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(54) **A tar reducing cigar with filter section comprising expanded, cut tobacco stems**

Teerverringernde Zigarre mit Filterabschnitt mit expandierten Schnitttabakstängeln

Cigare à goudron réduit avec section de filtre comportant des tiges de tabac découpées expansé

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Description

TECHNICAL FIELD

[0001] The invention pertains to the technical field of producing cigar rods, more specifically a tar reducing cigar comprising two different kinds of natural filler material, whereby one of the filler materials has a tar-reducing effect.

BACKGROUND

[0002] A 100% natural cigar typically consists out of three parts: the filler, the wrapper and a binder. Both the binder and wrapper generally consist out of 100% natural tobacco leaves, spirally wrapped around the filler to shape the cigar. The filler generally consists out of a tobacco blend. While cigarettes and to a lesser extend cigarillo's are often provided with a filter, cigars are seldom provided with a filter as they seem to be less attractive for the market. The smoker might feel that a filter will change the rich and full aroma of a cigar. Furthermore, the addition of a filter, which often consists out of a cellulose acetate wrapping, alters the cigar visually. However, as it is common knowledge that cigar smoke contains tar, nicotine and carbon oxides, it is strongly advisable to filter the smoke in order to reduce the concentration of these toxic compounds. US2250381 A describes a cigar consisting of a wrapper, binder and filler and at its proximal end provided with a filter. DE20309178U U1 describes a cigarette having a filter material made from expanded, cut tobacco stems, having the normal density tobacco in the actual smokable part and the high density tobacco in the filter part.

[0003] GB 2 064 293 describes a cigar with filter section composed of a mass of flexible fibers of a carbonaceous material which is produced by pyrolysis of a fibrous cellulose based precursor, particularly viscose fibers. The filter part may be placed at the extreme buccal end of the cigar, or sandwiched between the filler of the smokable part and a short section of tobacco filler at the extreme buccal end of the cigar. The inventors found that the fibrous mass of filter material formed an effective mechanical filter for the particles in the smoke, as well as for vapor phase constitutes such as hydrogen cyanide, formaldehyde and other volatile aldehydes.

[0004] US 3 858 593 relates to a method and apparatus for producing a cigar which has a different kind of filler in the mouthpiece and in the smokable part. The filler of the mouthpiece can serve as filter material. The system is provided with a press well comprising a punch mechanism and at least two ducts for the separate supply of the fillers. The pressing force for the filler intended for the smokable part must be set to a different value from that for the mouth end.

[0005] There remains a need in the prior art for a method to produce a cigar which has a filtering effect of the toxic compounds in the smoke, but at the same time does not negatively impact the taste and quality, compared to a normal cigar. Furthermore, the cigar should still preserve his visual looks so the smoker still finds enjoyment of smoking a natural, real cigar. Additionally, for an economical point of view, it is of interest to introduce at the tip the cigar, a part which comprise a less costly material than high quality tobacco, as a cigar can never be fully smoked, hence being a waste of expensive material. Introduction of such a part would reduce the cost of the cigars, which both manufacturer and customer will benefit from.

SUMMARY OF THE INVENTION

[0006] The present invention provides a tar reducing cigar, comprising two different kinds of filler. The filler in the proximal end, said mouthpiece is provided at a different density than the filler in the distal end, said the smokable part and will form a natural filter in the mouthpiece. The filler in the filter comprises of expanded, cut tobacco stems. This material has a high filling power, and allows a high degree of compression due to the elasticity of the material. The cigar with will reduce the toxic compounds in the smoke, such as tar. The nicotine in the smoke will also be reduced and the smoke will become less harsh. The cigar will however still keep its natural appearance and high-quality taste.

[0007] Typically a cigar comprises out of three parts: the filler, the wrapper and a binder. The filler of a cigar typically comprises tobacco, or tobacco blends, produced from tobacco leaves. In one embodiment, the cigar belongs to the group of Long filler cigars, with the filler comprising entire tobacco leaves. In another embodiment, the cigar belongs to the group of the Short filler cigars; whereby the filler comprises a mixture of tobacco, made from cut-up leafs.

[0008] Wrapper and binder are typically made from tobacco leaves, and enwrap the filler to keep the filler together and to ensure the form of the cigar.

[0009] In a first aspect, the present invention provides for a cigar, comprising two fillers, one for the smokable part, and one for the mouthpiece.

In a preferred embodiment, the filler for the mouthpiece has a filtering effect on the smoke yield of the cigar.

[0010] In a first aspect, the filler for the smokable part is made of high-quality tobacco. In a second aspect, the filler for the mouthpiece comprises a tobacco product of different quality, and hence less expensive. In a preferred embodiment, this said tobacco product of lesser quality comprises cut tobacco stems. In a more preferred embodiment, these cut tobacco stems are expanded.

[0011] In a preferred embodiment, the filter part of the cigar will be smaller in size compared to the smokable part of the cigar.

[0012] In a further preferred aspect, the filler for the filter part is provided at a lower density than the filler in the smokable part.

[0013] In a second aspect, the cigar will comprise rows of perforations, near the head of the cigar. These perforations will realize a pressure drop which allows optimal smoking and reduces the smoking yield of the products.

[0014] The filtering effect of the cigar will lower the harshness of the smoke, without loss of the specific taste of the smoke. This aspect is important for the smoker, as the smoker still has to be able to appreciate the taste of a 100% natural cigar, without the feeling of having to give in on the feeling and taste.

[0015] Furthermore, the cigar pertains its natural appearance as the filter is made of a natural tobacco product, and not, such as mostly known in prior art, from cellulose acetate which often occurs as a white mouthpiece. The mouthpiece of the cigar in the present invention is indistinguishable from a normal, filter-less cigar. The cigar keeps its natural look.

[0016] Finally, the presented cigar is less costly to produce, as less amount of high-quality tobacco is needed for the production of the cigar. Generally, as a cigar will never be fully smoked, the tobacco in the mouthpiece of a normal cigar is lost. Replacing part of the high-quality tobacco filler in the cigar by a tobacco product that is less expensive, will lower the production cost of the cigar, which is beneficial for both manufacturer and consumer.

[0017] The cigar according to present invention is characterised by a number of technical parameters and characteristics such as density of the two sorts of filler, pressure in the headpiece of the cigar, draw resistance, and reduction in smoke yields of the cigar compared to a cigar without filter. The parameters and characteristics of a cigar with filter comprising cut tobacco stems are discussed in more detail below.

[0018] In a further aspect, the present invention provides a method and apparatus for producing the cigar as above-mentioned, comprising two different fillers with different density.

[0019] In one embodiment, a different pressure is applied to the fillers from both the distal and proximal end.

[0020] In a preferred embodiment, the pressure exerted on the filler for the filter section is lower than the pressure exerted on the filler for the distal end.

[0021] In a further embodiment, the fillers will be enwrapped by the binder and wrapper.

[0022] Additional features and examples of the cigar and production method according to the present invention are discussed below in a non-limitative way.

DESCRIPTION OF FIGURES

[0023]

Figure 1 is an overview of the tar reducing cigar as presented by the current invention, showing the proximal mouthpiece comprising the filter section and the distal smokable end.

Figure 2 is an overall overview of the apparatus to produce the tar reducing cigars as presented by the current invention.

Figure 3 shows a detail of the apparatus for producing the tar reducing cigars, comprising the conveyor and the format chamber.

Figure 4 is an overview of the format chamber with the pestles driven by pneumatic cylinders.

Figures 5a and 5b represent a graph depicting the reduction in percentage of NFDPM, CO and nicotine levels of cigars according to the current invention, compared to control cigars.

DETAILED DESCRIPTION OF THE INVENTION

[0024] The present invention concerns a tar reducing cigar, comprising two different kinds of filler, with a different density. The filler in the mouthpiece comprises expanded, cut tobacco stems and forms a natural filter in the mouthpiece.

[0025] Unless otherwise defined, all terms used in disclosing the invention, including technical and scientific terms, have the meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. By means of further guidance, term definitions are included to better appreciate the teaching of the present invention.

[0026] As used herein, the following terms have the following meanings:
"A", "an", and "the" as used herein refers to both singular and plural referents unless the context clearly dictates otherwise. By way of example, "a compartment" refers to one or more than one compartment.

[0027] "About" as used herein referring to a measurable value such as a parameter, an amount, a temporal duration,

and the like, is meant to encompass variations of +/-20% or less, preferably +/-10% or less, more preferably +/-5% or less, even more preferably +/-1% or less, and still more preferably +/-0.1% or less of and from the specified value, in so far such variations are appropriate to perform in the disclosed invention. However, it is to be understood that the value to which the modifier "about" refers is itself also specifically disclosed.

[0028] "Comprise," "comprising," and "comprises" and "comprised of" as used herein are synonymous with "include", "including", "includes" or "contain", "containing", "contains" and are inclusive or open-ended terms that specifies the presence of what follows e.g. component and do not exclude or preclude the presence of additional, non-recited components, features, element, members, steps, known in the art or disclosed therein.

[0029] The recitation of numerical ranges by endpoints includes all numbers and fractions subsumed within that range, as well as the recited endpoints.

[0030] The expression "% by weight" (weight percent), here and throughout the description unless otherwise defined, refers to the relative weight of the respective component based on the overall weight of the formulation.

[0031] The term tobacco as used herein describes the product obtained by processing the leaves of the tobacco plant, which said process comprises the steps of harvesting the leaves of the tobacco plant, curing the said leafs, fermenting which lowers the sugar levels, moistening and stripping the leaves. In a final step, the laminas are separated from the stems, and shredded to form the tobacco which is used as filler material for cigarettes and cigars.

[0032] The term tobacco stems as used herein refers to the stems of the tobacco leaf, which are separated from the lamina.

[0033] The term proximal end as used herein, equals the term mouthpiece, and comprises the filter section of the cigar.

[0034] The term distal end as used herein, equals the term smokable part, and comprises typically the part of the cigar minus the proximal part, which contains tobacco.

[0035] The term Total Particulate Matter (TPM) as used herein refers to that portion of the mainstream smoke which is trapped in the smoke trap, expressed as milligrams per cigar.

[0036] The term Dry Particulate Matter (DPM) as used herein describes the total particulate matter after deduction of its water content, expressed as milligrams per cigar.

[0037] The term Nicotine-free Dry Particulate Matter (NFDPM) as used herein describes the dry particulate matter after deduction of its nicotine content, expressed as milligrams per cigar.

[0038] The term draw resistance or pressure drop as used herein describes the static pressure difference between the two ends of the cigar when it is traversed by an air flow under steady conditions in which the volumetric flow is 17,5 ml s^{-1} at the distal end.

[0039] Referring to figure 1, the invention provides in a first aspect for a cigar rod, comprising two different sorts of filler, one for the smokable part (2), and one for the mouthpiece (1). Figure 1 depicts a schematic overview of the cigar as presented by the current invention. The cigar furthermore comprises a wrapper (14) and binder (13) which in one embodiment comprises tobacco leaves.

[0040] In particularly preferred embodiment, the filler for the mouthpiece (1) has a reducing effect on the smoke yield of the cigar.

[0041] In a first aspect, the filler for the smokable part or distal end of the cigar (2) comprises high-quality tobacco. In one embodiment, the cigar is a Long filler cigar. In a more preferred embodiment, the cigar is a Short filler cigar.

[0042] In a second aspect, the filler for the mouthpiece or the proximal end of the cigar (1) comprises a tobacco product of different quality, and hence less expensive. In a preferred embodiment, this said tobacco product of lesser quality comprises cut tobacco stems. In a more preferred embodiment, these cut tobacco stems are expanded.

[0043] In the manufacture of cigars, the tobacco leaf is processed to separate the stems from the lamina. The lamina are shredded and are per definition considered as the high-quality tobacco used for making the smokable part of a cigar. The stems are not successfully utilizable as such in cigarette making because of their relatively large diameter, their hard nature and poor burning properties.

[0044] In the present invention, the tobacco stems are expanded. In carrying out the expansion process of these cut tobacco stems, at first the stems separated from tobacco leaves by threshing in a customary way are shredded to a suitable dimension. More specifically, the stem gets moistened, then flattened with rollers and afterwards cut. The expanding treatment is carried out under high temperature, for instance by use of super-heated steam. The cut stems go through an expansion unit based on steam and from there to the dryer. The process can be carried out by use of Sagemueller's Vibration Tunnel VFC, which comprises a heat-insulated tunnel section which incorporates a series of closely spaced, high-quality and exchangeable nozzles arranged side-by-side. These nozzles blow super-heated steam in the form of a tightly bundled and intensive jet through the in-fed material. Finally, the stems are dried.

[0045] In a preferred embodiment, the filter part (1) of the cigar will be smaller in size compared to the smokable part of the cigar (2). The size of the cigar rod preferably lies between 100 and 130 mm.

[0046] In a preferred embodiment, the smokable part of the cigar rod will comprise around 65 to 90% of the entire length of the cigar rod, more preferably 75%. The mouthpiece will comprise around 10 to 35% of the entire length of the cigar rod, more preferably 25%.

[0047] In one embodiment of the present invention, each kind of filler will have a specific density. The differences in density are obtained by the amount of pressure that the fillers will receive during the manufacturing of the cigar. Preferably, a pressure of 0.7 to 1.25 bar will be exerted on the filler of the smokable part, more preferably 1 bar, while the mouthpiece will receive a pressure of 0.2 to 0.75 bar, more preferably 0.5 bar.

[0048] The filling power of the filler in the mouth piece lies between 500 and 700 cm^3/100g, more preferably 600 cm^3/100g. The filling power of the material in the smokable part lies between 650 and 850 cm^3/100g, for instance 770 cm^3/100g.

[0049] Typically, the weight of the cigar will comprise between 0.8 and 15 gram.

[0050] In one embodiment, the cigar may contain rows of perforations along the mouthpiece. These perforations will permit air supply during the smoking of the cigar and the amount of perforations has equally an influence on the draw resistance of the cigar. The amount and size of the perforations is directly proportional to the amount of ventilation. In general, a well-defined amount and size of perforations can optimize the smoking enjoyment, as well as lower the smoke yields of the product. The perforation pattern can vary from 0 to more than 3x14 holes, and every combination thereof in between. In one embodiment, the cigar contains 2 rows of each 7 perforations.

[0051] In a preferred embodiment, the draw resistance of the cigar comprises between 45 and 65 mmWg in the smokable part, and between 95 and 120 mmWg in the mouthpiece. Determination of the draw resistance of the cigar and filter section occurred according to CORESTA Recommended Method N° 41 for filter rods and cigarettes (2007). The draw resistance was measured by a measuring device of the brand Sodim.

[0052] The expanded, cut tobacco stems provide for a reducing effect of the smoke components, more specifically NFDPM (tar), nicotine and carbon monoxide.

[0053] The levels of these components were measured in the cigar as presented in current invention, and compared to the levels of a reference cigar. Prior to the measurement of these components, the cigars were conditioned for minimal 48 hours in a room with constant temperature of 22°C, an atmospheric pressure 96 kPA and a relative air humidity of 60%.

[0054] All measuring methods used, were performed according to the CORESTA Recommended Methods as listed on their website. More specifically, the determination of TPM occurred according to CRM Nr. 65. The determination of nicotine occurred according to CRM Nr. 66. The determination of water occurred according to CRM Nr. 67. The determination of CO occurred according to CRM Nr. 68.

[0055] The levels of the smoke compounds were measured by use of a Borgwaldt KC smoke analyser and gas chromatography. All measurements were performed at a temperature of 22°C ± 2°C and a relative humidity of (60 ± 5)% and an atmospheric pressure within the range of 96 kPa ± 10 kPa as recommended by CORESTA (1998). Flameless ignition was used where possible. The smoking process was carried out in an environment that allows the sidestream smoke by minimum extraction, to generate a straight vertical smoke plume of approximately 10 cm during set up of the machine.

[0056] Diameters of the test cigars were measured 15 mm from the proximal end.

[0057] The population of test cigars was smoked on an automatic smoking machine with simultaneous collection of total particulate matter in a glass fiber filter trap. The mass of the collected total particulate matter (TPM) was gravimetric determined and extraction of the total particulate matter from the trap for the determination of the water and nicotine contents occurred through gas chromatography.

[0058] Filter discs, which had been conditioned in the test atmosphere for at least 12h, were inserted in their holders by placing the rough side of the filter disc so that it faced incoming smoke, hence forming a smoke trap. The filter discs were weighed prior to inserting in the smoking machine. The test cigars were conditioned prior to inserting the cigars in the cigar holders. The position of a cigar on the smoking machine generally is determined by the angle made by the longitudinal axis of the cigar and the horizontal plane when a cigar is inserted into a cigar holder in an analytical smoking machine. The conditioned test cigars were automatically lighted. The standard puff duration was 1,5 s, with a standard deviation of not greater than 0,05 s for individual puffs. The standard puff frequency was one puff every 40 s with a standard deviation for this time not greater than 0,5 s. Each individual puff was counted and recorded and the puff number rounded off to the nearest one-tenth of a puff based on the puff duration. The clearing puff was not included in the puff number. After the cigars were smoked, the smoke traps were removed from the smoking machine and weighed.

[0059] The mean mass per cigar of total particulate matter T, expressed in milligrams per cigar, is given by the equation:

$$T = (m1 - m0) / q$$

where :

m0 is the mass of the smoke trap before smoking (in milligrams)
m1 is the mass of the smoke trap after smoking (in milligrams)

q is the number of cigars smoked into the trap.

[0060] To extract the TPM, the filter disc were removed from the smoke traps and put in a flask containing propanol solvent. The flask was gently shaked on an electric shaker for at least 20 minutes, to ensure full extraction of the nicotine and water in the particulate matter.

[0061] Water in the supernatant solution in each flask was determined according to CORESTA Recommended Method N° 67 (2005).

[0062] The dry particulate matter, D, is calculated for each trap from the equation:

$$D = T - W$$

where :

D is the dry particulate matter, in milligrams per cigar;
T is the total particulate matter, in milligrams per cigar;
W is the water content in the total particulate matter, in milligrams per cigar.

[0063] Nicotine in the supernatant solution in each flask was determined according to CORESTA Recommended Method N° 66 (2005), by use of a gas chromatographic analysis.

[0064] The nicotine-free dry particulate matter, G, is calculated for each trap from the equation:

$$G = D - H_{nic}$$

where

G is the nicotine-free dry particulate matter, in milligrams per cigar;
D is the dry particulate matter, in milligrams per cigar;
H_{nic} is the nicotine in the total particulate matter, in milligrams per cigar.

[0065] Carbon monoxide in the mainstream smoke of was determined according to CORESTA Recommended Method N° 68 (2010), by non-dispersive infrared analysis.

[0066] The carbon monoxide yield - mass per cigar basis is calculated from the equation:

$$\text{mg carbon monoxide per cigar} = \frac{\text{C obs} \,.\, \text{V} \,.\, \text{N} \,.\, \text{p} \,.\, 273 \,.\, 28}{q \,.\, 100 \,.\, 101{,}3 \,.\, (t{+}173) \,.\, 22{,}4}$$

[0067] The carbon monoxide yield - mass per gram tobacco basis is calculated from the equation:

$$\text{mg carbon monoxide per gram tobacco} = \frac{\text{C obs} \,.\, \text{V} \,.\, \text{N} \,.\, \text{p} \,.\, 273 \,.\, 28}{q \,.\, 100 \,.\, 101{,}3 \,.\, (t{+}173) \,.\, 22{,}4 \,.\, W}$$

where

C_{obs} = observed carbon monoxide concentration, % (v/v)
N = total number of puffs in the measured sample (including clearing puffs)
q = number of cigars smoked to produce the measured sample
V = puff volume, ml
t = ambient temperature, °C
p = ambient pressure, kPa
W = average mass of conditioned cigars, g per cigar

[0068] The levels of the smoke compounds were measured with the use of a Borgwaldt KC smoke analyser. In general, by use of expanded, cut tobacco stems, the levels of tar (NFDPM) could be reduced by 10 to 60%, with an overall

average of 35% compared to the reference cigar. The CO and nicotine levels could respectively be reduced by 20 to 40%, overall average by 30% and by 35 to 50%, overall average 40% (see also example 1, table 1, figure 5).

[0069] Furthermore, the inventors found that cut tobacco stems of the filter material formed an effective mechanical filter for the particles in the smoke, as well as for vapor phase constitutes such as hydrogen cyanide, formaldehyde and other volatile aldehydes.

[0070] The cigar as presented by the current invention has also the advantage that it can be produced at a lower cost than a cigar without filter. Since the mouthpiece comprises a less expensive kind of tobacco, namely the tobacco stems, replacement of a part of the tobacco by these stems will result in a cost reduction during production.

[0071] The current invention equally provides for a method to produce the tar reducing cigar comprising the steps of

a) Providing fillers for the said distal and proximal end of the cigar, whereby said fillers have a different filling power;
b) Exerting a lower pressure on the said filler for the filter section compared to pressure exerted on said filler for distal end;
c) Enwrapping fillers with said binder and wrapper;
d) Applying perforations to the said distal end of the cigar.

[0072] The apparatus used to carry out the abovementioned method and to manufacture the cigar as presented in the current invention will require means to provide the two different sorts of filler and means to compress each type of filler independently of one another.

[0073] Therefore, an apparatus to produce the cigars as currently presented are provided with two distinct filler suppliers, two bunkers and format chamber divided in two separate parts to comply with the demand. Figures 2-4 represent schematic overviews of the apparatus or parts of the apparatus as presented in the current invention.

[0074] Referring to figure 2, the tobacco filler is delivered in bags or containers (3) to the installation. These bags or containers (3) are installed above the installation by a tackle. The filler material is collected by a funnel (15) which contains combs driven by pneumatic cylinders (not shown). These combs will separate the clumps of tobacco material. From the large funnel, the tobacco material will enter a smaller funnel which ends on the supplying means towards the format chamber.

[0075] The filler for the smokable part and the mouthpiece are supplied to the format chamber (6). In a preferred embodiment, these supplying means comprise a conveyor, subdivided in two separate parts for holding the different kinds of fillers. In another preferred embodiment, the supplying means comprise two separate conveyors (4, 5). Referring to figure 3, the conveyor transporting the filler for the smokable part (4) will preferentially be larger in width than the conveyor transporting the filler for the mouthpiece (5).

[0076] In a preferred embodiment, the conveyor will be installed in an angle of approximately 30°. The conveyor is motorized, for instance driven by a stepper motor. In one aspect, the surface of the conveyor comprises studs, to prevent the filler from clumping. In another aspect, a scraper is installed above the conveyor, again for preventing the filler from clumping and to evenly distribute the filler before entering the format chamber (not shown). The scraper is driven by a rotary cylinder with a radius of 180° which determines the position of the scraper. Depending on the position and angle of the scraper, and the speed and timing of the conveyor, the amount of filler that enters the format chamber is regulated.

[0077] At the end of the conveyor, the filler is entering the format chamber (6). In one embodiment, this occurs through a valve which regulates the amount of filler entering the format chamber by opening or closing. In a preferred embodiment, a hopper (7) is installed at the end of the conveyor. The filler will enter the format chamber (6), which is smaller than the conveyor, through the hopper (7).

[0078] The format chamber (6) will determine the format of the cigar, such as length and thickness. As the cigar to be produced by the apparatus comprises of two different kinds of filler, the filler cannot be mixed upon entering the format chamber. Therefore, in a preferred embodiment, the format chamber is divided in to sub-compartments, entirely separated from one another. The separation between the different compartments consists out of a vertical partition wall (16) placed in the format chamber.

[0079] Referring to figure 4, in a preferred embodiment, the pestles (8, 9) driven by pneumatic cylinders (10) with sensors (17), are installed above the format chamber for volume and weight measurement. A specific amount of filler will enter the format compartment coming from the hopper at the end of the conveyor. The right amount of filler that enters the format compartment is determined by the position of the pestle in the compartment. This position is determined by analogue sensors (17). The format chamber is movable in a vertical direction through guide rods. When a new supply of filler is needed, the format chamber will move upwards towards the hopper (7). When the format chamber (6) reaches this end position, a valve, normally closing the format chamber, will open, and the filler can enter the different compartments of the format chamber. Afterwards, the format valve will close again, and the format chamber will move downwards. When the format valve is entirely closed, the pestles (8, 9) will be pushed downward by the action of the pneumatic cylinders. The tightness of the tobacco parts in the cigar is determined by applying a certain pressure on the format cylinder, so the size of either one of the filler in the format compartments is consistent and depending on this pressure.

Applying a low pressure (0-0.5 bar) to the filter compartment, results in a very low packed filter. Applying higher pressures (up to a few bars, preferentially 1 bar) results in a very tightly packed filter. The tightness of the filter determines the final smoke composition and smoking experience.

[0080] The format pestle will push a certain amount of filler out the format compartments. Simultaneously, the format knife (18), installed underneath the format chamber, will swing away, aided by the arms connected to the knife. When the right amount of filler is pushed out of the format chamber, the knife (18) will swing back, and the cut-off filler will fall on the wrapping table (12) underneath the format chamber. Afterwards the tobacco material can now be enwrapped by binder (13) and wrapper (14), which will lead to a finished cigar.

[0081] The installation is built in such a way, that the format chambers are interchangeable; hence one installation can support the production of different cigar formats.

[0082] The invention is further described by the following non-limiting examples which further illustrate the invention, and are not intended to, nor should they be interpreted to, limit the scope of the invention.

[0083] It is supposed that the present invention is not restricted to any form of realization described previously and that some modifications can be added to the presented example of fabrication without reappraisal of the appended claims.

EXAMPLES

[0084] The smoke compounds of two populations of cigars of a given type were tested in a smoke analyzer according to the CORESTA recommended guidelines. Population A comprised of 20 cigars of type 1, sampled from a population of 1000 cigars (specifications see below), while population B comprised of 20 cigars of a given type 2, sampled from a population of 1000 cigars (specifications see below). For comparison reasons, a population of filter-less counterparts of each cigar type was used as control. The cigars of the population to be analyzed were randomly chosen within the group of cigars of a given type. Sampling occurred through the recommendations given by CORESTA recommended method n°47 (2000).

[0085] A cigar of given type 1 according to the present invention with the following parameters:

- total weight: 3.6 ± 0.45 g
- total length: 121.5 ± 1.5 mm
- weight mouthpiece: 0.95 ± 0.7 g
- weight smokable part: 2.65 ± 0.2 g
- diameter: 12.8 ± 0.3 mm
- diameter of head piece: 8.5 ± 0.5 mm
- perforations: 1 x 2 x 7

[0086] A cigar of given type 2 according to the present invention with the following parameters:

- total weight: 1.65 ± 0.2 g
- total length: 105 ± 1 mm
- weight of mouthpiece: 0.49 ± 0.035 g
- weight of smokable part: 1.025 ± 0.08 g
- diameter: 9.4 ± 0.2 mm
- diameter of head piece: 6 ± 0.4 mm
- perforations: 1 x 2 x 7

[0087] The values of all the measurements performed for each cigar type are shown below in Table 1.

Table 1. NFDPM, CO and nicotine content of cigars according to the presented invention compared to control cigars (mg/g)

	Cigar Type 1	**Control Type 1**	**Cigar Type 2**	**Control Type 2**
NFDPM (mg/g)	14 ± 2.0	23 ± 1.5	8 ± 1.2	15 ± 0.6
CO content (mg/g)	27 ± 2	36 ± 2	22 ± 1	36 ± 1
Nicotine content (mg/g)	1.25 ± 0.1	2.1 ± 0.1	0.75 ± 0.1	1.3 ± 0.1

[0088] Figure 5 shows graphs which depicts the percentage of reduction of NFDPM, CO and nicotine levels in the

cigars according to the invention compared with control cigars, based on the results obtained in Table 1.

[0089] In general, after similar analysis of several formats of cigars according to the invention, with use of expanded, cut tobacco stems in the filter section, under the experimental conditions as outlined here above, the levels of NFDPM could be reduced by 10 to 60%, with an overall average of 35% compared to the reference cigar. The CO and nicotine levels could respectively be reduced by 20 to 40%, overall average by 30% and by 35 to 50%, overall average 40%.

Claims

1. A tar reducing cigar, consisting of a wrapper, binder and filler, with a proximal and a distal end; whereby said the proximal end comprises a filter section composed of a filler of expanded, cut tobacco stems and whereby said expanded, cut tobacco stems in the filter section have a lower density than the filler in the distal end of the cigar.

2. A tar reducing cigar according to claim 1, whereby said filling power of the said tobacco stems lies between 500 and 700 cm^3/100g, and whereby said filling power of the said filler for the distal end lies between 650 and 850 cm^3/100g.

3. A tar reducing cigar according to claim 2, whereby said the filling power of the tobacco stems is 650 cm^3/100g.

4. A tar reducing cigar according to claim 2, whereby said the filling power of the said filler for the distal end is 770 cm^3/100g.

5. A tar reducing cigar, according to claim 4 whereby said the proximal end comprises perforations in the said wrapper and binder.

6. A tar reducing cigar, according to claim 5 whereby said perforations cause a pressure drop in said proximal end.

7. A tar reducing cigar according to claim 6, whereby the draw resistance of the filler for the said filter section lies between 95 and 120 mmWg and between 45 and 65 mmWg for the filler in the said distal end.

8. A tar reducing cigar according to claim 5, whereby said filter section comprises between 10% and 35% of the length of said cigar rod.

9. A tar reducing cigar, according to claim 8 whereby said NFDPM levels in the fumes of the said cigar are reduced by 10 and 60% compared to a reference cigar without filter section of expanded, cut tobacco stems.

10. A tar reducing cigar according to claim 9, whereby said tar levels in the fumes of the said cigar are reduced to 35%.

11. A method for producing a tar reducing cigar, comprising the steps of

    a) Providing fillers for the said distal and proximal end of the cigar, whereby said fillers have a different filling power;
    b) Exerting a lower pressure on the said filler for the filter section compared to pressure exerted on said filler for distal end;
    c) Enwrapping fillers with said binder and wrapper.

12. A method according to claim 11, whereby a pressure of 0.2 to 0.75 bar is exerted on the said filler for filter, and a pressure of 0.7 to 1.25 bar on the said filler for the distal end.

13. A method according to claim 12, whereby said the pressure applied on the said filler for filter is 0.5 bar.

14. A method according to claim 13, whereby pressure applied on said filler for distal end is 1 bar.

15. A method according to claim 14, whereby perforations are applied to the said distal end of the cigar.

Patentansprüche

1. Teer-reduzierende Zigarre, bestehend aus einem Deckblatt, einem Umblatt und einer Einlage, mit einem proximalen

und einem distalen Ende; wobei das proximale Ende einen Filterabschnitt umfasst, der aus einer Einlage aus expandierten, geschnittenen Tabakstängeln besteht, und wobei die expandierten, geschnittenen Tabakstängel in dem Filterabschnitt eine geringere Dichte aufweisen als die Einlage in dem distalen Ende der Zigarre.

2. Eine teer-reduzierende Zigarre nach Anspruch 1, wobei das Füllvermögen der Tabakstängel zwischen 500 und 700 cm^3/100g liegt, und wobei das Füllvermögen der Einlage für das distale Ende zwischen 650 und 850 cm^3/100g liegt.

3. Eine teer-reduzierende Zigarre nach Anspruch 2, wobei das Füllvermögen der Tabakstängel 650 cm^3/100g beträgt.

4. Eine teer-reduzierende Zigarre nach Anspruch 2, wobei das Füllvermögen der Einlage für das distale Ende 770 cm^3/100g beträgt.

5. Eine teer-reduzierende Zigarre nach Anspruch 4, wobei das proximale Ende Perforationen in dem Deckblatt und dem Umblatt umfasst.

6. Eine teer-reduzierende Zigarre nach Anspruch 5, wobei die Perforationen einen Druckabfall in dem proximalen Ende bewirken.

7. Eine teer-reduzierende Zigarre nach Anspruch 6, wobei der Zugwiderstand der Einlage für den Filterabschnitt zwischen 95 und 120 mmWS und zwischen 45 und 65 mmWS für die Einlage in dem distalen Ende beträgt.

8. Eine teer-reduzierende Zigarre nach Anspruch 5, wobei der Filterabschnitt zwischen 10% und 35% der Länge des Zigarrenwickels ausmacht.

9. Eine teer-reduzierende Zigarre nach Anspruch 8, wobei die NFDPM-Gehalte im Rauch der Zigarre um 10 und 60% im Vergleich zu einer Referenzzigarre ohne Filterabschnitt aus expandierten, geschnittenen Tabakstängel reduziert sind.

10. Eine teer-reduzierende Zigarre nach Anspruch 9, wobei die Teergehalte im Rauch der Zigarre auf 35% reduziert sind.

11. Ein Verfahren zur Herstellung einer teer-reduzierenden Zigarre, die folgenden Schritte umfassend:

    a) Bereitstellen von Einlagen für das distale und das proximale Ende der Zigarre, wobei die Einlagen ein unterschiedliches Füllvermögen aufweisen;
    b) Ausüben eines niedrigeren Drucks auf die Einlage für den Filterabschnitt im Vergleich zu Druck, der auf die Einlage für das distale Ende ausgeübt wird;
    c) Umwickeln der Einlagen mit dem Umblatt und dem Deckblatt.

12. Ein Verfahren nach Anspruch 11, wobei ein Druck von 0,2 bis 0,75 bar auf die Einlage für den Filter ausgeübt wird, und ein Druck von 0,7 bis 1,25 bar auf die Einlage für das distale Ende.

13. Ein Verfahren nach Anspruch 12, wobei der Druck, der auf die Einlage für den Filter angewendet wird, 0,5 bar beträgt.

14. Ein Verfahren nach Anspruch 13, wobei der Druck, der auf die Einlage für das distale Ende angewendet wird, 1 bar beträgt.

15. Ein Verfahren nach Anspruch 14, wobei Perforationen an dem distalen Ende der Zigarre angewendet werden.

Revendications

1. Cigare réduisant le goudron, composé d'une cape, d'une sous-cape, et d'une tripe, avec une extrémité proximale et distale□; dans lequel ladite extrémité proximale comprend une section de filtre composée d'une tripe de tiges de tabac coupées expansées et dans lequel lesdites tiges de tabac coupées expansées dans la section de filtre ont une densité inférieure à celle de la tripe dans l'extrémité distale du cigare.

2. Un cigare réduisant le goudron selon la revendication 1, dans lequel ledit pouvoir de remplissage desdites tiges de tabac est compris entre 500 et 700 cm^3/100g, et dans lequel ledit pouvoir de remplissage de ladite tripe pour

l'extrémité distale est compris entre 650 et 850 cm^3/100g.

3. Un cigare réduisant le goudron selon la revendication 2, dans lequel ledit pouvoir de remplissage des tiges de tabac est de 650 cm^3/100g.

4. Un cigare réduisant le goudron selon la revendication 2, dans lequel ledit pouvoir de remplissage de ladite tripe pour l'extrémité distale est de 770 cm^3/100g.

5. Un cigare réduisant le goudron selon la revendication 4, dans lequel ladite extrémité proximale comprend des perforations dans ladite cape et sous-cape.

6. Un cigare réduisant le goudron selon la revendication 5, dans lequel lesdites perforations provoquent une chute de pression dans ladite extrémité proximale.

7. Un cigare réduisant le goudron selon la revendication 6, dans lequel la résistance au tirage de la tripe pour ladite section de filtre est comprise entre 95 et 120 mmCE et entre 45 et 65 mmCE pour la tripe dans ladite extrémité distale.

8. Un cigare réduisant le goudron selon la revendication 5, dans lequel ladite section de filtre comprend entre 10 % et 35 % de la longueur de ladite tige de cigare.

9. Un cigare réduisant le goudron selon la revendication 8, dans lequel lesdits niveaux de matière particulaire anhydre et exempte de nicotine (MPAEN) dans les fumées dudit cigare sont réduits de 10 et 60 % par rapport à un cigare de référence sans section de filtre de tiges de tabac coupées expansées.

10. Un cigare réduisant le goudron selon la revendication 9, dans lequel lesdits niveaux de goudron dans les fumées dudit cigare sont réduits à 35 %.

11. Un procédé de fabrication d'un cigare réduisant le goudron, comprenant les étapes consistant à

a) fournir des tripes pour lesdites extrémités distale et proximale du cigare, dans lequel lesdites tripes ayant un pouvoir de remplissage différent□;
b) exercer une pression plus faible sur ladite tripe pour la section de filtre par rapport à la pression exercée sur ladite tripe pour l'extrémité distale□;
c) envelopper les tripes avec ladite sous-cape et ladite cape.

12. Un procédé selon la revendication 11, dans lequel une pression de 0,2 à 0,75 bar est exercée sur ladite tripe pour le filtre, et une pression de 0,7 à 1,25 bar sur ladite tripe pour l'extrémité distale.

13. Un procédé selon la revendication 12, dans lequel ladite pression appliquée sur ladite tripe pour le filtre est de 0,5 bar.

14. Un procédé selon la revendication 13, dans lequel la pression appliquée sur ladite tripe pour l'extrémité distale est de 1 bar.

15. Un procédé selon la revendication 14, dans lequel des perforations sont appliquées sur ladite extrémité distale du cigare.

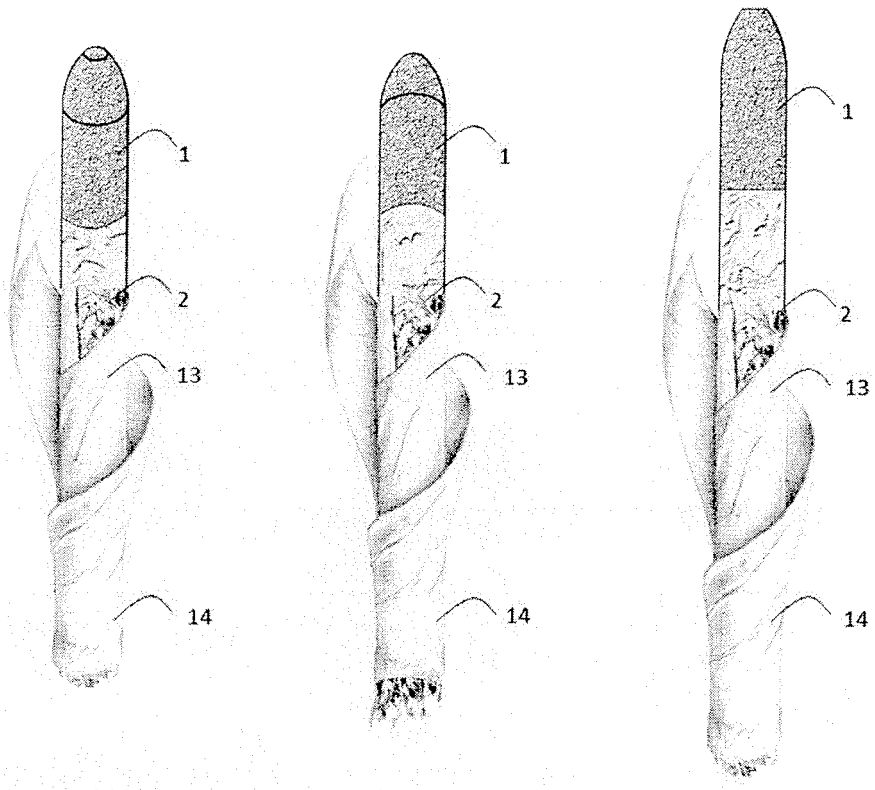


FIG. 1

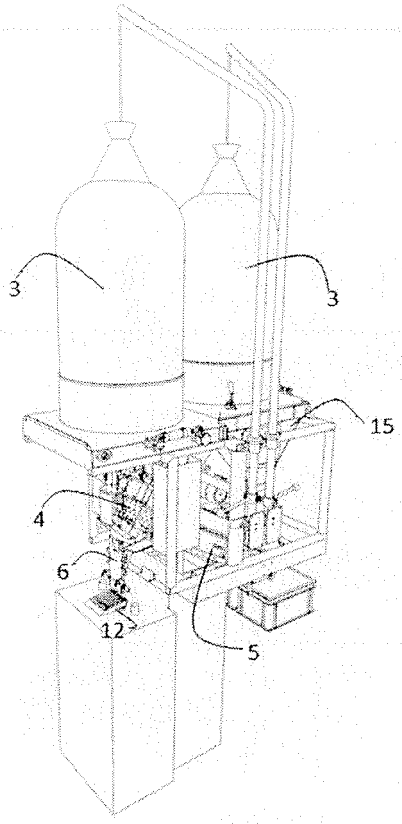


FIG. 2

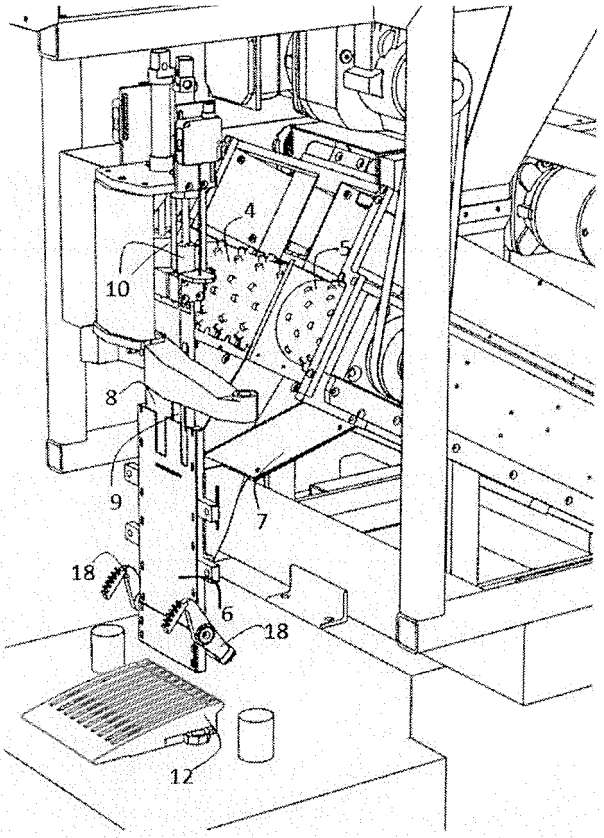


FIG.3

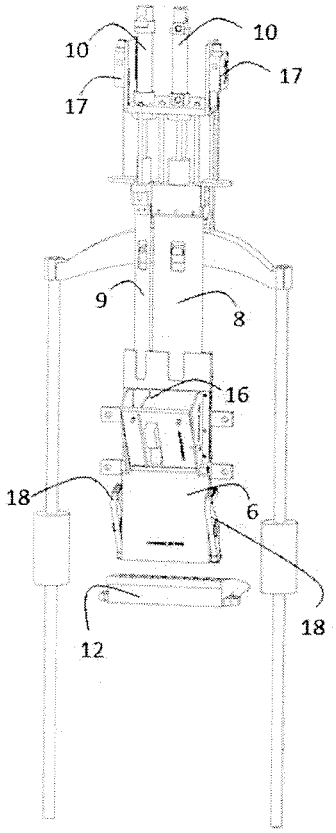
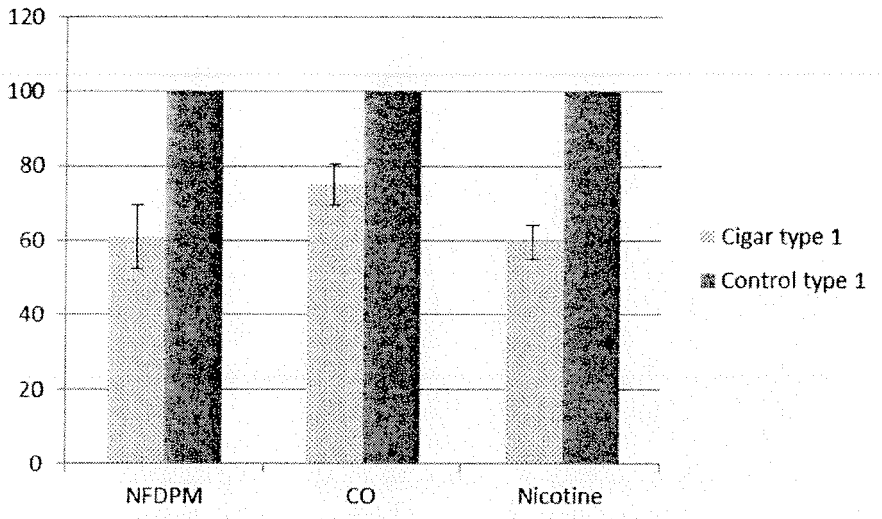


FIG. 4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100
80
60
40
20
0
NFDPM
CO
Nicotine
Cigar type 1
Control type 1

FIG. 5a

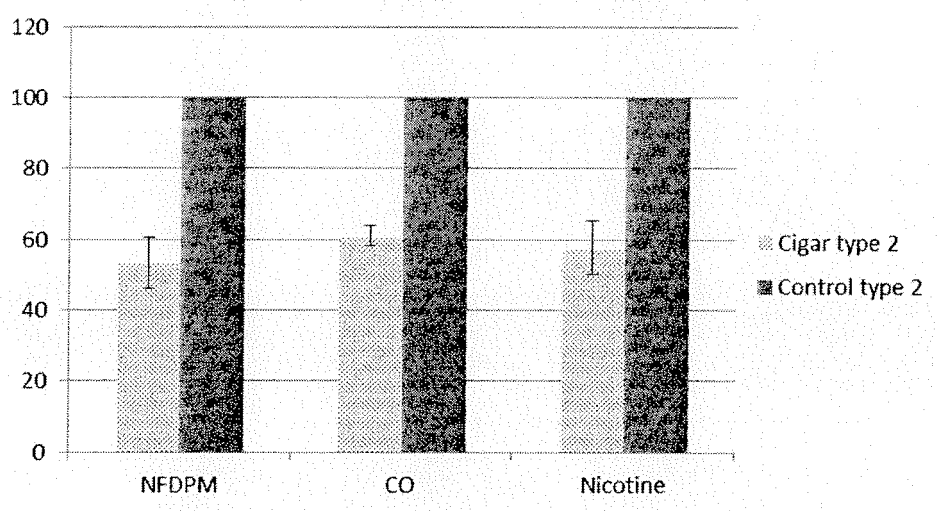
120
100
80
60
40
20
0
NFDPM
CO
Nicotine
Cigar type 2
Control type 2

FIG. 5b

REFERENCES CITED IN THE DESCRIPTION

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- DE 20309178 U **[0002]**
- GB 2064293 A **[0003]**
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