METHOD OF MAKING IMPROVED SHREDS FROM ROLLED TOBACCO STEMS

John D. Hind and James W. Leik, Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y., a corporation of Virginia
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ABSTRACT OF THE DISCLOSURE

This disclosure relates to rolled tobacco stems. It is known that tobacco stems may be passed between rollers in order to break up the structure of the same and to produce rolled tobacco stems which can thereafter be shredded and blended with shredded tobacco leaf. The present invention involves the addition to the tobacco stems, either before, during or after rolling the stems, of an ammonium phosphate, for example of diammonium phosphate, whereby improved rolled tobacco stems are produced. The improved stems yield a more satisfactory smoke when incorporated in a tobacco product.

This invention relates to improved rolled tobacco stems and to an improved method of making the same. More particularly, the invention relates to rolled tobacco stems having improved flavor and to a method of making the same.

In general, tobacco stems and midribs represent an unsatisfactory portion of the cured tobacco leaf, from the standpoint of smoking, in the sense that they may cause uneven burning, give a rough and unsightly appearance to tobacco for smoking, particularly when they are employed in cigarettes, and they may cause protuberances in cigars and cigarettes which may result in breaks in the wrapper, necessitating rejection.

Stems are usually separated from the desirable leaf or lamina of tobacco. To throw away the stems and midribs is uneconomical, and for this reason, methods have been devised to modify these parts to make them usable in smoking products. One of the methods which has been found to be relatively satisfactory, because of its simplicity and low cost, is to pass the stems between rollers in order to break up the bulky, rigid structure and to produce rolled stems, which are a flattened, loosened product which can be shredded and blended with shredded tobacco leaf.

It has been found, however, that the rolled stems still impart a certain amount of the harshness and strange taste which are imparted by tobacco stems to the smoke from cigarettes or other tobacco products into which they are introduced. Stems from burley tobacco are particularly undesirable in this respect. As a consequence, only a small portion of the stems from tobacco used in filler for cigarettes or cigars can be rolled and blended back into the filler.

We have now discovered a means by which rolled stems may be used to produce tobacco products having a more acceptable smoke. Stems from bright tobacco treated by our process may be used even without any added leaf to produce a cigarette which yields comparatively bland smoke, and burley tobacco stems so treated may be used in larger proportions than heretofore possible in blends with tobacco leaf to produce an acceptable cigarette.

The present invention comprises contacting tobacco stems, either before, during or after passing the stems between rollers, with a solution of an ammonium phosphate in a manner that the stems are intimately contacted by the ammonium phosphate.

The application of the ammonium phosphate preferably precedes the rolling process. For example, the stems may be soaked in an aqueous solution of the ammonium phosphate or a solution of the ammonium phosphate may be sprayed on the stems and the sprayed stems allowed to equilibrate for several hours before the stems are rolled.

The application of the ammonium phosphate may also occur during the rolling or after the rolling of the stems. By "rolling" as used in this specification, we mean the application of sufficient pressure by one, two or more rollers or similar devices to the tobacco stems, either whole or cut in pieces of any desired size, whereby the stems are broken open and somewhat flattened.

The ammonium phosphate may, for example, be ammonium orthophosphate, diammonium acid phosphate or ammonium dihydrogen phosphate.

The ammonium phosphate is preferably employed as an aqueous solution containing from ½ to 50 percent and preferably from 5 to 30 percent, of ammonium phosphate.

The aqueous solution of ammonium phosphate should preferably have a pH of from about 4 to about 10. The pH of the solution may be adjusted by the addition of ammonium hydroxide or other suitable pH adjusting agents.

The preferred amount of ammonium phosphate for purposes of this invention is from about 3 to 8% of the weight of the stems being treated. However, the invention may be practiced by employing the ammonium phosphate in amounts of from about 1% to 12%, based on the weight of the stems.

The time of treatment may be as short as one minute and need only be enough to provide intimate contact with the stems. However, the treatment may be continued for many weeks or even years, since the stems can advantageously be treated with the ammonium phosphate solution prior to their packaging for extended aging. The storage of stems which have been treated in this manner provides greatly improved results over the results which would be obtained were the stems to be stored without such a treatment. Some of the benefits which may result from such a treatment are improved mildness and aroma in the smoke resulting from smoking products incorporating such treated stems, better burning and the like.

While we do not wish to be bound by any particular theory, we believe the effectiveness of our process involves the use of a material which, when added to the stems, results in better burning characteristics of the stems with a slower burning, reduced heat and consequent reduced harshness of the smoke, the additive providing a phosphate ash which is light and flaky and porous and which does not have a quenching action on the tobacco but which permits the particles to retain their heat and yet not burn at an excessive rate.

The following examples are illustrative:

EXAMPLE 1

Burley tobacco stems, unwashed, weighing 15 lbs. were rolled for one hour in a solution made up as follows: distilled water 13.5 lbs., diammonium phosphate 1.125 lbs., ammonium hydroxide, concentrated, 0.41 lb., potassium sorbate 0.041 lb. The stems were removed, drained, and treated in a pressure cooker for five minutes at (nominal) 5 p.s.i.g. The stems were dried at 105° C. for one hour and finally at 70° C. overnight.

These stems were subjected briefly to live steam, rolled by the standard process, and cut to make cigarette filler.
When blended at a proportion of 1:3 by weight with shredded leaf, this product gave cigarettes which were judged by expert smokers to be acceptable. Cigarettes with the same proportion of rolled burley stems, untreated, were judged too harsh and strong for pleasant smoking.

**EXAMPLE 2**

The following solutions were prepared (two batches of each):

Solution A.—Water 2.61 lbs. Diammonium phosphate 0.55 lb.

Solution B.—Water 2.61 lbs. Diammonium phosphate 1.09 lbs.

One batch of 15 lbs. of unwashed burley stems and one of unwashed bright stems were sprayed with Solution A; the same quantities of burley and bright stems were sprayed with Solution B. Each batch was then bagged in polyethylene and kept in a refrigerator for 24 hours. The stems were then subjected to the steaming, rolling and shredding process in the conventional manner.

Results of chemical analysis of these products are given in Table I.

<table>
<thead>
<tr>
<th>TABLE I—ANALYSIS OF ROLLED STEMS, DRY BASIS</th>
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<tbody>
<tr>
<td>Percent</td>
</tr>
<tr>
<td>P</td>
</tr>
<tr>
<td>Bright, unsprayed</td>
</tr>
<tr>
<td>Bright, Solution A</td>
</tr>
<tr>
<td>Bright, Solution B</td>
</tr>
<tr>
<td>Burley, Solution A</td>
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<tr>
<td>Burley, Solution B</td>
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</tbody>
</table>

Thus, the bright stems retained approximately 4% and 6% of DAP, respectively; the burley stems retained approximately 4% and 8%, respectively.

Cigarettes having similar loading of filler and resistance-to-draw were prepared from these DAP-treated products as well as untreated stems which had been similarly rolled and shredded. A panel of five expert smokers compared these cigarettes, and gave them a rating as well as a descriptive judgment, as shown in Table II.

**TABLE II**

Comparison of cigarettes from rolled tobacco stems

1. Bright control vs. bright 4% DAP. In general, no great difference, but DAP gives slight improvement.
2. Bright control vs. 4% DAP vs. 6% DAP. Bright with 6% DAP least irritating; irritation decreasing in order named.
3. Burley control vs. burley 4% DAP. Control unbearably harsh and strong, 4% DAP less harsh but still very irritating.
4. Burley 4% DAP vs. burley 8% DAP. 8% somewhat improved; less harsh than 4%.

Order of increasing harshness:

- Bright 6% DAP.
- Bright 4% DAP.
- Bright control.
- Burley 8% DAP.
- Burley control.
- Burley 4% DAP.

We have also found that the addition of an ammonium phosphate to rolled tobacco stems in accordance with the present invention results in treated stems which, when smoked, provide a significantly lower organic gas phase content in the resulting tobacco smoke than the organic gas phase which results from the smoking of similar tobacco stems which have not been treated with an ammonium phosphate.

In a series of tests, burley tobacco stems and burley tobacco stems which have been treated with 7.4% of diammonium phosphate were evaluated for organic gas phase content by the procedure described by Watson, Ikeda, and Resnik in "Tobacco" 163 No. 5, on pages 176-182 (1966). It was found that the organic gas phase per puff for the untreated burley tobacco stems was 0.48. In comparison, the organic gas phase per puff of the burley tobacco stems which had been treated with 7.4% of diammonium phosphate was 0.40.

In a similar series of tests using bright tobacco stems, it was found that the organic gas phase per puff of the untreated bright tobacco stems was 0.50, in comparison with an organic gas phase per puff for bright tobacco stems which had been treated with 7.1% of diammonium phosphate which had an organic gas phase of 0.35 per puff.

We claim:

1. A process for manufacturing improved shreds from rolled tobacco stems which comprises the steps of (1) treating said tobacco stems with from 4% to 12% by weight of the stems of diammonium phosphate and (2) rolling said tobacco stems and finally shredding the rolled and flattened product.

2. The process of claim 1 wherein step 1 is conducted prior to step 2.

3. The process of claim 1 wherein step 2 is conducted prior to step 1.

4. The process of claim 1 wherein step 1 and step 2 are conducted simultaneously.

**References Cited**

- UNITED STATES PATENTS
  - 772,892 10/1904 Lauboff.
  - 2,580,568 1/1952 Matthews et al.
  - 2,613,673 10/1952 Sartoreto et al. 131—140
  - 3,353,541 11/1967 Hind et al. 131—17

- MELVIN D. REIN, Primary Examiner.