METHOD OF AND APPARATUS FOR TURGOR CONDITIONING TOBACCO

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ABSTRACT

A method of turgor conditioning tobacco that includes the steps of placing the tobacco in an enclosed chamber, saturating the tobacco with water, and evacuating the chamber until the water reaches its vapor point at which point the water vapor backs up against an overlying gas impervious hood and drives the excess water through drainage openings away from the tobacco. The water that is drained from the tobacco contains a portion of the water soluble sugars and nicotine from the tobacco and can be used to impregnate nicotine-free filler material that is later mixed with the tobacco in conventional cigarette production.

22 Claims, 3 Drawing Figures
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BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the processing of tobacco, and more particularly, to a method and apparatus for turgor conditioning tobacco in order to expand it prior to freeze drying.

2. Description of the Prior Art

The harmful effects of tar and nicotine that accompany cigarette smoking have long had a deterring effect upon those people who desire to smoke but have a fear of harming their health or physical well being. In an attempt to reduce the harmful effects of tar and nicotine in cigarette smoking, it has been proposed to use less tobacco in each cigarette. Inasmuch as tobacco is tamped into cigarettes with a predetermined amount of pressure to assure a firm product, the only way in which less tobacco, by weight, can be used in a cigarette without reducing the size of the cigarette is to enlarge or increase the volume of each shred or strip of tobacco used in the production of cigarettes.

It has recently been discovered that tobacco can be enlarged by a freeze-drying process which includes the steps of soaking or turgor conditioning, the normally dried and shredded tobacco whereby it expands far beyond its normal size. The turgorized tobacco is then frozen and subsequently processed in a vacuum freeze drying chamber to sublime the water crystals and leave the tobacco in an enlarged and dried state.

One prior art method of turgor conditioning tobacco is to place a layer of tobacco in a container and to add a predetermined volume of water under either atmospheric or vacuum conditions. The tobacco may be allowed to absorb the water naturally at atmospheric pressure, or, in the instance where the water is added to the tobacco under vacuum conditions, the vacuum is broken to permit the increase in pressure to increase the rate of absorption.

When the tobacco is turgorized by placing it in a container of water, a certain amount of water soluble solid content of the tobacco is leached out as can be evidenced by a brown discoloring of the water surrounding the tobacco. It is important that this leaching out process be minimized, and this requires not only a rapid absorption of the water by the tobacco but also a rapid draining of the excess water from the tobacco after the tobacco has absorbed a sufficient amount of water.

It should be pointed out that more water must be added to the tobacco than can actually be absorbed by the tobacco if maximum absorption is to be obtained. That is to say, the tobacco must be continuously surrounded by water during the absorption period. Thus, this excess water must be drained before freeze drying. If the unabsorbed water is allowed to remain in the container with the tobacco when the tobacco is frozen and placed in a freeze-drying chamber for sublimation, the freeze-drying process becomes very costly and time consuming. It is, therefore, desirable to drain the excess wetting liquid from the tobacco prior to freezing and freeze drying. Conventional gravity draining, however, does not adequately drain an acceptable percentage of the free, or excess, liquid in a reasonable period of time; therefore, a more suitable drainage method is desirable.

SUMMARY OF THE INVENTION

The present invention is concerned with a method of an apparatus for draining excess water from tobacco after turgor conditioning. It has been found that in order to obtain maximum expansion of tobacco in a process that includes the steps of wetting, freezing, and freeze drying the tobacco, it is desirable in the wetting step to vacuum impregnate the tobacco with water, i.e., to first place the dry tobacco under a vacuum before the water is applied thereto so as to eliminate possible air pockets in the tobacco during turgor conditioning. However, after impregnation of the tobacco with water it is very difficult to drain the excess water from the tobacco by gravitational forces alone even though the tobacco may be then placed under atmospheric, or even superatmospheric, conditions.

According to the method of the present invention the water can be vacuum drained with special apparatus by pulling the ambient air pressure below a predetermined pressure to cause a portion of the excess water to vaporize. As the water begins to vaporize, the vapor will occupy more volume than its water source and will drive the excess water away from the tobacco so that all that remains is the water that is absorbed and trapped within the tobacco. The vacuum can then be broken leaving the tobacco desirably turgorized for further processing according to known tobacco freeze drying processes.

It is unavoidable when impregnating tobacco with water that a portion of the water soluble solid content of the tobacco will be dissolved. These soluble solids, which include valuable nicotine, are then carried away from the tobacco in solution as part of the drainage liquid. It is contemplated that the amount of dissolved solids should be kept to a minimum by reducing the turgorizing and draining time to a minimum. It is also contemplated that the excess liquid, which contains the dissolved solids, be used to impregnate, and thereby flavor, nicotine-free filler material that is homogeneously mixed with tobacco after it has been dried and prior to the making of cigarettes. By so utilizing the drainage liquid, no part of the tobacco, particularly the valuable nicotine, is lost during processing.

Accordingly, it is an object of the present invention to provide a method and apparatus for vacuum draining liquid from tobacco that has been soaked with the liquid.

It is another object of the present invention to provide a method of flavoring cigarette filler material with the drained excess liquid resulting from the turgor conditioning of the tobacco.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic vertical section through one embodiment of an apparatus for vacuum draining liquid from soaked, or turgorized, tobacco.

FIG. 2 is a diagrammatic vertical section through a second embodiment of an apparatus for vacuum draining liquid from turgorized tobacco.

FIG. 3 is a diagrammatic view of a system of treating tobacco whereby liquid that was used to wet the tobacco is re-cycled to wet and flavor filler material which is subsequently mixed with the tobacco.
DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to FIG. 1 an apparatus for vacuum draining excess water from shredded or strip tobacco which has been turgorized is seen to include a vacuum chamber 10 with a valve controlled drain 11 and vacuum outlets 12 and 14 connected to a suitable vacuum pump which is not shown. The chamber is supported on legs 15. Depending from the upper wall of the chamber 10 and within its confines is a closed housing 16 in which there is situated a water header 18 having a plurality of spray nozzles 20 depending therefrom. Mounted inside the chamber 10 on hydraulic jacks 22 below the housing 16 are a pair of support brackets 24 on which a tray, or container, 26 of tobacco T can be removably supported. The tray has a plurality of drainage openings 28 in its bottom, the purpose of which will subsequently become clear. The jacks 22 are connected in a common hydraulic line (not shown) to work in unison with each other whereby the support brackets 24 can be raised to move the tray of tobacco into close proximity to the bottom wall of the housing 16 while retaining it in a horizontal spacial orientation.

Disposd between the jacks 22 is a vertically movable rubber platform or plate 30 having a size and shape substantially the same as that of the bottom of the tray 26. The platform 30 is mounted on the vertically reciprocating piston arm 32 of a hydraulic cylinder 34 so that it can be moved into and out of sealing engagement with the bottom of the tray on the support brackets 24. The piston rod and piston rod guide means should be keyed together to prevent the platform from rotating during its vertical movement or other guide means (not shown) should be provided to perform this function.

The housing 16 is in communication with the vacuum outlet 12 and has a bottom wall which is provided with a plurality of openings 38 through which water emanating from the nozzles 20 can evenly flow into a tray of tobacco T resting on the support brackets 24. An annular flange 42 of rubber or similar resilient material is provided around the outside of the housing 16 and is adapted to sealingly engage the upturned edge 43 of the tray when the tray is raised to its uppermost position adjacent the bottom wall of the housing. This resilient flange, in addition to providing a seal, assures that the successive trays placed in the chamber are consistently spaced a predetermined distance from the bottom wall of the housing 16 so as to avoid compressing the tobacco in the tray.

A method of turgor conditioning tobacco with the apparatus of FIG. 1 would include the steps of first placing a tray of dried and shredded tobacco on the support brackets 24 and then sealing the chamber 10 (by means not shown). The chamber, including the space within the housing 16, is then evacuated through outlets 12 and 14 by rotation of a control valve 45 and a control valve 46 to connect the outlets with the vacuum pump. This has the effect of evacuating the air from the tobacco and preparing it for the subsequent turgorizing step. The tray 26 of tobacco is next raised by the jacks 22 until the upturned edge of the tray seals against the rubber flange 42. The rubber platform 30 is then raised against the bottom of the tray to seal the openings 28 in the tray bottom, and a predetermined volume of water is sprayed from the nozzles 20 through the openings 38 in the housing onto the tobacco in the tray until the tobacco is completely encompassed and soaking in the water. At that time the chamber 10 is vented by rotation of the control valve 45 to allow the atmospheric pressure to immediately force the water into the tobacco cells and the intercellular spaces in the tobacco according to known practices. The water absorbed by the tobacco causes the tobacco to swell in size so that it occupies substantially more space than it did when it was in a dry state.

Once the tobacco has absorbed the desired quantity of water, which occurs after a very short time with the vacuum impregnation technique described, it is desirable to drain the excess water from the tray to prevent unnecessary losses of water soluble solids from the tobacco and also to reduce the freeze drying costs in subsequent processing. Therefore, the platform 30 is lowered to allow the liquid in the tray to begin to drain by gravity through the openings 28 in the bottom of the tray. Not all of the excess water will drain by gravity, however, so the vacuum draining technique of the present invention is employed to rapidly drive the excess liquid from the tray.

To vacuum drain the liquid from the tray the control valve 46 is first closed to block the outlet 12 from the housing 16 and thereby maintain atmospheric pressure above the water in the tray. The control valve 45 is then rotated to connect the outlet 14 in the chamber to the vacuum pump to drop the pressure in the chamber to about 9mm. of mercury or less. At this pressure the water, which is preferably at about 10°C. to prevent excessive leaching, begins to vaporize. The water vapor, which occupies more volume than its water source, expands within the confines of the housing 16 until the vapor pressure within the housing becomes large enough to flush all of the liquid in the tray downwardly through the openings 28 in the bottom of the tray. It will be apparent that the housing 16 acts as a gas imperious hood against which the vapors can back up to flush the water downwardly out of the tray. This action takes place very rapidly once the air pressure in the chamber is reduced and a large pressure differential is set up across the tobacco and the water layer therein. Even when most of the excess water is removed and the pressure equalizes on both sides of the tobacco, the movement of the water vapor is downward through the tobacco which movement aids in pushing the remaining excess water from the tobacco.

After the excess liquid is flushed from the tray, the chamber 10 is vented by opening the valves 45 and 46 to the atmosphere, and the drain 11 is opened to allow the liquid to be removed from the chamber and directed through a flow line for further use in the tobacco processing system. The drained liquid unavoidably contains a certain quantity of water soluble solids which are leached out of the tobacco during turgor conditioning of the tobacco. To avoid losing these soluble solids the liquid is used to impregnate filler material that is used with the regularly processed tobacco in the production of cigarettes. This use of the drainage liquid will be explained in greater detail hereinafter.

With the liquid in the tray drained, the chamber 10 can be opened (by means not shown) and the tray of turgorized tobacco removed. The tobacco is then in the desired condition for subsequent freezing and freeze drying according to known processing procedures.
A second embodiment of an apparatus for turgor conditioning and vacuum draining the turgorized tobacco is shown in FIG. 2. This apparatus can be seen to include a vacuum chamber 50 that is provided with diametrically disposed supporting shafts 52 which extend horizontally from the sides of the chamber and are journalled for rotation within support bearings 54. The bearings are rigidly secured to the upper ends of a pair of stanchions 56 whereby the chamber 50 is rotatable about a horizontally disposed axis 58. The chamber 50 is provided with two valve controlled drains 60 and 61 with drain 60 being located in the bottom wall 62 of the chamber and with drain 61 being located in the top wall 63 of the chamber (as the chamber is oriented in FIG. 2). The chamber is also provided with a vacuum outlet 64 which is connected to a vacuum pump (not shown) through a control valve 65 with the outlet being provided in one side wall of the chamber. Depending from the top wall of the chamber is a housing 66 having a plurality of openings 68 in its bottom wall. A plurality of peripherally spaced passages 70 are provided at the juncture of the housing 66 and the top wall 63 of the chamber. A multitude of needle-like fingers 71 are mounted on the underside of the bottom wall of the housing for engagement with the tobacco for a purpose to be explained presently. Inside the housing 66 is mounted a water header 72 which is provided with a plurality of downwardly directed spray nozzles 74 and which is connected to a valve-controlled water source that is not shown.

Directly beneath the housing 66 a lift platform 76 is mounted upon the vertically reciprocating piston arm 77 of a hydraulic cylinder 78. Means (not shown) should be provided to prevent rotative movement of the platform 76 when it is moved by the fluid pressure within the cylinder 78. The platform has upwardly extending side portions 82 to serve as guides for a tray 84 of tobacco T which is to be processed in the chamber 50. When the tray is lifted by the application of hydraulic fluid to the cylinder 78 the upturned peripheral edge 85 of the tray will be aligned with and will abut against an anular flange 86 of rubber or rubber-like material that extends outwardly from the periphery of the housing 66. The flange 86 assures a seal about the periphery of the tray and also serves to maintain a constant spacing between the bottom wall of the housing and the bottom wall of the tray so that the tobacco will not be compressed between these two surfaces.

In using the apparatus of FIG. 2 to vacuum impregnate tobacco with water and to vacuum drain the tobacco according to the method of the present invention, it is first necessary to place a tray 84 of dry shredded tobacco on the platform 76 in the vacuum chamber 50 and to then seal the chamber (by means not shown). Next, the chamber is evacuated by rotating the control valve 65 and then is rotated 180° by the cylinder 78 until the upturned peripheral edge 85 of the tray abuts against the resilient flange 86. A predetermined volume of water, preferably at about 10° C. or lower, is then sprayed by the nozzles 74 through the openings 68 in the bottom wall of the housing 66 onto the tobacco. The chamber is then vented by rotation of the control valve 65 to allow the atmospheric pressure to immediately force a portion of the water into the tobacco cells and the intercellular spaces in the tobacco to cause the tobacco to swell. To drain the excess water from the tray in accordance with the principles of the present invention, the chamber 50 is rotated 180° about the axis 58 with the projecting fingers 71 on the housing 66 holding the tobacco in the tray in place during this rotative movement. After the tray is upside down some of the water will drain by gravity back through the openings 68 into the housing and subsequently through the spaced passages 70 at the juncture of the housing and the wall 63 of the vacuum chamber. However, as pointed out with reference to the apparatus shown in FIG. 1, not all of the water will drain by gravity in an acceptable period of time. Consequently, the chamber is again evacuated (after rotation of the chamber) so that the pressure in the chamber is dropped to about 9mm. or less of mercury (with a water temperature of about 10° C.) at which pressure the excess water remaining in the tray and around the tobacco will rapidly vaporize. Inasmuch as the water vapor occupies more volume than its liquid source, it will back up against the inverted bottom of the tray 84 and aid in flushing the water not absorbed by the tobacco and the openings 68 and 70 in the housing 66 so that it can be drained from the chamber through the drain 61 in the inverted top wall 63 of the chamber.

After the water in the tray has been vacuum drained, the chamber 50 can be vented (by rotation of valve 65), rotated back through 180° to its original position as shown in FIG. 2, and opened (by means not shown) to permit the tray of moist tobacco to be removed. Any remaining liquid in the chamber will then be drained through drain 60. The tobacco at that time will be desirably turgorized for subsequent freezing and freeze drying according to known tobacco processing procedures.

When shredded tobacco is wet, either by soaking in water at atmospheric pressure or by vacuum impregnating as described with reference to the apparatuses of Figs. 1 and 2, a certain quantity of the water soluble solids in the tobacco, such as the sugar and nicotine, are unavoidably dissolved and carried away in solution by the drainage liquid. To prevent the loss of these water soluble solids, particularly the nicotine, the drainage liquid can be used to impregnate nicotine-free filler material that is presently mixed with the aforementioned tobacco shreds prior to making cigarettes. This filler material usually comprises the tobacco leaf stems that have been processed to visually resemble shredded tobacco which, it might be mentioned, is comprised of the blade portions of the tobacco leaves. Typically, the stems from the tobacco leaves are collected in containers and subsequently are rolled and flattened. The flattened tobacco leaf stems are fed through a shredder identical to the shredders used in shredding the blade portion of the tobacco leaf. The shredded stems are then homogeneously mixed with the shredded blades before the tobacco is used in the manufacture of cigarettes.

A system for treating tobacco which includes the impregnation of the filler material (i.e., the stems) with drainage liquid from the turgor conditioning of the shredded tobacco blades is shown diagrammatically in FIG. 3. The vacuum impregnating chamber 10 of FIG. 1 is there illustrated with the drain 11 being connected to a flow line 100. This flow line is provided with a pump 102 that pumps the drainage liquid into a header 104 having spray nozzles 105 which header is part of a tobacco wetting apparatus 106. A feed hopper 108 directs the material to be wetted, in this case the dry to-
bacco leaf stems, into a screen-walled drum 110 mounted for rotation. The drum is inclined downwardly from its feed end so that the stems will progress through the drum while being tumbled inside. The drainage liquid from the vacuum chamber 10 is sprayed through the screen wall from the nozzles 105 in a fine misty spray and is entirely absorbed by the tumbling stems. The tobacco wetting apparatus 106 may, if desired, be of the type shown in the prior United States patent to Sowa, U.S. Pat. No. 2,596,183, issued on May 13, 1952, and reference to this patent may be had for a complete description of the structure and operation of a usable tobacco wetting apparatus.

The stems which are soaked in the wetting apparatus 106 are put on trays and placed in a freezer 112. The shredded blades of the tobacco leaves which are turgorized in the vacuum chamber 10 are also put on trays and placed in the freezer 112 along with the stems. After freezing, the stems and the shredded blades of the tobacco leaves are separately placed in a freeze drying chamber 114 wherein the frozen liquid crystals in the products are sublimated to leave the products in a dried and enlarged state. Actually, the products upon leaving the freeze drier 114 have a lower moisture content (normally less than 4 per cent) than they had before they were turgorized. Consequently, it is desirable to direct both products into a humidifier 116 after the freeze drying step wherein the moisture content can be raised back to the desired level of about 10–13 per cent which moisture content facilitates the subsequent handling of the tobacco. After both stems and blades have been humidified, the stems are conventionally rolled and flattened by a roller 118 and shredded by a shredder 120 so that they resemble the shredded blades of the tobacco leaves. The shredded stems are then mixed with the shredded blades in a mixer 122 to form the final tobacco mixture out of which cigarettes are subsequently made.

It will be understood that even though some of the water soluble solids in the tobacco are leached out during the turgorizing process performed on the blade portions of the tobacco leaves, these solids can be at least partially recovered and absorbed by the tobacco stems so that the final mixture will not be unduly deficient in these highly important constituents.

Although the best mode contemplated for carrying out the present invention has been herein shown and described, it will be apparent that modification and variation may be made without departing from what is regarded to be the subject matter of the invention.

What is claimed is:

1. In a method of turgor conditioning tobacco wherein the tobacco is first impregnated with water in a container, the improvement comprising the steps of covering the container containing the soaked tobacco and excess water, providing drainage passages directly below the tobacco in the container, initially blocking drainage through said passages, thereafter removing said blocking and permitting gravitational flow of the excess water downwardly through the tobacco and outwardly through the underlying drainage passages, evacuating the air about the drainage passages and thereby flushing the excess water in the container out through the underlying drainage passages by expanding a portion of the excess water in the container through vaporization.

2. In a method of turgor conditioning tobacco according to claim 1 including the step of providing atmospheric pressure within the container prior to the evacuation of the air about the drainage passages so that after unblocking initially the excess water gravitationally flows downward in a liquid state and subsequently the excess water flows downward in both a liquid and vapor state caused by a pressure differential existing across said excess water and the drainage passages in the container.

3. In a method of turgor conditioning tobacco wherein the tobacco is first impregnated with water in a container, the improvement comprising the steps of providing covered drainage passages underlying the tobacco in the container, enclosing the top of the container with a gas impervious hood after the impregnation of the tobacco with water, uncovering said drainage passages to induce a downward, gravitational flow of the excess water through the tobacco, and lowering the air pressure about the drainage passages until excess water in the container begins to vaporize and thereby flushing said excess water in the container out through said drainage passages by expanding the water vapor therein.

4. A method of turgor conditioning tobacco comprising the steps of putting tobacco in a container, placing said container in a vacuum chamber, evacuating said chamber, spraying water into said container to thoroughly wet the tobacco, allowing the air pressure in the chamber and the container to rise, opening drainage passages to the tobacco in the container, lowering the air pressure about the drainage passages until the excess water in the container begins to vaporize whereby the water vapor will be caused to flush substantially all of the excess water in the container through said drainage passages, venting the chamber and the container to bring the pressure therein back to atmospheric pressure, and removing the tray of tobacco from the vacuum chamber.

5. An apparatus for turgor conditioning tobacco comprising in combination a vacuum chamber, said chamber including means for evacuating and venting said chamber, a container for holding a quantity of tobacco, means inside the chamber for supporting said container of tobacco, means for applying a predetermined quantity of liquid to said quantity of tobacco, and means including said container for selectively enclosing said tobacco within a small space within the larger space occupied by said chamber, said enclosing means being provided with openings in at least one portion thereof and a gas impervious area in another portion thereof, said enclosing means being positionable with the openings below the tobacco and the gas impervious area above both the tobacco and the openings, whereby a positive differential pressure across the openings will flush any excess liquid away from the gas impervious area, downward from the tobacco and out of the openings.

6. The apparatus of claim 5 wherein said means for applying liquid includes water spray means disposed within said chamber in a position to spray water into said container when said container is supported upon said supporting means.

7. The apparatus of claim 6 wherein said enclosing means includes a housing with a bottom wall, said bottom wall having a plurality of passages therethrough,
said water spray means being disposed within said housing.

8. The apparatus of claim 7 wherein said container supporting means is adjustable whereby a container supported thereby can be alternatively moved between a position immediately adjacent to and in sealing engagement with said bottom wall and a position displaced therefrom.

9. The apparatus of claim 8 further including means for selectively opening and closing said openings in said container.

10. The apparatus of claim 8 wherein the upper edge of said container is arranged to be placed in sealing engagement with said housing when said container is supported adjacent said bottom wall of the housing, said housing being provided with a resilient annular member for abutting with said upper edge of the container.

11. The apparatus of claim 9 wherein said means for alternately opening and closing said openings in said container includes a movable plate having a size and shape substantially the same as the area on the container having said openings whereby said plate can be moved into and out of abutting contact with said container in said area of said openings.

12. The apparatus of claim 5 further including a supporting frame for said chamber, shaft means interconnecting said frame and said chamber, and bearing means operatively connected to said shaft means whereby the chamber can be rotated on said frame through approximately 180° of rotational movement.

13. The apparatus of claim 12 wherein said means for applying liquid includes water spray means disposed within said chamber in a position to spray water into said chamber when said container is in said chamber.

14. The apparatus of claim 13 wherein said enclosing means includes a housing with a bottom wall, said bottom wall having a plurality of passages therethrough, and said water spray means being disposed within said housing.

15. The apparatus of claim 14 wherein said supporting means is adjustable whereby a container supported thereby can be alternatively moved between a position immediately adjacent to and in sealing engagement with said bottom wall and a position displaced therefrom.

16. The apparatus of claim 15 wherein said openings in said enclosing means are in said housing at a location where excess liquid in the container will flow through said openings when said chamber is disposed so that said container is inverted and positioned above said housing.

17. An apparatus for turgor conditioning tobacco comprising a vacuum chamber, means for mounting a container of tobacco within said chamber, means for selectively evacuating said chamber, means for supplying a quantity of water to the tobacco when it is received in said container in said chamber in order to turgor condition the tobacco, a cover member positioned within said chamber, at least one of said cover member or said container being provided with drainage passages, means for selectively blocking said drainage passages, and means for moving said container into operative engagement with said cover member whereby a vacuum may be applied in said chamber about said drainage passages to cause a portion of the excess water in said container to readily vaporize to thereby flush the remaining excess water from the tobacco and into said chamber through said drainage passages.

18. In a method of processing tobacco comprising the steps of shredding tobacco leaves, placing the tobacco shreds in a container, adding water to said container to turgorize said tobacco shreds, freezing the turgorized tobacco, and freeze drying the frozen tobacco, the improvement comprising the steps of placing said container and the tobacco therein under a vacuum immediately following said turgorizing step and thereby applying a positive pressure to the remaining excess water to separate it from the tobacco by vaporizing a portion of the excess water, recovering said excess water which is forced from said container and the tobacco shreds therein, reusing the recovered excess water for turgor conditioning filler material, freezing the turgorized filler material, freeze drying the frozen filler material, and adding the freeze dried filler material to said freeze dried tobacco shreds.

19. In a method of processing tobacco according to claim 18 wherein said filler material comprises tobacco leaf stems.

20. Tobacco processing apparatus comprising a vacuum chamber for turgorizing tobacco shreds, means for draining the excess water used in the turgorizing of the tobacco, means for collecting and feeding dry tobacco stems, means for spraying said dry tobacco stems with said excess water drained from said vacuum chamber, means for freezing said wet tobacco stems and said turgorized tobacco shreds, means for freeze drying the frozen tobacco stems and tobacco shreds, and means for mixing the freeze dried tobacco stems and tobacco shreds to form a tobacco product for use in the manufacture of cigarettes.

21. Tobacco processing apparatus according to claim 20 including means for rolling and shredding said freeze dried tobacco stems prior to mixture with said freeze dried tobacco shreds.

22. An improved method for processing tobacco of the type having the steps of shredding tobacco leaves, placing the tobacco shreds in a container, adding water to said container to turgorize said tobacco shreds, freezing the turgorized tobacco, and freeze drying the frozen tobacco, wherein the improvement comprises the steps of:

a. providing a plurality of drainage passages in the container and underlying the tobacco;

b. blocking said drainage passages during turgorizing;

c. thereafter unblocking said drainage passages and permitting gravitational flow of the excess water downward through the tobacco in the container and outward through the passages; and

d. applying a differential pressure across the underlying drainage passages in the container to separate the excess water from the turgorized tobacco.

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