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(54) Forming reconstituted tabacco.

(57) A sheet material is formed from a slurry comprising tobacco, gum and water by forming the slurry into a paste web on a smooth surface such as stainless steel, drying the paste web from its exposed surface, and removing the web from the support surface prior to complete drying of the portion of the web in contact with the support surface, thus enhancing sheet removal without breakage caused by adherence to the surface.

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FORMING RECONSTITUTED TOBACCO

TECHNICAL FIELD

This invention relates to a method for forming and drying a reconstituted tobacco sheet material.

BACKGROUND ART

In the manufacture of tobacco products, particularly cigarettes, a considerable amount of tobacco scraps are produced. In view of the high cost of the tobacco, it has been found desirable to process this scrap material into a usable condition commonly known as reconstituted tobacco. In the process for conditioning this scrap tobacco into reconstituted or reusable form, the scrap material is generally slurried or chemically treated by different means to form sheets and then cutting the sheet material to produce shreds resembling naturally cut tobacco. This material is then usable alone or along with natural tobacco in producing cigarettes.

There are basically two commonly known, commercially employed, processes for preparing reconstituted tobacco. One employs a slurry of finely divided tobacco parts and a binder which is cast onto a steel band or drum and then dried. After drying, the sheet is shredded

and used as a cigarette filler. The second commonly known process employs papermaking techniques and does not require the addition of a binder in order to form a reconstituted sheet of satisfactory strength.

Drum drying has been proposed as a method for producing reconstituted tobacco sheet material, e.g., U. S. Patent No. 3,213,858; however, the dry sheet was difficult to remove from the drum unless the dry sheet was remoistened prior to doctoring.

BRIEF SUMMARY OF THE INVENTION

The present invention provides an improved method for forming a sheet material from a slurry of tobacco, gum, and water.

It is a principal object of this invention to provide an efficient method for forming a sheet of smoking material on a drum dryer or the like.

It is a further object of this invention to provide a method for forming a sheet of reconstituted tobacco smoking material on a smooth surface and drying it under controlled conditions so that it may be readily removed from the smooth surface.

DETAILED DESCRIPTION OF THE INVENTION

Numerous processes have been described for manufacturing of reconstituted tobacco sheet material. The present invention is an improvement on processes which employ a slurry of finely divided tobacco parts and a binder which is cast onto a steel band or drum and then dried. The dry sheet is removed from the band or drum by a doctor blade and is then shredded for use as a cigarette filler. In order to minimize adherence of the sheet to the smooth surface and consequent damage to the sheet by the doctor blade, some prior art processes employ a release agent on the surface prior to casting of

the sheet and others remoisten the dry sheet prior to doctoring. We have discovered that the sheet may be easily doctored from the surface without the need for employing a release agent or remoistening by drying the cast sheet from its exposed surface under controlled conditions so that the surface of the sheet in contact with the smooth surface is not completely dry at the time it reaches the doctor blade for removal from the smooth surface.

In carrying out this invention, the tobacco materials, such as stems, scrap, pyrolysed tobacco parts, etc., may be reduced to particulate form using commercially available apparatus such as a DM-3C SWECO Vibro-Energy Dry Grind Mill available from SWECO, Inc. of Los Angeles, California. The SWECO Mill is suitable for milling the dry tobacco material. It is preferred, however, that the material be placed in water and milled to the desired particle size using a suitable mill such as the Model 504 Morehouse Mill available from Morehouse-Cowles, Inc. of Los Angeles, California.

The milled tobacco plant materials are converted into a form suitable for use in the manufacture of smoking products by combining the materials with binders or adhesives and sufficient water to produce a thick paste that can be shaped into a sheet and dried. The term "tobacco" as used herein is meant to include tobacco leaf, tobacco stems, tobacco dust, and other tobacco plant parts as well as any such materials which have been treated in various ways, such as by heating to produce pyrolysis of the tobacco plant parts. It is important that the proper adhesive agents be used in appropriate amounts so that the resulting product will have acceptable characteristics. For example, the sheet material must have sufficient tensile strength to withstand further processing in the manufacture of smoking products

therefrom, it must have satisfactory burning properties and it must not impart objectionable flavor and aroma to the smoke produced during smoking.

The adhesive agents useful in connection with this invention are water-soluble polysaccharide gums of either natural or synthetic origin. The gums of synthetic origin are intended to include natural gums which have been chemically modified to alter solubility and/or adhesive properties. Adhesive or binding agents which may be used include gum arabic, gum ghatti, gum karaya, gum tragacanth, locust bean gum, guar gum, pectins, algins, carrageenans, agar, arabinogalactan, dextrans, xanthans, starches, starch ethers, starch esters, cellulose esters, and cellulose ethers.

The milled tobacco plant materials are combined with one or more of the water-soluble polysaccharide gums in weight proportions of 4:1 to 9:1 respectively, and sufficient water to form a thick paste. The consistency of the paste should be such that it can be extruded or otherwise formed into a sheet for drying. The amount of water required to form a paste of proper consistency will depend to some extent on the polysaccharide gum being used but two to three parts of water per part of tobacco material (dry weight basis) are generally sufficient to produce a satisfactory paste. Extrusion or sheet forming can be effected by various techniques known to those skilled in the art. The paste sheet, preferably less than about one millimeter in thickness, is formed on a smooth surface such as stainless steel for drying. The drying is effected from the exposed surface of the formed sheet by radiant heat such as that from electrical resistance heaters, by a combination of radiant and convective heat such as that obtained from gas burners located near the surface of the sheet, or by convective heat alone. Preferably, the heat source is fixed in position and the

smooth surface, such as a stainless steel belt or cylinder, is passed beneath the heaters. The amount of heat from the heaters and the speed of the smooth surface past the heaters are controlled such that the sheet material passes from the heating zone when most of the sheet is dry but the portion of the sheet in contact with the smooth surface is still somewhat moist so that it is easily removed from the smooth surface by a doctor blade.

EXAMPLE

Tobacco materials, pyrolyzed by heating for 2-5 hours at about 650° C. in a nitrogen atmosphere, were milled in an aqueous medium to obtain particle sizes of 100 microns or less. One part by weight of the milled material was combined with two parts by weight of water and the resulting mixture was agitated using a food-type mixer manufactured by Hobart Corporation of Troy, Ohio, for a sufficient period of time to reduce the larger pieces to a size that could be fed into the inlet of a Model 504 Morehouse Mill obtained from Morehouse-Cowles, Inc. of Los Angeles, California. Grinding of the water-suspended material in the Morehouse Mill resulted in an aqueous slurry of finely divided tobacco material having a maximum particle size of less than 100 microns.

This aqueous slurry of finely divided tobacco material was combined with varous polysaccharide gums, humectant (optional) and additional water (if necessary). The resulting mixture was thoroughly blended using a Hobart HCM-450 cutter/mixer provided with a cut/mix attachment and mixing baffle to give a uniform thick paste consistency. A continuous ribbon of the thick paste was deposited on the smooth surface of a metal cylinder having a width of approximately 10 centimeters and a diameter of about 92 centimeters. The ribbon of paste was spread out into a thin sheet less than about 1

millimeter thick by a flexible metal strip maintained at a fixed distance from the surface of the metal cylinder. The metal cylinder was provided with means for rotating it at approximately 22 revolutions per hour. Surrounding about one-half of the circumference of the cylinder was a metal housing and associated infrared gas heater manufactured by Marsden Manufacturing Co., Delran, New Jersey, which directed radiant heat and hot gaseous fluid onto the thin sheet of paste. The gaseous fluid moved in a direction that was generally counter-current to the direction of movement of the cylinder surface and the maximum temperature of the gaseous fluid was about 690° C. At a point following exit of the sheet from the metal housing and before the point at which paste was deposited onto the metal cylinder was a doctor blade which easily removed the mostly dried sheet of material from the surface of the cylinder. The moisture content of the sheet was approximately 20 to 30% by weight and the thickness of the sheet was between 0.3 and 0.6 millimeters at the time it was removed from the smooth metal surface. The sheet was then cut into pieces which approximated the size of tobacco strips produced by conventional tobacco stemming procedures, the sheets were then shredded and the resulting shreds utilized in the manufacture of cigarettes.

Claims:

1. A method of forming a sheet material from a slurry comprising tobacco, gum and water comprising the steps of:

(a) forming said slurry into a paste web on a smooth support surface,

(b) drying the paste web from its exposed surface to progressively dry the web in the direction from the exposed surface toward the support surface, and

(c) removing the web from the support surface prior to complete drying of the portion of the web in contact with the support surface.

2. The method of Claim 1 wherein said drying is effected by radiant heat.

3. The method of Claim 2 wherein said radiant heat is produced by a gas burner.

4. The method of Claim 2 wherein said radiant heat is produced by an electrical resistance heater.