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Stungis et al.

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[54] **SEPARATION OF TOBACCO FINES FROM SAND**

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[52] **U.S. Cl.** ..... **209/4,** 131/110, 131/121, 131/140 P, 209/11

[51] **Int. Cl.** **B03b 1/02**

[58] **Field of Search** ..... 209/3, 4, 7, 133 T, 233, 209/235, 11; 131/121, 110, 140 P

[56] **References Cited**

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[57] **ABSTRACT**

Tobacco fines, mixed with sand, are puffed employing microwave energy to a size at least sufficient to be used directly in cigarette manufacture and are then separated from the sand for use in tobacco products. Other botanicals may be similarly treated.

5 Claims, No Drawings

SEPARATION OF TOBACCO FINES FROM SAND

BACKGROUND OF THE INVENTION

The use of microwave energy for puffing tobacco products has previously been disclosed. For example, U.S. Pat. Nos. 3,409,022 and 3,556,112 show such processes. However, the patents relate to specific conditions for puffing particular parts of the tobacco plant, generally stems. Additionally, the patents generally disclose a particular placement for these portions of the tobacco plant in order to accomplish this puffing. The patents do not disclose the puffing of tobacco, or a component of the tobacco plant, in combination with impurities so as to allow separation of the tobacco from the impurity.

A method for liquid separation of tobacco fines from sand, inter alia, is disclosed and claimed in copending application Ser. No. 838,158, filed July 1, 1969, now U.S. Pat. No. 3,608,717, in the name of David G. Strubel and Nicholas E. Ludwig, assigned to the same assignee as the present application. Unlike the tobacco separated from the fines according to the copending application, the fines that are recovered according to the present invention are considerably expanded and are free from water or other liquids.

SUMMARY OF THE INVENTION

In accordance with the present invention a mixture of tobacco fines and sand, or other non-expandable, non-tobacco, dry material, is subjected to microwave energy while the tobacco is maintained at a moisture level of between 5 and 75 percent. Preferably, the water content of the tobacco at the time that the mixture is subjected to microwave energy is approximately 40 percent by weight of the tobacco. As a result of the absorption of microwave energy, the tobacco fines are expanded in size and a majority of these fines are expanded to a size to allow direct use in cigarette manufacture. In many cases the particles are expanded to a size sufficient to be retained on a 40 mesh screen, and, frequently on a 30 mesh screen.

After puffing of the tobacco fines, as indicated, they may be easily separated from the sand and any tobacco fines which have not puffed, or not puffed to a sufficient size, by any mechanical means of separation, such as by sieving. In general, the sand particles are retained on a 200 mesh screen, but would easily pass through a 30 or 40 mesh screen. The thus recovered tobacco fines can be used directly in the manufacture of tobacco products, such as cigarettes.

The process is similarly applicable to botanical materials other than tobacco.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with the present invention, tobacco fines mixed with sand and other solid, non-tobacco and non-puffable material, is treated to obtain a moisture content of from 5 to 75 percent by weight. Such methods of treatment are well known in the art and any of these well known methods can be employed. It has been found that maximum puffing of the tobacco fines or other botanicals, with microwave energy is obtained when the fines have a moisture content of approximately 40 percent by weight of the tobacco.

The power level for the microwave energy can vary widely and is generally between about 2 and 5 kilowatts, or even higher, such as about 50 kilowatts. For fastest puffing, a slotted wave guide is employed so as to improve the energy transfer efficiency. The frequencies at which the microwave energy is generated are those generally used for industrial, scientific and medical purposes. Frequently, the frequency is 915 or 2,450 megacycles.

A convenient method of puffing the fines is to place a thin layer of the mixture on a moving belt which, at one point in its travel, passes in juxtaposition to the microwave energy field. The depth of the mixed fines and sand on such a belt is generally maintained below 50 millimeters, and more preferably below about 30 millimeters. The material may be conveyed by any other suitable means, such as a moving air stream.

The depth of the mixed fines and sand on the belt, the speed of the belt, the moisture content, and the power level are all interdependent. For example, with the tobacco having a moisture content of 40 percent by weight of the tobacco, a belt supporting a mixture of the material may be moved at 20 feet per minute when the bed depth is no more than 20 millimeters and the microwave energy is generated at a frequency of 2,450 megacycles. On the other hand, when the frequency of the microwave energy is approximately 915 megacycles, the bed depth may be increased to about 30 millimeters. This would be true employing power levels of between 2 and 5 kilowatts. As the speed of the belt is increased, the power must be increased within this range, but the bed depth may then also be increased.

The temperature at which the process is carried out is not critical. The temperature need only be such, dependent upon the relative humidity, that the desired moisture level of the tobacco is not significantly affected.

Following treatment with microwave energy, as just indicated, at least a majority of the tobacco fine particles will be puffed or expanded to such a size that they will be retained on a 30 mesh screen. These expanded tobacco particles may then be separated from the remainder of the mixture which was originally subjected to microwave energy by any standard mechanical separation process. For example, standard vibrating or shaking screen systems may be used.

Tobacco fines containing approximately 50 percent sand were raised to a moisture level of approximately 18 percent by weight of the tobacco. The mixture was conveyed on a belt through a microwave field so as to provide an energy absorption resonance time of approximately 15 seconds. The particle size of the materials, before and after treatment with the microwave energy, are as given in Table I below:

TABLE I

Screen Size (Mesh)	Particles Less Than Screen Size (Weight Per Cent) — Initial Mixture	Particles Less Than Given Screen Size (Weight Per Cent) — Final Mixture
No. 40	93.4	60.9
No. 30	99.9	89.3
No. 20	—	96.9

Thus, the weight per cent of particles retained on the No. 40 screen is increased sixfold and that on the No.

30 screen one hundredfold. Clearly, a major portion of the tobacco fines are retained.

While the recovered, expanded fines can be employed to form sheets of tobacco, as discussed in a variety of patents for forming reconstituted tobaccos, they have even more value in direct use in a tobacco product, such as a cigarette. A quantity of the expanded fines, such as an amount up to about 10 percent or 20 percent may be incorporated with standard tobacco leaf and formed into cigarettes by methods well known in the art. As such, these expanded particles impart advantages to the cigarette which have now been recognized for expanded tobaccos generally.

In accordance with the present invention, a method has been taught for recovering tobacco fines from mixtures with other dry materials which are not useful in the formation of tobacco products. The process is also applicable to botanicals other than tobacco, such as tea. While specific embodiments of the invention have been shown and described, the invention should not be considered as so limited and it is intended to cover all modifications within the spirit and scope of the invention as defined in the appended claims.

We claim:

1. A method for separating tobacco fines or fines of other botanical materials from non-moisture absorbent material comprising:

a. supplying a quantity of said fines and said material mixed together;

b. applying moisture to maintain the fines at a moisture level of from 5 to 75 percent by weight of the fines;

c. subjecting the mixture to microwave energy to substantially expand the individual fines while said non-absorbent material remains at substantially its original size; and

d. mechanically separating the fines subsequent to completion of expansion thereof from the non-moisture absorbent materials.

2. The process of claim **1** wherein the microwave energy is generated at at least 2 kilowatts.

3. The method of claim **1** wherein a substantial portion of the fines has been expanded to at least 30 mesh in size.

4. The method of claim **3** wherein the moisture level of the fines is approximately 40 percent by weight of the fines.

5. The process of claim **3** wherein the expanded fines recovered have a particle size of at least 30 mesh and are mechanically separated by introducing the mixture to a screen at least as small as 30 mesh so that substantially only the non-moisture absorbent material passes therethrough.

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