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(54) IMPROVING THE SMOKING TASTE OF TOBACCO STEMS

(71) We, THE AMERICAN TOBACCO COMPANY, a corporation organized and existing under the laws of the State of New Jersey, United States of America, of 245 Park Avenue, 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 improvement of the quality of tobacco and, more particularly, to improvement of the smoking taste of tobacco stems.

It has been known for over a century that the color of tobacco stems could be darkened by steaming them for a period of about 40 hours, and the same type of treatment has been used to darken cigar leaf. Shorter periods of time for darkening tobacco have been achieved by using superheated or high pressure steam, and ordering of tobacco has also been carried out by the alternate use of a vacuum and steam. These treatments, and many other variations thereof, have been used on a variety of tobacco products, but although they have improved the color of the tobacco it is still an accepted fact that the characteristically harsh smoking taste of the stem constituent of the tobacco has not been significantly altered.

We have now discovered, however, that a specific steam treatment of tobacco stems, carried out prior to their conventional processing for production of smoking products, appears to alter some component or components of the stems to the extent that subsequent conventional processing of the stems results in a smoking product greatly reduced in the "off" or harsh taste formerly attributable to its stem content. This specific steam treatment consists essentially of subjecting a body of the raw tobacco stems, prior to all other extraction and chemical processing treatments, to the action of a vacuum and then braking the vacuum by the

admission of superheated steam to the body of stems.

The reason for the improved results obtained by the practice of the invention is not fully understood. However, it appears likely that some component of the stems is chemically altered because the improvement resulting from the aforementioned vacuum-steam cycle is not achieved when the stems have been subjected to some prior extraction or heating step, or both. For example, when the stems are water-extracted and the separated fibrous and aqueous phases are heated and are then recombined to form reconstituted tobacco, there is no significant improvement in the harsh smoking taste attributable to the stem constituent. Moreover, when the stems are water-extracted and the separated fibrous and aqueous phases are re-combined pursuant to the conventional practice of forming reconstituted tobacco, and the resulting reconstituted tobacco is given the vacuum-steam treatment used in practicing the present invention, there is again little change in the harsh taste of the smoke caused by the presence of the stem components. For the vacuum-steam treatment of this invention to make a significant improvement in the smoking taste of the stems, they must be subjected to the specified treatment prior to any other changes being made in the stem constituents by prior extraction or chemical processing treatment.

In treating any tobacco stem constituent pursuant to this invention, the stem material is charged to a vessel capable of being evacuated. A vacuum is then drawn on the vessel to a pressure below about 1 inch of mercury absolute and advantageously to about 0.2 inch or less. After the desired vacuum has been established, it is broken by admitting superheated steam. The extent of superheating is determined by practical considerations, such as the availability of the superheated steam and time requirements. The effectiveness of the steam treatment in improving the smoking taste of the stems increases with increasing steam tem-

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perature and with increasing temperature within the stem mass of the end of the steam treatment. Superheated steam under 5 pounds pressure appears to be wholly satisfactory in practicing the invention but higher pressure steam, such as 10-20 psi steam, can be used with advantage. Although the incoming steam is cooled as it enters the evacuated tobacco mass, the use of superheated steam assures an effectively high final temperature in the mass of stems, a final temperature within the range of about 160—220°F. generally being consonant with markedly improved smoking taste of the stems.

The superheated steam is let into the evacuated mass of tobacco stems sufficiently slowly to promote whatever chemical action takes place to produce the taste improvement characteristic of the practice of the invention. In general, a steam introduction period of at least about 5 minutes appears to provide adequate time for effective darkening of the fibres, although we presently prefer to break the vacuum with the superheated steam over a period of 15 to 30 minutes. After the pressure in the treating vessel has returned substantially to that of the ambient atmosphere, the steam introduction is terminated. A curing period of at least 24 hours is advantageous following the treatment. Although a single cycle of this vacuum steam treatment is effective in improving the smoking taste of the stems, two or more cycles appear to progressively promote the desired improvement, and in general we presently prefer to subject the stem material to four or more substantially identical cycles to complete the treatment.

The following specific example is illustrative of the practice of the invention. For the purpose of this example, a number of tests were run to compare the results of the practice of the invention with treatments outside the scope of the invention:

1) In the first test, tobacco stems in a tobacco mass were subjected to conventional water extraction with grinding and beating to form an aqueous phase and a fibrous phase. The two phases were separated, the aqueous phase was concentrated, the fibrous phase was converted into sheet form and then the aqueous phase was returned as an impregnant for the sheet-like fibrous phase. The resulting reconstituted tobacco sheet was subjected to evacuation to at least 0.5 inch of mercury absolute and the vacuum was then broken by admitting superheated steam at 5 psi into the tobacco mass over a period of about 20 minutes with a resulting final tobacco temperature of about 200°F. When smoked, the resulting tobacco product had the unacceptable harsh taste characteristic of the starting stem material.

2) In the second test, a separated fibrous phase obtained from a mass of stems as described in Test 1 was given the same vacuum-steam treatment described in that test but prior

to re-combining of the thus-treated fibrous phase and the concentrated aqueous phase. The resulting reconstituted tobacco product had the characteristic harsh smoking taste of the untreated stem content.

3) In the third test, a mass of the same raw stems was given the vacuum treatment described in Test 1 but the vacuum was broken by admitting the ambient atmosphere rather than with superheated steam. The thus-treated stem material was then worked up into reconstituted sheet as described in Test 1, and when this sheet was smoked it had the characteristic harsh taste attributable to the initial stem content.

4) In the fourth test, a mass of the same raw stems was not evacuated but was given the steam treatment described in Test 1. The thus-treated stem material was then worked up into reconstituted sheet as described in Test 1, and when this sheet was smoked it had the same harsh taste as in each of the preceding tests.

5) In the fifth test, a mass of the same raw stem material was given the treatment of the present invention by evacuating a mass of the raw stems to at least 0.5 inch of mercury absolute and the vacuum was then broken by admitting superheated steam at 5 psi into the stem mass over a period of about 20 minutes with a resulting final tobacco temperature of about 160°F. When the thus-treated stem material was worked up into reconstituted sheet as described in Test 1, and was then smoked, the harsh taste attributable to the initial stem content was significantly alleviated and the product had an acceptable smoking taste.

6) In the sixth test, a mass of the same raw stem material was given the vacuum-steam treatment described in Test 5. This same vacuum-steam treating cycle was repeated until a total of four cycles had been performed. When the thus-treated stem material was worked up into reconstituted sheet as described in Test 1 and was then smoked, its smoke was substantially free of the harsh taste characteristic of the raw stem material.

WHAT WE CLAIM IS:—

1. The method of improving the smoking taste of tobacco stems which consists essentially of subjecting a body of raw tobacco stems, prior to all other extraction and chemical processing treatments, to the action of a vacuum and then breaking the vacuum by the admission of superheated steam to the body of stems.

2. The method according to claim 1 in which the vacuum is below 1 inch of mercury absolute and the super-heated steam is under super-atmospheric pressure up to 20 pounds per square inch.

3. The method according to claim 1 in which the steam is admitted for a period of time sufficient to raise the temperature of the body of stems to a value within the range of 160° to 220°F.

perature and with increasing temperature within the stem mass of the end of the steam treatment. Superheated steam under 5 pounds pressure appears to be wholly satisfactory in practicing the invention but higher pressure steam, such as 10-20 psi steam, can be used with advantage. Although the incoming steam is cooled as it enters the evacuated tobacco mass, the use of superheated steam assures an effectively high final temperature in the mass of stems, a final temperature within the range of about 160—220°F. generally being consonant with markedly improved smoking taste of the stems.

The superheated steam is let into the evacuated mass of tobacco stems sufficiently slowly to promote whatever chemical action takes place to produce the taste improvement characteristic of the practice of the invention. In general, a steam introduction period of at least about 5 minutes appears to provide adequate time for effective darkening of the fibres, although we presently prefer to break the vacuum with the superheated steam over a period of 15 to 30 minutes. After the pressure in the treating vessel has returned substantially to that of the ambient atmosphere, the steam introduction is terminated. A curing period of at least 24 hours is advantageous following the treatment. Although a single cycle of this vacuum steam treatment is effective in improving the smoking taste of the stems, two or more cycles appear to progressively promote the desired improvement, and in general we presently prefer to subject the stem material to four or more substantially identical cycles to complete the treatment.

The following specific example is illustrative of the practice of the invention. For the purpose of this example, a number of tests were run to compare the results of the practice of the invention with treatments outside the scope of the invention:

1) In the first test, tobacco stems in a tobacco mass were subjected to conventional water extraction with grinding and beating to form an aqueous phase and a fibrous phase. The two phases were separated, the aqueous phase was concentrated, the fibrous phase was converted into sheet form and then the aqueous phase was returned as an impregnant for the sheet-like fibrous phase. The resulting reconstituted tobacco sheet was subjected to evacuation to at least 0.5 inch of mercury absolute and the vacuum was then broken by admitting superheated steam at 5 psi into the tobacco mass over a period of about 20 minutes with a resulting final tobacco temperature of about 200°F. When smoked, the resulting tobacco product had the unacceptable harsh taste characteristic of the starting stem material.

2) In the second test, a separated fibrous phase obtained from a mass of stems as described in Test 1 was given the same vacuum-steam treatment described in that test but prior

to re-combining of the thus-treated fibrous phase and the concentrated aqueous phase. The resulting reconstituted tobacco product had the characteristic harsh smoking taste of the untreated stem content.

3) In the third test, a mass of the same raw stems was given the vacuum treatment described in Test 1 but the vacuum was broken by admitting the ambient atmosphere rather than with superheated steam. The thus-treated stem material was then worked up into reconstituted sheet as described in Test 1, and when this sheet was smoked it had the characteristic harsh taste attributable to the initial stem content.

4) In the fourth test, a mass of the same raw stems was not evacuated but was given the steam treatment described in Test 1. The thus-treated stem material was then worked up into reconstituted sheet as described in Test 1, and when this sheet was smoked it had the same harsh taste as in each of the preceding tests.

5) In the fifth test, a mass of the same raw stem material was given the treatment of the present invention by evacuating a mass of the raw stems to at least 0.5 inch of mercury absolute and the vacuum was then broken by admitting superheated steam at 5 psi into the stem mass over a period of about 20 minutes with a resulting final tobacco temperature of about 160°F. When the thus-treated stem material was worked up into reconstituted sheet as described in Test 1, and was then smoked, the harsh taste attributable to the initial stem content was significantly alleviated and the product had an acceptable smoking taste.

6) In the sixth test, a mass of the same raw stem material was given the vacuum-steam treatment described in Test 5. This same vacuum-steam treating cycle was repeated until a total of four cycles had been performed. When the thus-treated stem material was worked up into reconstituted sheet as described in Test 1 and was then smoked, its smoke was substantially free of the harsh taste characteristic of the raw stem material.

WHAT WE CLAIM IS:—

1. The method of improving the smoking taste of tobacco stems which consists essentially of subjecting a body of raw tobacco stems, prior to all other extraction and chemical processing treatments, to the action of a vacuum and then breaking the vacuum by the admission of superheated steam to the body of stems.

2. The method according to claim 1 in which the vacuum is below 1 inch of mercury absolute and the super-heated steam is under super-atmospheric pressure up to 20 pounds per square inch.

3. The method according to claim 1 in which the steam is admitted for a period of time sufficient to raise the temperature of the body of stems to a value within the range of 160° to 220°F.



4. The method according to claim 1 in which the vacuum is broken by admission of the steam over a period of at least about 5 minutes.
- 5 5. The method according to claim 1 in which the vacuum-steam treatment is repeated for a total of at least 2 cycles.
- 10 6. A method of improving the smoking taste of tobacco stems, substantially, as hereinbefore described.

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