Nov. 27, 1962 L. R. BOYD ETAL 3,065,755

CIGARETTE

Filed June 7, 1957

Fig. 1.

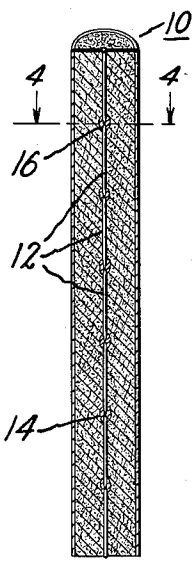


Fig. 2.

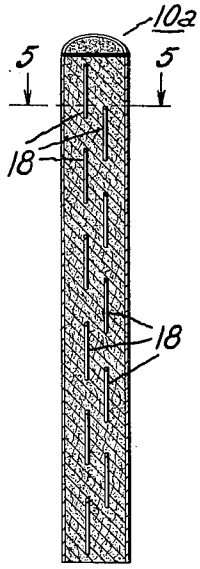


Fig. 3.

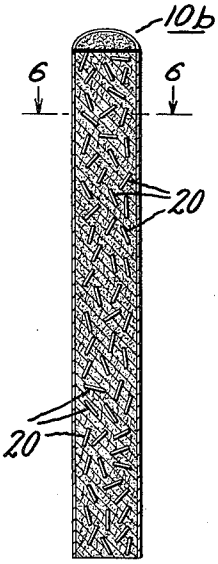


Fig. 4.

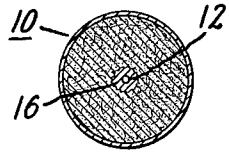


Fig. 5.

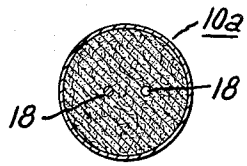
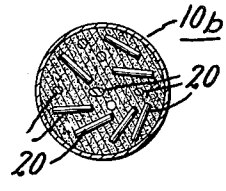


Fig. 6.



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3,065,755

CIGARETTE

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2 Claims. (Cl. 131—9)

This invention relates to an improved cigarette and more particularly to an improved cigarette which will burn at a lower coal temperature than presently known cigarettes.

In the past few years the relation between cancer and cigarette smoking has been investigated by many research groups. These research groups have amassed a large body of evidence showing that a number of substances in the tar of tobacco smoke will cause cancer in mice. These carcinogenic substances have been separated from the tars and when painted on the skin of mice or injected into the mice, have caused cancer to appear in a large portion of the treated mice.

Recently a Dr. Wynder of the Sloan-Kettering Institute has reported on the results of his cancer research. Dr. Wynder reported that his tests have shown that if cigarette tobacco is burned at a lower temperature than usual, the potentially carcinogenic substances in the tar of the tobacco smoke produces little or no cancer in treated mice. According to the doctor's report, the normal burning temperature of cigarettes is in the range of 800 to 880° C. and a temperature of approximately 767° C. is a "relatively harmless burning temperature" with reference to the causing of cancer in treated mice.

Considering the above research into cancer, it is apparent that it would be desirable to produce a cigarette which is capable of burning at a lower than normal temperature, preferably with a temperature approximately that of the "relatively harmless" burning temperature noted by Dr. Wynder.

It is therefore a principal object of this invention to provide a new and improved cigarette which will burn at a lower coal temperature than presently known cigarettes.

It is a further object of this invention to provide a new and improved cigarette which will have a lower coal temperature than presently known cigarettes without impairing the taste or burning of the cigarette.

A still further object of this invention is to provide an improved cigarette in which the coal temperature has been lowered to a "relatively harmless" burning temperature.

In carrying out this invention in one form, means having high thermal conductivity or high thermal capacity are provided in the cigarette in contact with the tobacco in order to conduct some of the heat from the burning coal to a cooler portion of the cigarette or to absorb some of the heat of the coal, thereby reducing the coal temperature.

This invention will be better understood from the following description taken in connection with the accompanying drawing wherein:

FIGURE 1 is a perspective view in section of a cigarette showing one form of the invention;

FIGURE 2 is a perspective view in section of a cigarette showing another form of the invention;

FIGURE 3 is a perspective view in section of a cigarette showing a third form of the invention;

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 1;

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 2; and

FIGURE 6 is a sectional view taken on the line 6—6 of FIGURE 3.

Referring now to the drawing wherein like numerals are used to indicate like parts throughout and in particular with reference to FIGURES 1 and 4, this invention in one form is shown as comprising means inserted within a cigarette along the center line thereof, in contact with the tobacco, to conductor absorb some of the heat of the burning coal. In FIGURE 1, one-half of a cigarette **10** is shown in perspective view with the means **12** inserted therein along the center line of the cylinder formed by the cigarette. The means **12** may take the form of a single piece of metallic wire, such as molybdenum, having a diameter of approximately .005 inch and being approximately the length of the cigarette. This wire **12** may be provided with weakened portions **14** at approximately every one-half inch along the length thereof. These weakened parts will allow the wire to fall off with the ashes as the cigarette is smoked. Alternatively, the means **12** may be formed of a number of sections of wire of approximately one-half inch in length, the sections being joined together by a solder or other substance **16** which will melt, dissolve, or disintegrate at the coal temperature of the cigarette, causing the length of wire to drop off with the cigarette ashes as the cigarette is smoked. Of course, it is apparent that the means **12** could also be a ceramic material, such as aluminum oxide, which will absorb some of the heat of the burning coal, thus lowering its temperature. It will be understood that ceramic is a better heat conductor than air, and therefore will conduct some of the heat of the burning coal to cooler portions of the cigarette.

With a wire having similar thermal properties to molybdenum a diameter range of approximately .004 to .007 inch is the optimum diameter necessary to provide a sufficient lowering of the coal temperature of the cigarette while at the same time allowing normal burning of the cigarette. A diameter in excess of .007 inch causes the cigarette to burn erratically while a wire diameter lower than approximately .004 inch does not lower the coal temperature of the cigarette to the "relatively harmless" area of approximately 767° C. If wire or foil were used having thermal properties different than molybdenum, the diameter would change according to thermal properties.

FIGURES 2 and 5 show a modified form of this invention. In this form of the invention the means for conducting or absorbing heat is shown as a number of physical objects disposed along the center line of the cylinder formed by the cigarette. These objects are provided with overlapping areas to enhance the conduction of some of the heat away from the coal of the cigarette or to provide continuous absorption of some of the heat of the coal. As shown in FIGURE 2 a cigarette **10***a* is provided with a number of physical objects **18** placed on either side of the center line thereof. FIGURE 5 is a sectional view of the cigarette **10***a* showing the manner in which these objects may be lined up about the axis of the cylinder of the cigarette. As will be noted from FIGURE 2 the physical objects **18** are provided with a small overlapping area such that when the cigarette burns to the junction of these objects the object extending further into the tobacco of the cigarette will be able to conduct or absorb some of the heat of the coal. The objects **18** may be in the form of wire or foil capable of conducting heat or they may take the form of a ceramic material which is capable of absorbing the heat of the cigarette coal. The ceramic will also act as a conductor of some of the heat, as previously mentioned. Either conduction or absorbing objects will provide a lowering of the coal temperature to the "relatively harmless" temperature. For example, twenty pieces of nickel foil, .002 inch thick, 1/16 inch wide and 1/8 inch long, when disposed along the axis of the cigarette, will lower the temperature of the burning coal

to approximately 750° C. Obviously, other metals would perform in the same manner, adjustment being made in size or quantity for differences in thermal properties.

FIGURES 3 and 6 show another form which this invention may take. As shown in FIGURES 3 and 6 the means for conducting or absorbing heat are a number of physical objects which are randomly disbursed throughout the length and thickness of the cigarette to provide the necessary conductivity or absorption of some of the heat of the burning coal of the cigarette. As shown in FIGURES 3 and 6 a cigarette **10***b* has randomly disbursed throughout a large number of physical objects **20** which may be metallic, such as wire or foil, to conduct the heat of the burning coal to a cooler part of the cigarette, or they may be in the form of a ceramic material which will absorb some of the heat of the burning coal thereby lowering the temperature at which such coal burns. For example, when forty pieces of aluminum wire, having a diameter of .012 inch and approximately ¼ inch long, are disposed randomly in the cigarette the coal temperature will be lowered to approximately 765° C. This invention has been shown and described as employing physical objects disposed in the cigarette in contact with the tobacco. It will be apparent that this could be done by means of a cigarette holder, which introduces ceramic or metallic material, radially or longitudinally into the cigarette to perform the desired function of lowering the coal temperature of the cigarette.

It will of course be obvious to those skilled in the art that many changes and substitutions may be made in the above-described invention. It should be understood that where ceramic material has been described as being used for heat absorption that such material may contain a certain amount of moisture and that therefore, some of the heat reduction of the burning coal may occur by means of latent heat of vaporization. The materials mentioned are by way of illustration only, since it will be apparent that other materials having similar properties would also provide the desired lowering of the coal temperature of a burning cigarette. It should therefore be understood that the above description is for purposes of illustration only and all modifications or changes which come within the spirit and scope of the present invention are intended to be covered by the appended claims.

What is claimed as new and which is desired to secure by Letters Patent is:

1. An improved cigarette comprising a tobacco-filled cigarette and including means placed within the cigarette in contact with the tobacco for lowering the coal temperature of the cigarette when smoked, said means comprising a number of small rod-like metallic particles randomly disposed in the cigarette throughout its length, said particles having a small diameter relative to the diameter of the cigarette, said number of particles being of such density relative to the tobacco that at least one is disposed in each area of length of the cigarette thereby providing contact between at least one of said number of particles and the burning coal of the cigarette when smoked to remove some of the heat of burning coal and lower its temperature.

2. An improved cigarette as claimed in claim 1 in which said number of small particles lower the burning coal temperature to approximately 767° C. or lower.

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