied to one base 751, two areas 750 can be heated sequentially by sequentially applying the other pole of power source 121 to each of two adjacent fingers 752. To heat further areas 750, the second pole of power source 121 is left attached to the second one of fingers 752 and the first (or third) pole of power source 121 is connected to a different base 751, and so, on.

Structure 76 shown in FIG. 7G is similar to structure 72 shown in FIG. 7C, except that a slidable heater 760 is provided to serially heat each pair of opposed segments 722, 723 by conduction, convection or radiation as it is moved in the direction of arrow A. Optionally, structure 703 can be indexed through stationary heater collar 760. A variant structure 77 shown in FIG. 7H is an extruded rod 770 (hollow or solid) made solely of flavor generating medium and components to add mechanical strength, provided with slidable heater 771. Heater 771 is similar to heater 760. The heater is moved in the direction of arrow A, either manually by the consumer, or automatically by electromagnetic or mechanical means (not shown) linked to the consumer's actuation of the heater with pushbutton 127 or with a switch activated by either pressure or airflow provided by the consumer during a puff. For example, in addition to closing electrical contacts, pushbutton 127 could also engage a mechanical ratchet (not shown). Alternatively, the closing of switch 127 (or alternative switches) could, in addition to providing current for the heaters, move a pawl which allows a spring

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attached to collar 760 or 771 to move the collar one position in the direction of arrow A.

The same principle can be applied to each of the three heater structures shown in FIGS. 7I, 7J and 7K. Structure 78 of FIG. 7I is a thermally conductive substrate divided by slots 780, 781 into strips 782, 783. Applying heat to the width-wise strips defined by opposed pairs of strips 782, 783 causes heat to flow primarily to those width-wise strips, heating that section of substrate 78 and flavor generating medium 784 thereon. Heat is applied to strips 782, 783 by passing substrate 78 through a heater 785. The movement of substrate 78 through heater 785 in the direction of arrow A can be accomplished in any of the ways set forth above for the movement of collars 760, 771. Heater 785 can be disposable, as part of section 11, or permanent, as part of section 12, 31 or 52, with only substrate 78 being replaced as part of section 11.

Structure 79 of FIG. 7J is similar to structure 78, except that substrate 79 is made from graphite, which serves as its own heater, so that heater 785 can be omitted and replaced with electrical contacts (not shown) for applying power across strips 782, 783 of substrate 79.

Structure 790 of FIG. 7K has an inert substrate 791 on which lines 792 of flavor generating medium, mixed with graphite or similar material to make it conductive, are laid. Contacts similar to those used with structure 79 are used to apply power across lines 792, which, by virtue of their conductivity, form their own heaters integral with the flavor generating medium.

FIGS. 8A-8C show a particularly preferred embodiment of a heater structure 80 for use with the present invention. Structure 80 includes ten U-shaped heater elements 81 connected to a central hub 82. Preferably, heater elements 81 are made of graphite. Hub 82 serves as one contact point for the application of power to each heater element 81, while outer edge 83 of each heater element 81 serves as the second contact point for that respective heater. Hub 82 is connected to one contact and outer edges 83 are connected to a series of ten contacts that are activated sequentially to sequentially heat heater elements 81. (As used herein, "sequentially" does not necessarily imply any spatial order, but only that some individual element is heated after some other individual element.)

Whatever heater design is used, it is subject to several design criteria. First, the electrical resistance of the heater should be matched to the voltage of power source 121 so that the desired rate of heating is accomplished. At the same time the resistance must be large compared to the internal resistance of power source 121 to avoid excessive losses due to the internal resistance. Second, the surface area must be sufficient to allow for support of the flavor generating medium with proper thickness of the flavor generating medium to allow rapid heating and with proper area for generation or release of vapors or aerosols containing flavors or other volatile components. Third, the thermal conductivity, heat capacity and heater mass must be such that the heat generated is conducted effectively to the flavor generating medium but not away from the heater to the surroundings, and such that excessive energy is not necessary to heat the heater itself.

The contact resistance between the heater material and the contacts should be kept low. If necessary, suitable materials, such as tantalum, can be compounded or coated at the contact points to lower contact resistance. Any materials added should be non-reactive at the operating temperatures.

Heater/flavor/mouthpiece section 11 preferably would contain heater elements as described above coated with flavor generating medium, all wrapped in a tube, which can be made of heavy paper, to allow it to be inserted by a consumer into section 12, 31 or 52.

Power source 121 preferably must be able to deliver sufficient energy to generate or release flavors or other components in vapor or aerosol form from ten charges of flavor generating medium, while still fitting conveniently in the article. However, the energy to be delivered is not the only criterion, because the rate at which that energy is delivered --i.e., the power -- is also important. For example, a conventional AAA-sized alkaline cell contains enough energy to heat several hundred charges of flavor generating medium, but it is not designed to deliver the necessary energy at a high enough rate. On the other hand, nickel-cadmium (Ni-Cad) rechargeable batteries are capable of providing much greater power on discharge. A preferred power source is four N50-AAA CADNICA nickel-cadmium cells produced by Sanyo Electric Company, Ltd., of Japan. These batteries provide 1.2-volts each, for a total of 4.8 volts when connected in series. The four batteries together supply about 264 milliwatt-hours, which is sufficient to power at least one ten puff article without recharging. of course, other power sources, such as rechargeable lithium-manganese dioxide batteries, can be used. Any of these types of batteries can be used in power source 121, but rechargeable batteries are preferred because of cost and disposal considerations associated with disposable batteries. In addition, if disposable batteries are used, section 12, 31 or 52 must be openable for replacement of the battery.

If rechargeable batteries, as preferred, are used, a way must be provided to recharge them. A

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conventional recharging unit (not shown) deriving power from a standard 120-volt AC wall outlet, or other sources such as an automobile electrical system or a separate portable power supply, can be used. The charge rate and controller circuitry must be tailored to the specific battery system to achieve optimal recharging. The recharging unit would typically have a socket into which the article, or at least section 12, 31 or 52, would be inserted. Contacts 128 on section 12, 31 or 52 connected to power source 121 would contact corresponding contacts in the recharging unit.

The energy content of a battery in power source 121 can be more fully exploited, despite the power or current limitation of the battery, if a capacitor is included in power source 121 as well. The discharge of the capacitor can be used to power heaters 110. Capacitors are capable of discharging more quickly than batteries, and can be charged between puffs, allowing the battery to discharge into the capacitor at a lower rate than if it were used to power heaters 110 directly.

An idealized schematic form of a power source 121 including a capacitor is shown in FIG. 9. Capacitor 90 is part of a series R-C circuit 91 with resistor 92, in which capacitor 90 is charged between puffs by battery 93 with a time constant RC, where R is the resistance of resistor 92 and C is the capacitance of capacitor 90. (In a real, non-ideal circuit, resistance R would also include the internal resistance of battery 93 and the impedance of capacitor C, as well as the resistance of any wires or other conductors in circuit 91.) In this embodiment, pushbutton (or pressure- or air flow-sensitive device) 127 acts as a single-pole, double-throw momentary switch that normally connects capacitor 90 to R-C circuit 91 for charging. When contact is made by depression of pushbutton 127 (or by activation of the above-mentioned devices), capacitor 90 can be disconnected from charging circuit 91 and connected to discharge across heater resistance 110.

Alternatively, power source 121 could include only capacitor 90, with no battery. In such an embodiment, contacts 128 would have to be touched to an external power source to charge capacitor 90. Capacitor 90 could be sized in such a case to require charging after each puff, or to be capable of being charged for a number of puffs (e.g., the same as the number of charges of flavor generating medium in the article). The external power source could be a specially designed ashtray or other appliance (not shown) having power contacts for mating with contacts 128. The ashtray itself could be battery powered or could contain a power supply that connects to a 120 volt AC wall outlet. Another type of external power source could be a socket provided on an automobile dashboard and connected to the electrical system of the automobile, similar to the cigarette lighter currently provided in automobiles.

In another possible embodiment, energy would be coupled to the article by magnetic or electromagnetic induction, followed by suitable rectification and conditioning prior to charging the capacitor. For example, the specially designed ashtray referred to above could contain a suitable generator for coupling magnetic or electromagnetic energy to the article.

If a capacitor is used in the article, the required capacitance is determined by the voltage available for charging and the maximum amount of energy to be stored. For example, if the voltage available is 6 volts and the amount of energy needed for a single puff is 10 joules, then the required capacitance is 0.56 farads. The capacitance needed would increase proportionally if energy for multiple puffs is to be stored. Preferably, the capacitor also has a very low internal resistance, so that the time constant for discharging into heater 110 is determined exclusively by the heater resistance and the capacitance.

The most preferred embodiment of the present invention includes control circuit 32 of FIG 10. Control circuit 32 preferably fulfills several functions. It preferably sequences through the ten (or other number of) heaters 110 to select the next available heater 110 each time switch 127 is closed. It preferably applies current to the selected heater for a predetermined duration that is long enough to produce sufficient flavor-containing substance for an average puff, but not so long that the charge of flavor generating medium can begin to burn. It preferably controls indicators 33, 34 which show how much of the article remains or has been used and when one of heaters 110 is active. In addition, it may also lock out switch 127 for a predetermined time period after each actuation to allow time to charge capacitor 90 in power source 121, and to avoid inadvertently energizing the next heater 110.

Control circuit 32 also controls the amount of total particulate matter (TPM) evolved from the flavor generating medium by controlling the temperature to which the flavor generating medium is heated, which is a function of the duration of heating and the power applied. For example, about two milligrams of TPM are typically released when 100 milligrams of the preferred flavor generating medium is heated to 120° C for 300 seconds, while about twenty-two milligrams of TPM are released when the same amount of flavor generating medium is heated to 280° C for 300 seconds. Heating five milligrams of flavor generating medium to 300° C for 2 seconds releases about one milligram of TPM. Thus the total TPM delivery of an article

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according to this invention can be controlled by selecting the amount of flavor generating medium as well as by tailoring heaters 110 and circuit 32 to control the temperature to which the flavor generating medium is heated and the rate and duration of heating.

A preferred embodiment of control circuit 32 is shown in FIG. 10. In FIG. 10, all points labelled V+ are connected to the positive terminal of power source 121, and all points labelled as ground are connected to the negative terminal of power source 121.

Each heater 110 is connected to V+ directly, and to ground through a respective field-effect transistor (FET) 900. A particular FET 900 will turn on under control of standard 4028-type CMOS BCD-to-decimal decoder 901 (via pins 3, 14, 2, 15, 1, 6, 7, 4). Decoder 901 is also connected (via pin 11) to the complementary output of a 4047-type CMOS timer 902 (also via pin 11). Pin 11 of decoder 901 is high when the output of timer 902 (pin 10) is low. All outputs of decoder 901 remain low if a BCD code greater than or equal to 1001 is applied to its inputs. Therefore an output of decoder 901 can only be on during a positive clock pulse to 4024-type CMOS counter 903. Decoder 901 will decode a standard BCD 4-bit code input from counter 903 into 1-of-10 outputs. Decoder 901 is connected to supply voltage V+ (at pin 16) and to ground (at pin 8). Decoder 901 receives BCD input from counter 903 (at pins 10, 13, 12).

Heater-active indicators 33 (light-emitting diodes (LEDs) or other indicator devices) are connected to V+ through an ADG508-type multiplexer 904 (via pins 4, 5, 6, 7, 12, 11, 10, 9) supplied by Analog Devices of Norwood, Massachusetts. LEDs 33 are connected to ground via a 2 KΩ current-limiting resistor 905. Multiplexer 904 is connected to V+ (via pins 2, 13, 8) and to ground (via pins 14, 3). Multiplexor 904 receives BCD input from counter 903 (via pins 1, 16, 15). The operation of multiplexer 904 is similar to that of decoder 901 in that it receives BCD input from counter 903, and decodes it such that an individual output is selected through which V+ is supplied, but in this case to LEDs 33 rather than to heaters 110.

Counter 903 is connected to V+ (via pin 14) and to ground (via pins 8, 7), and receives a positive clock pulse from timer 902 (via pin 1). Counter 903 is reset to 0 via a positive pulse (through pin 2). BCD output is provided at pins 12, 11, 9, 6. Every time the clock pulse (received at pin 1) changes from positive to ground, counter 903 advances one count. Counter 903 counts positive clock pulses and converts the count to BCD. The output at pin 6 is connected to pin 6 of timer 902.

Timer 902 is in a monostable configuration and is connected to V+ (via pins 4; 8, 14) and to ground (via pins 5, 7, 12, 9) for negative triggering (through pin 6). Negative triggering is accomplished by leaving pin 6 positive and then briefly pulling it to ground to initiate the timing sequence. When triggered, the complementary outputs (via pins 10, 11) change for a time period that is dependent upon resistance value R of resistor 906, preferably 2 MΩ (connected between pins 2, 3), and a capacitance value C of capacitor 907, preferably 1 μF (connected between pins 1, 3).

Puff actuator 908 is the source of the negative trigger at pin 6 of timer 902. Puff actuator 908 has two power inputs (for V+ and for ground), and one output. The output drives the gate of a MOSFET switch 909. The source of MOSFET switch 909 is connected to counter 903 (at pin 6). The drain of MOSFET switch 909 is connected to timer 902 (at pin 6). Puff actuator 908 can be a device similar to silicon based pressure sensitive sensor Model 163PC01D36 referred to above, or a gas flow transducer such as a wheatstone bridge semiconductor version of a hot wire anemometer.

Resistor 910 preferably has a value of 1 MΩ, while resistors 911, 912, 913 preferably all have values of 100 KΩ. Capacitors 914, 915, 916 preferably all have values of 0.1 μF.

Prior to the consumer taking the initial puff, the control circuitry is turned on via on/off switch 917 or similar device. The heater active indicator LED 33 is illuminated for the first heater 110. Correspondingly, heater number 1 is selected by decoder 901 and awaits firing. Counter 903 is reset to begin counting. Timer 902 complementary output at pin 10 is low (which is the clock to counter 903, pin 1) and at pin 11 is high (which keeps the heater from firing via pin 11 of decoder 901). When the consumer takes a puff, puff actuator 908 causes a trigger of timer 902. The RC time constant is set by resistor 910 and capacitor 913 such that a pulse of desired duration is output from complementary outputs at pins 10, 11 of timer 902. The output from pin 11 of timer 902, connected to pin 11 of decoder 901 goes low, causing the first heater to be heated. The output at pin 10 of timer 902 stays high for the duration set by RC then goes low causing counter 903 to advance one count. The output at pin 11 returns high, discontinuing heater activation. Since the count of counter 903 has advanced by one, the heater active LED illuminated via multiplexer 904 has correspondingly advanced, and the next heater to be fired in sequence has been selected via decoder 901. This cycle will repeat until the final heater has been heated. At such time, pin 6 of counter 903 will go high causing timer 902 to become non-triggerable. In such case the heater firing sequence is halted until the circuit is reset by turning it off then on again.

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Although not implemented in circuit 32 as depicted in Fig. 10, a lockout function as described above can be provided. An example of a circuit containing such a lockout function is described in copending, commonly-assigned United States patent application Serial No. 07/444818, filed 1 December 1989, and hereby incorporated by reference in its entirety.

Thus it seems that an electrically heated flavor generating article which operates at a controlled temperature to produce a consistent release of flavor-containing substance with each puff, which reaches its operating temperature quickly and provides sufficient heat to generate or release the desired flavor-containing substance, without overheating and causing burning of its flavor generating medium, which is self-contained, and which can have the appearance of a conventional cigarette, is provided.

Claims

1. An article (10) for delivering to a consumer an inhalable flavor-containing substance, said article comprising a plurality of predetermined charges of flavor generating medium (111, 732, 750, 746, 784); electrical heating means (110, 70 - 77; 80, 760, 771; 785; 792) for individually heating each of said plurality of charges; a source of electrical energy (121) for powering said electrical heating means; and control means (122, 32) for applying said electrical energy to said electrical heating means to heat, at any one time, at least one but less than all of said plurality of charges, each of said charges, when heated, delivering a predetermined quantity of flavor-containing substance to said consumer.

2. The article of Claim 1, wherein said flavor generating medium comprises tobacco, and a flavor-containing substance comprising tobacco components is formed on heating the flavor generating medium.

3. The article of Claim 1 or 2, wherein the flavor generating medium comprises an aerosol-forming material which forms an aerosol on heating.

4. The article of Claim 3 wherein said aerosol-forming material comprises glycerine.

5. The article of Claim 3 or 4 wherein said aerosol-forming material comprises water.

6. The article of any of Claims 3 to 5 dependent upon Claim 2, wherein said flavor generating medium (111) is a dried slurry comprising ground tobacco and said aerosol-forming material.

7. The article of any preceding claim, wherein the flavor generating medium comprises tobacco extracts.

8. The article of any preceding claim, wherein the flavor generating medium comprises condensed components of smoke produced by combustion of tobacco.

9. The article of any preceding claim, wherein the electrical heating means comprises resistance heating means (110) in contact with said flavor generating medium.

10. The article of Claim 9, wherein the resistance heating means (110) is a mesh of resistive wire, and the flavor generating medium is deposited on the wire mesh.

11. The article of any preceding claim, wherein the plurality of charges of flavor generating medium are deposited on a substrate (78, 79), and the electrical heating means is in contact with the substrate.

12. The article of Claim 10 or 11 comprising an adhesion agent for adhering the flavor-generating medium to the mesh, or substrate (78, 79).

13. The article of Claim 12 wherein the adhesion agent is a pectin.

14. The article of Claim 13 wherein the pectin is a citrus pectin.

15. The article of any preceding claim, wherein the flavor-generating medium is concentrated, thereby reducing the amount of electrical energy necessary to form said flavor-containing substance.

16. The article of Claim 11, wherein said electrical heating means comprises a plurality of heating elements (701, 711, 782, 783, 792) corresponding to said plurality of charges.

17. The article of Claim 11 wherein the electrical heating means comprises a heating element (40), and means (122) for indexing said substrate past said heating element.

18. The article of Claim 1, wherein the flavor generating medium comprises an electrically con-

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ductive material having a selected resistance, whereby the electrical heating means is integral with the flavor generating medium.

19. The article of Claim 18, wherein the electrical heating means comprises means for conducting electrical energy from the source of electrical energy to the electrically conductive flavor generating medium.

20. The article of Claim 19 wherein said electrical heating means comprises a plurality of said conducting means corresponding to said plurality of charges, each of said conducting means contacting one of said charges.

21. The article of Claim 20, wherein the plurality of charges of flavor generating medium are deposited on a substrate (78, 79); and said electrical heating means comprises a plurality of conducting means corresponding to said plurality of charges, each of said conducting means contracting one of said charges.

22. The article of Claim 18 wherein, the plurality of charges of flavor-generating medium are deposited on a substrate (78, 79), and the electrical heating means comprises a conducting means for contacting said charges, and means for indexing (122) the substrate past the conducting means, whereby the conducting means sequentially contacts each of said charges.

23. The article of Claim 1 wherein said electrical heating means comprises graphite.

24. The article of Claim 23, wherein said graphite is compounded with other forms of carbon.

25. The article of Claim 23 or 24, wherein the electrical heating means further comprises electrical contact means for contacting the graphite and the graphite is coated with a contact resistance reducting substance.

26. The article of Claim 25, wherein the contact-resistance reducing substance comprises tantalum.

27. The article of any of Claims 23 to 26, wherein the heating means comprises a cylindrical structure comprising graphite and having a plurality of radially extending vanes (701, 711), at least one surface of each vane being coated with the flavor generating medium such that each vane has one of the plurality of charges thereon, one of the axial and radial edges of each vane all being connected in common to the electrical energy source (121) and the other of the axial and radial edges being connected individually to the electrical energy source (121).

28. The article of Claim 27, wherein the heating means comprises a cylinder (70) comprising graphite and having a continuous cylindrical outer surface (703), wherein the vanes (701) extend inwardly therefrom to a respective inner edge (704) to a point short of the axis of the cylinder, the outer surface comprising the common connection to the electrical energy source, and the inner edges (702) comprising the individual connections to the electrical energy source (121).

29. The article of Claim 27, wherein the heating means comprises a cylinder (71) comprising graphite and having a cylindrical inner core (713), wherein the vanes extend outwardly therefrom to a respective outer edge (714) to a point remote from the cylinder axis, the inner core comprising the common connection and the outer edges comprising the individual connections to the electrical energy source (121).

30. The article of Claim 23, wherein the heating means comprises a hollow cylinder (72) comprising graphite and having the flavor generating medium coated thereon, the cylinder being divided by at least one pair of opposed partially circumferential slits (720, 721) into a plurality of opposed pair of strips, (722, 723) each strip of an opposed pair being connected to a pole of said source of electrical energy to form a ring-like heater segment, the flavor generating medium on said inner side of each of said ring-like segments forming one of said plurality of charges.

31. The article of Claim 23, wherein said heating means comprises a cylinder comprising graphite, and having an outer surface having a plurality of grooves (730) therein separated by lands (731) thereon, each groove being coated with the flavor generating medium (732) and forming one of said individual charges thereof, each groove being heated by applying power from said source of electrical energy to a land (731) on either side of said groove (730).

32. The article of Claim 23, wherein the heating means comprises a ring comprising graphite and being divided by first and second interleaved sets of slits (740, 742) extending from a respective end more than halfway to the opposite end and into a plurality of bases (745)

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adjacent a first end and into fingers (744) adjacent a second end, the fingers being coated with the flavor generating medium (746), wherein individual charges of flavor generating medium are heated by applying power from the energy source to one base and one finger or to adjacent ones of the bases.

33. The article of Claim 32, wherein the flavor generating medium is coated onto the ring in a circumferential band in an area overlapped by both sets of slits (740, 742), individual charges of said flavor generating medium being heated by applying power from said source of electrical energy to adjacent ones of the bases.

34. The article of Claim 32, wherein the flavor generating medium is coated onto the ring in a circumferential band in an area beginning at the second and extending towards the first end for a distance shorter than that over which the set of slits extending from the second end extends, individual charges of said flavor generating medium being heated by applying power from said source of electrical energy to one of the bases and one of the fingers.

35. The article of Claim 23, wherein said heating means comprises an elongated sheet comprising graphite, and divided laterally by opposed pairs of slits (780, 781) into opposed pairs of strips (782, 783), the slits extending inwardly from longitudinal edges of the sheet, the flavor generating medium (784) being coated onto the sheet in a longitudinal band spaced from the longitudinal edges, and individual charges of said flavor generating medium being heated by applying power from the electrical energy source to opposed strips.

36. The article of Claim 23, wherein the heating means comprises a plurality of U-shaped vanes (81), each vane having two legs of inequal length interconnected at their proximate ends by a base, each vane being joined to an electrically conductive hub (82) at the distal end of the longer leg to orientate the vanes radially with their longer legs adjacent one another, wherein the bases extend radially outward, and the shorter legs extend parallel to the longer legs but spaced radially outwardly therefrom, and wherein the vanes are coated with the flavor generating medium and individual charges of flavor generating medium are heated by applying power from the electrical energy source to the hub and to respective legs.

37. The article of any preceding Claim wherein the source of electrical energy comprises a capacitor (90) and a capacitor charging means (93).

38. The article of Claim 37, wherein the capacitor (90) has a capacitance sufficient to store energy for heating at least one of said charges of flavor generating medium.

39. The article of Claim 38, wherein the capacitance is sufficient to store energy for heating all of said plurality of charges of flavor generating medium.

40. The article of any preceding claim, wherein the control means comprises means for selecting one of said pre-measured charges of and means for applying a pulse of electrical energy to the heating means to heat the selected charge when the consumer puffs at the article.

41. The articles of Claim 40, wherein the selecting means is automaltic and selects each charge sequentially.

42. The article of Claim 40 or 41, wherein the control means further comprises sequential indication means for indicating which charge is selected.

43. The article of any of Claims 40 or 42, wherein the pulse applying means applies a pulse of predetermined duration.

44. The article of Claim 43 or 44, wherein the control means further means for indicating when the pulse is being applied.

45. The article of Claim 43 or 44, wherein the pulse applying means includes actuation means whereby actuation of said actuation means by a consumer causes application of the pulse.

46. The article of Claim 45, wherein the control means further comprises lockout means for disabling the actuation means for a predetermined lockout period after an actuation thereof.

47. The article of Claim 45 or 46, wherein the actuation means comprises a pushbutton (127).

48. The article of Claim 45 or 46, wherein said actuation means comprises a switch (52) actuated when a consumer draws on the article.

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49. The article of Claim 48, wherein the switch is actuated by a pressure-sensitive sensor.

50. The article of Claim 48, wherein the switch is actuated by a flow-sensitive sensor.

51. The article of any preceding claim, wherein the control means causes the heating means to heat each charge of flavor generating medium to a temperature of from about 100° C to about 600° C.

52. The article of Claim 51, wherein the control means causes the heating means to heat each charge of flavor generating medium to a temperature of from about 300° C to about 400° C.

53. The article of any preceding claim, wherein the control causes means the heating means to heat each charge of flavor generating medium for a duration of from about 0.1 second to about 4 seconds.

54. The article of claim 53, wherein the control means causes said heating means to heat each charge of flavor generating medium for a duration of from about 0.8 second to about 1.2 seconds.

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Fig.1.

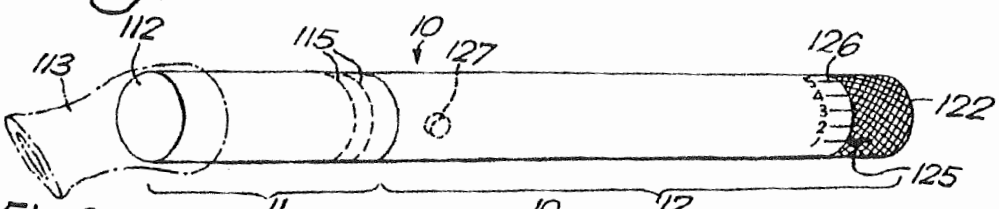


Fig.2.

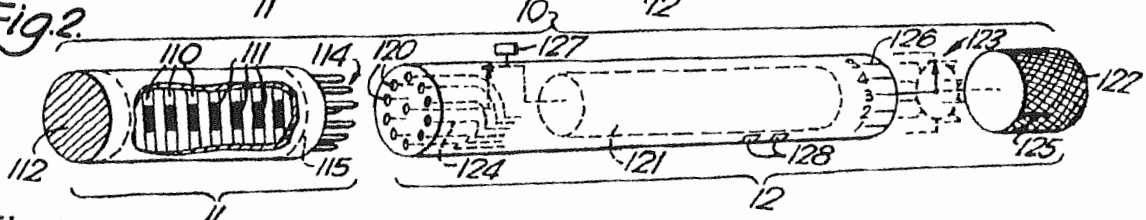


Fig.3.

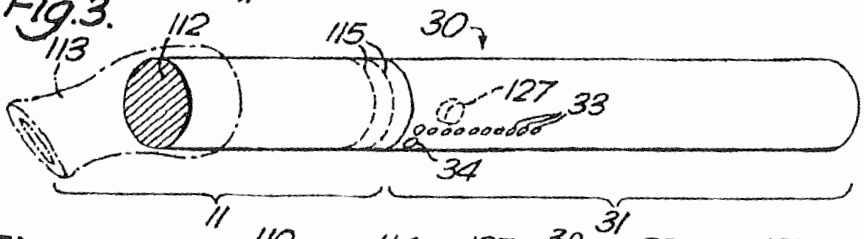


Fig.4.

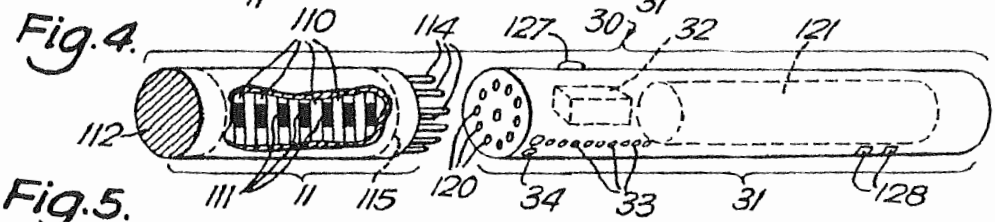


Fig.5.

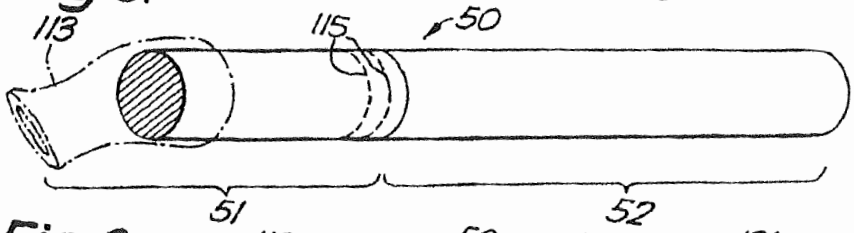
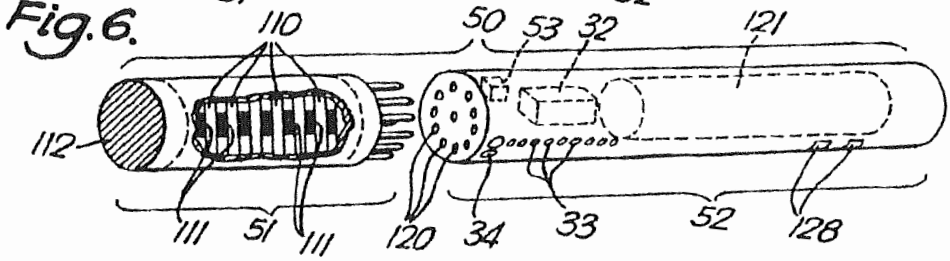


Fig.6.



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Fig. 7A.

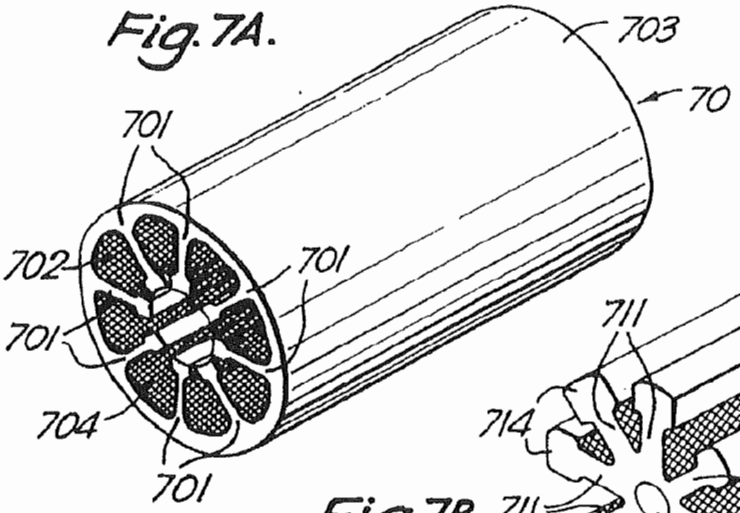


Fig. 7B.

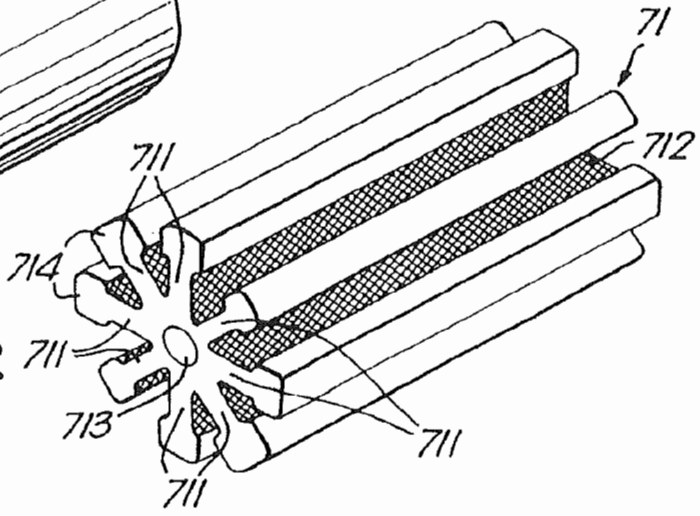


Fig. 7C.

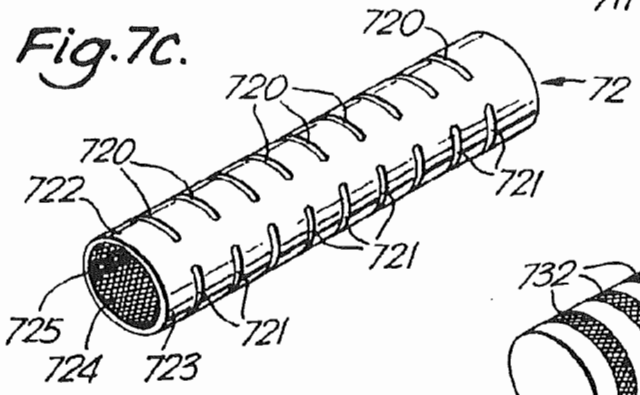


Fig. 7D.

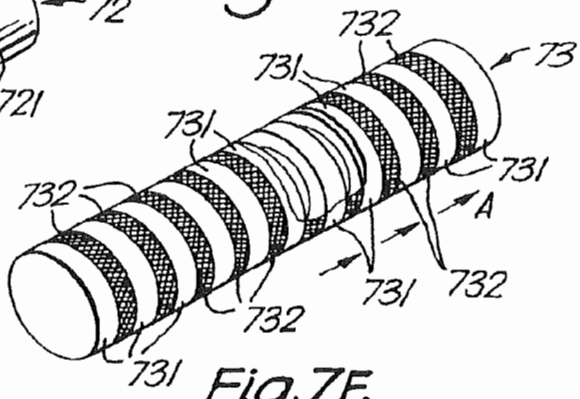


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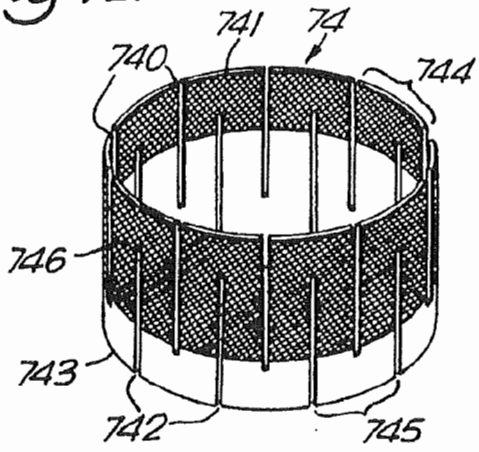
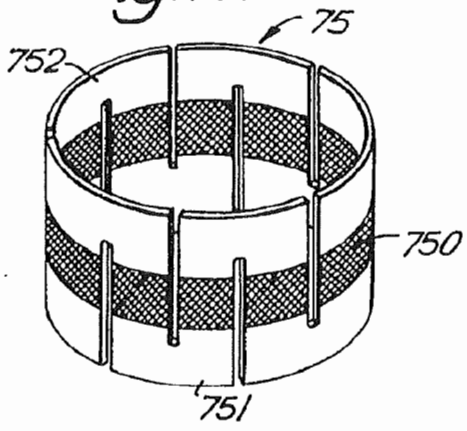


Fig. 7F.



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Fig. 7G.

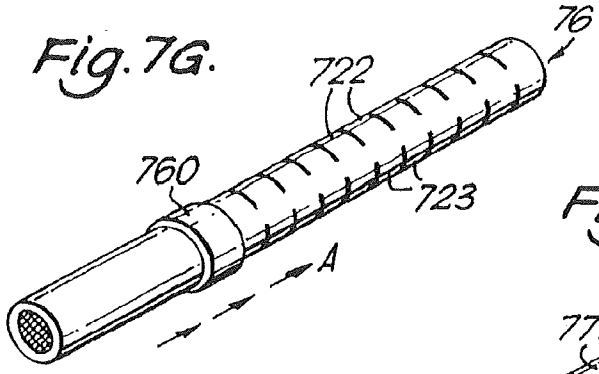


Fig. 7H.

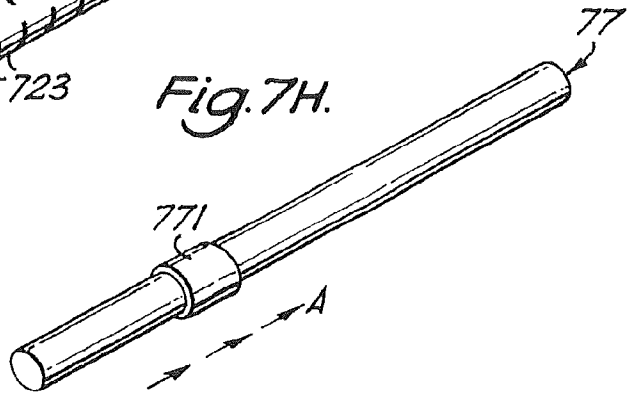


Fig. 7I.

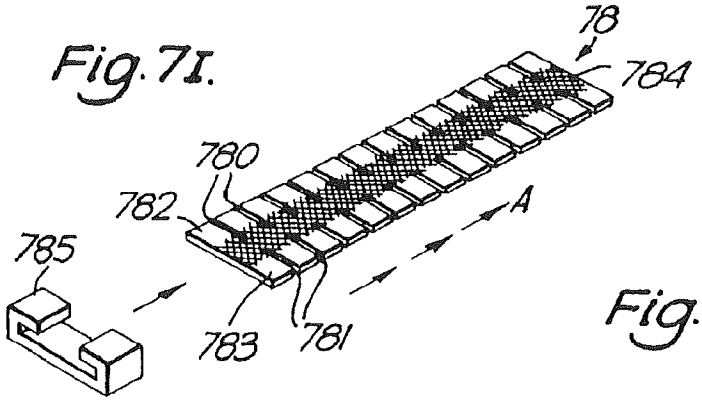


Fig. 7J.

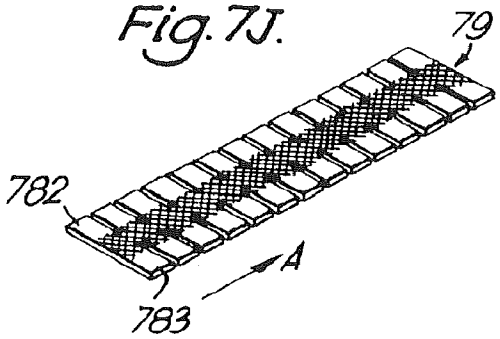
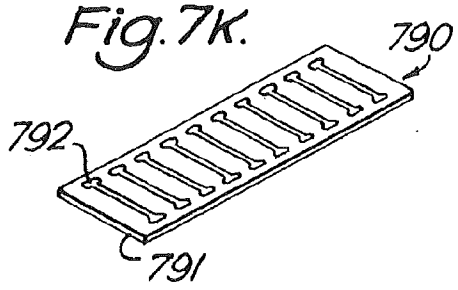


Fig. 7K.



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Fig. 8A.

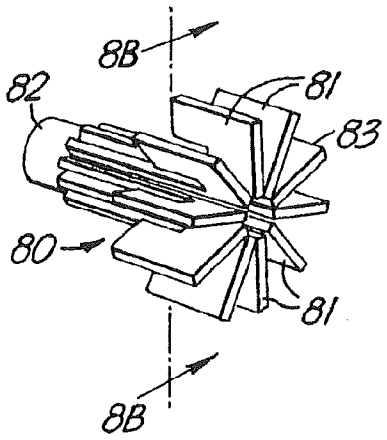


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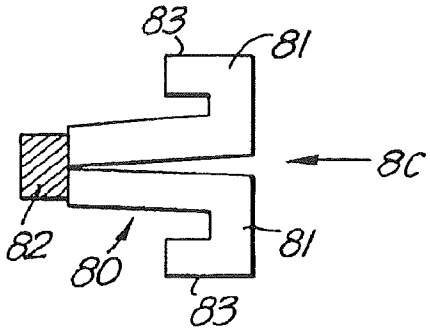


Fig. 8C.

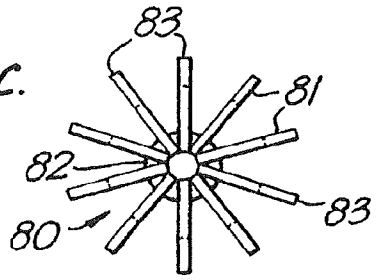
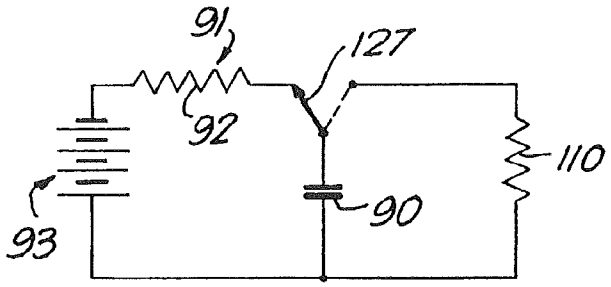
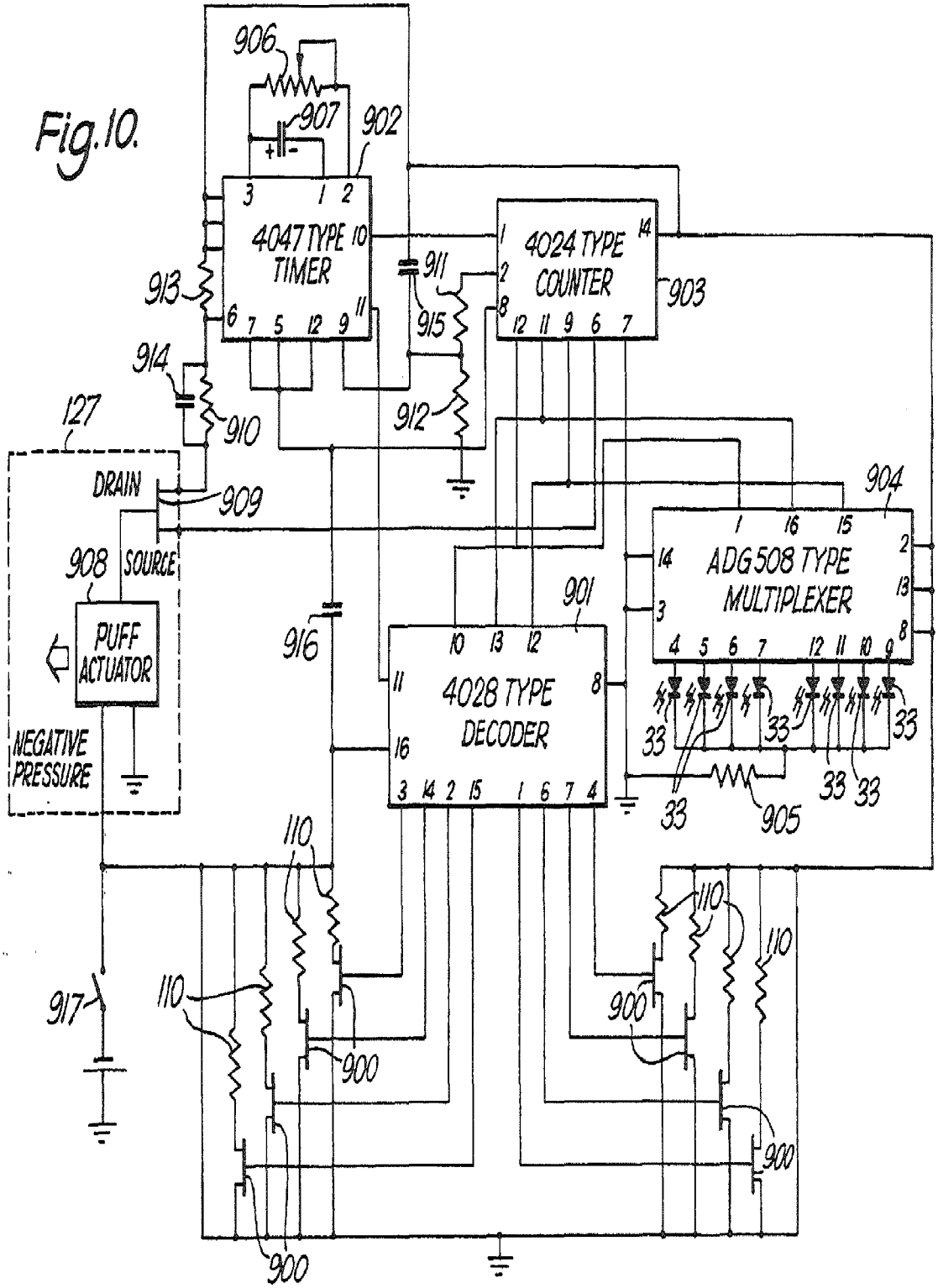


Fig. 9.



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Fig.10.



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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 430 566 A3**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **90312672.0**

(51) Int. Cl.5: **A24F 47/00**

(22) Date of filing: **20.11.90**

(30) Priority: **01.12.89 US 444746**

(43) Date of publication of application:
05.06.91 Bulletin 91/23

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI NL SE

(88) Date of deferred publication of the search report:
03.06.92 Bulletin 92/23

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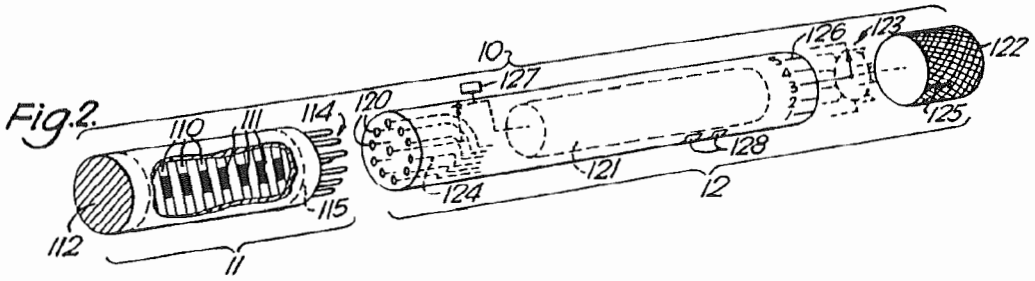
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(54) **Flavor delivering article.**

(57) An article (10) is provided in which a flavor generating medium (111) is electrically heated by heaters (110) to evolve inhalable flavors such as tobacco or other components in vapor or aerosol form. The article has a plurality of charges (111) of the flavor generating medium which are heated sequentially to provide individual puffs. The charges are located in a portion (11) of the article detachable from a second second (12) in which is located a power source (121). The heaters are connected to the power source by fingers (114) on the first section which are received in recesses (120) on the second second. A mouthpiece may be provided on the first section through which vapor may be inhaled.

Fig.2.



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European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 31 2672

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A,P	EP-A-0 358 002 (REYNOLDS TOBACCO CY)		A24F47/00
A	US-A-3 200 819 (GILBERT)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A24F
A61M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	01 APRIL 1992	VAN BOGAERT J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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EPO FORM 1503 03.82 (P0401)

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No documents available for this priority number.

Espacenet

Bibliographic data: CN1541577 (A) — 2004-11-03

Electronic nonflammable spraying cigarette

Inventor(s):	LI HAN [HK] ± (HAN LI)
Applicant(s):	LI HAN [HK] ± (HAN LI)
Classification:	**- international:** ***A24B15/16; A24D1/00; A24F47/00; A61K9/00;*** (IPC1-7): A24F47/00 **- cooperative:** **A24F47/002**; **A61K9/007**
Application number:	CN20031011582 20030429
Priority number (s):	CN20031011582 20030429
Also published as:	CN100381083 (C) EP1618803 (A1) EP1618803 (A4) EP1618803 (B1) US2012273589 (A1) more

Abstract of CN1541577 (A)

The present invention relates to one kind of noninflammable electronic spray cigarette containing nicotine and no harmful tar. The electronic cigarette includes one integral cigarette holder comprising casing, battery, HF generator, nicotine liquid and container, control circuit, display screen, gas flow sensor, body contact sensor, piezoelectric ultrasonic atomizer, high temperature gasifying nozzle and attachment; and liquid storing capsule filled with nicotine solution. The present invention has the advantages of no tar suction of smoking and no fire harm, and this reduces the cancer inducing danger while the smoker enjoys smoking feeling.

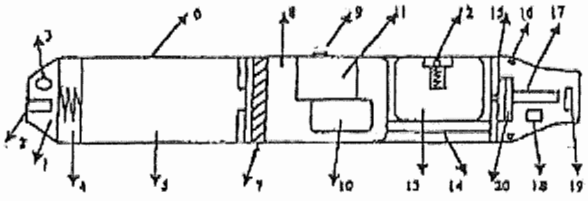


FIG. 1

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Machine Translation of Chinese Patent Application 03111582.9

(Hon '955 translation)

1. A non- flammable electron spraying cigarette, characterized in that the cigarette includes that casing, battery, nicotine stores liquid container, control circuit board, sensor, gasification spray tube and annex, installs in casing (6) gasification spray tube (17) that afterbody suction end and sensor are met, through automatically controlled pump (11) even to with the control circuit board on the high-frequency generator meet store sol bag (13); Front end in casing (6) is equipped with battery and red light emission diode, constitutes the whole of one cigarette holder shape, pipe shape or the form of a stroke or a combination of strokes jointly.

2. The store sol bag (113) that the non- flammable electron of spraying cigarette, the spray tube that characterized in gasifying links thermally driven pump (111) and connects with with the thermally driven pump according to claim 1, 2 output termination electric heaters, pump or valves on control circuit board (108), the input at the control circuit is connected in bulk resistor sensor (119) alone.

3. According to the said non- flammable electronics of claim 1 spraying cigarette, characterized in gasifying the spray tube through the pneumatic valve even to storing sol bag (213), super-elasticity component (210) connect to with store bag carriage (211) that the sol bag pressure leaned on.

4. The electric control valve (311) constitute the fluid delivery passageway with storing sol bag (313) that the non-flammable electron of spraying cigarette, the spray tube that characterized in gasifying measures chamber (320) through the connected with according to claim 1, stores sol bag periphery has the one to fill the gas container into the high-pressure nitrogen.

5. According to the said non- flammable electron of claim 1 spraying cigarette, characterized in that the frequency of high-frequency generator on the control circuit board of saying (8) is 35KHz to 3.3MHz.

6. According to the said non- flammable electron spraying cigarette of claim 1, characterized in storing sol bag (13) and make by silicon rubber.

7. According to the said non- flammable electron spraying cigarette of claim 1, the one-way notes liquid valves (12) that characterized in storing on the sol bag connect with with the spring through sphere or taper thing.

8. According to the said non- flammable electron spraying cigarette of claim 1, characterized in that pneumatic sensor (18) are integrated thin-film thermistor array.

9. According to the said non- flammable electron spraying cigarette of claim 1, the electrode that characterized in the sensor comprises upper and lower two metallic film at the cigarette holder tele-.

10. According to the said non- flammable electron spraying cigarette of claim 1, characterized in that automatically controlled pump (11) link to each other with motor or linear motion actuator through the shaft coupling.

11. According to the said non- flammable electron spraying cigarette of claim 1, characterized in the gasificationMake with the exotic material of lower thermal conductivity spray tube (17), and the internal diameter is 0.05 to 2mm's tubule, and length is 3 to 20mm, the intraductal electrical heating component that is equipped with; Gasification spray tube (17) be ordinary pottery, or aluminium silicate pottery, titanium oxide, zirconia, yttrium, dissolves silicon, silica, dissolves the aluminium oxide and makes, and the shape is the straight tube describes or the heliciform, or chooses for use polytetrafluoroethylene (PTFE), carbon fiber, glass fiber material to make.

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12. The electrical heating for the component nichrome wire, Aludirome silk, stainless steel wire, gold wire, platinum filament, tungsten-molybdenum alloy silk make that the non- flammable electron of spraying cigarette, in characterized in gasifying spray tube (17) according to claim 1, the shape is linearity, single-screw form, double helix form, form tied in a bundle, heliciform tied in a bundle, wherein uses linearity and heliciform tied in a bundle for preferred.

13. According to the said non- flammable electron spraying cigarette of claim 1, it is by nicotine to characterized in being used for atomizing nicotine solution, the propylene glycol, and the glycerine, the organic acid, anti-oxidant, essence, water, ethanol constitutes; Wherein 0.1 % of content to 6 %, 80 % of propylene glycol content to 90 %, 0.2 % of the organic acid content to 20 %, the surplus of nicotine are glycerine, essence, anti-oxidant, water and ethanol.

14. According to the said non- flammable electron spraying cigarette of claim 2, characterized in that the thermally driven pump contracts the rubber tube peristaltic pump by the electric heat that TiNi-SMA or copper base memorial alloy silk were made.

15. According to the said non- flammable electron spraying cigarette of claim 1, characterized in that automatically controlled pump or the valve said are the thermal contraction valve.

16. The measurement chamber on the valve is the cylinder body that has liquid import and export that the non- flammable electron of spraying cigarette characterized in connected with measurement chamber according to claim 4, have in the cylinder body to have mipor piston and connect the restoring spring on the piston.

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A non- flammable electron spraying cigarette

The technical field

This utility model relates to one kind and does not contain harmful tar, only contains the non- flammable electron spraying cigarette of nicotine (nicotine).

The background art

Become under the circumstances of general knowledge current " Smoking is harmful to your health ", the whole world still has 1,000,000,000 people's smokings at present, but also annual this numeral is also enlarging, first international ban on opium-smoking and the opium trade agreement of passing through of the World Health Organization on March 1 (WHO) in 2003 " (the Framework Convention on Tobacco Control ", the numeral that provides according to WHO indicates that smoking leads to the fact 4,900,000 people dead every year, although smoking can result in serious respiratory disease and cancer, it is an exceedingly difficult thing the smoker to give up smoking totally.

The effective ingredient of cigarette is nicotine (being the nicotine), absorbs rapidly after nicotine produced along with cigarette when burning during smoking a large amount of tar droplets get into the alveolus, and nicotine absorbs the blood after-action on the receptor of central nervous system, causes the sensation of having a dizzy spell or walking on air of " the intoxicated sense ", such as smoker's experience of similar stimulant.

Nicotine is the micro molecule alkaloid, and is harmless basically to the human body under the low dose, and the half-life in blood is extremely short.The harmful substance of bacco mainly is a tar, and bacco tar comprises hundreds of kinds of compositions, and it is carcinogens wherein to have tens of kinds of compositions.Confirm at present that secondary smoking is bigger to non-smoker's harm.

Only to contain nicotine and does not contain the cigarette substitute of harmful tar in order to look for, have many utility models to make such as " quit smoking and paste ", " nicotine contains the water of coughing ", " it is having the high-pressure gas pitcher nebula of propellant pack ", " nicotine gum " nicotine beverage " the product of etc.ing with purer nicotine, though these products do not have the harm of tar, because of the nicotine absorption slowly, can not establish effectual peak concentration in blood, can not solve the sensation of demand nicotine " enjoyable ", the custom that " taking out " that the smoker had acquireed " inhales " has also been deprived to the while, therefore similar product can not real conduct quit smoking articles for use or cigarette substitute.

The utility model content

This utility model relates to one kind and has the non- flammable electron spraying cigarette of quiing smoking with the effect of cigarette substitute, has avoided above-mentioned shortcoming, more is close real humanized cigarette.The cigarette includes that casing, battery, high-frequency generator, nicotine stores liquid and container, control circuit, display screen, pneumatic sensor, peopleThe cigarette holder shape that physical contact sensor, piezoelectricity ultrasonic atomizer, high temperature gasification spray tube and annex are constituteed is whole,Install in the casing electric heat gasification spray tube that afterbody suction end and sensor connect with,Through automatically controlled pump even to with the control circuit board on the high-frequency generator meet store the sol bag,Or through the valve in connected with measurement chamber and link to each other with automatically controlled pump or valve be equipped with the one-way notes liquid valve of taking of nicotine solution connect the control circuit board on the high-frequency generator store the sol bag,High-frequency generator in the supersound piezoelectricity patch budding control circuit board of gasification spray tube outside adhesion,4 output connection high-frequency generators, electric heater, pump or valves and display screen on the control circuit board,The input at the control circuit is connected to bulk resistor sensor and one pneumatic sensor alone; Front end in the casing is equipped with one battery and red light emission diode,Constitute the whole of one cigarette holder shape, pipe shape or the form of a stroke or a combination of strokes jointly.The control circuit provides the pick-up current to the electric heater of gasification in the spray tube and pump makes nicotine solution pump in the sump assemblies go into the gasification spray tube, under the high temperature dither ripples condition of liquid in the gasification spray tube, rapidly gasification blowout condensation become the smog form, the operating status of control circuit is started by the electric resistance sensor and the pneumatic sensor of connection on the control circuit, the one passes through the liquid crystal display of numeral or the graphical display operating status and the number of starts.Through the battery of control circuit to pump, high-frequency generator, electric heater power supply, can one-off, also can rechargeable battery.

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This utility model also discloses the simple non- flammable electronics of one spraying cigarette, and gasification spray tube and gasification spray tube that the device includes the one electrical heating are connected has an electric heat driving pump in one ration chamber, and also available one dosage and one solenoid valve or electric heat valve replace having the pump in quantitative chamber, relinking to the sump assemblies that is filled with nicotine solution, this for the sump assemblies highly resistance tear silicon rubber and make, impose compressed air or super-elasticity component and can make and store liquid outflow voluntarily on storing the sol bag, TiNi-SMA super-elasticity component should be the first-selection.It has included that the one control circuit provides the operating current for electric heater, pump or valve respectively, and the operating status of control circuit is started by the electric resistance sensor of connecting on the control circuit, and the power of connecting at the control circuit is rechargeable battery.

The advantage that this utility model has is, tar is not had in smoking, reduces greatly carcinogenic risk, and the user still has the sensation and the excitement of smoking, need not to light the harm of no fire.

The Conventional medication therapy of can packing into the apparatus of dosing in supplying the lung is being store to the device of this utility model and link construction after the liquid container is changed a little.

The description of drawings

Picture 1 is this utility model Equipment structure picture in 1 of giving typical examples.

Picture 2 is this utility model circuit structure block diagram.

Picture 3 is the schematic diagram of this utility model high temperature gasification spray tube and electrical heating element structure.

4 schematic diagrames that are this utility model memorial alloy valve in the picture.

5 schematic diagrames that are this utility model memorial alloy peristaltic pump in the picture.

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Figure 6 is a schematic diagram of this utility model peristaltic pump .

Picture 7 is this utility model electron cigarette structure chart in 2 of giving typical examples.

Picture 8 is this utility model pressure type electron cigarette structure chart in 3 of giving typical examples.

Picture 9 is this utility model reduced form pressure type electron cigarette structure chart in 4 of giving typical examples.

Picture 10 is this utility model measurement cavity configuration picture in 4 of giving typical examples.

The detailed description of the invention

High-frequency generator on the control circuit board 8 constitutes by bikini electric capacity oscillator, bikini inductance oscillator or by the Transformer type oscillating circuit, and the frequency has frequency automatic fine tuning circuit and 20 resonance of piezoelectric patches at 35KHz to 3.3MHz in the circuit.Nicotine is store sol bag 13 and is made by silicon rubber, and the macromolecular compound that is not diped by nicotine also can use.The one-way notes liquid valve of storing on the sol bag 13 12 connects with with the spring through sphere or taper thing, by sphere or taper thing in the spring pressure lower seal.Pneumatic sensor 18 is made by integrated thin-film thermistor array.The resistance of people's physical contact or the electrode of capacitance sensor 19 comprise upper and lower two metallic film at the cigarette holder tele-, and constitute human contact switch in the change input control circuit of resistance-capacitance parameter behind people's physical contact.Automatically controlled pump 11 links to each other through shaft coupling and motor or linear motion actuator, is by motor or linear motion actuator drive, drives the operation with the low velocity high torque through the reduction gear of the big velocity ratio of shaft coupling drive, and the pump can be peristaltic pump, plunger pump, eccentric driven pump or screw pump, and the liquid pump also can use piezoelectric pump and super magnetostriction pump and thermal energy driving pump, thermal contraction driving pump, thermal pump.Automatically controlled pump or valve can be for the thermal contraction valves, and the valve is sent the shrink oppression by TiNi-SMA or copper base memorial alloy silk at electric heat and is constituted on the silicone rubber tube.Electric heat gasification spray tube 17 is made with the exotic material of lower thermal conductivity, and the internal diameter is 0.05 to 2mm's tubule, and effective active length is 3 to 20mm, and the intraductal electrical heating component that is equipped with, thermal element and lumen form planing are favorable to liquid gasification and blowout; Gasification spray tube 17 available ordinary potteries are made, or aluminium silicate pottery, titanium oxide, zirconia, yttrium, dissolve silicon, silica, dissolve the aluminium oxide and make, and the shape is the straight tube describes or the heliciform, and also the similar material of available polytetrafluoroethylene (PTFE), carbon fiber, glass fibre or performance is made.The 17 interior available nichrome wire of electrical heating component, Aludirome silk, stainless steel wire, gold wire, platinum filament, tungsten-molybdenum alloy silks of gasification spray tube are made,The shape is linearity, single-screw form, double helix form, form tied in a bundle, spiral form tied in a bundle,Wherein use linearity and heliciform tied in a bundle for preferred; The electrical heating component can be the form heating that adds the hot coating in the inner wall coating of managing,The coating can be electric heat ceramic material, Semiconductor Materials,Corrosion-resistant metal film,Like gold, nickel, chromium, platinum, molybdenum; The coating method can adopt coating sintering process, electroless deposition sintering process and ion splash; The available above-mentioned material of mode of heating and the mode of high temperature gasification spray tube are adorned in the pipe wall of spray tube,The heating wire can not adorned to metallic one-tenth spray tube with the high resistance,The direct metal spray tube of giving lets in the heating current; Also available above-mentioned material and mode dress is inThe outside of spray tube also can obtain the suitable response time in the Power supply mode that the short-term is preheated.A 0.1 % of content to 6 %, 80 % of propylene glycol content to 90 %, 0.2 % of the organic acid content to 20 %, surplus are glycerine, essence, anti-oxidant, water and ethanol that it is by nicotine that is used for atomizing nicotine solution, the propylene glycol, and the glycerine, the organic acid, anti-oxidant, essence, water, ethanol constitutes; Nicotine wherein 。

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Give typical examples 1: it is the structure chart of the device to show like picture 1.

Its basic principle is on cigarette holder placed mouth the time, and the two driving voltage is exported respectively to 19 Start-up control circuit boards 8 of electric resistance sensor, control circuit board, and the one of which is for the electrical heating element power supply of high temperature gasification spray tube 17, and next starts 11 (picture 6 is seen to the structure) of Micropump, goes into to store liquid to 17 pumps of spray tube by storing liquid container 13, and nicotine solution gasifies into high temperature steam on the electrical heating element of spray tube spouts to the open end, and the steam inflation condensation in the atmosphere after the blowout becomes the small droplet of cigarette form.Effect with supersound piezoelectricity piece 20 on the spray tube is: firstly make the abundant and heating element heater contact gasification of the big liquid drop that is in in the high-pressure unstable hot gas flow, the 2nd, to being in the direct broken atomizing of liquid drop in the spray tube, thirdly solve the bumping problem of liquid when being higher than the boiling point.It can make smog droplet diameter at 0.2 to 3um to synthesize the effect that atomizes.The droplet of size absorbs in changeeing and enterring the alveolus like this, and pneumatic sensor 18 flows sensitively when taking place " suction " action to 16 diluent airs that enter of inlet port, and its transducing signal input control circuit is by the power supply to Micropump and heater after the time delay.The time delay relation of Micropump and heater is: after the heater starts, and the Micropump starts after time delay in 0.1 to 0.5 second, and 0.2 to the 0.5 second post heating ware of delaying after the Micropump control circuit is closed cuts out again, and its purpose is in ration infusion back liquid complete gasification noresidue at harvest time.The volume that the liquid container was store to nicotine can design not equidimension as required, can replenish a nicotine solution every day, also can replenish one in several days.LCDs 10 can show the operating status parameter, as aspirating battery capacity, every day the number of times, using median period, number of times excessively to warn.In 3 flashes of light of red light emission diode in the suction at every turn, the flashing signal provides 1.2 seconds sawtooth wave signal of one by the control circuit, makes the flash of light be the brightness flop of gradual change nature, the brightness flop of the burning flash of light of smoking with the simulation.In the picture 11 is the charging seat, and 2 for the hole of charging, and 4 are the spring, and 6 are the casing, and 7 are the screw thread, and 9 are the switch, and 14 are the pipeline, and 15 are the baffle.In the picture 6 601 is the silicone tube, and 602 are the pinch roller, and 603 are the worm, and 604 are the motor.

Do not get rid of in the design of this utility model with micromechanics (MEMS) principle control circuit and the technological route of supersound Micropump preparation on a silicon chip.

Give typical examples 2: reduced form electron cigarette

7 structure charts that are the reduced form in the picture have wherein saved ultrasonic atomizatio high-frequency generator and piezoelectric ceramic piece 20.For guaranteeing the atomizing effect, use sharp heating wire and spray tube cooperation (picture 3 is seen to the structure), make the aperture in one or more gasification chambeies that heating wire and spray tube inner wall formed, the maximum diameter of hole is in0.02 Between to the 0.6mm, the effect of the pneumatic sensor 18 that saves is the end signal by the initialize signal of resistance-capacitance sensor 119 through control circuit time delay succeeding crop and replaces.Its structure is used 111 (picture 5 is seen to the structure) of thermally driven pump that the TiNi-SMA silk made together and is store the 113 fluid delivery devices of constituteing in the sol bag with the thermally driven pump connects with for gasification spray tube 117,2 output connection electric heaters, pump or valves on the control circuit board 108, and the input at the control circuit is connected to bulk resistor sensor 119 alone; Front end in the casing also includes the whole of one battery 105 and 103 common constitution one cigarette holders of red light emission diode shape, pipe shape or the form of a stroke or a combination of strokes.The thermally driven pump contracts the rubber tube peristaltic pump by the electric heat that TiNi-SMA or copper base memorial alloy silk were made, sends the shrink in-process at electric heat and oppresses the pressure chamber that the three constitution one of silicone tube pumped liquid respectively.Quantitative chamber in the thermally driven pump decides the atomizing solution volume of smoking at every turn, electric resistance sensor 119 with lip contact back Start-up control circuit 108, the control circuit starts backward thermally driven pump and electric heater provides the operating current, the output of time delay switching-off control circuit after 2 seconds, restart when treating next smoking.Also can select thermal energy driving pump and thermal pump for use, the thermal energy driving pump is that open liquid outlet forms the pressure chamber that pumps liquid by miniature hydrogen capsule jam inlet when the inflation is sent to electric heat of the built-in electrical heating element of one.The thermal pump is that liquid gasifies fast and forms the pressure chamber that pumps liquid on the electrical heating film.In the picture 7 102 is the hole of charging, and 103 are the LED, and 105 are the battery, and 109 are the switch, and 112 are the prefill valve, and 116 are the gas pocket.

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In the picture 3 401 is the contact conductor, and 402 are the heating wire, and 403 are the screw thread, and 404 are the base, and 405 are the spray tube.In the picture 5 501 is the support, and 502 for the extension spring, and 503 for pumping the bag carriage, and 504 be the silicone tube, and 505 for by the bag carriage, and 506 for pushing up the spring, and 507 are the memorial alloy silk, and 508 are electrode A, and 509 are electrode B, and 510 are electrode C.

Give typical examples 3: TiNi-SMA electron spraying cigarette

Picture 8 is its structure charts, the electric heat of the device gasification spray tube 217 through pneumatic valve 220 even to storing sol bag 213, super-elasticity component 210 connect to with store the bag carriage 211 that the sol bag pressure leaned on, the pneumatic valve comprises pneumatic film 214, magnet steel ring 218, steel needle 220 and restoring spring 221.Using TiNi-SMA super-elasticity component 210 to store the sol bag through 211 pairs bag carriages and imposing the constant voltage, the liquid that contains nicotine when the pneumatic valve is opened flows in the gasification spray tube from storing the liquid pocket through the pneumatic valve, and the condensation of gasifying under high temperature becomes " cigarette ", and electric resistance sensor Start-up control circuit behind the contact lip is supplied power to the electric heater, and when breathing in the action, the pneumatic valve diaphragm receives the negative pressure effect to drive NdFeB permanent-magnet alloy ring to inhale the needle and move, and the feed liquid is opened to the needle, and the pneumatic valve resets after the control circuit time delay stops after 0.5 second supplying power to the electric heater.In the picture 8 203 is the LED, and 202 for the hole of charging, and 205 are the battery, and 208 are the control circuit, and 209 are the switch, and 212 are the prefill valve, and 215 are the baffle, and 216 are the gas pocket, and 219 are the electric resistance sensor.

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Give typical examples 4: use the pressor electronics of gasbag atomizing cigarette

The electric heat of the device (seeing picture 9) gasification spray tube 317 through 311 (picture 4 is seen to the structure) of electric control valve in connected with measurement chamber 320 with store sol bag 313 and constitute the fluid delivery passageways, it has the one to fill.to exert pressure in order to impel the fluid delivery to storing the sol bag intos the gas container of high-pressure nitrogen to store sol bag periphery, when the control signal acted on the electric control valve, the electric control valve was opened, the solution that contains nicotine flows into the measurement chamber and promotes constant volume liquid that the piston made the piston opposite side and get into the gasification spray tube through the electric control valve to gasify condensation one-tenth vaporific from storing the sol bag under the effect of pressure.Measurement chamber on the valve in connected with measurement chamber is the cylinder body that has liquid import and export, comprises the restoring spring that has mipor piston and connect on the piston in the cylinder body.The operating status of electric control valve and electric heater is regulated and control respectively to the control circuits that are started by electric resistance sensor 319, and after one atomizing, mipor in the piston in the measurement chamber resets at 5 to 8 seconds inner pistons under oozing the effect of phenomenon and restoring spring slowly.In the picture 9 305 is the battery, and 321 are the pressure bottle, and 322 are the pressure chamber, and 323 revolve mouthful for sealed, and 308 are the control circuit board, and 316 are the gas pocket.

In the picture 4 406 is the silicone tube, and 407 for by the bag carriage, and 408 are the memorial alloy silk, and 409 are the support, and 410 are the contact conductor, and 411 are the pressure spring.In the picture 10 701 is the entry, and 702 be the piston, and 703 be the piston micropore, and 704 for the measurement chamber, and 705 are the restoring spring, and 706 are exporting.

A prescription: for electron donating atomizing cigarette

1. 1 % in 2 % organic acids in 6 % propylene glycol in the nicotine, 85 % glycerine, the 2 % essence, the 1 % anti-oxidant

2. 1 % in 4 % propylene glycol in the nicotine, 80 % glycerine, the 5 % valeric acid butyl fat

1 % Cinnamyl cinnamate in the caproic acid isoamyl fat, 0.6 % benzyl benzoate, 0.4 %

0.5 % cognac oil of octynic acid methyl ester, 0.2 % Hexyl hexanoate, 0.3 %

2 % menthols of geranyl butyrate, 0.5 % citric acid, 0.5 % bacco, 4 smart %

3. 1 % bacco in 2 % propylene glycol in the nicotine, 90 % citric acids, the 2.5 % essence, 4.5 smart %

4. 2.9 % in 0.1 % propylene glycol in the nicotine, 80 % glycerine, 5 % ethanol, the 8 % water

Smart 1 % organic acid, 2 % of 1 % bacco in the essence

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No documents available for this priority number.

Espacenet

Bibliographic data: CN2719043 (Y) — 2005-08-24

Atomized electronic cigarette

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Classification: - international: ***A24D1/18; A24F47/00; A61M15/00; A61M15/06; C01B39/06;*** (IPC1-7): A24D1/18; A24F47/00
- cooperative: **A24F47/008**; **A61M15/0085**; **A61M15/06**

Application number: CN20042031182U 20040414

Priority number (s): CN20042031182U 20040414

Also published as: EP1736065 (A1) EP1736065 (A4) EP1736065 (B1) US2012285476 (A1) US2011168194 (A1) more

Abstract of CN2719043 (Y)

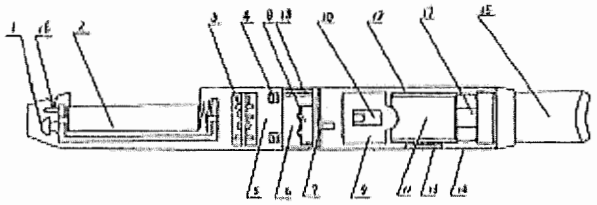


Fig. 1

The utility model relates to an atomized electronic cigarette only containing methylpyrrolidine (nicotine) without tar, comprising a shell body and a suction nozzle. The outer wall of the shell body is provided with an air-in hole, and an electronic circuit board, a normal pressure cavity, a sensor, an air-liquid segregator, an atomizer and a liquid supplying bottle are arranged in the shell body in turn; wherein the electronic circuit board is composed of an electronic switching circuit and ahigh-frequency generator; one side of the sensor is provided with the airflow channel of the sensor, and a negative pressure cavity is arranged in the sensor; the atomizer is contacted with the liquid supplying bottle, and the inner part of the atomizer is provided with an atomized cavity; a retainer ring is arranged between one side of the liquid supplying bottle and the shell body for locking the liquid supplying bottle, and the other side of the liquid supplying bottle is provided with a smogless channel; the air-in hole, the normal pressure cavity, the air-liquid segregator, the atomizer, the smogless channel, an air guiding hole and the suction nozzle are communicated in turn. The atomized electronic cigarette has no tar, and can greatly reduce cancerogenic risks; users have the feel and excitement of smoking, and the atomized electronic cigarette needs not to light without the harm of fire hazard.

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Machine Translation of Chinese Patent Application 200420031182

(Hon '494 translation)

1. an atomizing electronics cigarette includes casing and suction nozzle, characterized in: and it has inlet port (4) to open on the outer wall of said casing (14), is equipped with electronic circuit board (3), ordinary pressure chamber (5), sensor (6), gas-liquid separator (7), atomizer (9), supplying bottle (11) in casing (14) in proper order; Wherein electronic circuit board (3) comprise electronic switching circuit and high-frequency generator; It has sensor gas channel (18) to open in one side of sensor (6), is equipped with negative pressure cavity (8) in sensor (6); Atomizer (9) contact with supplying bottle (11), are equipped with atomizing chamber (10) in the inside of atomizer (9); Be equipped with retaining ring (13) of locking supplying bottle (11) between the one side of supplying bottle (11) and casing (14), foggy vapour passageway (12) are opened to the opposite side of supplying bottle (11); Inlet port (4), ordinary pressure chamber (5), gas-liquid separator (7), atomizer (9), fog vapour passageway (12), air guide hole (17), suction nozzle (15) consecutive expert; Front end in casing (14) still includes one LED (1) and battery (2), constitutes the whole of a cigarette holder shape, cigar shape or pipe shape jointly.

2. an atomizing electronics cigarette according to claim 1 characterized in: in casing (14), atomizer (9) postposition, and establish between gas-liquid separator (7) and atomizer (9) supplying bottle (11), adds to be equipped with in the one end of supplying bottle (11) to compress tightly shell fragment (33) on atomizer (9) with supplying bottle (11).

3. According to 1 or 2 said atomizing electronics cigarettes of claim, characterized in: with being equipped with display screen (32) on the inner wall of casing (14).

4. According to 1 or 2 said atomizing electronics cigarettes of claim, characterized in: be used for manual clear microswitch (16) with sensor (6) parallelly connected being equipped with in casing (14).

5. according to 1 or 2 said atomizing electronics cigarettes of claim, characterized in: be equipped with ripple membrane (22) between said sensor (6) negative pressure cavity (8) rather than inside that still being equipped with first magnet steel (20), second magnet steel (21) in sensor (6) and placing tongue tube (19) between the two in, second magnet steel (21) rigid coupling is on ripple membrane (22).

6. according to 1 or 2 said atomizing electronics cigarettes of claim, characterized in: said sensor (6) are built-in to have silica gel spare check valve (31), is equipped with third magnet steel (34) in the valve, and one side that the valve is close to the magnet steel outward is equipped with tongue tube (19).

7. according to 1 or 2 said atomizing electronics cigarettes of claim, characterized in: said gas-liquid separator (7) goes up to open has the through-hole.

8. According to the said atomizing electronics cigarette of claim 7, characterized in: the through-hole overcoat on gas-liquid separator (7) has silica gel spare check valve (31).

9. according to 1 or 2 said atomizing electronics cigarettes of claim, characterized in: atomizing chamber wall (25) of said atomizing chamber (10) go up to open has spout hole (29), be equipped with in atomizing chamber (10) the chamber heating member (26), it has long air current jet orifice (24) to open in one side of heating member (26), porous body (27) package

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Outside atomizing chamber wall (25), the one side of atomizer (9) is equipped with first piezoelectric patches (23), and the opposite side is equipped with arch (36).

10. According to 1 or 2 said atomizing electronics cigarettes of claim, characterized in: said atomizer (9) China and Canada establish second piezoelectric patches (35).

11. according to the said atomizing electronics cigarette of claim 9, characterized in: porous body (27) available foam nickel, stainless steel fiber felt, polymer poly thing foaming body and foamed ceramics in said atomizer (9) are made; Heating member (26) available platinum filament, nichrome or the Aludirome silk that contains the rare earth element are made, also can make the platellite; Atomizing chamber wall (25) available aluminum oxide or pottery are made.

12. according to the said atomizing electronics cigarette of claim 7, characterized in: said gas-liquid separator (7) available plastics or silicon rubber are made.

13., characterized in: be equipped with and store liquid porous body (28) that its available third of the ten Heavenly Stems fiber, polyester fiber or nylon fiber of gathering fills in said supplying bottle (11) according to 1 or 2 said atomizing electronics cigarettes of claim, or fill with plastics foaming formed body; Also multiple-plate column is molded plastics into to available polyvinyl chloride, polypropylene, Merlon.

14. According to the said atomizing electronics cigarette of claim 5, characterized in: tongue tube (19), first magnet steel (20), second magnet steel (21), ripple membrane (22) available semiconductor gauge that has the closing membrane replace, install in sensor ripple membrane position.

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Atomizing electron cigarette

The technical field

This utility model relates to an electron cigarette, and especially one kind does not contain tar, an atomizing electron cigarette including nicotine (nicotine).

The background art

Become under the condition of general knowledge current " Smoking is harmful to your health ", the whole world still has 1,000,000,000 people's smoking at present, and annual this digit is also enlarging.2003 First international ban on opium-smoking and the opium trade agreement " the Framework Convention on Tobacco Control " that the World Health Organization in on March 1, (WHO) passes through, the numeral that provides according to WHO indicate that smoking leads to the fact 4,900,000 people dead every year, although smoking can result in serious respiratory disease and cancer, it is extremely difficult thing to let the smoker give up smoking totally.

The effective constituent of cigarette is nicotine (being the nicotine), is absorbed rapidly after nicotine produced along with cigarette burning during smoking a large amount of tar droplets get into the alveolus, and the blood after-action is gone into on the receptor of central nervous system to the nicotine absorbate, causes the sensation of having a dizzy spell or walking on air of " the intoxicated sense ", such as smoker's experience of similar stimulant.

Nicotine is the micro molecule alkaloid, and is harmless basically to the human body under the low dose, and the half-life in blood is extremely short. The harmful substance of tobacco mainly is a tar, and tobacco tar comprises thousands of kinds of compositions, and it is carcinogens wherein to have tens of kinds of compositions. Confirm at present that the passive smoking is bigger to non-smoker's harm.

Only to contain nicotine and does not contain the cigarette substitute of harmful tar in order to look for, have many inventions to make such as products such as " quit smoking and paste ", " nicotine contain gargle water ", " it is having the high-pressure gas pitcher nebula of propellant pack ", " nicotine gum ", " nicotine beverages " with purer nicotine, though these products do not have the harm of tar, because of the nicotine absorption slowly, cannot establish effectual peak concentration in blood, cannot solve the sensation of demand nicotine " enjoyable ", the custom of " taking out " that the smoker had acquired, " inhaling " has also been deprived to the while, therefore similar product cannot real conduct quit smoking articles for use or cigarette substitute.

The utility model content

Above-mentioned not enough in order to overcome, the aim at of this utility model provides one kind and has the atomizing electron cigarette of quitting smoking with the effect of cigarette substitute.

The purpose of this utility model realizes through following technical scheme:

This utility model includes casing and suction nozzle, It has the inlet port to open on the outer wall of casing, Be equipped with Electronic circuit board, ordinary pressure chamber, sensor, gas-liquid separator, atomizer, supplying bottle in the casing in proper order; Wherein the Electronic circuit board comprises electronic switching circuit and high-frequency generator; It has the sensor gas channel to open in one side of sensor, Be equipped with the negative pressure cavity in the sensor; The atomizer contacts with the supplying bottle, Be equipped with the atomizing chamber in the inside of atomizer; Be equipped with the retaining ring of locking supplying bottle between the one side of supplying bottle and the casing, Foggy vapour passageway is opened to the opposite side of supplying bottle; Inlet port, ordinary pressure chamber, gas-liquid separator, atomizer, fog vapour passageway, air guide hole, the consecutive expert of suction nozzle; Front end in the casing also includes one LED and battery, Constitute the whole of one cigarette holder shape, cigar shape or pipe shape jointly.

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Wherein: with being equipped with the display screen on the inner wall of casing; Be used for manual clear microswitch with parallelly connected being equipped with of sensor in the casing; Be equipped with the ripple membrane between the negative pressure cavity of sensor and its inside, Also be equipped with first magnet steel, second magnet steel in the sensor and arrange tongue tube between the two in, Second magnet steel rigid coupling is epimembranal at the ripple; The sensor embeds there is silica gel spare check valve, Be equipped with the third magnet steel in the valve, One side that the valve is close to the magnet steel outward is equipped with the tongue tube; It has the through-hole to open on the gas-liquid separator, Through-hole overcoat on the gas-liquid separator has silica gel spare check valve; It has the spout hole to open on the atomizing chamber wall in atomizing chamber, Atomizing chamber intracavity is equipped with the heating member, It has long air current jet orifice to open in one side of heating member, The porous body wraps outside the chamber wall that atomizes, One side of atomizer is equipped with first piezoelectric patches, The opposite side is equipped with the arch; Add second piezoelectric patches in the atomizer; The available Foamed nickel of porous body, stainless steel fiber felt, polymer poly thing foaming body and foamed ceramics in the atomizer are made; The available platinum filament of heating member, nichrome or the Aludirome silk that contains the rare earth element are made, Also can make the platellite; Atomizing available aluminum oxide of chamber wall or pottery are made; Available plastics of gas-liquid separator or silicon rubber are made; Be equipped with in the supplying bottle and store the liquid porous body, Its available third of the ten Heavenly Stems fiber, polyester fiber or nylon fiber of gathering fills, Or fill with the plastics foam forming body; Also multiple-plate column is molded plastics into to available polyvinyl chloride, polypropylene, Merlon; Tongue tube, first magnet steel, second magnet steel, the available semiconductor gauge that has the closing membrane of ripple membrane replace, Install in sensor ripple membrane position.

This utility model also discloses the atomizing electronics cigarette of another kind of structure, and in the casing, the atomizer is rear mounted, between supplying bottle disposed on gas-liquid separator and the atomizer, adds to be equipped with in the one end of supplying bottle and compresses tightly the shell fragment on the atomizer with the supplying bottle.

The advantage of this utility model is: tar is not had in smoking, carcinogenic risk reduces greatly, and the user still has the sensation and the excitement of smoking, need not to light the harm of no fire.

The device of this utility model and link construction can be packed the Conventional medication therapy into and supplied the apparatus of dosing in the lung after the cistern is changed a little.

The description of drawings

Picture 1 is a global architecture schematic diagram of this utility model;

Picture 2 is the another kind of global architecture schematic diagram of this utility model;

Picture 3 is the global architecture schematic diagram of this utility model area display screen;

4 structure charts that are this utility model sensor in the picture;

Picture 5 has the sensor structure picture of silica gel spare check valve for this utility model;

6 structure charts that are this utility model atomizer in the picture;

Picture 7 is the structure chart of ceramic member in this utility model atomizer;

Picture 8 is the structure chart of the another kind of atomizer of this utility model;

9 structure charts that are this utility model gas-liquid separator in the picture;

Picture 10 is the structure chart of the another kind of gas-liquid separator of this utility model;

Picture 11 is the joining knot composition of this utility model supplying bottle and suction nozzle;

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Figure 12 is a circuit theory diagram of this utility model.

The detailed description of the invention

The face bonding figure further details this utility model down.

Embodiment No. 1

As shown in FIG. 1, this utility model can constitute the whole of one cigarette holder shape, cigar shape or pipe shape. It has inlet port 4 to open on the outer wall of casing 14, and the order is provided with LED 1, battery 2, Electronic circuit board 3, ordinary pressure chamber 5, sensor 6, gas-liquid separator 7, atomizer 9, supplying bottle 11, suction nozzle 15 in the casing 14.Electronic circuit board 3 comprises electronic switching circuit and high-frequency generator. As shown in FIG. 4, be equipped with negative pressure cavity 8 in the sensor 6, separate by ripple membrane 22 and sensor 6.Also being equipped with first magnet steel 20, second magnet steel 21 and arranging tongue tube 19 between the two in the sensor 6,21 rigid couplings of second magnet steel are on ripple membrane 22.Atomizer 9 contacts the 9 inside atomizing chambers 10 that are equipped with in the atomizer through protruding 36 with supplying bottle 11.7 shown like picture 6, picture, the atomizing chamber wall 25 in atomizing chamber 10 is gone up to open has spout hole 29, and the intracavity is equipped with heating member 26, and available platinum filament, nichrome or the Aludirome silk that contains the rare earth element are made, also can make the platellite. It has the jet orifice just to open one side of heating member 26, and the jet orifice can be according to the material of atomizing chamber wall 25 and choose long air current jet orifice 24 for use or lose heart jet injection hole 30.Long air current jet orifice 24 can adopt the haplopore and the cellular structure of 0.1mm to 1.3mm slit structure or Φ 0.2mm to 1.3mm round hole; Lose heart the diameter in jet injection hole 30 at 0.3mm to 1.3mm.Atomizing chamber 25 outsourcings on the wall have porous body 27, and available Foamed nickel, stainless steel fiber felt, polymer poly thing foaming body and foamed ceramics are made. Also be equipped with first piezoelectric patches 23 on atomizer 9.Atomizing chamber 25 available aluminum oxide on the wall or pottery are made. As shown in FIG. 9, gas-liquid separator 7 is gone up to open there is the through-hole, and available plastics or silicon rubber are made. As shown in FIG. 11, one side of supplying bottle 11 and the casing was equipped with locking supplying bottle 11 between 14 retaining ring 13, foggy vapour passageway 12 is opened to the opposite side, is equipped with in the bottle and stores liquid porous body 28, and available third of the ten Heavenly Stems fiber, polyester fiber or the nylon fiber of gathering fills, or personally experiences sth. part of the body like polyamine ester Thysanophyllum or gather third of the ten Heavenly Stems Thysanophyllum and fill with the plastics foam forming, and also multiple-plate column is molded plastics into to available polyvinyl chloride, polypropylene, Merlon. Inlet port 4, ordinary pressure chamber 5, gas-liquid separator 7, atomizer 9, fog vapour passageway 12, air guide hole 17,15 consecutive experts of suction nozzle.

Shown like 12 circuit theory diagrams in the picture, K 1 is used for constituting bikini electric capacity oscillator to overdischarge protection, the M1 of lithium cell for first piezoelectric patches 23, C1, C2, R3, L1, C3, BG, M1 for the low voltage detector piece for LED 1, U2 for heating member 26, LED 1 for tongue tube 19, RL. Its electrical circuitry is: when 1 closure of K, U1 effect power tube on the spot opens, RL work, bikini electric capacity oscillator oscillation starting simultaneously, M1 reaches the atomizing effect for atomizer 9 provides high frequency machinery vibration wave.

When smoker's smoking, suction nozzle 15 is in the negative pressure state, and ordinary pressure chamber 5 and negative pressure cavity draught head or the high velocity air between 8 results in 6 output enabling signals of sensor, 3 work of connecting mutually with it of Electronic circuit board. Ripple membranes 22 in this moment sensor 6 are out of shape, drive second magnet steel 21 and keep away from tongue tube 19, and tongue tube 19 starts field effect power tube electron switch (being that U1 opens) the excessive magnetic line of force effect of the first magnet steel 20 closed (being 1 closure of K) down, and the high frequency oscillator adopts bikini electric capacity oscillator, and the frequency is at 550KHz to 8MHz, frequency automatic fine tuning and annular 23 resonance of the first piezoelectric patches in the circuit, and to the energy supply of liquid molecule, LED 1 gives off light under 2 power supplies of rechargeable battery simultaneously. The atmosphere is advanced to the ordinary pressure chamber 5 in by inlet port 4, Confucian classics and commentaries sensilla gas channel 18, again the through-hole on gas-liquid separator 7 flow the atomizing chamber 10 in the atomizer 9.Through the tobacco juice during the high velocity air of jet orifice drives porous body 27 spurts into atomizing chamber 10 with the droplet form in, through the ultrasonic atomization of first piezoelectric patches 23, further atomizing under the effect of heating member 26 again, major diameter droplet after the atomizing under the effect of the vortex epispore through spout hole 29 by 27 reabsorptions of porous body, the suspension of minor diameter droplet in the air current formation aerosol through fog vapour passageway 12, air guide hole 17, suction nozzle 15 by the suction.36 contacts of arch on liquid porous body 28 and the atomizer 9 of storing in the supplying bottle 11 realize that capillaries soak feed liquids.

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Make threadedly on the suction nozzle 15, when tobacco juice in supplying bottle 11 was exhausted, it was backed out to rotatable suction nozzle 15, takes out supplying bottle 11, pour into the tobacco juice into supplying bottle 11 in, in the casing 14 of packing into again, screw up suction nozzle 15.

Tongue tube 19, first magnet steel 20, second magnet steel 21, ripple the membrane 22 also available semiconductor gauge that has the closing membrane replace, install in sensor ripple membrane position.

For the Simplified design, first piezoelectric patches 23 on the desirable fog dispersal spinning disk atomizer 9 only leans on heating member 26 with the tobacco juice atomizing. It is less that the size of this kind of atomizer can be done, and the link construction of whole atomizing electron cigarette and embodiment are one the same. In addition, also can be shown like picture 8, with the first piezoelectric patches in the atomizer 9 23,26 cancellations of heating member, at atomizing intracavity add individual layer or many stromatolites, plate shaped second piezoelectric patches 35, air current by the jet orifice is in its center vibration focus point atomizing, reaches the effect of strong ultrasonic atomization.

As shown in FIG. 10, the through-hole of gas-liquid separator 7 also can overlap outward and have silica gel spare check valve 31. During smoking, the air current reaches the through-hole, because the atmospheric pressure in the through-hole rises makes silica gel spare check valve 31 open, and the air current passes through; During the non-smoking, silica gel spare check valve 31 is closed.

As shown in FIG. 5, sensor 6 also can design the structure that becomes to have silica gel spare check valve 31. During smoking, the air current assembles in silica gel spare check valve 31, and atmospheric pressure rises, the gas expansion, and third magnet steel 34 in the valve is close to tongue tube 19 gradually, until the tongue tube closed, open the circuit, along with the draught head continues the increase, open the gas outlet of silica gel spare check valve 31.Tongue tube 19 also can be with hall device or magnetodiode or the replacement of magnetic-sensing triode.

Embodiment No. 2

As shown in FIG. 2, in order to improve the feed liquid state, in casing 14, 9 postposition in the atomizer, 11 disposed on gas-liquid separators 7 of supplying bottle and atomizer be between 9, adds in the one end of supplying bottle 11 to be equipped with the shell fragment 33 that compresses tightly supplying bottle 11 on atomizer 9, and other part and theory of operation and embodiment are together.

On the inner wall of the casing 14 of the said atomizing electron cigarette of embodiment No. 1, embodiment No. 2, but add digital display screen 32 also is used for showing number of times, the battery capacity of smoking every day. Sensor 6 adopts linear signals output, is directly proportional (being that the suction time bigger, work is long more) with the power of suction, and atomizer 9 is according to linear mode work, in order to simulate more real humanized cigarette.

In casing 14 with sensor 6 also parallelly connected have be used for manual clear microswitch 16.When the non-smoking, press down microswitch 16, with 6 work of its parallelly connected sensor, or drive 14 interior residual matter and other impurity of casing clean.

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A nicotine that is used for atomizing tobacco juice to contain 0.4 to 3.5 %, 0.05 to 2 % of Tobacco flavor, 0.1 to 3.1 % of organic acid, 0.1 to 0.5 % in the anti-oxidant, the surplus is 1, the 2-propanediol.

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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 July 2007 (12.07.2007)

PCT

(10) International Publication Number
WO 2007/078273 A1

(51) International Patent Classification:
A24F 1/24 (2006.01)

(21) International Application Number:
PCT/US2005/046546

(22) International Filing Date:
22 December 2005 (22.12.2005)

(25) Filing Language: English

(26) Publication Language: English

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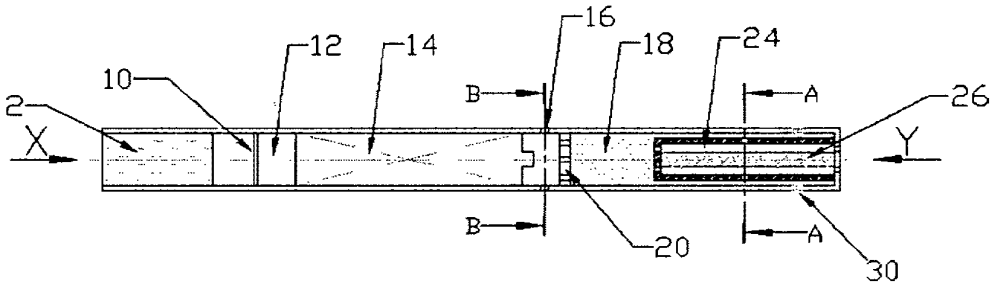
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC,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

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NO-TAR ELECTRONIC SMOKING UTENSILS



(57) Abstract: No-tar electronic smoking utensils includes a container (18) formed of a porous material for storing a liquid mixture. The container communicates with a heater vapouriser (24) via a series of small apertures (28). The heater is in the form of a spirally wound electrical heater (26) mounted on an electrical insulating support. Battery supply means are provided for the heater. The heater vapouriser communicates with a mouthpiece. In use, suction on the mouthpiece by the user causes air to be drawn through the porous container for liquid, over the heated vapouriser, into the mouthpiece and into the mouth of the user.

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NO-TAR ELECTRONIC SMOKING UTENSILS

TECHNICAL FIELD

The present invention relates to no-tar electronic smoking utensils such as, for example, cigarettes, cigars and cigarette holders.

BACKGROUND

Cigarettes are well known in which one end of a tobacco filled cigarette is held in the mouth of the user and the other end of the cigarette is ignited by a match or a lighter and the user draws on one end of the cigarette to draw the tobacco smoke through the cigarette into the mouth/lungs of the user. The health dangers of tobacco smoking are well documented and many products have appeared on the market in an attempt to assist smokers to cease smoking tobacco products or to provide a more healthy tobacco substitute.

One such product is a "flameless electronic atomising cigarette" described in Malaysian patent application 03111582.9. The product is a non-combustible simulated cigarette and the user draws on one end of the "cigarette" to draw a nicotine vapour through the cigarette via a solution having a controlled amount of nicotine. The lack of a flame avoids inhaling tar and other unhealthy tobacco products, and the user can also control the amount of nicotine inhaled. The nicotine mixture of the prior art electronic cigarette is pumped through the device and is atomised by the use of a high frequency generator, a piezoelectric ultrasonic atomiser and a high-temperature gasification jet tube. The resulting vapour, lacking the

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conventional tar and unhealthy by- products, but including a controlled amount of nicotine, is inhaled by the user.

SUMMARY OF INVENTION

It is an object of the present invention to provide a no-tar electronic smoking utensils which is a suitable alternative to known products and/or is of a simpler construction in comparison to known products.

In accordance with one aspect of the invention, there is provided a no-tar electronic smoking utensils including:
a container for a liquid,
a vapouriser including heater means adapted to vapourise the liquid,
wherein air can be drawn by the suction of the user over the container and vapouriser to form a simulated smoke vapour.

Preferably, in contrast to the above prior art device the vapourisation is effected solely or principally by the air distribution through the container in combination with the heat from the heating means.

Preferably, in contrast to the above prior art device the flow of fluids through the cigarette is caused solely or principally by the suction of the user.

Thus, the simulated cigarette of the present invention is of a simpler construction, easier to manufacture and more cost effective than the above prior art device.

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Preferably, at least a portion of the container is formed of a porous material to facilitate distribution of the liquid through the container, prior to being fed to the heater means. Suitable materials include, for example, foamed metal, foamed ceramic or special fibre.

In a preferred arrangement the heater means includes an electrical heater mounted on an electrical insulating support, for example a spirally wound heater wire.

The liquid mixture may be formed from any suitable materials/chemicals. The mixture could include a controlled amount of nicotine, however the mixture need not include a nicotine content.

Indicating/monitoring means may be included for the purpose of indicating a range of activities such as when a pre-set level of nicotine has been reached, when the unit is switched on or when the liquid in the container is low.

In a preferred arrangement simulated tobacco is provided in the tip end of the smoking article to give the article the appearance of a conventional smoking article.

The no-tar electronic smoking utensils preferably includes electrical supply means, such as a battery, to supply power to the heater and/or the indicator means. In a preferred arrangement power supply switch means are located adjacent the mouthpiece end of the cigarette, the power supply switch means being adapted to be activated by the lips of the user.

In accordance with another aspect of the invention, there is provided a simulated cigarette including a container formed of a

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porous material for storing a liquid mixture, the container communicating with a heater vapouriser via a series of apertures, said vapouriser including a spirally wound electrical heater mounted on an electrical insulating support, battery supply means for the heater, said heater vapouriser communicating with a mouthpiece, whereby in use, suction on the mouthpiece by the user causes air to be drawn through the porous container for liquid, over the heated vapouriser, into the mouthpiece and into the mouth of the user.

SPECIFIC EXAMPLE OF THE INVENTION

In order to better understand the invention, an example will now be described with reference to the following drawings, in which:

FIG 1 is an enlarged side view of a simulated cigarette constructed in accordance with the invention,

FIG 2 is a cross- sectional side view of the simulated cigarette of FIG 1,

FIG 3 is a tip end view of the simulated cigarette of FIG 1 looking in the direction of arrow X,

FIG 4 is a mouthpiece end view of the simulated cigarette of FIG 1 looking in the direction of arrow Y,

FIG 5 is a cross-sectional end view taken along the lines AA of FIG 2,

FIG 6 is a cross-sectional end view taken along the lines BB of FIG 2, and

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FIG 7 is a schematic diagram of the electrical components of the example shown in FIG 1.

Referring to FIG 1 of the example, the simulated cigarette is of the general size and shape of a conventional elongated cylindrical cigarette, having a tip end 2 and a mouthpiece end 4.

In broad terms, the simulated cigarette of the example is provided with a container for a liquid mixture, a heater for vapourising the liquid, apertures for passage of air/mixture vapour through the cigarette into the mouth of the user, and a battery for supplying power to the heater.

Referring to FIGS 1 and 2, the simulated cigarette is provided with an outer casing 6. The tip end 2 of the casing 6 is provided with simulated tobacco to give the simulated cigarette the appearance of a conventional cigarette. Modifications, such as choice and feel of materials, obvious to those skilled in the art, could also be made to give the simulated cigarette the look and feel of a conventional cigarette.

Adjacent and inner the tip end 2 of the cigarette and mounted on the cigarette casing 6 is a light emitting diode (LED) 8. The LED is for the purpose of monitoring/indicating, amongst other things, the level of liquid in the container and when a pre-set level of nicotine has been reached.
Located inner and adjacent of the simulated tobacco is a printed circuit board (PCB) control unit 10 for controlling the electrics of the cigarette.

Adjacent and inner of the PCB 10, is a cylindrical battery chamber 12 for housing a battery 14. The cigarette outer casing 6, adjacent

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the battery chamber 12 is provided with a plurality of apertures 16 to permit entry of air into the battery chamber. Adjacent and inner of the battery chamber 12 is a cylindrical liquid container 18 separated from the battery chamber by a dividing wall 20. The dividing wall 20 is provided with a plurality of apertures 22 to permit entry of air from the battery chamber into the liquid container.

The container liquid mixture can be fed into the container 18 via a one-way valve (not shown) mounted through the wall of the cigarette casing 6. The liquid container 18 is formed of porous inorganic material. The porous material of the liquid container facilitates the distribution and the mixing of the air and liquid mixture.

A cylindrical vapouriser heater assembly housing 24 is mounted within a central bore provided in the mouthpiece end of the liquid container 18. The vapouriser heater assembly housing houses a heater wire 26 spirally wound on a central ceramic insulating rod. The walls of the heater housing 24 are provided with a plurality of apertures 28 to permit entry of the liquid/air from the liquid container 18 into the heater housing 24.

Adjacent the mouthpiece end 4 of the cigarette and mounted on the cigarette outer casing 6 is a switch 30 activated, in use, by the mouth of the user for the purpose of switching on the battery power supply.

As indicated above, the liquid of the container may contain any suitable chemicals, and may be provided with or without nicotine.

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The approximate percentages of ingredients for a mixture containing nicotine are as follows:
1,2 propylene glycol 81%, nicotine 7%, distilled water 6%, glycerol triacetin 5%, formic acid, acetic acid, acetol and fragrance etc. 1%.

The approximate percentages of ingredients for a mixture without nicotine are as follows:
1,2 propylene glycol 88%, distilled water 6%, glycerol triacetin 5%, formic acid, acetic acid, acetol and fragrance etc. 1%.

In operation, the switch 30 is activated by the lips of the user touching the switch 30 thus switching on the battery power supply. As best seen in the electrical schematic diagram of FIG 7, battery power is supplied to the PCB control unit 10, the LED 8 and the vapouriser heater 26.
As the user draws on the cigarette mouthpiece, air is drawn into the battery chamber, into the liquid container to mix with the liquid mixture, and into the heater assembly. The resulting vapour is drawn into the mouth of the user.

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CLAIMS:

1. A no-tar electronic smoking utensils including:
a container for a liquid,
a vapouriser including heater means adapted to vapourise the liquid,
wherein air can be drawn by the suction of the user over the container and vapouriser to form a simulated smoke vapour.

2. A no-tar electronic smoking utensils according to Claim 1 wherein the vapourisation is effected solely or principally by the air distribution through the container in combination with the heat from the heating means.

3. A no-tar electronic smoking utensils according to Claim 1 or Claim 2 wherein the flow of fluids through the cigarette is caused solely or principally by the suction of the user.

4. A no-tar electronic smoking utensils according to any preceding claim wherein at least a portion of the container is formed of a porous material to facilitate distribution of the liquid through the container, prior to being fed to the heater means.

5. A no-tar electronic smoking utensils according to any preceding claim wherein the heater means includes an electrical heater mounted on an electrical insulating support.

6. A no-tar electronic smoking utensils according to any preceding claim wherein the liquid includes a controlled amount of nicotine.

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7. A no-tar electronic smoking utensils according to any preceding claim including indicator means for the purpose of indicating when a pre-set level of nicotine has been reached.

8. A no-tar electronic smoking utensils according to any preceding claim including simulated tobacco at a first or tip end of the smoking article to give the article the appearance of a conventional smoking article.

9. A simulated cigarette according to any preceding claim including electrical supply means to supply power to the heater and/or the indicator means, power supply switch means located adjacent the second or mouthpiece end of the cigarette, said power supply switch means being adapted to be activated by the lips of the user.

10. A simulated cigarette including a container formed of a porous material for storing a liquid mixture, the container communicating with a heater vapouriser via a series of apertures, said vapouriser including a spirally wound electrical heater mounted on an electrical insulating support, battery supply means for the heater, said heater vapouriser communicating with a mouthpiece, whereby in use, suction on the mouthpiece by the user causes air to be drawn through the porous container for liquid, over the heated vapouriser, into the mouthpiece and into the mouth of the user.

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FRONT VIEW
(FIG 1)

VIEW ON X
(FIG 3)

FIG 2

VIEW ON Y
(FIG 4)

SECTION
ON B-B
(FIG 6)

SECTION
ON A-A
(FIG 5)

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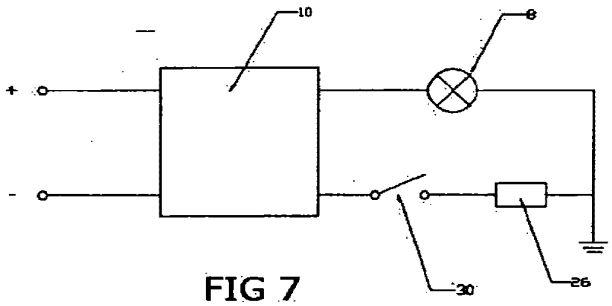


FIG 7

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/46546

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **A 24 F 01/24**

USPC: 131/194,329,347
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 131/194,329,347

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 4,947,874 A (BROOKS et al) 14 August 1990 (14.08.1990), see entire document.	1-5 --- 6-10

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

* Special categories of cited documents:

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Date of the actual completion of the international search
22 May 2006 (22.05.2006)

Date of mailing of the international search report
27 JUN 2006

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
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Form PCT ISA/210 (second sheet) (April 2005)

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Espacenet

Bibliographic data: DE102006004484 (A1) — 2007-08-09

Re-usable part for smoke-free cigarette, has filament preheated by attaching filter, where filament is brought to operating temperature, when pulling on entire construction of cigarette

No documents available for this priority number.

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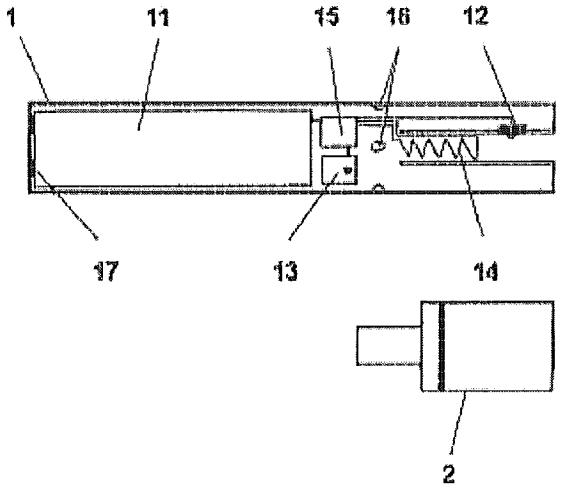
Classification: **- international:** ***A24D1/18***
- cooperative: **A24F47/008**

Application number: DE20061004484 20060129

Priority number (s): DE20061004484 20060129

Abstract of DE102006004484 (A1)

The part has a storage battery (11), a filter sensor, an air flow sensor (13), a filament (14), timing, vent holes and charging contact, where the filament is preheated by attaching a filter. The filament is brought to the operating temperature, when pulling on an entire construction of the cigarette. The air flow sensor detects the pulling of the smoker and bringing of the filament to the operating temperature, in such a manner that the desired effect of heating of the airflow occurs for releasing contents of active depots in filter.



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DESCRIPTION DE102006004484

State of the art

[0001] The technical solution presented here describes an alternative way to implement the desired properties of a smokeless cigarette, as described in patent application WO 2004098324 (DE 10321379).

[0002] The approach above reference patent is based on a reusable part (claim 1), which is to serve as a heat store for heating of inhaled by the smoker air.

The heat storage itself is supplied either as described warmth in claim 2 or as in claim 5.

[0003] The heat storage unit is to provide the necessary heat for 1 .. 3 minutes is required to heat the air inhaled by the smoker.

[0004] The specific heat capacity of air is 1.01 kJ kg <-1> grd <-1>.

[0005] With a cigarette puff of smoke decreases to about 300ml of air.

[0006] If this amount of air for

B. 20 deg.

C to 70 deg.

C (at which the nicotine from the depot triggers) heated, save 300ml air heat equivalent to about

20J.

[0007] Assuming at least 5 cigarettes trains, which required a smoker for smoking a cigarette, the air flow rate of 1500 ml has an amount of energy of about

100J be supplied that can be maintained without major technical effort in a cigarette large heat storage.

[0008] In the invention, it was not considered that the air has an extremely low thermal conductivity, that is, the amount of energy is many times higher in order to supply the air, the necessary amount of energy.

[0009] The specific thermal conductivity of a substance is reflected in the specific thermal conductivity again.

[0010] This is for air 0.025 W / mK for copper 402 W / mK.

[0011] That is, the amount of energy must be by 4 orders of magnitude higher than that of metal listed here, to compensate for the resistance that opposes the air being heated by another substance.

[0012] This is also the reason why the air passes through a real cigarette, can be at all inhaled, although the glow temperature of between 700 deg.

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C and 1000 deg.

C..

[0013] If one assumes that one. A temperature of at least 700 deg

Must generate C, to bring at least 1500ml air on "operating", so you would have to heat storage to several 1000 deg.

C heat, so it has 3 minutes sufficient thermal energy available for 1 .., by a total of 1500ml of air at 70 deg.

C for heating.

[0014] A uniform heat dissipation, as described in paragraph 4 of the reference patent explains appears using a heat accumulator can not be realized in the reusable part of a smokeless cigarette.

Embodiment

[0015] The Alternative Solution A described below, leaning as close to the functionality of a real cigarette.

[0016] That is, the reusable part of a smokeless cigarette (1) Figures not used as a heat storage but also houses a rechargeable battery (11), a filter sensor (12), an air flow sensor (13), a filament (14), timing (15) and air holes (16).

A complex design of air flow passages or the application of a vapor-deposited reflective coating is not required.

[0017] The filament (14) is located immediately in front of the replaceable filter (2), so that the forming by the filament to temperature and thus the power consumption goes down lower than would be the case at the end of the cigarette.

The filter (2) in the reusable portion of the cigarette (1) is inserted, this is registered by the sensor filter (12) and on the filament (14), which is thus brought to the preheating.

This function is similar to the glow of a cigarette without inhaling and serves a more rapid achievement of the working temperature of the filament during inhalation.

Only when cigarette puff, which generates an air flow and is detected by the airflow sensor (13), the filament (14) is brought to operating temperature.

This saves energy and prevents a on the other hand, the known in real cigarettes hazards due to overheating / burns.

[0018] Forgetting the smoking of the cigarette after use to remove the filter (2), the timing (15) assumes the isolation of the circuit, such

B. After 3 minutes.

[0019] The sensor filter (12) is interpretable as a normal electro-mechanical contact.

[0020] As the air-flow sensor (13) is a conventional air pressure sensor is used, which reacts to a sudden pressure drop within the reusable portion of the cigarette (1).

[0021] Batteries (11) Li-ion technology have a power density of up to 350Wh / l and can be manufactured in custom designs.

Today they come with very small dimensions, for

B. Bluetooth headsets for use.

[0022] Assuming that one has 2/3 of the volume of the reusable portion of the cigarette (1) of the battery (11) is available, then this corresponds to a volume of about 2 ml and thus a theoretical capacity of 0.2 Ah at a nominal voltage of 3.6 V.

[0023] If one uses a few [mu] m thick filament, as can be at 3.6 V with less than 100mA Power Consumption annealing temperatures of 1000 deg.

C and achieve more.

[0024] Thus, the battery capacity is sufficient for multiple cigarette use (multiple filters) when going from an average useful life of 3 minutes per cigarette (filter) goes out.

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[0025] If the capacity of the battery (11) is exhausted, it can be charged using an external charger to the charging contacts (17) again.

The necessary charging intelligence is in the charger.

[0026] The alternative solution B now described shows another way to achieve the targets set in the referenced patent waiving the claim to creating the resulting heat feeling when inhaling goals.

[0027] This is done without the detour of the heating of the air at about 70 deg.

C, in which the ingredients of the drug depots are solved, where the agent depot is heated directly in the filter.

Does the agent depot reaches the working temperature, the air flow generated by the smoker pulls the ingredients with it, which are then inhaled by him.

[0028] The cigarette again consists of a reusable part (3) Figures and a replaceable filter with active ingredient Depot (4).

The reusable portion (3) accommodates a battery (31), the charging contacts (32), a timer (33), air holes (34) and two electrical contacts filter (35).

[0029] These electrical filter contacts (35) provide an electrical connection to the filter with her agent depot (4).

In that an electrical heating element (41) is installed, which is connected to the electrical contacts the filter (42) with the electrical contacts the filter (35) of the reusable part (3).

After connecting the filter with active ingredient Depot (4) this is brought up to operating temperature.

[0030] Forgetting the smoking of the cigarette after use to remove the filter (4), the timing (33) assumes the isolation of the circuit, such

B. After 3 minutes.

[0031] If the capacity of the battery (31) is saturated, it can be an external charger to the charging contacts (32) recharged.

The necessary charging intelligence is in the charger.

[0032] Due to the lower operating temperature of the heating element (41) of the energy consumption and the Nutungsdauer until the next charge of the battery (31) decreases increases.

[0033] If you want to avoid the disadvantages of a contact-type heat generation in the agent depot of the filter, the following construction can be selected.

[0034] The cigarette again consists of a reusable part (5) Figures and a replaceable filter with active ingredient Depot (6).

The reusable portion (5) accommodates a battery (51), the charging contacts (52), a timer (53), air holes (54), an electronic vibration generating unit (55), a coil (56) and a filter sensor (57).

[0035] The active ingredients of the drug depots (61) in the filter (6) is fine metal powder, mainly ferruginous, mixed.

This may not leave the agent depot.

[0036] If the filter (6) in the reusable portion of the cigarette (5) is inserted, this is registered by the sensor filter (57) and switches to the vibration generating unit (55).

The low-frequency vibration generated is conducted to the coil (56) and calls of the induced eddy currents in the metal powder, heating the metal powder, and thus the entire drug depots produced.

The temperature generated can be controlled by the selection of the size, shape and material properties of the admixed metal and by the supplied energy.

[0037] If the replaceable filter (6) is removed, the filter sensor (57) to disconnect the circuit for electronic vibration generation unit (55).

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[0038] Forgetting the smoker this by use of the cigarette, the time control (53) assumes the isolation of the circuit, such

B. After 3 minutes.

[0039] This method is particularly energy efficient since the power transfer through induction by approximately 1000-fold more effective than the power transfer through contact with a heat source.

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CLAIMS DE102006004484

1 The reusable part for a smokeless cigarette, characterized in that this one battery (11), a filter sensor (12), an air flow sensor (13), a filament (14), timing (15), air holes (16) and charging contacts (17) contains, in which, by connecting a filter, the filament is pre-heated and is brought to operating temperature upon pulling of the overall construction of the cigarette of the filament.

2 The reusable part for a smokeless cigarette, characterized in that this one battery (31), charging contacts (32), timing (33), air holes (34) and two electrical filter contacts (35) and a filter with active ingredient Depot (4) characterized in that it (41) contains an electric heating element and electric contacts filter (42) so that an electrical contact is produced by plugging together the two parts and the heating element, and thus the active substance is brought to operating temperature.

3 The reusable part for a smokeless cigarette, characterized in that this one battery (51), charging contacts (52), timing (53), air holes (54), an electronic vibration generation unit (55), a coil (56) and a filter sensor (57) and a filter with an active substance depot, characterized in that this fine metal powder is added, so that plugging of the filter, a low-frequency voltage is generated, which - transmitted by the coil (56) - causes the eddy current losses in the admixed metal powder, and thus the agent brings to operating temperature in the agent depot (61) of the filter (6).

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(19) Bundesrepublik Deutschland
Deutsches Patent- und Markenamt

(10) **DE 10 2006 004 484 A1 2007.08.09**

(12) # Offenlegungsschrift

(21) Aktenzeichen: **10 2006 004 484.3**
(22) Anmeldetag: **29.01.2006**
(43) Offenlegungstag: **09.08.2007**

(51) Int Cl.[8]: ***A24D 1/18*** (2006.01)

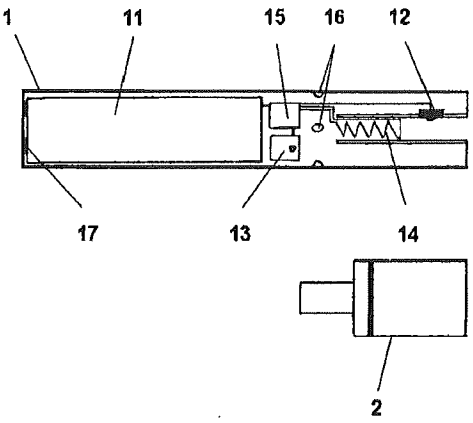
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Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Bezeichnung: **Technische Lösung zum Betreiben von rauchfreien Zigaretten**

(57) Zusammenfassung: Die Erfindung beschreibt verschiedene Lösungswege zur technischen Ausgestaltung des wiederverwendbaren Teils einer rauchfreien Zigarette nach Patent DE10321379. In diesem befinden sich unter anderem ein Akku (11), ein Glühfaden (14), ein Luftstromsensor (13) und ein Filtersensor (12), der das Vorheizen des Glühfadens (14) veranlasst, sobald ein Filter (2) eingesteckt wird. Der Luftstromsensor (13) detektiert das Ziehen des Rauchers an der Zigarettennachbildung und bringt den Glühfaden auf Betriebstemperatur, so dass der gewünschte Effekt des Aufheizens des Luftstroms zur Freisetzung der Inhaltsstoffe des Wirkstoffdepots im Filter (2) eintritt.



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Beschreibung

[0001] Die hier dargestellte technische Lösung beschreibt einen alternativen Weg zur Umsetzung der gewünschten Eigenschaften einer rauchfreien Zigarette, wie sie in der Patentanmeldung WO 2004098324 (DE 10321379) beschrieben wird.

[0002] Der Lösungsansatz obigen Bezugspatents beruht auf einem wiederverwendbaren Teil (Patentanspruch 1), der als Wärmespeicher zur Erwärmung der durch den Raucher inhalierten Luft dienen soll. Dem Wärmespeicher selbst wird Wärme entweder wie in Patentanspruch 2 oder wie in Patentanspruch 5 beschrieben zugeführt.

[0003] Der Wärmespeicher soll die notwendige Wärme für 1...3 Minuten vorhalten, die benötigt wird, um die vom Raucher inhaliert Luft zu erwärmen.

[0004] Die spezifische Wärmekapazität der Luft beträgt 1,01 $kJ \cdot kg^{-1}$ grd^{-1}.

[0005] Mit einem Zigarettenzug nimmt der Raucher etwa 300ml Luft auf.

[0006] Wird diese Luftmenge von z.B. 20°C auf 70°C (bei dem sich das Nikotin aus dem Depot löst) erwärmt, speichern 300ml Luft eine Wärmemenge von ca. 20J.

[0007] Geht man von mindestens 5 Zigarettenzügen aus, die ein Raucher für das Rauchen einer Zigarette benötigt, so muss der Luftmenge von 1500ml eine Energiemenge von ca. 100J zugeführt werden, die ohne größeren technischen Aufwand in einem zigarettengroßen Wärmespeicher vorgehalten werden kann.

[0008] Bei der Erfindung wurde jedoch nicht bedacht, dass Luft eine extrem schlechte Wärmeleitfähigkeit besitzt, d.h. der Energieaufwand um ein vielfaches höher ist, um der Luft die notwendige Energiemenge zuzuführen.

[0009] Die spezifische Wärmleitfähigkeit eines Stoffes schlägt sich in der spezifischen Wärmeleitzahl wieder.

[0010] Diese beträgt für Luft 0,025 W/mK, für Kupfer 402 W/mK.

[0011] D.h. die Energiemenge muss um 4 Zehnerpotenzen höher als die des hier benannten Metalls sein, um den Widerstand auszugleichen, den die Luft der Erwärmung durch einem anderen Stoff entgegensetzt.

[0012] Dies ist auch der Grund dafür, warum die Luft, die durch eine echte Zigarette strömt, überhaupt eingeatmet werden kann, obwohl die Gluttemperatur zwischen 700°C und 1000°C beträgt.

[0013] Setzt man voraus, dass man eine Temperatur von mindestens 700°C erzeugen muss, um mindestens 1500ml Luft auf „Betriebstemperatur" zu bringen, so müsste man den Wärmespeicher auf mehrere 1000°C aufheizen, damit dieser für 1...3 Minuten genügend Wärmeenergie vorrätig hat, um insgesamt 1500ml Luft auf 70°C zu erwärmen.

[0014] Eine gleichmäßige Wärmeabgabe, wie unter Absatz 4. des Bezugspatents erläutert, erscheint unter Verwendung eines Wärmespeichers im wiederverwendbaren Teil einer rauchfreien Zigarette nicht realisierbar.

[0015] Die im Folgenden beschriebene Alternativlösung A lehnt sich möglichst nah an der Funktionsfähigkeit einer echten Zigarette an.

[0016] D.h. der wiederverwendbare Teil einer rauchfreien Zigarette (**1**) Abb. I dient nicht als Wärmespeicher sondern beherbergt einen Akku (**11**), einen Filtersensor (**12**), einen Luftstromsensor (**13**), einen Glühfaden (**14**), eine Zeitsteuerung (**15**) und Luftlöcher (**16**). Eine aufwendige Gestaltung von Luftströmungskanälen oder die Anbringung einer aufgedampften rückstrahlenden Beschichtung sind nicht erforderlich.

[0017] Der Glühfaden (**14**) befindet sich unmittelbar vor dem auswechselbaren Filter (**2**), so dass die durch den Glühfaden zu erzeugende Temperatur und damit der Energieverbrauch geringer ausfällt, als dies am Ende der Zigarette der Fall wäre. Wird der Filter (**2**) in den wiederverwendbaren Teil der Zigarette (**1**) eingesteckt, registriert dies der Filtersensor (**12**) und schaltet den Glühfaden (**14**) zu, der damit zum Vorglühen gebracht wird. Diese Funktion ist vergleichbar mit der Glut einer Zigarette ohne Inhalation und dient einem schnelleren Erreichen der Arbeitstemperatur des Glühfadens bei der Inhalation. Erst beim Zigarettenzug, der eine Luftströmung erzeugt und vom Luftstromsensor (**13**) erfasst wird, wird der Glühfaden (**14**) auf Betriebstemperatur gebracht. Dies spart zum Einen Energie und verhindert zum Anderen die bei echten Zigaretten bekannten Gefährdungen durch Überhitzung/Verbrennungen.

[0018] Vergisst der Raucher nach Nutzung der Zigarette den Filter (**2**) zu entfernen, übernimmt die Zeitsteuerung (**15**) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0019] Der Filtersensor (**12**) ist als normaler elektromechanischer Kontakt auslegbar.

[0020] Als Luftstromsensor (**13**) ist ein herkömmlicher Luftdrucksensor verwendbar, der auf einen

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plötzlichen Druckabfall innerhalb des wiederverwendbaren Teils der Zigarette (1) reagiert.

[0021] Akkus (11) in Li-Ion-Technologie haben eine Leistungsdichte von bis zu 350Wh/l und können in individuellen Bauformen gefertigt werden. Sie kommen heute mit sehr kleinen Abmessungen z.B. in Bluetooth-Headsets zum Einsatz.

[0022] Geht man davon aus, dass man 2/3 des Volumens des wiederverwendbaren Teils der Zigarette (1) für den Akku (11) zur Verfügung hat, so entspricht dies einem Volumen von etwa 2ml und damit einer theoretischen Kapazität von 0,2Ah bei einer Nennspannung von 3,6V.

[0023] Verwendet man einen wenige µm dicke Glühfaden, so lassen sich bei 3,6V mit weniger als 100mA Stromverbrauch Glühtemperaturen von 1000°C und mehr erreichen.

[0024] Die Akkukapazität reicht somit für einen mehrfachen Zigarettengebrauch (mehrere Filter), wenn man von einer durchschnittlichen Nutzungsdauer von 3 Minuten pro Zigarette (Filter) ausgeht.

[0025] Ist die Kapazität des Akkus (11) erschöpft, kann er über ein externes Ladegerät an den Ladekontakten (17) wieder aufgeladen werden. Die notwendige Ladeintelligenz steckt im Ladegerät.

[0026] Die nun beschriebene Alternativlösung B zeigt eine weitere Möglichkeit, die im Bezugspatent unter Verzicht des Anspruches auf Schaffung des beim Inhalieren entstehenden Wärmegefühls gesteckten Ziele zu erreichen.

[0027] Dies erfolgt ohne den Umweg der Erwärmung der Luft auf etwa 70°C, bei der die Inhaltsstoffe des Wirkstoffdepots gelöst werden, in dem das Wirkstoffdepot im Filter direkt erwärmt wird. Hat das Wirkstoffdepot die Arbeitstemperatur erreicht, so reißt der durch den Raucher erzeugte Luftstrom die Inhaltsstoffe mit sich, die dann von ihm inhaliert werden.

[0028] Die Zigarette besteht wiederum aus einem wiederverwendbaren Teil (3) Abb. II und einem austauschbaren Filter mit Wirkstoffdepot (4). Der wiederverwendbare Teil (3) beherbergt einen Akku (31), Ladekontakte (32), eine Zeitsteuerung (33), Luftlöcher (34) und zwei elektrische Filterkontakte (35).

[0029] Diese elektrischen Filterkontakte (35) stellen eine elektrische Verbindung zum Filter mit Wirkstoffdepot (4) her. In diesem ist ein elektrisches Heizelement (41) eingebaut, welches über die elektrischen Filterkontakte (42) mit den elektrischen Filterkontakten (35) des wiederverwendbaren Teils (3) verbunden wird. Nach Anstecken des Filters mit Wirkstoffdepot (4) wird dieses auf Betriebstemperatur gebracht.

[0030] Vergisst der Raucher nach Nutzung der Zigarette den Filter (4) zu entfernen, übernimmt die Zeitsteuerung (33) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0031] Ist die Kapazität des Akkus (31) erschöpft, kann er über ein externes Ladegerät an den Ladekontakten (32) wieder aufgeladen werden. Die notwendige Ladeintelligenz steckt im Ladegerät.

[0032] Aufgrund der geringeren Arbeitstemperatur des Heizelements (41) sinkt der Energieverbrauch und die Nutungsdauer bis zur nächsten Ladung des Akkus (31) erhöht sich.

[0033] Möchte man die Nachteile einer kontaktbehafteten Wärmeerzeugung im Wirkstoffdepot des Filters vermeiden, kann folgende Bauform gewählt werden.

[0034] Die Zigarette besteht wiederum aus einem wiederverwendbaren Teil (5) Abb. III und einem austauschbaren Filter mit Wirkstoffdepot (6). Der wiederverwendbare Teil (5) beherbergt einen Akku (51), Ladekontakte (52), eine Zeitsteuerung (53), Luftlöcher (54), eine elektronische Schwingungserzeugungseinheit (55), eine Spule (56) und einen Filtersensor (57).

[0035] Den Wirkstoffen des Wirkstoffdepots (61) im Filters (6) wird feines Metallpulver, vornehmlich eisenhaltig, beigemengt. Dieses kann das Wirkstoffdepot nicht verlassen.

[0036] Wird der Filter (6) in den wiederverwendbaren Teil der Zigarette (5) eingesteckt, registriert dies der Filtersensor (57) und schaltet die Schwingungserzeugungseinheit (55) zu. Die erzeugte niederfrequente Schwingung wird an die Spule (56) geleitet und ruft durch die in dem Metallpulver induzierten Wirbelströme eine Erwärmung des Metallpulvers und damit des gesamten Wirkstoffdepots hervor. Die erzeugte Temperatur lässt sich durch die Auswahl der Größe, Form und Materialbeschaffenheit des beigemengten Metalls sowie durch die zugeführte Energie steuern.

[0037] Wird der auswechselbare Filter (6) entnommen, so trennt der Filtersensor (57) den Stromkreis zur elektronischen Schwingungserzeugungseinheit (55).

[0038] Vergisst der Raucher dies nach Nutzung der Zigarette, übernimmt die Zeitsteuerung (53) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0039] Diese Methode ist besonders energieeffizient, da die Leistungsübertragung durch Induktion etwa um das 1.000fache effektiver ist, als die Leistungsübertragung durch Berührung mit einer Heiz-

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quelle.

Patentansprüche

1. Wiederverwendbarer Teil für eine rauchfreie Zigarette, **dadurch gekennzeichnet**, dass dieser einen Akku (**11**), einen Filtersensor (**12**), einen Luftstromsensor (**13**), einen Glühfaden (**14**), eine Zeitsteuerung (**15**), Luftlöcher (**16**) und Ladekontakte (**17**) enthält, bei der durch Anstecken eines Filters der Glühfaden vorgeheizt wird und beim Ziehen an der Gesamtkonstruktion der Zigarette der Glühfaden auf Arbeitstemperatur gebracht wird.

2. Wiederverwendbarer Teil für eine rauchfreie Zigarette, dadurch gekennzeichnet, dass dieser einen Akku (**31**), Ladekontakte (**32**), eine Zeitsteuerung (**33**), Luftlöcher (**34**) und zwei elektrische Filterkontakte (**35**) enthält sowie ein Filter mit Wirkstoffdepot (**4**), dadurch gekennzeichnet, dass dieser ein elektrisches Heizelement (**41**) und elektrische Filterkontakte (**42**) enthält, so dass durch Zusammenstecken beider Teile ein elektrischer Kontakt hergestellt und das Heizelement und somit der Wirkstoff auf Arbeitstemperatur gebracht wird.

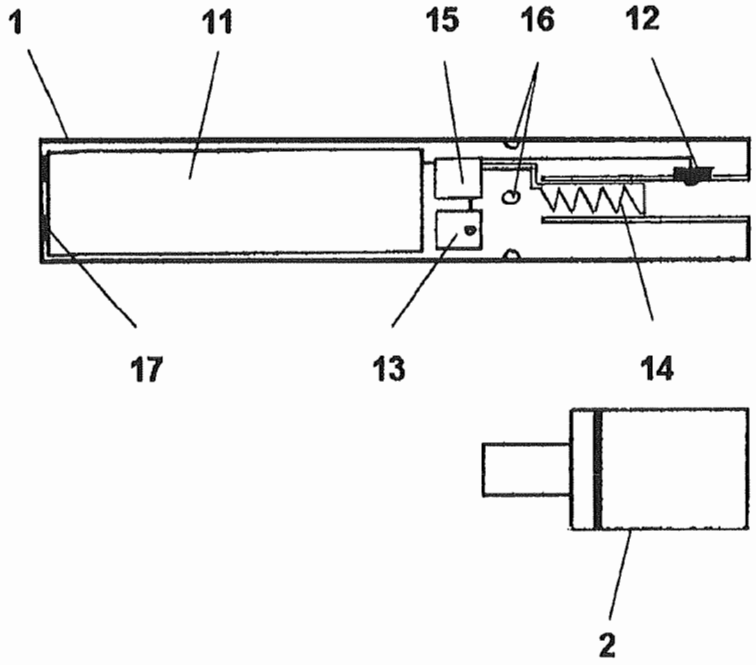
3. Wiederverwendbarer Teil für eine rauchfreie Zigarette, dadurch gekennzeichnet, dass dieser einen Akku (**51**), Ladekontakte (**52**), eine Zeitsteuerung (**53**), Luftlöcher (**54**), eine elektronische Schwingungserzeugungseinheit (**55**), eine Spule (**56**) und eine Filtersensor (**57**) enthält sowie ein Filter mit Wirkstoffdepot, dadurch gekennzeichnet, dass diesem feines Metallpulver beigemengt ist, so dass bei Anstecken des Filters eine niederfrequente Spannung erzeugt wird, die – übertragen durch die Spule (**56**) – Wirbelstromverluste in dem beigemengten Metallpulver hervorruft und somit den Wirkstoff im Wirkstoffdepot (**61**) des Filters (**6**) auf Betriebstemperatur bringt.

Es folgen 3 Blatt Zeichnungen

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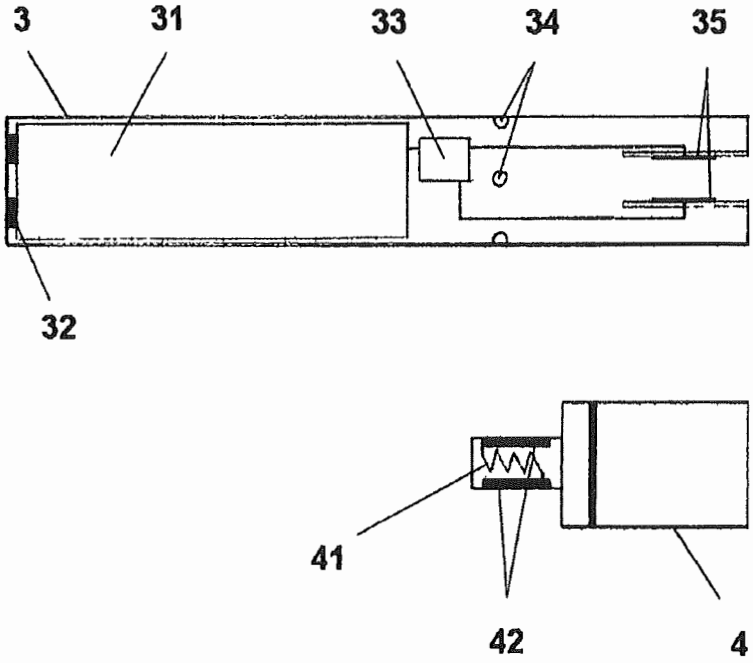
Anhängende Zeichnungen

Abbildung I



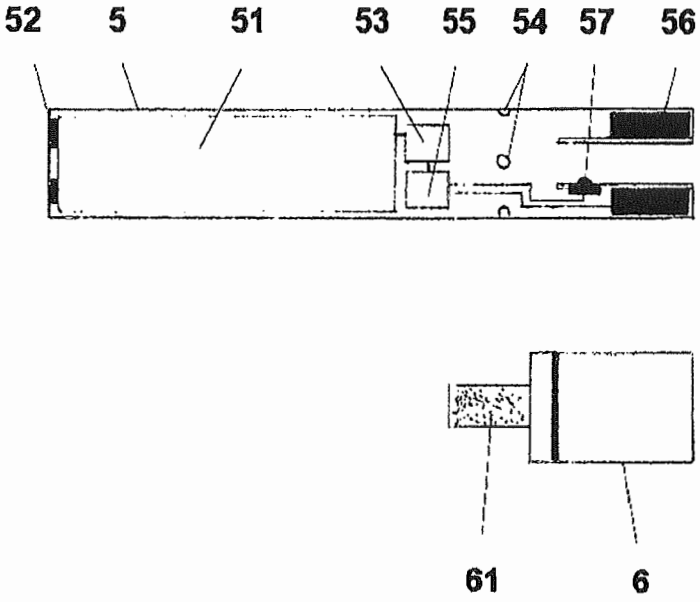
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Abbildung II



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Abbildung III



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(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日
2007 年11 月22 日 (22.11.2007)

PCT

(10) 国际公布号
WO 2007/131449 A1

(51) 国际专利分类号:
A24D 1/18 (2006.01) *A24F 47/00* (2006.01)

(21) 国际申请号: PCT/CN2007/001575

(22) 国际申请日: 2007 年5 月15 日 (15.05.2007)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
200620090805.0
2006 年5 月16 日 (16.05.2006) CN

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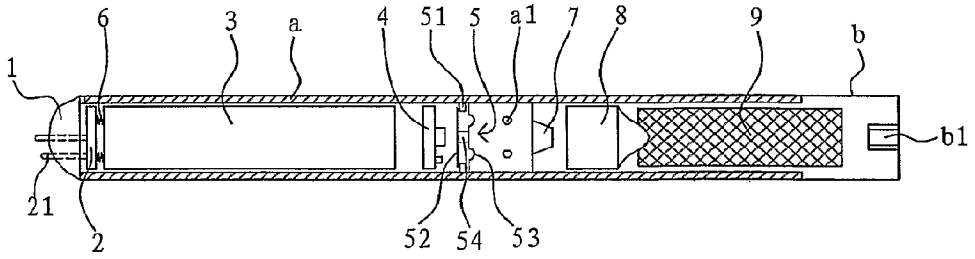
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本国际公布:
— 包括国际检索报告。

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(54) **Title:** AEROSOL ELECTRONIC CIGRARETTE

(54) **发明名称:** 一种雾化电子烟



(57) **Abstract:** An aerosol electronic cigrarette includes a battery assembly,an atomizer assembly and a cigarette bottle assembly and also includes a shell(a) which is hollow and integrally formed. Said battery assembly connects with said atomizer assembly and both are located in said shell(a). Said cigarette bottle assembly is located in one end of the shell(a),which is detachable. Said cigarette bottle assembly fits with said atomizer assembly. Said shell(a) has through-air-inlets(a1).

(57) **摘要:**

一种雾化电子烟，包括电池组件、雾化器组件和烟瓶组件，还包括一中空的一体成形的壳体(a)，所述电池组件与所述雾化器组件相连接，并容置于所述壳体(a)内，所述烟瓶组件可拆卸的安装于所述壳体(a)的一端，并与其内的所述雾化器组件相配合，所述壳体(a)上贯穿的开有进气孔(a1)。

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一种雾化电子烟

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。

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现有市面上的电子烟产品，虽然可以解决上述问题，但同时结构比较复杂。烟体大多分为三段，使用者在使用时需将各段插接或螺纹连接在一起才能使用。另外，电池需要频繁的更换，给使用者带来诸多不便。而且，更重要的一点是，电子烟在工作中产生的雾化效果不够理想，雾化效率不高。

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：一种雾化电子烟，包括电池组件，雾化器组件和烟瓶组件，还包括一中空的一体成形的壳体，所述电池组件与所述雾化器组件相连接，并容置于所述壳体内，所述烟瓶组件可拆卸的安装于所述壳体的一端，并与其内的所述雾化器组件相配合，所述壳体上贯穿的开有进气孔。

本发明进一步特征在于：所述电池组件包括电池，与所述电池连接的工作指示灯、电子线路板、气流传感器，所述气流传感器的信号输出端与所述电子线路板相连接；

还包括一单向阀，所述电池为一充电电池，所述充电电池设有一与其相弹性连接的充电插头，所述充电插头上的插片从所述壳体的另一端伸出；

所述充电插头与所述充电电池之间安装有弹簧，所述弹簧的一端顶靠于所述充电电池的本体上，自由端顶靠于所述充电插头上；

所述电池为一充电电池，所述充电电池上设有一充电插槽；所述工作指示灯为发光二极管；

所述气流传感器也可为半导体力敏芯片电容传感器或电感式传感器；

所述电子线路板包括电子开关电路；

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所述气流传感器设有一硅胶件波纹膜，所述硅胶件波纹膜连接一磁钢，所述磁钢的一端设有干簧继电片，所述干簧继电片的两端分别与继电电极相对应；

所述气流传感器设有一硅胶件波纹膜，所述硅胶件波纹膜连接一磁钢，所述磁钢的一端设有霍尔器件或磁敏二极管或磁敏三极管；

所述雾化器组件为一雾化器，所述雾化器包括一多孔渗透件，加热体；

所述雾化器还包括一电加热棒，所述多孔渗透件的本体开有一贯通的雾化腔，所述电加热棒的直径小于所述雾化腔的直径，所述电加热棒伸入所述雾化腔内，并与所述雾化腔内壁之间形成有空隙，所述空隙为负压气流腔，所述多孔渗透件的一端与所述烟瓶组件相配合；

所述电加热棒包括一圆柱体，所述加热体为一加热丝，所述加热丝缠绕于所述圆柱体的周壁上，所述多孔渗透件的一端设有凸起，所述凸起与所述烟瓶组件相配合；所述凸起为半圆形球形凸起，在所述半圆形球形凸起的侧边开有与所述雾化腔相连通的通孔；

所述电加热棒包括一圆柱体，所述加热体采用导电陶瓷PTC材料制成，所述加热体设于所述圆柱体的周壁上，在所述圆柱体两端的周壁上分别设有顶杆，所述多孔渗透件的一端设有凸起，所述凸起与所述烟瓶组件相配合；所述凸起为半圆形球形凸起，在所述半圆形球形凸起的侧边开有与所述雾化腔相连通的通孔；

所述加热体为加热丝，所述雾化器组件包括一架体，所述多孔渗透件设于所述架体上，所述多孔渗透件上缠绕有加热丝，所述架体上开有一通孔，所述多孔渗透件上缠绕加热丝的部位处于所述通孔的轴向方向的一侧，所述多孔渗透件的一端与所述烟瓶组件相配合；

所述多孔渗透件采用泡沫镍、不锈钢纤维毡、高分子多聚物发泡体或泡沫陶瓷制成；

所述加热丝为铂丝、镍铬合金或含有稀土元素的铁铬铝合金丝制成，或制成片状体；

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在所述多孔体渗透件的一端可拆卸的设有一限流件，所述限流件的本体上开有限流孔，所述限流孔与所述雾化腔相对应，所述限流孔的孔径小于所述雾化腔的内径；

所述烟瓶组件包括一中空的烟嘴壳体，容置于所述烟嘴壳体内的贮液多孔体，所述烟嘴壳体的一端插入所述壳体，所述烟嘴壳体的外周面具有向内凹的通气凹槽，在所述烟嘴壳体一端的端面上设有一向内延伸的吸气道；

所述吸气道位于所述烟嘴壳体一端端面的中心处；

所述多孔渗透件的一端抵靠于所述贮液多孔体一端的端面，与所述贮液多孔体相接触；

所述贮液多孔体的材料为聚丙纤维、涤纶纤维或尼龙纤维；

所述贮液多孔体采用塑料发泡成形体；或用聚氯乙烯、聚丙烯、聚碳酸酯注塑成多层板的柱状体；

所述电子烟容置于一充电装置中；

所述充电装置包括一盒体，所述盒体内安装有辅助充电蓄电池，容置电子烟并给电子烟内部的充电电池充电的充电器，以及电源电路，所述辅助充电蓄电池和充电器的电源输入端分别与电源电路相连接；

所述盒体内设有备用供液瓶；

所述辅助充电蓄电池的电源输出端与所述充电器的电源输入端相连接；

所述充电器的电源输出端为一与所述电子烟内部充电电池上的充电插头相配合的充电插槽，或与充电电池上的充电插槽相配合的充电插头；

所述充电器为一恒压恒流充电器；

在所述壳体的本体上，对应于放置所述电子烟的位置开有或安装有一对滑槽，所述滑槽内滑动的容置有一滑盖。

采用本发明带来的有益效果：（1）本发明在烟瓶组件内的贮液多孔体上只贮存有烟碱液，而不含焦油，大大降低了吸烟带来的致癌风险，同时吸烟者在使用时仍有吸烟的感觉和兴奋，无需点燃，无火灾危害。（2）

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本发明将电池组件和雾化器组件直接安装于壳体内，之后与烟瓶组件相插接，只有两个部件之间的相互连接，结构简单。在使用或更换时只需将烟嘴插入壳体即可，使用更换方便。当烟瓶组件内部的烟碱液用完或烟瓶组件损坏需要更换时，操作亦十分方便。（3）本发明的电池组件内部的充电电池设有充电插头，充电插头的插片从壳体内伸出，当电子烟内的充电电池电量用完时可直接插在充电器上进行充电，而无需将充电电池拆卸下来，使用更加方便。（4）本发明的充电装置内部包括充电器和辅助充电蓄电池，电子烟在不使用时放在充电器里，充电装置接上电源即可对电子烟进行充电，并同时对辅助充电蓄电池充电。当没有供充电装置使用的电源时，辅助充电蓄电池则会对电子烟进行充电。在携带的过程中即可完成对电子烟的充电，而且出差或旅行时携带方便。另外，充电装置内还有备用供液瓶，备用供液瓶内装有烟碱液，当出差或旅行时，可以做备用。（5）本发明烟瓶组件的壳体一端设有向内延伸的吸气道，该吸气道的作用是当电子烟工作产生雾气后，雾气在向壳体流动的过程中有些细小的液滴会相互凝结成较大的液滴，当出现较大的液滴时，液滴就会顺着吸气道的外壁落入烟瓶组件壳体的内腔中，而不会从吸气道中被吸烟者吸走。（6）另外，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为本发明电子烟的侧面剖视图；

图2为本发明电子烟的烟瓶组件壳体a分离后的剖视图；示出烟瓶组件可拆卸的安装于壳体a的结构；

图3为本发明烟瓶组件的轴向结构示意图，示出烟嘴壳体周壁上的通气凹槽结构

图4为本发明烟瓶组件的侧面剖视图；示出吸气道的结构；

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图5为本发明雾化器的多孔渗透件的侧面剖视图，示出雾化腔，半圆形球形凸起的结构；

图6为本发明雾化器的电加热棒的结构示意图；

图7为本发明雾化器的侧面剖视图，示出电加热棒与多孔渗透件的位置连接关系；

图8为本发明雾化器的立体结构示意图，示出电加热棒与多孔渗透件的位置连接关系；

图9为本发明单向阀的剖视图；

图10为本发明第二优选实施例中限流件的正面剖视图，示出限流孔的结构；

图11为本发明第三优选实施例中烟瓶组件的轴向结构示意图；

图12为图11的A-A向剖视图；

图13为本发明第四优选实施例雾化器中的电加热棒的结构示意图；

图14为本发明第四优选实施例雾化器中的多孔渗透件的剖视图，

图15为图14的轴向结构示意图；

图16为本发明第四优选实施例雾化器的侧面剖视图，示出电加热棒与多孔渗透件的连接位置关系；

图17为本发明第五优选实施例雾化器轴向结构示意图；

图18为本发明第五优选实施例雾化器的侧面剖视图；

图19为本发明第六优选实施例电子烟的侧面剖视图，示出气流传感器采用霍尔器件的结构示意图；

图20为本发明气流传感器采用干簧继电片结构的电子烟的电路图；

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图21为本发明气流传感器采用霍尔器件的电子烟的电路图；

图22为本发明充电装置的立体结构示意图，示出内部各部件的位置和连接关系；

图23为本发明充电装置侧面剖视图，示出滑盖和滑槽的结构；

图24为本发明充电装置的正面结构示意图，示出滑盖滑动时的结构；

具体实施方式

下面结合附图对本发明做进一步的详述：

如图1至图10所示，本实用新型提供的一种雾化电子烟，包括电池组件，雾化器组件和烟瓶组件，还包括一中空的一体成形的壳体a，壳体a为一整体件，一体成形。电池组件与雾化器组件相连接，并容置于壳体内，烟瓶组件可拆卸的安装于壳体的一端，并与其内的雾化器组件相配合，壳体a上贯穿的开有进气孔a1。

在本具体实施例中，电池组件包括电池，与电池连接的工作指示灯1、电子线路板4、气流传感器5，还包括一单向阀7，气流传感器5的信号输出端与电子线路板4相连接。本实施例中的电池为一充电电池3，充电电池3为可充电的聚合物锂电池，也可为可充电的锂离子电池。气流传感器5也可为半导体力敏芯片电容传感器或电感式传感器。充电电池3设有一与其相弹性连接的充电插头2，充电插头2上的插片21从壳体a的另一端伸出。充电插头2与充电电池3之间安装有弹簧6，弹簧6的一端顶靠于充电电池3的本体上，自由端顶靠于充电插头2上，形成一种弹性结构，在充电时，插接充电插头2的时候起到缓冲的作用，避免损坏充电电池3。当然，本实施例的充电电池3上也可设有位于充电电池3上的充电插槽，代

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替充电插头2的结构，一样可以实现充电的功能，同时起到避免损坏充电电池3的作用。工作指示灯1为发光二极管，本实施例发光二极管的数量为2个。电子线路板4包括电子开关电路。电子开关电路根据输入的信号进行电路的通断控制，以便实现充电电池3对雾化器8内的电加热棒82进行供电以及对发光二极管供电。

如图1，图2所示，气流传感器5设有一硅胶件波纹膜53，硅胶件波纹膜53连接一磁钢54，所述磁钢54的一端设有干簧继电片52，所述干簧继电片52的两端分别与继电电极51相对应。

如图5至图8所示，雾化器组件为一雾化器8，雾化器8包括一多孔渗透件81，电加热棒82，多孔渗透件81的本体开有一贯通的雾化腔811，电加热棒82的直径小于雾化腔811的直径，电加热棒82伸入雾化腔811内，并与雾化腔811内壁之间形成有空隙，空隙为负压气流腔83，多孔渗透件81的一端与烟瓶组件相配合。如图5，图7和图8所示，多孔渗透件81的另一端设有凸起812，凸起812与烟瓶组件相配合。凸起812为半圆形球形凸起，在半圆形球形凸起的侧边开有与雾化腔811相连通的通孔813。当然，凸起812的形状还可为圆锥形、矩形等其他形状。多孔渗透件81采用泡沫镍、不锈钢纤维毡、高分子多聚物发泡体或泡沫陶瓷制成，具有很好的液体吸附及扩散能力，可以将烟瓶组件中存储的烟液吸附过来。

如图6所示，电加热棒82包括一圆柱体821，加热丝822缠绕于圆柱体821的周壁上，在圆柱体821两端的周壁上还分别设有顶杆823。顶杆823抵靠于多孔渗透件81的雾化腔811内壁上，在电加热棒与雾化腔内壁之间形成负压气流腔83。

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加热丝为铂丝、镍铬合金或含有稀土元素的铁铬铝合金丝制成，或制成片状体。当然，在电加热棒82的周壁上设有采用导电陶瓷PTC材料制成的加热层来代替加热丝的方案也是可以的。

本实施例的电池组件与雾化器组件相互连接后安装于一体成形的壳体a内，形成一个整体部件，充电电池3可进行充电而无需再频繁的更换电池。在使用时，使用者只需将烟瓶组件插接到壳体a的一端开口处即可使用，不仅使用时方便，而且在更换时也十分方便。

如图3，图4所示，烟瓶组件包括一中空的烟嘴壳体b，容置于壳体b内的贮液多孔体9。贮液多孔体9的材料为聚丙纤维、涤纶纤维或尼龙纤维等可以存储液体的材料，或采用塑料发泡成形体；或用聚氯乙烯、聚丙烯、聚碳酸酯注塑成多层板的柱状体。烟嘴壳体b的一端插入壳体a，烟嘴壳体b的外周面具有向内凹的通气凹槽b2，在烟嘴壳体b一端的端面上设有一向内延伸的吸气道b1。吸气道b1位于壳体b一端端面的中心处。

如图1至图9，多孔渗透件81的一端抵靠于贮液多孔体9一端的端面，与贮液多孔体9相接触。将贮液多孔体9中存储的烟液吸附过来。当吸烟者吸烟时，烟嘴壳体b的内腔处于负压状态。在壳体a内，气流传感器5的一端形成常压腔，另一端形成负压腔，常压腔与负压腔之间的气压差或高速气流导致气流传感器5上的磁钢54带动干簧继电片52动作，与继电电极51相接触，如图20所示，电路导通，电子线路板4内的电子开关电路导通，充电电池3开始对雾化器8内的电加热棒82供电，同时发光二极管在充电电池3的供电下发光。大气由进气孔a1进入到常压腔内，经气流传感器5内的气流通道通过单向阀7，流到雾化器8内的负压气流腔83，由于负

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压气流腔83内部较于外部为负压，气流进入时为喷射状进入，气流带动多孔渗透件81中的烟液以微滴形式喷射到负压气流腔83内，此时，电加热棒82在电子线路板4的控制下与充电电池3通电，对微滴进行加热雾化，雾化后的大直径微滴在涡流的作用下被多孔渗透件81重吸收，小直径微滴悬浮在气流中形成气溶胶经由负压气流腔83和通孔813排出，继而流入烟瓶组件的烟嘴壳体b中，被吸气道b1吸出。在气溶胶进入烟嘴壳体b内后，会出现由于多个较小的液滴相互凝结而形成直径较大的液滴，当出现直径较大的液滴后，液滴会落入烟嘴壳体b与吸气道b1的空隙处，而不会被吸气道b1吸走。烟瓶组件中的贮液多孔体9与雾化器8中的多孔渗透件81相接触实现毛细浸润供液。

本实用新型的装置和连接结构还可装入常规药物作为肺内吸入式给药器械。

如图22，图23和图24所示，雾化电子烟5容置于一充电装置中。充电装置包括一盒体1，盒体1内安装有辅助充电蓄电池2，容置电子烟5并给电子烟5内部的充电电池充电的充电器3，辅助充电蓄电池2和充电器3的电源输入端分别与电源相连接。本实施例中的充电器3为一恒压恒流充电器，可以采用GY5210型号充电器，也可为其他恒流恒压充电器。盒体1内还设有备用供液瓶4。辅助充电蓄电池2的电源输出端与充电器3的电源输入端相连接。充电器3的电源输出端为一与电子烟内部充电电池上的充电插头相配合的充电插槽31，或与充电电池上的充电插槽相配合的充电插头。

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如图23和图24所示，在壳体1的本体上，对应于放置电子烟的位置开有或安装有一对滑槽12，滑槽内滑动的容置有一滑盖11。

按照本实用新型提供的第二优选实施例中：在多孔体渗透件81的一端可拆卸的设有一限流件10，限流件10的本体上开有限流孔101，限流孔101与雾化腔811相对应，限流孔的孔径小于雾化腔811的内径。限流孔101的孔径根据安装于多孔体渗透件81上的限流件10的尺寸的不同，小于雾化腔811内径的尺寸也不同，起到限制气体流量的作用，并根据实际使用情况可相应的更换不同尺寸，不同孔径的限流件。

本实用新型提供的第三优选实施例中：如图11，图12所示，在烟嘴壳体b的外壁上设有均分相间隔分部的凸肋b2，贮液多孔体9伸入烟嘴壳体b内后抵靠于凸肋b2上。这样，贮液多孔体9的外周面与壳体b的内壁之间就形成有空隙，该空隙起的作用是连通壳体a与烟嘴壳体b，在使用者吸烟时，通过吸气道b1吸气使壳体a内部产生气流流动，触动气流传感器5，进而启动电子烟工作。另外，在雾化器8工作时将烟液雾化后产生的气体流人到烟嘴壳体b内。

本实用新型提供的第四优选实施例中：如图13，图14，图15和图16所示，圆柱体821的一端设有一固定板84，所述固定板84的外周壁相间隔的设有支撑杆841，支撑杆841的外端顶靠与壳体a的内壁上，把与固定板84连接的圆柱体821悬空在壳体a的空腔内。在固定板84的板面上设有顶杆842，所述顶杆842的前端与多孔渗透件81的一端相抵靠，使固定板84与多孔渗透件81中的雾化腔811隔开，不至于将雾化腔811一端的通孔堵住，同时也便于雾化腔811产生的气雾向外扩散。多孔渗透件81的一端在

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雾化腔811的腔口处设有两个瓣状的凸起812，这两个凸起812之间形成间隙，凸起812抵靠于贮液多孔体9。

按照本实用新型提供的第五优选实施例中：如图17，图18所示，雾化器组件为一雾化器8，雾化器8包括一架体82，设于架体82上的多孔渗透件81，多孔渗透件81上缠绕有加热丝83，架体82上开有一通孔821，多孔渗透件81上缠绕加热丝83的部位处于通孔821的轴向方向的一侧，多孔渗透件81的一端与烟瓶组件相配合。多孔渗透件81采用泡沫镍、不锈钢纤维毡、高分子多聚物发泡体或泡沫陶瓷制成。

按照本实用新型提供的第六优选实施例中：如图19所示，气流传感器5设有一硅胶件波纹膜53，硅胶件波纹膜53连接一磁钢54，磁钢54的一端设有霍尔器件52。或也可设磁敏二极管或磁敏三极管。图21为采用该方案的电子烟电路图。

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权 利 要 求

1、一种雾化电子烟，包括电池组件，雾化器组件和烟瓶组件，其特征在于：还包括一中空的一体成形的壳体（a），所述电池组件与所述雾化器组件相连接，并容置于所述壳体（a）内，所述烟瓶组件可拆卸的安装于所述壳体（a）的一端，并与其内的所述雾化器组件相配合，所述壳体（a）上贯穿的开有进气孔（a1）。

2、根据权力要求1所述的雾化电子烟，其特征在于：所述电池组件包括电池，与所述电池连接的工作指示灯（1）、电子线路板（4）、气流传感器（5），所述气流传感器（5）的信号输出端与所述电子线路板（4）相连接。

3、根据权力要求2所述的雾化电子烟，其特征在于：还包括一单向阀（7），所述电池为一充电电池（3），所述充电电池（3）设有一与其弹性连接的充电插头（2），所述充电插头（2）上的插片（21）从所述壳体（a）的另一端伸出。

4、根据权力要求3所述的雾化电子烟，其特征在于：所述充电插头（2）与所述充电电池（3）之间安装有弹簧（6），所述弹簧（6）的一端顶靠于所述充电电池（3）的本体上，自由端顶靠于所述充电插头（2）上。

5、根据权力要求2所述的雾化电子烟，其特征在于：所述电池为一充电电池（3），所述充电电池（3）上设有一充电插槽，所述工作指示灯（1）为发光二极管。

6、根据权力要求2所述的雾化电子烟，其特征在于：所述气流传感器（5）也可为半导体力敏芯片电容传感器或电感式传感器。

7、根据权力要求2所述的雾化电子烟，其特征在于：所述电子线路板（4）包括电子开关电路。

8、根据权力要求2所述的雾化电子烟，其特征在于：所述气流传感器（5）设有一硅胶件波纹膜（53），所述硅胶件波纹膜（53）连接一磁

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钢（54），所述磁钢（54）的一端设有干簧继电片（52），所述干簧继电片（52）的两端分别与继电电极（51）相对应。

9、根据权力要求2所述的雾化电子烟，其特征在于：所述气流传感器（5）设有一硅胶件波纹膜（53），所述硅胶件波纹膜（53）连接一磁钢（54），所述磁钢（54）的一端设有霍尔器件（52）或磁敏二极管或磁敏三极管。

10、根据权力要求3或5所述的雾化电子烟，其特征在于：所述雾化器组件为一雾化器（8），所述雾化器（8）包括一多孔渗透件（81），加热体。

11、根据权利要求10所述的雾化电子烟，其特征在于：所述雾化器（8）还包括一电加热棒（82），所述多孔渗透件（81）的本体开有一贯通的雾化腔（811），所述电加热棒（82）的直径小于所述雾化腔（811）的直径，所述电加热棒（82）伸入所述雾化腔（811）内，并与所述雾化腔（811）内壁之间形成有空隙，所述空隙为负压气流腔（83），所述多孔渗透件（81）的一端与所述烟瓶组件相配合。

12、根据权力要求11所述的雾化电子烟，其特征在于：所述电加热棒（82）包括一圆柱体（821），所述加热体为一加热丝（822），所述加热丝（822）缠绕于所述圆柱体（821）的周壁上，在所述圆柱体（821）两端的周壁上分别设有顶杆（823），所述多孔渗透件（81）的一端设有凸起（812），所述凸起（812）与所述烟瓶组件相配合；所述凸起（812）为半圆形球形凸起，在所述半圆形球形凸起的侧边开有与所述雾化腔（811）相连通的通孔（813）。

13、根据权利要求11所述的雾化电子烟，其特征在于：所述电加热棒（82）包括一圆柱体（821），所述加热体采用导电陶瓷PTC材料制成，所述加热体设于所述圆柱体（821）的周壁上，在所述圆柱体（821）两端的周壁上分别设有顶杆（823），所述多孔渗透件（81）的一端设有凸起（812），所述凸起（812）与所述烟瓶组件相配合；所述凸起（812）为半圆形球形凸起，在所述半圆形球形凸起的侧边开有与所述雾化腔（811）相连通的通孔（813）。

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14、根据权力要求10所述的雾化电子烟，其特征在于：所述加热体为加热丝，所述雾化器（8）包括一架体（82），所述多孔渗透件（81）设于所述架体（82）上，所述多孔渗透件（81）上缠绕有所述加热丝（83），所述架体（82）上开有一通孔（821），所述多孔渗透件（81）上缠绕加热丝（83）的部位处于所述通孔（821）的轴向方向的一侧，所述多孔渗透件（81）的一端与所述烟瓶组件相配合。

15、根据权利要求10所述的雾化电子烟，其特征在于：所述多孔渗透件（81）采用泡沫镍、不锈钢纤维毡、高分子多聚物发泡体或泡沫陶瓷制成。

16、根据权利要求10所述的雾化电子烟，其特征在于：所述加热丝为铂丝、镍铬合金或含有稀土元素的铁铬铝合金丝制成，或制成片状体。

17、根据权利要求11所述的雾化电子烟，其特征在于：在所述多孔体渗透件（81）的一端可拆卸的设有一限流件，所述限流件的本体上开有限流孔，所述限流孔与所述雾化腔（811）相对应，所述限流孔的孔径小于所述雾化腔（811）的内径。

18、根据权利要求12或14所述的雾化电子烟，其特征在于：所述烟瓶组件包括一中空的烟嘴壳体（b），容置于所述烟嘴壳体（b）内的贮液多孔体（9），所述烟嘴壳体（b）的一端插入所述壳体（a），所述烟嘴壳体（b）的外周面具有向内凹的通气凹槽（b2），在所述烟嘴壳体（b）一端的端面上设有一向内延伸的吸气道（b1）。

19、根据权利要求18所述的雾化电子烟，其特征在于：所述吸气道（b1）位于所述烟嘴壳体（b）一端端面的中心处。

20、根据权利要求18所述的雾化电子烟，其特征在于：所述多孔渗透件（81）的一端抵靠于所述贮液多孔体（9）一端的端面，与所述贮液多孔体（9）相接触。

21、根据权利要求18所述的雾化电子烟，其特征在于：所述贮液多孔体（9）的材料为聚丙纤维、涤纶纤维或尼龙纤维。

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22、根据权利要求18所述的雾化电子烟，其特征在于：所述贮液多孔体（9）采用塑料发泡成形体；或用聚氯乙烯、聚丙烯、聚碳酸酯注塑成多层板的柱状体。

23、根据权利要求11或14所述的雾化电子烟，其特征在于：所述雾化电子烟（5）容置于一充电装置中。

24、根据权利要求23所述的雾化电子烟，其特征在于：所述充电装置包括一盒体（1），所述盒体（1）内安装有辅助充电蓄电池（2），容置电子烟（5）并给电子烟（5）内部的充电电池充电的充电器（3），所述辅助充电蓄电池（2）和充电器（3）的电源输入端分别与电源相连接。

25、根据权利要求24所述的雾化电子烟，其特征在于：所述盒体（1）内还设有备用供液瓶（4）。

26、根据权利要求24所述的雾化电子烟，其特征在于：所述辅助充电蓄电池（2）的电源输出端与所述充电器（3）的电源输入端相连接。

27、根据权利要求24所述的雾化电子烟，其特征在于：所述充电器（3）的电源输出端为一与所述电子烟内部充电电池上的充电插头相配合的充电插槽（31），或与充电电池上的充电插槽相配合的充电插头。

28、根据权利要求26所述的雾化电子烟，其特征在于：所述充电器（3）为一恒压恒流充电器。

29、根据权利要求24所述的雾化电子烟，其特征在于：在所述壳体（1）的本体上，对应于放置所述电子烟的位置开有或安装有一对滑槽（12），所述滑槽（12）内滑动的容置有一滑盖（11）。

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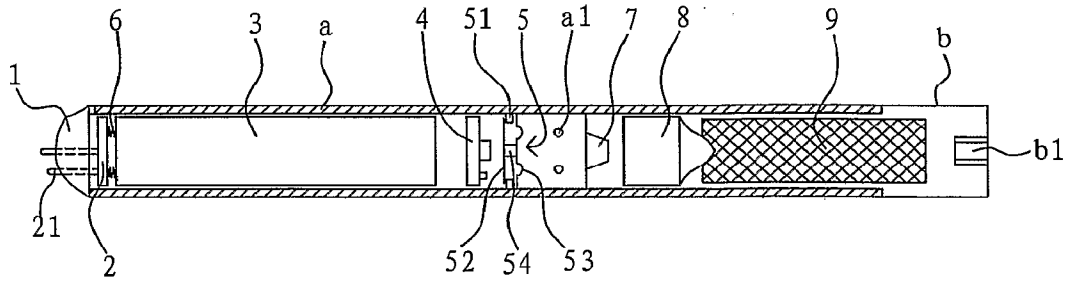


图1

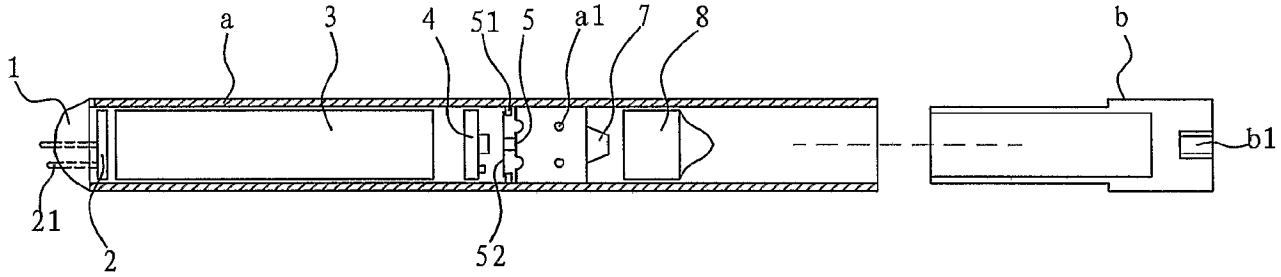


图2

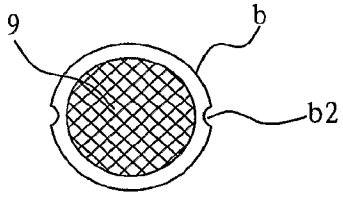


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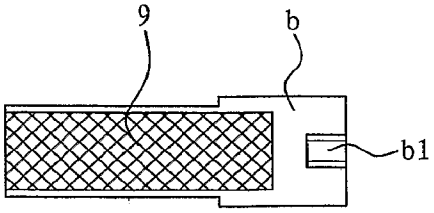


图4

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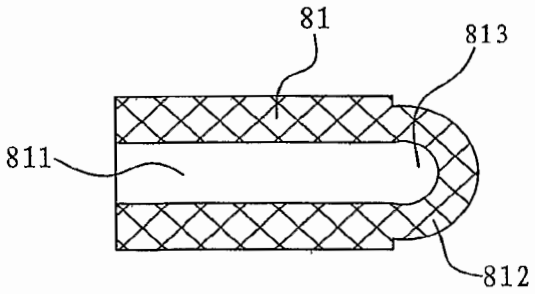


图5

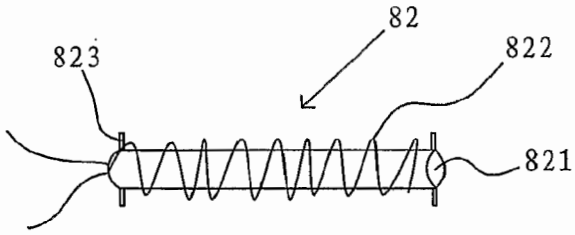


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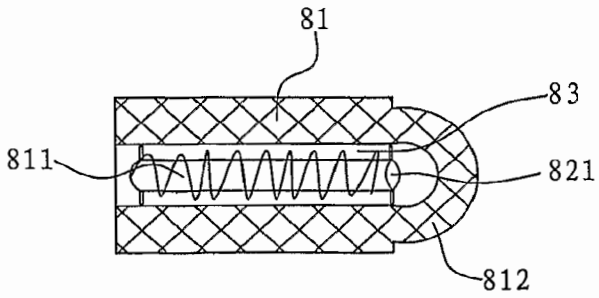


图7

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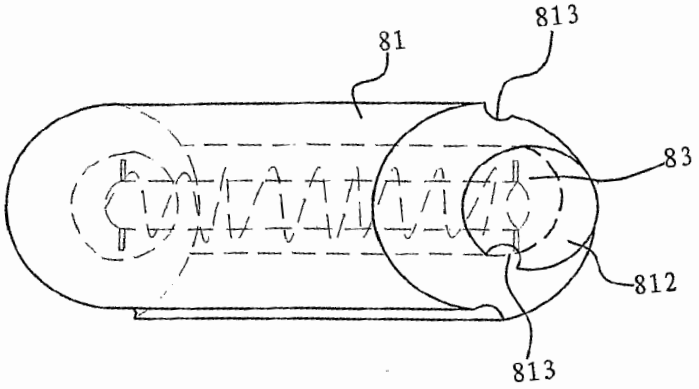


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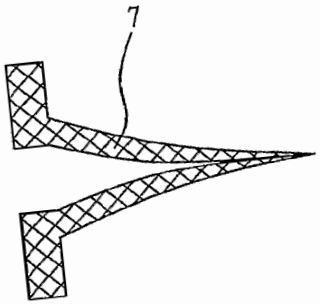


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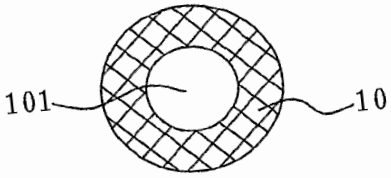


图10

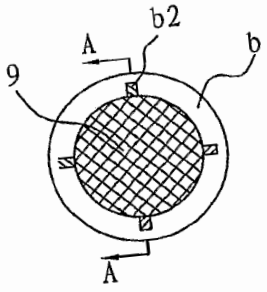


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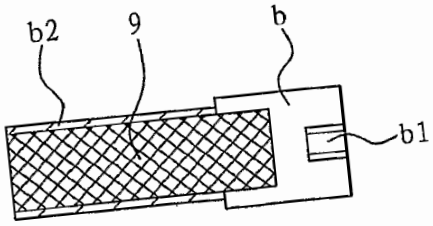


图12

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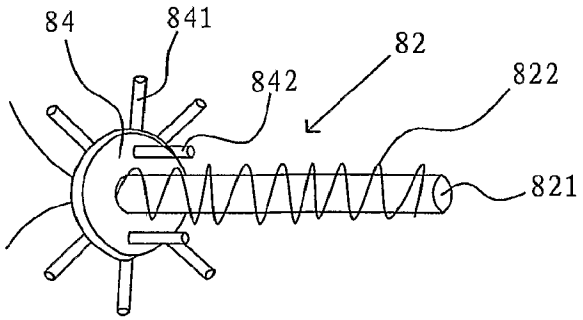


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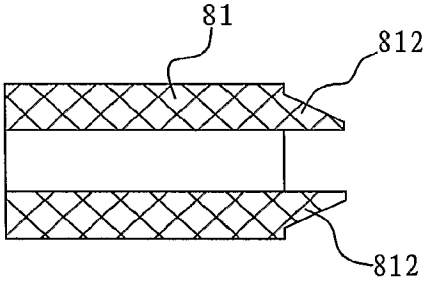


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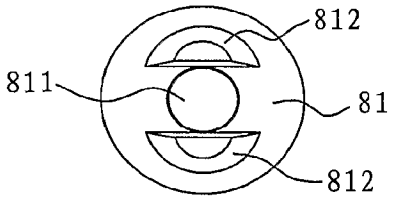


图15

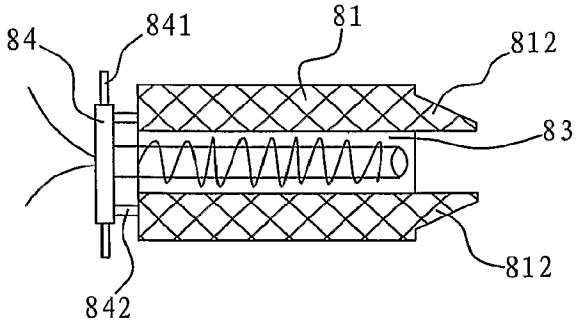


图16

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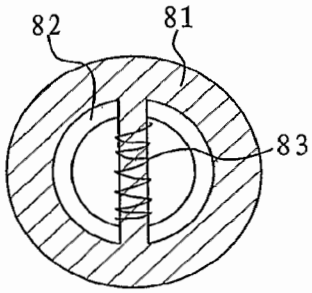


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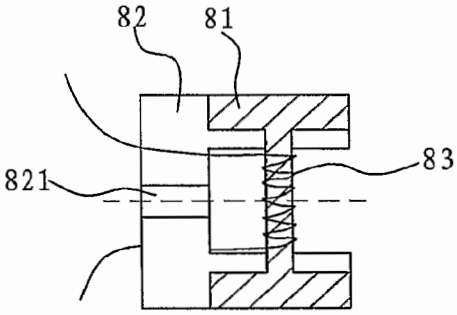


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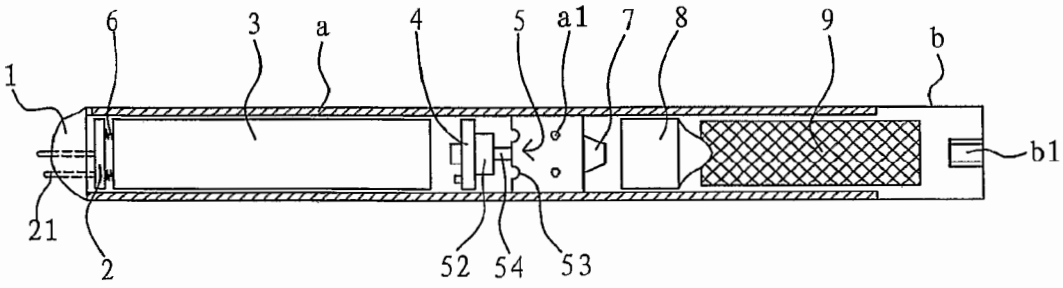


图19

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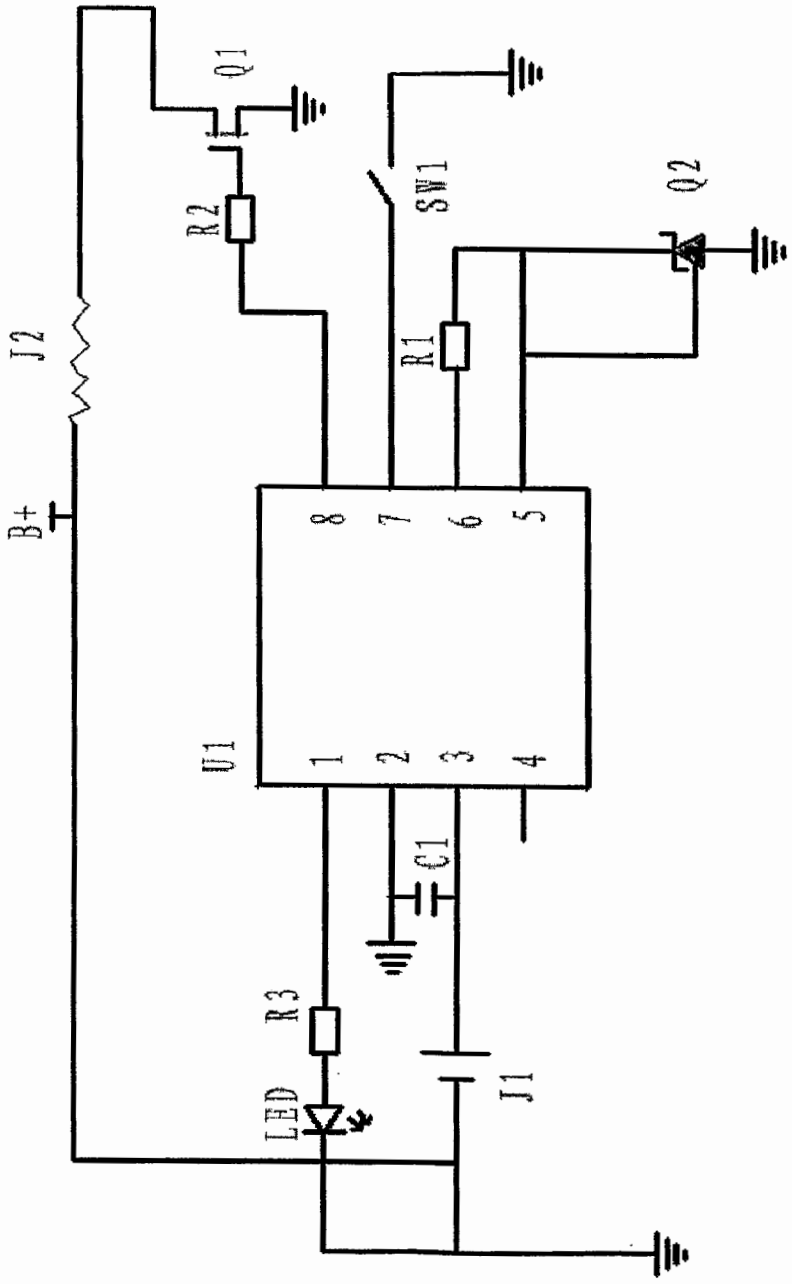


图20

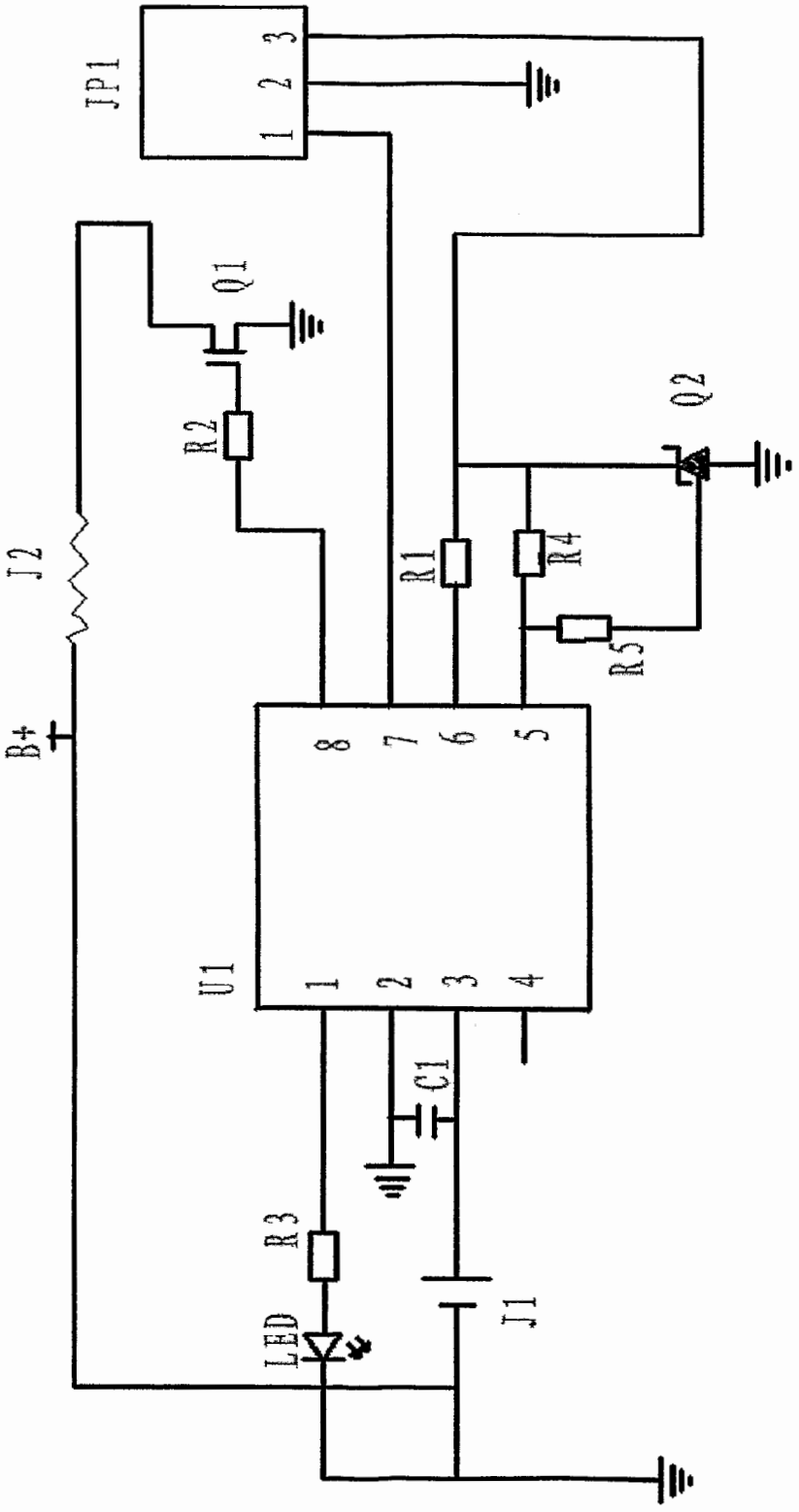


图21

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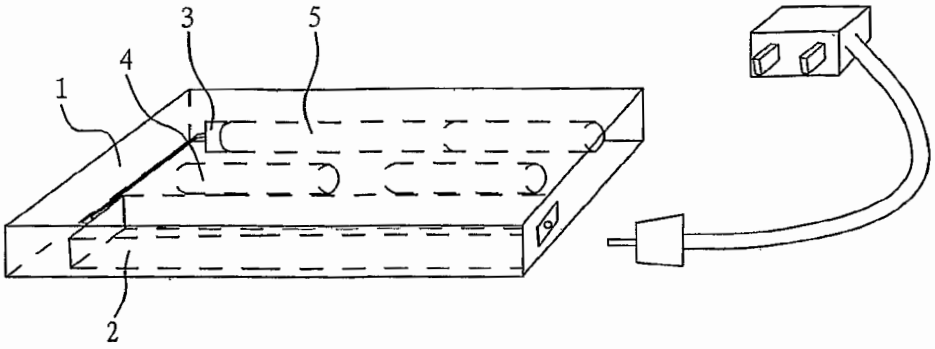


图22

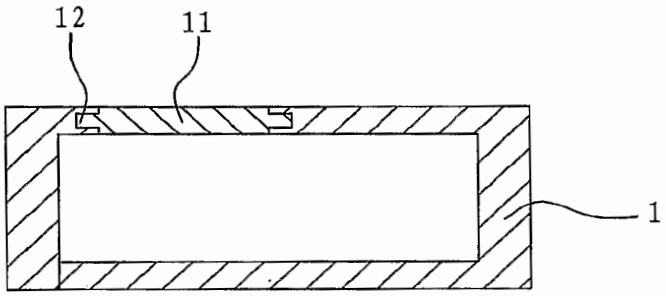


图23

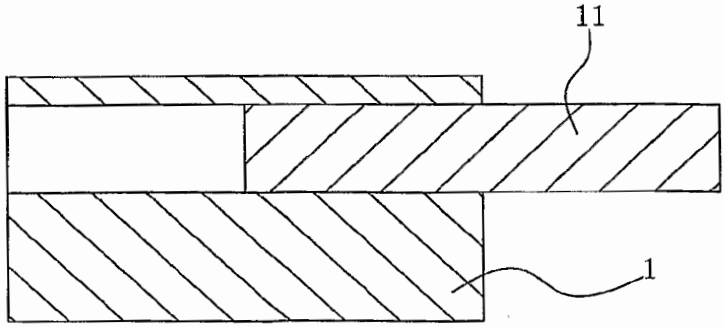


图24

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2007/001575

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A24D, A24F

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI&EPODOC&PAJ Chinese Patent Document (1985~)

Electronic, pipe, cigarette

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN2719043Y(HAN Li)24 Aug. 2005(24.8.2005) Page 3 lines 5- page 4 lines 27;figures 1-5	1-10
A	CN1252961A(SONG Guoqiang)17 May 2000(17.05.2000) the whole document	1-29
A	US4945929A (BRITISH-AMERICAN TOBACCO CO., LTD.) 07 Aug. 1990(07.08.1990) the whole document	1-29
A	CN1575673A (SEIKO EPSON COR) 09 Feb.2005(09.02.2005) the whole document	1-29

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

* Special categories of citcd documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 Jul. 2007(20.07.2007)	**16 Aug. 2007 (16.08.2007)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer ZHAO,Xiaoyu Telephone No. (86-10)62085853

Form PCT/ISA /210 (second sheet) (April 2007)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2007/001575

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN2719043Y	24 Aug.2005	AU2005232354A	27 Oct. 2005
		WO2005099494A	27 Oct. 2005
		CA2562581A	27 Oct. 2005
		EP1736065A	27 Dec. 2006
		CN1942114A	04 Apr.2007
		BRPI0506780A	22 May 2007
CN1252961A	17 May 2000	None	
US4945929A	07 Aug. 1990	GB2191718A	23 Dec. 1987
		DE3719718A	23 Dec. 1987
		GB2191718B	05 Sep. 1990
CN1575673A	09. Feb.2005	US2005016550A1	27 Jan. 2005
		JP2005034021A	10 Feb. 2005
		CN1284493C	15 Nov. 2006

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2007/001575

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

A24D1/18(2006.01) i

A24F47/00(2006.01) i

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国际检索报告

国际申请号
PCT/CN2007/001575

A. 主题的分类

参见附加页

按照国际专利分类表(IPC)或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC: A24D, A24F

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

WPI&EPODOC&PAJ 中国专利文献（1985～）

Electronic, pipe, cigarette 电子、烟斗、烟

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
X	CN2719043Y(韩力)24. 8 月 2005(24.8.2005) 说明书第 3 页第 5 行－第 4 页 27 行；图 1－5	1－10
A	CN1252961A(宋国强)17. 5 月 2000(17.5.2000) 全文	1－29
A	US4945929A (BRITISH-AMERICAN TOBACCO CO., LTD.）07. 8 月 1990(07.08.1990) 全文	1－29
A	CN1575673A（精工爱普生株式会社）09. 2 月 2005(09.02.2005) 全文	1－29

☐ 其余文件在 C 栏的续页中列出。　　☒ 见同族专利附件。

* 引用文件的具体类型：

"A" 认为不特别相关的表示了现有技术一般状态的文件

"E" 在国际申请日的当天或之后公布的在先申请或专利

"L" 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件

"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

"X" 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性

"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
20.7 月 2007(20.07.2007)	**16.8 月 2007 (16.08.2007)**

中华人民共和国国家知识产权局(ISA/CN)
中国北京市海淀区蓟门桥西土城路 6 号 100088
传真号： (86-10)62019451

受权官员
赵晓宇
电话号码：(86-10) **62085853**

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国际检索报告
关于同族专利的信息

国际申请号
PCT/CN2007/001575

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN2719043Y	24. 8 月 2005	AU2005232354A	27.10 月 2005
		WO2005099494A	27.10 月 2005
		CA2562581A	27.10 月 2005
		EP1736065A	27.12 月 2006
		CN1942114A	04.4 月 2007
		BRPI0506780A	22.5 月 2007
CN1252961A	17. 5 月 2000	无	
US4945929A	07. 8 月 1990	GB2191718A	23.12 月 1987
		DE3719718A	23.12 月 1987
		GB2191718B	05.9 月 1990
CN1575673A	09. 2 月 2005	US2005016550A1	27.1 月 2005
		JP2005034021A	10.2 月 2005
		CN1284493C	15.11 月 2006

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按照国际专利分类表(IPC)或者同时按照国家分类和 IPC 两种分类：

A24D1/18(2006.01) i

A24F47/00(2006.01) i

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Electronic Acknowledgement Receipt

EFS ID:	21810823
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Christopher Harrison Orders/Sheila Rogers
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	18-MAR-2015
Filing Date:	29-OCT-2014
Time Stamp:	16:44:13
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		R60999_1400USC3.PDF	394449 549412f16669ba143984c3a500e066b4c7d782e7	yes	14

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	1	
	Information Disclosure Statement (IDS) Form (SB08)		2	14	
Warnings:					
Information:					
2	Foreign Reference	WO199748293.pdf	1503438 9f88f7e7e60b76f11f1eb788cf3ae50580ff0f1c	no	44
Warnings:					
Information:					
3	Foreign Reference	EP0845220.pdf	1049007 341cb57a25bd553750c866d240be60fbf947f77d	no	21
Warnings:					
Information:					
4	Foreign Reference	WO2004080216.PDF	490079 f3e2f2c0374c785be04d372a52ae8c0a55e3a304	no	17
Warnings:					
Information:					
5	Foreign Reference	WO2005099494.PDF	1162398 fb09c8213eebefe3cc58e2605dade3ba178ee5ab	no	30
Warnings:					
Information:					
6	Foreign Reference	EP1618803.pdf	654114 3d20ad550fabe4e3d4dbaf2264646d3df2a5d63e	no	15
Warnings:					
Information:					
7	Foreign Reference	AU276250.pdf	1900287 520dd2da88c2f64baca18a1b04db9b1bbacb9702	no	29
Warnings:					
Information:					
8	Foreign Reference	EP0295122.pdf	407432 94d444f19ce1cb380a34cffb8d7e6d8ad29cfbf8	no	7
Warnings:					
Information:					

9	Foreign Reference	EP0430566.pdf	1485524 6a60c1264089bcc31e2390544bca55b3321632c4	no	20
Warnings:					
Information:					
10	Foreign Reference	CN1541577.pdf	490079 5aa165f0ad288105fae772c730441131a083cb6c	no	9
Warnings:					
Information:					
11	Foreign Reference	CN2719043.pdf	428913 9b3dec4b289813ddd5dc7d0109fe4296582f939f	no	8
Warnings:					
Information:					
12	Foreign Reference	WO2007078273.pdf	401614 15870c26d14e091dae8e69bc5eb36967319a0e26	no	13
Warnings:					
Information:					
13	Foreign Reference	DE102006004484.pdf	559223 f50984fa1b2be7b80e5596d3a32976c5c2cbf145	no	13
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14	Foreign Reference	WO2007131449.pdf	1259429 d5f0415d6ee15f76909787f0862d416735f59908	no	31
Warnings:					
Information:					
		Total Files Size (in bytes):	12185986		

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.

Attorney's Docket No. R60999 1400US.C3 (0830.9) PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Robinson et al.	Confirmation No.:	6397
Appl No.:	14/527,287	Group Art Unit:	1747
Filed:	October 29, 2014		
For:	TOBACCO-CONTAINING SMOKING ARTICLE		

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

INFORMATION DISCLOSURE STATEMENT
CITATION UNDER 37 C.F.R. § 1.97

Attached is a list of documents. It is requested that the Examiner consider these documents and officially make them of record in accordance with the provisions of 37 C.F.R. § 1.97 and Section 609 of the MPEP. By identifying the listed documents, Applicant in no way makes any admission as to the prior art status of the listed documents, but is instead identifying the listed documents for the sake of full disclosure.

Any foreign patents or non-patent literature documents items are attached, except those that were supplied in, or cited by the Office during prosecution of, parent Application Nos. 11/550,634 filed October 18, 2006, 12/763,890 filed April 20, 2010 and 13/297,983 filed November 16, 2011. Since the benefit of these applications were claimed under 35 U.S.C. 120, no copies need to be furnished in accordance with 37 C.F.R. 1.98(d); however, copies will be furnished on request.

Respectfully submitted,

/christopher h. orders/

Date: March 18, 2015

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UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3	6397

26158 7590 10/06/2016

WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

EXAMINER
NGUYEN, PHU HOANG

ART UNIT	PAPER NUMBER
1747	

NOTIFICATION DATE	DELIVERY MODE
10/06/2016	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):

IPDocketing@WCSR.COM

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Office Action Summary	Application No. 14/527,287	Applicant(s) ROBINSON ET AL.	
	Examiner PHU NGUYEN	Art Unit 1747	AIA (First Inventor to File) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/31/2014*.

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

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *57-81* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *57-81* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

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

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

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

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

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The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

It is noted that the IDS filed 3/18/2015 contains an extremely large number of references for consideration by the Examiner. If the applicant and/or applicant's representative are aware of any particular reference or portion of a reference in the list which the examiner should take pay particular attention to it is requested that it be specifically pointed out in response to this Office action.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

The closest prior art of Counts et al. (U.S Patent No. 5692525) discloses a tobacco containing, electrically powered smoking article comprising:

(a) a tubular outer housing having a mouth-end (by reference sign 37, fig. 2) and an end distal to the mouth end, the housing comprising an opening adapted for intake of air into the smoking article;

(b) an electrical power source (35a, fig.2) within the outer housing;

(c) at least one electrical resistance heater (37, fig. 3) within the outer housing, the heater being configured to allow air flow therethrough and being powered by said electrical power source; and wherein the heater comprises at least one elongated portion extending downstream therefrom.

(d) a puff actuated controller adapted for regulating current flow through electrical resistance heating elements during draw, the controller comprising a sensor capable of selectively powering electrical components of the smoking article (column 7, lines 32-49);

(e) a rod-shaped carrier device (23, fig. 2 and column 5, line 65 to column 6, line 5) removably engaged with the mouth-end of the outer housing and comprising a tubular mouth-end piece (by reference sign 104, fig. 4A) and a tubular cartridge (houses inside reference sign 71, fig. 4A or any one of the equivalence in alternative embodiments in figs.7A, 10, 11) with two open ends allowing air to flow therethrough, wherein the cartridge includes a substrate that comprises a tobacco material (reference sign 80, fig. 4A, 220", fig. 7A) and glycerin (corresponding to the claimed "an aerosol forming material") added to the tobacco material as a humectant and as an aerosol precursor (column 12, lines 33-37); wherein the cartridge is capable of operatively positioned within the outer housing and adjacent to the heater such that the electrical resistance heater is adapted for heating at least a portion of the tobacco and the aerosol-generating material and such that air drawn into the outer housing passes through at least a portion of the heater, through the cartridge, and through the mouth-end piece.

However, Counts does not teach or suggest that the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating

tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

Therefore the claimed invention is distinguished from the prior art of Counts.

Claims 57-81 are allowed.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of

activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 57-81 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-40 of U.S Patent No. 8899238, claims 1-35 of U.S. Patent No. 8079371 and claims 1-9 of Patent No. 7726320. Although the claims at issue are not identical, they are not patentably distinct from each other because they have the same scope of invention with the same features of a smoking article has an outer housing, an electrical power source, resistance heating element, puff actuated controller and a rod-shaped carrier device.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHU NGUYEN whose telephone number is (571)272-5931. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wilson can be reached on 571-270-3882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PHU NGUYEN/
Examiner, Art Unit 1747

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	("8899238").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/10/02 21:47
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S13	18	aerosol near2 material and cartridge and electrica$4 and tobacco and heat$4 near2 element	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2010/01/06 21:08
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S20	29	A24F47/$ and cartridge and substrate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/28 17:00
S22	4	(("20120060853") or ("7726320")).PN.	US-PGPUB; USPAT;	OR	OFF	2014/01/28 17:02

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			USOCR; EPO; JPO; DERWENT			
S24	21	A24F$/$ and polyethylene near2 terephthalate and electronic	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:14
S27	18	polyethylene near2 terephthalate and electronic and absorbent and tobacco and smoking	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:17
S28	359	("20030131859" | "20040173229" | "20050016549" | "20050066986" | "20060185687" | "20060196518" | "20070062549" | "3258015" | "3356094" | "3516417" | "3614956" | "3738374" | "3844294" | "3878850" | "3931824" | "3943941" | "4044777" | "4079742" | "4190046" | "4219031" | "4233993" | "4284089" | "4286604" | "4326544" | "4340072" | "4347855" | "4391285" | "4635651" | "4700727" | "4714082" | "4735217" | "4756318" | "4771795" | "4793365" | "4800903" | "4807809" | "4819665" | "4823817" | "4836225" | "4848374" | "4874000" | "4892109" | "4893639" | "4917121" | "4917128" | "4920990" | "4924886" | "4947874" | "4961438" | "4966171" | "4969476" | "4972855" | "4977908" | "4991606" | "5020548" | "5025814" | "5033483" | "5040551" | "5050621" | "5060667" | "5060671" | "5060676" | "5065776" | "5072744" | "5074321" | "5076296" | "5076297" | "5092353" | "5099861" | "5101839" | "5105835" | "5105836" | "5105837" | "5105838" | "5115820" | "5146934" | "5148821" | "5159940" | "5159942" | "5178167" | "5183062" | "5203355" | "5211684" | "5224498" | "5240014" | "5240016" | "5271419" | "5285798" | "5293883" | "5327917" | "5345955" | "5357984" | "5360023" | "5369723" | "5388574" | "5396911" | "5533530" | "5551451" | "5588446" | "5593792" | "5595577" | "5598868" | "5692525" | "5715844" | "5743251" | "5778899" | "5799663" | "5819751" | "5829453" | "5865185" | "5878752" | "5880439" | "5915387" | "5934289" | "6033623" | "6053176" | "6089857" | "6095152" | "6146934" | "6164287" | "6182670" | "6234167" | "6289898" | "6397852" | "6408856" | "6516796" | "6532965" | "6537186" | "6578584" | "6591841" | "6598607" | "6615840" | "6730832" | "6823873" | "7117867").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/01/29 17:17
S31	713	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber)	US-PGPUB;	OR	ON	2014/01/29 17:20

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S32	12	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber) and base near2 web	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:20
S33	65	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber) and absorbent	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:34
S34	28	(polyethylene near2 terephthalate near2 fiber) same bio	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/02/02 00:35
S38	2	("3486508").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/02/02 01:31
S40	22	A24F$/$ and paper same "metallic foil"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/02/02 01:32
S42	14	A24F$/$ and paper and base near2 web and calcium near carbonate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/02/03 15:41
S43	2	("8079371").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/02/03 21:22
S44	7	cigarette near2 paper and carbon near2 fiber and carbon near2 particle and carbonate near2 particle	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:31
S45	0	(A24B15/165).cpc. and controller and aerosol and heater	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:32
S46	2	(A24B15/14).cpc. and controller and aerosol and heater	US-PGPUB;	OR	ON	2014/08/02 23:32

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			USPAT; USOCR; EPO; JPO; DERWENT			
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S50	1	S49 and glycerin and (electrical electronic) and controller	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/30 00:00
S53	122	smoking near2 article and tobacco near extract and heater	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2016/10/02 20:40

10/2/2016 10:11:53 PM
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	Art Unit
	PHU NGUYEN	1747

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
See East Search History	10/2/2016	P.N

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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	Examiner	Art Unit
	PHU NGUYEN	1747

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/02/2016								
	57	✓								
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Substitute for form 1449/PTO (Revised 07/2005)				Complete if Known	
				Application Number	14/527,287
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Filing Date	October 29, 2014
				First Named Inventor	John Howard Robinson
(Use as many sheets as necessary)				Group Art Unit	
				Examiner Name	
Sheet	1	of	13	Attorney Docket Number	R60999 1400US.C3 (0830.9)

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Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear
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	2	US-3,258,015	06-28-1966	Ellis et al.	
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	10	US-3,878,850	04-22-1975	Gibson et al.	
	11	US-3,931,824	01-13-1976	Miano et al.	
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	17	US-4,233,993	11-18-1980	Miano et al.	
	18	US-4,284,089	08-18-1981	Ray	
	19	US-4,286,604	09-01-1981	Ehretsmann et al.	
	20	US-4,326,544	04-27-1982	Hardwick et al.	
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	25	US-4,700,727	10-20-1987	Torigian	

Examiner Signature		Date Considered	

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	14/527,287
				Filing Date	October 29, 2014
				First Named Inventor	John Howard Robinson
				Group Art Unit	
				Examiner Name	
Sheet	2	of	13	Attorney Docket Number	R60999 1400US.C3 (0830.9)

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	29	US-4,771,795	09-20-1988	White et al.	
	30	US-4,793,365	12-27-1988	Sensabaugh, Jr. et al.	
	31	US-4,800,903	01-31-1989	Ray et al.	
	32	US-4,807,809	02-28-1989	Pryor et al.	
	33	US-4,819,665	04-11-1989	Roberts et al.	
	34	US-4,823,817	04-25-1989	Luke	
	35	US-4,836,225	06-06-1989	Sudoh	
	36	US-4,848,374	07-18-1989	Chard et al.	
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	38	US-4,892,109	01-09-1990	Strubel	
	39	US-4,893,639	01-16-1990	White	
	40	US-4,917,121	04-17-1990	Riehl et al.	
	41	US-4,917,128	04-17-1990	Clearman et al.	
	42	US-4,920,990	05-01-1990	Lawrence et al.	
	43	US-4,922,901	05-08-1990	Brooks et al.	
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	45	US-4,947,874	08-14-1990	Brooks et al.	
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	48	US-4,966,171	10-30-1990	Serrano et al.	
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	50	US-4,972,855	11-27-1990	Kuriyama et al.	
	51	US-4,977,908	12-18-1990	Luke	
	52	US-4,981,522	01-01-1991	Nichols et al.	

Examiner Signature		Date Considered	

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.N./

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	14/527,287
				Filing Date	October 29, 2014
				First Named Inventor	John Howard Robinson
				Group Art Unit	
				Examiner Name	
Sheet	3	of	13	Attorney Docket Number	R60999 1400US.C3 (0830.9)

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	295	EP 0 845 220	06-03-1998	Japan Tobacco Inc.		
	296	WO 02/37990 A2	05-16-2002	Vector Tobacco (Bermuda) Ltd.		
	297	WO 2004/095955 A1	03-08-2004	Best Partners Worldwide Limited		
	298	WO 2004/080216 A1	09-23-2004	Hon, Lik		
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	300	EP 1 618 803 A1	01-25-2006	Hon, Lik		
	301	AU 276250	07-08-1965	Battelle Memorial Institute		
	302	EP 0 295 122	12-14-1988	Imperial Tobacco Limited		
	303	EP 0 430 566	06-05-1991	Philip Morris Products Inc.		
	304	CN 1541577	11-03-2004	HAN, Li		
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	306	WO 2007/078273	07-12-2007	Liu		
	307	DE 10 2006 004 484	08-09-2007	Schmidt, Karsten		
	308	WO 2007/131449	11-22-2007	Han		

Examiner Signature		Date Considered	

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.N./

Substitute for form 1449/PTO (Revised 07/2005)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	14/527,287
				Filing Date	October 29, 2014
				First Named Inventor	John Howard Robinson
				Group Art Unit	
				Examiner Name	
Sheet	13	of	13	Attorney Docket Number	R60999 1400US.C3 (0830.9)

OTHER DOCUMENTS			
Examiner Initials*	Cite No.	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.	English Language Translation Attached
	309	LU, ZHANG, "Safe Substitute", China Daily, July 11, 2005.	
	310	Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco, R. J. Reynolds Tobacco Company Monograph, 1988, pp. 43-72.	
	311	Inhalation Technology, Dr. Donald E. Garden, ed., Vol. 12, No. 5, pp. 1-58, (2000).	

Examiner Signature	/Phu Nguyen/	Date Considered	10/02/2016

*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

WCSR 33182094v1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.N./

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

This Declaration is directed to the patent application entitled:

TOBACCO-CONTAINING SMOKING ARTICLE,

the specification of which

☐ is attached hereto

OR

☒ was filed on October 29, 2014 as United States Application No. 14/527,287 or PCT International Application Number ___ and was amended on ___ (if applicable).

Each below named inventor hereby declares that: (1) the above-identified application was made or authorized to be made by me; (2) I believe that I am the original inventor or an original joint inventor of a claimed invention in the application; and (3) 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.

Full name of (first/sole) inventor: John Howard Robinson

Inventor's Signature: John Howard Robinson Date: 10/14/16

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 407

Full name of second inventor: David William Griffith, Jr.

Inventor's Signature: David William Griffith Jr. Date: 10-10-2016

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 408

Full name of third inventor: Billy Tyrone Conner

Inventor's Signature: Billy Tyrone Conner Date: 10/07/2016

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Ecto World v. RAI
IPR2024-01280
Page 409

Full name of fourth inventor: Evon Llewellyn Crooks
Inventor's Signature: Evon Llewellyn Crooks Date: 10/12/2016

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
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Full name of fifth inventor: Dempsey Bailey Brewer, Jr.

Inventor's Signature: _____ Date: 10/20/2016

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 411

Electronic Acknowledgement Receipt

EFS ID:	27290287
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Christopher Harrison Orders/Tenika Askew
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	21-OCT-2016
Filing Date:	29-OCT-2014
Time Stamp:	16:49:45
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	Oath or Declaration filed	R609991400USC3_Declaration.pdf	399242 9a0e5094004037bf37d9f53fa35e1fa2fef41035	no	5

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RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 412

Information:	
Total Files Size (in bytes):	399242

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

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

PTO/AIA/82A (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

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

Application Number	14/527,287
Filing Date	October 29, 2014
First Named Inventor	John Howard Robinson
Title	TOBACCO-CONTAINING SMOKING ARTICLE
Art Unit	1747
Examiner Name	NGUYEN, Phu Hoang
Attorney Docket Number	R60999 1400US.C3 (0830.9)

SIGNATURE of Applicant or Patent Practitioner

Signature	/christopher h. orders/	Date (Optional)	December 28, 2016
Name	Christopher H. Orders	Registration Number	57151
Title (if Applicant is a juristic entity)	Patent Practitioner		
Applicant Name (if Applicant is a juristic entity)			

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

☐ *Total of _____ forms are submitted.

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

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

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.

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

PTO/AIA/82B (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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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.)

☑ 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: 26158

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 to:

☑ 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):

RAI STRATEGIC HOLDINGS, INC.

☐ Inventor or Joint Inventor (title not required below)

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

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

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

SIGNATURE of Applicant for Patent

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

Signature	Michael J Madigan	Date (Optional)	March 31, 2016
Name	Michael J. Madigan		
Title	Secretary		

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 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.

Electronic Acknowledgement Receipt

EFS ID:	27914274
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Christopher Harrison Orders/Tenika Askew
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	28-DEC-2016
Filing Date:	29-OCT-2014
Time Stamp:	12:30:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	R609991400USC3_POATransmittal.pdf	889197 3818117c95a2408e98be81bd49b696e50c01fa32	no	2

Warnings:

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Ecto World v. RAI
IPR2024-01280
Page 417

Information:					
2	Power of Attorney	R609991400USC3_POA.pdf	146282 b4b82d2d31f54ff7bfe4110fbbeb6c4df0cfd91b	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	1035479	

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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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3

CONFIRMATION NO. 6397

IMPROPER CPOA LETTER

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

OC000000088200695

Date Mailed: 01/04/2017

NOTICE REGARDING POWER OF ATTORNEY

This is in response to the power of attorney filed 12/28/2016. The power of attorney in this application is not accepted for the reason(s) listed below:

- The power of attorney has not been accepted because the party who is giving power has not been identified. Power of attorney may only be signed by the applicant for patent (37 CFR 1.42) or the patent owner. A party who is not the applicant must become the applicant in accordance with 37 CFR 1.46(c) and appoint any power of attorney in compliance with 37 CFR 3.71 and 3.73. For a reissue application, reexamination proceeding, or supplemental examination proceeding, a patent owner who was not the applicant under 37 CFR 1.46 must appoint any power of attorney in compliance with 37 CFR 3.71 and 3.73. See 37 CFR 1.32(b)(4).

/qtran/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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Ecto World v. RAI
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Page 419

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3

CONFIRMATION NO. 6397

IMPROPER CFR REQUEST

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

OC000000088200723

Date Mailed: 01/04/2017

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Power of Attorney, Claims, Fees, System Limitations, and Miscellaneous

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- Any request to correct or update the name of the applicant must include an application data sheet (ADS) in compliance with 37 CFR 1.76 specifying the correct or updated name of the applicant in the applicant information section. Any request to change the applicant after an original applicant has been specified under 37 CFR 1.46(b) must include a new ADS in compliance with 37 CFR 1.76 specifying the applicant in the applicant information section and comply with 37 CFR 3.71 and 3.73. See 37 CFR 1.46(c).

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

/qtran/

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 420

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Robinson et al.	Confirmation No.:	6397
Appl No.:	14/527,287	Group Art Unit:	1747
Filed:	October 29, 2014	Examiner:	Nguyen, Phu Hoang
For:	TOBACCO-CONTAINING SMOKING ARTICLE		

Docket No.: **R60999 1400US.C3 (0830.9)**
Customer No.: 26158

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

REPLY UNDER 37 CFR § 1.111

Sir:

In response to the non-final Office Action dated October 6, 2016, please consider the following:

A listing of the **pending claims** begins on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

RAI Exhibit 2007
Ecto World v. RAI
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Page 421

Pending Claims:

1 – 56. (Cancelled)

57. (Previously Presented) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract and an aerosol-forming material absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

58. (Previously Presented) The smoking article of claim 57, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

59. (Previously Presented) The smoking article of claim 57, wherein the mixture further comprises a flavoring agent.

60. (Previously Presented) The smoking article of claim 59, wherein the flavoring agent comprises menthol.

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61. (Previously Presented) The smoking article of claim 57, wherein the mixture further comprises an organic acid.

62. (Previously Presented) The smoking article of claim 57, wherein the mixture comprises essentially pure nicotine, extracts composed predominantly of nicotine, or formulations composed predominantly of nicotine.

63. (Previously Presented) The smoking article of claim 57, wherein the absorbent fibrous material comprises a synthetic polymeric material.

64. (Previously Presented) The smoking article of claim 57, wherein the amount of aerosol-forming material is sufficient to provide greater than about 200 puffs per cartridge.

65. (Previously Presented) The smoking article of claim 57, wherein the cartridge is made from paper, plastic, or heat conductive materials.

66. (Previously Presented) The smoking article of claim 57, wherein the cartridge has a length that does not exceed about 30 mm.

67. (Previously Presented) The smoking article of claim 57, wherein the cartridge is electrically conductive.

68. (Previously Presented) The smoking article of claim 57, wherein the rod-shaped carrier device is removably engaged with the mouth-end of the tubular outer housing.

69. (Previously Presented) The smoking article of claim 57, wherein the mixture comprises glycerin, tobacco extract, and a flavoring agent.

70. (Previously Presented) The smoking article of claim 57, wherein the absorbent fibrous material is in contact with the electrical resistance heater.

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71. (Previously Presented) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

72. (Previously Presented) The smoking article of claim 71, wherein the mixture further comprises a flavoring agent.

73. (Previously Presented) The smoking article of claim 72, wherein the flavoring agent comprises menthol.

74. (Previously Presented) The smoking article of claim 71, wherein the mixture further comprises an organic acid.

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Ecto World v. RAI
IPR2024-01280
Page 424

75. (Previously Presented) The smoking article of claim 71, wherein the mixture comprises essentially pure nicotine, extracts composed predominantly of nicotine, or formulations composed predominantly of nicotine.

76. (Previously Presented) The smoking article of claim 71, wherein the amount of the aerosol-forming material is sufficient to provide greater than about 200 puffs per cartridge.

77. (Previously Presented) The smoking article of claim 71, wherein the cartridge is made from paper, plastic, or heat conductive materials.

78. (Previously Presented) The smoking article of claim 71, wherein the cartridge has a length that does not exceed about 30 mm.

79. (Previously Presented) The smoking article of claim 71, wherein the cartridge is electrically conductive.

80. (Previously Presented) The smoking article of claim 71, wherein the absorbent fibrous material is in contact with the electrical resistance heater.

81. (Previously Presented) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent

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fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the absorbent fibrous material is in contact with the electrical resistance heater and, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

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REMARKS/ARGUMENTS

In light of the following remarks, reexamination and reconsideration of this application, withdrawal of the rejections, and formal notification of the allowability of all claims as presented are earnestly solicited.

Claims 57-81 are pending. In the Office Action, Claims 57-81 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-40 of U.S. Patent No. 8,899,238 ("the '238 patent"), Claims 1-35 of U.S. Patent No. 8,079,371 ("the '371 patent"), and Claims 1-9 of U.S. Patent No. 7,726,320 ("the '320 patent).

Outside of the double patenting rejections, each of the claims is indicated as reciting allowable subject matter. Applicant thanks the Examiner for the indications of allowable subject matter. However, Applicant does not acquiesce to the statements included therein relating to U.S. Pat. No. 5,692,525 to Counts et al. and reserves the right to argue such statements as they relate to the claims of the present application at a later time.

CLAIMS

Independent Claim 57 recites "An electrically-powered, aerosol-generating smoking article comprising: an electrical power source within a tubular outer housing having a mouth-end and an end distal to the mouth-end; at least one electrical resistance heater powered by said electrical power source; a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and a rod-shaped carrier device engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract and an aerosol-forming material absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough; wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article."

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Independent Claim 71 recites "An electrically-powered, aerosol-generating smoking article comprising: an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end; at least one electrical resistance heater powered by said electrical power source; a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough; wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article."

Independent Claim 81 recites "An electrically-powered, aerosol-generating smoking article comprising: an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end; at least one electrical resistance heater powered by said electrical power source; a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough; wherein the absorbent fibrous material is in contact with the electrical resistance heater and, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or

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tobacco-derived components that can be drawn into the mouth of the user of the smoking article."

Claim rejections – Double Patenting

As noted above, Claims 57-81 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-40 of the '238 patent, Claims 1-35 of the '371 patent, and Claims 1-9 of the '320 patent. In response, Applicant files a terminal disclaimer herewith with respect to the '371 patent. Accordingly, Applicant respectfully asserts that the double patenting rejection over the claims of the '371 patent is overcome.

Regarding the double patenting rejections over Claims 1-40 of the '238 patent and Claims 1-9 of the '320 patent, Applicant respectfully asserts that the rejections are improper. In this regard, the mere listing of various claims in U.S. Pat. No. 7,726,320 and 8,899,238 and the statement that these patents "have the same scope of invention with the same features of a smoking article ha[ving] an outer housing, an electrical power source, resistance heating element, puff actuated controller and a rod-shaped carrier device" is insufficient to support a *prima facie* case of nonstatutory double patenting. *See*, Office Action pg. 5. In this regard, the rejections fail to address each of the elements of the claims and perform the factual inquires required to form a nonstatutory double patenting rejection. *See*, MPEP 804.

Additionally, the claims of the '320 patent fail to meet the elements of the claims of the present application. By way of example, each of independent Claims 57, 71, and 81 recites "a rod-shaped carrier device." However, the claims of the '320 patent fail to recite a rod-shaped carrier device, as claimed in the present application. Accordingly, Applicant respectfully asserts that the claims of the '320 patent fail to support a *prima facie* case of nonstatutory double patenting for this additional reason, and hence the rejections over the '320 patent must be removed.

Further, the claims of the '238 patent fail to meet the elements of the claims of the present application. By way of example, independent Claims 57 and 71 state that "the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be ***wicked into contact*** with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user

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of the smoking article." Similarly, independent Claim 81 states that "the absorbent fibrous material is in contact with the electrical resistance heater and, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be ***wicked into contact*** with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article." However, the claims of the '238 patent fail to recite positioning a rod-shaped carrier device/absorbent fibrous material to ***wick*** a mixture comprising tobacco extract and aerosol-forming material ***into contact*** with an electrical resistance heater, as claimed in the present application. Accordingly, Applicant respectfully asserts that the claims of the '238 patent fail to support a *prima facie* case of nonstatutory double patenting for this additional reason, and hence the rejections over the '238 patent must be removed.

As noted above, Applicant respectfully submits that each of the nonstatutory double patenting rejections should be removed. As such, each of Claims 57-81 is believed to be in condition for allowance.

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CONCLUSION

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 09-0528.

Respectfully submitted,

/christopher h. orders/

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PTO/SB/26 (08-08)
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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) R60999 1400US.C3 (0830.9)

In re Application of: John Howard Robinson et al.

Application No.: 14/527,287

Filed: October 29, 2014

For: TOBACCO-CONTAINING SMOKING ARTICLE

The owner*, RAI Strategic Holdings, Inc., of 100 percent interest 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 **prior patent** No. 8,079,371 as the term of said prior patent is defined in 35 U.S.C. 154 and 173, and as the term of said **prior patent** is presently shortened by any terminal disclaimer. 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 the **prior patent** 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 the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

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;
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Check either box 1 or 2 below, if appropriate.

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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.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 57,151,

/christopher h. orders/ — Signature
January 4, 2017 — Date

Christopher H. Orders — Typed or printed name

(704) 331-4900 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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

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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.
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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.
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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.

Electronic Patent Application Fee Transmittal

Application Number:	14527287
Filing Date:	29-Oct-2014
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Filer:	Christopher Harrison Orders/Tenika Askew
Attorney Docket Number:	R60999 1400US.C3

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($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
		Total in USD ($)		**340**

Electronic Acknowledgement Receipt

EFS ID:	27965269
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Christopher Harrison Orders/Tenika Askew
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	04-JAN-2017
Filing Date:	29-OCT-2014
Time Stamp:	16:02:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$340
RAM confirmation Number	010517INTEFSW00002618090528
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1		R609991400USC3_Reply.pdf	41369 f48cf3a041aee3af6b5e8be4217cad8a86881ae5	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	11

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2	Information Disclosure Statement (IDS) Form (SB08)	R609991400USC3_SB08.pdf	1150225 3c86bfe684c1ddc6e319764d66e090ac39b335af	no	4

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Application Number	14527287
Filing Date	2014-10-29
First Named Inventor	John Howard Robinson
Art Unit	1747
Examiner Name	NGUYEN, Phu Hoang
Attorney Docket Number	R60999 1400US.C3 (0830.9)

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	1514682		1924-11-11	H. Wilson	
	2	3479561		1969-11-18	J. L. Janning	

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Application Number	14527287
Filing Date	2014-10-29
First Named Inventor	John Howard Robinson
Art Unit	1747
Examiner Name	NGUYEN, Phu Hoang
Attorney Docket Number	R60999 1400US.C3 (0830.9)

Examiner Initials*	Cite No	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, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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Examiner Signature		Date Considered	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14527287
Filing Date	2014-10-29
First Named Inventor	John Howard Robinson
Art Unit	1747
Examiner Name	NGUYEN, Phu Hoang
Attorney Docket Number	R60999 1400US.C3 (0830.9)

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/christopher h. orders/	Date (YYYY-MM-DD)	2017-01-04
Name/Print	Christopher H. Orders	Registration Number	57151

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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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.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/527,287	Filing Date 10/29/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

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

APPLICATION AS AMENDED – PART II

AMENDMENT **01/04/2017**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** 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 number found in the appropriate box in column 1.

LIE
KIM WATSON

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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

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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	14/527,287
Filing Date	October 29, 2014
First Named Inventor	John Howard Robinson
Title	TOBACCO-CONTAINING SMOKING ARTICLE
Art Unit	1747
Examiner Name	NGUYEN, Phu Hoang
Attorney Docket Number	R60999 1400US.C3 (0830.9)

SIGNATURE of Applicant or Patent Practitioner

Signature	/christopher h. orders/	Date (Optional)	2017-01-06
Name	Christopher H. Orders	Registration Number	57151
Title (if Applicant is a juristic entity)	Patent Practitioner		
Applicant Name (if Applicant is a juristic entity)			

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

☐ *Total of _____ forms are submitted.

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

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

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.

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

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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.)

☑ 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: 26158

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 to:

☑ 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):

RAI STRATEGIC HOLDINGS, INC.

☐ Inventor or Joint Inventor (title not required below)

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

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

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

SIGNATURE of Applicant for Patent

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

Signature	Michael J Madigan	Date (Optional)	March 31, 2016
Name	Michael J. Madigan		
Title	Secretary		

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 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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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
	John	Howard	Robinson	

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

City	Kernersville	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	604 Antler Court		
Address 2			
City	Kernersville	State/Province	NC
Postal Code	27284	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	David	William	Griffith	Jr.

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

City	Winston-Salem	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	4130 White Hawk Lane		
Address 2			
City	Winston-Salem	State/Province	NC
Postal Code	27106	Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Billy	Tyrone	Conner	

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	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

City	Clemmons	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	180 Scott Farm Road		
Address 2			
City	Clemmons	State/Province	NC
Postal Code	27012	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Evon	Llewellyn	Crooks	

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

City	Mocksville	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	749 Howell Road		
Address 2			
City	Mocksville	State/Province	NC
Postal Code	27028	Country	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Dempsey	Bailey	Brewer	Jr.

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

City	East Bend	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	2853 Davis Road		
Address 2			
City	East Bend	State/Province	NC
Postal Code	27018	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.**

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Customer Number	26158		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	Tobacco-Containing Smoking Article		
Attorney Docket Number	R60999 1400US.C3	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	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

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	26158		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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 blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	13297983	2011-11-16

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13297983	Continuation of	12763890	2010-04-20	8079371	2011-12-20

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12763890	Continuation of	11550634	2006-10-18	7726320	2010-06-01

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

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(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(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	Filing Date (YYYY-MM-DD)	Access Code (if applicable)

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.
In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Applicant 1

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	~~R.J. Reynolds Tobacco Company~~ RAI STRATEGIC HOLDINGS, INC.

Mailing Address Information For Applicant:

Address 1	401 North Main Street		
Address 2			
City	Winston-Salem	**State/Province**	NC
Country	US	Postal Code	27101
Phone Number		Fax Number	
Email Address			

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

Assignee Information including Non-Applicant Assignee Information:

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

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.

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

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Ecto World v. RAI
IPR2024-01280

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/christopher h. orders/			Date (YYYY-MM-DD)	2017-01-06
First Name	Christopher H.	Last Name	Orders	Registration Number	57151

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

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 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.

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280

Electronic Acknowledgement Receipt

EFS ID:	27997869
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Christopher Harrison Orders/Shanele Jones
Filer Authorized By:	Christopher Harrison Orders
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	06-JAN-2017
Filing Date:	29-OCT-2014
Time Stamp:	16:39:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	1400USC3-POA.pdf	304633 4a1a2ce5d92fda0e4308a70cf63e9d18a5c29c85	no	3

Warnings:

RAI Exhibit 2007
Ecto World v. RAI
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Page 455

Information:					
2	Application Data Sheet	1400USC3-ADS.pdf	4444164 945c8a089faef44d994e0872462b18011d0d59c1	no	8
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
			Total Files Size (in bytes):	4748797	

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3

CONFIRMATION NO. 6397

IMPROPER CPOA LETTER

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

OC000000088418898

Date Mailed: 01/12/2017

NOTICE REGARDING POWER OF ATTORNEY

This is in response to the power of attorney filed 01/06/2017. The power of attorney in this application is not accepted for the reason(s) listed below:

- The power of attorney has not been accepted because the party who is giving power has not been identified. Power of attorney may only be signed by the applicant for patent (37 CFR 1.42) or the patent owner. A party who is not the applicant must become the applicant in accordance with 37 CFR 1.46(c) and appoint any power of attorney in compliance with 37 CFR 3.71 and 3.73. For a reissue application, reexamination proceeding, or supplemental examination proceeding, a patent owner who was not the applicant under 37 CFR 1.46 must appoint any power of attorney in compliance with 37 CFR 3.71 and 3.73. See 37 CFR 1.32(b)(4).

/agizaw/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 457

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3

CONFIRMATION NO. 6397

IMPROPER CFR REQUEST

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

OC000000088418997

Date Mailed: 01/12/2017

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Power of Attorney, Claims, Fees, System Limitations, and Miscellaneous

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- Any request to correct or update the name of the applicant must include an application data sheet (ADS) in compliance with 37 CFR 1.76 specifying the correct or updated name of the applicant in the applicant information section. Any request to change the applicant after an original applicant has been specified under 37 CFR 1.46(b) must include a new ADS in compliance with 37 CFR 1.76 specifying the applicant in the applicant information section and comply with 37 CFR 3.71 and 3.73. See 37 CFR 1.46(c).
- The ADS submitted on 01-06-2017 attempts to change the applicant but cannot be entered. Any request to change the applicant once the applicant has been specified must include (1) an application data sheet specifying the new applicant in the Applicant Information section, and (2) a statement under 37 CFR 3.73(c) (USPTO Form PTO/AIA/96 or an equivalent) to show chain of title to the new applicant. The application data sheet must contain markings to show the information that is being changed, with underlining for additions and strike-through or brackets for deletions. See 37 CFR 1.76(c)(2).

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

/agizaw/

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Page 458

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	14/527,287	ROBINSON ET AL.	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☐ APPROVED	☒ DISAPPROVED
Date Filed : 1/4/17	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

Td disapproved.

The POA has not been accepted because the party who is giving POA has not been identified. Please note the N572 form for the reason for non-acceptance of the PA.

Also resubmit Td with these papers, NO Fee is required.

Lawana Hixon

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 459

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

PTO/AIA/82B (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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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.)

☑ 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: 26158

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 to:

☑ 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):

RAI STRATEGIC HOLDINGS, INC.

☐ Inventor or Joint Inventor (title not required below)

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

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

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

SIGNATURE of Applicant for Patent

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

Signature	Michael J Madigan	Date (Optional)	March 31, 2016
Name	Michael J. Madigan		
Title	Secretary		

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 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.

PTO/SB/26 (08-08)
Approved for use through 09/30/2008. 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.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) R60999 1400US.C3 (0830.9)

In re Application of: John Howard Robinson et al.

Application No.: 14/527,287

Filed: October 29, 2014

For: TOBACCO-CONTAINING SMOKING ARTICLE

The owner*, RAI Strategic Holdings, Inc., of 100 percent interest 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 **prior patent** No. 8,079,371 as the term of said prior patent is defined in 35 U.S.C. 154 and 173, and as the term of said **prior patent** is presently shortened by any terminal disclaimer. 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 the **prior patent** 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 the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

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 presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

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.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 57,151

/Christopher H. Orders/ — Signature
2017-01-27 — Date

Christopher H. Orders — Typed or printed name

(704) 331-4900 — Telephone Number

☐ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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

*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.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Privacy Act Statement

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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.

Electronic Acknowledgement Receipt

EFS ID:	28188108
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Tyler Spence/Shanele Jones
Filer Authorized By:	Tyler Spence
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	27-JAN-2017
Filing Date:	29-OCT-2014
Time Stamp:	12:49:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	CorrADS.pdf	1516911 06788e0b42c0dedf03fc12b0421b6ae044a0c439	no	8

Warnings:

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IPR2024-01280
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Information:					
This is not an USPTO supplied ADS fillable form					
2	Assignee showing of ownership per 37 CFR 3.73	373c.pdf	99719 18a26a253d49394f17e7b8d2687f85af2ef16205	no	3
Warnings:					
Information:					
3	Power of Attorney	RAI.pdf	146852 85afaac03987fea9b964338912e593fc212416c1	no	1
Warnings:					
Information:					
4	Terminal Disclaimer Filed	TerminalDisclaimer.pdf	249731 51e4e0ab39ebbfa4cd2beddcb72c6eb52405b5b4	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2013213		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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
	John	Howard	Robinson	

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

City	Kernersville	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	604 Antler Court		
Address 2			
City	Kernersville	State/Province	NC
Postal Code	27284	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	David	William	Griffith	Jr.

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

City	Winston-Salem	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	4130 White Hawk Lane		
Address 2			
City	Winston-Salem	State/Province	NC
Postal Code	27106	Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Billy	Tyrone	Conner	

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

RAI Exhibit 2007
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

City	Clemmons	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	180 Scott Farm Road		
Address 2			
City	Clemmons	State/Province	NC
Postal Code	27012	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Evon	Llewellyn	Crooks	

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

City	Mocksville	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	749 Howell Road		
Address 2			
City	Mocksville	State/Province	NC
Postal Code	27028	Country	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Dempsey	Bailey	Brewer	Jr.

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

City	East Bend	State/Province	NC	Country of Residence	US

Mailing Address of Inventor:

Address 1	2853 Davis Road		
Address 2			
City	East Bend	State/Province	NC
Postal Code	27018	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.**

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Customer Number	26158		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	Tobacco-Containing Smoking Article		
Attorney Docket Number	R60999 1400US.C3	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	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

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	26158		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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 blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	13297983	2011-11-16

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13297983	Continuation of	12763890	2010-04-20	8079371	2011-12-20

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12763890	Continuation of	11550634	2006-10-18	7726320	2010-06-01

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

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(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(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	Filing Date (YYYY-MM-DD)	Access Code (if applicable)

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

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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.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.
In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

Applicant 1

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. [x]

Organization Name	~~R.J. Reynolds Tobacco Company~~ RAI STRATEGIC HOLDINGS, INC.

Mailing Address Information For Applicant:

Address 1	~~401 North Main Street~~ 401 North Main Street		
Address 2			
City	~~Winston-Salem~~ Winston-Salem	**State/Province**	~~NC~~ NC
Country	~~US~~ US	Postal Code	~~27101~~ 27101
Phone Number		Fax Number	
Email Address			

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

Assignee Information including Non-Applicant Assignee Information:

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

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.

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	R60999 1400US.C3
	Application Number	
Title of Invention	Tobacco-Containing Smoking Article	

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.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/christopher h. orders/			Date (YYYY-MM-DD)	2017-01-27
First Name	Christopher H.	Last Name	Orders	Registration Number	57151

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

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 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.

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

Applicant/Patent Owner: RAI Strategic Holdings, Inc.

Application No./Patent No.: 14/527,287 Filed/Issue Date: October 29, 2014

Titled: Tobacco-Containing Smoking Article

RAI Strategic Holdings, Inc., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

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

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

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

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

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

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

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

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

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

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

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 038325, Frame 0639, or for which a copy thereof is attached.

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

   1. From: _____ To: _____

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

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

   2. From: _____ To: _____

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

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

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

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

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

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

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

4. From: _____ To: _____

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

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

5. From: _____ To: _____

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

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

6. From: _____ To: _____

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

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

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

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

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

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

/Christopher H. Orders/	2017-01-27
Signature	Date
Christopher H. Orders	57,151
Printed or Typed Name	Title or Registration Number

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3

CONFIRMATION NO. 6397

POA ACCEPTANCE LETTER

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

OC000000088850515

Date Mailed: 02/02/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/27/2017.

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

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

/tpetros/

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UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/527,287	10/29/2014	1747	2140	R60999 1400US.C3	25	3

CONFIRMATION NO. 6397

CORRECTED FILING RECEIPT

26158
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037



Date Mailed: 02/02/2017

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)

John Howard Robinson, Kernersville, NC;
David William Griffith JR., Winston-Salem, NC;
Billy Tyrone Conner, Clemmons, NC;
Evon Llewellyn Crooks, Mocksville, NC;
Dempsey Bailey Brewer JR., East Bend, NC;

Applicant(s)

RAI STRATEGIC HOLDINGS, INC., Winston-Salem, NC;

Power of Attorney: The patent practitioners associated with Customer Number 26158

Domestic Priority data as claimed by applicant

This application is a CON of 13/297,983 11/16/2011 PAT 8899238
which is a CON of 12/763,890 04/20/2010 PAT 8079371
which is a CON of 11/550,634 10/18/2006 PAT 7726320

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

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

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

If Required, Foreign Filing License Granted: 11/10/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/527,287**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

Tobacco-Containing Smoking Article

Preliminary Class

131

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

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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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

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technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	14/527,287	ROBINSON ET AL.	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 1/27/17	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
Felicia D. Roberts 8,079,371

U.S. Patent and Trademark Office

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3	6397

26158 7590 04/12/2017

WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

EXAMINER
NGUYEN, PHU HOANG

ART UNIT	PAPER NUMBER
1747	

NOTIFICATION DATE	DELIVERY MODE
04/12/2017	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):

IPDocketing@WCSR.COM

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Office Action Summary	Application No. 14/527,287	Applicant(s) ROBINSON ET AL.	
	Examiner PHU NGUYEN	Art Unit 1747	AIA (First Inventor to File) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/4/2017*.

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

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *57-81* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *57-81* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

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

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

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

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

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The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

It is noted that the IDS filed 3/18/2015 contains an extremely large number of references for consideration by the Examiner. If the applicant and/or applicant's representative are aware of any particular reference or portion of a reference in the list which the examiner should take pay particular attention to it is requested that it be specifically pointed out in response to this Office action.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 57-81 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-40 of U.S Patent No. 8899238 and claims 1-9 of Patent No. 7726320. Although the claims at issue are not identical, they are not patentably distinct from each other because they have the same scope of invention with the same features of a smoking article has an outer housing, an electrical power source, resistance heating element, puff actuated controller and a rod-shaped carrier device.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of

the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Response to Arguments

Applicant's arguments filed 1/4/2017 have been fully considered but they are not persuasive.

Applicant essentially argues that the claims of the ‘320 patent fail to meet the elements of the claims of the present application namely "a rod-shaped carrier device" and conclude that the '320 patent fail to support a prima facie case of nonstatutory double patenting. This argument is not persuasive because the ‘320 patent also discloses a rod shaped carrier device (column 1, lines 1-37) that provides support for a prima facie case of nonstatutory double patenting.

Applicant essentially argues that the claims of the ‘238 patent fail to meet the elements of the claims of the present application namely "a rod-shaped carrier device" and conclude that the '238 patent fail to support a prima facie case of nonstatutory double patenting. This argument is not persuasive because the ‘238 patent also discloses a rod shaped carrier device (column 1, lines 1-37) and the extracted tobacco components can be wicked from a tobacco substrate and the heating element can be extend into the tobacco segment (column 27, lines 1-53); therefore put the extracted tobacco material into contact with the heating element. Therefore, the ‘238 patent provides support for a prima facie case of nonstatutory double patenting.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHU NGUYEN whose telephone number is (571)272-5931. The examiner can normally be reached on M-F.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wilson can be reached on 571-270-3882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PHU NGUYEN/
Examiner, Art Unit 1747

PTO/SB/08a (01-10)
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 contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14527287
Filing Date	2014-10-29
First Named Inventor	John Howard Robinson
Art Unit	1747
Examiner Name	NGUYEN, Phu Hoang
Attorney Docket Number	R60999 1400US.C3 (0830.9)

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	1514682		1924-11-11	H. Wilson	
	2	3479561		1969-11-18	J. L. Janning	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.H.N/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14527287
Filing Date	2014-10-29
First Named Inventor	John Howard Robinson
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Attorney Docket Number	R60999 1400US.C3 (0830.9)

Examiner Initials*	Cite No	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, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/PHU H NGUYEN/	Date Considered	04/01/2017

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1]See Kind Codes of USPTO Patent Documents at www.USPTO.GOVor MPEP 901.04. [2]Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5]Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.H.N/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14527287
Filing Date	2014-10-29
First Named Inventor	John Howard Robinson
Art Unit	1747
Examiner Name	NGUYEN, Phu Hoang
Attorney Docket Number	R60999 1400US.C3 (0830.9)

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/christopher h. orders/	Date (YYYY-MM-DD)	2017-01-04
Name/Print	Christopher H. Orders	Registration Number	57151

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.H.N/

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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.H.N/

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Ecto World v. RAI
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Page 492

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	Art Unit
	PHU NGUYEN	1747

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
See East Search History	10/2/2016	P.N
See East Search History	4/1/2017	P.N

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280
Page 493

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	284	("20030131859" | "20040173229" | "20050016549" | "20050066986" | "20060185687" | "20060196518" | "20070062549" | "3258015" | "3356094" | "3516417" | "3614956" | "3738374" | "3844294" | "3878850" | "3931824" | "3943941" | "4044777" | "4079742" | "4190046" | "4219031" | "4233993" | "4284089" | "4286604" | "4326544" | "4340072" | "4347855" | "4391285" | "4635651" | "4700727" | "4714082" | "4735217" | "4756318" | "4771795" | "4793365" | "4800903" | "4807809" | "4819665" | "4823817" | "4836225" | "4848374" | "4874000" | "4892109" | "4893639" | "4917121" | "4917128" | "4920990" | "4924886" | "4947874" | "4961438" | "4966171" | "4969476" | "4972855" | "4977908" | "4991606" | "5020548" | "5025814" | "5033483" | "5040551" | "5050621" | "5060667" | "5060671" | "5060676" | "5065776" | "5072744" | "5074321" | "5076296" | "5076297" | "5092353" | "5099861" | "5101839" | "5105835" | "5105836" | "5105837" | "5105838" | "5115820" | "5146934" | "5148821" | "5159940" | "5159942" | "5178167" | "5183062" | "5203355" | "5211684" | "5224498" | "5240014" | "5240016" | "5271419" | "5285798" | "5293883" | "5327917" | "5345955" | "5357984" | "5360023" | "5369723" | "5388574" | "5396911" | "5533530" | "5551451" | "5588446" | "5593792" | "5595577" | "5598868" | "5692525" | "5715844" | "5743251" | "5778899" | "5799663" | "5819751" | "5829453" | "5865185" | "5878752" | "5880439" | "5915387" | "5934289" | "6033623" | "6053176" | "6089857" | "6095152" | "6146934" | "6164287" | "6182670" | "6234167" | "6289898" | "6397852" | "6408856" | "6516796" | "6532965" | "6537186" | "6578584" | "6591841" | "6598607" | "6615840" | "6730832" | "6823873" | "7117867").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2009/06/03 21:16
S2	42	S1 and electrical	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2009/06/03 21:19

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S4	2	"20080092912"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2009/06/03 21:46
S5	3	flameless near2 electronic near2 cigarette	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2009/06/04 12:58
S6	4	(("5093894") or ("5505214")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2009/06/04 13:40
S7	109	("1771366" | "1968509" | "2057353" | "2104266" | "2442004" | "2974669" | "3200819" | "3255760" | "3258015" | "3363633" | "3402723" | "3482580" | "3608560" | "3738374" | "3744496" | "3804100" | "3889690" | "4016061" | "4068672" | "4077784" | "4131119" | "4141369" | "4164230" | "4193411" | "4215708" | "4219032" | "4246913" | "4256945" | "4259970" | "4303083" | "4319591" | "4393884" | "4431903" | "4436100" | "4463247" | "4505282" | "4562337" | "4570646" | "4580583" | "4621649" | "4623401" | "4637407" | "4659912" | "4735217" | "4771796" | "4776353" | "4837421" | "4846199" | "4848376" | "4874924" | "4877989" | "4922901" | "4945931" | "4947874" | "4947875" | "4966171" | "4981522" | "4991606" | "5016656" | "5040552" | "5060671" | "5076296" | "5093894" | "5159940" | "5249586" | "5274214").PN. OR ("5505214").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/06/04 13:41
S8	284	("20030131859" | "20040173229" | "20050016549" | "20050066986" | "20060185687" | "20060196518" | "20070062549" | "3258015" | "3356094" | "3516417" | "3614956" | "3738374" | "3844294" | "3878850" | "3931824" | "3943941" | "4044777" | "4079742" | "4190046" | "4219031" | "4233993" | "4284089" | "4286604" | "4326544" | "4340072" | "4347855" | "4391285" | "4635651" | "4700727" | "4714082" | "4735217" | "4756318" | "4771795" | "4793365" | "4800903" | "4807809" | "4819665" | "4823817" | "4836225" | "4848374" | "4874000" | "4892109" | "4893639" | "4917121" | "4917128" | "4920990" | "4924886" | "4947874" | "4961438" | "4966171" | "4969476" | "4972855" | "4977908" | "4991606" | "5020548" | "5025814" | "5033483" | "5040551" | "5050621" | "5060667" | "5060671" | "5060676" | "5065776" |	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2009/06/04 13:55

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		"5072744" | "5074321" | "5076296" | "5076297" | "5092353" | "5099861" | "5101839" | "5105835" | "5105836" | "5105837" | "5105838" | "5115820" | "5146934" | "5148821" | "5159940" | "5159942" | "5178167" | "5183062" | "5203355" | "5211684" | "5224498" | "5240014" | "5240016" | "5271419" | "5285798" | "5293883" | "5327917" | "5345955" | "5357984" | "5360023" | "5369723" | "5388574" | "5396911" | "5533530" | "5551451" | "5588446" | "5593792" | "5595577" | "5598868" | "5692525" | "5715844" | "5743251" | "5778899" | "5799663" | "5819751" | "5829453" | "5865185" | "5878752" | "5880439" | "5915387" | "5934289" | "6033623" | "6053176" | "6089857" | "6095152" | "6146934" | "6164287" | "6182670" | "6234167" | "6289898" | "6397852" | "6408856" | "6516796" | "6532965" | "6537186" | "6578584" | "6591841" | "6598607" | "6615840" | "6730832" | "6823873" | "7117867").PN.				
S9	2	(S8 S7) and puff near2 controller	US-PGPUB; USPAT; USOCR	OR	ON	2009/06/04 13:55
S10	16	(S8 S7) and glycerin and (electrical electronic)	US-PGPUB; USPAT; USOCR	OR	ON	2009/06/04 14:28
S11	54	(S8 S7) and glycerin and extract	US-PGPUB; USPAT; USOCR	OR	ON	2009/06/04 16:33
S12	2	("20080092912").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2010/01/06 20:51
S13	18	aerosol near2 material and cartridge and electrica$4 and tobacco and heat$4 near2 element	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2010/01/06 21:08
S14	497	("2881770" | "20020000235" | "20020014453" | "20030075193" | "20030114298" | "20030131859" | "20030154993" | "20040084056" | "20040107973" | "20040134631" | "20040173229" | "20040194792" | "20040217023" | "20040226569" | "20040237984" | "20040255965" | "20040256253" | "20040261807" | "20050005947" | "20050016549" | "20050016556" | "20050049128" | "20050066983" | "20050066984" | "20050066986" | "20050076929" | "20050133051" | "20050133052" |	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2010/01/06 21:13

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		"20050150786"	"20050194014"						
		"20050252693"	"20050274390"						
		"20060021624"	"20060025292"						
		"20070023056"	"20070190347"						
		"3101723"	"3217715"	"3258015"					
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		"3516417"	"3614956"	"3648711"					
		"3738374"	"3844294"	"3878850"					
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		"4903714"	"4917121"	"4917128"					
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S17	2	("20120060853").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/01/27 13:59
S18	598	("2881770" | "20020000235" | "20020014453" | "20030075193" | "20030114298" | "20030131859" | "20030154993" | "20040084056" | "20040107973" | "20040134631" | "20040173229" | "20040194792" | "20040217023" | "20040226569" | "20040237984" | "20040255965" | "20040256253" | "20040261807" | "20050005947" | "20050016549" | "20050016556" | "20050049128" | "20050066983" | "20050066984" | "20050066986" | "20050076929" | "20050133051" | "20050133052" | "20050150786" | "20050194014" | "20050252693" | "20050274390" | "20060021624" | "20060025292" | "20070023056" | "20070190347" | "3101723" | "3217715" | "3258015" | "3263244" | "3308600" | "3347247" | "3356094" | "3370595" | "3419015" | "3516417" | "3614956" | "3648711" | "3738374" | "3844294" | "3878850" | "3931824" | "3943941" | "3957563" | "3972335" | "4044777" | "4054145" | "4079742" | "4174720" | "4201234" | "4219031" | "4223597" | "4233993" | "4280187" | "4281670" | "4286604" | "4294353" | "4326544" | "4340072" | "4347855" | "4391285" | "4449541" | "4508525" | "4534463" | "4700727" | "4714082" | "4715497" | "4756318" | "4771795" | "4793365" | "4807809" | "4823817" | "4836224" | "4848374" | "4852734" | "4874000" | "4881556" | "4887619" | "4893637" | "4893639" | "4903714" | "4917121" | "4917128" | "4920990" | "4924883" | "4924886" | "4924888" | "4938238" | "4947874" | "4961438" | "4966171" | "4969476" | "4977908" | "4989619" | "4991606" | "4995405" | "5012829" | "5020548" | "5022416" | "5025814" | "5027836" | "5027837" | "5033483" | "5040551" | "5046514" | "5050621" | "5052413" | "5056537" | "5060676" | "5065776" | "5067499" | "5072744" | "5074320" | "5074321" | "5076295" | "5076296" | "5076297" | "5088507" | "5092353" | "5099861" | "5101839" | "5103842" | "5105831" | "5105834" | "5105835" | "5105836" | "5105837" | "5105838" | "5115820" | "5129409" | "5137034" | "5139140" | "5146934" | "5148821" |	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/28 16:59

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		"5156170" | "5159940" | "5159942" | "5159944" | "5178167" | "5183062" | "5203355" | "5211684" | "5220930" | "5224498" | "5240014" | "5240016" | "5247947" | "5261425" | "5271419" | "5285798" | "5303720" | "5327917" | "5345955" | "5357984" | "5360023" | "5369723" | "5396909" | "5396911" | "5462073" | "5469871" | "5533530" | "5546965" | "5551451" | "5560376" | "5568819" | "5588446" | "5593792" | "5595577" | "5598868" | "5622190" | "5699812" | "5706834" | "5711320" | "5715844" | "5718250" | "5727571" | "5778899" | "5819751" | "5829453" | "5865185" | "5874508" | "5878752" | "5880439" | "5902431" | "5915387" | "5934289" | "5938018" | "5944025" | "6089857" | "6095152" | "6164287" | "6182670" | "6229115" | "6367481" | "6378528" | "6397852" | "6408856" | "6530377" | "6537186" | "6578584" | "6584979" | "6595218" | "6615842" | "6631722" | "6656412" | "6730832" | "6761174" | "6779528" | "6789547" | "6805174" | "6814786" | "6823873" | "6848450" | "6907885" | "6913784" | "7004896").PN.				
S19	38	S18 and cartridge	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/28 16:59
S20	29	A24F47/$ and cartridge and substrate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/28 17:00
S22	4	(("20120060853") or ("7726320")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/01/28 17:02
S24	21	A24F$/$ and polyethylene near2 terephthalate and electronic	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:14
S27	18	polyethylene near2 terephthalate and electronic and absorbent and tobacco and smoking	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:17
S28	359	("20030131859" | "20040173229" | "20050016549" | "20050066986" | "20060185687" | "20060196518" | "20070062549" | "3258015" | "3356094" |	US-PGPUB; USPAT; USOCR;	OR	OFF	2014/01/29 17:17

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S31	713	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:20
S32	12	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber) and base near2 web	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:20
S33	65	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber) and absorbent	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:34
S34	28	(polyethylene near2 terephthalate near2 fiber) same bio	US-PGPUB; USPAT;	OR	ON	2014/02/02 00:35

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			USOCR; EPO; JPO; DERWENT			
S38	2	("3486508").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/02/02 01:31
S40	22	A24F$/$ and paper same "metallic foil"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/02/02 01:32
S42	14	A24F$/$ and paper and base near2 web and calcium near carbonate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/02/03 15:41
S43	2	("8079371").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/02/03 21:22
S44	7	cigarette near2 paper and carbon near2 fiber and carbon near2 particle and carbonate near2 particle	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:31
S45	0	(A24B15/165).cpc. and controller and aerosol and heater	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:32
S46	2	(A24B15/14).cpc. and controller and aerosol and heater	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:32
S47	0	(A24D1/18).cpc. and controller and aerosol and heater	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:33
S49	142	("1771366" | "2057353" | "2104266" | "20020146242" | "20030226837" | "20040129280" | "20040200488" | "20040226568" | "20050016550" | "20060016453" | "20060196518" | "20070074734" | "20070102013" | "20070215167" | "3200819" | "4303083" | "4907606" | "4945931" | "4986286" | "5019122" | "5042510" | "5093894" | "5261424" | "5353813" | "5408574" |	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/09/29 23:59

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		"5468936" | "5498850" | "5515842" | "5530225" | "5564442" | "5649554" | "5666977" | "5687746" | "5726421" | "5727571" | "5865186" | "5894841" | "5954979" | "5967148" | "6095153" | "6125853" | "6155268" | "6164287" | "6196218" | "6196219" | "6601776" | "6772756" | "6803545" | "6854461" | "6854470" | "7293565").PN.				
S50	1	S49 and glycerin and (electrical electronic) and controller	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/30 00:00
S53	122	smoking near2 article and tobacco near extract and heater	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2016/10/02 20:40
S54	2	("8899238").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/10/02 21:47
S55	0	(smoking and puff and carrier and wick and heater and controller).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2016/10/02 21:55
S56	1	(smoking and puff and carrier and wick$3 and heater and controller).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2016/10/02 21:55
S58	4	(("7726320") or ("8899238")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2017/04/01 01:42
S59	2	("20150047656").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2017/04/01 01:46
S60	6	(("7726320") or ("8899238") or ("8079371")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2017/04/01 02:00
S61	2	("20150047656").PN.	US-PGPUB; USPAT;	OR	OFF	2017/04/01 13:33

RAI Exhibit 2007
Ecto World v. RAI
IPR2024-01280

			USOCR; EPO; JPO; DERWENT			
S62	2	(smoking and puff and carrier and wick$3 and heater and controller).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2017/04/01 13:46

4/5/2017 11:50:07 PM
C:\Users\pnguyen9\Documents\EAST\Workspaces\14527287.wsp

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IPR2024-01280

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	Art Unit
	PHU NGUYEN	1747

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/02/2016	04/01/2017							
	57	✓	✓							
	58	✓	✓							
	59	✓	✓							
	60	✓	✓							
	61	✓	✓							
	62	✓	✓							
	63	✓	✓							
	64	✓	✓							
	65	✓	✓							
	66	✓	✓							
	67	✓	✓							
	68	✓	✓							
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	72	✓	✓							
	73	✓	✓							
	74	✓	✓							
	75	✓	✓							
	76	✓	✓							
	77	✓	✓							
	78	✓	✓							
	79	✓	✓							
	80	✓	✓							
	81	✓	✓							

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Robinson et al.	Confirmation No.:	6397
Appl No.:	14/527,287	Group Art Unit:	1747
Filed:	October 29, 2014	Examiner:	Nguyen, Phu Hoang
For:	TOBACCO-CONTAINING SMOKING ARTICLE		

Docket No.: **R60999 1400US.C3 (0830.9)**
Customer No.: 26158

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

REPLY UNDER 37 CFR § 1.116

Sir:

In response to the final Office Action dated April 12, 2017, please consider the following:

A listing of the **pending claims** begins on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

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Ecto World v. RAI
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Pending Claims:

1 – 56. (Cancelled)

57. (Previously Presented) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract and an aerosol-forming material absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

58. (Previously Presented) The smoking article of claim 57, wherein the aerosol-forming material comprises glycerin, propylene glycol, or a mixture thereof.

59. (Previously Presented) The smoking article of claim 57, wherein the mixture further comprises a flavoring agent.

60. (Previously Presented) The smoking article of claim 59, wherein the flavoring agent comprises menthol.

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61. (Previously Presented) The smoking article of claim 57, wherein the mixture further comprises an organic acid.

62. (Previously Presented) The smoking article of claim 57, wherein the mixture comprises essentially pure nicotine, extracts composed predominantly of nicotine, or formulations composed predominantly of nicotine.

63. (Previously Presented) The smoking article of claim 57, wherein the absorbent fibrous material comprises a synthetic polymeric material.

64. (Previously Presented) The smoking article of claim 57, wherein the amount of aerosol-forming material is sufficient to provide greater than about 200 puffs per cartridge.

65. (Previously Presented) The smoking article of claim 57, wherein the cartridge is made from paper, plastic, or heat conductive materials.

66. (Previously Presented) The smoking article of claim 57, wherein the cartridge has a length that does not exceed about 30 mm.

67. (Previously Presented) The smoking article of claim 57, wherein the cartridge is electrically conductive.

68. (Previously Presented) The smoking article of claim 57, wherein the rod-shaped carrier device is removably engaged with the mouth-end of the tubular outer housing.

69. (Previously Presented) The smoking article of claim 57, wherein the mixture comprises glycerin, tobacco extract, and a flavoring agent.

70. (Previously Presented) The smoking article of claim 57, wherein the absorbent fibrous material is in contact with the electrical resistance heater.

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71. (Previously Presented) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the rod-shaped carrier device is operatively positioned such that, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

72. (Previously Presented) The smoking article of claim 71, wherein the mixture further comprises a flavoring agent.

73. (Previously Presented) The smoking article of claim 72, wherein the flavoring agent comprises menthol.

74. (Previously Presented) The smoking article of claim 71, wherein the mixture further comprises an organic acid.

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75. (Previously Presented) The smoking article of claim 71, wherein the mixture comprises essentially pure nicotine, extracts composed predominantly of nicotine, or formulations composed predominantly of nicotine.

76. (Previously Presented) The smoking article of claim 71, wherein the amount of the aerosol-forming material is sufficient to provide greater than about 200 puffs per cartridge.

77. (Previously Presented) The smoking article of claim 71, wherein the cartridge is made from paper, plastic, or heat conductive materials.

78. (Previously Presented) The smoking article of claim 71, wherein the cartridge has a length that does not exceed about 30 mm.

79. (Previously Presented) The smoking article of claim 71, wherein the cartridge is electrically conductive.

80. (Previously Presented) The smoking article of claim 71, wherein the absorbent fibrous material is in contact with the electrical resistance heater.

81. (Previously Presented) An electrically-powered, aerosol-generating smoking article comprising:

an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end;

at least one electrical resistance heater powered by said electrical power source;

a puff-actuated controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater during draw, the controller comprising a sensor adapted for sensing draw on the smoking article by a user; and

a rod-shaped carrier device removably engaged with the mouth-end of the tubular outer housing and comprising a cartridge providing a liquid storage compartment containing a mixture comprising a tobacco extract comprising nicotine and an aerosol-forming material selected from glycerin, propylene glycol, or a mixture thereof, the mixture absorbed within an absorbent

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fibrous material, the cartridge having a generally tubular shape with open ends such that air may flow therethrough;

wherein the absorbent fibrous material is in contact with the electrical resistance heater and, during draw, the mixture comprising the tobacco extract and the aerosol-forming material can be wicked into contact with the electrical resistance heater and volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.

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REMARKS/ARGUMENTS

In light of the following remarks, reexamination and reconsideration of this application, withdrawal of the rejections, and formal notification of the allowability of all claims as presented are earnestly solicited.

Claims 57-81 are pending. In the Office Action, Claims 57-81 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-40 of U.S. Patent No. 8,899,238 ("the '238 patent") and Claims 1-9 of U.S. Patent No. 7,726,320 ("the '320 patent).

Outside of the double patenting rejections, each of the claims is indicated as reciting allowable subject matter. Applicant thanks the Examiner for the indications of allowable subject matter.

Claim rejections – Double Patenting

As noted above, Claims 57-81 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-40 of the '238 patent and Claims 1-9 of the '320 patent. In response, Applicant files a terminal disclaimer herewith with respect to the '238 patent and the '320 patent. Accordingly, Applicant respectfully asserts that the double patenting rejection over the claims of the '238 patent and the '320 patent is overcome.

As noted above, Applicant respectfully submits that each of the nonstatutory double patenting rejections should be removed. As such, each of Claims 57-81 is believed to be in condition for allowance.

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CONCLUSION

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 09-0528.

Respectfully submitted,

/lauren f. anderson/

Lauren F. Anderson
Registration No. 69,344

Customer No. 26158
Womble Carlyle Sandridge & Rice, LLP
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P.O. Box 7037
Atlanta, GA 30357-0037
Tel Raleigh Office (919) 755-2100
Fax Raleigh Office (919) 755-2150

ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON June 12, 2017.

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PTO/SB/26 (08-08)
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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) R60999 1400US.C3 (0830.9)

In re Application of: John Howard Robinson et al.

Application No.: 14/527,287

Filed: October 29, 2014

For: TOBACCO-CONTAINING SMOKING ARTICLE

The owner*, RAI Strategic Holdings, Inc., of 100 percent interest 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 **prior patent** No. 8,899,238 as the term of said prior patent is defined in 35 U.S.C. 154 and 173, and as the term of said **prior patent** is presently shortened by any terminal disclaimer. 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 the **prior patent** 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 the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

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 presently shortened by any terminal disclaimer.

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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.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 69,344

/lauren f. anderson/ — Signature
June 12, 2017 — Date

Lauren F. Anderson — Typed or printed name

(919)755-8127 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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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.
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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.
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Electronic Patent Application Fee Transmittal

Application Number:	14527287
Filing Date:	29-Oct-2014
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Filer:	Lauren F Anderson/Shanele Jones
Attorney Docket Number:	R60999 1400US.C3

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($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	2	160	320
		Total in USD ($)		**320**

Electronic Acknowledgement Receipt

EFS ID:	29465038
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	Tobacco-Containing Smoking Article
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Lauren F Anderson/Shanele Jones
Filer Authorized By:	Lauren F Anderson
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	12-JUN-2017
Filing Date:	29-OCT-2014
Time Stamp:	16:08:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$320
RAM confirmation Number	061317INTEFSW00003201090528
Deposit Account	090528
Authorized User	Shanele Jones

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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)

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1		R609991400USC3_Amendment.pdf	27556 2f4305997fb53a6b4eadf014c47117896996 97db	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	8

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Information:					
2	Terminal Disclaimer Filed	TD320.PDF	1650020 f7a734ec8620af42b469652f7af0b263e1fe7 918	no	2
Warnings:					
Information:					
3	Terminal Disclaimer Filed	TD238.PDF	1651513 c8eeb6263916ce7750abc290793cd7e2a0b 86a33	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30476 19dadad54c3774de59e063c9a5a80ddb03 4b7df5	no	2
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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) R60999 1400US.C3 (0830.9)

In re Application of: John Howard Robinson et al.

Application No.: 14/527,287

Filed: October 29, 2014

For: TOBACCO-CONTAINING SMOKING ARTICLE

The owner*, RAI Strategic Holdings, Inc., of 100 percent interest 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 **prior patent** No. 7,726,320 as the term of said prior patent is defined in 35 U.S.C. 154 and 173, and as the term of said **prior patent** is presently shortened by any terminal disclaimer. 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 the **prior patent** 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 the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

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 presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

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.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 69,344

/lauren f. anderson/ — Signature
June 12, 2017 — Date

Lauren F. Anderson — Typed or printed name

919-755-8127 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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*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.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	14/527,287	ROBINSON ET AL.	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 12 June, 2017	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

PAMELA YOUNG

Technology Center: PLRC

Telephone: _____
2 TD

U.S. Patent and Trademark Office

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/527,287	Filing Date 10/29/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

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

APPLICATION AS AMENDED – PART II

AMENDMENT **06/12/2017**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** 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 number found in the appropriate box in column 1.

LIE
ROSA WEST

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

26158 7590 06/26/2017

WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

EXAMINER
NGUYEN, PHU HOANG

ART UNIT	PAPER NUMBER
1747	

DATE MAILED: 06/26/2017

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3	6397

TITLE OF INVENTION: TOBACCO-CONTAINING SMOKING ARTICLE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	09/26/2017

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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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Ecto World v. RAI
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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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)

26158 7590 06/26/2017
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3	6397

TITLE OF INVENTION: TOBACCO-CONTAINING SMOKING ARTICLE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	09/26/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, PHU HOANG	1747	131-200000

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 03-02 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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — 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.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — 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.
- ❑ Applicant changing to regular undiscounted fee 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 (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3	6397

26158 7590 06/26/2017

WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

EXAMINER	
NGUYEN, PHU HOANG	
ART UNIT	PAPER NUMBER
1747	

DATE MAILED: 06/26/2017

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.

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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 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, 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. 14/527,287	Applicant(s) ROBINSON ET AL.	
	Examiner PHU NGUYEN	Art Unit 1747	AIA (First Inventor to File) Status No

-- 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 *6/12/2017*.
   ☐ 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 *57-81*. 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 a reply 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 _____.

/PHU NGUYEN/ Examiner, Art Unit 1747	/MICHAEL H WILSON/ Supervisory Patent Examiner, Art Unit 1747

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The present application is being examined under the pre-AIA first to invent provisions.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance: The approved Terminal Disclaimer Filed 6/12/2017 put the claimed invention in conditions for allowance.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHU NGUYEN whose telephone number is (571)272-5931. The examiner can normally be reached on M-F.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wilson can be reached on 571-270-3882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PHU NGUYEN/
Examiner, Art Unit 1747

/MICHAEL H WILSON/
Supervisory Patent Examiner, Art Unit 1747

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	**Art Unit**
	PHU NGUYEN	1747

CPC						
Symbol					**Type**	**Version**
A24F		47	/	008	F	2013-01-01
A24B		15	/	12	I	2013-01-01
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A24B		13	/	02	I	2013-01-01
A24B		15	/	167	I	2016-11-01
H05B		3	/	42	I	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
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/PHU NGUYEN/ Examiner.Art Unit 1747	6/19/2017	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	25	
/MICHAEL H WILSON/ Supervisory Patent Examiner.Art Unit 1747	06/20/2017	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	**Art Unit**
	PHU NGUYEN	1747

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
131	200	A	2	4	F	1 / 00 (2006.0)						

CROSS REFERENCE(S)					
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131	194	335	352		
392	390	395	404		
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/PHU NGUYEN/ Examiner.Art Unit 1747 (Assistant Examiner)	6/19/2017 (Date)	**Total Claims Allowed:** 25	
/MICHAEL H WILSON/ Supervisory Patent Examiner.Art Unit 1747 (Primary Examiner)	06/20/2017 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	**Art Unit**
	PHU NGUYEN	1747

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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/MICHAEL H WILSON/ Supervisory Patent Examiner.Art Unit 1747	06/20/2017	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	Art Unit
	PHU NGUYEN	1747

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
See East Search History	10/2/2016	P.N
See East Search History	4/1/2017	P.N
See East Search History	6/19/2017	P.N

INTERFERENCE SEARCH			
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CONFIRMATION NO. 6397

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
14/527,287	10/29/2014	131	1747	R60999 1400US.C3

APPLICANTS

RAI STRATEGIC HOLDINGS, INC., Winston-Salem, NC;

INVENTORS

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Billy Tyrone Conner, Clemmons, NC;
Evon Llewellyn Crooks, Mocksville, NC;
Dempsey Bailey Brewer JR., East Bend, NC;

**** CONTINUING DATA ***************************

This application is a CON of 13/297,983 11/16/2011 PAT 8899238
which is a CON of 12/763,890 04/20/2010 PAT 8079371
which is a CON of 11/550,634 10/18/2006 PAT 7726320

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

11/10/2014

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /PHU HOANG NGUYEN/ Examiner's Signature	☐ Met after Allowance P.N Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		NC	5	25	3

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P.O. BOX 7037
ATLANTA, GA 30357-0037
UNITED STATES

TITLE

Tobacco-Containing Smoking Article

FILING FEE RECEIVED		
2140	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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		"5156170" | "5159940" | "5159942" | "5159944" | "5178167" | "5183062" | "5203355" | "5211684" | "5220930" | "5224498" | "5240014" | "5240016" | "5247947" | "5261425" | "5271419" | "5285798" | "5303720" | "5327917" | "5345955" | "5357984" | "5360023" | "5369723" | "5396909" | "5396911" | "5462073" | "5469871" | "5533530" | "5546965" | "5551451" | "5560376" | "5568819" | "5588446" | "5593792" | "5595577" | "5598868" | "5622190" | "5699812" | "5706834" | "5711320" | "5715844" | "5718250" | "5727571" | "5778899" | "5819751" | "5829453" | "5865185" | "5874508" | "5878752" | "5880439" | "5902431" | "5915387" | "5934289" | "5938018" | "5944025" | "6089857" | "6095152" | "6164287" | "6182670" | "6229115" | "6367481" | "6378528" | "6397852" | "6408856" | "6530377" | "6537186" | "6578584" | "6584979" | "6595218" | "6615842" | "6631722" | "6656412" | "6730832" | "6761174" | "6779528" | "6789547" | "6805174" | "6814786" | "6823873" | "6848450" | "6907885" | "6913784" | "7004896").PN.				
S19	38	S18 and cartridge	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/28 16:59
S20	29	A24F47/$ and cartridge and substrate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/28 17:00
S22	4	(("20120060853") or ("7726320")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/01/28 17:02
S24	21	A24F$/$ and polyethylene near2 terephthalate and electronic	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:14
S27	18	polyethylene near2 terephthalate and electronic and absorbent and tobacco and smoking	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:17
S28	359	("20030131859" | "20040173229" | "20050016549" | "20050066986" | "20060185687" | "20060196518" | "20070062549" | "3258015" | "3356094" |	US-PGPUB; USPAT; USOCR;	OR	OFF	2014/01/29 17:17

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IPR2024-01280

		"3516417" | "3614956" | "3738374" | "3844294" | "3878850" | "3931824" | "3943941" | "4044777" | "4079742" | "4190046" | "4219031" | "4233993" | "4284089" | "4286604" | "4326544" | "4340072" | "4347855" | "4391285" | "4635651" | "4700727" | "4714082" | "4735217" | "4756318" | "4771795" | "4793365" | "4800903" | "4807809" | "4819665" | "4823817" | "4836225" | "4848374" | "4874000" | "4892109" | "4893639" | "4917121" | "4917128" | "4920990" | "4924886" | "4947874" | "4961438" | "4966171" | "4969476" | "4972855" | "4977908" | "4991606" | "5020548" | "5025814" | "5033483" | "5040551" | "5050621" | "5060667" | "5060671" | "5060676" | "5065776" | "5072744" | "5074321" | "5076296" | "5076297" | "5092353" | "5099861" | "5101839" | "5105835" | "5105836" | "5105837" | "5105838" | "5115820" | "5146934" | "5148821" | "5159940" | "5159942" | "5178167" | "5183062" | "5203355" | "5211684" | "5224498" | "5240014" | "5240016" | "5271419" | "5285798" | "5293883" | "5327917" | "5345955" | "5357984" | "5360023" | "5369723" | "5388574" | "5396911" | "5533530" | "5551451" | "5588446" | "5593792" | "5595577" | "5598868" | "5692525" | "5715844" | "5743251" | "5778899" | "5799663" | "5819751" | "5829453" | "5865185" | "5878752" | "5880439" | "5915387" | "5934289" | "6033623" | "6053176" | "6089857" | "6095152" | "6146934" | "6164287" | "6182670" | "6234167" | "6289898" | "6397852" | "6408856" | "6516796" | "6532965" | "6537186" | "6578584" | "6591841" | "6598607" | "6615840" | "6730832" | "6823873" | "7117867").PN.	EPO; JPO; DERWENT			
S31	713	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:20
S32	12	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber) and base near2 web	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:20
S33	65	(polyethylene near2 terephthalate near2 fiber) same (carbon near2 fiber) and absorbent	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/01/29 17:34
S34	28	(polyethylene near2 terephthalate near2 fiber) same bio	US-PGPUB; USPAT;	OR	ON	2014/02/02 00:35

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			USOCR; EPO; JPO; DERWENT			
S38	2	("3486508").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/02/02 01:31
S40	22	A24F$/$ and paper same "metallic foil"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/02/02 01:32
S42	14	A24F$/$ and paper and base near2 web and calcium near carbonate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/02/03 15:41
S43	2	("8079371").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/02/03 21:22
S44	7	cigarette near2 paper and carbon near2 fiber and carbon near2 particle and carbonate near2 particle	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:31
S45	0	(A24B15/165).cpc. and controller and aerosol and heater	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:32
S46	2	(A24B15/14).cpc. and controller and aerosol and heater	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:32
S47	0	(A24D1/18).cpc. and controller and aerosol and heater	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2014/08/02 23:33
S49	142	("1771366" | "2057353" | "2104266" | "20020146242" | "20030226837" | "20040129280" | "20040200488" | "20040226568" | "20050016550" | "20060016453" | "20060196518" | "20070074734" | "20070102013" | "20070215167" | "3200819" | "4303083" | "4907606" | "4945931" | "4986286" | "5019122" | "5042510" | "5093894" | "5261424" | "5353813" | "5408574" |	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/09/29 23:59

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		"5468936" | "5498850" | "5515842" | "5530225" | "5564442" | "5649554" | "5666977" | "5687746" | "5726421" | "5727571" | "5865186" | "5894841" | "5954979" | "5967148" | "6095153" | "6125853" | "6155268" | "6164287" | "6196218" | "6196219" | "6601776" | "6772756" | "6803545" | "6854461" | "6854470" | "7293565").PN.				
S50	1	S49 and glycerin and (electrical electronic) and controller	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/30 00:00
S53	122	smoking near2 article and tobacco near extract and heater	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2016/10/02 20:40
S54	2	("8899238").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/10/02 21:47
S55	0	(smoking and puff and carrier and wick and heater and controller).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2016/10/02 21:55
S56	1	(smoking and puff and carrier and wick$3 and heater and controller).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2016/10/02 21:55
S58	4	(("7726320") or ("8899238")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2017/04/01 01:42
S59	2	("20150047656").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2017/04/01 01:46
S60	6	(("7726320") or ("8899238") or ("8079371")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2017/04/01 02:00
S61	2	("20150047656").PN.	US-PGPUB; USPAT;	OR	OFF	2017/04/01 13:33

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Ecto World v. RAI
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			USOCR; EPO; JPO; DERWENT			
S62	2	(smoking and puff and carrier and wick$3 and heater and controller).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2017/04/01 13:46

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	(smoking and puff and carrier and wick$3 and heater and controller).clm.	US-PGPUB; USPAT	OR	ON	2017/06/19 22:26
S16	1	(tobacco and aerosol and heating and cartridge).clm.	USPAT	OR	ON	2010/01/11 13:26
S48	5	(tobacco and tub$3 and electric$3 and heater and aerosol).clm.	US-PGPUB; USPAT	OR	ON	2014/08/02 23:34
S51	0	(tobacco and tub$3 and electric$3 and heater and aerosol and absorbent).clm.	US-PGPUB; USPAT	OR	ON	2014/09/30 00:14
S52	1	(tobacco and electric$3 and heater and aerosol and absorbent).clm.	US-PGPUB; USPAT	OR	ON	2014/09/30 00:15
S57	1	(smoking and puff and carrier and wick$3 and heater and controller).clm.	US-PGPUB; USPAT	OR	ON	2016/10/02 21:55

6/ 19/ 2017 10:30:03 PM
C:\ Users\ pnguyen9\ Documents\ EAST\ Workspaces\ 14527287.wsp

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OK TO ENTER: /P.H.N/

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Robinson et al.	Confirmation No.:	6397
Appl No.:	14/527,287	Group Art Unit:	1747
Filed:	October 29, 2014	Examiner:	Nguyen, Phu Hoang
For:	TOBACCO-CONTAINING SMOKING ARTICLE		

Docket No.: **R60999 1400US.C3 (0830.9)**
Customer No.: 26158

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

REPLY UNDER 37 CFR § 1.116

Sir:

In response to the final Office Action dated April 12, 2017, please consider the following:

A listing of the **pending claims** begins on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

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Ecto World v. RAI
IPR2024-01280
Page 546

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14527287	ROBINSON ET AL.
	Examiner	Art Unit
	PHU NGUYEN	1747

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/02/2016	04/01/2017	06/19/2017						
1	57	✓	✓	=						
2	58	✓	✓	=						
3	59	✓	✓	=						
4	60	✓	✓	=						
5	61	✓	✓	=						
6	62	✓	✓	=						
7	63	✓	✓	=						
8	64	✓	✓	=						
9	65	✓	✓	=						
10	66	✓	✓	=						
11	67	✓	✓	=						
12	68	✓	✓	=						
13	69	✓	✓	=						
14	70	✓	✓	=						
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23	79	✓	✓	=						
24	80	✓	✓	=						
25	81	✓	✓	=						

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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)

26158 7590 06/26/2017
WOMBLE CARLYLE SANDRIDGE & RICE, LLP
ATTN: IP DOCKETING
P.O. BOX 7037
ATLANTA, GA 30357-0037

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/527,287	10/29/2014	John Howard Robinson	R60999 1400US.C3	6397

TITLE OF INVENTION: TOBACCO-CONTAINING SMOKING ARTICLE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	09/26/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, PHU HOANG	1747	131-200000

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 03-02 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 Womble Carlyle Sandridge & Rice, LLP
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 has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: RAI STRATEGIC HOLDINGS, INC.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Winston-Salem, North Carolina

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies .....

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 09-0528 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ Applicant certifying micro entity status. See 37 CFR 1.29
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.
☐ Applicant asserting small entity status. See 37 CFR 1.27
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.
☐ Applicant changing to regular undiscounted fee 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 /lauren f. anderson/ Date September 26, 2017
Typed or printed name Lauren F. Anderson Registration No. 69,344

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Ecto World v. RAI
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Electronic Patent Application Fee Transmittal

Application Number:	14527287
Filing Date:	29-Oct-2014
Title of Invention:	TOBACCO-CONTAINING SMOKING ARTICLE
First Named Inventor/Applicant Name:	John Howard Robinson
Filer:	Lauren F Anderson/Tenika Askew
Attorney Docket Number:	R60999 1400US.C3

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:				
UTILITY APPL ISSUE FEE	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**960**

Electronic Acknowledgement Receipt

EFS ID:	30470754
Application Number:	14527287
International Application Number:	
Confirmation Number:	6397
Title of Invention:	TOBACCO-CONTAINING SMOKING ARTICLE
First Named Inventor/Applicant Name:	John Howard Robinson
Customer Number:	26158
Filer:	Lauren F Anderson/Tenika Askew
Filer Authorized By:	Lauren F Anderson
Attorney Docket Number:	R60999 1400US.C3
Receipt Date:	26-SEP-2017
Filing Date:	29-OCT-2014
Time Stamp:	14:10:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$960
RAM confirmation Number	092717INTEFSW00000385090528
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	Issue Fee Payment (PTO-85B)	R609991400USC3_IssueFee.pdf	275764 e6866c13353b4dbe2f187f942a55c082e715c605	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30789 2d1271fa4a4b737257e6341588d24462de78ac4e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	306553		

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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.

Substitute for form 1449/PTO (Revised 07/2005)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	14/527,287
				Filing Date	October 29, 2014
				First Named Inventor	John Howard Robinson
				Group Art Unit	
				Examiner Name	
Sheet	6	of	13	Attorney Docket Number	R60999 1400US.C3 (0830.9)

U. S. PATENT DOCUMENTS					
	134	US-6,408,856	06-25-2002	McAdam	
	135	US-6,516,796	02-11-2003	Cox et al.	
	136	US-6,532,965	03-18-2003	Abhulimen et al.	
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	148	US-2005/0016549	01-27-2005	Banerjee et al.	
	149	US-2005/0066986	03-31-2005	Nestor et al.	
	150	US-6,994,096	02-07-2006	Rostami et al.	
	151	US-2006/0185687	08-24-2006	Hearn et al.	
	152	US-2006/0196518	09-07-2006	Hon	
	153	US-7,117,867	10-10-2006	Cox et al.	
	154	US-2007/0062549	03-22-2007	Holton, Jr., et al.	
	155	US-2007/0074734	04-05-2007	Braunshteyn et al.	
	156	US-2007/0267031	11-22-2007	Hon	
	157	US-1,771,366	07-22-1930	Wyss et al.	
	158	US-2,057,353	10-13-1936	Whittemore, Jr.	
	159	US-2,104,266	01-04-1938	McCormick	
Change(s) applied to document, /M.E.G./ 6/30/2017	160	US-3,200,819	08/1965 ~~04-17-1963~~	Gilbert	

Examiner Signature		Date Considered	

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.N./

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/527,287	10/31/2017	9801416	R60999 1400US.C3	6397

26158 7590 10/11/2017

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ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 284 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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