

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in Production of Reconstituted Tobacco.

We, THE AMERICAN TOBACCO COMPANY, a corporation organized and existing under the laws of the State of New Jersey, United States of America, of 150 East 42nd Street, New York, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to the production of reconstituted tobacco sheet and, more particularly, to an improved method which produces reconstituted tobacco of superior flavor and quality.

It has long been known that reconstituted tobacco can be produced from tobacco plant components by grinding these components, extracting their water-soluble constituents by leaching with water, separating the aqueous phase from the fibrous phase, converting the fibrous phase into a thin sheet either with or without the further addition of extraneous cellulosic fiber to increase the strength of the sheet, concentrating the aqueous phase, thereafter applying the concentrated aqueous phase to the thin sheet of the fibrous phase, and drying the resulting sheet product. In spite of the antiquity of this procedure, it has not produced a wholly desirable product because the flavor of the reconstituted sheet was not equal to the quality of the flavor of the starting material. Numerous variations in grinding, leaching and sheet-forming techniques have failed to completely free the reconstituted sheet from its "off" taste.

We have now discovered that the flavor of reconstituted tobacco sheet produced by the afore-described method can be raised to virtually the same quality level as the starting material by imposing a solids-

separation operation upon the aqueous phase before it is concentrated and applied to the thin sheet of fibrous phase components. We have found that the water-insoluble solids present in the aqueous phase resulting from separation of the fibrous phase from the product of the leaching operation, and prior to its concentration are the components that impart an "off" taste to the tobacco sheet when the concentrated aqueous phase is returned to the sheet of fibrous phase components of the tobacco. As in other matters concerning taste, the amount of these solids which is permitted to remain in the aqueous phase without tasting objectionable is variable. Removal of about one-third of these solids results in an improved flavor to those with sensitive taste, but in general we prefer to remove at least about 50% of the water-insoluble solids from the aqueous phase for a significant improvement in the flavor of the final product.

The separation step of the invention is advantageously carried out in any conventional centrifuge. Centrifuges are readily capable of separating from the tobacco extract aqueous phase at least about 75%, and generally at least about 90%, of its water-insoluble solids content. For this reason, we presently prefer to use a centrifuge for the separation operation because the slimy characteristic of these solids complicates their separation by other conventional means such as decantation, bed settling or filtration. However any separating device or procedure can be used in practicing our invention where it can remove from the aqueous liquor a significant amount of the solids constituents that appear to have contributed in the past to the "off" taste of such reconstituted tobacco sheet.

[Price 4s. 6d.]

The identity of the thus-separated solids has not been ascertained. In addition to particles of sand or grit and fine particles of the fibrous constituents of the tobacco, these solids appear to contain a denatured proteinaceous material and products of hydrolysis of some water-soluble constituents of the tobacco which approach a colloidal size. This material, when burned, produces a typical protein or burning fat aroma which is objectionable in a smoking product. The sludge, on hydrolysis with hydrochloric acid, yields ten to twelve amino acids. It is presently believed that the sludge also contains carbohydrate compounds, pentoses, galacturonic acids, polyphenols, rutin and the like. Regardless of the uncertainty of the composition of the centrifugally separated solids of the aqueous tobacco extract, it has been clearly established that these separated solids contain the constituent or constituents which have heretofore contributed to the inferior quality of the reconstituted sheet.

We have also observed that the concentrated aqueous tobacco extract phase after removal of these water-insoluble constituents has a greater ability to penetrate the sheet of fibrous components than when the liquor is not freed of them. The increased penetration of the liquor into the sheet makes possible in the final sheet product an increase in its content of the dominant flavoring constituents of the tobacco starting materials. Without an increase in such penetration, an increase in liquor content of the sheet product increases the difficulty in producing a sheet without a tacky surface and thus impairs the handling characteristic of the sheet before and after its completion.

The improvement in flavor of the reconstituted tobacco sheet obtained by practice of the invention is particularly important where the sheet is used as a cigar wrapper. It is known that the burning of a cigarette or cigar is not uniform throughout its cross-section and that the dominant flavor of the smoke is derived from that portion near the periphery. This means that the flavor of a cigar wrapper is significant in the flavor of the cigar smoke and, of course, in the contact flavor of the mouth end of the cigar. The removal of off-taste ingredients in the tobacco liquor component of the reconstituted sheet pursuant to the invention is therefore an important advance in the art.

The following is a representative example of the practice of the invention:

Stems and leaf components of tobacco were passed through an ordering drum to soften these components and thereby prevent excess dust losses during subsequent breaking operation, and the softened components were then broken to the desired

size by means of a hammer mill. The broken stems and leaf components were blended with fine tobacco particles in a ratio of about 3 to 1, and the resulting blend of tobacco particles was water extracted in a three-stage counter-current extraction system to produce a dilute aqueous extract containing 6% to 11% solids and an extracted tobacco-pulp stock.

After separation of the dilute extract from the extracted tobacco stock, the extract was passed through a centrifuge where about 90% by weight of its water-insoluble constituents including fine particles of sand and tobacco and a sludge material which approached colloidal size were removed. The dilute extract was concentrated in a thin film evaporator operating under a vacuum of about 27 inches of mercury to produce a concentrated extract containing between 44% to 50% by weight of water-soluble solids.

The extracted tobacco stock was mixed with fresh water to obtain a sheet pulp of approximately 0.7% consistency suitable for fabrication into a paper-like sheet on a four-drinier paper making machine. A paper web was formed on the fourdrinier wire, and after drying the web to reduce its moisture content to approximately 35% to 40% the sheet was re-combined with the concentrated extract so that the resulting product contained approximately 50% water extractable solids calculated on the dry basis of the final product, thus corresponding to the amount of water-soluble solids present in the tobaccos that entered the system. The wet impregnated sheet was then passed through a tunnel dryer until its moisture content was reduced to the level appropriate for the desired use of the final product. The resulting product was a reconstituted tobacco sheet of superior quality substantially free of the "off" taste which previously has characterized such a product.

WHAT WE CLAIM IS:

1. In the method of making reconstituted tobacco sheet by grinding tobacco plant components, extracting water-soluble constituents of the ground tobacco components by leaching with water, separating the fibrous phase from the product of the leaching operation consisting essentially of an aqueous phase, converting the fibrous phase into a thin sheet, concentrating the aqueous phase, thereafter applying the concentrated residual aqueous phase to the thin sheet of the fibrous phase and drying the resulting sheet product, the improvement which comprises separating water-insoluble solids from the residual aqueous phase before concentrating and applying the resulting aqueous phase to the fibrous phase sheet.

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2. The method according to claim 1 in which at least about 50% by weight of its water insoluble solids content is removed from the separated aqueous phase before concentrating it.
3. The method according to claim 1 in which at least about 90% by weight of its water-insoluble solids content is removed from the separated aqueous phase before concentrating it.
4. The method according to claim 1 in which the separated aqueous phase is subjected to centrifuging of sufficient force to separate its water-insoluble solids.
5. The method according to any of the preceding claims in which the water-soluble constituents of the ground tobacco components are extracted with cold water.

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