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2,887,414

SMOKING PRODUCT AND METHOD OF MANUFACTURE

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FIG. 1

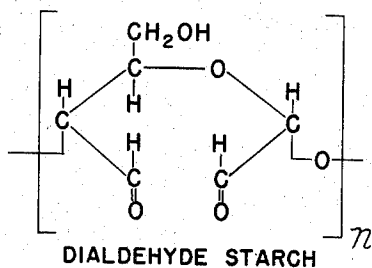
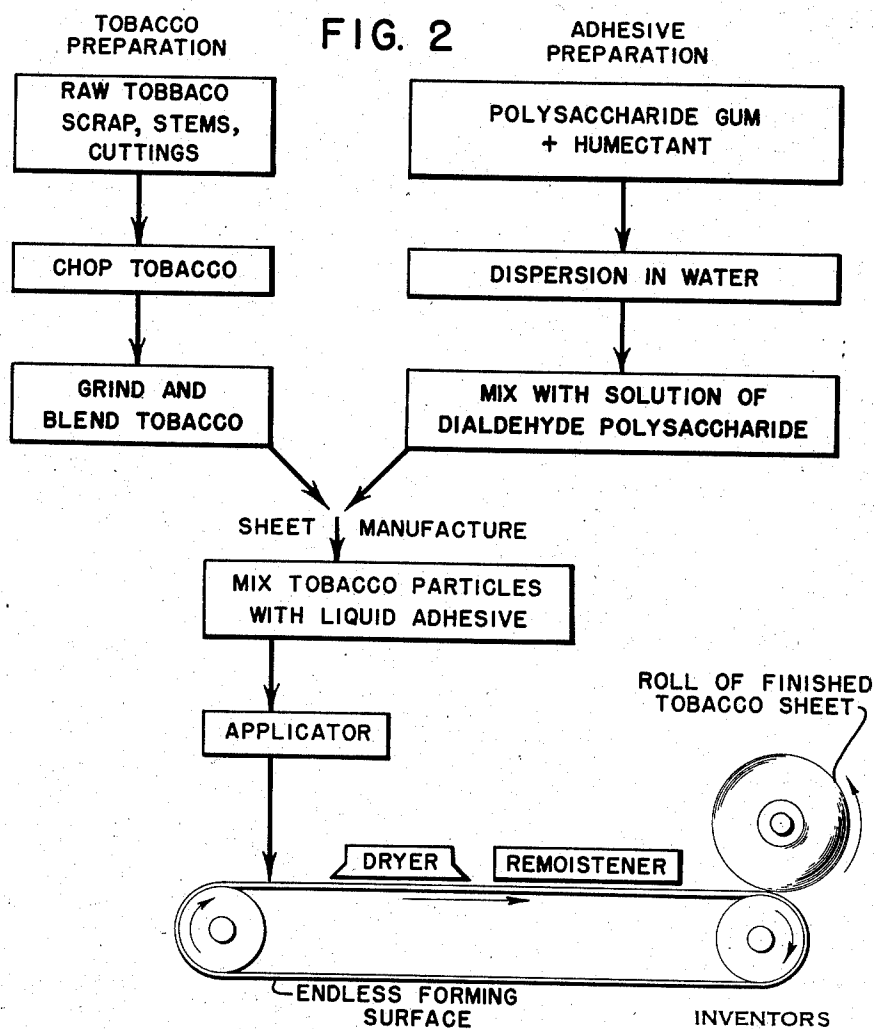


FIG. 2



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SMOKING PRODUCT AND METHOD OF
MANUFACTURE

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12 Claims. (Cl. 131—17)

This invention relates to a smoking product in the form of a sheet of tobacco particles bound together by an adhesive. More particularly, the invention relates to the combination of finely divided tobacco, a polysaccharide adhesive and a dialdehyde polysaccharide.

Tobacco sheets have been described which are manufactured from finely divided tobacco and a variety of polysaccharide materials together with burn control additives, humectants, coloring materials, flavoring materials and reinforcing fibers. Moreover, some of these known tobacco sheets contain glyoxal as a polysaccharide cross-linking material which contributes to the water resistance of the smoking product. Glyoxal does not readily cross-link methyl cellulose, a polysaccharide known to be useful in the manufacture of tobacco sheet. Dialdehyde polysaccharides have never been used in combination or association with tobacco. Tobacco sheet which lacks substantial water resistance or wet strength is difficult to manufacture into smoking articles on some modern machines and is subject to disintegration by saliva in a smoker's mouth.

Therefore, it is an object of this invention to provide a novel tobacco sheet material of great water resistance and wet strength.

It is also an object of the invention to provide a method of making water resistant tobacco sheet which includes methyl cellulose and related cellulose ethers as well as gum karaya, gum tragacanth, polyuronides, galactomannans and dextrans.

Another object of the invention is to provide a method of making tobacco sheet from finely divided tobacco, a polysaccharide adhesive and a dialdehyde polysaccharide.

The present invention resides in the combination of finely divided tobacco, a film-forming polysaccharide adhesive and a dialdehyde polysaccharide which acts as a cross-linking or waterproofing material. Among suitable dialdehyde polysaccharides are dialdehyde forms of starch, cellulose, dextran and galactomannans such as locust bean gum. A tobacco sheet may be formed by mixing a major amount of tobacco powder with a minor part of film-forming polysaccharide gum and a dialdehyde polysaccharide in water to form a viscous slurry which is spread on a sheet forming surface and dried into a tobacco sheet. A tobacco sheet can also be made in laminated form as described in U.S. Patent 2,734,510 in which a polysaccharide adhesive is combined with dialdehyde polysaccharide.

In the drawing:

Fig. 1 is a structural formula of one of the units in dialdehyde starch, a fragment of the preferred polymeric adhesive cross-linking agent used to make water-resistant tobacco sheet according to this invention.

Fig. 2 is a schematic flow diagram which illustrates the manufacture of tobacco sheet according to this invention.

According to the present invention, finely divided tobacco is prepared from any part of the tobacco plant such as leaves, stems, stalks or roots. Various different

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species of tobacco may be blended together. The tobacco is preferably cleaned and finely chopped. Then the tobacco is powdered by dry grinding in a ball mill, although wet milled tobacco may also be used. The tobacco particles are graded according to size, and it is preferably to use tobacco which will pass through a 200 mesh U.S. standard sieve, although particles as large as those which pass a 60 mesh sieve may be used with good results.

The adhesive is prepared by dissolving or dispersing one to five percent by weight of a suitable polysaccharide film-forming adhesive gum in water to form a viscous preparation. Among the suitable adhesives are cellulose ethers such as methyl cellulose, carboxymethyl cellulose (particularly the alkali salts thereof), hydroxyethyl cellulose, hydroxyethyl carboxymethyl cellulose and ethyl cellulose. Other suitable adhesives which may be cross-linked and insolubilized by dialdehyde polysaccharides are film-forming starches such as amylose, polyuronides such as pectins and algin and their derivatives, galactomannans such as guar and locust bean gum, carrageenins, karaya and tragacanth. These materials may be used separately or in mixtures.

The dialdehyde polysaccharide cross-linking agent is prepared by rapid agitation of two to twenty percent by weight of the powder in boiling water. This is cooled and mixed with the adhesive preparation so that five to one hundred percent by weight of the dialdehyde is mixed with the gum.

Various dialdehyde or oxy type polysaccharide materials are suitable for cross-linking the film-forming gums. These are prepared by the oxidation of polysaccharides with periodic acid, for example, according to well-known reactions. The more completely oxidized materials are preferred, although almost any degree of oxidation is somewhat useful.

Among the polysaccharides which form useful oxy derivatives or dialdehyde forms with periodic acid for the manufacture of tobacco sheet are cellulose, starch, dextran and galactomannans such as locust bean gum. Starch is the preferred form. A molecular fragment of this starch polymer is represented in Fig. 1 of the drawing.

Tobacco powder is mixed with the aqueous adhesive solution which contains a dialdehyde polysaccharide cross-linking agent so that the tobacco constitutes about eighty-five percent of the solid material by weight. It is also valuable to include about five percent by weight of total solids of fibrous material and some conventional tobacco humectant in the viscous slurry so formed. All the ingredients can also be formed as a single dry mixture to which water and/or humectant may be added. The viscous slurry is applied upon a film-forming surface to form a thin layer of slurry where it is dried into a sheet, humidified and stripped off to be formed into a roll. This procedure is represented by Fig. 2 of the drawing. The finished sheet can be used in all tobacco smoking articles as shredded filler or as a wrapper or binder.

A feature of the invention is that methyl cellulose, which does not form a water-resistant tobacco sheet with glyoxal can be used to form a water-resistant tobacco sheet with a dialdehyde polysaccharide such as starch. Oxystarch has inherent film-forming properties and when combined with polysaccharide adhesive film-forming gums gives a somewhat stronger sheet than glyoxal. An advantage of the use of oxypolysaccharides (dialdehyde polysaccharides) is found in their direct derivation from natural vegetable products. They do not adversely affect the smoking quality of the tobacco sheet and indeed improve the color of the sheet. A further advantage is found in the easy separation of sheets made with oxypolysaccharide from film-forming surfaces.

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The invention is further illustrated by the following examples in which the dialdehyde materials were substantially completely oxidized:

Example 1

In a preferred example of the manufacture of tobacco sheet according to this invention five pounds of sodium carboxymethyl cellulose, which forms a two percent by weight aqueous solution characterized by a viscosity between 250 and 1,000 centipoises at 20° C. as measured on a Brookfield viscosimeter were dispersed in 145 pounds of water.

To this solution were added fifty pounds of a five percent solution of completely periodate oxidized starch in water and the composite solution was mixed. Two and one-half pounds of U.S.P. grade glycerine were mixed in to serve as a humectant. Twenty pounds of tobacco dust which passed a 200 mesh U.S. standard sieve were mixed into the liquid to form a smooth homogeneous slurry. This slurry was applied on a stainless steel film-forming surface where it was dried, remoistened and removed as a continuous sheet.

Example 2

In an example of the manufacture of tobacco sheet according to this invention, five pounds of methyl cellulose, which forms a 2% by weight aqueous solution characterized by a viscosity of approximately 4,000 centipoises at 20° C. as measured on a Brookfield viscosimeter, and two and one-half pounds of glycerine were added to 145 pounds of water.

To this solution were added forty pounds of a 10% solution of completely periodate oxidized locust bean gum (dialdehyde carob gum) in water and the composite solution was mixed. Twenty pounds of tobacco dust which passed an 80 mesh U.S. standard sieve were mixed into the liquid to form a smooth homogeneous slurry. This slurry was applied on a stainless steel film-forming surface where it was dried, remoistened and removed as a continuous sheet.

Example 3

In another example of the manufacture of tobacco sheet according to this invention four pounds of 200 mesh locust bean gum, which forms a 2% by weight aqueous solution characterized by a viscosity between 800 and 2,500 centipoises at 20° C. as measured on a Brookfield viscosimeter, were dispersed in one hundred pounds of water with three pounds of sorbitol.

To this solution were added 1.2 pounds of oxydextran (dialdehyde dextran) and the composite solution was mixed. Twenty pounds of tobacco dust were mixed into the liquid to form a smooth, homogeneous slurry. This slurry was applied on a film-forming surface where it was dried, remoistened and removed as a continuous sheet with a moisture content on a dry weight basis between 10% and 30%.

Example 4

In a further example of the manufacture of tobacco sheet according to this invention, a dry blend of two pounds of locust bean gum and two pounds of sodium carboxymethyl cellulose and one pound of methyl cellulose was dispersed in 150 pounds of water. Ten pounds of U.S.P. grade glycerine were added and mixed with the viscous solution.

To this solution were added fifty pounds of a 5% solution of completely periodate oxidized starch (dialdehyde starch) in water and the composite solution was mixed. Twenty-five pounds of tobacco dust which passed a 200 mesh U.S. standard sieve were mixed into the

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liquid to form a smooth, homogeneous slurry. This slurry was applied on an endless, stainless steel film-forming belt surface where it was dried, remoistened and removed in a continuous sheet.

There has thus been described a novel tobacco smoking product formed of finely divided tobacco, polysaccharide adhesive and dialdehyde polysaccharide cross-linking material. These ingredients are mixed and shaped into a sheet.

What is claimed is:

1. A composition of matter comprising in combination finely divided tobacco, a polysaccharide film-forming gum and a dialdehyde polysaccharide.

2. A tobacco smoking product which comprises in combination finely divided tobacco and at least one dialdehyde polysaccharide selected from the group consisting of starches, cellulose, galactomannans and dextrans.

3. A tobacco smoking product which comprises in combination finely divided tobacco, moisture, humectant, adhesive and at least one dialdehyde polysaccharide selected from the group consisting of starches, cellulose, galactomannans and dextrans.

4. A tobacco smoking product which comprises in combination finely divided tobacco, a cellulosic adhesive and at least one dialdehyde polysaccharide selected from the group consisting of starches, cellulose, galactomannans and dextrans.

5. A tobacco smoking product which comprises in combination finely divided tobacco, a galactomannan adhesive and at least one dialdehyde polysaccharide selected from the group consisting of starches, cellulose, galactomannans and dextrans.

6. A tobacco smoking product which comprises in combination finely divided tobacco, carboxymethyl cellulose and dialdehyde starch.

7. A tobacco smoking product which comprises in combination finely divided tobacco, methyl cellulose and dialdehyde starch.

8. A tobacco smoking product which comprises in combination locust bean gum, finely divided tobacco and dialdehyde starch.

9. A tobacco sheet material which comprises in combination locust bean gum, carboxymethyl cellulose, methyl cellulose, finely divided tobacco, humectant, moisture and dialdehyde starch.

10. A method of making tobacco smoking material which comprises the steps of forming a first aqueous dialdehyde polysaccharide composition, forming a second aqueous polysaccharide adhesive composition, mixing together said first and second compositions to form a mixture, combining said mixture with finely divided tobacco to form a tobacco composition and drying said tobacco composition to form a tobacco smoking material.

11. A method of making a tobacco smoking product comprising in combination the steps of combining an aqueous dialdehyde starch preparation with finely divided tobacco and an aqueous solution of at least one polysaccharide selected from the group consisting of locust bean gum, carboxymethyl cellulose and methyl cellulose to form a tobacco sheet and adjusting the moisture content of said tobacco sheet to a value between 10% and 30% on a dry weight basis to form a tobacco smoking product.

12. A method of making a tobacco smoking product which comprises in combination the steps of mixing in water finely divided tobacco, a polysaccharide adhesive film-forming gum and a dialdehyde polysaccharide to form a slurry, applying said slurry upon a film-forming surface to form a thin layer of slurry and drying said thin layer of slurry to form a tobacco smoking product.

No references cited.