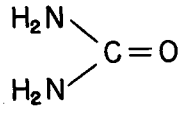
TOBACCO MANUFACTURE

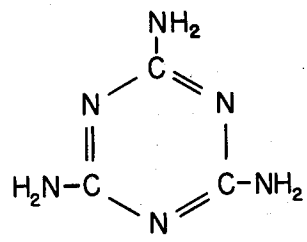
Filed May 21, 1962

FIG. 1



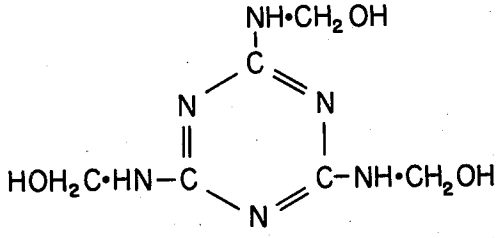
UREA

FIG. 2



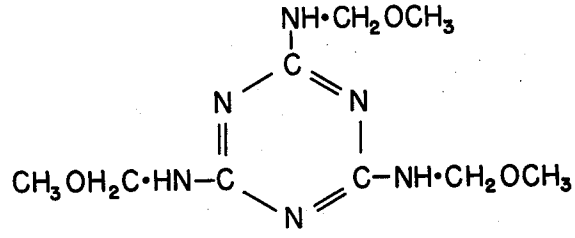
MELAMINE

FIG. 3



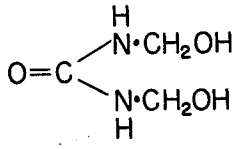
TRIMETHYLOLMELAMINE

FIG. 4



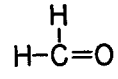
TRIMETHYLETHER OF TRIMETHYLOLMELAMINE

FIG. 5



DIMETHYLOLUREA

FIG. 6



FORMALDEHYDE

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TOBACCO MANUFACTURE

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This invention relates to the manufacture of tobacco products and more particularly to tobacco products made from finely divided tobacco and adhesive material.

In recent years tobacco manufacture from finely divided tobacco and adhesives has assumed substantial commercial importance. Products have been made which include sheets, shreds and other shaped articles. In general these products have either had a very substantial resistance to disintegration in the presence of moisture or else have had hardly any such resistance. Effectively, the water soluble tobacco products have suffered when exposed to the action of saliva and various treatment solutions used in the application of flavors and the like. Some of the water insoluble products, while generally satisfactory, particularly when first manufactured, have tended under some storage conditions to lose much of their water insolubility.

It is an object of this invention to provide water resistant tobacco products made from finely divided tobacco and adhesive material.

It is an object of this invention to provide water resistant tobacco products which retain their resistance to water even when stored for a long period of time.

It is also an object of this invention to provide a method of manufacturing tobacco products which include a long-term stable moisture resisting ingredient.

These and other objects of the invention are achieved by combining finely divided tobacco with water soluble polysaccharide adhesives and one or more wet strength agents which when used in minor amounts are effective to control the moisture resistance of the finished product without significant adverse effect upon the color, aroma or ash of the useful product.

Water soluble polysaccharide derivatives have become established in the art as particularly useful film forming adhesives for the manufacture of tobacco products from finely divided tobacco. In general these polysaccharides include cellulose ethers such as sodium carboxymethyl cellulose, hydroxyethyl cellulose and ethylhydroxyethyl cellulose; galactomanan material such as locust bean gum and guar; and polyuronides such as pectins and alginates. According to the present invention polysaccharide gums, used either individually or admixed with one another in any proportion, comprise about 1% to 30% of the finished tobacco product and preferably between 5% and 15% by weight.

The tobacco used in the manufacture of the products of the present invention is preferably dry ground and will pass through screens having mesh openings between about 0.8 millimeters and about 0.03 millimeters or less. Wet ground tobacco, such as colloidal tobacco or beaten tobacco fibers, may also be used separately or together with the dry ground tobacco. It is preferable to use at least a major proportion of dry ground tobacco which may be prepared in a hammer mill, for example. When reinforcing tape, to be used at the mouthpiece of cigars and cigarettes, is made according to this invention, it should contain at least 25% by weight of tobacco and preferably above 40%. In most other tobacco products including chewing tobacco, pipe tobacco, cigarette and cigar filler shreads, cigar binder and wrapper, the tobacco should constitute a major proportion by weight of the finished manufacture. This invention is useful in the manufacture of all of the foregoing smoking products as well as other shaped articles such as pipe cartridges and the like.

It is known in the prior art to combine water soluble polysaccharides and finely divided tobacco to form useful products. It is also known that in many instances these products can be further improved by the addition of minor amounts of cross-linking material such as glyoxal and dialdehyde starch or other dialdehyde materials including dialdehyde polysaccharides. For many purpose dialdehyde cross-linked polysaccharides together with finely divided tobacco form very satisfactory smoking products. However it has been found that when natural tobacco and tobacco products including these wet strength agents are stored together under conditions which support the fermentation of some kinds of tobacco the water resistance of the finished product may eventually be lost either to a large extent or may disappear completely. This effect has been ascribed to the generation of ammonia and related products when tobacco is stored under conditions of insufficient ventilation of the individual surfaces of the smoking products. It is possible to mitigate some of these undesirable effects by refrigeration and ventilation used either separately or together but heretofore no wet strength ingredient for combination with water soluble polysaccharides has been available which effectively resists this loss of moisture resistance with all kinds of tobacco. It is to be noted that some kinds of natural leaf tobacco have generally more pronounced adverse storage effects upon moisture resistance of dialdehyde cross-linked polysaccharides than do other species of tobacco.

According to the present invention it has been found that minor amounts of formaldehyde derivatives of primary and secondary amines and primary and secondary amides, such as melamine formaldehydes and urea formaldehydes and particularly their lower alkyl ethers such as methyl and ethyl ethers, will provide a moisture resistance agent of superior quality for use with tobacco. In particular the substitution of from one to six formaldehyde units per melamine unit and the substitution of from one to four formaldehyde units per urea unit will result in useful wet strength materials. A preferred wet strength material for use with the above polysaccharides is the trimethylether of trimethylol melamine. Another material of this type which is also highly useful is dimethylol urea. These moisture resistance agents are included in the tobacco product on the basis of the polysaccharide gum content and in general range from about 5% to about 50% by weight of the gum and preferably about one-fourth of the gum weight. The formaldehyde derivatives of this invention may be used either mixed together, separately, or mixed with conventional dialdehyde cross-linking agents such as glyoxal and dialdehyde starch. The proportions of mixing the materials with one another or with the dialdehyde materials are determined by the use to which the tobacco product is put and by the character and species of the particular adhesive and tobacco used. When a high degree of moisture resistance is desired a relatively larger proportion of formaldehyde material should be added to the polysaccharide. Generally, more moisture resistance material may be added to mouthpiece reinforcement tape since great moisture resistance with little concern for burn aroma is required.

In the drawing:

FIGURE 1 shows a schematic formula for urea.

FIGURE 2 shows a schematic formula for melamine.

FIGURE 3 shows a schematic formula for trimethylol melamine.

FIGURE 4 shows a schematic formula for the trimethyl ether of trimethylol melamine, a preferred form of the invention. Each of the carbons on the ring of

FIGURE 4 is bonded to a branch nitrogen which in turn has substituted a hydrogen and ether chain. Each of the hydrogens bonded to these nitrogens may be further substituted by a lower alkyl ether of a methylol group to form various alternative products useful with different tobaccos for enhancing moisture resistance.

FIGURE 5 illustrates a schematic formula of dimethylol urea, another valuable moisture resistance agent.

FIGURE 6 is a schematic formula for formaldehyde.

Among the advantages of the use of the formaldehyde derivatives of this invention are firstly the stable moisture and alkaline vapor resistance which they impart to tobacco products; secondly the relatively neutral burn odor or aroma of the smoke when these products are used in the recommended proportion, and finally these products when used in cigar wrapper and the like provide a particularly acceptable burn ring or zone of charring behind the advancing coal on the end of a burning cigar. It is important to some smokers that the width and color of the burn ring should resemble a corresponding area of burning natural tobacco.

The tobacco compositions of the present invention also include additional conventional additives such as humectants, for example glycerine and glycols; moisture, about 20%; diatomaceous earth, clay and other ash additives; fibers and pulp, such as paper pulp or tobacco stem pulp to give mechanical coherence; fungicides and fungistats; coloring agents and dyes; and caseing solutions and flavors such as menthol and aromatic substances which may be used for example in pipe tobacco.

The tobacco products may be formed by combining finely divided tobacco with an aqueous mixture of one or more water soluble polysaccharides together with any of the above ingredients and a moisture resistance agent. If a thick paste is formed this may be suitably shaped, for example, into a film, or shred and dried completely and remoistened to an appropriate moisture content such as 15% or 20% by weight. Moisture content of the finished product may range from 10% to 50% by weight. It has been found that the action of heat in drying tends to activate the moisture resistance agent so that once the product has been dried it acquires moisture resistance. It may afterward be remoistened. In general it is desirable to shape and dry the product promptly after the composition is compounded to obtain the maximum moisture resistance.

However, it has also been found that in addition to heat and drying the water resistance of the finished tobacco manufacture is often achieved relatively more quickly when a mineral acid catalyst is also added to the mixture. The use of a small amount of mineral acid makes possible a substantial reduction in the duration and heat of drying to achieve an equal effect. The acid catalyst is not generally an essential ingredient but is a useful adjunct to the formaldehyde wet strength agents of this invention. The preferred acid for use with this invention is a 10% aqueous solution of phosphoric acid. Volatile hydrocloric acid solutions may be used separately or together with phosphoric acid.

Example I

In a preferred example of this invention one kilogram of guar gum powder is dispersed in forty-nine kilograms of water to form a viscous solution. To this is added 500 grams of a 10% aqueous phosphoric acid solution. If the phosphoric acid solution is omitted it is necessary to dry the product at a temperature between 110° C. and 150° C., rather than 100° C. To this mixture is added two kilograms of a 10% clear aqueous solution of the trimethyl ether of trimethylol melamine. This product is generally available as an 80% clear aqueous solution and is preferably diluted to the 10% range for use in formulation. Finally, two kilograms of cigar tobacco dust which has been dry ground to pass a screen having openings of about 0.25 millimeter is mixed into the solution until a uniform viscous paste is formed and this paste is then shaped into tobacco products in the conventional manner. It may be conveniently formed into a sheet on a flat stainless steel belt and dried at about 100° C. by impingement of steam on the under surface of the steel belt when phosphoric acid has been used. When the acid has not been used additional heating in an oven is desirable to achieve a maximum moisture resistance.

Example II

In another example of the invention one kilogram of hydroxyethyl cellulose powder is dispersed in forty-nine kilograms of water and is mixed with two kilograms of a 10% aqueous solution of dimethylol urea. Dimethylol urea is ordinarily supplied as a solid powder which can be first formed into a 10% by weight aqueous solution by mild heating. Finally two kilograms of cigarette tobacco dust are sifted or blown over the surface of a thin film of the above liquid material so that all of the tobacco particles are imbedded in the surface of the film and the film is dried over steam.

The tobacco compositions of Examples I and II may be formed in conventional ways, such as shredding, extruding and the like, into useful tobacco products and may be incorporated in any proportion with natural whole leaf tobacco such as in the blend of a cigarette filler.

What is claimed is:

1. A composition of matter comprising at least 25% by weight of finely divided tobacco adhered together by an adhesive composition, said adhesive composition comprising a mixture of a major proportion by weight of a polysaccharide and a minor proportion by weight of a moisture resistance agent, said agent being selected from the group consisting of melamine formaldehydes, urea formaldehydes and the lower alkyl ethers of said urea and melamine formaldehydes..

2. A shaped smoking article made from the composition of claim 1.

3. Reconstituted tobacco sheet material made from the composition of claim 1.

4. A composition according to claim 1 in which the agent is the trimethyl ether of trimethylol melamine.

5. A composition according to claim 1 in which the agent is dimethylol urea.

6. A composition according to claim 1 which includes reinforcement fibers.

7. A method of tobacco manufacture which comprises: (1) forming an aqueous mixture of a polysaccharide adhesive and a moisture resistance agent, said agent being selected from the group consisting of melamine formaldehydes, urea formaldehydes and the lower alkyl ethers of said urea and melamine formaldehydes; (2) contacting said aqueous mixture with a quantity of finely divided tobacco greater than one-half the dry weight of said mixture to form an aqueous tobacco composition; and (3) adjusting the moisture content of and drying said composition to about 10% to 50% moisture by weight.

8. A method according to claim 7 in which a mineral acid is added to said mixture prior to drying, to reduce the duration and heat of drying.

9. A method according to claim 7 in which phosphoric acid is added to said mixture prior to drying, to reduce the duration and heat of drying.

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