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

(11) **EP 4 230 062 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.08.2023 Bulletin 2023/34

(21) Application number: **23156941.9**

(22) Date of filing: **15.02.2023**

(51) International Patent Classification (IPC):
A24D 1/20 *(2020.01)* ***A24D 1/22*** *(2020.01)*

(52) Cooperative Patent Classification (CPC):
A24D 1/20; A24D 1/22

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **17.02.2022 CN 202210148073**

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(54) AEROSOL-GENERATING PRODUCT

(57) The present invention relates to an aerosol-generating product, including: an aerosol-generating matrix; a first portion having a first cavity penetrating through the first portion in a first direction; a second portion having a second cavity penetrating through the second portion in the first direction, wherein the first cavity communicates with the second cavity; and a third portion, wherein the aerosol-generating matrix, the first portion, the second portion, and the third portion are disposed in sequence along the first direction, an aerosol generated by the aerosol-generating matrix heated by a heating body is able to pass through the first portion, the second portion, and the third portion in sequence; and the pressure drop of the aerosol-generating matrix is P_D1 and the total pressure drop of the first portion, the second portion and the third portion is P_D2, wherein $0.5 \leq P_D1/P_D2 \leq 5$. The aerosol-generating product of the present invention has a good fuming effect of the released aerosol.

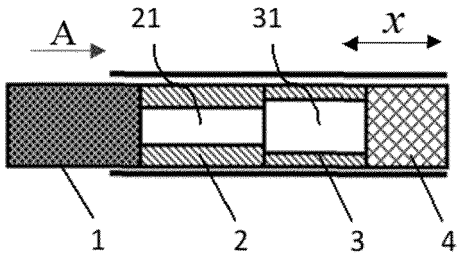

Fig. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of aerosol generation technology, in particular to an aerosol-generating product.

BACKGROUND

[0002] In recent years, aerosol-generating products have received attention from a wide range of tobacco consumers and have rapidly emerged worldwide, driving a great change in the world's tobacco landscape. As a new type of tobacco, the aerosol-generating products, whose aerosol forming matrix such as the tobacco matrix, is heated rather than burned, have attracted much attention because of the significant advantage in reducing the release of harmful constituents.

[0003] Currently, the heat-not-burn tobacco products are mainly composed of two portions: a cigarette and a heating device, wherein the profile of the cigarette is not substantially different from that of a conventional cigarette, which conforms to the characteristics of the heat-not-burn tobacco, but the heating device needs to be carried, which brings inconvenience to consumers.

[0004] There is also a new class of tobacco products in which the cigarette itself has its own heating source, which is convenient to carry. The existing self-heating non-combustion cigarette includes a self-heating source and a tobacco matrix, the self-heating source is located at the end of the cigarette, such as carbon, and the tobacco matrix and the self-heating source are wrapped by cigarette paper. The cigarette paper consists of aluminum foil and a heat-not-burn tobacco paper layer, the aluminum foil wraps the tobacco matrix and the self-heating source, and the paper layer wraps the aluminum foil. After the carbon is ignited, the aluminum foil transfers the heat to the tobacco matrix. The tobacco matrix will not burn, but its internal volatile constituents will be released, condensed and atomized to form the aerosol for puffing.

[0005] The prior art records the improved cigarette paper which is adapt to the heat-not-burn tobacco, for example, the Chinese patent document with the publication number CN104452479B discloses a composite cigarette paper. The cigarette made of the cigarette paper is similar to the existing cigarette in appearance. During puffing, the cut tobacco is heated through the heat generated by the burning of the outer cigarette paper via the aluminum foil layer, and the volatile constituents, such as aroma constituents and nicotine, produced by the heating and volatilization of the cut tobacco enter the mouth during puffing, thereby making a unique new type of low-temperature non-combustion tobacco product.

[0006] For another example, the Chinese patent document with the publication number CN204224923U discloses a cigarette paper with a certain thickness and high air permeability and high gram weight. Then, the aluminum foil is compounded on the cigarette paper through a binder, and then laser, electrostatic or mechanical drilling is carried out, so that the cigarette made of the cigarette paper is similar to the existing cigarette in appearance. After the cigarette is rolled and formed, the aluminum foil layer directly contacts with the cut tobacco. When the cigarette is ignited, the aluminum foil is heated by the combustion of the cigarette layer and the heat is transferred to the cut tobacco, and the volatile constituents such as aroma constituents and nicotine produced by the heating and volatilization of the cut tobacco are pumped into the mouth, thus making a unique new type of tobacco product.

[0007] The main problems of the aerosol-generating products are less smoke and higher aerosol temperature. The reasons mainly include two aspects: on one hand, the aerosol-generating products have lower heating temperature and higher aerosol moisture content than traditional cigarettes, so they have higher perceived temperature than the traditional cigarette aerosol; on the other hand, the aerosol-generating products are short in length and the aerosol path is short, thus leading to the high inlet aerosol temperature. The conventional solid cellulose acetate tows of traditional cigarettes have high aerosol retention rate, which leads to less release of the aerosol-generating products and affects consumer experiences.

SUMMARY

[0008] The problems addressed by the present invention are that the aerosol-generating product has a poor aerosol fuming effect and the consumer puffing experience is poor.

[0009] In order to solve the above problems, the objective of the present invention is to provide an aerosol-generating product, including: an aerosol-generating matrix; a first portion having a first cavity penetrating through the first portion in a first direction; a second portion having a second cavity penetrating through the second portion in the first direction, wherein the first cavity communicates with the second cavity; and a third portion, wherein the aerosol-generating matrix, the first portion, the second portion, and the third portion are disposed in sequence along the first direction, an aerosol generated by the aerosol-generating matrix heated by a heating body is able to pass through the first portion, the second

portion, and the third portion in sequence; and the pressure drop of the aerosol-generating matrix is P_D1 and the total pressure drop of the first portion, the second portion and the third portion is P_D2, wherein $0.5 \leq P_D1/P_D2 \leq 5$.

[0010] With the above solution, the aerosol-generating matrix is heated by the heating body to produce an aerosol, which flows sequentially through the first cavity, the second cavity and the third portion and is then puffed by a user. Within the above-described pressure drop ratio range, the fuming effect of the aerosol released by the aerosol-generating product may be effectively enhanced, and the user has a good consumption experience.

[0011] The term "aerosol-generating product" is used herein to describe a product including an aerosol-forming base material that can be heated to produce an aerosol and deliver it to the consumer. The term "aerosol-forming base material" denotes a base material capable of releasing volatile compounds upon heating to generate an aerosol. During use, the volatile compounds are released from the aerosol-forming base material by heat transfer. The term 'aerosol-forming matrix' means consisting of or including an aerosol-forming base material capable of releasing volatile compounds upon heating to generate an aerosol. The aerosol-forming matrix may be a solid aerosol-forming matrix. The aerosol-forming matrix may include a tobacco-containing material containing volatile tobacco flavour compounds which are released from the matrix upon heating. The aerosol-forming matrix may include a non-tobacco material. The aerosol-forming matrix may include an aerosol former. The aerosol former may include at least one of glycerine and propylene glycol. In embodiments in which the aerosol-forming matrix is a solid aerosol-forming matrix, the solid aerosol-forming matrix may include one or more of powder, granules, pellets, shreds, spaghettis, strips or sheets containing one or more of herb leaves, tobacco leaves, sheets of tobacco ribs, reconstituted tobacco, homogenised tobacco, extruded tobacco and expanded tobacco. The solid aerosol-forming matrix may be in a loose form. The aerosol-forming matrix may include a rod of the solid aerosol-forming matrix. The wrapper may wrap the rod of the solid aerosol-forming matrix.

[0012] In some possible implementations, the third portion is a non-cavity structure.

[0013] In some possible embodiments, $100Pa \leq P_D1 \leq 300Pa$.

[0014] In some possible embodiments, $100Pa \leq P_D1 \leq 200Pa$.

[0015] In some possible embodiments, $P_D2 \leq 250Pa$.

[0016] In some possible embodiments, $P_D2 \leq 100Pa$.

[0017] In some possible implementations, the outer surface of the second portion is provided with perforations communicating with the second cavity.

[0018] In some possible embodiments, the outer surface of the second portion is provided with one or more rows of groups of perforations, with the groups of perforations of each row comprising of a plurality of the perforations.

[0019] In some possible embodiments, the number of the perforations is N, wherein $1 \leq N \leq 10$.

[0020] In some possible implementations, $2 \leq N \leq 8$.

[0021] In some possible embodiments, the equivalent diameter of the perforations is D, wherein $0.1\ mm \leq D \leq 0.5\ mm$.

[0022] In some possible embodiments, $0.1\ mm \leq D \leq 0.4\ mm$.

[0023] In some possible embodiments, the first cavity is an equal-section body and the second cavity is an equal-section body.

[0024] In some possible embodiments, the equivalent diameter of the first cavity is D1 and the equivalent diameter of the second cavity is D2, $1 \leq D2/D1 \leq 3$.

[0025] In some possible embodiments, the equivalent diameter of the first cavity is from 2mm to 4mm.

[0026] In some possible embodiments, the equivalent diameter of the second cavity is from 4mm to 6mm.

[0027] In some possible embodiments, the first portion and the second portion are both filter rods.

[0028] In order to make the above contents of the invention more obvious and easy to understand, the following is a detailed description of preferred embodiments in combination with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029]

FIG 1 is a schematic diagram of an aerosol-generating product according to an embodiment of the present invention; and

FIG. 2 is a graph of puffing temperature test results for an aerosol-generating product according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0030] Embodiments of the present invention will now be described with reference to specific embodiments thereof, and other advantages and effects of the present invention will be readily apparent to those skilled in the art from the disclosure herein. Although the present invention will be described in connection with preferred embodiments, it is not intended that the features of the invention be limited to the embodiments. On the contrary, the description of the invention

in connection with the embodiments is intended to cover other alternatives or modifications that are possible based on the claims of the invention. The following description contains numerous specific details in order to provide a thorough understanding of the present invention. The invention may also be practiced without these details. In addition, some specific details will be omitted from the description in order to avoid cluttering or obscuring the focus of the invention. It should be noted that the embodiments of the present invention and the features of the embodiments can be combined with each other without conflict.

[0031] Referring to FIG. 1, the present invention provides an aerosol-generating product including: an aerosol-generating matrix 1, a first portion 2, a second portion 3 and a third portion 4 sequentially disposed in a first direction (shown in the X-direction in FIG. 1). Exemplarily, the aerosol-generating matrix 1 includes, but is not limited to, a tobacco substance, an atomizing agent, a flavour substance, and the like, and the tobacco substance includes, but not limited to, cut tobacco, tobacco sheets, tobacco particles, and a combination thereof.

[0032] The order in which the aerosol-generating matrix 1, the first portion 2, the second portion 3 and the third portion 4 are combined in the manufacturing process is not limited. Exemplarily, the first portion 2, the second portion 3 and the third portion 4 are formed in one piece before being combined with the aerosol-generating matrix 1 into an aerosol-generating product. In some possible embodiments, the aerosol-generating matrix 1 and the first portion 2 are combined to form a first combination, the second portion 2 and the third portion 3 are combined to form a second combination, and the first combination and the second combination are connected to form the aerosol-generating product.

[0033] Exemplarily, in the first direction, the aerosol-generating matrix 1 abuts the first portion 2. Exemplarily, in the first direction, the first portion 2 abuts the second portion 3. Exemplarily, the second portion 3 abuts the third portion 4. Exemplarily, in the first direction, both ends of the first portion 2 abut the aerosol-generating matrix 1 and the second portion 3, respectively, and both ends of the second portion 3 abut the first portion 2 and the third portion 4, respectively.

[0034] The aerosol-generating matrix 1, the first portion 2, the second portion 3 and the third portion 4 are wrapped into an aerosol-generating product by a wrapper, for example, an aluminium foil paper, the aerosol-generating product being in the shape of a column, the extension direction of the aerosol-generating product coinciding with the first direction. Exemplarily, the aerosol-generating matrix 1 is a solid aerosol-forming matrix, containing tobacco constituents. Without combustion during puffing the aerosol-generating product, the release of large amounts of hazardous substances due to high temperature combustion can be greatly reduced. Exemplarily, the wrapper used for the outer layer of the aerosol-generating product is selected from an air-impermeable material. In some possible embodiments, there may also be no wrapping paper.

[0035] Exemplarily, the first portion 2, the second portion 3 and the third portion 4 are made of cellulose acetate fibers. Exemplarily, the first portion 2, the second portion 3 and the third portion 4 are all filter rods. Exemplarily, the second portion 3 is a hollow tube, acting as a support.

[0036] That is, the first portion 2, the second portion 3 and the third portion 4 constitute a filter portion of the aerosol-generating product. The filter portion functions primarily to reduce the release of harmful substances as well as to reduce the temperature of the aerosol. Exemplarily, the filter portion may function to effectively reduce the release of harmful substances such as NNK, crotonaldehyde, phenol, HCN, ammonia and BaP. At the same time, the filter portion also minimizes the retention of flavors, nicotine, and the like.

[0037] In this embodiment, the aerosol-generating matrix 1 is for insertion of a heating body (not shown) to generate an aerosol for puffing by a user, and the end of the third portion 4 not connected to the second portion 3 is the puffing end. The first portion 2 has a first cavity 21 which penetrates through the first portion 2 in a first direction; the second portion 3 has a second cavity 31 which penetrates through the second portion 3 in the first direction; the third portion 4 is a non-cavity structure; the first cavity 21, the second cavity 31 are in communication. Exemplarily, the non-cavity structure described above is that the third portion 4 does not include a cavity extending in the first direction.

[0038] The aerosol-generating matrix 1 is heated by the heating body to produce an aerosol that flows through an aerosol passage for puffing by a user, i.e., the aerosol flows through the first cavity 21, the second cavity 31 and the third cavity 41 in sequence for puffing by a user, thus effectively enhancing the fuming effect of the aerosol released by the aerosol-generating product.

[0039] In the present application, the pressure drop of the aerosol-generating matrix is P_D1 and the total pressure drop of the first portion 2, the second portion 3 and the third portion 4 is P_D2, i.e., the total pressure drop of the filter portion is P_D2. Exemplarily, when a user puffs on the aerosol-generating product of the present application, the pressure drop of the aerosol-generating matrix is P_D1 and the total pressure drop of the first portion 2, the second portion 3 and the third portion 4 is P_D2, i.e., the total pressure drop of the filter portion is P_D2, and $0.5 \leq P_D1/P_D2 \leq 5$. The aerosol-generating matrix 1 provides sufficient tobacco substances, the filter portion (first portion 2, second portion 3, and third portion 4) retains hazardous substances, reduces the temperature of the aerosol, and delivers the tobacco substances to the consumer. The pressure drops of the aerosol-generating matrix 1 and the filter portion (the first portion 2, the second portion 3 and the third portion 4) are designed within the above-mentioned pressure drop parameter ratio range, which allows for a synergistic effect of aerosol atomization and temperature reduction.

[0040] When the ratio of P_D1/P_D2 is too small, that is, when in the case where the filter portion material and structure

are unchanged, the resistance of the gas to flow through the aerosol-generating matrix 1 under the corresponding conditions is too small, and correspondingly, the total amount of tobacco substances in the aerosol-generating matrix 1 is too small, the tobacco substances in the aerosol-generating matrix are piled up loosely, which is easy to form quality defects such as tobacco matrix looseness or collapse, and also reduces the total amount of aerosol constituents released from the aerosol-generating product and the corresponding amount of the aerosol, thus affecting the puffing experience of the consumer.

[0041] When the ratio of P_D1/P_D2 is too large, that is, when in the case where the filter portion material and structure are unchanged, the resistance of the gas to flow through the aerosol-generating matrix 1 under corresponding conditions is large, and correspondingly, there are too many tobacco substances in the aerosol-generating matrix 1, the filling is too dense, and the overall heating condition of the tobacco matrix is poor. In addition, in view of the characteristic of the perforations of the filter portion in this application, when the consumer smokes, the air will enter more from the perforations of the filter portion with less resistance, which will dilute the concentration of the tobacco substances in the aerosol, and also affect the consumer' puffing experience.

[0042] Therefore, a design of $0.5 \leq P_D1/P_D2 \leq 5$ enables a better puffing experience for the aerosol-generating product.

[0043] Exemplarily, the pressure drop is measured as follows: a tested sample is completely sealed in a measuring apparatus to ensure no air leakage according to the national standard of GB/T 22838, when the sample is passed by a steady airflow and the flow rate at the output end is 17.5mL/s under standard conditions, the static pressure difference at both ends of the sample is measured.

[0044] In some possible embodiments, 100 $Pa \leq P_D1 \leq$ 300Pa. In some possible embodiments, 100 $Pa \leq P_D1 \leq$ 200 Pa. In some possible embodiments, $P_D2 \leq$ 250 Pa. In some possible embodiments, $P_D2 \leq$ 100 Pa.

[0045] Materials used for the first portion 2, the second portion 3 and the third portion 4 include, but are not limited to, cellulose acetate tow, polypropylene tow, polylactic acid tow, paper and polymer. The total pressure drop P_D2 of the first portion 2, the second portion 3 and the third portion 4 is brought within the above parameters by processing.

[0046] In some possible embodiments, drilling the cavity portions of the aerosol-generating product, such as the first cavity 21 and the second cavity 31, may effectively reduce the temperature of the aerosol at the outlet of the aerosol-generating product. During puffing by the consumer, air enters the interior of the aerosol-generating product through the small holes, thus reducing the temperature of the aerosol at the outlet of the aerosol-generating product by means of air dilution, gas condensation, etc., to provide a good puffing experience for the consumer.

[0047] In some possible embodiments, the second cavity 31 of the aerosol-generating product is drilled. The outer surface of the second portion 3 is provided with perforations (not shown) communicating with the second cavity 31. In some possible embodiments, the outer surface of the second portion 3 is provided with one or more rows of groups of perforations, the groups of perforations of each row including a plurality of perforations. The shape of the perforations on the second cavity 31 includes, but is not limited to, a circle, an oval, a bar, etc., the perforation arrangement includes, but is not limited to, a row of perforations or a plurality of rows of perforations, and the perforation distribution includes a uniform distribution or a non-uniform distribution.

[0048] Exemplarily, when the above-mentioned ratio of P_D1/P_D2 is too large, because of the feature of the perforations in the filter portion in the present application, air will enter more from the less resistive perforations in the filter portion when the consumer is smoking, thus diluting the concentration of the tobacco substances in the aerosol, and also affecting the puffing experience of the consumer. Therefore, a design of $0.5 \leq P_D1/P_D2 \leq 5$ enables a better puffing experience for the aerosol-generating product.

[0049] In some possible embodiments, the number of the perforations is N, and $1 \leq N \leq 10$. In some possible implementations, $2 \leq N \leq 8$. In some possible embodiments, the equivalent diameter of the perforations is D, and 0.1 mm $\leq D \leq$ 0.5 mm. For a circular perforation, the equivalent diameter of the perforation is the diameter of the circular hole. For a non-circular perforation or an irregular perforation, the area corresponding to the equivalent diameter of the perforation is equal to the area corresponding to the non-circular perforation or the irregular perforation. In some possible embodiments, 0.1 mm $\leq D \leq$ 0.4 mm. by such setting, the temperature of the aerosol at the outlet of the aerosol-generating product can be effectively reduced.

[0050] The second cavity 31 is drilled in a manner including, but not limited to, a mechanical drilling form and an on-line laser drilling form. Exemplarily, the on-line laser drilling is used.

[0051] Drilling the second cavity 31 using the on-line laser drilling technique has the advantage that it is easier to adjust compared to the mechanical drilling, and the position, size, number, shape, etc. of the perforation can be quickly adjusted according to the actual situation. The laser drilling apparatus needs a high power to penetrate through part of the wrapping paper of the second cavity 31 and the tube wall of the cavity so that it has a ventilating effect. During manufacture of the aerosol-generating product, when it is run to the laser drilling drum position, the high-energy laser passes through the laser-focusing head to focus the beam at the second cavity 31 to drill the second cavity 31. The size and shape of the perforation in the second cavity 31 can be adjusted by controlling the time of the laser drilling apparatus, the speed of the cigarette machine and other parameters. The number of perforations in each row in the circumferential direction in the second cavity 31 can be adjusted by controlling the laser drilling frequency. Multiple rows of perforations

can be drilled by increasing the number of laser-focusing head of the laser drilling apparatus.

[0052] In the first direction, the length of the first cavity 21 coincides with the length of the first portion 2, the length of the second cavity 31 coincides with the length of the second portion 3, and the length of the third cavity 41 coincides with the length of the third portion 4.

[0053] The user puffs on the aerosol-generating product to produce the aerosol, the aerosol flows from the "upstream" to the "downstream" of the aerosol-generating product (shown in the direction A in FIG. 1), the second portion 3 has a sidewall upstream end portion and a sidewall downstream end portion in the aerosol flow direction, the sidewall upstream end portion of the second portion 3 being disposed facing the first portion 2, the sidewall downstream end portion of the second portion 3 being disposed facing the third portion 4.

[0054] Exemplarily, with reference to FIG. 1, the first cavity 21 is an equal-section body, the second cavity 31 is an equal-section body and the third cavity 41 is an equal-section body. That is, the first cavity 21 has a hollow cylindrical shape, the second cavity 31 has a hollow cylindrical shape, and the second cavity 31 has a hollow cylindrical shape.

[0055] Exemplarily, the equivalent diameter of the first cavity 21 is D1 and the equivalent diameter of the second cavity 31 is D2. For the cavities, the equivalent diameter of the cavity is the diameter of a circular cavity. For a non-circular cavity or an irregular cavity, the area corresponding to the equivalent diameter of the cavity is equal to the area corresponding to the non-circular cavity or the irregular cavity.

[0056] $1.2 \leq D2/D1 \leq 3$, that is, the aperture of the second cavity 31 of the second portion 3 is larger than the aperture of the first cavity 21 of the first portion 2. That is, the first cavity 21 of the first portion 2 has a "small cavity structure" and the second cavity 31 of the second portion 3 has a "large cavity structure".

[0057] When D2/D1 is too large, that is, D2 is too large or D1 is too small, the too large D2 may cause quality problems such as deformation or even fracture of the aerosol-generating product caused by the insufficient strength of the second portion 3 to support the insertion of a heating element into the aerosol-generating matrix 1. If D1 is too small, the wall thickness of the first portion is too thick, which will increase the retention effect on the aerosol, and the heat transfer resistance of the corresponding portion is too large, which is not conducive to the cooling of the aerosol, the temperature of the aerosol at the outlet is too high and the consumption experience is affected. When D2/D1 is too small, that is, the D2 and D1 are too large or too small synchronously, it may also cause insufficient strength of the aerosol-generating product, too strong aerosol retention effect and too high aerosol temperature at the outlet.

[0058] Exemplarily, the equivalent diameter of the first cavity 21 is from 2 mm to 4 mm, including 2mm and 4mm. More exemplarily, the equivalent diameter of the second cavity 31 is from 4 mm and 6 mm, including 4mm and 6mm. Within such parameter ranges, the aerosol-generating product of the present invention has a good aerosol fuming effect.

[0059] The filter portion (first portion 2, second portion 3 and third portion 4) of the present application adopts the combination of "small cavity structure + large cavity structure + solid core structure" and uses laser drilling for aerosol temperature reduction. The wall thickness and strength of the small cavity structure are capable of preventing axial displacement of the tobacco substances that may occur during insertion of the heating element into the aerosol-generating matrix 1. When the heated aerosol passes through the first cavity 2 with small volume to the second cavity 3 with large volume, the pressure decreases, correspondingly the temperature is decreased, and the sudden change in the flow field is conducive to convective heat transfer so as to promote cooling of the aerosol.

[0060] In addition, the small thermal resistance corresponding to the thin wall of the large cavity structure is conducive to the temperature reduction of the aerosol. At the same time, combined with the side wall drilling of the second cavity 3, the supplement of cold air during the puffing process can promote the condensation of water vapor in the aerosol to release heat in advance, thus further reducing the temperature of the aerosol system at the outlet of the filter portion to prevent the aerosol temperature from overheating. Exemplarily, the aerosol temperature at the outlet end of the filter portion is 40 °C to 70 °C, including 40 °C and 70 °C.

[0061] Furthermore, after the gas flow resistance of the third portion 4 (or the filter portion) of the present application is reduced, excessive retention of the aerosol active constituents can be effectively avoided.

[0062] The comparison of the content of key substances of the aerosol and the comparison of the outlet temperatures of the aerosol at different pressure drop parameters of the tobacco products according to embodiments of the present application will be described in more detail below.

Embodiment One

[0063] The present embodiment controls that the aerosol-generating matrix 1 is unchanged, the ratio of P_D1 and P_D2 is adjusted by changing the pressure drop of the filter portion, Samples 1 to 3 mainly adjust the pressure drop of the filter portion by drilling.

[0064] The sample 1 includes an aerosol-generating matrix 1, a first cavity 2, a second cavity 3 and a third portion 4. The second cavity 3 is of a large hollow cellulose acetate filter rod structure, and the outer surface of the second cavity 3 is drilled with 3 perforations, each perforation having an aperture of 0.3 mm. The third portion 4 is of a solid cellulose acetate filter rod structure. The pressure drop P_D1 of the aerosol-generating matrix 1 is 180 Pa, the total pressure drop

P_D2 of the filter portion is 50Pa, and P_D1/P_D2 is 3.6.

[0065] The sample 2 includes an aerosol-generating matrix 1, a first cavity 2, a second cavity 3 and a third portion 4. The second cavity 3 is of a large hollow cellulose acetate filter rod structure, and the outer surface of the second cavity 3 is drilled with 5 perforations, each perforation having an aperture of 0.3 mm. The third portion 4 is of a solid cellulose acetate filter rod structure. The pressure drop P_D1 of the aerosol-generating matrix 1 is 180 Pa, the total pressure drop P_D2 of the filter portion is 40Pa, and P_D1/P_D2 is 4.5.

[0066] The sample 3 includes an aerosol-generating matrix 1, a first cavity 2, a second cavity 3 and a third portion 4. The second cavity 3 is of a large hollow cellulose acetate filter rod structure, and the outer surface of the second cavity 3 is not drilled. The third portion 4 is of a solid cellulose acetate filter rod structure. The pressure drop P_D1 of the aerosol-generating matrix 1 is 180 Pa, the total pressure drop of the filter portion P_D2 is 60Pa, and P_D1/P_D2 is 3.

[0067] The aerosol-generating product is used in conjunction with a heating appliance by putting the aerosol-generating products in the same heating appliance for puffing, the heating appliance is pressed for 2.4 s, the first puff starts after an interval of 14.6 s, each puff is for 2s, the next puff starts after an interval of 28 s, and after the 8th puff, the capture is completed, with 8 puffs captured per cigarette.

[0068] The aerosol-generating product described above is puffed on a puffing machine in conjunction with the heating appliance, the puffing machine adopts bell-wave puffing, the puffing solution is under the Health Canada Intensive Smoking Regime and the puffing capacity is 55 mL, while the aerosol is collected with a glass fiber filter aerosol trap and the aerosol trap is used for determining the content of nicotine and glycerol by gas chromatography.

[0069] At the same time, three samples are puffed on the puffing machine using the heating appliance and a thermocouple is attached to the center of the aerosol outlet of the aerosol-generating product and the thermocouple is connected to a temperature data acquisition system for determining the outlet temperature at the time of aerosol puffing.

[0070] The different drilling treatments of the three samples change the total pressure drop of the filter portion, thereby also affecting the value of P_D1/P_D2 and thus the aerosol content and the outlet temperature of the aerosol. The above puffing procedure is repeated a number of times, and three samples are tested for key component content in the aerosol trap and aerosol outlet temperature. The results are averaged over the number of measurements. The results are shown in Table 1 below.

Table 1 Comparison of content of key substances in aerosol release and comparison of aerosol outlet temperatures

Name	Aerosol collected mass (mg/cig)	Nicotine (mg/cig)	Glycerol (mg/cig)	Aerosol outlet maximum temperature (°C)
Sample 1	38.0	0.96	3.7	61.8
Sample 2	28.1	0.93	3.7	57.6
Sample 3	29.8	0.91	2.9	67.4

[0071] The maximum aerosol puff-by-puff temperatures at the aerosol outlets of Sample 1, Sample 2, and Sample 3 are shown in FIG. 2. The maximum aerosol puff-by-puff temperature is data measured using a thermocouple, i.e., each marked point in the graph, the line connecting each marked point is only illustrative of the temperature change and does not represent the true temperature change trend.

[0072] As can be seen from Table 1, the aerosol-generating products of Sample 1, Sample 2, and Sample 3 have good aerosol fuming effect and the aerosol outlet temperature is satisfactory.

Embodiment Two

[0073] The filter portion is controlled unchanged and the pressure drop of the aerosol-generating matrix is varied to adjust the ratio of P_D1 and P_D2, and the control sample is sample 1.

[0074] Sample 4 includes an aerosol-generating matrix 1, a first cavity 2, a second cavity 3 and a third portion 4, the internal structure and manner of drilling being in accordance with sample 1. The aerosol-generating matrix 1 has a pressure drop P_D1 of 210 Pa, the total pressure drop P_D2 of the filter portion is 50 Pa, and P_D1/P_D2 of 4.2. The pressure drop of the aerosol-generating matrix 1 in sample 4 compared to sample 1 is increased by increasing the amount of tobacco substances.

Table 2 Comparison of content of key substances in aerosol release

Name	Aerosol collected mass (mg/cig)	Nicotine (mg/cig)	Glycerol (mg/cig)	Aerosol outlet maximum temperature (°C)
Sample 1	38.0	0.96	3.7	61.8
Sample 4	28.2	0.94	2.8	61.1

Embodiment Three

[0075] The present embodiment controls that the aerosol-generating matrix 1 is unchanged, the ratio of P_D1 and P_D2 is adjusted by changing the pressure drop of the filter portion, and samples 5 and 6 adjust the pressure drop of the filter portion mainly by changing the structure of the second cavity 3 and the material of the third portion 4.

[0076] The sample 5 includes an aerosol-generating matrix 1, a first cavity 2, a second cavity 3 and a third portion 4. The second cavity 3 is of a small hollow cellulose acetate filter rod structure, which is not drilled due to the thick filter wall of the cavity. The third portion 4 is of a solid cellulose acetate filter rod structure. The pressure drop P_D1 of the aerosol-generating matrix 1 is 180 Pa, the total pressure drop P_D2 of the filter portion is 150 Pa, and P_D1/P_D2 is 1.2.

[0077] The sample 6 includes an aerosol-generating matrix 1, a first cavity 2, a second cavity 3 and a third portion 4. The second cavity 3, similar to the sample 5, is of a small hollow cellulose acetate filter rod structure and is not drilled. The third portion 4 is of a solid cellulose acetate filter rod structure with a greater pressure drop than sample 5. The pressure drop P_D1 of the aerosol-generating matrix 1 is 180 Pa, the total pressure drop P_D2 of the filter portion is 220 Pa, and P_D1/P_D2 of is 0.8.

[0078] Compared with sample 1, sample 5 has a change in the filter portion structure and although only the structure of the second cavity 3 is changed, the P_D2 value is increased a lot. Further, the third portion 4 of sample 5 is increased in pressure drop to form sample 6, which has an increased P_D2 value.

Table 3 Comparison of content of key substances in aerosol release

Name	Aerosol collected mass (mg/cig)	Nicotine (mg/cig)	Glycerol (mg/cig)	Aerosol outlet maximum temperature (°C)
Sample 1	38.0	0.96	3.7	61.8
Sample 5	35.7	0.54	2.1	68.3
Sample 6	30.7	0.46	1.8	69.6

[0079] It is shown by the above experimental results that the aerosol-generating product of the present invention has a good fuming effect of the released aerosol.

Claims

1. An aerosol-generating product, **characterized by** comprising:

an aerosol-generating matrix;
a first portion having a first cavity penetrating through the first portion in a first direction;
a second portion having a second cavity penetrating through the second portion in the first direction, wherein the first cavity communicates with the second cavity; and
a third portion, wherein the aerosol-generating matrix, the first portion, the second portion, and the third portion are disposed in sequence along the first direction, an aerosol generated by the aerosol-generating matrix heated by a heating body is able to pass through the first portion, the second portion, and the third portion in sequence; and
the pressure drop of the aerosol-generating matrix is P_D1 and the total pressure drop of the first portion, the second portion and the third portion is P_D2, wherein $0.5 \leq P_D1/P_D2 \leq 5$.

2. The aerosol-generating product according to claim 1, **characterized in that** the third portion is a non-cavity structure.

3. The aerosol-generating product according to claim 1 or 2, **characterized in that** 100Pa≤P_D1≤300Pa.

4. The aerosol-generating product according to claim 3, **characterized in that** 100Pa ≤P_D1≤200Pa.

5. The aerosol-generating product according to any one of claims 1 to 4, **characterized in that** P_D2≤250Pa.

6. The aerosol-generating product according to claim 5, **characterized in that** P_D2≤ 100Pa.

7. The aerosol-generating product according to any one of claims 1 to 6, **characterized in that** an outer surface of the second portion is provided with perforations communicating with the second cavity.

8. The aerosol-generating product according to claim 7, **characterized in that** the outer surface of the second portion is provided with one or more rows of groups of perforations, and the groups of perforations of each row are comprised of a plurality of the perforations.

9. The aerosol-generating product according to claim 7, **characterized in that** the number of the perforations is N, wherein 1≤N≤10.

10. The aerosol-generating product according to claim 9, **characterized in that** 2^N ≤8.

11. The aerosol-generating product according to any one of claims 1 to 10, **characterized in that** the equivalent diameter of the perforations is D, wherein D satisfies at least one of the following conditions:

$$0.1\ \text{mm} \leqslant D \leqslant 0.5\ \text{mm};$$

$$0.1\ \text{mm} \leqslant D \leqslant 0.4\ \text{mm}.$$

12. The aerosol-generating product according to any one of claims 1 to 11 **characterized in that** the first cavity is an equal-section body and the second cavity is an equal-section body.

13. The aerosol-generating product according to claim 12, **characterized in that** the equivalent diameter of the first cavity is D1 and the equivalent diameter of the second cavity is D2, and 1≤D2/D1≤3.

14. The aerosol-generating product according to any one of claims 1 to 13, **characterized in that** the equivalent diameter of the first cavity is from 2 mm to 4 mm. and/or the equivalent diameter of the second cavity is from 4 mm to 6 mm.

15. The aerosol-generating product according to any one of claims 1 to 14, **characterized in that** the first portion and the second portion are both filter rods.

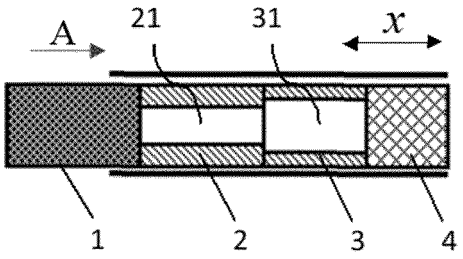
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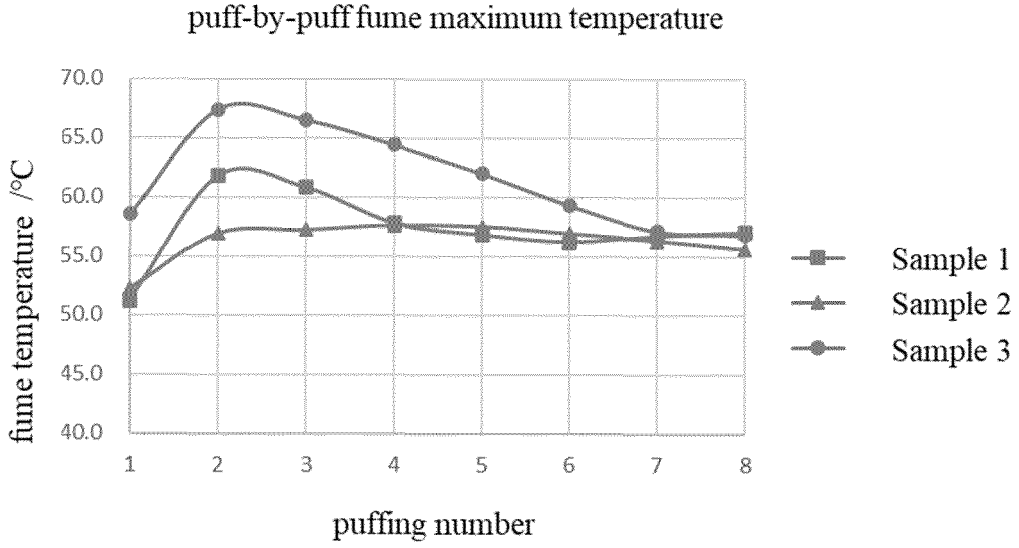
Fig. 1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fume temperature /°C
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1
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puffing number
Sample 1
Sample 2
Sample 3

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 23 15 6941

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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