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(54) **SMOKING ARTICLE AND MANUFACTURING  
METHOD FOR A SMOKING ARTICLE**

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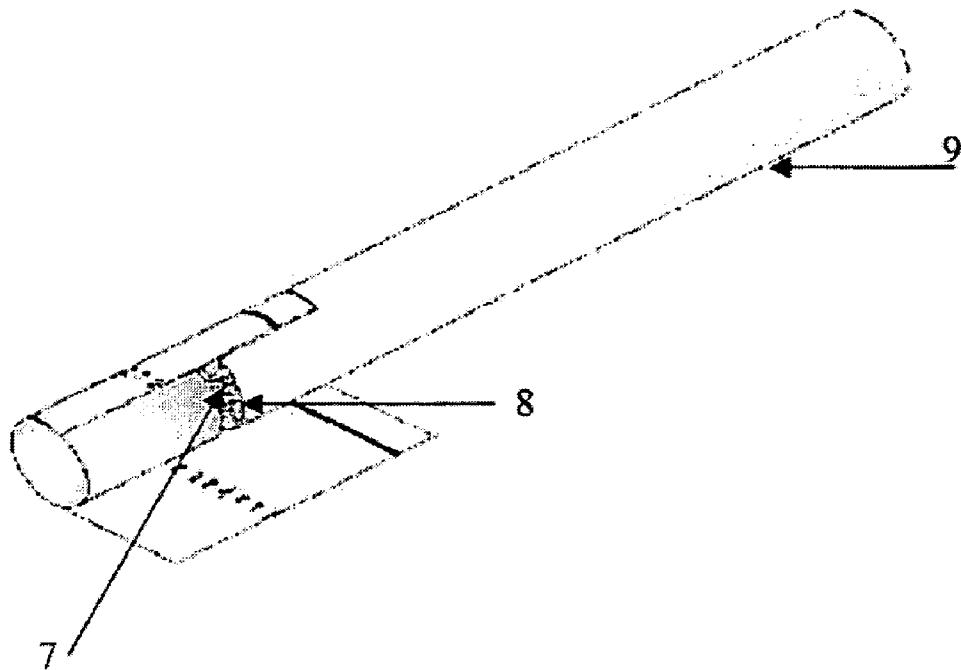
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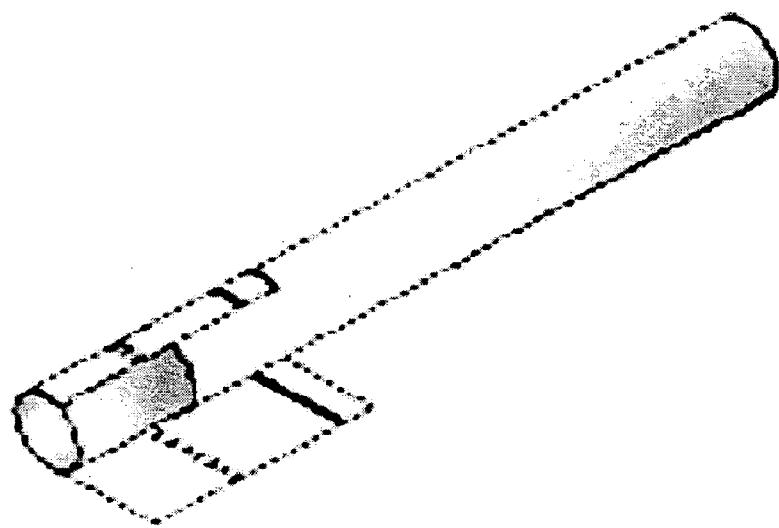
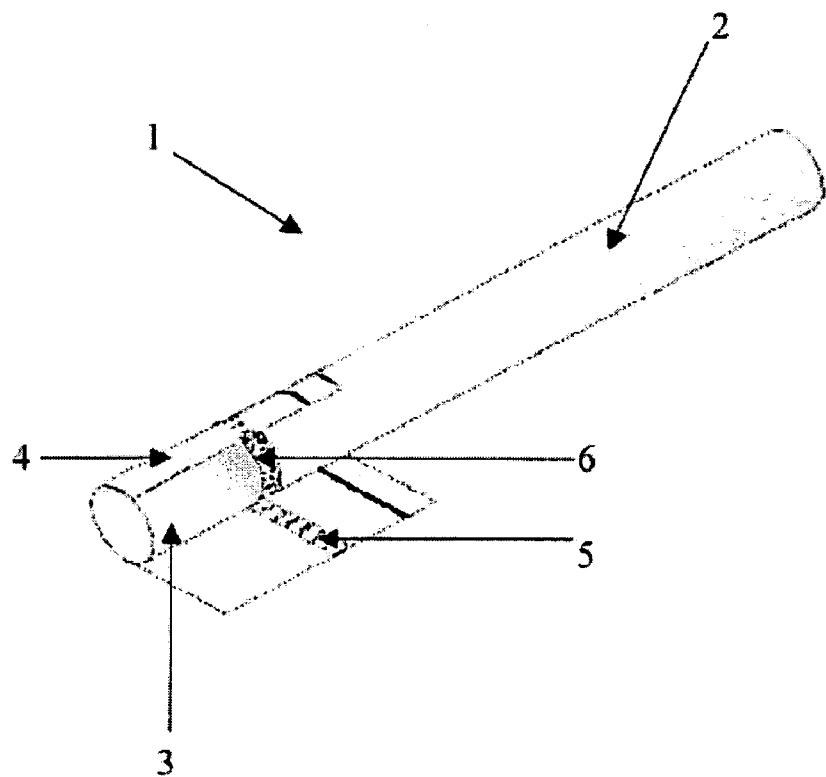
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**ABSTRACT**

This invention relates to a smoking article (1) and to a method for manufacturing a smoking article. The smoking article comprises a smoking material rod (2), at least one filtering element (3) and a wrapper (4), said wrapper connects the at least one filtering element and the smoking material rod; the smoking material rod and the at least one filtering element are spaced apart and this space is enclosed by the wrapper to form a chamber (6); and the wrapper comprises at least one ventilation opening (5).



**FIG. 1****FIG. 2**

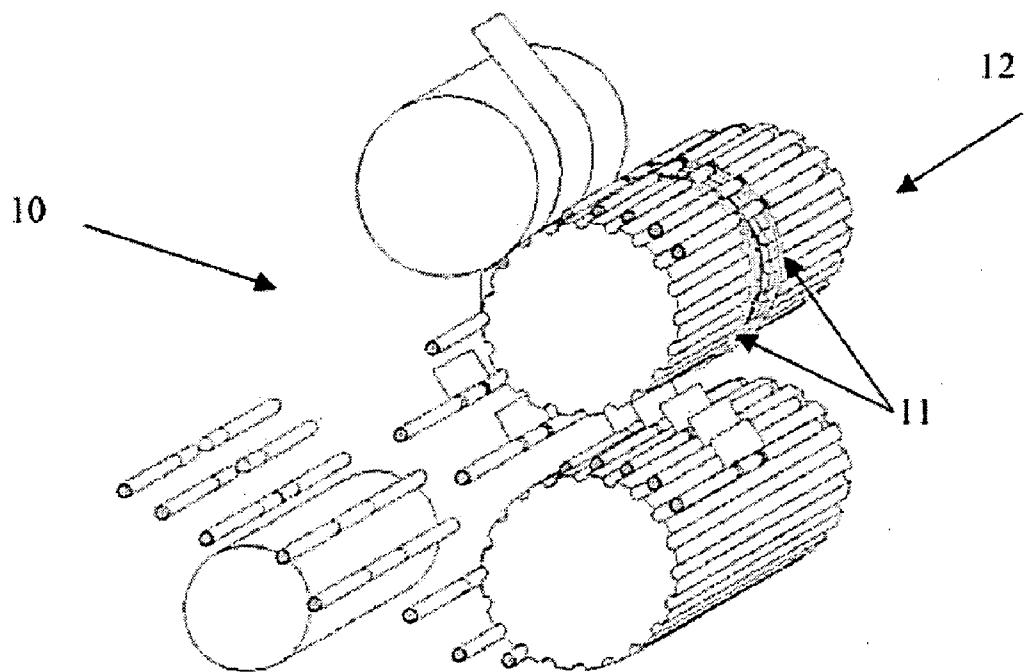
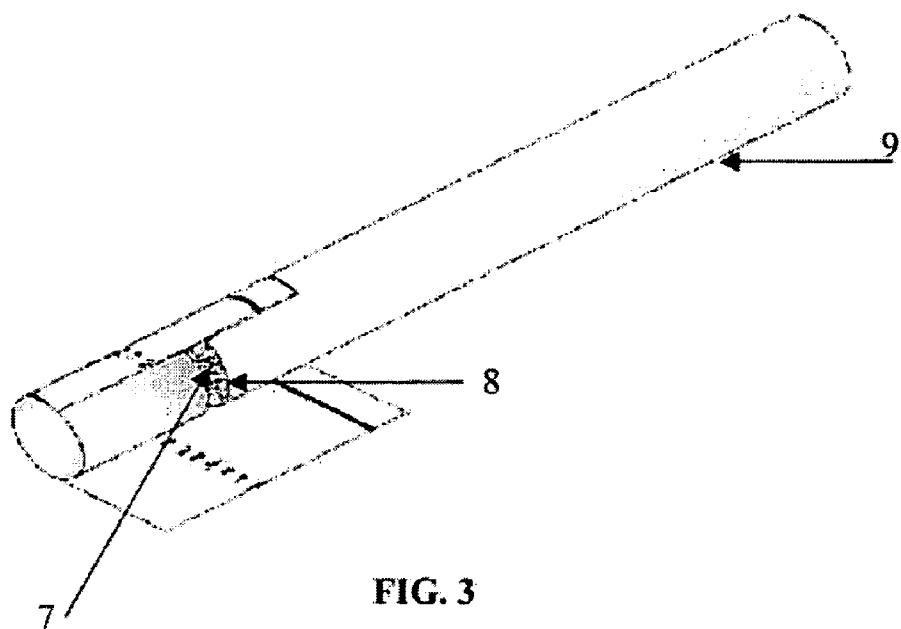


FIG. 4

## SMOKING ARTICLE AND MANUFACTURING METHOD FOR A SMOKING ARTICLE

### INVENTION FIELD

**[0001]** The present invention relates to a smoking article comprising a space between a smoking material rod and a filtering element so as to form a chamber that is peripherally sealed by a wrapper that unites the smoking material rod to the filtering element, said wrapper having at least one ventilation opening.

### STATE OF THE ART

**[0002]** Conventional ventilated cigarettes known in the art, which do not possess a space between a tobacco rod and a filtering element, usually provide cigarette smoke with variable characteristics. These variable characteristics may result in flavor alterations. These variable characteristics arise because the ventilation may vary in accordance with the conditions in which the cigarette is being smoked.

**[0003]** Documents PI8303783 and PI9001386 disclose cigarettes that possess a chamber located between two filters. Additionally, said documents disclose at least one ventilation opening in the wrapper that unites the tobacco rod to each filtering element in order to ventilate the chamber. In contrast with the objective of the present invention, said documents seek to optimize the smoke characteristics by means of better filtering of the same, without considering the standard deviation of the cigarette ventilation that could influence the smoke characteristics.

**[0004]** Document PI9401850-2 discloses a coaxial cigarette that provides a chamber between a coaxial tobacco rod and a filter to mix the smokes of the two types of tobacco present in the tobacco rod. The volume of said chamber is also adjustable in order to enable the change in smoke flavor perceived by the smoker. In contrast with the main objective of the present invention, in said document the chamber is designed to only mix the two types of smoke. In this document, there is also no consideration regarding the effect of the standard deviation of the cigarette ventilation.

**[0005]** No state of the art document reveals a ventilated smoking article consisting of a chamber located between a tobacco rod and a filter designed to homogenize the smoke in order to maintain the product flavor characteristics and simultaneously increase the diffusion of the smoke vapor phase.

### INVENTION SUMMARY

**[0006]** In a first aspect, the invention provides a smoking article comprising a smoking material rod, at least one filtering element and a wrapper, wherein:  
said wrapper connects the at least one filtering element and the smoking material rod;  
the smoking material rod and the at least one filtering element are spaced apart and this space is enclosed by the wrapper to form a chamber; and  
the wrapper comprises at least one ventilation opening.

**[0007]** In another aspect, the invention provides a method for manufacturing a smoking article as described herein, comprising the steps of:  
providing a smoking material rod and at least one filtering element in a spaced apart relationship to form a space between the smoking material rod and the filter element; and  
connecting the smoking material rod to the at least one filtering element by means of a wrapper comprising at least one

ventilation opening wherein the wrapper encloses the space between the smoking material rod and the at least one filtering element to form a chamber.

**[0008]** In another aspect, the present invention provides a smoking article comprising a tobacco rod, at least one filtering element and a wrapper, being that said wrapper fastened to the at least one filtering element and the tobacco rod in order to allow the coupling of the two, the wrapper having at least one ventilation opening, wherein the smoking article comprises a chamber that is formed in the space between the tobacco rod and the filtering element, and is enclosed by the wrapper.

**[0009]** The smoking article described herein may consist of a tobacco rod, at least one filtering element and a wrapper.

**[0010]** In another aspect, the present invention provides a manufacturing method for a smoking article, comprising the steps of formation of a tobacco rod and formation of a filtering element, wherein the method additionally comprises the steps of formation of a space between the tobacco rod and the filtering element and the coupling of the tobacco rod to the filtering element by fastening a wrapper over both, thus forming a chamber in the space between the tobacco rod and the filtering element.

**[0011]** Preferably the at least one ventilation opening is located over the chamber.

**[0012]** Preferably the wrapper comprises a plurality of ventilation openings. Preferably the plurality of openings are circumferentially positioned on the wrapper. Preferably the plurality of openings are positioned in a line on the wrapper. Preferably the plurality of openings are located over the middle of the chamber. Preferably the plurality of openings are a ventilation perforation line on the wrapper.

**[0013]** Preferably the spacing between the smoking material rod and the filtering element is between 2 to 5 mm. Preferably the spacing between the smoking material rod and the filtering element is between 2 to 3 mm.

**[0014]** In a further aspect, the spacing between the smoking material rod and the filtering element is from 1.1 to 5.0 mm. Preferably the spacing is from 1.2 to 3.5 mm.

**[0015]** Preferably the spacing is from 1.3 to 2.7. Preferably the spacing is from 1.5 to 2.5.

**[0016]** Preferably the smoking material rod is a tobacco rod. A tobacco rod is a smoking material rod that comprises tobacco.

**[0017]** Preferably the extremity of the tobacco rod adjacent to the chamber comprises tobacco that is fastened to a tobacco rod liner. A tobacco rod liner is a wrapper that enwraps the tobacco rod.

**[0018]** Preferably the tobacco is fastened to the tobacco rod liner by means of an adhesive or by adjusting the quantity of tobacco on the tobacco rod extremities.

**[0019]** Preferably spacing guides are installed in a closing drum of a filter coupling machine to form the space between the smoking material rod and the at least one filtering element.

**[0020]** Preferably the method further comprises the step of fastening tobacco located at the tobacco rod extremity adjacent to the chamber to a tobacco rod liner.

**[0021]** Preferably the smoking article has a CO/TAR reduction of at least 5% as compared to an equivalent smoking article that does not comprise a chamber. Preferably the smoking article has a CO/TAR reduction of at least 6%. Preferably the smoking article has a CO/TAR reduction of at least 7%.

[0022] Preferably the smoking article has a ventilation standard deviation of less than 2.00. Preferably the smoking article has a ventilation standard deviation of less than 1.95. Preferably the smoking article has a ventilation standard deviation of less than 1.57. Preferably the smoking article has a ventilation standard deviation of less than 1.0. Preferably the smoking article has a ventilation standard deviation of less than 0.74.

#### DESCRIPTION OF THE FIGURES

[0023] FIG. 1 represents an example of a conventional cigarette, without an air chamber.

[0024] FIG. 2 represents a preferred embodiment of the present invention in which the ventilation is located over the air chamber.

[0025] FIG. 3 represents another preferential embodiment of the present invention in which the ventilation is located over the air chamber.

[0026] FIG. 4 represents a drawing of a machine on which the method of manufacturing of the smoking article object of the present invention is performed.

#### DETAILED DESCRIPTION OF THE INVENTION

[0027] The present invention will now be described in further detail in the following examples.

[0028] A suitable smoking article 1, which comprises a tobacco rod 2, at least one filtering element 3 and a wrapper 4, may have said wrapper fastened over the at least one filtering element and the tobacco rod so as to connect the same, the wrapper having at least one ventilation opening 5 (see FIG. 2).

[0029] The smoking article comprises a chamber 6 that is formed in the space located between the tobacco rod 2 and the filtering element 3, and is enclosed by the wrapper 4. Typically, the space measures between 2 and 5 mm, for example, between 2 and 3 mm (FIG. 2).

[0030] As shown in FIG. 2, the at least one ventilation opening 5 may be located over the chamber 6. However, acceptable results may also be obtained when the ventilation opening(s) is (are) located over the filtering element (FIG. 3).

[0031] In order to avoid that the smoke present in the extremity 8 of the tobacco rod 2 adjacent to the chamber 6 is deposited inside the same, part of the tobacco may be fastened on the liner 9 of the tobacco rod. Normally, this fixation is performed by means of an adhesive or by adjusting the quantity of tobacco on the extremities of the tobacco rod.

[0032] The smoking article may be manufactured by means of a manufacturing technique that comprises the steps of formation of a tobacco rod 2, formation of at least one filtering element 3 and the formation of at least one ventilation opening 5 in the wrapper 4; followed by the formation of a space between the tobacco rod 2 and the at least one filtering element 3; and connecting the tobacco rod 2 to the at least one filtering element 3 by means of fastening of a wrapper 4 over the same, such that a chamber 6 is formed by the space located between the tobacco rod and the at least one filtering element. Alternatively, suitable tobacco rods 2, at least one filtering element 3, and wrapper 4 with at least one ventilation opening 5 may be obtained commercially. Thus, the method may be carried out without the steps of forming such materials.

[0033] The method may additionally comprise the step of fastening on the tobacco rod liner 9 the tobacco present on the extremity 8 of the tobacco rod 2 adjacent to the chamber 6.

This fixation is preferably made by means of an adhesive or by means of the adjustment of the quantity of tobaccos located at the extremities of the tobacco rod.

[0034] The method of the present invention can be implemented on state of the art filter coupling machines, such as model MAX 100 manufactured by the Hauni Hamburg Company. The spacing between the tobacco rod 2 and the at least one filtering element 3 may be obtained by the installation of spacing guides 11 on a double closing drum 12 of a filter coupling machine 10 (FIG. 4).

[0035] The main benefit of the smoking article of the present invention is the reduction in the TIP ventilation standard deviation, conferring increased cigarette quality. TIP ventilation is the percentage measurement of the quantity of air that passes through the filter, promoting the dilution of the smoke resulting from the burning of the tobacco rod.

[0036] The secondary benefit of the present invention is the reduction of the concentration of carbon monoxide in the main smoke.

[0037] Table 1 below presents the experimental results observed in laboratory tests of the reduction in the ventilation standard deviation and of the reduction of carbon monoxide content obtained with the use of smoking articles of the present invention compared to commercial products with both high and low ventilation levels.

TABLE 1

Spacing (mm)	Product					
	Low Ventilation			High Ventilation		
	Alternative					
	135300	135302	135304	135301	135303	135305
Spacing (mm)	0	2	2	0	2	2
Mouth End (mm)	10	15	10	10	15	10
TAR (mg/cigarette)	9.3	10.1	9.4	7.6	8.0	8.1
Nicotine (mg/cigarette)	0.72	0.82	0.75	0.64	0.75	0.7
CO (mg/cigarette)	9.2	9.3	8.7	7.2	6.5	7.1
Inhalations	7.3	7.0	7.2	7.6	7.2	7.5
CO/TAR	0.99	0.92	0.92	0.94	0.81	0.88
CO/TAR reduction (%)	—	7	7	—	14	6
Ventilation (%)	17	19	17	34	41	36
Ventilation Standard Deviation	2.01	0.74	1.95	3.32	1.57	6.71
Ventilation Variation Coefficient	11.8	4.0	11.6	9.7	3.8	18.1

[0038] In Table 1, six cigarette alternatives were used, identified by numbers 135300 to 135305. Alternatives 135300 and 135301 refer to conventional cigarettes with ventilation over the filtering element and the remaining alternatives refer to the type of cigarette of the present invention that have a spacing of 2 mm.

[0039] The expression mouth end represents the distance between the extremity of the filter closest to the smoker's mouth and the ventilation perforation line. TAR is the term used to describe the total substances present in the smoke excluding water and nicotine. Inhalations represent the number of times the cigarette is smoked by the smoking machine.

**[0040]** The measurement of the ventilation consists in the application of a vacuum to the cigarette extremity containing the filter, generating an airflow of 17.5 mL/s through the cigarette (tobacco rod+ventilation). The airflow that passes through the cigarette tip and the tobacco rod are measured using a low-pressure transducer and these individual measurements of the cigarette are performed by adequately isolating the areas with coils lined with a latex glove. The result of ventilation is expressed as the total % of air that passes through the tobacco rod and the ventilation.

**[0041]** Alternatives 135305 and 135304 provide the ventilation openings positioned over the filtering element and alternatives 135302 and 135303 provide the ventilation openings over the space between the filtering element and the tobacco rod. As can be seen, the lowest ventilation standard deviation and variation coefficient was obtained for alternatives 135302 and 135303. However, all the alternatives cigarettes of the present invention provided a reduction of CO/TAR.

**[0042]** All publications mentioned in the above specification are herein incorporated by reference. Various modifications and variations of the described methods and system of the invention will be apparent to those skilled in the art without departing from the scope and spirit of the invention. Although the invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the described modes for carrying out the invention which are obvious to those skilled in chemistry or related fields are intended to be within the scope of the following claims

**1.** A smoking article comprising a smoking material rod, at least one filtering element and a wrapper, wherein:

    said wrapper connects the at least one filtering element and the smoking material rod;  
    the smoking material rod and the at least one filtering element are spaced apart and this space is enclosed by the wrapper to form a chamber; and  
    the wrapper comprises at least one ventilation opening.

**2.** A smoking article according to claim 1, wherein the at least one ventilation opening is located over the chamber.

**3.** A smoking article according to claim 1, wherein the spacing between the smoking material rod and the filtering element is between 2 to 5 mm.

**4.** A smoking article according to claim 3, wherein the spacing between the smoking material rod and the filtering element is between 2 to 3 mm.

**5.** A smoking article according to claim 1, wherein the smoking material rod is a tobacco rod.

**6.** A smoking article according to claim 5, wherein the extremity of the tobacco rod adjacent to the chamber comprises tobacco that is fastened to a tobacco rod liner.

**7.** A smoking article according to claim 6, wherein the tobacco is fastened to the tobacco rod liner by means of an adhesive or by adjusting the quantity of tobacco on the tobacco rod extremities.

**8.** A method for manufacturing a smoking article, comprising:

    providing a smoking material rod and at least one filtering element in a spaced apart relationship to form a space between the smoking material rod and the filter element;  
    and

    connecting the smoking material rod to the at least one filtering element by means of a wrapper comprising at least one ventilation opening, the wrapper enclosing the space between the smoking material rod and the at least one filtering element to form a chamber.

**9.** A method according to claim 8, wherein spacing guides are installed in a closing drum of a filter coupling machine to form the space between the smoking material rod and the at least one filtering element.

**10.** A method according to claim 8, wherein the smoking material rod is a tobacco rod.

**11.** A method, according to claim 10, wherein the method further comprises the step of fastening tobacco located at the tobacco rod extremity adjacent to the chamber to a tobacco rod liner.

**12.** A method of manufacturing a smoking article, comprising:

    providing a tobacco rod and at least one filtering element in a spaced apart relationship to form a space between the tobacco rod and the filter element,

    wherein the spacing between the tobacco rod and the filtering element is between 2 to 5 mm;

    connecting the tobacco rod to the at least one filtering element by means of a wrapper comprising at least one ventilation opening, the wrapper enclosing the space between the smoking material rod and the at least one filtering element to form a chamber,  
    wherein the at least one ventilation opening is located over the chamber

    wherein spacing guides are installed in a closing drum of a filter coupling machine to form the space between the tobacco rod and the at least one filtering element;  
    and

    fastening tobacco located at the tobacco rod extremity adjacent to the chamber to a tobacco rod liner.

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