June 28, 1966 C. D. ELLIS ET AL 3,258,015

SMOKING DEVICE

Filed Feb. 4, 1964 3 Sheets-Sheet 1

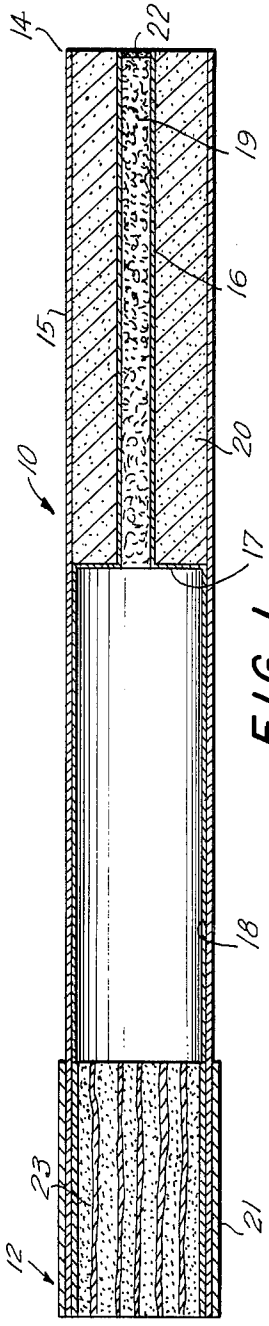

FIG. 1

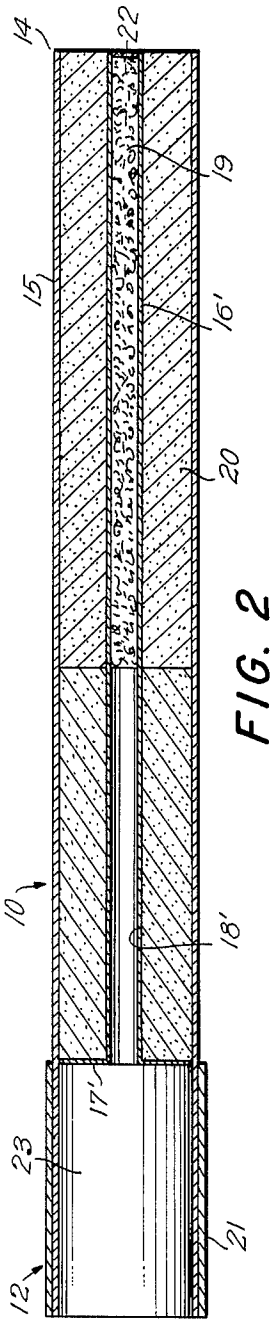

FIG. 2

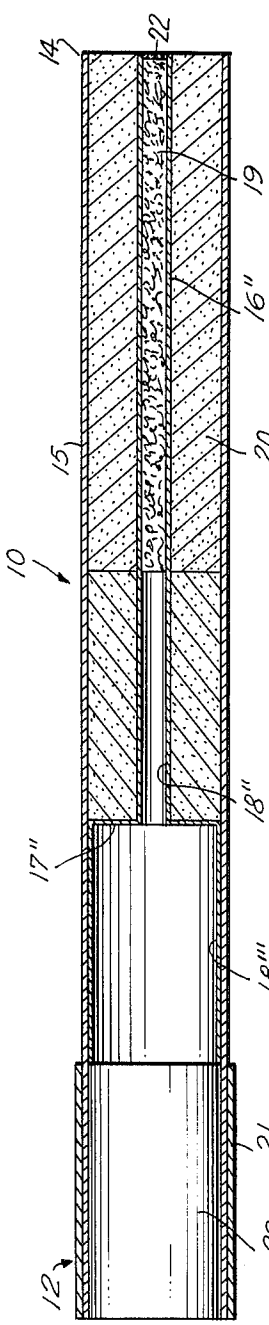

FIG. 3

INVENTORS.
CHARLES DRUMMOND ELLIS
HERBERT SCHACHNER
DAVID WILLIAMSON

BY Kane, Dalsimer & Kane
ATTORNEYS

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SMOKING DEVICE

Filed Feb. 4, 1964 3 Sheets-Sheet 2

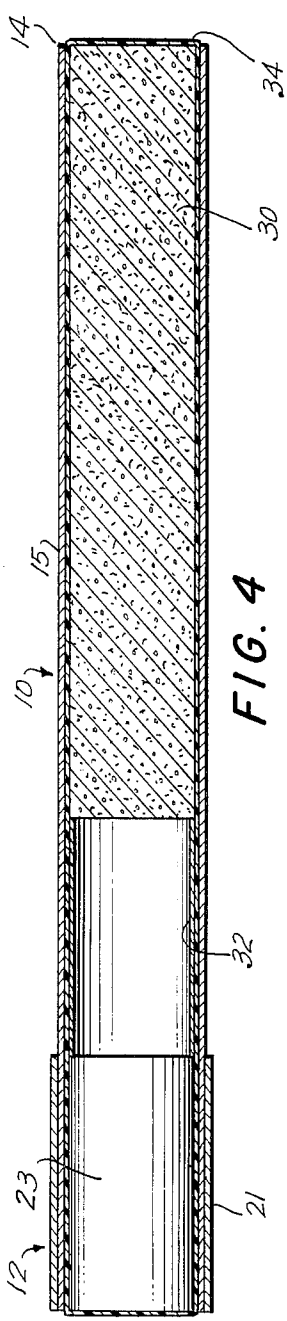

FIG. 4

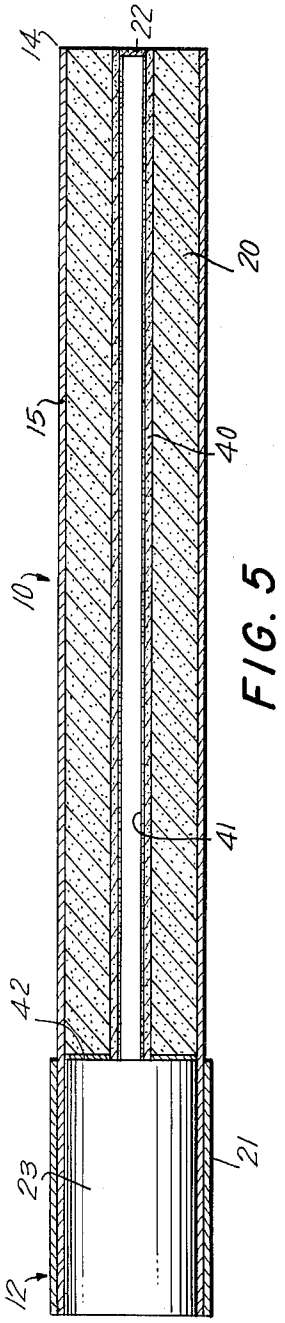

FIG. 5

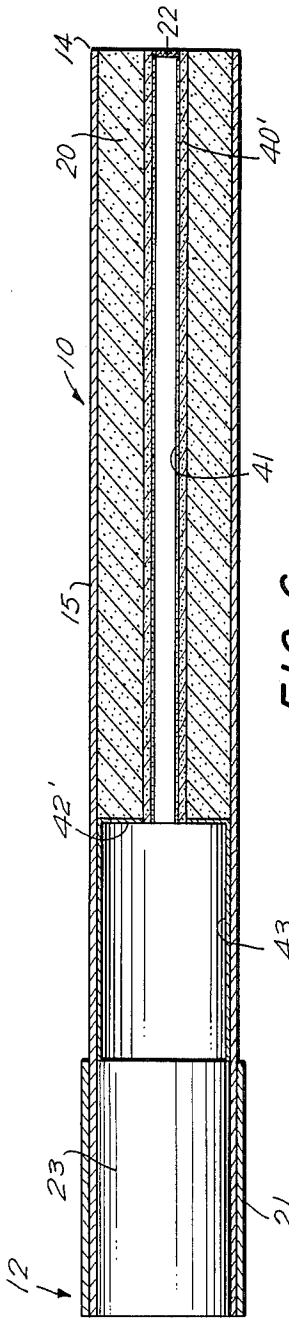

FIG. 6

INVENTORS
CHARLES DRUMMOND ELLIS
HERBERT SCHACHNER
BY DAVID WILLIAMSON

Kane, Dalsimer & Kane
ATTORNEYS

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SMOKING DEVICE

Filed Feb. 4, 1964 3 Sheets-Sheet 3

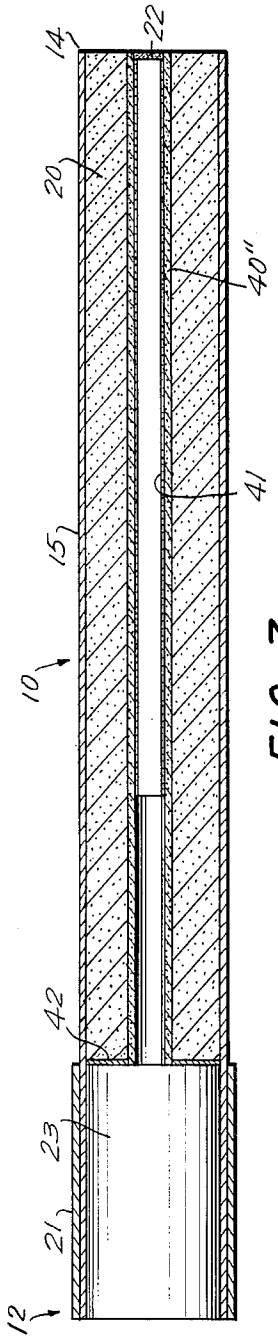

FIG. 7

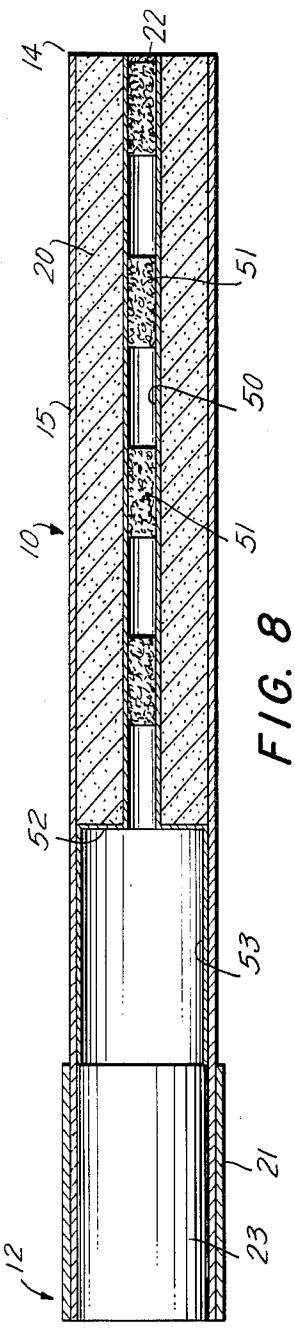

FIG. 8

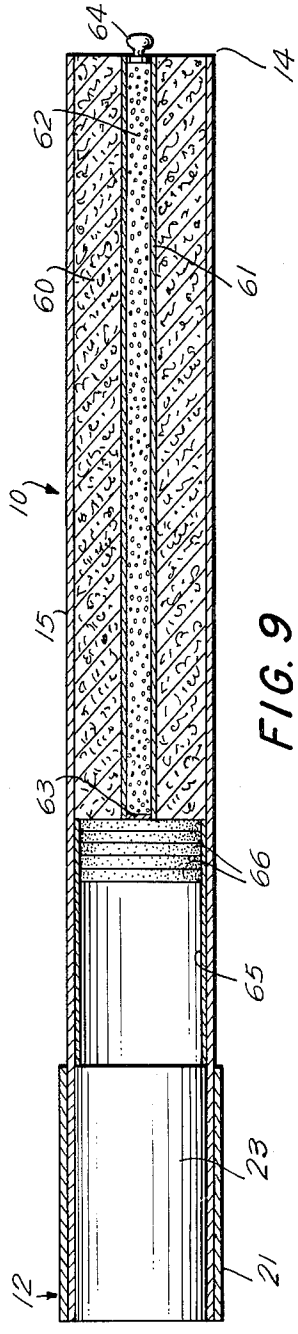

FIG. 9

INVENTORS
CHARLES DRUMMOND ELLIS
HERBERT SCHACHNER
BY DAVID WILLIAMSON

Kane, Dalsimer and Kane
ATTORNEYS

United States Patent Office 3,258,015 Patented June 28, 1966

3,258,015

SMOKING DEVICE

Charles Drummond Ellis, Seawards, Cookham Dean, England, and Herbert Schachner and David Williamson, Grand-Lancy, Geneva, Switzerland, assignors to Battelle Memorial Institute, Columbus, Ohio, a corporation of Ohio

Filed Feb. 4, 1964, Ser. No. 342,869
19 Claims. (Cl. 131—171)

This invention relates to an improved smoking device whereby an improved smoke stream of a controlled character is delivered to the smoker.

In commercially available conventional smoking devices such as cigarettes, cigars and pipes, tobacco and reconstituted tobacco, or tobacco substitutes, are ignited and the products of combustion, in the form of a smoke stream in filtered or unfiltered form, are delivered to the mouth of the smoker. The smoke stream thus formed of the products of combustion may contain components which do not enhance the quality and characteristics of the smoke.

It is a prime object of the present invention to overcome the difficulties and disadvantages heretofore encountered and to provide an improved smoking device which delivers an improved smoke stream of a controlled character and which does not contain the products of combustion.

A further object is the provision of an improved smoking device of the above character which simulates a conventional or traditional smoking device, such as a cigarette, in appearance and in social habit attributes, and which affords the same benefits, pleasure and satisfaction without the attendant disadvantages.

Among other objects of the present invention is the provision of a smoking device having the above-indicated advantages which is relatively simple and inexpensive to manufacture and which may be handled and smoked in a manner similar to a conventional or traditional smoking device, such as a cigarette.

Our invention contemplates the provision of an improved smoking device having the appearance of a traditional smoking device and embodying a composition which releases nicotine vapor and potentially aerosol-forming materials, including water vapor, when subjected to an elevated temperature below the ignition point of the composition, and significantly below a temperature where major decomposition of the nicotine occurs, and also having heating means for heating the composition to an elevated temperature below its ignition point to cause the release of the nicotine vapor and the aerosol-forming vapors.

The smoking device incorporates a continuous smoke passageway from its outer end to its mouthpiece end and which communicates with the nicotine-releasing composition. The smoke passageway includes an aerosol-nucleating chamber between the nicotine-releasing composition and the mouthpiece. This chamber is arranged so as to cool at an appropriate rate the potentially aerosol-forming materials sufficiently to enable aerosol particles to form, and the nicotine vapor is caused to contact the aerosol particles and condense thereon, whereby the nicotine assumes the transferability of the aerosol particles on which they condense.

As will be seen from the following description and from the accompanying drawings, our invention is capable of being embodied in many different forms. Thus, in the drawings:

FIGS. 1, 2 and 3 are similar longitudinal, sectional views of three different forms of cigarettes embodying our invention in which the composition for releasing nicotine and potentially aerosol-forming vapors is confined inside a tube in the smoking device and the heating means or material is disposed around the outside of the tube;

FIG. 4 is a longitudinal, sectional view of a further modified form of our invention in which a pyrophorous or heating material is mixed with the composition for releasing nicotine and potentially aerosol-forming vapors disposed in the smoking device;

FIGS. 5, 6, and 7 are longitudinal, sectional views of three further modified forms of our invention in which the composition for releasing nicotine and potentially aerosol-forming vapors is in the form of a thin layer or coating disposed around the inner surface of a tube inside the smoking device with a space or chamber being disposed centrally of the tube and with the heating material being disposed around the outside of the tube;

FIG. 8 is a longitudinal, sectional view of a still further form of our invention in which the composition for releasing nicotine and potentially aerosol-forming vapors is arranged in separate, spaced units inside a tube disposed in the smoking device with the heating material disposed around the tube; and

FIG. 9 is a longitudinal, sectional view of another form of smoking device embodying our invention in which the heating material is disposed in a tube inside the smoking device and the composition for releasing nicotine and potentially aerosol-forming vapors is disposed around the outside of the tube.

In each of the illustrated forms of our invention, the smoking device is provided with an elongated body element simulating a cigarette and of a size to be carried and manipulated in the hand of a user. The body element of each form of smoking device has a mouthpiece end and an outer end extending outwardly therefrom. Inside the body member, we provide a nicotine-releasing composition which releases nicotine vapor and potentially aerosol-forming materials, including water vapor, when subjected to an elevated temperature below the ignition point of the composition and significantly below a temperature where major decomposition of the nicotine occurs. We also provide means for heating the composition to an elevated temperature below its ignition point to cause the release of the nicotine vapor and the aerosol-forming materials.

A continuous smoke passageway is provided from the outer end to the mouthpiece end of the smoking device and it is in communication with the nicotine-releasing composition. In each of the illustrated smoking devices, the smoke passageway includes suitable means, such as an aerosol-nucleating chamber, positioned between the composition and the mouthpiece end and arranged so as to cause the potentially aerosol-forming materials to cool sufficiently and in a way to cause these materials to condense into aerosol droplets. The aerosol-nucleating chamber also provides further space in which the nicotine vapor contacts the aerosol particles and condenses thereon. This is an important and significant part of our invention because the nicotine thus condensed on the aerosol particles assumes the transferability thereof. In other words, under ordinary circumstances, the nicotine vapors are highly condensable and would condense upon surfaces which they contact between the nicotine-releasing composition and the mouthpiece end of the cigarette and only a very small percentage of the nicotine would be delivered to the mouth of the user.

However, when the aerosol particles are thus formed and the nicotine vapor is condensed thereon, the nicotine thus condensed on the aerosol particles acquires the transferability of the aerosol particles.

The full scope of our invention will be more fully understood by reference to the several specific forms illustrated and described herein.

Each form of our smoking device has an elongated body element **10** having the general size and configuration of a cigarette so that it can be readily carried and manipulated in the hand of a user. It has a mouthpiece end **12** to be inserted in the mouth of a user and an outer end **14** projecting outwardly therefrom.

Each form of the smoking device is encased in a suitable wrapper **15**. The wrapper is preferably made of a porous cigarette paper but may also be made of other suitable materials, such as a natural or reconstituted tobacco wrapper.

As indicated above, the smoking device should preferably simulate a cigarette in appearance. Thus, it may be between 70 and 85 mm. in length and between 7 and 20 mm. in diameter. It should be understood, however, that these dimensions are merely suggested so that the smoking device will simulate the appearance of a conventional cigarette and that the length and diameter may both be varied beyond the indicated limits.

In the forms of our device shown in FIGS. 1, 2 and 3, we provide a tubular member in the body of the smoking device and the nicotine-releasing composition is disposed inside the tubular member and the heating means is arranged in the body of the cigarette surrounding the outer surface of the tubular member.

In the form of device shown in FIG. 1, we provide a tubular member **16** concentric with the body portion of the cigarette and extending from the outer end **14** towards the mouthpiece end for approximately one-half the length of the body portion. The tubular member is connected with an outwardly flared flange or annulus **17** at its inner end which, in turn, connects with the large cylindrical portion **18** forming a nucleating chamber. The nicotine-releasing composition **19** is disposed inside the tubular member **18** and may extend for the entire length thereof.

Heating means **20** surrounds the tubular member **16** and extends for the entire length thereof within the wrapper **15**.

As shown, the wrapper **15** may extend for the entire length of the smoking device from the outer end **14** and around the heating means **20** and the cylindrical portion **18**, and finally terminating at the mouthpiece end of the smoking device. If desired, a suitable tip **21** made of relatively heavier gage paper or of cork may encase the mouthpiece end of the smoking device.

The diameter of the tubular member **16** may be varied. However, sufficient space should be left between the outer surface of the tube and the wrapper to accommodate enough of the heating material to have good smoldering characteristics and to heat the nicotine-releasing material to the required temperature. Satisfactory results are achieved where the diameter of the body portion of the smoking device is between approximately one and a half and four times the outside diameter of the tubular member.

We have also found that the best results are obtained where the tubular member **16** is made of a material of high heat conductivity, such as copper or aluminum.

The thickness of the wall of the tubular member **16** may be varied but satisfactory results are achieved where it is made of copper or aluminum foil between approximately 0.1 mm. and 1.0 mm. in thickness.

The annular flange **17** and the cylindrical portion **18** may be made of the same material as the tubular member but they may also be made of different materials which are non-heat conducting. The annular flange **17** prevents communication between the heating means **20** and the chamber inside the cylindrical portion **18**.

The assembly of tubular member **16**, flange **17** and cylindrical portion **18** may be preformed in one piece or may be separately made and suitably secured together. Thus, the tubular member may be made of foil and wrapped around the nicotine-releasing material and then assembled with the flange and cylindrical portion.

The nicotine-releasing material **19** may be tobacco, reconstituted tobacco, a tobacco extract or a synthetic mixture comprising nicotine. The nicotine-releasing material employed in this form of device preferably comprises, cured, shredded or cut and blended cigarette tobacco or reconstituted tobacco or mixtures thereof. The nicotine content of the tobacco or reconstituted tobacco is preferably enriched by mixing therewith a tobacco concentrate rich in nicotine so that the available nicotine in the mixture constitutes between approximately 5 and 20% by weight of the tobacco material. We have also found that interesting results are obtained if additives, such as essential oils, including orange oil, lemon oil, mandarin, angelica and bergamot are mixed with the tobacco or reconstituted tobacco forming the nicotine-releasing composition. The essential oils enhance the flavor without interfering with nucleation or aerosol formation. The percentage of essential oils that may be mixed with the cut tobacco or reconstituted tobacco may be varied, but satisfactory results are obtained if up to 1% or more by weight are mixed therewith.

The heating means **20** may be of any desired type which will heat the cut tobacco or reconstituted tobacco inside the tubular member to a temperature of between approximately 200° C. and 400° C. so as to cause the release of nicotine vapors and potentially aerosol-forming materials, including water vapor, from the tobacco. For this purpose, we prefer to employ a fine cut tobacco or reconstituted tobacco having good smoldering characteristics. The use of tobacco or reconstituted tobacco as the heating means further enhances the similarity of the product to a cigarette.

The tobacco employed as the heating means should be fine cut to between approximately 100 and 200 cuts per inch, and may have mixed therewith a smoldering enhancing compound such as sodium chlorate, potassium chlorate, sodium nitrate or potassium nitrate and should be packed to a density of between approximately 0.25 and 0.35 g./cc. The percentage of smoldering compound may be varied, but satisfactory results are obtained where approximately 5% by weight is mixed with the tobacco or reconstituted tobacco.

The outer end of the heating material **20** communicates with the atmosphere and may be ignited. However, the heating material **20** does not have direct communication with the passage formed by the tubular member **16**, the cylindrical member **18**, and the mouthpiece end portion **12**. Thus, the smoke and products of combustion coming from the material **20** are not drawn into the mouth of the smoker. The heat generated by the burning of the material **20** serves to heat the nicotine-releasing composition **19** to a temperature of between 200° C. and 400° C. sufficient so as to cause the release of nicotine vapor and potentially aerosol-generating material, including water vapor.

The outer end of the tubular member **16** may be provided advantageously with a porous disc **22** extending thereacross. This porous disc permits air to be drawn by the smoker through the disc and through the nicotine-generating material **19**. However, it prevents the composition **19** from being ignited at the time that the heating material **20** is lighted. The disc may be made of a porous ceramic material or of a ceramic material or metal sheet having small perforations therein. The disc **22** also serves to increase the draw resistance when a smoker smokes the device, thereby causing it to further simulate the characteristics of a cigarette. To further increase the draw resistance, the mouthpiece end **12** may be provided with a filter **23** made in the usual manner of absorbent paper, cellulose ester filaments or other fibrous material. Instead of using a filter, the smoking device may be provided with perforated or porous baffles at the mouthpiece end for building up the draw resistance.

In using the device, the mouthpiece end **12** is placed in the mouth of the smoker and the outer end of the

heating material **20** is ignited with a match or lighter in the usual manner. The glowing or smoldering tobacco material **20** has a temperature of approximately 600° C. or more, and serves to heat the nicotine-releasing material **19** to a temperature between approximately 200° C. and 400° C. to cause the release of nicotine vapor and of potentially aerosol-forming material, including water vapor. When the smoker draws inwardly, the nicotine vapor and aerosol-forming material are drawn through the passage inside the tubular member **16** into the chamber formed by cylinder **18** where the aerosol-forming materials are cooled in a manner to cause them to condense into aerosol droplets. As the aerosol droplets and nicotine vapor are drawn through the chamber towards the filter and mouthpiece portion, nicotine vapor contacts the aerosol droplets and condenses thereon with the result that the nicotine vapor, thus condensed on the droplets, assumes the transferability thereof. Thus, a significant portion of the nicotine condensed on the aerosol droplets is drawn into the mouth of the user.

The form of smoking device shown in FIG. 2 is quite similar to that shown in FIG. 1 and has a tubular member **16'** similarly made of a high heat conducting material, such as copper or aluminum, in which is contained the nicotine releasing material in the form of tobacco, reconstituted tobacco or mixtures thereof, preferably enriched with tobacco extract, and having additives such as essential oils applied thereto. Also, the heating material **20** surrounding the tubular member **16'** is preferably in the form of a cured, blended, fine-cut cigarette tobacco, reconstituted tobacco or mixtures thereof, having high smoldering characteristics. However, in this form of device, the cylindrical portion and chamber **18'** are not substantially larger in diameter than the tubular member, but simply constitutes a continuation thereof of substantially the same diameter. Communication between the tobacco material **20** and the passageway to the smoker's mouth is prevented by ring or flange **17'**.

The nicotine-releasing material **19** inside the tubular member **16** extends to the chamber portion **18'** as shown. The heating material or tobacco **20** should extend for at least the same distance as the nicotine-releasing material and may extend up to the filter or mouthpiece end past the chamber portion **18'**. However, the materials surrounding the chamber portion **18'** need not be heating material or tobacco and may be inert or non-burning material, such as finely divided clay.

The device shown in FIG. 2 is smoked in a manner similar to the device shown in FIG. 1. The mouthpiece end is placed in the mouth of the smoker and the outer end of the heating material **20** is ignited in the usual manner, heating the nicotine-releasing material so as to cause the release of nicotine vapor and potentially aerosol-forming material, including water vapor. The nicotine vapor and potentially aerosol-forming material is drawn through the passageway inside the tubular member **16** into the chamber portion **18'** where the potentially aerosol-forming materials are cooled in a manner to cause the formation of aerosol particles. As the nicotine vapor and aerosol particles are drawn towards the mouthpiece end, they are caused to contact each other in a manner so that the nicotine condenses thereon. The nicotine then assumes the transferability of the aerosol particles on which it is condensed with the result that a substantial proportion is drawn into the mouth of the smoker.

The device shown in FIG. 3 is quite similar to that shown in FIGS. 1 and 2, and nicotine-releasing material, preferably in the form of cured, blended, shredded or cut cigarette togacco or reconstituted tobacco or mixtures thereof, preferably enriched with a tobacco concentrate and an additive such as an essential oil, is encased in the tubular member **16''**.

The heating material in the form of a fine cut tobacco or reconstituted tobacco of good smoldering characteristics surrounds the tubular member **16** inside the wrapper **15**. In this form of device, however, two chamber portions are provided, namely chamber **18''**, simply constituting an extension of the tubular member **16''** and having substantially the same diameter and an enlarged cylindrical chamber portion **18'''** positioned immediately adjacent the filter or mouthpiece end of the smoking device. The device is smoked in a similar manner to the first two devices, i.e., the mouthpiece end is placed in the mouth of the smoker and the outer end of the material **20** is ignited so as to heat the nicotine-releasing material **19** to cause the release of nicotine vapor and potentially aerosol forming material. As this material and vapor are drawn through the passageway into the first chamber portion **18''** and thereafter into the enlarged chamber portion **18'''**, the aerosol-forming materials are cooled in a manner to cause them to condense into aerosol droplets. On being drawn towards the filter or mouthpiece end, the nicotine vapor contacts the aerosol droplets in a manner to be condensed thereon and thereby assume the transferability of these droplets. Communication between tobacco material **20** and the passageway to the smoker's mouth is prevented by ring or flange **17''**.

The following are specific examples of smoking devices made in accordance with FIGS. 1, 2 and 3:

Example I

A tubular member, as shown in FIG. 1, is formed of thin copper so as to have a tubular portion approximately 3 mm. in diameter and connected integrally at one end with a cylindrical chamber portion approximately 30 mm. in length and 8 mm. in diameter. The restricted tubular portion is filled with cured, blended and cut cigarette tobacco enriched with a tobacco concentrate prepared as hereinafter explained so that the percentage of nicotine in the tobacco mixture is approximately 5%. It is packed to a density of approximately 0.3 g./cc. Heating material, in the form of tobacco cut to approximately 200 cuts per inch and having 5% sodium chlorate mixed therewith is then formed around the tubular member and a porous ceramic disc is applied over the outer end of the tubular member and a cellulose acetate filter is applied to the inner end of the cylindrical chamber portion. The entire assembly is then wrapped in porous cigarette paper and a strip of tipping material is wrapped around the mouthpiece end of the device. The device is then ready for use and it may be smoked at once or it may be suitably packaged in moisture-proof and protective wrapping for smoking at a later date.

When the device is smoked, the mouthpiece end is inserted in the mouth of the smoker and the outer end of the heating material is ignited so as to heat the nicotine-releasing composition to a temperature of between 200° C. and 400° C. to cause the release of nicotine vapor and aerosol-forming material. When the smoker draws inwardly, the products of combustion of the heating material are not drawn into the passage of the smoking device since there is no connection therebetween. The nicotine vapor and the aerosol-forming materials are drawn along the passage to the nucleating chamber where the potentially aerosol-forming materials are caused to cool in a way to cause them to condense into aerosol particles. As the aerosol particles and nicotine vapor are drawn towards the mouthpiece end, they are caused to contact each other in a manner so that the nicotine vapor condenses on the aerosol droplets, assuming the transferability thereof. Thus, a high proportion of the nicotine is drawn into the mouth of the user.

Example II

The procedure set forth in Example I is repeated, but reconstituted tobacco in the proportion of approximately 15% by weight is blended with the cigarette tobacco in-

side the tubular member and 1% by weight of orange oil is added thereto.

Example III

The procedures of Examples I and II are repeated, with the exception that a tubular member made of copper of the configuration shown in FIG. 2 is employed.

Example IV

The procedures of Examples I and II are repeated, with the exception that a tubular member made of aluminum of the configuration shown in FIG. 3 is employed.

It should be understood that in each of the examples set forth above, the other materials and ingredients herein listed and indicated may be substituted for those specifically set forth in the examples, and the proportions of materials may be varied within the indicated limits.

In the form of smoking device shown in FIG. 4, we use a pyrophorous material as the heating means, and the pyrophorous material is mixed directly with the nicotine-releasing composition. Accordingly, no tubular member is required within the smoking device. In this form of smoking device, we prefer to employ as the nicotine-releasing composition cured, blended and cut cigarette tobacco or reconstituted tobacco or mixtures thereof, preferably enriched with a tobacco concentrate and having mixed therewith an additive such as an essential oil, as described above.

As the pyrophorous material, we prefer to employ a moderately active Raney metal, such as finely divided iron, nickel, zinc or lead which, when contacted by air or oxygen, will generate heat. Sufficient pyrophorous material should be mixed with the tobacco so that when the smoker smokes or puffs the device in the normal manner, the tobacco will be heated to a temperature of between 200° C. and 400° C. We have found that the desired results are achieved when between approximately 2% and 10% by weight of the finely divided metal is mixed with the tobacco.

In the device illustrated in FIG. 4, the mixture of cut or shredded cigarette tobacco and pyrophorous material is shown at **30**. The particles of pyrophorous material are shown as substantially uniformly distributed throughout the mass of tobacco. Forwardly of the mass of tobacco, we provide a nucleating chamber inside the cylindrical portion **32**. The mouth piece end of the cigarette may be provided with a conventional filter, such as shown at **23**, or with a series of porous or perforated baffles to build up the draw resistance to conform with a conventional cigarette.

It will be appreciated that prior to use, the pyrophorous material must be isolated from the air or atmosphere and for this purpose we enclose the smoking tobacco mixture **30**, the cylinder **32**, and the filter **23** in an imprevious envelope **34** made of a suitable resin or plastic material, such as linear polyethylene. This material may be precoated on the inside with aluminum foil. The envelope completely encases these portions of the smoking device, and extends over the inner and outer ends thereof. Prior to using the device, the two ends must be suitably removed, as by cutting or tearing, or must be perforated so that the air can be drawn therethrough. So that the device presents the conventional appearance of a cigarette, a cigarette wrapper **15** may be disposed around the envelope **34** and a strip of tipping material **12** may be wrapped around the mouthpiece end of the smoking device in overlapping relationship with the cylindrical portion **32**.

In using the device shown in FIG. 4, the two ends of the envelope are perforated or removed and the mouthpiece end is inserted in the mouth of the user. When air is drawn inwardly, it contacts the pyrophorous material causing the generation of sufficient heat to cause the tobacco to release nicotine vapors and potentially aerosol-forming materials which are drawn through the tobacco mixture into the nucleating chamber. The potentially aerosol-forming materials are cooled in the nucleating chamber in a manner so as to condense into aerosol droplets. As the aerosol droplets and nicotine vapor are drawn through the nucleating chamber, the nicotine vapors contact and condense on the aerosol droplets and assume the transferability thereof with the result that a substantial proportion of the nicotine is drawn into the mouth of the user with the aerosol droplets.

Instead of using a pyrophorous material which is responsive to air or oxygen, we may employ a pyrophorous material which is responsive to other substances, such as water or alcohol. Thus, we may employ finely divided aluminum hydride or boron hydride, or calcium oxide or fully activated molecular sieve material, all of which are responsive to water to generate heat.

We may also use finely divided rare metals, such as platinum or zirconium, which are responsive to alcohol, to generate heat. Where the material is responsive to water, there may be sufficient moisture in the atmosphere to cause the generation of sufficient heat when the ends of the envelope are opened and the smoker draws the air inwardly through the device. Under any circumstances, the outer end of the device may be dipped in water after the ends of the envelope have been opened. Similarly, where pyrophorous material, which is responsive to alcohol, is employed, the outer end of the smoking device may be dipped in alcohol after the envelope has been opened.

The following is a specific example of a smoking device made in accordance with the disclosure of FIG. 4:

Example V

Cured, blended and cut cigarette tobacco is mixed with a tobacco concentrate prepared as hereinafter explained so that the percentage of nicotine in the tobacco mixture is approximately 8%. The tobacco is then thoroughly mixed with Raney iron in an oxygen-free atmosphere in the proportion of approximately 6% by weight of the iron particles to the entire mixture. The tobacco preparation is then packed to a density of approximately 0.3 g./cc. and assembled in an oxygen-free atmosphere inside an impervious envelope approximately 85 mm. in length along with a cylindrical chamber forming member **32** and a cellulose acetate filter **23**. This assembly, in turn, is then encased in a conventional cigarette wrapper **15** and a strip of tipping material **21** is assembled around the filter end of the device in overlapping relationship with the cylindrical portion. The device, thus made, may then be packaged along with other similar devices in a package similar to a cigarette package. When it is desired to use the device, the two ends of the envelope are opened or perforated and the mouthpiece end of the device is inserted in the mouth and air is drawn therethrough in the usual manner.

Example VI

The example set forth in Example V is repeated, but reconstituted tobacco in the proportion of approximately 15% by weight is blended with a cigarette tobacco and approximately 1% by weight of lemon oil is added thereto.

It should be understood that, in each of the Examples V and VI, the other materials and ingredients herein listed and indicated may be substituted for those specifically set forth in the examples and that the proportions of materials may be varied within the indicated limits.

In the forms of our device shown in FIGS. 5, 6 and 7, we employ a tobacco concentrate as the nicotine-releasing composition. The tobacco concentrate is disposed in a relatively thin layer around the inner surface of a tubular member, concentrically disposed in the body portion of the smoking device. The central portion of the tubular member is open and free from obstruction and forms a passageway and nucleating chamber.

In each of the devices shown in FIGS. 5, 6 and 7, we provide suitable heat generating material around the outer surface of the tubular member and this preferably takes the form of a fine-cut tobacco having good smoldering characteristics indicated at **20** and similar to that employed in the forms of our device shown in FIGS. 1, 2 and 3.

In FIG. 5, the tubular member is shown at **40** and it extends from the outer end of the smoking device up to the mouthpiece **21**. A tobacco concentrate **41**, rich in nicotine, coats the inner surface of the tubular member for its entire length. The tubular member may be made of clay or other porous ceramic material, such as Agalain. It may also be made of aluminum or it may be made of composite layers of clay or ceramic and aluminum. The diameter of the tubular member may vary but we have found that satisfactory results are obtained where the diameter of the body portion of the smoking device is between approximately one and a half and four times the outside diameter of the tubular member and where the outside diameter of the tubular member is between approximately one and a half and three times the inside diameter thereof.

Where the tubular member is made of porous clay or ceramic material, the coating of tobacco concentrate may be applied thereto by preparing a slurry of the tobacco concentrate and drawing it into the tubular member by suction applied through the outer surface thereof until a coating of the desired thickness is deposited on the inner surface. Where the tubular member is made of aluminum or of a composite of aluminum and clay or ceramic material, a layer of the tobacco concentrate of the desired thickness may be coated on a sheet of aluminum or of aluminum foil, which is then wrapped into a tube of the desired size. In the case of a composite tube, the aluminum tube is then inserted inside the porous clay or ceramic tube.

The tobacco extracted may be prepared by macerating tobacco with petroleum ether (boiling point 50–70° C.) to remove waxes and some of the resins. The mixture is then filtered and the filtrate discarded. The extracted tobacco is then re-extracted with chloroform yielding a fraction of approximately 5 to 10% of the weight of the tobacco, which is rich in nicotine and flavoring acids. This solution may be used in that form for enriching tobacco where tobacco is used as the nicotine-releasing composition, or it may be evaporated to further concentration or to dryness. A concentrated solution or a water slurry of the residue may be used for coating the inner surface of the tubular member or for coating aluminum foil.

A tobacco extract may alternately be prepared by mascerating the tobacco with a mixture of 50% aqueous acetone or with pure acetone. Depending upon the tobacco type, the extract made from the 50% aqueous acetone will contain between 20 and 60% of the weight of the tobacco and will contain the nicotine flavoring acids, waxes, etc. The concentrade made with the pure acetone will represent between approximately 15 and 20% of the weight of the tobacco and it likewise will contain the nicotine and flavoring acids but less of the resins, sugars and waxes. These tobacco extracts may likewise be used for enriching cured and blended cigarette tobacco employed as the nicotine-releasing composition or they may be employed in concentrated form or the form of a slurry for coating the inner surface of the tubular member or the aluminum foil, as previously described.

We have found that a higher delivery of the nicotine to the mouth of the user is attained where there is mixed with the tobacco extract a solid, powdered additive, inert to the tobacco extract and to nicotine vapor and the potentially aerosol-forming materials released therefrom. Examples of such materials are powdered silica, magnesium tri-silicate, chalk, sodium chloride, aluminum oxide, calcium carbonate and tobacco. More satisfactory results are obtained where the inert, powdered material has a specific surface area greater than 10 $m.^2/gm.$ Silica having a specific surface area of between 100 and 250 $m.^2/gm.$ serves very satisfactorily for this purpose. Where the materials have a high specific surface area of 100 $m.^2/gm.$ or more, the amount of additives should be between approximately 5% and 25% by weight of the extract. Where the materials have a lower specific surface area, then between approximately 25% and 70% by weight of the powdered inert material should be mixed with the extract.

We have found that very satisfactory results are achieved when the tobacco extract is impregnated or deposited upon steel wool or upon fibrous asbestos or silica. For example, such a source material may comprise 14.7 mgm. of tobacco extract, containing 4 mgm. of nicotine, which is deposited upon 60 mgm. of steel wool or of fibrous asbestos or silica, or mixtures thereof.

As will be noted in the form of device shown in FIG. 5, the coating of tobacco extract **41** extends for the entire length of the tubular member **40**. This coating is preferably between approximately 0.5 mm. and 1.0 mm. thick leaving a central passageway and nucleating chamber at least 1.0 mm. in diameter.

The outer end of the tubular member may be closed by a porous or perforated ceramic or metal disc **22** as in the first form of our invention. Extending laterally from the inner end of the tubular member between the tobacco preparation **20** and the filter **23** is an impervious flange or ring **42** which blocks connection between the heating material and the passageway leading to the smoker's mouth. Thus, the products of combustion cannot be drawn into the mouth of the user.

In using the smoking device shown in FIG. 5, the mouthpiece end is placed in the mouth of the user and the outer end of the tobacco heating material **20** is ignited as by means of a match or cigarette lighter. Since the tobacco preparation **20** has good smoldering characteristics, it will continue to burn progressively from the outer end towards the inner end, even though there is no passageway between the tobacco material **20** and the smoker's mouth. The smoldering tobacco **20** heats the tobacco concentrate **41** to a temperature of between 200° and 400° C. so as to cause it to release nicotine vapor and potentially aerosol-forming materials.

The central passageway inside the tubular member **40** serves both as a passageway to the smoker's mouth and as a nucleating chamber so that the potentially aerosol-forming materials will cool and condense into aerosol particles, which are contacted by the nicotine vapor so that the nicotine vapor condenses thereon, assuming the transferability thereof.

In the form of device shown in FIG. 6, the tubular member **40'** extends for only a portion of the length of the body of the smoking device and terminates at its inner end in an imperforate circular disc or flange **42'** blocking connection between the tobacco heating material **20** and the smoke passageway. A cylindrical member **43** encasing a nucleating expansion chamber extends from the ring or flange **42'** to the filter **23**. In other respects, the device shown in FIG. 6 is the same as that shown in FIG. 5. A tobacco extract **41**, rich in nicotine is coated on the inner surface of the tubular member **40'**. As in the form shown in FIG. 5, the tobacco extract preferably has mixed therewith a solid, powdered material, inert to the smoke generating composition and the nicotine and to the potentially aerosol-forming materials. When the device shown in FIG. 6 is used, the central passageway through the tubular member serves as one portion of the nucleating chamber and the chamber inside the cylindrical member **43** serves as another portion thereof.

In the form of device shown in FIG. 7, the tubular member **40''** extends from the outer end of the smoking device to the mouthpiece, **21**. The coating of tobacco extract **41** only extends for a portion of the length of

the tubular member. Thus, in a smoking device approximately 85 mm. in length, the tubular member may be approximately 75 mm. in length and the coating **41** may extend for approximately 60 mm. from the outer end thereof towards the filter. The inner end of the tubular member adjacent the filter is free from any internal coating and accordingly leaves a space of larger size to serve as the inner end of the nucleating chamber. A ring or flange **42** of imperforate metal extends outwardly from the inner end of the tubular member so as to block connection between the heating tobacco material **20** and the passageway to the smoker's mouth.

The device shown in FIG. 7 is used in the same manner as the device shown in FIGS. 5 and 6. When the nicotine vapor and potentially aerosol-forming materials are released by the tobacco extract, they are drawn along the central portion of the tubular member, which serves as an aerosol-nucleating chamber with the inner end thereof providing a larger nucleating chamber space.

The following are specific examples of methods of preparing smoking devices, as shown in FIGS. 5, 6 and 7.

Example VII

A tubular member as shown in FIG. 5 is formed of porous ceramic material having an internal diameter of 2.5 mm. and an external diameter of 6 mm. and a length of 75 mm. A tobacco extract is prepared as described in Example XIV and there is mixed therewith approximately 10% by weight of silica particles having a specific surface area of approximately 150 $m.^2/gm.$ The inner surface of the tubular member is coated with a layer of the tobacco extract by applying a suction to the outer surface of the tubular member to draw a slurry of the extracted material into the tubular member until a coating approximately 0.6 mm. is built up on the inner surface of the tubular member. The tubular member thus internally coated with tobacco extract is then assembled with a paper filter approximately 10 mm. in length. Heating material in the form of tobacco cut to approximately 200 cuts per inch and having 5% sodium chlorate mixed therewith is then formed around the tubular member and a porous ceramic disc **22** is applied over the outer end of the tubular member. The tobacco heating material is packed to a density of approximately 0.3 g./cc. and is formed to a diameter of approximately 10 mm. The entire assembly, including the filter, is then wrapped in porous cigarette paper and a strip of tipping material is wrapped around the mouthpiece end of the device. The device is then ready for use and it may be smoked at once or it may be suitably packaged in moisture-proof and protective wrapping for smoking at a later date.

When the device is smoked, the mouthpiece end is inserted in the mouth of the smoker and the outer end of the tobacco heating material **20** is ignited as with a match or lighter, heating the tobacco extract inside the tube to a temperature of between approximately 200° C. and 400° C. to cause the release of nicotine vapor and aerosol-forming material. When the smoker draws inwardly, the products of combustion of the heating material are not drawn into the passage of the smoking device since there is no connection therebetween. The nicotine vapor and the aerosol-forming materials are drawn along the passage formed by the central portion of the tubular member, which serves as a nucleating chamber where the potentially aerosol-forming materials are caused to cool in a manner to cause them to condense into aerosol particles. As the aerosol particles and nicotine vapor are drawn towards the mouthpiece end, they are caused to contact each other in a manner so that the nicotine vapor condenses on the aerosol droplets assuming the transferability thereof. Thus, a high proportion of the nicotine is drawn into the mouth of the user.

Example VIII

The procedure set forth in Example VII is repeated, but approximately 1% by weight of orange oil is mixed with the tobacco extract prior to coating the interior of the tubular member.

Example IX

The procedures of Examples VII and VIII are repeated, but a tubular member made of a sheet of aluminum is used instead of the tubular member of porous ceramic material. The sheet of aluminum is coated with tobacco extract prepared as herein described and mixed with silica particles of the type and in the proportion indicated in Example VII and the sheet aluminum is then formed into a tubular member of the dimensions indicated in connection with Example VII.

Example X

The procedures of Examples VII and VIII are repeated, except that a tubular member made of composite aluminum and ceramic material is employed. A sheet of aluminum material is prepared and coated as in Example IX and is then wrapped into a tube and inserted inside of a ceramic tubular member of the type described in Example VII.

Example XI

The procedures of Examples VII, VIII, IX and X are repeated with the exception that a tubular member and cylindrical casing assembled as shown in FIG. 6 is employed.

Example XII

The procedures of Examples VII, VIII, IX and X are repeated with the exception that a tubular member internally coated for only a portion of the length with a tobacco extract in the manner shown in FIG. 7 is employed.

Example XIII

The procedures of Examples VII through XII are repeated with the exception that the tobacco is impregnated or deposited upon steel wool or upon fibrous asbestos or silica or mixtures thereof in the proportion of approximately 14.7 mgm. of tobacco extract containing 4 mgm. of nicotine upon 60 mgm. of the steel wool or fibrous material.

It should be understood that in each of the foregoing Examples VII through XIII set forth above, other materials and ingredients herein listed and indicated may be substituted for those specifically set forth in the examples and the proportions of materials may be varied within the indicated limits.

The following is a specific example of a procedure for preparing a tobacco extract:

Example XIV

30 g. of tobacco (with a nicotine content of approximately 2.7% on a dry basis) is placed in a mixer together with 600 ml. of petroleum ether (boiling point of between 507 and 70° C.). The tobacco and ether should be thoroughly mascerated and mixed approximately six times for periods of ten minutes with intervals of thirty minutes between each mixing.

The mixture is then filtered, the petroleum ether filtrate is discarded, and the extracted tobacco is then re-extracted with 600 ml. of chloroform adopting the same mixing sequence as above. The mixture is again filtered and the tobacco cake washed with chloroform until the filtrate is colorless (approximately 50 ml. of chloroform should be used for this washing). The chloroform solution is then concentrated by evaporation to a volume of less than 50 ml. and is then transferred to a graduated flask (50 ml.) and made up to volume. Ultraviolet spectrophotometric analysis show the nicotine concentrate to be approximately 8.7 mg. per ml. of chloroform solution.

The solution may be used in that form for enriching the cured, blended and cut cigarette tobacco employed as the nicotine-releasing composition. It may also be used in this form for coating the tubular members shown in FIGS. 5 through 7. However, it may be further concen-

trated or may be evaporated to dryness with the residue being re-dissolved or prepared in an aqueous solution where it is desired to coat the inner surface of the tubular member.

Where the tobacco extract per se is used as the nicotine-releasing composition, we preferably mix therewith a solid, powdered material inert to the tobacco concentrate and to the nicotine vapor and potentially aerosol-forming materials released therefrom. Where materials having a high specific surface area, such as silica, are employed, between 5 and 25% by weight of the material should be mixed with the tobacco concentrate. Where materials are of relatively low specific surface area, between 25 and 70% by weight of the materials should be mixed with the tobacco extract. By way of example, approximately 10% by weight of silica having a specific surface area of 150 $m.^2/gm.$ is mixed with the extract before coating the inner surface of the tubular member with the material.

As previously indicated, the tobacco extract may be mixed with steel wool or fibrous asbestos or silica in the proportion of approximately 14.7 mgm. of tobacco extract to approximately 60 mgm. of steel wool or fibrous material.

The form of device shown in FIG. 8 is a further modification of the devices shown in FIGS. 1, 2 and 3. Thus, a blended and cut or shredded cigarette tobacco, reconstituted tobacco, or mixture thereof enriched with a tobacco extract and with an additive is disposed inside a tubular member concentric with the body portion of the cigarette. The heating material preferably in the form of fine-cut tobacco having a high smoldering rate is disposed around the inside of the tube.

The tubular member is indicated by the numeral **50** and is preferably made of a metal of high heat conductivity, such as copper or aluminum. It extends from the outer end of the smoking device towards the mouthpiece end thereof and preferably terminates a spaced distance from the filter portion so as to leave a nucleating or expansion chamber between the end of the tubular member and the filter **23** or mouthpiece. The tubular member may conform in diameter and wall thickness with the forms of tubular members shown in FIGS. 1 to 3.

As indicated above, the nicotine-releasing composition is preferably in the form of cured, blended and cut or shredded cigarette tobacco, reconstituted tobacco or mixtures thereof. In addition, the tobacco material is preferably enriched with a tobacco concentrate having a high nicotine content prepared as previously explained. Furthermore, additives such as essential oils are preferably mixed with the tobacco. Instead of filling the entire tubular member, however, the nicotine-releasing tobacco material is preferably arranged in spaced units or plugs as indicated at **51** with spaces or gaps arranged between the plugs.

The spaces or gaps serve as auxiliary nucleating chambers and as the potentially aerosol-forming materials enter these spaces or gaps, they tend to cool in a manner to cause them to condense into aerosol droplets. The length of the nicotine-releasing tobacco plugs and the chambers or spaces between the plugs may vary, but we have found that satisfactory results are obtained where the tobacco plugs are approximately 10 mm. in length and the spaces or chambers between the plugs are of approximately the same length.

The outer end of the tubular member is preferably closed with a porous or perforated clay or metal disc **22**. At its inner end, the tubular member is connected with an impermeable ring or flange **52** extending outwardly therefrom which, in turn, is connected with the chamber enclosing cylindrical member **53**. The flange **52** and cylindrical member **53** may be made of the same material as the tubular member or may be made of a non-heat conducting material, such as clay.

A conventional cigarette filter **23** or porous or perforated discs of the type hereinafter described may be provided at the mouthpiece end of the cigarette so as to establish the normal pressure drop of a cigarette. The tobacco heating material **20** may be similar to that employed in the forms of my invention shown in FIGS. 1, 2 and 3, and has high smoldering characteristics.

The device shown in FIG. 8 is used in the same manner as the devices shown in the first three figures. The mouthpiece end is placed in the mouth of the user and the tobacco heating material **20** is ignited with a match or lighter. The nicotine-releasing tobacco shown at **51** is heated to a temperature between 200° and 400° C. to cause the release of nicotine vapors and aerosol-forming materials, which are drawn along the smoke passage inside the tubular member through the chamber **53** and filter **23** to the mouth of the smoker. In the chambers between the plugs of tobacco and inside the chamber **53**, the aerosol particles are condensed and the nicotine forming vapors contact the aerosol particles and are condensed thereon, assuming the transferability thereof. The result is that a relatively high proportion of the nicotine is transferred to the mouth of the user.

In the form of device shown in FIG. 9, the nicotine-releasing material **60** is disposed outside the tubular member **61** and the heating material **62** is disposed inside the tubular member. The nicotine-releasing composition preferably takes the form of cured, blended and cut or shredded cigarette tobacco or reconstituted tobacco or mixtures thereof, preferably enriched with a tobacco extract having a high nicotine content and preferably mixed with a suitable flavoring additive, such as an essential oil. This mixture may be of the type described in connection with the disclosures of FIGS. 1 through 3.

The heating material **62** is preferably a pyrophorous material such as a finely divided iron, nickel, zinc or lead of moderate activity similar to that employed with the form of device shown in FIG. 4.

The tubular member is made of an air impermeable heat conducting material, such as copper or aluminum. Its inner end is closed by an impermeable disc **63** which may be made of similar material and its outer end is sealed by an impermeable closure **64** which is frangible or removable so that the end of the tube may be opened when it is desired to use or smoke the device. Thus, the plug **64** may be made of plastic material or metal. The tubular member extends from the outer end of the smoking device towards the mouthpiece end and terminates a spaced distance therefrom so that a chamber may be provided inside of the cylindrical member **65** interposed between the cigarette tobacco material **60** and the filter **23**.

The cylindrical member may be made of a suitable metal, metallic foil, plastic or clay.

At the outer end of the cylindrical member **65** and interposed between the nicotine-releasing tobacco **60** and the nucleating chamber is an assembly formed of a plurality of air permeable discs **66**, which may be made of porous clay or ceramic material, or sintered metal, or may be in the form of perforated metal or clay discs. This assembly serves to help increase the pressure drop without removing excessive quantities of aerosol particles and nicotine vapors.

In using the device shown in FIG. 9, the mouthpiece end is placed in the mouth of the user and the plug **64** is broken or removed to expose the metallic particles to the air with the result that they generate sufficient heat to heat the tobacco material to a temperature between 200° C. and 400° C. causing the release of nicotine vapor and potentially areosol-forming materials. When the smoker puffs inwardly, these products are drawn through the permeable discs **66** into the nucleating chamber enclosed by cylinder **65**, causing the condensation of the aerosol droplets and causing the nicotine vapor to contact the droplets and condense thereon.

It should be understood that in each of the several forms of our invention porous discs, such as shown at 66 in FIG. 9, may be used forward of the mouthpiece or in place of the filter.

It will thus be seen that our improved smoking device may be made in a number of different forms. In each of the forms, the smoking device has the appearance of a traditional smoking device, such as a cigarette and embodies a nicotine-releasing composition which releases nicotine vapor and potentially aerosol-forming materials, including water vapor, when subjected to an elevated temperature. The smoking device also incorporates heating means for heating the composition to an elevated temperature below its combustion point and significantly below a temperature where major decomposition of the nicotine occurs.

Each of the several forms of our smoking device also incorporates a continuous smoke passageway from the outer end to the mouthpiece end which connects with the nicotine-releasing composition, and this passageway includes an aerosol-nucleating chamber. The chamber in each form of device is arranged so as to cool, at an appropriate rate, the potentially aerosol-forming materials sufficiently to enable aerosol particles to form and the nicotine vapor is caused to contact the aerosol particles and condense thereon. Thus, the nicotine in each form of device is caused to assume the transferability of the aerosol particles on which it condenses.

It will be appreciated that while we have shown several specific embodiments of our invention that modifications may be made therein without departing from the invention as set forth in the accompanying claims.

We claim:

1. A smoking device comprising: an elongated body element of a size to be carried and manipulated in the hand of a user and having a mouthpiece end to be inserted in the mouth of a user and an outer end projecting outwardly therefrom, a nicotine-releasing composition which releases nicotine vapor and potentially aerosol-forming materials, including water vapor, when subjected to an elevated temperature below the ignition point of the composition disposed in said body element and extending from a point spaced from the mouthpiece end to a point adjacent the outer end, and means for heating the nicotine-releasing composition progressively from a point adjacent the outer end towards the mouthpiece end to an elevated temperature below its ignition point so as to cause progressively the release of the nicotine vapor and the potentially aerosol-forming materials, said body element being formed with a continuous passageway from said outer end to the mouthpiece end and communicating with the nicotine-releasing composition but being free from communication with the heating means, and said passageway including an aerosol-nucleating chamber between the nicotine-releasing composition and the mouthpiece end and being arranged so that the potentially aerosol-forming materials cool and condense into aerosol particles and so that nicotine vapor contacts said aerosol particles and condenses thereon whereby the nicotine assumes the transferability of the aerosol particles.

2. A smoking device comprising: an elongated body element of a size to be carried and manipulated in the hand of a user and having a mouthpiece end to be inserted in the mouth of the user and an outer end projecting outwardly therefrom, a tubular member having an inner surface and an outer surface disposed in said body element and extending from the outer end thereof at least part way towards the mouthpiece end, a nicotine-releasing composition which releases nicotine vapor and potentially aerosol-forming materials including water vapor when subjected to an elevated temperature below its ignition point disposed around one of the surfaces of the tubular member, and means for heating the nicotine-releasing composition to an elevated temperature below its ignition point to cause the release of the nicotine vapor and the potentially aerosol-forming materials and being positioned around the opposite surface of the tubular member from the nicotine-releasing composition, said body element being formed with a continuous passageway from said outer end to the mouthpiece end and being in communication with the nicotine-releasing composition, but being free from communication with the heating means, said passageway including an aerosol-nucleating chamber between the composition and the mouthpiece end and being arranged so that the potentially aerosol-forming materials cool and condense into aerosol particles and so that nicotine vapor contacts said aerosol particles and condenses thereon whereby the nicotine assumes the transferability of the aersol particles.

3. A smoking device as set forth in claim 2 in which the nicotine-releasing composition is disposed inside the tubular member and the heating means is disposed outside the tubular member.

4. A smoking device as set forth in claim 2 in which the nicotine-releasing composition is disposed around the outside of the tubular member and the heating means is disposed inside said tubular member.

5. A smoking device as set forth in claim 2 in which the tubular member has an inside diameter of between approximately 1.5 mm. and 2.5 mm. and the outside diameter is between approximately one and one-half and three times greater than the inside diameter.

6. A smoking device as set forth in claim 2 in which the heating means heat the nicotine-releasing composition to a temperature of between approximately 200° C and 400° C.

7. A smoking device as set forth in claim 2 in which the nicotine-releasing composition is in the form of a thin layer coating the inner surface of the tubular member and an unobstructed chamber is formed at the center of the tube.

8. A smoking device as set forth in claim 2 in which the tubular member has an inside diameter of between approximately 1.5 mm. and 2.5 mm. and the outside diameter is between approximately one and one-half and three times greater than the inside diameter and the nicotine-releasing composition is in the form of a thin coating applied to the inner surface of the tubular member providing an unobstructed chamber at the center of the tubular member.

9. A smoking device as set forth in claim 2 in which the nicotine-releasing composition is in the form of a tobacco extract having mixed therewith a solid, powdered material inert to the smoke generating composition and the nicotine and potentially aerosol-forming materials and is in the form of a relatively thin coating applied to the inner surface of the tubular member.

10. A smoke generating composition as set forth in claim 9 in which the solid, powdered material has a specific surface area greater than 10 $m.^2/gm$.

11. A smoking device as set forth in claim 9 in which the solid, powdered material is selected from the group of materials consisting of silica, magnesium tri-silicate, chalk, sodium chloride, aluminum oxide, calcium carbonate, and tobacco.

12. A smoking device as set forth in claim 2 in which the nicotine-releasing composition is disposed inside the tubular member and the heating means comprises fine cut tobacco particles having good smoldering properties disposed around the outside of the tubular member and encased in a cigarette wrapper.

13. A smoking device as set forth in claim 2 in which the nicotine-releasing composition is a tobacco extract impregnated in material selected from the group consisting of steel wool, fibrous asbestos and fibrous silica.

14. A smoking device comprising: an elongated body element of a size to be carried and manipulated in the hand of a user and having a mouthpiece end to be inserted in the mouth of the user and an outer end projecting outwardly therefrom, a tubular member having an inner sur-

face and an outer surface with an inside diameter of between approximately 1.5 mm. and 2.5 mm. and an outside diameter between approximately one and one-half and three times the inside diameter disposed in said body element and extending from the outer end thereof at least part way towards the mouthpiece end, a nicotine-releasing composition which releases nicotine vapor and potentially aerosol-forming materials including water vapor when subjected to an elevated temperature below its ignition point disposed in a thin coating around the inner surface of the tubular member, and means for heating the nicotine-releasing composition to an elevated temperature below its ignition point between approximately 200° C. and 400° C. to cause the release of the nicotine vapor and the potentially aerosol-forming materials and being positioned around the outside of the tubular member, said body element being formed with a continuous passageway from the outer end through the tubular member in communication with the nicotine-releasing composition but being free from communication with the heating means, and said passageway being provided with an aerosol-nucleating chamber between the nicotine-releasing composition and the mouthpiece end and being of a size so that the potentially aerosol-forming materials cool and condense into aerosol particles and so that nicotine vapor contacts said aerosol particles and condenses thereon whereby the nicotine assumes the transferability of the aerosol particles.

15. A smoking device as set forth in claim **14** in which the nicotine-releasing composition is a tobacco extract having mixed therewith a solid, powdered material which is chemically inert to the tobacco extract, the nicotine and the potentially aerosol-forming materials and has a specific surface area greater than 10 $m.^2/gm.$

16. A smoking device comprising: an elongated body element of a size to be carried and manipulated in the hand of a user and having a mouthpiece end to be inserted in the mouth of the user and an outer end projecting outwardly therefrom, a tubular member having an inner surface and an outer surface disposed in said body element and extending from the outer end thereof to a point spaced from the mouthpiece end, a nicotine-releasing composition which releases nicotine vapor and potentially aerosol-forming materials including water vapor when subjected to an elevated temperature below its ignition point disposed inside said tubular member, and means for heating the nicotine-releasing composition to an elevated temperature below its ignition point to cause the release of the nicotine vapor and the potentially aerosol-forming materials and being positioned around the outside of the tubular member, said body element being formed with a continuous passageway from the outer end through the tubular member to the mouthpiece end and being in communication with the nicotine-releasing composition but being free from communication with the heating means, and tubular means of greater diameter than said tubular member in communication with the inner end of the tubular member in said passageway between the tubular member and the mouthpiece end and providing an aeresol-nucleating chamber in which the potentially aerosol-forming materials cool and condense into aerosol particles and the nicotine vapor contacts said aerosol particles and condenses thereon to thereby assume the transferability of the aerosol particles.

17. A smoking device as set forth in claim **16** in which the nicotine-releasing composition is in the form of a relatively thin coating applied around the inner surface of the tubular member.

18. A smoking device as set forth in claim **16** in which the nicotine-releasing composition is a tobacco extract having mixed therewith a powdered, solid material inert to the tobacco extract and to the nicotine and potentially aerosol-generating materials.

19. A smoking device as set forth in claim **16** in which the heating means comprises tobacco particles having good smoldering characteristics disposed around the tubular member and encased in a cigarette wrapper.

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SAMUEL KOREN, *Primary Examiner.*

LUCIE H. LAUDENSLAGER, *Examiner.*