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TOBACCO PRODUCT AND PROCESS FOR MAKING SAME

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No Drawing. Application Aug. 20, 1965, Ser. No. 493,950, now Patent No. 3,364,935, which is a division of application Ser. No. 130,829, Aug. 11, 1961. Divided and this application Oct. 11, 1967, Ser. No. 674,463

6 Claims. (Cl. 131—140)

This is a divisional application of Ser. No. 493,950, filed Aug. 20, 1965, now Patent No. 3,364,935, which was a divisional application of Ser. No. 130,829, filed Aug. 11, 1961, now abandoned.

This invention relates to a new smoking product and the process for making it.

It is an object of the invention to form a tobacco paste or slurry which may be formed into an article suitable for smoking.

It is a further object of the invention to provide such a tobacco paste or slurry which is capable of being formed into a smoking article of predetermined shape and which because of its composition and mode of formation will have desired draw characteristics.

It is a further object of the invention to make such a slurry or paste adaptable for forming into a smoking article that will be uniform in construction, feel, appearance, composition, bulk density and burn.

Still another object of the invention is to provide a method of manufacture of a smoking article that will be adaptable to a uniform predetermined blending of various tobacco types as well as a uniform blending of desired ingredients such as casings, humectants, burn additives, ash additives and the like.

It is accordingly an object of the invention to provide a novel smoking article having unusual uniformity in both its physical characteristics and its organoleptic qualities.

A primary object is to provide a process for making reconstituted tobacco wherein a foaming agent, a foam stabilizer and tobacco particles are mixed to form a slurry which is then formed to a smoking article.

One of the objects of the invention is to provide a novel smoking article formed from a viscous, plastic tobacco paste or slurry which will form a relatively rigid porous structure suitable for wrapping in a conventional manner, or which may be finished by novel methods such as coating or otherwise sealing the surface pores.

It is an object of the invention to form a slurry or paste comprising tobacco particles mixed in a liquid vehicle with foaming and adhesive agents.

It is also an object of the invention to provide a process for manufacturing a novel smoking article which is readily adaptable to continuous processing advantageous to reducing the costs of a commercial operation.

It is an object of the invention to improve or enhance the natural qualities of tobacco by providing a means for increasing uniformity to a heretofore unheard of degree in blend, bulk density and draw.

It is a further object of the invention to improve the smoking qualities of tobacco by forming a smoking article having a continuous open cell filter matrix.

Accordingly, it is an object of the invention to produce a foamed tobacco slurry which when cast or otherwise formed into a desired shape and suitably treated will provide an open cellular structure. This produces a smoking article of improved mildness.

With the foregoing and other objects in view, the advantages of the novel smoking article and of the method

for forming same will appear from the following description.

The process as hereinafter more particularly described comprises foaming an adhesive, adding a foam stabilizer and refoaming, adding shredded or finely divided tobacco preferably with a blowing agent to form a stabilized foamed slurry. The slurry is then formed into a desired shape and dried to a preselected moisture content, ranging from 5% to 40%, typically 20% to 40%, and preferably about 35%. During the drying, the blowing agent or, in the absence of blowing agent, expanding gases reforms the foam to provide a skeletal structure in the final porous cohesive tobacco product.

While it is possible to initially foam the adhesive and refoam same after adding a foam stabilizer, the foaming operation may also be performed by foaming the stabilizer and then adding adhesive and refoaming the mixture, or a mix of adhesive and stabilizer may be foamed.

The preferred method of this invention comprises, whipping a mixture of an adhesive foaming agent, a foam stabilizer and tobacco particles into a foam slurry, forming said slurry into a predetermined shape and drying said shaped slurry to a preselected moisture content to form a stable, relatively porous mass.

In adding the tobacco particles to the foamed adhesive, tobacco shreds are preferably added at first, followed by tobacco dust, although either shreds or dust may be used. Otherwise, when the preferred method of foaming the adhesive is employed, the tobacco particles may be admixed with the foam stabilizer and foamed in situ.

In accordance with the invention the slurry or paste foam may be made with water or a mixture of water and organic liquids. Satisfactory results have been obtained from the water paste system. Satisfactory foam agents include hydrophilic gums derived from natural or synthetic sources. The naturally occurring hydrophilic gums would include the broad carbohydrate and protein classes. The former class comprises gums from animals, plants and microbial sources. The animal sources would include glycogen, etc. The plant gums and derivatives would include cellulose ethers, cellulose esters, starches, starch ethers, starch esters, amylose, amylopectin and their ester and ether derivatives, locust bean gum, guar gum, gum arabic, and related seed gums and plant exudate gums. The plant gums also include marine plant gums such as the algins, carrageenins, laminarins, agar. The microbial gums include the dextrans, phosphomannans such as the USDA B-1459, B-1428, and the glucoronic acid containing microbial gums such as the USDA Y-1409 gums. The synthetic hydrophicolloids, which have proved satisfactory, are polyvinyl alcohol, polyoxyethylene and polyacrylamide.

In a preferred embodiment of the invention we have found that the methylhydroxypropyl celluloses as a class give excellent results. We have further found that excellent results are produced with dispersible proteins including animal proteins such as hydrolyzed keratins, egg albumin, and vegetable proteins such as gluten, zein, soy and cotton seed whipping proteins, and also microbial proteins such as torula yeastt proteins.

Following is an example of the manufacture of a cigar or cigar-like smoking product in accordance with the invention.

Example I

A mixture consisting of 4 grams of Methocel,[1] and 200 milliliters of water was beaten into a foam at 25° C. with a household type mixer for four minutes. A solution consisting of 0.9 gram of Alipal CO-436 [2] in 3 milliliters of water was beaten into the foam for four minutes at a high speed setting. A tobacco mixture consisting of 27 grams of powdered tobacco (—80 U.S. standard mesh)

63 grams of shredded tobacco (average dimension 0.06" by 0.75") was folded into the stabilized foam to form a tobacco paste foam. The tobacco paste foam was tempered by allowing it to stand at a room temperature for fifteen minutes. The tobacco paste-foam was poured into a polystyrene mold, pre-coated with a silicone type release agent. The dimensions of the mold were I.D. 5/8", O.D. 1¼", length 6". The foam paste was heated for 1.5 minutes in a Raytheon Radar Range using 800 watts power and dried to a 30% moisture level. The formed tobacco was conditioned overnight at 60% RH, 70° F. The formed tobacco core was wrapped with a cigar wrapper leaf. The density of the finished article was 0.35 and had a pressure drop of 0.9 inch of water.

It should be here noted that commercial cigars have a density in the generally acceptable range of 0.2 to 0.6 and a pressure drop in the generally acceptable range of 0.4 to 2.5 inches of water. The pressure drop referred to relates to a known capacity commonly used in the industry drawing a maximum of 8 inches of water.

Example 2

Six grams of commercial baking powder were added to the mixture of Example 1 and the foam-paste was dried in a hot air oven at 63° C. to a 35% moisture content.

Example 3

Example 1 was repeated except that 1 gram of Methocel was treated with 0.2 gram Igepal CO-630 [3] instead of Alipal CO436. The formed paste-foam was dried for 1½ minutes to a 35% moisture content. The pressure drop was 0.5 inch of water.

Example 4

3½ grams of Methocel, 15,000 cps., and 0.5 gram of locust bean gum were mixed with a household type mixer into 180 ml. of water at 25° C. for two minutes. A premix containing 6 grams of commercial baking powder and 72 grams of powdered tobacco (—80 mesh) and 18 grams of shredded tobacco was blended into the foam. The paste was placed in cylindrical aluminum molds, cut lengthwise (I.D. 5/8", O.D. 1¼", length 6"), which were precoated with a lecithin mold-release agent. The molds were joined together with dowels and placed in a hot air oven for 1 hour at 63° C. The drying was completed at 63° C. in vacuo. In order to facilitate drying, the molds have small vent holes drilled through their walls but at a high angle to the axis of the mold to prevent expansion of the mix passing out the vent holes. Additionally, when the mold halves were doweled together the edges of the molds did not meet but were kept a small distance apart, on the order of 1/32". This facilitated escape of liquid vapors. The density of these tobacco cores was 0.39. The cores were in some instances wrapped with natural wrapper leaf without a binder layer and in other instances wrapped with manufactured tobacco wrapper sheet also without the necessity of a binder layer. The result was a cigar having the appearance, bulk density, aroma, drag and burning quality comparable to ordinary good commercial cigars.

Referring to the above examples, it will be noted that Example 1 employs an anionic foaming agent and uses no blowing agent. Example 2 has a blowing agent and is dried in hot air which provides time for the blowing agent to operate. Example 3 has no blowing agent but employs a non-ionic foam stabilizer. Example 4 has no stabilizer but a blowing agent operating in a hot air drier.

Additionally, in the first and third examples drying was accomplished in 1 to 1½ minutes by microwave drying. Examples 2 and 4 were accomplished by ordinary heat drying for a longer period of time. The blowing agent operates during the heat period to sustain and/or reconstitute the foam.

At the time of folding in the tobacco the foam is substantially diminished. We have found that with the more rapid microwave drying it is preferable to have a foam stabilizer to reduce this. In the preferred embodiment, the foamed mix includes the foamed stabilizer in substantially the proportions given above in order to achieve the aforesaid result.

In accordance with the invention, the hydrophilic colloid serves the dual function of providing a foam-like matrix as well as serving as an adhesive for bonding the tobacco particles.

A blowing or gassing agent is useful in reconstituting the foam that may have collapsed during the folding in process. The usefulness of such an agent will, of course, depend on the foam setting or drying method employed. Where a slow heat method is employed, the agent has more time in which to work and is accordingly more effective. In rapid heat or rapid vacuum drying the effective action of the agent may be nil. In such case the use of a good foam stabilizer is desirable. The stabilizing agent effects a beneficial action increasing the stability and the overrun of the foam. Foam stabilizing agents are chosen from the general class of surfactants or detergents. A wide chemical range of surfactants perform satisfactorily. These include ionic and nonionic types. For example, the salts of the sulfate esters of the alkylphenoxypolyoxethene ethanols, the parent alcohols such as nonylphenoxypolyoxyethylene ethanol, the salts of sulfate compounds of the type N-methyl-N-oleoyl taurine, sorbitan esters such as sorbitan monostearate (Span 60) or the monooleate (Span 80), ethylene oxide-sorbital condensation products, and lecithins and lecithin derivatives.

Since the stabilizing agent is also, in fact, a foaming agent, and since the foaming agent is, in fact, a stabilizing agent, their roles can be reversed in certain formulas so long as adhesive is present. That is to say, a foam prepared from a hydrophilic gum may be stabilized with a different hydrophilic gum or a surfactant, but a surfactant foam must be stabilized with a hydrophilic gum for its adhesive properties.

Using the formulation of Example 2, the tobacco paste foam was extruded through an orifice to produce a continuous rod which then was dried. The rods were then severed into desired cigar lengths which were then wrapped in natural or manufactured tobacco wrapper sheet. In extruding the core as a continuous rod a varying orifice may be employed to provide a predetermined shape to the formed article.

Considerable variations within the spirit of the invention is possible. The above examples are thought sufficient to give one skilled in the art an understanding of the invention.

In addition to the unique possibilities for uniform blending, the invention allows the unusually uniform addition of burn accelerators or inhibitors and/or ash additives. The known burn accelerators such as nitrate salts, or inhibitors such as halide salts may be advantageously incorporated during the mixing operation to obtain uniquely uniform distribution throughout the smoking mass. The same is true of the known ash additives which include titanium dioxide or diatomaceous earths. In fact, the invention is adapted to the uniform addition of any desired

[1] Methocel is the proprietary trade name for a methylhydroxypropyl cellulose containing 20–80% methyl and 2–15% hydroxypropyl groups. It has a viscosity of 4000 cps. (measured on a 2% solution at 20° centigrade). Although the examples are not specifically set forth here, good results have been obtained with viscosities ranging from 100 cps. to 15,000 cps. and higher viscosities have been employed, although it was often necessary to go to an organic solvent system rather than an aqueous system because of the low solubility of the methocels of higher viscosity.

[2] Alipal CO-436 is the proprietary trade name for an anionic surfactant made of the ammonium salt of sulphate ester of alkylphenoxy (ethyleneoxy) ethanol (58% active ingredients).

[3] Igepal CO-630 is a proprietary trade name for a nonionic surfactant — nonylphenoxypolyoxyethylene ethanol (100% active ingredients).

additive such as flavoring agents, humectants, biocides and the like.

The above examples and disclosure relate to a novel article of manufacture. Usually, the article is formed or finished into a cigar shape or wrapped in a cigar wrapper, natural or synthetic. However, the article could be shaped and, if desired, wrapped as a cigarette or as a pipe charge. Several such samples were made and proved quite satisfactory. The invention thus may be employed to form known types of smoking articles as well as completely novel types, as for example the coated or "unwrapped" article, to be described below.

The tobacco product of the present invention may be formed in any desired shape, for example, as pipe plugs or fillers, in addition to rod-like cigar or cigarette forms. Moreover, the paste or slurry foam may also be cast in continuous sheets in thicknesses approximating the diameters of cigars or cigarettes, then dried and cut into rod-like lengths of cigarettes or cigars.

The shaped smoking article, particularly a cigar, or cigarette shape, may be covered with a relatively non-porous covering or envelope as, for example, a web of combustible material compatible with smoking, such as cigarette paper, natural tobacco leaf wrapper and reconstituted tobacco web.

The product formed by the present invention may use a coating composition in the form of dispersions with which the shaped article, such as a cigar or cigarette core, may be coated as by dipping or spraying. Upon drying, the residue of the coating forms a relatively non-porous covering similar to wrapper material.

The tobacco dispersions employed in forming tobacco sheets such as disclosed in Letters Patent No. 2,769,734 to D. Bandel and Letters Patent Nos. 2,887,414 and 2,988,445 to S. Rosenberg et al., form ideal coating compositions. The following two examples have proved satisfactory.

Example 5

Amylose acetate (D.S. 2.6–2.9)	grams	2.6
Havana seed tobacco (ball milled)	do	10.6
Chloroform	ml	80.0
Methylene chloride	ml	20.0

Example 6

Cellolose triacetate	grams	2.6
Havana seed tobacco (ball milled)	do	10.6
Chloroform	ml	80.0
Methylene chloride	ml	20.0

When a tobacco product of the invention is coated with a coating composition and the vehicle permitted to evaporate, there remains a relatively non-porous residue of tobacco in a film or matrix of the adhesive equivalent, if not superior, to the wrapper materials mentioned previously.

The smoking articles of the present invention may be cast, group or continuously molded, extruded, etc. For example, casting and drying may be accomplished in accordance with the teachings in Geitz et al. Patent No. 3,145,716 and molding and drying in accordance with the teachings in the aforementioned parent application Ser. No. 493,950.

The term "tobacco" as used herein includes tobacco, substitutes therefor, tobacco-like substances and reconstituted tobacco.

The invention is not to be restricted to the particular embodiments described and exemplified, as modifications thereof may be made which fall within the scope of the appended claims.

We claim:

1. The process of manufacturing a smoking product comprising the steps of mixing a foaming agent, a foam stabilizer and tobacco particles, at least one element of said mixture being adhesive, creating a tobacco foam slurry from said mixture, forming said slurry into a predetermined shape and drying said shaped slurry to be a preselected moisture content in which said tobacco particles are spaced from each other by a gaseous media to form a stable foamed mass.

2. The process according to claim 1 wherein the foaming agent is an adhesive chosen from natural or synthetic hydrophilic gums in which the natural gums are selected from carbohydrate classes including the animal gums such as glycogen, plant gums and their derivatives, such as, cellulose ethers, cellulose esters, starches, starch ethers, starch esters, amylose, amylosepectin and their ester and ether derivatives, locust bean gum, guar gum, gum arabic and related seed gums and plant exudate gums, marine plant gums, such as, algins, carrageenins, laminarins and agar, and microbial gums such as the dextrans, phosphomannans such as the USDA B–1459 and B–1428, and the gluconic acid microbial containing gums such as the USDA Y–1409 gums, and protein classes including water dispersible proteins such as animal proteins such as hydrolized keratins, egg albumin, and vegetable proteins such as gluten and the synthetic gums are selected from the group consisting of polyvinyl alcohol, polyoxyethylene and polyacrylamide.

3. The process according to claim 1 in which the foam stabilizing agent is selected from the class of ionic and non-ionic surfactants consisting of the salts of the sulfate esters of the alkylphenoxypolyoxyethylene ethanol, the salts of sulfate compounds of the type N-methyl-N-oleoyl taurine, sorbitan esters such as sorbitan monostearate (Span 60) or the monooleate (Span 80), ethylene oxide-sorbital condensation products, and lecithins and lecithin derivatives.

4. The process according to claim 1 including the additional step of admixing with the slurry a blowing agent.

5. The process according to claim 4 wherein baking powder is used as the blowing agent.

6. The product made by the process according to claim 1.

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