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Schmidt

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[54] **RECONSTITUTED TOBACCO COMPOSITION**

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[57] **ABSTRACT**

This invention is for a new composition of matter comprising tobacco and at least one gum selected from the group consisting of film-forming, polar solvent soluble ether, ester and mixed ether-ester substituted galacto-mannan gums. The process for preparing the new composition comprises mixing the tobacco, preferably in finely divided form, a polar solvent and the gum and agitating the mixture until a homogeneous composition is attained.

Generally, in use, the composition is then formed into a sheet by conventional means, the sheet product having improved properties and which may be commercially used in smoking articles, especially a wrapper for cigars which has excellent wet strength as well as being more resistant to enzymatic degradation.

4 Claims, No Drawings

TOBACCO COMPOSITION

BACKGROUND

This invention relates to a new composition of matter. More particularly, the invention relates to a tobacoo and adhesive composition and tobacoo sheet material formed therefrom and wherein the adhesive is a substituted galacto-mannan gum.

It is to be understood that in its broadest aspects the invention encompasses a composition of tobacco and the substituted galacto-mannan gum set forth. However, for the sake of simplicity and illustrative purposes, the invention is disclosed more fully as it is used in the form of sheet material and in which form its beneficial aspects and advantages may most easily be utilized.

In the manufacture of tobacco sheet material, finely ground tobacoo is usually admixed with aqueous gum solutions to form a paste-like mass which is then formed into a continuous sheet by conventional means. Preferably, naturally occurring polysaccharides like Locust Bean and Guar Gum are used as the adhesives for tobacco sheet. These naturally occurring galacto-mannan gums are preferred over Methycellulose gum. For example, for a number of reasons they are easily cross-linked thereby rendering the tobacco sheet moisture resistant. Consequently, wet strength of considerable magnitude can thus be imparted to the tobacco sheet. This wet strength is of special importance for tobacoo sheet which is to be used as wrapper for cigars in order that the head of the cigars do not disintegrate in the smoker's mouth and thus they have the required chewability.

Another advantage of polysaccharides of the galacto-mannan class over other water soluble gums derived from cellulose is their inherent high viscosity and the subsequent good strength of films made from such gums particularly when the films are made from either Locust Bean Gum, Guar Gum or combinations thereof. Moreover, the fact that these galacto-mannans are food approved additives and, as such, find widespread application in food preparation, enhances their desirability even further as adhesives for tobacco sheet manufacture, since tobacco products are also designed for human consumption. This added aesthetic value lends, therefore, further weight to the preference of Locust Bean and Guar Gum for use in tobacco sheet manufacture.

However, in spite of the preference for employing these gums in tobacoo sheet manufacture, they are afflicted with certain characteristics which restrict their application in commercial use. For example, aqueous adhesive preparations made therefrom have a limited shelf-life. In addition, in plant practice is has been found that aqueous suspensions of Guar and Locust Bean Gums lose their viscosity and, consequently, their capability of forming strong films into which large amounts of finely ground tobacco may be incorporated. This loss in viscosity is caused by the action of naturally occurring enzymes which are integral parts of the plant seeds from which the gums are made. Although the degree of enzymatic activity of these naturally occurring gums can be regulated to a certain extent by the milling process employed, cleavage of the molecular chain, with resultant viscosity reduction of aqueous gum suspensions through inherent enzymatic

activity cannot be completely eliminated. Furthermore, deactivation of such gum native enzymes by chemical means is largely undesirable as this may introduce substances into tobacco sheet material in which they are used which are undesirable for aesthetic and/or health reasons.

The loss of viscosity and subsequent film forming capability as the result of enzymatic reactions generally limits the useful shelf-life under production plant conditions to from five to twenty hours. Occasionally, the useful shelf-life is further drastically reduced by microbial spoilage, thus giving rise to considerable material losses, as well as costly disruption of the continuous tobacco sheet manufacture.

A comparison of the viscosity profile of food grade Locust Bean Gum against that of a good technical grade Locust Bean Gum will illustrate the relationship between purity of gum to sol stability. Gum suspensions (aqueous) at 2 percent solids content were prepared in the laboratory. The solutions were kept at ambient upon temperature and viscosity determinations performed at periodic intervals on a Brookfield Viscometer, Model RVF with a No. 4 spindle at 70°F. – 75°F. and 20 rpm. The following results were recorded:

VISCOSITY PROFILE OF LOCUST BEAN SOLUTIONS

	AGING TIME/HOURS					
	0	5	20	24	28	48
GUM TYPE	BROOKFIELD VISC. CPS					
Grade: LBG 1/11 (Food Grade)	3800	5400	5200	2750	2400	340
Grade: Techn. LBG	1200	1500	1300	650	520	0

The date shows that the food grade gum produces sols of greater viscosity, being, therefore, less susceptible to enzymatic degradation than the gum prepared from a good technical grade of Locust Bean Gum.

Sol degradation by gum native enzyme reactions is not limited to Locust Bean Gum alone. Similar circumstances prevail for Guar Gum also. Even though the speed with which the enzymatic reactions take place in Guar Gum solutions is slower, degradation of viscosity occurs nonetheless, as shown by the following data.

The test method was the same as given for Locust Bean Gum and also involves sols of 2 percent solids content.

VISCOSITY PROFILE OF GUAR GUM SOLUTIONS

	AGING TIME/HOURS					
	0	5	20	24	48	72
GUM TYPE	VISCOSITY-CPS					
*Grade:Guar D/F	24000	35000		34000	17500	8200
*Grade:Guar 1005	2700	37000	32000	31400	16000	7000

*Food Grade Gum

The vulnerability of galacto-mannan gums to degradation is further increased when the adhesive preparations made from them come into intimate contact with tobacco which is enzymatically active and thus, capable of degrading aqueous suspensions of polysaccha-

rides. The extent to which the enzymatic activity of tobacco affects the viscosity of gum solutions can be shown by the result of the following investigation.

A laboratory method to determine the enzymatic effect of tobacco on the viscosity of aqueous gum suspensions consists of the following procedure.

One hundred grams of tobacco are steeped in tap water for one hour. The mother liquor is decanted and screened through a cheesecloth pad. One hundred grams of this tobacco extract is then added to an aliquot of a gum suspension, prepared either from Locust Bean Gum or Guar Gum. To the control portion of the gum solution 100gms. of tap water is added to maintain identical gum. concentration in the samples. The test solutions are placed in a water bath of 95°–98°F and viscosity measurements are carried out as set forth above at predetermined time intervals.

DEGRADATION OF LBG SOLUTIONS BY TOBACCO ENZYMES

BROOKFIELD VISCOSITY/CPS

Time/Min.	Control	Test
0	3480	3200
30	3650	1520
60	3230	860
90	2850	580
120	2580	410

The gum used was LBG 1/11 (food grade) and the tobacco was Broadleaf Lot No. C213 in this series of measurements.

The degradation of galacto-mannan gums by tobacco enzymes has been of concern to tobacco sheet manufacturers and known methods or operating procedures used to overcome this problem include pasteurization of aqueous tobacco suspensions prior to their contact with adhesive preparations or the elimination of enzymatic activity by means of heating tobacco in an atmosphere of formalin to deactivate tobacco enzymes. Among the obvious disadvantages of such tobacco treatment are loss of most of the desirable smoking quality by tobacco so treated and need for capital expenditures for tobacco treatment equipment as well as subsequent economic disadvantages, resulting from increased labor and handling costs.

There exists, therefore, a need to overcome the above mentioned disadvantages when using galacto-mannan gums in tobacco compositions.

SUMMARY

The present invention obviates the stated disadvantages by utilizing chemically substituted galacto-mannan gums which are more resistant to enzymatic degradation and which form excellent adhesives useful in the manufacture of tobacco compositions.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with the invention there is provided a composition of matter comprising tobacco and at least one gum selected from the group consisting of film-forming, polar solvent soluble ether, ester and mixed ether-ester substituted galacto-mannan gums which is made by a process comprising mixing the tobacco and gum with agitation in the presence of a polar solvent to form an homogeneous mixture which may then be converted to a film or sheet by casting and removing the solvent at elevated temperature.

Any derivatized galacto-mannan gum may be employed in a composition of the invention. However, the derivatives of naturally occuring galacto-mannan are preferred and of these derivatives, Locust Bean Gum and Guar Gum are the most preferred.

As mentioned hereinbefore, the galacto-mannan gums as employed in a composition of this invention are substituted, the substituents being derived from ethers and esters which may be present on the galacto-mannan material as either similar or dissimilar substituent groups, that is, where:

1. one of more of the available and replaceable hydroxyl groups of the sugar moiety is replaced by the same functional ether groups, such as methyl galacto-mannan, and the like;

2. more than one available and replaceable hydroxyl group of the sugar moiety is replaced by different functional ether groups, such as methyl hydroxypropyl galacto-mannan, ethyl hydroxypropyl galacto-mannan, and the like;

3. the same as 1 and 2 except that the groups introduced are ester groups; and

4. more than one available and replaceable hydroxyl group of the sugar moiety is replaced by different functional groups, such as ethers and esters to form for example, methyl acetyl galacto-mannan and the like.

Consequently, a wide variety of ethers and esters can be obtained as derivatives of the galacto-mannans. Compounds of this type are known, some being commercially available, and are prepared by procedures similar to those employed for producing like derivatives from cellulose.

Generally preferred in the practice of the present invention, however, are the lower alkyl types of these compounds, that is, those containing from 1 to 3 carbon atoms. Consequently, these materials generally form the hydroxyalkyl and alkylhydroxyalkyl substituted galacto-mannan gums with the lower alkyl types, that is those containing from 1 to 3 carbons in the alkyl groups substituted on Locust Bean Gum and Guar Gum being the most preferred in the practice of this invention. Specific examples of substituted gums of this type are hydroxypropyl Guar Gum, methylhydroxyethyl Locust Bean Gum, methyl-hydroxyethyl Guar Gum, propylhydroxymethyl Guar Gum and similar substituted galacto-mannan gums which are film-forming, polar solvent soluble galacto-mannan gums.

In a composition of the invention, the amount of tobacco and gum may vary within wide limits, being compatible in all proportions. As a practical matter, however, enough tobacco is employed so that the composition has an effective tobacco content. Consequently, the tobacco is employed generally in a range of from about 20 percent to 90 percent by weight, based on the total weight of the composition and preferably from about 65 percent to about 75 percent by weight.

As mentioned above a polar solvent is employed in preparing suspensions and/or slurries to make sheet material. A wide variety of polar solvents may be employed. These include water, the lower alcohols and esters. Examples of the lower alcohols are methyl alcohol, ethyl alcohol, propyl alcohol and the like as well as the lower esters, such as methyl acetate, ethyl acetate, propyl acetate and the like. Moreover, the total amount of tobacco and gum in polar solvent can vary

widely being compatible in all proportions with at least enough present to form a slurry or suspension. As a practical matter, however, slurries and/or suspensions containing from about 8 percent to 20 percent by weight of tobacco and gum, based on the total weight of the mixture, that is, tobacco, gum and solvent can be used, with the preferred solids content being in a range of from about 10 percent to 15 percent.

It is generally desirable, although not absolutely necessary, to employ a cross linking agent when water is a component of the system in a composition of the invention in amounts generally less than 0.5 percent by weight, to improve the moisture resistance of sheet material made therefrom. Any of the known cross linking agents, such as glyoxal for example may be used.

tobacco enzymes.

The sheet so obtained can be shredded or otherwise comminuted and used as cigar or cigarette filler or formed into plugs for pipe tobacco and is also useful as cigar wrapper exhibiting excellent wet strength.

The substituted gums discussed in detail hereinabove not only are excellent adhesives which are more resistant to enzymatic degradation but also exhibit greatly increased viscosity in aqueous suspensions.

Comparison of viscosity data obtained on 2 percent aqueous gum solutions clearly illustrates this fact, as well as the much improved sol stability of the modified gums against their underivatized gum counterparts.

Test procedures given above were adhered to and the following viscosity data recorded:

COMPARATIVE VISCOSITY MEASUREMENTS 2% GUM SOLS

	AGING TIME/HOURS							
Gum Type	0	5	20	24	28	44	48	120
Control Grade LBG 1/11	3800	5400	5200	2750	2400	1840	340	—
LBG Grade Tec	1200	1500	1300	650	520	332	0	—
HEM No. 1	10000	21000	25200	21400	25500	25200	23100	—
HEM No. 2	15800	24000	28000	28500	24200	23400	24000	—
HPG No. 492	22000	31400	33200	35000	34200	31600	29600	—
Control Guar D/F	24600	35000	—	34000	—	—	17500	*8200 (72Hr)

Legend:
LBG 1/11 — Food Grade Locust Bean Gum
LBG Tec — Techn. Grade LBG
HEM No. 1 — Hydroxyethyl Locust Bean Gum
HEM No. 2 — Hydroxyethyl Guar Gum
HPG No. 492 — Hydroxypropyl Guar Gum

The compositions of the invention are prepared by mixing the tobacco in finally divided form with the substituted gum in the presence of the solvent and agitating the mixture until homogeneity is obtained. Agitation can be carried out at widely varying temperature ranges from the freezing point to the boiling point of the mixture. As a practical matter, however, the mixture is generally agitated at a temperature in a range of about 70°F. to about 75°F. until homogeneity is attained. On the other hand, to form a product such as a sheet material, any conventional sheet forming process may be employed. Preferably the composition is then cast in the form of a film on a heated metal belt which travels through drying ovens at a temperature sufficient to drive off the solvent that is, about 150°F. to about 195°F. at a belt speed in a range of about 15 feet per minute to 200 feet per minute to obtain a sheet material containing tobacco and gum as adhesive.

It is preferred, however, that in making a composition of the invention the gum is dissolved in part of the solvent and the tobacco, in finely divided form, is then suspended in the remainder of the solvent. Subsequently the two mixtures are combined to form the final slurry. On the other hand, the tobacco and solvent can be mixed and the gum subsequently added thereto to make the final composition. These steps are recommended where the composition is to be held for an extended period of time before making a sheet material thereof, since it prevents any possible degradation by

The data show a nearly five-fold viscosity advantage with the substituted Locust Bean Gum over the natural Locust Bean Gum at maximum hydration stage after 20 hrs. This is, indeed, striking and this newly acquired property is further enhanced by the stability of the sols over a time period of at least 120 hrs.

Although the improved viscosity of the chemically substituted gums and their resistance to gum-native enzymatic degradation is of great value in tobacco sheet manufacture because of the newly acquired greater film strength and the longer shelf-life of adhesive preparations, it has also been found that these much desired properties are further supplemented by yet another property, namely, the greater resistance of the sols of substituted gums against tobacco enzymes. The results of laboratory tests illuminate the full extent of the novel effect of chemical substitution. For the determination of resistance of enzymatic degradation, a highly enzymatically active Broadleaf Tobacco, Lot No. C213, was used.

Gum suspensions at 2 percent solids were prepared. To 300 cc of these sols, there were added 25 gms of 80 mesh Broadleaf Tobacco, Lot No. C213. The constituents were mixed in a Warning blender. The test specimens were held in a water bath of 97° – 98°F. and the viscosity was measured at predetermined intervals in the same manner as set out above. The following results were obtained.

Time/Min.	LBG Control Blank	LBG & Tobacco C213	Substituted LBG & Tobacco C213
0	3480 CPS	2630 CPS	37000 CPS
30	3650 CPS	530 CPS	29800 CPS
60	3230 CPS	220 CPS	23600 CPS
90	2850 CPS	140 CPS	21000 CPS
120	2580 CPS	100 CPS	17400 CPS

The stability of the substituted galacto-mannan gum against degradation by tobacco enzymes, as clearly shown by this data, is, of course, of great value in tobacco sheet technology since it eliminates premature spoilage of the adhesive preparations which might be caused by contaminants in the form of airborne tobacco dust particles amongst others.

The present invention offers numerous advantages. For example, the film forming strength and the capacity of the gum film to bind large quantities of tobacco into a useful tobacco foil is related to the viscosity grade of the gums employed in tobacco sheet manufacture. Experience has shown that films made from higher viscosity grade gums exhibit superior strength characteristics than like films derived from lower viscosity grades. The improved film strength is further shifted in favor of the high viscosity grades since the gum films have to be loaded with comparatively large amounts of tobacco in tobacco sheet manufacture. The considerable viscosity increase of chemically modified Locust Bean Gum and the subsequently greatly improved film strength and loading capacity is of great value for the manufacture of tobacco sheet products, since it results in increased tobacco content in the sheet while maintaining the necessary strength as required for industrial application of tobacco sheet.

The increased viscosity and subsequent greater loading capacity yield yet another beneficial effect, characterized by the fact that the tobacco sheet made from the improved gums, exhibits greater elongation and the stress-strain curves of tobacco sheets become more like those of natural leaf. This improvement in the physical characteristics translates itself into better machinability of the tobacco sheet, resulting in the improved wrapping of complicated cigar shapes.

Another improvement in tobacco sheet technology arising from the use of chemically modified gums, as related to greater film strength, is the fact that the amount of cellulosic fibers may be reduced by as much as 40 percent without the loss of sheet strength. Cellulosic material in highly fibrilated form, is an essential part of tobacco sheet composition and functions mainly as a reinforcing media of the tobacco loaded gum films. Since the quantity of cellulose fiber contained in a cigar wrapper sheet can affect the stretch and pliability properties of wrapper sheet proportionately, the reduction of the fiber content is of profound value. Thus, the workability of the tobacco sheet can be greatly enhanced and improved taste and smoking pleasure results from the diminished cellulose content in the tobacco sheet.

In order to illustrate the invention more fully, the following examples are given. In the examples all parts and percents are by weight unless otherwise stated.

EXAMPLE I

Adhesives were prepared in the pilot plant by making aqueous solution of unsubstituted Locust Bean Gum and Hydroxyethyl Locust Bean Gum in identical amounts of 2 parts of gum in the solutions. The unsubstituted gum solution was used on the control. The control solution also contained 0.8 parts of highly refined cellulose and the test solution 0.6 parts and both solutions also contained 0.05 parts of glyoxal and 6.8 parts of finely divided tobacco. The tobacco, gum and water were mixed in a tank at ambient temperature (about 70°F to 75°F) to form a homogeneous composition containint 71 percent to 72 percent tobacco on a bone dry basis.

The compositions so formed were then cast as films on a stainless steel belt moving at a rate of 60 feet per minute. The belt was passed through drying ovens and was heated by impinging steam on the underside of the belt to bring the temperature to about 195°F to remove the water and tobacco sheets were formed. The sheets were suitable for cigar wrapper and had the physical properties set forth in the following table.

The breaking strength and wet braking strength were determined on a Scott Tester.

LEGEND	Run No. 16 Control Cigar Wrapper	Run No. 225 Test Cigar Wrapper
Gum Type:	Unsubstituted LNG	Hydroxyethyl LBG
Sheet Wgt:	2.99–3.08 g/ft²	3.00–3.06 g/ft²
Moisture:	32.4–32.7%	32.5–33.0%
Brkg. strength, Long	240–250 g/in.	430–450 g/in.
Brkg. strength, Transv.	120–125 g/in.	250–260 g/in.
Wet Brkg. strength, Long	110–120 g/in.	215–220 g/in.
Wet Brkg. strength, Transv.	80–85 g/in.	175–185 g/in.

Comparison of the breaking strength values exemplifies the weakness of the tobacco wrapper sheet made from natural Locust Bean Gum. In fact, its structural weakness did not allow for satisfactory cigar manufacture. Poor rolling of the bunch, accompanied by tearing of the wrapper at the tuck end of Perfecto shaped cigars, made this wrapper sheet unusable. By comparison, the cigar wrapper made from hydroxyethyl Locust Bean Gum worked well on the cigar machine. Torn tucks were absent and improved rolling of the bunch with less tuck and body wrinkles made for a well-formed cigar. The overall cigar appearance was judged superior by experts.

The cigars made with hydroxyethyl Locust Bean Gum were given to an expert smoking panel which reported on the improved smoking quality of the test cigars, commenting favorably on the noticeable reduction of a cellulosic burn aroma.

EXAMPLE 2

Example 1 was repeated except that in the adhesive for wrapper sheet production, the gum was Hydroxyethyl Guar Gum. The content of highly refined cellulose pulp in the adhesive preparation was again proportioned to be 0.6 parts of the total gum content and the tobacco content was 70 percent bone dry basis.

Wrapper sheet was made as in Example 1. The end product in the form of cigar wrapper tobacco sheet, was subjected to the normally performed physical testing, the results of which are tabulated below.

EXAMPLE 3

An adhesive for wrapper sheet production was prepared as in Example 1. The gum employed was Hydroxypropyl Guar Gum. The content of highly refined cellulose pulp in the adhesive preparation was again proportioned to be 0.6 parts of the total gum content and the tobacco content was 70 percent bone dry basis.

Wrapper sheet was made as set out in Example 1. The end product in the form of cigar wrapper tobacco sheet, was subjected to the normally performed physical testing, the results of which are tabulated below.

EXAMPLE 4

An adhesive composition for the manufacture of wrapper sheet was prepared as in Example 1. The gum employed was unsubstituted, normally used Food Grade Guar Gum. The content of cellulose fibers was adjusted to be in this case one part to one part of the total gum content and the tobacco content was 70 percent bond dry basis. The gum fiber ratio conforms most closely to a standard wrapper sheet formula, and serves therefore, as a control for the substituted Guar Gums used in Examples 2 and 3.

A tobacco sheet was formed as in Example 1 and subjected to physical testing, the results being tabulated in the following table:

Legend	Ex. 2 Run No. 227	Ex. 3 Run No. 221	Ex. 4 Control Run 104
Gum Type:	Hydroxyethyl Guar Gum	Hydroxypropyl Guar Gum	Guar Gum D/F Grade
Gum Content: (total)	1.0 part	1.0 part	1.0 part
Pulp Content	0.6 part	0.6 part	1.00 part
Sheet Wgt.	2.90–3.00 g/ft^2	2.90–3.00 g/ft^2	2.90–3.00 g/ft^2
Moisture	32.4–32.9%	32.8–33.9%	31.9–32.6%
Transv. Wet Brkg. Stg.	155–160 g/in.	128–140 g/in.	135–155 g/in.

The data show that the various tobacco wrapper sheets have comparative strength properties. The reduction of the pulp content form one part to 0.6 parts, which would normally cause a decrease in the wet strength values and thereby render the tobacco wrapper sheet unusable, is fully overcome by the greater film strength and loading capacity of the substituted galacto-mannan gums.

The cigar wrapper sheets were further subjected to an evaluation for their capability to wrap a complicated Perfecto shape cigar. In a side by side comparison of the wrappers on a cigar machine, the wrapper made according to Example 2 and the wrapper made according to Example 3, were preferred over the control, made according to Example 4.

The preferences manifested themselves in:

a. Smoother, wrinkle-free body rolling;

b. Proficient tuck formation, free of pockets;

c. Good head formation, free of shoulder wrinkles.

The overall appearance of the test cigars in comparison with the control cigars was that of a product of generally improved workmanship.

In analogy to Example 1, an expert smoking panel passed judgment on the smoking quality of the cigars. In each case, the reduction of cellulosic burn aroma was cited as an improvement of considerable magnitude, in addition to the more faultless appearance of cigars made with the substituted galacto-mannan gums.

The tobacco products of this invention may be cigar wrapper, cigar binder and cigar or cigarette filler, and generally, contain more than two-thirds by weight, of tobacco, and may contain four-fifths or more tobacco.

They are made by a method which combines tobacco with an adhesive preparation and the composition of the latter governs to be a considerable extent the end use of the final product. Whether one deals with cigar wrapper, cigar binder, cigar filler, or cigarette filler, the binding agent, as in this application, is indeed the basis of the sheet formation concept. The demonstrated improvements in the viscosity characteristics, sol stability and resistance to enzymatic degradation applies, therefore, to all tobacco products and is not restricted to any form or manner to the examples set forth.

The term "film-forming" as employed in this Specification and in the appended Claims is to be understood to mean a material, natural or synthetic, which will form a system with a polar solvent and which has the additional property of being loaded with another substance which it has the ability to bind into a continuous film when cast from the system formed with the solvent.

Regardless of when a natural tobacco or a tobacco substitute is employed in a composition of this invention, it is utilized in a comminuted or finely divided form prior to sheet formation. Moreover, a composition of the invention may include humectants, flavors and other additives, such as foaming agents and the like, if desirable.

It is evident from the above that a composition of this invention presents many advantages. Moreover, numerous variations of the invention may be made without departing from the spirit and scope thereof. Consequently, it is to be understood that the invention is not to be limited to the disclosed embodiment except as defined in the appended claims.

I claim:

1. A tobacco composition in the form of a continuous sheet consisting essentially of finely divided tobacco and gum as an adhesive, the proportion of tobacco based upon the weight of the composition ranging from about 20 to 90 percent by weight, the said gum being selected from the group consisting of film-forming polar solvent-soluble ether, ester and mixed etherester substituted galactomannan gums.

2. The tobacco sheet of claim **1,** wherein said gum is selected from the group consisting of hydroxyalkyl and alkylhydroxyalkyl substituted galactomannan gums.

3. The tobacco sheet of claim **1,** wherein said gum is selected from the group consisting of hydroxymethyl locust bean gum, hydroxyethyl locust bean gum, hydroxypropyl locust bean gum, ethylhydroxyethyl locust bean gum, methylhydroxyethyl locust bean gum, propylhydroxymethyl locust bean gum, hydroxymethyl guar gum, hydroxyethyl guar gum, and hydroxypropyl guar gum.

4. The tobacco sheet of claim **1,** wherein said gum is hydroxyethyl locust bean gum.

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Disclaimer

3,821,959.—*Otto K. Schmidt,* So. Windsor, Conn. RECONSTITUTED TOBACCO COMPOSITION. Patent dated July 2, 1974. Disclaimer filed Dec. 29, 1980, by the assignee, *AMF Incorporated.*

Hereby enters this disclaimer to claims 1 through 4, of said patent.

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