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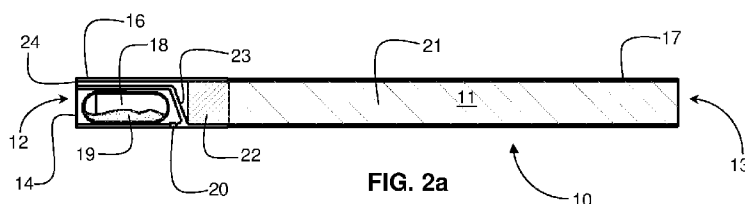
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(54) Title: MODIFIED RISK TOBACCO PRODUCT



(57) Abstract: A smoking device (10) has a smoke-yield generating section (17) configured to produce smoke and a powder-entrain-
ing mechanism (18, 19) sharing a common airflow conduit (24) with the smoke produced by the smoke-yield generating section so
as to create a combined airstream. The smoke-yield generating section (17) may include a pyrolysis or combustion or vaporization
mechanism.

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Modified Risk Tobacco Product

FIELD OF THE INVENTION

This invention relates generally to cigarette additives and so-called “modified risk tobacco products”.

BACKGROUND OF THE INVENTION

5 Many years and much research have been dedicated to the cessation of smoking and the reduction in the health risks associated with smoking. For example, the use of heat-not-burn technology and e-cigarettes to provide tobacco vapor without the combustion products has been studied extensively, and a number of products have reached the market. However, so far this approach has not been commercially
10 successful mainly due to poor consumer acceptance. Smoking cessation products have focused on nicotine replacement therapy (NRT), and include such products as nicotine gum and transdermal patches. However, research from Harvard (reported in the journal Tobacco Control; 10, 1136) concludes that people who have quit smoking relapsed at equivalent rates whether or not they used NRT to help them in their attempts to quit.
15 Thus the steady-state nicotine supply provided by NRTs does not seem to satisfy the desires behind smoking. The experience with modified risk tobacco products so far indicates that that factors derived from the combustion itself are key factors in the attractiveness of cigarette smoking.

Another approach to reducing the health damage resulting from smoking is to
20 leave the cigarette structure much as it is at present but merely reduce the tobacco content or alter its burning conditions. One approach has been to introduce filter ventilation to dilute the smoke yield. A problem with this approach is that the smoker changes his smoking behavior in order to adjust (compensate) for any change (increase or decrease) in smoke yield. This negates much of the supposed benefit, while
25 potentially also frustrating the consumer.

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Likewise, there are many cigarette holders that include active filters and/or additives or modifiers. But these significantly alter the smoker's experience because the "look and feel" are different since the smoker has the feel of plastic in his mouth. Furthermore, they are intrusive because the cigarette must be installed within a cavity of
5 the cigarette holder. Cigarette holders are rarely an option for seasoned smokers.

Accordingly, there is a need for a healthier smoking device which overcomes the limitations of the prior art by delivering a lower, overall, yield of harmful substances while avoiding compensatory smoking behavior without altering or detracting from the regular "user experience" typically relating to the handling, "mouth-feel", throat impact,
10 smoke-production and inhalation, and nicotine-delivery aspects of the cigarette.

SUMMARY OF THE INVENTION

It is therefore an objective of the present invention to provide a cigarette which decreases the health risk of smoking.

It is a further objective of the invention to maintain the nicotine-delivery factor
15 and other "user experience" factors associated with smoking conventional cigarettes.

It is a further objective of the invention to substantially maintain the tobacco flavor factor associated with smoking conventional cigarettes.

It is yet a further objective of the invention to reduce substantially (by at least one third) exposure to harmful smoke constituents as compared to conventional
20 cigarettes.

It is a still further objective of the invention to substantially maintain the structure and texture/feel factor associated with smoking conventional cigarettes.

These objectives are realized in accordance with the invention by a cigarette have the features of the independent claims.

25 Thus, the present invention provides a cigarette-like smoking device that synergistically combines a pyrolysis/combustion/vaporization assembly and a powder-entraining mechanism, both sharing a common air-flow housing. On puffing on the device, powder released by the powder-entraining mechanism is merged with the compounds resulting from the pyrolysis/combustion/vaporization (hereinafter "smoke
30 yield products") process into a combined airstream, while maintaining the "user experience" of conventional cigarettes.

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The combination can be achieved in either serial or parallel fashion. In the serial combination, the smoke yield from the pyrolysis/vaporization medium passes through the powder-entraining mechanism on its way to the smoker's mouth. In the parallel combination, the smoke yield and the entrained powders are generated by parallel
5 airflows that are directed separately through a common housing and merge only on exit from the housing where they enter the consumer's mouth. In yet a different embodiment, the two mechanisms are both present within the housing but have no connecting element. For example, the smoker can light the cigarette and have the pyrolysis medium burn, but in fact only the clean airstream through the powder-
10 entraining mechanism is inhaled.

The composition of the smoke yield being quantitatively and qualitatively altered by such modifications may result in altered taste, sensorial and user experience factors. In this case, the powder-entraining mechanism may also serve to compensate for this loss or alteration by providing at least some of the effect of by introducing
15 similar or additional compounds in the form of dry powders.

In a further aspect of the present invention, the tobacco-section (i.e. the pyrolysis/vaporization medium) of the device does not undergo pyrolysis or combustion as per a conventional cigarette, but instead employs heat-not-burn technology, such as that employed in the Ploom product (Ploom, Inc, CA, USA) to vaporize the pyrolysis
20 medium.

A typical cigarette is comprised of a filter, tipping paper, rolling paper and tobacco blend. The device of the present invention substantially retains this structure, while adding a small powder-entraining mechanism within the proximal end of said device (i.e. the mouth end), and changing the composition of the tobacco blend. For
25 example, said powder-entraining mechanism can serve to entrain respirable-size powder (having diameters in the 0.5 micron to 5 micron range) made from tobacco extracts containing forms of nicotine or nicotine compounds into the air-stream, while the smoke yield is modified to contain a smaller proportion of harmful smoke constituents. In this example, the consumer can still receive the expected dose of nicotine per puff, while
30 inhaling lower concentrations of harmful smoke constituents.

The powder delivered into the airstream by the powder-entraining mechanism can serve to compensate for one or more smoke yield products which would be lacking

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as a result of modifications in cigarette design to produce a reduced risk product; thereby maintaining consumer satisfaction. For example, powders delivered by said powder-entraining mechanism can include known tobacco flavors such as beta-Damascenone, Megastigmatrienones (which are permitted flavorants), 4-keto-
5 oxyphorone plus furaneol, isovaleric acid, 3-ethylpyridine; and 4-Isobutyl- γ -butyrolactone, Octahydrobenzopyrone, Oxo-Edulan I, Oxo-Edulan II, 4-Oxo-beta-ionone, and 3-Ethylpyridine. Complementary flavors such as chamomile extract, valerian root (or cetylpyrazine) and cloves (or Eugenol) may also be added. Where the chemical itself is not a solid, salts or other chemical derivatives of these chemicals may
10 be used to provide the powder formulation. By delivering powders of this nature, the smoking taste can be enhanced despite the reduced flavor delivered from the pyrolysis/combustion/vaporization mechanism. As opposed to the nicotine which needs to be provided in respirable form, the flavor-providing powder particles should be of a non-respirable diameter - preferably 10 microns and up – so that they are trapped in the
15 mouth and throat as opposed to delivered to the lungs. Inhalable and non-inhalable powders can be blended together, the latter serving as a carrier and assisting the delivery of the former.

Furthermore, the powder-entraining mechanism can be combined with other technologies aimed at reducing the negative health effects of smoking such as activated
20 carbon filters, filter ventilation, aerosol generation and reduced toxicant tobacco. The composition of the smoke yield being quantitatively and qualitatively altered by such modifications may result in altered taste, sensorial and user experience factors. In this case, the powder-entraining mechanism may serve to compensate for this loss or alteration by providing at least some of the effect, by introducing similar or additional
25 compounds in the form of dry powders.

A further example illustrating the use of this synergistic combination is the provision within the powder-entraining mechanism of powder particles designed to compensate for and/or counteract the influence of the biologically active smoke yield products. Examples of such particles may have antioxidant and/or anti-inflammatory
30 properties and include glutathione, L-glutathione, enzymes catalase, peroxide dismutase, L-selenomethionine, L-selenocysteine, resveratrol/resveratrol, vitamin C, or a

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member selected from the group consisting of ascorbylpalmitate and ascorbic acid esters, L-cysteine and N-acetyl-L-cysteine.

A still further example illustrating the use of this synergistic combination is the provision within the powder-entraining mechanism of powder particles designed to
5 provide a source of nitric oxide, for example Arginine, L-Arginine, Alpha-Ketoglutarate and Arginine HCL.

In a preferred embodiment of the invention, the powder-entraining mechanism comprises a porous capsule containing the powder to be delivered. In a further preferred embodiment said porous capsule or container is rattled within the conduit housing by
10 the airflow generated by the puffing action, further enhancing the entraining of particles from within the capsule into the airflow.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, embodiments of a substitute cigarette will now be described, by way of non-
15 limiting example only, with reference to the accompanying drawings, in which:

Fig. 1 is a pictorial representation of a cigarette according to a first embodiment of the invention having a capsule toward its mouthpiece for combing airstreams from different sources;

Fig. 2a is a cross-sectional view showing schematically the internal components
20 of the cigarette according to a first embodiment;

Fig. 2b is an enlarged cross-sectional view showing a detail of the cigarette shown in Fig. 2a;

Fig. 3 is a cross-sectional view showing schematically the internal components of the cigarette according to a second embodiment;

25 **Figs. 4a and 4b** show respectively exploded and assembled views of the capsule according to a first embodiment;

Figs. 5a, 5b and 5c show schematically cross-sectional end views of the capsule in three different orientations; and

Fig. 6 is a pictorial representation of a cigarette according to a different embodi-
30 ment wherein the tobacco section is vaporized as opposed to pyrolysed.

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DETAILED DESCRIPTION OF EMBODIMENTS

In the following description of some embodiments, identical components that appear in more than one figure or that share similar functionality will be referenced by identical reference symbols.

5 Fig. 1 shows pictorially a cigarette 10 (constituting a smoking device) having a housing 11 whose proximal end 12 is inserted into the smoker's mouth and will therefore be referred to as a "mouthpiece" and at whose distal end 13 the cigarette is lit and pyrolysis/combustion is initiated. The proximal end 12 terminates in a porous screen 14, which enables the compounds emerging from the cigarette to be sucked into the mouth
10 and/or lungs as the cigarette is "puffed". As shown, the external structure and mode of operation of the cigarette 10 is thus similar to conventional cigarettes, advantageously maintaining the existing user experience or look-and-feel. To this end, the housing 11 is preferably formed from tipping paper and cigarette paper, similar to that used in the current art.

15 Fig. 2a is a cross-sectional view showing schematically the internal components of the cigarette 10 according to a first embodiment. The housing 11 comprises two sections, namely a mouth section 16 at the proximal end 12 covered by the porous screen 14 and at the distal end 13 a combustion section 17 constituting a smoke-yield generating section. The mouth section 16 contains a capsule 18 containing a powder 19
20 and is provided with an air inlet 20 in a side wall of the housing 11. The combustion section 17 contains a pyrolysis medium 21 such as tobacco and is separated from the mouth section 16 by a filter 22. Alternatively, part of or all of the filter 22 may be located in the mouth section 16 on the other side of the capsule 18, as long as the capsule 18 remains at least partially constrained in position and the powder particles
25 emerging from the capsule 18 are able to merge into the airstream through the cigarette. In this embodiment, the air-flow into the capsule 18 derives from the air inlet 20 which may be implemented either as one or more holes, as an inlet via air-porous paper or as an annular structure. The air-flow containing the smoke-yield from the pyrolysis medium 21 is diverted by a separating wall 23 into a passage 24 shown in enlarged
30 detail in Fig. 2b such that it bypasses the mouth section 16 containing the capsule 18 and combines with the airstream at or just before the screen 14 to form a combined airstream, depending on whether the separating wall 23 extends all the way to the screen

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14 or terminates slightly before it. In this way the smoke-yield and the powder are merged together for the smoker. By altering the cross-sectional area of the passage 24, the ratio of airflow from the smoke yield to airflow from the air inlet 20 can be adjusted. Preferably, the cross-section of the passage 24 is negligible as compared with that of the
5 mouth section 16 such that almost all the airflow inhaled by the consumer derives from the clear air entering the air inlet 20. Taking this concept still further, the separating wall 23 may be dimensioned to cover the entire diameter of the housing 11, such that the combustion section 17 containing the pyrolysis medium is entirely separated from the airflow entering the smoker's mouth. In this case, no filter is required as the smoke
10 is not inhaled. In all cases, much of the satisfaction to the smoker deriving from the puffing away at a cigarette remains, and the "look and feel" and social factors of the cigarette burning is also retained; however the health risk for the smoker is sharply reduced and approaches that of secondary smoking.

The separating wall 23 and passage 24 (when provided) are preferably formed
15 using card or paper converting technology, for low fabrication cost and also because the small dimensions make plastic fabrication difficult. Preferably, the housing is also made of paper, such that converting technology is suitable for fabricating the cigarette.

Fig. 3 is a cross-sectional view showing schematically the internal components of the cigarette 10 according to a second embodiment. As in the first embodiment
20 described above with reference to Fig. 2, the housing 11 comprises two sections, namely a mouth section 16 at the proximal end 12 covered by the porous screen 14 and a combustion section 17 at the distal end 13. The mouth section 16 contains a capsule 18 containing a powder 19. The combustion section 17 contains a pyrolysis medium 21 such as tobacco and is separated from the mouth section 16 by a filter 22. Alternatively,
25 part of or all of the filter 22 may be located in the mouth section 16 on the other side of the capsule 18, as long as the capsule 18 remains at least partially constrained in position and the powder particles emerging from the capsule 18 are able to merge into the airstream through the cigarette. In this embodiment, there is no air inlet in the side of the mouth section 16. Instead, the air-flow into the capsule 18 derives from the air
30 flow created by the combustion section 17. This air-flow contains the smoke-yield from the pyrolysis medium 21 and passes through the filter 22 where it enters the mouth

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section 16. In this way the smoke-yield and the powder are merged together for the smoker. Additionally, the cigarette may be ventilated as is typical in the art.

The pyrolysis medium 21 comprises materials that are burned or vaporized during the regular functioning of the cigarette in a manner similar to what happens in
5 conventional cigarettes. In a preferred embodiment, the pyrolysis medium 21 comprises significantly less tobacco and/or lower toxicant tobacco than that in most currently marketed cigarettes, such that the quantity of harmful smoke constituents resulting from the vaporization or pyrolysis/combustion is significantly less than that of existing cigarettes. For example, in one embodiment, the number of harmful smoke constituents
10 is reduced by about one-third. In another embodiment, they are reduced to one-half or less than that of existing standard cigarettes. Preferable compositions for the pyrolysis medium 21 include tobacco substitute sheets and reduced toxicant tobacco.

A number of potential filter technologies known in the art can be used for the filter 22 of the present invention, including but not limited to carbon filters, amine-
15 functionalized resin. Similarly, known ventilation techniques can be integrated into the cigarette for optimal control of the airflow. These include ventilation holes, or channels in the filter.

Figs. 4a and 4b show respectively exploded and assembled views of the capsule 18 according to a first embodiment that uses a standard capsule formed of hard-gelatin
20 or Hydroxypropyl methylcellulose (HPMC). The capsule 18 is formed in two parts comprising a distal portion 30 that clips inside a proximal portion 32. Obviously, the capsule could be formed such that the proximal portion clips inside the distal portion since it is axially symmetrical and its orientation within the housing is not important. However, unlike typical capsules of this type, the capsule 18 used in the cigarette of the
25 present invention is porous such that airflow through it can release and entrain the powder within. To this end, two or more holes are required in the capsule 18, shown by way of example only as being limited to a distal hole 34 and a proximal hole 36. As will be obvious to one skilled in the art, the capsule can also be fabricated using alternative technologies including wire-frames and/or using metals or plastics. In a further
30 embodiment, the capsule is formed using paper or card and constitutes a section of a structure entirely or mostly formed using converting technology.

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By way of non-limiting example, the filling of the powder 19 is such that a layer forms on the inner surface of the capsule 18, where the powder 19 is entrained into the airstream through the cigarette by one or more mechanisms including but not limited to: (a) the airflow through the capsule, (b) turbulence within the capsule created by the
5 airflow, and (c) rattling of the capsule created by airflow flowing around the capsule as described below with reference to Fig. 4a to 4c. Preferably, the powder 19 comprises inhalable-size particles containing tobacco extracts containing forms of nicotine or nicotine compounds typically between 1 and 3 microns in diameter, together with optional particles conveying flavor and taste elements. These elements may include
10 commercially available flavors, or sensorial mediators or extracts obtained from tobacco distillation /extraction. They have a larger diameter than the respirable size particles, which are typically 1-3 microns in diameter to the extent that they are to be retained in the mouth and/or throat. Particles that we wish to deposit in the mouth and throat will preferably be in the 50-200 micron range – to ensure that they are light enough to be
15 entrained in the airflow, but not so small as to get into the lungs. Compounds such as menthol, and eugenol (clove oil) may further be incorporated.

The key elements of this embodiment are that, once the cigarette has been lit at its proximal end, and as airflow passes through it as a resulting of the consumer “taking a puff”, the two types of compounds generated by the cigarette – the powder 19 from
20 the capsule 18 and the smoke and other particles from the vaporization or pyrolysis of the pyrolysis medium 21 or whatever remains of them after filtering – are merged in the airstream such that the consumer breathes in both together. This synergetic effect means that even though the smoke yield products may be lacking in, or have a reduced amount of, one or more compounds, the powder 19 from the capsule 18 can serve to compensate
25 for this lack by providing the desired or replacement compound(s) directly. Examples of the compound to be thus provided can be selected from the group including tobacco extracts and other nicotine-containing compounds, flavor enhancers, and potentially also antioxidants and/or anti-inflammatory compounds to counteract the effect of the toxins remaining.

30 Fig. 5a shows schematically a cross-sectional end view of an embodiment of the capsule 18 within the housing 11. Air flow past the side wall of the capsule 18 causes it to bounce or rattle within the housing such that at successive instants of time a different

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generatrix of the capsule 18 contacts a different generatrix of an inner side surface of the housing 11. As is known in geometry, the generatrix of a cylinder is a line on the side surface thereof that is parallel to the longitudinal axis of the cylinder and generates the volume of the cylinder as it is rotated about the axis. The housing 11 can be paper or
5 card or any other suitable material in which the cigarette is wrapped, or a special reinforced part thereof especially tailored to hold the capsule. This arrangement leaves an open area 40, through which part of the airstream can flow through the cigarette. In this embodiment, part of the airstream goes through the capsule 18, entering through the distal hole 34 and emerging from the proximal hole 36. By way of non-limiting
10 example, altering the ratio between the respective areas of the distal hole 34 and the open area 40 enables adjustment of the ratio of powder entrained per volume of air stream. This factor, together with the shape of the capsule, enables alteration of the rattling phenomenon implemented by the arrangement shown. The rattling serves to enable more efficient entrainment of the powder within the capsule into the airflow, and
15 requires that the capsule 18 be only partially constrained, so as to permit it to be able to be "jiggled" a little. However, the invention has been found to operate effectively without the need to rattle the capsule. In one such embodiment, all the powder was released over the 8-10 breaths typical of a cigarette.

Figs. 5b and 5c show two additional cross-sectional end views show the rattling
20 phenomenon associated with this embodiment, wherein the capsule 18 is shifted from the initial position shown in Fig. 5a to the parallel position on the other side of the housing 13 shown in Fig. 5c via an intermediate position shown in Fig. 5b where it is centrally disposed within the housing and makes no contact with the inner side surface thereof. It is to be noted that this type of linear back-and-forth type of rattling is not the
25 only possible rattling that may be implemented. By making appropriate engineering changes, the capsule can be made to spin or rattle up and down parallel to the longitudinal axis (i.e. into and out of the paper). However, the shape and size of the capsule relative to the diameter of the housing is such that the capsule cannot turn over or turn sideways, since this would at least temporarily prevent the entrainment of the
30 particles within.

As inhalable particles are often sensitive to moisture, the cigarette 10 may further comprise desiccant materials to counteract the effect of humidity on the

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particles. Such desiccant may be included in the pyrolysis medium 21, the filter 22 or the gel from which the capsule is fabricated, among other places in the cigarette. As a further approach to humidity-protection, the cigarette may be wrapped within a plastic or other film having a barrier layer, as is known in the art.

5 Fig. 6 is a pictorial representation of a cigarette 10 according to a different embodiment wherein heat-not-burn technology is used to vaporize the pyrolysis medium. In this embodiment, the cigarette 10 is inserted into a heat-generating device 45 such as that used by the Ploom product (see <http://www.ploom.com/pax>), and therefore the “smoke-yield” is the result of vaporization as opposed to pyrolysis. As in
10 the previous embodiments, the smoke-yield generating section may be a combustion section 17, typically constituted by a tobacco rod, which is inserted into the heat-generating device 45. Regardless of how the smoke is generated, the overall scheme remains of compensating for lacking elements in the vapor by providing at least some of the elements by using entrained powder.

15 It will be understood that while the invention has been described with regard to a reduced risk cigarette, the principles of the invention are equally applicable to other smoking products such as cigars and even drugs that are inhaled by smoking and where reduced risk is desired. The description is therefore not intended to be limiting, the scope of the invention being defined solely by the appended claims.

CLAIMS:

1. A smoking device (10) comprising a smoke-yield generating section (17) and a powder-entraining mechanism (18, 19) sharing a common airflow conduit (24) with the product of the smoke-yield generating section so as to create a combined airstream.
- 5 2. The smoking device according to claim 1, wherein the powder-entraining mechanism (18, 19) contains powder (19) that compensates for a deficiency in one or more compounds from said smoke yield.
3. The device of claim 1 or 2, wherein said powder-entraining mechanism comprises a capsule having at least two holes, and said powder is located within the
10 capsule, whereby said powder is entrained as a result of the airflow through the capsule.
4. The device of claim 3 wherein said capsule is caused to rattle by the airflow passing around or through said capsule.
5. The device of any one of claims 1 to 4, wherein said smoke yield contains a smaller proportion of harmful smoke constituents than that of conventional cigarettes.
- 15 6. The device of any one of claims 1 to 5, wherein the smoke-yield generating section (17) is connected via a passage to a proximal end of the smoking device in parallel with an airflow passing through the powder-entraining mechanism (18, 19).
7. The claim of claim 6 where said passage is dimensioned so as to reduce the amount of smoke yield inhaled.
- 20 8. The device of any one of claims 1 to 5, wherein the smoke-yield generating section (17) is decoupled from a proximal end of the device so as to prevent inhalation of smoke yield products.
9. A smoking device comprising a smoke-yield generating section (17) producing smoke yield and a powder-entraining mechanism having separate airflow channels for
25 separately directing smoke and powder, respectively, via said separate airflow channels into the mouth of a smoker where they are combined.

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- 10.** The smoking device according to claim 9, wherein the powder-entraining mechanism (18, 19) contains powder (19) that compensates for a deficiency in one or more compounds from said smoke yield.
- 11.** The smoking device according to any one of the preceding claims, wherein the
5 product of the smoke-yield generating section (17) is of reduced-toxicant as compared with conventional cigarettes.
- 12.** The device of any one of the preceding claims, wherein the powder contains sensorial or taste compounds which compensate for altered aspects of said smoke yield.
- 13.** The device of any one of the preceding claims, wherein the powder contains at
10 least one compound selected from the group including nicotine, flavor compounds, tobacco flavors, sensorial enhancers, antioxidants, and anti-inflammatory compounds.
- 14.** The device of any one of the preceding claims, wherein said smoke yield contains a smaller proportion of harmful smoke constituents than that of conventional cigarettes.
- 15.** The smoking device according to any one of claims 1 to 14, wherein the smoke-
15 yield generating section (17) comprises a pyrolysis or combustion or vaporization mechanism.
- 16.** The smoking device according to any one of claims 1 to 14, wherein the smoke-
20 yield generating section (17) comprises a heat-not-burn mechanism producing vaporized tobacco.

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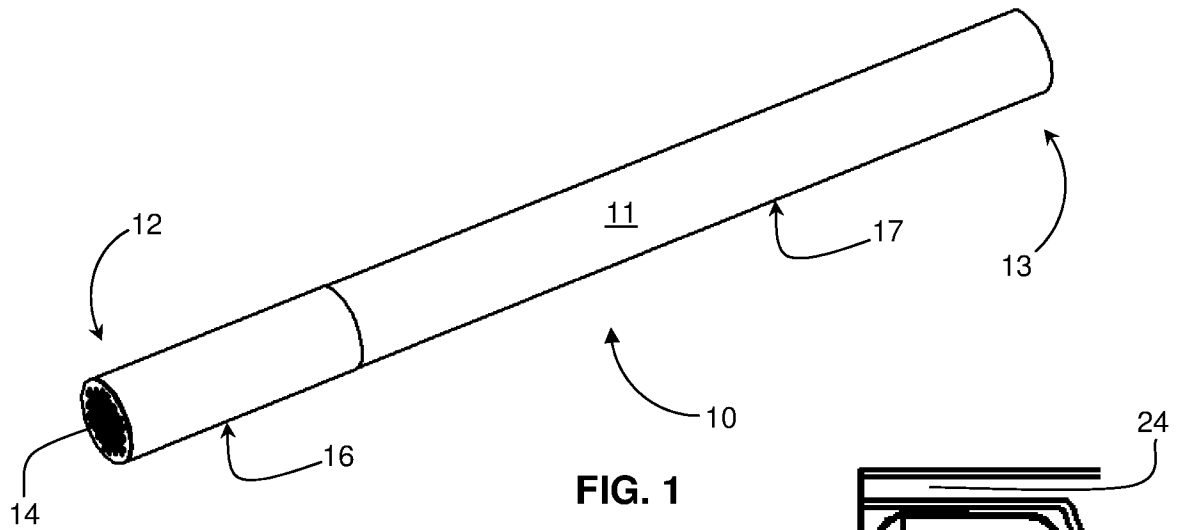


FIG. 1

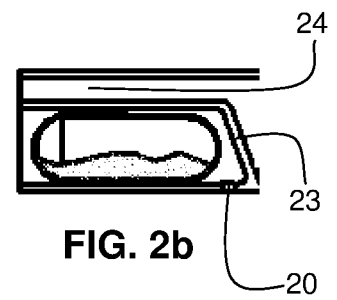


FIG. 2b

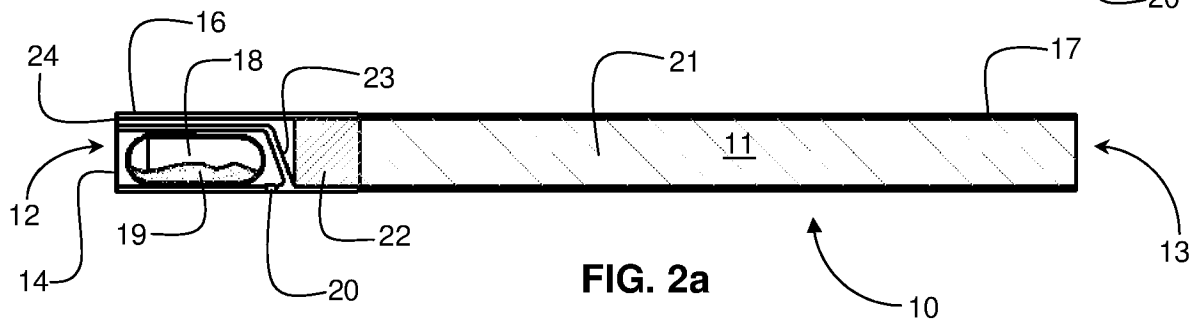


FIG. 2a

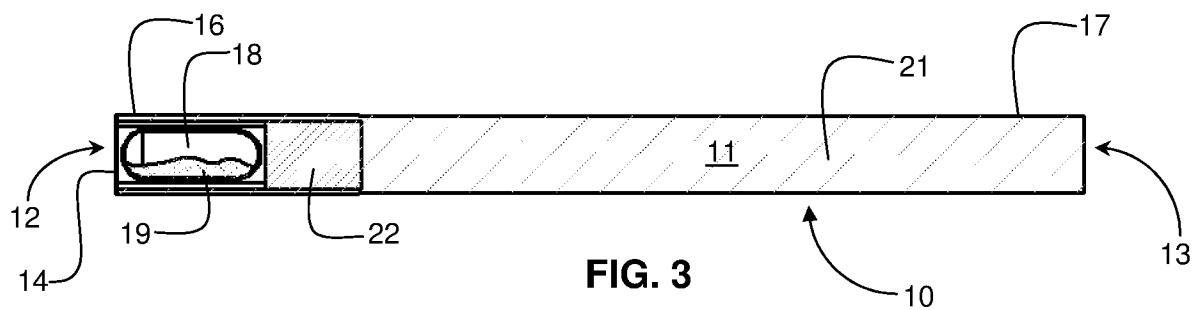


FIG. 3

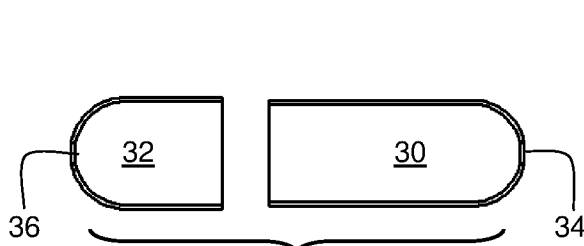


FIG. 4a

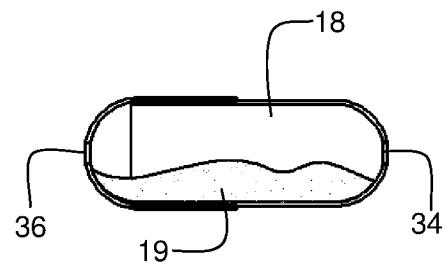


FIG. 4b

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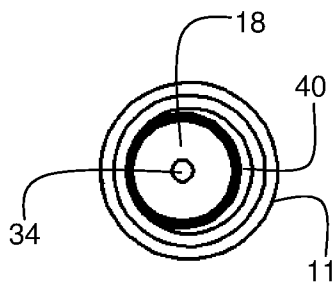


FIG. 5a

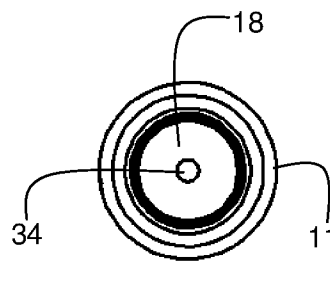


FIG. 5b

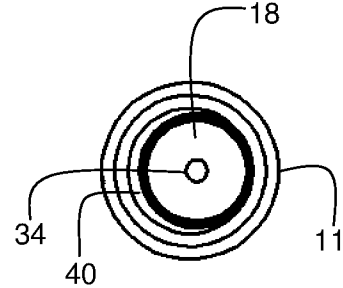


FIG. 5c

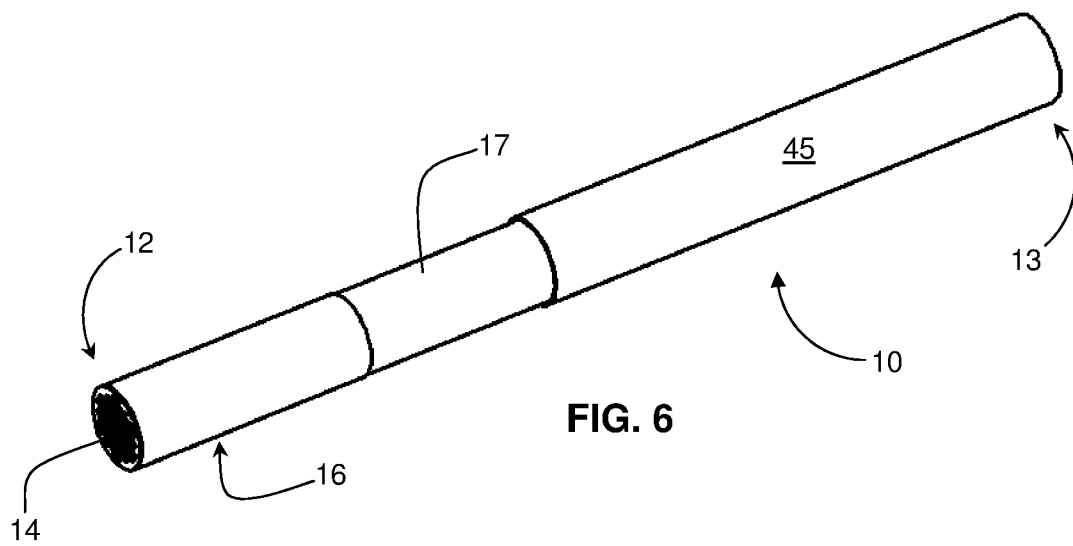


FIG. 6

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER IPC (2014.01) A24D 1/18, 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) IPC (2014.01) A24D 1/00, A24B 15/16 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) Databases consulted: THOMSON INNOVATION, Esp@cenet, Google Patents		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0174645 A2 REYNOLDS TOBACCO CO R 19 Mar 1986 (1986/03/19) The Whole document	1-16
Y	US 4924883 A R.J.REYNOLDS TOBACCO CO 15 May 1990 (1990/05/15) The Whole document	1-16
A	US 5080114 A B.A.T Cigarettenfabriken GmbH 14 Jan 1992 (1992/01/14) The whole document	1-16
A	US 4340072 A Imperial Group Limited 20 Jul 1982 (1982/07/20) The whole document	1-16
A	US 8235056 B2 Philip Morris USA Inc. 07 Aug 2012 (2012/08/07) The whole document	1-16
☒ 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 29 Jul 2014		Date of mailing of the international search report 29 Jul 2014
Name and mailing address of the ISA: Israel Patent Office Technology Park, Bldg.5, Malcha, Jerusalem, 9695101, Israel Facsimile No. 972-2-5651616		Authorized officer LAHAV Ronen Telephone No. 972-2-5651732

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