April 15, 1952 W. G. FRANKENBURG 2,592,554

RESILIENT TOBACCO PRODUCT AND METHOD OF MAKING THE SAME

Filed Aug. 24, 1946

Fig. 1

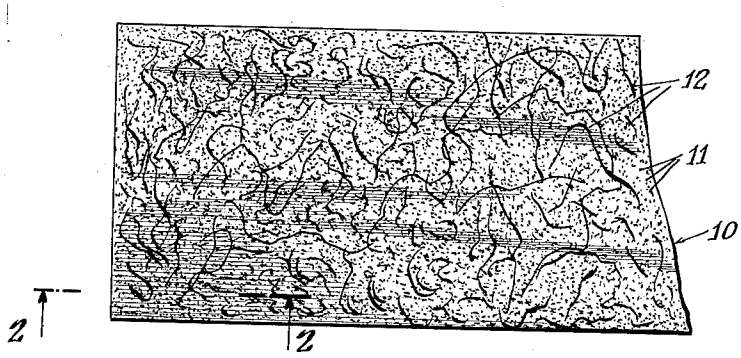


Fig. 2

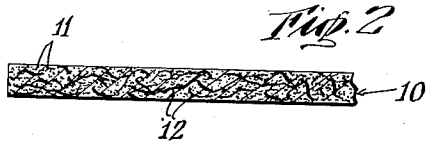


Fig. 3

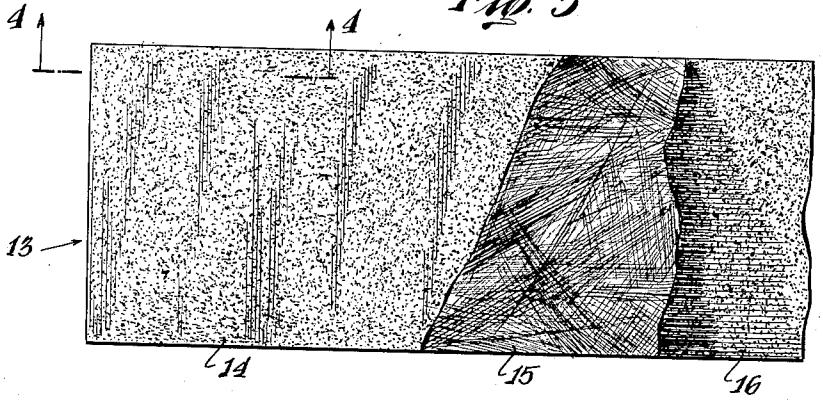
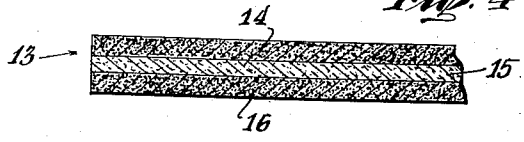


Fig. 4



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Patented Apr. 15, 1952

2,592,554

UNITED STATES PATENT OFFICE

2,592,554

RESILIENT TOBACCO PRODUCT AND METHOD OF MAKING THE SAME

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Application August 24, 1946, Serial No. 692,775

29 Claims. (Cl. 131—15)

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This invention relates to tobacco products adapted for smoking and more particularly to products comprising tobacco in comminuted form.

This application is a continuation-in-part of my application Ser. No. 677,107, filed June 15, 1946, now abandoned.

Heretofore many proposals have been advanced with the object of converting finely divided tobacco into sheets or other coherent masses suitable for utilization in the manufacture of cigars and other smoking products. However, none of these suggestions has attained commercial recognition because in every instance the tobacco product failed to equal the original tobacco leaf form as to both smoking qualities and physical properties. With all of the proposals with which I am acquainted, the conversion of comminuted tobacco to a coherent or self-supporting body entailed such drastic processing of the comminuted tobacco that the smoking qualities, e. g., easy burning of the tobacco and pleasant aroma of the smoke, were substantially impaired if not entirely destroyed. Furthermore, these products were characterized by a considerably lower tensile strength and flexibility than the tobacco leaves from which they were prepared.

In my application Ser. No. 677,107, filed June 15, 1946, now abandoned, I have made a detailed disclosure of improved tobacco products comprising comminuted tobacco and a relatively small proportion of a water-soluble acid polysaccharide compound functioning as a binding agent or adhesive to hold the tobacco particles together in coherent masses. Judged in the light of the relatively small quantity of binding agent which I employ and the mild conditions under which adhesion is brought about between the tobacco particles so as not to detract from the smoking qualities of the tobacco so processed, the products of the invention of my copending application are remarkably coherent and self-supporting and, accordingly, represent a distinct advance over the prior art.

In the interests of better understanding and greater clarity, illustrative embodiments of my invention are presented hereinbelow in detail. In these examples, which are not to be construed in any restrictive sense, the proportions mentioned are all based on a common weight unit.

Example 1

Fifteen types and grades of leaf tobacco were weighed up in proportions dictated by the formula followed in the manufacture of a nationally known cigar. This weighed tobacco was passed

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through a Raymond pulverizer operating with a screen of medium-size apertures. Substantially all of the comminuted tobacco could be screened through a 20-mesh sieve and approximately 50% of the material passed through a 40-mesh sieve. The powdered tobacco was thoroughly mixed to ensure good blending of the various types and grades. Obviously, at this point the tobacco had been blended with a degree of homogeneity impossible of attainment in conventional practice involving unpulverized tobacco. A highly viscous solution (like a heavy syrup) was prepared with 400 parts of water, 6 parts of refined sodium alginate and 10 parts of glycerine. One part of bentonite was added to 20 parts of water; when the bentonite suspension became homogeneous it was added to the foregoing aqueous alginate solution. The resulting composite liquid was added with stirring and kneading to 100 parts of the pulverized tobacco blend previously prepared. The pasty mass obtained by combining the liquid and the tobacco powder had a consistency like that of freshly prepared neat cement mortar and showed no tendency to exude liquid on standing. The pasty mass was placed on plate glass and covered with a sheet of wax paper. With the aid of a roller, the mass was pressed out between the wax paper and plate glass into a layer about 1/60 inch thick. The wax paper was removed and the plastic layer on the plate glass was transferred to a drying chamber in which air at a temperature of 50° C. was circulated. When the moisture content of the tobacco mass had been brought down to about 16%, the product was withdrawn from the drying chamber. The sheet of comminuted tobacco thus produced was self-supporting and fairly pliable. Conditioning of this sheet at 10° C. and at a relative humidity of 90%, increased its plasticity and flexibility considerably. The sheet was put up in the form of small rolls and, in other tests, in the form of irregularly shaped bunches which were then encased with a fine wrapper of Sumatra tobacco. In the cigars thus produced, it is clear that the roll or bunch of sheeted tobacco made in accordance with this invention replaced the filler leaf tobacco and binder leaves conventionally used in cigar manufacture. In blindfold smoking tests, the cigars of this example compared favorably, in the opinion of the average smoker, with ordinary cigars containing the same tobaccos. Experts considered the new cigars superior in that the smoke was of uniform quality and was freer of undesirable and irritating products of dry distillation and combustion; the latter feature appears to be

attributable to the presence of the bentonite in the cigar filler.

Example 2

One hundred parts of finely powdered tobacco (all particles passing through a 40-mesh screen) consisting of ground leaves of 8 types of flue-cured, air-cured and properly aged cigarette tobaccos were mixed with an aqueous solution of 500 parts of water, 1 part of sodium alginate, 2 parts of potassium pectate, 1 part of gum tragacanth, 8 parts of glycerine and 10 parts of diatomaceous earth. The thoroughly mixed paste was then extruded through a slit 2 inches long and 1/40 inch wide. The extruded ribbon of tobacco paste was deposited on a moving band of wire cloth and dried while on this band by means of a dry air stream at 50° C. After the ribbon of compacted tobacco powder was dried to a moisture content of 19%, it is cut into shreds of the ordinary size used in cigarette manufacture. These shreds were fed into a cigarette machine. The cigarettes made with this material were remarkable for the mildness and aroma of their smoke.

Example 3

One hundred parts of finely ground tobacco consisting of a blend of 12 different types and crops of American and Turkish, properly cured and aged tobaccos were thoroughly mixed with 250 parts of an aqueous solution of 5 parts of potassium alginate, 3 parts of sodium pectate, 10 parts of glycerine, 5 parts of sorbitol, 1 part of bentonite, 1/6 part of iron citrate and 5 parts of a flavoring solution which was a blend of several natural and synthetic aroma substances. The sorbitol supplemented the glycerine as plasticizer. The paste thus formed was extruded with the equipment used in Example 2 and dried in an air stream of 40° C. After reaching a moisture content of 25%, the tobacco ribbon was cut into pieces of the size ordinarily used for pipe tobacco. This blended pipe tobacco had a much more even burn, a better fire-holding capacity and a better retention of flavor than a control sample of a conventional rough mixture of pieces of the same tobaccos. Furthermore, its smoking quality was characterized by a high degree of mildness and a pleasant and uniform aroma.

The present invention is not to be confused with the many suggestions made in prior patents of which a large number issued during the period of 1860 to 1900. These prior proposals generally treated waste tobacco in substantially the same way in which wood, rag, straw, bagasse, etc., are pulped in the manufacture of paper. Some of the later patents acknowledge that the tobacco so converted to paper had lost practically all of the constituents which make tobacco suitable for smoking, and attempted to correct this deficiency by impregnating the tobacco paper with a concentrated decoction obtained by boiling a suspension of tobacco in water. However, all of these earlier schemes failed because it was not appreciated that tobacco and tobacco extracts are inherently delicate and unstable and that even moderate variations in such factors as temperature and hydrogen-ion concentration may adversely affect the tobacco or tobacco extracts by causing decomposition, oxidation, polymerization or other chemical reactions of the compounds in tobacco. In contrast to these prior unsuccessful efforts, the present invention involves the mildest conditions of treatment and avoids the pulping of the tobacco in water or other processing liquid which would extract many soluble tobacco compounds and thus leave an impoverished and deteriorated tobacco product.

Two or more acid polysaccharide compounds are sometimes used in compounding a tobacco product of this invention since certain advantages, e. g., increased thickening of the aqueous solution, may be obtained with mixed polysaccharides.

In spite of the improvements achieved, these products are not wholly satisfactory from the point of view of physical properties particularly when they are utilized in automatic machines for the production of cigars and the like.

It is an object of this invention to improve the physical properties of products made from comminuted tobacco without detrimentally influencing the smoking characteristics of the original tobacco.

Another object is to facilitate materially the manufacture of cigars from sheets or other coherent bodies of comminuted tobacco.

These and further objects of my invention will become apparent from the description which follows.

In accordance with this invention, tobacco products in the form of coherent masses of comminuted tobacco are improved in physical properties by combining a minor proportion of glass fibers with the tobacco mass. I have found that fine fibers of glass of the order of 0.0002'' in diameter resembling silk threads not only in appearance but also in softness and flexibility contribute appreciable tensile strength, flexibility and resiliency to coherent masses of comminuted tobacco in which they have been incorporated. While the proportion of glass fibers may vary over a broad range, it is generally satisfactory to use from about 1 to 15% of glass fibers based on the weight of the tobacco. Preferably, from about 2 to 5% by weight of glass fibers are combined with the finely divided tobacco. The fibers may be arranged in the coherent mass of comminuted tobacco either as more or less individual fibers uniformly distributed throughout the tobacco mass or as a lamina of felted fibers carrying an adhering layer of ground tobacco on one or both of its faces.

When loose fibers are mixed with comminuted tobacco and converted into coherent, self-supporting bodies by means of a suitable binding agent or adhesive, the glass fibers usually will have a length ranging from about ½ to 2½'' with a major portion of the fibers measuring from about 1 to 1½'' in length. Where the glass fibers are used in the form of a felted mat, they may be considerably longer. Glass fiber mats have reached a high state of technical development and are commercially available. Such mats are generally supplied with the fibers bonded together by a minor proportion of adhesive, e. g., resin or starch, and, for most purposes of this invention, it is advisable to select mats of not more than about 0.010'' thickness, preferably of about 0.003 to 0.006'' thickness.

For more detailed description and further clarification of my invention, reference is made to the accompanying drawing of which:

Figure 1 is a plan view of one type of tobacco sheet prepared in accordance with the invention;

Figure 2 is a magnified sectional view taken along the line 2—2 of Figure 1;

Figure 3 is a plan view of another form of product of this invention; and

Figure 4 is a magnified sectional view taken along the line 4—4 of Figure 3.

In Figure 1, the numeral 10 designates a coherent, self-supporting sheet comprising tobacco particles 11 and glass fibers 12 in intimate and uniform admixture. The tobacco particles 11 and glass fibers 12 are held together by a small proportion of a binding substance. The glass fibers 12 act to improve the physical properties of the sheet 10, the tensile strength, flexibility and resiliency being notably good. In effect, the glass fibers function in a coherent mass of comminuted tobacco in much the same manner as do reinforcing steel rods in concrete masses.

Figure 2 presents an enlarged cross-section of sheet 10 to show the random orientation and uniform distribution of glass fibers 12 throughout the thickness of sheet 10. It is, therefore, clear from both Figure 1 and Figure 2 that the glass fibers form a three-dimensional reinforcing network for the adhering tobacco particles 11.

In Figure 3, the numeral 13 refers to a laminated sheet consisting of a top layer 14 of finely divided tobacco held together and to the underlying layer by an adhesive, an intermediate layer 15 of matted glass fibers, and a bottom layer 16 of tobacco similar to top layer 14.

The enlarged sectional view of laminated sheet 13 represented by Figure 4 shows schematically that the superficial tobacco layers 14 and 16 are bonded not only to the faces of the glass fiber mat 15 but also to each other through the interstices of the thin, porous mat 15. Because the tobacco layers 14 and 16 are anchored to and through the intermediate layer 15 of glass fibers, the three laminae function as a unitary sheet. As in the product depicted in Figures 1 and 2, the glass fiber mat 15 is the reinforcing element of sheet 13.

More specifically, a product of the type shown in Figures 1 and 2 is prepared as follows. Several types and grades of leaf tobacco are weighed up in proportions dictated by the formula followed in the manufacture of a nationally known cigar. This weighed tobacco is passed through a Raymond pulverizer operating with a screen of medium-size apertures. Substantially all of the comminuted tobacco can be screened through a 20-mesh sieve and approximately 50% of the material passes through a 40-mesh sieve. With 100 parts by weight of the thus pulverized and blended tobacco there are uniformly mixed 2½ parts of glass fibers having an average diameter of 0.00022" and an average length of about 1½". A highly viscous solution (like a heavy syrup) is prepared with 400 parts of water, 6 parts of refined sodium alginate and 5 parts of glycerine. The viscous solution is added with stirring and kneading to the dry mixture of pulverized tobacco and glass fibers previously prepared. A pasty mass is obtained having a consistency similar to that of the freshly prepared neat cement mortar and there is no evidence of liquid exuding from the paste. The pasty mass is placed on plate glass and covered with a sheet of wax paper. With the air of a roller, the mass is pressed out between the wax paper and plate glass into a layer about 1/40" thick. The wax paper is removed and the plastic layer on the plate glass is transferred to a drying oven in which air at a temperature of 50° C. is circulated. When the moisture content of the tobacco mass has been brought down to about 15%, the product is withdrawn from the drying chamber and is lifted from the plate glass. The sheet of comminuted tobacco thus produced is self-supporting and remarkably pliable.

As an example of a product of my invention of the type shown in Figures 3 and 4, 100 parts by weight of finely powdered tobacco (all particles passing through a 40-mesh screen) consisting of ground leaves of 8 types of air-cured, sweated and properly aged tobaccos are mixed with an aqueous solution of 500 parts of water, 1 part of sodium alginate, 2 parts of potassium pectate, 1 part of gum tragacanth, 6 parts of glycerine and 5 parts of diatomaceous earth. The thoroughly mixed paste is then applied to both faces of a glass fiber mat approximately 0.005" thick and weighing about 1.5 grams per square foot. The quantity of tobacco paste spread on the glass fiber mat is controlled so that, on the dry basis, the glass fibers of the composite sheet represent about 5% of the weight of the tobacco. The wet tobacco sheet is brought to a moisture content of about 17% by exposure to a circulating stream of dry air at a temperature of about 50° C. After the drying operation, the sheet can be handled with ease and shows considerable flexibility and resiliency.

In still another example, 100 parts by weight of a finely ground mixture of American and Cuban tobaccos and 3 parts of silky glass fibers ranging in length from about ½ to 2" are thoroughly mixed with a viscous slurry consisting of 300 parts of water, 4 parts of potassium alginate, 3 parts of sodium pectate, 4 parts of glycerine, 2 parts of sorbitol and 1 part of bentonite. The paste thus formed is extruded through a slit 2" long and 1/40" wide. The extruded ribbon of tobacco paste is deposited on a moving band of wire cloth and dried while on this band by means of a circulating dry air stream at a temperature of 45° C. After the ribbon has been conditioned to a moisture content of approximately 14% it can be subjected to mechanical operations, such as winding in rolls, inasmuch as it has a fairly high tensile strength and flexibility.

A further example illustrates the production of a tobacco sheet which is a desirable replacement for the "binder leaf" conventionally used in cigar manufacture to wrap up and hold together the loose pieces of filler tobacco in roll form. It is obvious that a sheet utilized as binder leaf must have good tensile strength, pliability and resistance to crumbling. Such a sheet is prepared by kneading 100 parts by weight of a finely ground Connecticut binder tobacco with a mixture of 300 parts of water, 5½ parts of sodium alginate, 4 parts of glycerine and 8 parts of diatomaceous earth. A stiff paste is obtained which is then softened by addition with continued kneading of a warm solution (40° C.) consisting of 100 parts of water and 3 parts of agar-agar, the solution having been previously prepared by dissolving the agar-agar in water at a temperature of 90° C. The resulting smooth paste is spread on both sides of a glass fiber mat approximately 0.008" thick. The tobacco-coated mat is moved slowly through a drying tunnel at a temperature of 45° C. until the material has a residual moisture content of about 19% by weight. The finished sheet carries about 25 grams of tobacco per square foot of glass fiber mat which weighs about 2.2 grams per square foot. The tensile strength and resiliency of this sheet are at least equal, if not superior, to those of binder leaves. It can be readily cut into pieces of exactly the right shape required for binder leaves so that in contrast to conventional cigar production with "natural"

leaves, only a negligible amount of trimmings are formed. Such trimmings do not necessarily represent waste material since by my invention they may be reworked into new sheets.

As illustrated in the immediately preceding example, I have found it advantageous to use a limited quantity of agar-agar, generally not more than about 5% by weight of the tobacco. It appears that the agar-agar dispersed throughout the mass of comminuted tobacco as a water solution forms a fibrous structure in the finished tobacco product when the water is expelled by evaporation. This belief is based on the observation that agar-agar improves the physical properties of tobacco sheets prepared from finely divided tobacco and a binding agent, e. g., sodium alginate, even in the absence of glass fibers. When used in a mixture which includes glass fibers, agar-agar supplements glass fibers in their function of improving the tensile strength, resiliency, flexibility, etc., of the coherent tobacco product.

When each of the products of the foregoing examples is compared with a product made with the same formula proportions under the same processing conditions, except that the glass fibers are omitted, it is evident that the glass fibers contribute materially to the tensile strength, resiliency and flexibility of the product. Thus, while a given coherent sheet of comminuted tobacco will generally crumble when rolled up between the fingers, the same product with a minor proportion of glass fibers, say 2 to 5% by weight of the tobacco, will withstand rolling up between the fingers substantially without evidence of cracking. This distinct improvement in the physical properties of sheets or other coherent forms of comminuted tobacco is of significant importance in permitting the utilization of these coherent tobacco bodies in mechanical operations, such as the bunching and rolling operations encountered in the current manufacture of cigars.

From experience I have found it advisable to employ a plasticizer for the coherent body of finely divided tobacco. This accounts for the presence of glycerine and sorbitol in the foregoing examples of my invention. Additions of glycerine of the order of 2% to 15% by weight, based on the weight of dry tobacco used, to mixtures of comminuted tobacco and aqueous solutions of acid polysaccharide compounds with or without bentonite exert an appreciable plasticizing effect.

Furthermore, I have found it advantageous to add a small proportion of bentonite or other water-swelling clay to the mixture prepared for forming a continuous, self-supporting body of comminuted tobacco. Generally, additions of the order of 1 to 2% by weight of bentonite, based on the weight of dry tobacco powder used, are recommended. It appears that bentonite on swelling in the wet plastic mass of tobacco tends to form a coherent inorganic skeleton or reinforcing network which supplements the fine glass fibers in improving the physical properties of the final product. Moreover, the bentonite tends to absorb or filter out undesirable tarry constituents and alkaloids of tobacco smoke as it is drawn through the unburned portion of the bentonite-containing tobacco product.

While any desired adhesive or binding substance in liquid form may be utilized in preparing the products of my invention, I favor the use of the water-soluble acid polysaccharide compounds disclosed in my application Ser. No. 677,107, filed June 15, 1946, now abandoned. As used in my copending application and in this specification and appended claims, the term, acid polysaccharide compound, embraces algins, pectins and plant gums which are characterized by a molecular structure involving uronic acids, as well as polysaccharic and polysaccharinic compounds. The acid polysaccharide compounds may be in the form of acids, salts and esters. The acid polysaccharide compounds of the type involving uronic acids, sometimes referred to as polyuronides (cr. J. A. C. S. 52, 2474 (1930)), are often associated with pentosans and are utilizable in such form in this invention. The selected acid polysaccharide compound must be such that a small quantity, i. e., not exceeding about 5% by weight, added to water will form a solution having a viscosity of at least 1500 centipoises at a temperature of 25° C. Preferably, the acid polysaccharide compound should be one that yields an aqueous solution of equal or greater viscosity when present in only about 2% concentration.

The quantity of viscous polysaccharide solution which is admixed with the powdered tobacco is limited to that which yields a plastic mass having a consistency approximating that of a good neat cement mortar. An excess of solution detectable by the tendency of the plastic mass to exude liquid should be avoided since any substantial loss of liquid reflects a loss of extractable constituents in the tobacco and consequent alteration of the original smoking qualities of the tobacco. Usually, one part by weight of comminuted tobacco and about two to six parts by weight of the aqueous polysaccharide solution will form a paste of the desired consistency; the finished tobacco product contains less than 20% by weight of the polysaccharide, and frequently less than 10%. My preferred tobacco compositions contain only about 6% by weight of admixed polysaccharide.

Of the several acid polysaccharide compounds meeting my requirements, the algin and pectin families are notably satisfactory. The water-soluble derivatives of these polysaccharides, such as alginic and pectic acids and their sodium and potassium salts, are particularly desirable. It is well to note that algin and pectin and their derivations resemble the family of gums which on hydrolysis give uronic acids, e. g., glucuronic and galacturonic acids.

Acid polysaccharide compounds being compounds made up entirely of carbon, hydrogen and oxygen atoms are well suited for incorporation in tobacco compositions intended for smoking. It has been found that the dry distillation and the incomplete combustion of these polysaccharides yield substantially no substance of disagreeable or irritating properties. The complete combustion of acid polysaccharide compounds yields carbon dioxide and water vapor which are the products of combustion of many natural constituents of tobacco. This smoking compatibility of acid polysaccharide compounds and tobacco should be safeguarded by the exercise of care in selecting polysaccharides in a state of refinement. The refined products should be free of any appreciable quantities of extraneous matter containing compounds of nitrogen, particularly proteins, and compounds of sulfur, phosphorus and the halogens; in short, compounds giving undesirable products of combustion or dry distillation should be avoided. Where the tobacco paste is prepared with a water solution of an acid poly-

saccharide compound and this paste is applied to a mat of glass fibers, it is advantageous to have the glass fibers bonded together with the same acid polysaccharide compound used in the tobacco paste.

In the interests of producing coherent masses of comminuted tobacco having good porosity to facilitate smoking, it is advisable to include diatomaceous earth in the tobacco composition. Additions of diatomaceous earth of 10 to 25% of the weight of the powdered tobacco result in products of relatively high porosity and low density. With some tobaccos, this favors combustion and high aroma content in the smoke.

The tobacco products prepared in accordance with this invention may also include other valuable additives, such as minute quantities of combustion catalysts, e. g., finely dispersed oxides of iron and copper, organic substances to impart desired flavors to the smoke of the resulting tobacco product, and wetting agents which facilitate the attainment of intimate contact and cohesion between the tobacco particles, glass fibers, additives, and the binding agent.

The term, glass, is used in this specification and the appended claims in its broadest sense. Glass is commonly defined as an amorphous substance, usually transparent or translucent and ordinarily comprising chiefly a mixture of silicates, but in some cases, of borates, phosphates, etc. Glass is also identified as a super-cooled liquid. It is well to note at this point that the fine fibers of glass which I employ to reinforce coherent bodies of comminuted tobacco are, contrary to popular belief, completely harmless. The glass fibers are so soft and pliable that even when the end of a cigar containing them is chewed, their presence is not felt by the lips or tongue. When a tobacco product containing glass fibers is burned, the fine fibers are softened and disintegrated within the glowing zone so that the glass residue is not sensibly different from the rest of the tobacco ash. Obviously, during the combustion of the tobacco, the glass fibers do not give off any products which contaminate or adulterate the smoke.

Hereinabove it has been emphasized that glass fibers increase the resiliency of coherent bodies of comminuted tobacco. In the manufacture of cigars and the like, this effect is important not only because the finished product has the pleasing and natural resilient feel of cigars made of leaf tobacco (not comminuted) but also because resiliency prevents or minimizes packing of the tobacco within the cigar. Consolidation of the tobacco in cigars or other smoking products is undesirable since the voids are reduced and a low content of voids in such products interferes with the easy drawing of smoke therethrough. It is clear that the products of this invention may be utilized in place of filler, binder or wrapper tobacco leaves commonly used in the production of cigars.

Those skilled in the art will visualize many other modifications and variations of the invention set forth hereinabove without departing from its spirit and scope. Accordingly, the claims should not be interpreted in any restrictive sense other than that imposed by the limitations recited within the claims.

What I claim is:

1. In the manufacture of cigars, the improvement which comprises dry-grinding tobacco, forming a paste of said dry-ground tobacco with a quantity of viscous aqueous solution of an acid polysaccharide compound sufficient to form a cohesive paste but insufficient to permit exudation of said viscous solution from said paste, said viscous solution containing not more than about 5% by weight of said polysaccharide and having a viscosity of not less than 1500 centipoises at a temperature of 25° C., coating a thin mat of fine glass fibers with said paste, drying said coated mat, and using said dried, coated mat as binder leaf in the manufacture of cigars.

2. The process of claim 1 wherein the acid polysaccharide compound is a member of the family of algin compounds.

3. A tobacco product in physically continuous and coherent form characterized by flexibility and adaptability for smoking, which comprises a predominant proportion of dry-ground tobacco, a minor proportion, not exceeding 20% by weight of said tobacco, of a water-soluble acid polysaccharide compound having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than 5% by weight of said acid polysaccharide is dissolved in water, and a minor proportion, lesser than said minor proportion of acid polysaccharide and not exceeding 5% by weight of said tobacco, of fine flexible glass fibers, said acid polysaccharide and said glass fibers holding the particles of said tobacco together in said physically continuous and coherent form.

4. A tobacco product in physically continuous and coherent form characterized by flexibility and adaptability for smoking, which comprises a predominant proportion of dry-ground tobacco, a minor proportion, not exceeding 20% by weight of said tobacco, of a water-soluble algin compound having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than 5% by weight of said algin compound is dissolved in water, and a minor proportion, lesser than said minor proportion of algin compound and not exceeding 5% by weight of said tobacco, of fine flexible glass fibers, said algin compound and said glass fibers holding the particles of said tobacco together in said physically continuous and coherent form.

5. A tobacco product in physically continuous and coherent form characterized by flexibility and adaptability for smoking, which comprises a predominant proportion of dry-ground tobacco, a minor proportion, not exceeding 10% by weight of said tobacco, of a water-soluble alkali metal alginate having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than 2% by weight of said alignate is dissolved in water, and a minor proportion, lesser than said minor proportion of alginate and not exceeding 5% by weight of said tobacco, of fine flexible glass fibers, said alginate and said glass fibers holding the particles of said tobacco together in said physically continuous and coherent form.

6. A thin tobacco sheet characterized by flexibility and adaptability for smoking, which comprises a predominant proportion of dry-ground tobacco, a minor proportion, not exceeding 20% by weight of said tobacco, of a water-soluble algin compound having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than 2% by weight of said algin compound is dissolved in water, and a minor proportion, lesser than said minor proportion of algin com-

pound and not exceeding 5% by weight of said tobacco, of fine flexible glass fibers, said algin compound and said glass fibers holding the particles of said tobacco together in the form of said thin tobacco sheet.

7. A thin tobacco sheet characterized by flexibility and adaptability for smoking, which comprises a predominant proportion of dry-ground tobacco, a minor proportion, not exceeding 20% by weight of said tobacco, of a water-soluble algin compound having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than 5% by weight of said algin compound is dissolved in water, and a minor proportion, lesser than said minor proportion of algin compound and not exceeding 5% by weight of said tobacco, of fine flexible glass fibers in matted form, the particles of said tobacco being bonded by said algin compound to said matted glass fibers and thus forming said thin tobacco sheet.

8. A thin tobacco sheet characterized by flexibility and adaptability for smoking, which comprises a predominant proportion of dry-ground tobacco, a minor proportion, not exceeding 20% by weight of said tobacco, of a water-soluble sodium alginate having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than 2% by weight of said sodium alginate is dissolved in water, and a minor proportion, lesser than said minor proportion of sodium alginate and not exceeding 5% by weight of said tobacco, of fine flexible glass fibers in matted form, the particles of said tobacco being bonded by said sodium alginate to said matted glass fibers and thus forming said thin tobacco sheet.

9. In the manufacture of smoking products, the improvement which comprises dry-grinding tobacco, forming a paste of said dry-ground tobacco with a quantity of viscous aqueous solution of an acid polysaccharide compound sufficient to form a cohesive paste but insufficient to permit exudation of said viscous solution from said paste, said viscous solution containing not more than about 5% by weight of said polysaccharide and having a viscosity of not less than 1500 centipoises at a temperature of 25° C., combining said paste with a minor proportion of fine flexible glass fibers, said minor proportion not exceeding 5% by weight of said tobacco, pressing and drying said paste containing the glass fibers into a desired, coherent form, and utilizing said coherent form of tobacco in the manufacture of smoking products.

10. The process of claim 9 wherein the acid polysaccharide compound is a member of the family of algin compounds.

11. In the manufacture of smoking products, the improvement which comprises dry-grinding tobacco, forming a paste of said dry-ground tobacco with a quantity of viscous aqueous solution of an acid polysaccharide compound sufficient to form a cohesive paste but insufficient to permit exudation of said viscous solution from said paste, said viscous solution containing not more than about 2% by weight of said polysaccharide and having a viscosity of not less than 1500 centipoises at a temperature of 25° C., combining said paste with a minor proportion of fine flexible glass fibers, said minor proportion not exceeding 5% by weight of said tobacco, pressing and drying said paste containing the glass fibers into a desired, coherent form, and utilizing said coherent form of tobacco in the manufacture of smoking products.

12. The process of claim 11 wherein the acid polysaccharide compound is an alkali metal alginate.

13. A tobacco product in physically continuous and coherent form characterized by flexibility and adaptability for smoking, which comprises a predominant proportion of dry-ground tobacco, a minor proportion, not exceeding 20% by weight of said tobacco, of a water-soluble binding agent innocuous to the smoking qualities of said tobacco and having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than 5% by weight of said binding agent is dissolved in water, and a minor proportion, lesser than said minor proportion of binding agent and not exceeding 5% by weight of said tobacco, of fine flexible glass fibers, said binding agent and said glass fibers holding the particles of said tobacco together in said physically continuous and coherent form.

14. The tobacco product of claim 13 wherein said glass fibers are in matted form.

15. A tobacco product suited for smoking, which comprises a predominant proportion of dry-ground tobacco and a minor proportion, not more than 20% by weight of said tobacco, of a water-soluble acid polysaccharide compound having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at 25° C. when not more than about 5% by weight of said polysaccharide is dissolved in water, said polysaccharide functioning to hold said dry-ground tobacco as a coherent mass.

16. A tobacco product suited for smoking, which comprises a predominant proportion of dry-ground tobacco and a minor proportion, not more than 10% by weight of said tobacco, of a water-soluble acid polysaccharide compound having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at 25° C. when not more than about 2% by weight of said polysaccharide is dissolved in water, said polysaccharide functioning to hold said dry-ground tobacco as a coherent mass.

17. In the manufacture of cigars, the improvement which comprises dry-grinding tobacco, mixing said dry-ground tobacco with a quantity of an aqueous solution of an acid polysaccharide compound sufficient to form a cohesive paste but insufficient to permit exudation of said solution from said paste, said solution containing not more than about 5% by weight of said polysaccharide and having a viscosity of not less than 1500 centipoises at a temperature of 25° C., pressing and drying said paste into a desired, coherent form, and utilizing said coherent form of tobacco in the manufacture of cigars.

18. The process of adapting and blending a plurality of tobaccos for use in smoking products, which comprises dry-grinding said tobaccos, mixing said dry-ground tobaccos with a quantity of an aqueous solution of an acid polysaccharide compound sufficient to form a cohesive paste but insufficient to permit exudation of said solution from said paste, said solution containing not more than about 2% by weight of said polysaccharide and having a viscosity of not less than 1500 centipoises at a temperature of 25% C., and pressing and drying said paste into a coherent form adapted for use in smoking products.

19. The improved process of converting tobacco into a physically continuous and coherent form adapted for smoking, which comprises dry-grinding tobacco, mixing the dry-ground tobacco and a viscous aqueous solution of a binding

agent innocuous to the smoking qualities of said tobacco in proportions to form a cohesive paste substantially free of exudation of said viscous aqueous solution, said viscous aqueous solution containing not more than about 5% by weight of said binding agent and having a viscosity of not less than 1500 centipoises at a temperature of 25° C., and shaping and drying said paste into a desired, physically continuous and coherent form adapted for smoking.

20. The improved process of claim 19 wherein the binding agent is an alkali metal alginate.

21. The improved process of converting tobacco into a thin sheet adapted for the manufacture of cigars, which comprises dry-grinding tobacco, mixing the dry-ground tobacco and a viscous aqueous solution of sodium alginate in proportions to form a cohesive paste substantially free of exudation of said viscous aqueous solution, said viscous aqueous solution containing not more than about 2% by weight of said alginate and having a viscosity of not less than 1500 centipoises at a temperature of 25° C., and forming and drying said paste into a thin sheet adapted for the manufacture of cigars.

22. A tobacco product suited for smoking, which comprises a predominant proportion of dry-ground tobacco and minor additions of not more than about 10% by weight of an alkali metal alginate having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than about 2% by weight of said alginate is dissolved in water, and about 2% to 15% by weight of glycerine, all said additions being based on the weight of said tobacco and being homogeneously mixed therewith to hold said dry-ground tobacco as a coherent, self-supporting mass.

23. A tobacco product suited for smoking, which comprises a predominant proportion of dry-ground tobacco and a minor proportion, not more than 20% by weight of said tobacco, of a water-soluble acid polysaccharide compound having the property of forming an aqueous solution with a viscosity of at least 1500 centipoises at a temperature of 25° C. when not more than about 2% by weight of said polysaccharide is dissolved in water, said polysaccharide functioning to hold said dry-ground tobacco as a coherent mass.

24. The tobacco product of claim 23 wherein the water-soluble acid polysaccharide compound is an alkali metal alginate.

25. The tobacco product of claim 24 wherein there has been incorporated about 2% to 15% by weight of glycerine, based on the weight of the tobacco.

26. The improved process of converting tobacco into a physically continuous and coherent form adapted for smoking, which comprises dry-grinding tobacco, mixing the dry-ground tobacco and a viscous aqueous solution of a binding agent innocuous to the smoking qualities of said tobacco in proportions to form a cohesive paste substantially free of exudation of said viscous aqueous solution, said viscous aqueous solution containing not more than 2% by weight of said binding agent and having a viscosity of not less than 1500 centipoises at a temperature of 25° C., and shaping and drying said paste into a desired, physically continuous and coherent form adapted for smoking.

27. The improved process of claim 26 wherein the binding agent is an alkali metal alginate.

28. The improved process of claim 26 wherein glycerine, in an amount corresponding to about 2% to 15% of the weight of the dry-ground tobacco, is admixed with said viscous aqueous solution.

29. The tobacco product of claim 15 wherein there has been incorporated about 2% to 15% by weight of glycerine, based on the weight of the dry-ground tobacco.

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