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Saint-Pastou

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[45] **June 5, 1973**

[54] CIGARETTE WITH ASH-RETAINING MEANS

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 741,924, June 2, 1968, Pat. No. 3,632,384.

[30] **Foreign Application Priority Data**

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Dec. 19, 1967	France	6722085
Jan. 18, 1968	France	6822155

[52] **U.S. Cl.** ..... **131/4 A,** 131/15 A

[51] **Int. Cl.** **A24d 01/12**

[58] **Field of Search** ..... 131/4 A, 15 A

[56] **References Cited**

FOREIGN PATENTS OR APPLICATIONS

22,161	0/1901	Great Britain	131/4 A

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Assistant Examiner—George M. Yahwak
Attorney—Robert E. Burns and Emmanuel J. Lobato

[57] **ABSTRACT**

A cigarette comprises a tubular envelope of paper impregnated with a network of intersecting narrow bands of a non-combustible material defining an array of paper areas. The paper with the impregnated network is shrunk relative to the paper areas which bulge outwardly. Upon combustion, the non-combustible material vitrifies and welds the intersections of the network lines to form a rigid network armature for supporting cigarette ash.

6 Claims, 6 Drawing Figures

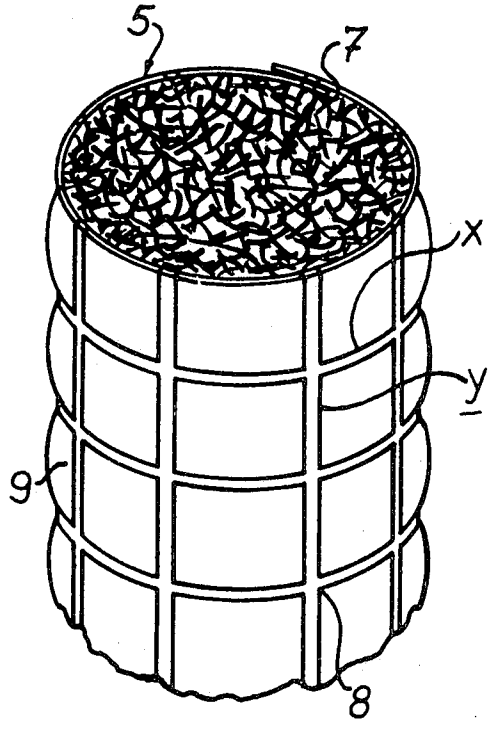


FIG. 1

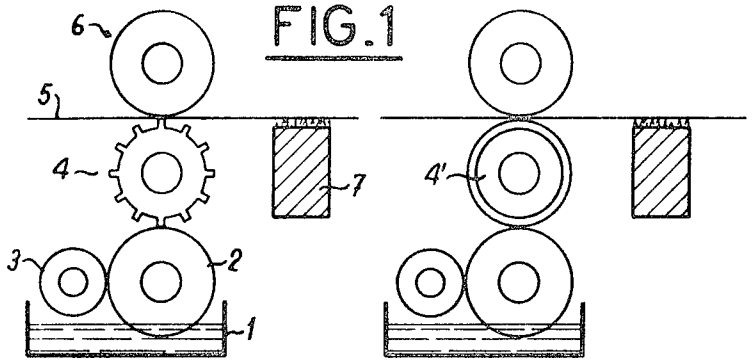
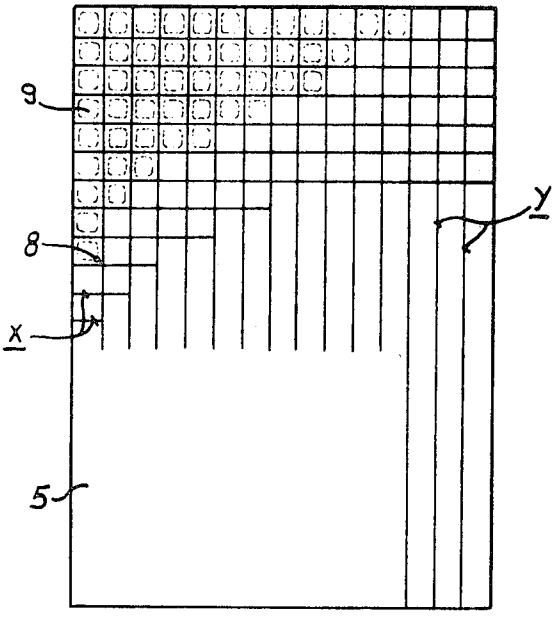


FIG. 2



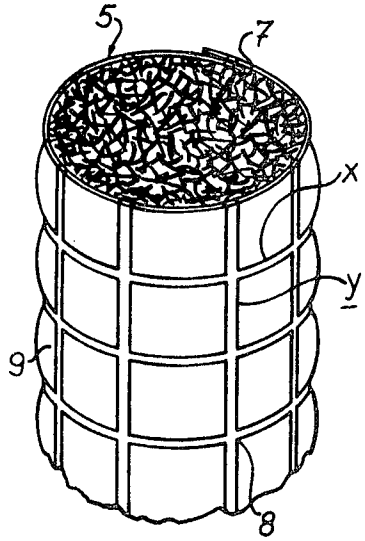
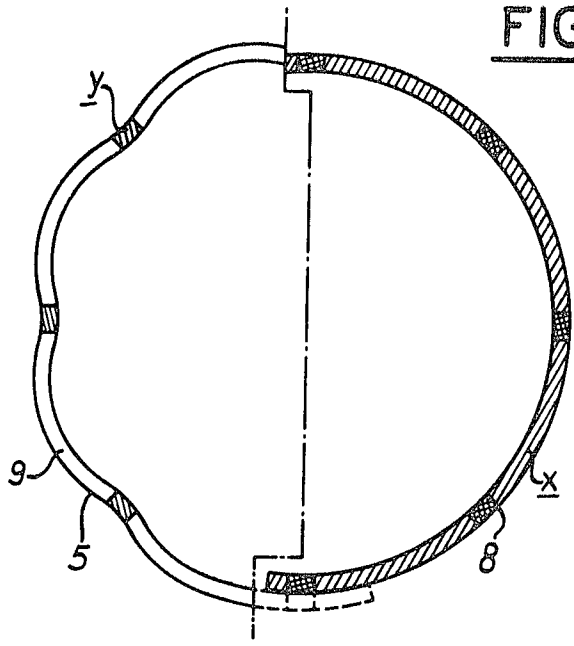


FIG. 3

FIG.4



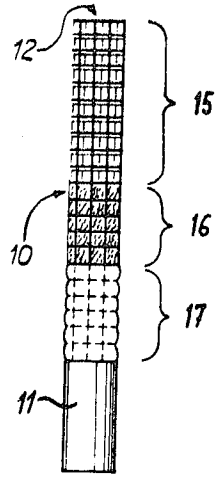


FIG.5

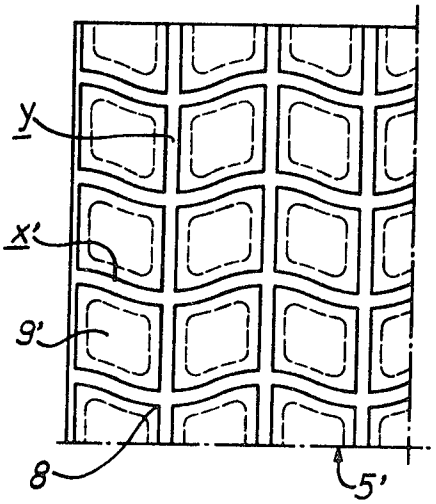


FIG.6

CIGARETTE WITH ASH-RETAINING MEANS

This application is a continuation-in-part of application Ser. No. 741,924; now U.S. Pat. No. 3,632,384.

BACKGROUND OF THE INVENTION

This invention relates to cigarettes and is particularly concerned with cigarettes comprising means for retaining the ash as the cigarette is consumed.

Various proposals for such cigarettes have already been made. For example, it has been suggested to provide a cigarette with a non-combustible grill-like armature of asbestos or metal which supports the ash as the cigarette burns. However, the manufacture of such a cigarette is both difficult and expensive. Another proposition has been to print a network of flame-proof material such as silicone varnish onto the cigarette paper, but in order to obtain a sufficient rigidity of the structure, the network had to be composed of lines so thick that insufficient space was allowed to enable the smoker to draw enough air to ensure regular combustion. Alternatively, if sufficient space was left to allow an adequate draw of air, the network structure was found to be lacking in strength and therefore did not reliably support ash as the cigarette is consumed.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an improved cigarette of the above-mentioned type.

According to the invention, in a cigarette comprising a combustible paper in tubular configuration and means for supporting cigarette ash as said paper is consumed, there is provided the improvement in which said supporting means comprises a tubular network of intersecting narrow bands of a non-combustible material impregnated in said paper, said network defining an array of paper areas free of said non-combustible material, the paper impregnated with said network of non-combustible material being shrunk relative to the paper in said areas so that each paper area bulges outwardly from said tubular network, and said network of intersecting narrow bands comprising a relatively greater amount of non-combustible material at the intersections of said lines to thereby reinforce said network.

DESIGNATION OF THE DRAWINGS

The invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which :

FIG. 1 is a schematic diagram of a device for treating paper for incorporation into cigarettes according to the invention ;

FIG. 2 is a schematic plan view of cigarette paper for incorporation into cigarettes according to the invention.

FIG. 3 is a fragmentary perspective view of a cigarette according to the invention ;

FIG. 4 schematically shows, in its right and left hand parts, two cross-sections through the cigarette of FIG. 3, the relative thickness of the paper being exaggerated for the sake of explanation ;

FIG. 5 is an elevational view of a cigarette according to the invention during smoking thereof ; and

FIG. 6 is a schematic fragmentary plan view of varied cigarette paper for incorporation into cigarettes according to the invention.

MANUFACTURE OF THE CIGARETTE PAPER

Referring to FIG. 1, a liquid mixture of a non-combustible substance is provided in a reservoir 1 with a constant head device (not shown) to maintain the liquid at a constant level and means (not shown) to stir the liquid to maintain it in a homogeneous state.

The liquid mixture comprises a non-combustible substance such as sodium silicate (35 to 40 percent); a combustion retarding substance with binding properties such as talc, micronized mica or calcium carbonate (30 to 35 percent) ; a substance with flexing properties such as gum arabic or paraffin previously treated with glucose to compensate for alkalinity of the silicate (5 to 10 percent) ; a whitening or coloring material such as titanium white (5 to 10 percent) ; and a solvent of distilled water (5 to 10 percent). At least one of these components, for example gum arabic, has vitrifying properties. The mixture may also contain aromatic substances or any other agents which may affect the aroma or quality of tobacco smoke from a finished cigarette.

A wetting roller 2 dips into the reservoir 1 to take up the liquid mixture on its surface, any surplus liquid mixture being removed by means of a regulating roller 3, and delivers the liquid mixture onto raised axial ribs 14 on a printing roller 4. Each rib has a width of about 0.5mm and adjacent ribs are separated by approximately 3 mm.

Cigarette paper 5 is passed between roller 4 and a pressure roller 6 including a supple resilient coating so that a series of narrow bands of the liquid mixture are impregnated into the paper. The paper 5 is then passed by an infra-red heater 7 where these lines are heated to avoid spreading of the liquid in the paper by capillarity.

The cigarette paper then passes through a second printing and drying system identical to the first except that the printing roller 4' has a series of raised circumferential narrow bands or collars each about 0.5 mm wide and separated axially from the adjacent bands or collars by about 3 mm. After passage between the roller 4' and the corresponding pressure roller, the paper is consequently impregnated with a network of intersecting transversal and longitudinal narrow bands 0.5 mm wide and with a spacing of 3 mm, as indicated by *x* and *y* in FIG. 2. At the points of overlap 8 of the transversal and longitudinal lines, the network comprises a double thickness of the non-combustible material. After passage by the second heating device, the paper areas 9 enclosed between the network lines bulge slightly as a result of retraction of the non-combustible material upon drying.

DESCRIPTION OF PREFERRED EMBODIMENTS

A cigarette according to the invention incorporating the paper shown in FIG. 2 is illustrated in partial perspective view in FIG. 3. The cigarette comprises a tubular envelope of the paper 5 containing tobacco 7. The cigarette is rolled by any known procedure using automatic or manually operated machines, or even by hand. The axial *y* bands of impregnated non-combustible material are arranged longitudinally of the cigarette, while the axially spaced *x* bands are transversal and assume a circular configuration, and the paper areas 9 each bulge outwards. At the points of intersection 8 of the *x* and *y* lines the double thickness of non-combustible material reinforces the tubular network of non-

combustible material, as schematically indicated in the cross-sectional views of FIG. 4.

The right hand part of FIG. 4 is a cross-sectional view of the cigarette of FIG. 3 taken along one of the transversal x bands, and through the points of intersection 8, the x bands and the paper in which they are impregnated adopting a circular configuration. The left hand part of FIG. 4 is a cross-sectional view taken intermediate of two adjacent *x* lines, and shows the bulging configuration of the paper 5 in the enclaves 9 between the network bands.

The paper of the cigarette is folded in tubular configuration and stuck with each *x* line slightly overlapping at its two ends, and with first and ninth *y* lines substantially overlapping along all of their length. The cigarette thus has seven single *y* bands and one double overlapping *y* line, eight *y* band being visible from outside the cigarette. For such a cigarette in which the paper has a network spacing of 3.1 mm, the diameter of the cigarette is about 8 mm, but of course cigarettes according to the invention can be provided with other network spacing and other numbers of *y* bands, and can be made to any suitable dimensions.

FIG. 5 schematically shows a cigarette according to the invention during smoking thereof. The cigarette comprises a main body portion 10 secured to a filter tip 11 in any known manner. The main body portion initially comprises a tubular envelope of paper with impregnated network lines and filled with tobacco, substantially as described with reference to FIGS. 3 and 4. During smoking, the tobacco and paper burn and the heat of combustion vitrifies the material of the non-combustible network. The empty spaces between the network lines, that is the parts formerly covered by the paper enclaves 9, allow a sufficient supply of air to the area of combustion to ensure continuous and regular smoking of the cigarette, without a risk of the cigarette going out when the smoker ceases to draw smoke. When the network cools down, the *x* and *y* lines become welded together at the points of intersection 8, and the overlapping portions of the *x* bands and the two overlapping *y* bands are also welded together. The network of the consumed part of the cigarette thus forms a relatively rigid armature able to support the remaining ashes.

The heating of the network lines upon combustion may also cause further shrinking of the non-combustible material, so that the cooled network armature is slightly further retracted than the initial network.

If desired, the smoker can remove part of the remaining ashes while the cigarette is being smoked by inclining the cigarette and lightly shaking it so that ashes fall out of the open end 12 of the cigarette into an ash tray or other receptacle. The remainder of the cigarette can then be smoked in the normal manner. This sequence is illustrated in FIG. 5 in which section 15 of the cigarette consists of the empty network armature from which ash has been removed as described above ; section 16 of the cigarette consists of the network armature supporting ash of a part of the cigarette smoked after removal of the ash along section 15; and section 17 consists of an unsmoked part of the cigarette.

FIG. 6 shows a modified form of cigarette paper 5' comprising rectilinear *y* bands, as before, and wavy, parallel transversal *x'* lines intersecting at points 8 at which there is a double thickness of the non-combustible material. The paper enclaves 9' formed between the network lines bulge outwards upon retraction of the non-combustible material, but instead of having substantially spherical shape, they are somewhat oblong, as illustrated. This paper can be formed into cigarettes in exactly the same manner as before, the wavy *x'* bands preferably being transversal of the cigarette.

In another variant, not shown, in order to prevent ash from unwantedly falling from the opening in the network armature at the smoked end of the cigarette during smoking, for example upon careless smoking of the cigarette either by inclining the cigarette with the open end downwards or due to gesticulations of the smoker, the cigarette is provided at its "lighting" end with an annular inturned fold of paper, empty of tobacco, forming a funnel-like opening. The end can be emptied of tobacco either by tamping tobacco after rolling, or by the removal of tobacco, for example. The paper of the inturned end includes the network lines and is bathed in a hardening substance such as starch. When the paper and tobacco burn, the network lines of the inturned end remain in place to prevent the fall of ash. A non-filter cigarette can be provided with two such inturned ends.

In another variant, prior to application of the network lines, the cigarette paper is subjected to a microperforation. Each paper enclave 9 thus has a multitude of minute perforations which improves aeration for the combustion of the finished cigarette.

What is claimed is:

1. In a cigarette comprising a combustible paper in tubular configuration and means for supporting cigarette ash as said paper is consumed, the improvement in which said supporting means before combustion comprises a tubular network of intersecting narrow bands of non-combustible material impregnated in said paper, said network defining an array of paper areas free of said non-combustible material, the paper impregnated with said network of non-combustible material being shrunk relative to the paper in said areas so that each paper area bulges outwardly from said tubular network, said network of intersecting narrow bands comprising a relatively greater amount of non-combustible material at the intersections of said bands to thereby reinforce said network, said paper having overlapping marginal edges extending longitudinally of said cigarette, and said network narrow bands overlapping on areas thereof along said overlapping marginal areas.

2. A cigarette according to claim 1, in which said network comprises a plurality of equally spaced rectilinear first narrow bands disposed parallel to the longitudinal axis of said cylinder, two of said first narrow bands substantially overlapping in said marginal areas.

3. A cigarette according to claim 2, in which said network comprises a plurality of equally spaced rectilinear second narrow bands disposed perpendicularly to said first bands, each second band having overlapping ends in said marginal areas.

4. A cigarette according to claim 2, in which said network comprises a plurality of equally spaced wavy second narrow bands disposed transversally of said first narrow bands.

5. A cigarette according to claim 1, in which said non-combustible material comprises a component capable of vitrifying upon combustion of the cigarette

whereby said network narrow bands become welded together at their points of intersection and areas of overlapping, and form a reinforced network armature for supporting cigarette ash.

6. A cigarette according to claim 5, in which said non-combustible material comprises a material shrinkable during combustion of the cigarette whereby said network armature is shrunk relative to the original network during said combustion.

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