March 21, 1939. A. PODMORE 2,151,527

PREPARATION OF CUT TOBACCO

Filed May 18, 1935 2 Sheets-Sheet 1

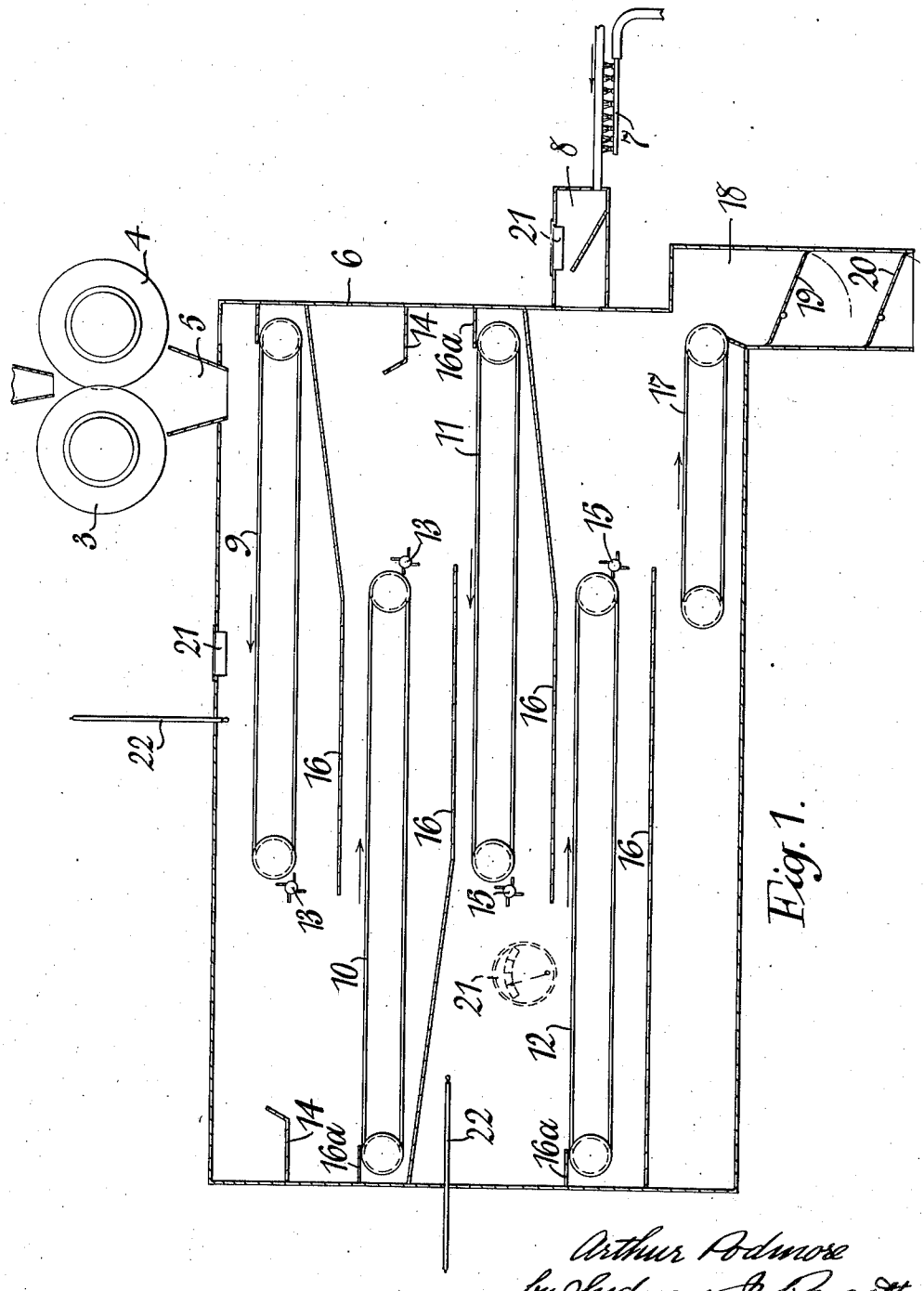


Fig. 1.

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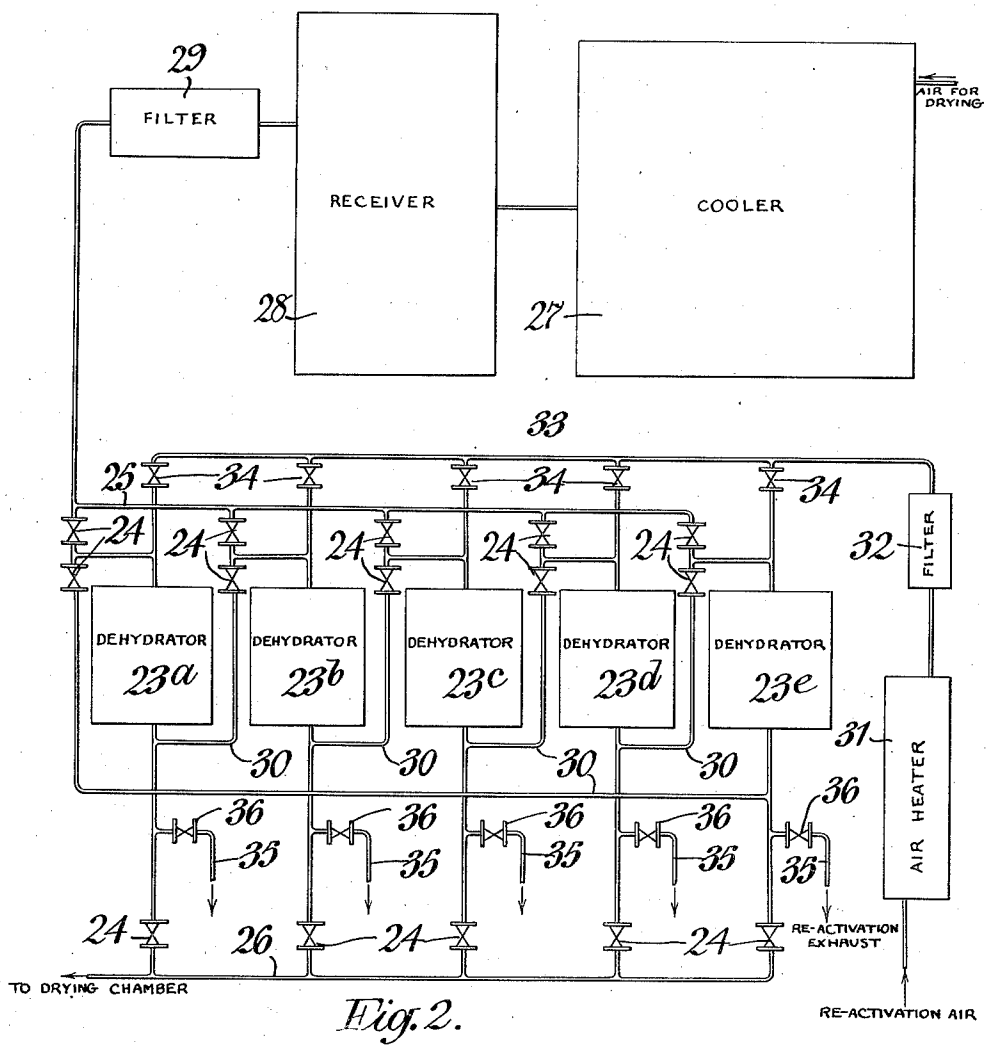


Fig. 2.

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Patented Mar. 21, 1939 2,151,527

UNITED STATES PATENT OFFICE

2,151,527

PREPARATION OF CUT TOBACCO

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Application May 18, 1935, Serial No. 22,223
In Great Britain May 26, 1934

9 Claims. (Cl. 131—60)

This invention relates to the preparation of tobacco whereby the tobacco leaves are shredded and the cut tobacco brought to a state suitable for the formation of cigarettes by the usual cigarette rod making machine.

According to the usual methods employed in the preparation of cut tobacco, the tobacco leaves are moistened in any suitable way as by steaming in order that they may be separated and also render them in a state fit for subsequent treatment without producing too much breakage of the leaf and consequent dust.

The amount of moisture added in some tobaccos is about 7 per cent. making a total moisture in the bundle of about 17 per cent.

After separation of the leaves which may be effected by the operator bending the leaves while holding one end of the bundle they are passed through a stemming machine or similar device by which the mid-rib is removed, or the mid-rib may be removed by hand. The leaves are then passed to a cutting machine by which they are cut or shredded.

The cutting machine mostly employed in the trade is of the guillotine type, and in order to use such machine economically it is necessary to feed the leaves in bundled form so that a plurality of leaves is cut at the same time. For this purpose the leaves are fed under compression to the machine and advanced intermittently a suitable distance according to the cut desired. It is found in practice that in order to obtain efficient cutting by this method the degree of compression is such that a considerable bruising of the leaves occurs which results in a darkening of the cut tobacco.

The next stage in the process consists in partially drying the cut tobacco as it contains too much moisture to pass it direct to the cigarette making machine.

The usual type of drying machine employed consists in a drier drum which was heated by suitable means such as steam heated coils. With such an apparatus it was found that the strands of tobacco come into direct contact with the heated pipes, the temperature of which is so high that the strands become brittle and break. A long strand thus becomes two shorter strands each of which strands has two brittle ends which crumble into dust.

The drying of the cut tobacco, usually effected at about 150° F., results in driving off about 4 per cent. of the moisture. After drying, the tobacco was passed through a cooling apparatus.

The above method of preparation of the cut tobacco has certain disadvantages which it is the object of the present invention to avoid.

First, owing to the harsh treatment of the leaves during the cutting, viz. the compression of the leaves as fed to the cutter, a greater amount of moisture has to be added than is desirable for the subsequent steps. This leads to a second objectionable feature in that in order to reduce the moisture to the desired content, it is necessary to dry at a high temperature or alternatively continue the drying over a relatively long period.

An object of the present invention is to provide an improved method of treatment which utilizes steps, known by themselves, wherein the cut tobacco is of superior quality particularly as regards colour.

According to the present invention the cutting or shredding of the tobacco leaves is effected under conditions which preclude subjecting the leaves to a bruising pressure and the drying of the cut tobacco is effected by means of predried or dry, preferably heated, air.

The cutting or shredding is preferably effected without removal of the mid-rib, the pieces of which are removed by winnowing, preferably simultaneously with the drying of the cut tobacco.

The invention also consists in a plant, comprising in combination a cutting device consisting of intermeshing disc cutter knives, and a drying chamber to which the cut tobacco may be delivered direct from the cutting machine, said chamber being provided with a plurality of conveyors, preferably a vertical series by which the tobacco is caused to travel along a serpentine path, means being provided for causing predried or dry, preferably heated, air to flow through the chamber.

The delivery from one conveyor to the next is preferably effected by paddle wheels which open up the tobacco and cause the separation of the pieces of mid-rib.

Owing to the gentle treatment of the tobacco leaves during cutting, less moisture is added to the leaves whereby the subsequent drying time is reduced.

Further features of the invention will be hereinafter described.

In the accompanying diagrammatic drawings,

Figure 1 illustrates a cutting machine and drying chamber according to the invention.

Figure 2 illustrates a plant for preparing the dry air and for reactivating the dehydrators.

In carrying the invention into effect according to one convenient mode, by way of example, a

relatively small percentage of moisture is added to the tobacco leaves in the bundle form. The leaves are then separated in any suitable manner and are fed to a cutting device of the type comprising intermeshing rotary cutting discs 3 and 4.

The cutting machine may be of the type described in my United States Patent No. 2,066,053, issued December 29, 1936.

It is noted that the leaves are passed through the cutting machine without removal of the mid-rib which thus becomes cut up into pieces which are dealt with at a later stage.

By cutting or shredding the leaves in a machine of the type referred to, substantially no pressure is exerted on the leaves as they are fed to and passed through the machine whereby bruising with the objectionable darkening of the cut tobacco is avoided.

Instead of an intermeshing disc cutting machine any other form of cutting device may be employed provided it is not necessary to use pressure on the leaves.

The removal of the pieces of mid-rib may be effected at this stage by any known type of winnowing device but preferably the winnowing is effected concurrently with the drying of the cut tobacco.

According to the preferred form of dryer a chamber 6 is provided through which predried or dry air is circulated. The air may be cold but is preferably heated by the provision of suitable heating appliances 7 at the entry 8 for the air. These appliances may comprise steam heated coils, gas burners, or electrical heating means over which the air is passed. In addition or alternatively the air may be heated by similar means during its passage through the drying chamber. The cut tobacco may be delivered direct from the cutting machine 3, 4 into the drying chamber 6 or a belt or other suitable means may convey the tobacco from the cutter to the inlet 5 to the drying apparatus.

Within the chamber a series of endless conveyors 9, 10, 11, 12 and 17 are mounted one above the other, the conveyors preferably lying horizontally. The tobacco which is fed to the uppermost conveyor 9 is delivered therefrom on to the next conveyor 10 below and then travels in the opposite direction and so on, the tobacco thus travelling through the chamber in a serpentine path. The drying air flows in countercurrent to the travel of the tobacco, baffles or partitions 16 being provided for ensuring the flow of the drying air along the desired paths.

At the delivery end of each of the conveyors 9 and 10 a winnowing device 13 is provided comprising a high speed paddle wheel on to which the tobacco is fed by the respective conveyor.

The paddle wheel is adapted to project the heavier pieces of stem or mid-rib into a box or compartment 14 at the end of the chamber from which the pieces may be removed from time to time through suitable doors in the walls of the chamber 6. The paddle wheel also has the effect of opening the cut tobacco and turning it over as it delivers or showers it to the conveyor next below so that all parts of the tobacco will be subjected to the influence of the drying air.

Baffles 16a are provided at the feeding ends of the conveyors to close the space between the end of the conveyor and the wall of the chamber. These baffles may be inclined so that any tobacco caught thereon will slide down on to the conveyor. Paddle wheels 15 are also provided in association with the conveyors 11 and 12 and act to open out and turn over the tobacco.

From the final conveyor of the series, the conditioned tobacco is delivered to the outlet 18.

The outlet 18 for the tobacco which is adjacent the air inlet 8 may be provided with automatically operating delivery doors to avoid a short circuiting of the air.

This device may comprise a chute in which two flap valves 19 and 20 one above the other are provided forming an air trap. The tobacco collects upon the upper valve 19 which opens to release the tobacco under a predetermined weight. As the tobacco falls on to the lower valve the upper valve closes.

Where winnowing takes place before drying, a greater overlap of the conveyors than that indicated may be provided.

It will be appreciated that as only a relatively small percentage of moisture was added to the tobacco leaves prior to the cutting operation, it is only necessary to continue the drying process for a sufficient time to allow the predried air to absorb the moisture in excess of that which is considered ideal for the cigarette making machine. Thus the time of drying is considerably reduced as compared with that taken up according to the usual method of procedure, and the disadvantages arising from excess moisture and relatively extreme heat during drying are obviated.

Hygrometers 21 and thermometers 22 may be provided to indicate the humidity and temperature conditions prevailing.

Means may be provided for controlling the moisture content of the cut tobacco in an automatic manner; thus means operating in accordance with the moisture content of the tobacco as delivered to the drying apparatus may be provided for controlling the adjustment (*a*) of the speed of travel of the conveyors 9, 10, 11, 12 and 17 in the drier, thus controlling the time of treatment, (*b*) the heating of the chamber by the passage of the hot air therethrough and (*c*) the volume of the predried or dry air passing through the chamber.

These adjusting means may control (*a*), (*b*) and (*c*) as above, individually or combined.

The air delivered to the drying chamber may be treated in any convenient manner for removal of the moisture therefrom and according to one mode it may be passed through dehydrating chambers filled with a suitable dehydrating agent, for example, silica gel.

Figure 2 illustrates a convenient arrangement of dehydrating plant. The dehydrating chambers are coupled up under the control of valves 24 to common pipe lines 25 and 26, the pipe line 25 passing air from the cooler 27, receiver 28, and filter 29 while the dried air flows to the pipe line 26 and thence to the drying chamber 6.

Pipe lines 30 are provided whereby two or more chambers may be used in series.

Reactivation air may be passed to the chambers 23a etc., by way of heater 31, filter 32 and common pipe line 33 under control of the valves 34, moisture laden air flowing to exhaust by way of the outlets 35 under control of the valves 36.

It will be appreciated that the valves 24 and 34, 35 will be used alternately according to whether the chambers 23a, etc., are being used as dehydrators or are being reactivated.

By preparing cut tobacco according to the improved process as compared with the normal

method employed the following advantages are obtained:

(1) Bruising of the tobacco leaves and consequent darkening of the product is avoided.

(2) The apparatus is simplified in that the usual stemming or cutting out of the midrib is unnecessary, thus avoiding the use of complicated machinery and replacing it by a simple winnowing device.

(3) Owing to the reduction in the initial added moisture content, the time in drying the cut tobacco is considerably reduced and further by utilizing the predried or dry air method, with the absence of heated pipes in the drying chamber, the spoiling of the tobacco during the drying step is avoided.

While in the drying apparatus illustrated the drying air flows in countercurrent to the path of travel of the tobacco it will be noted that the air may be caused to flow along any other suitable path. For example the conveyors may comprise perforated bands through which the drying air may percolate.

I claim:

1. Apparatus for the preparation of tobacco for the manufacture of cigarettes comprising in combination an intermeshing disc cutting machine for shredding unstemmed tobacco, means for winnowing the cut tobacco to remove the pieces of mid-rib, means for delivering the winnowed tobacco through a drying chamber having a series of conveyors by which the tobacco is caused to travel through the chamber, and means for passing dry air through the chamber in contact with the tobacco, said winnowing means acting in part at least for turning over positively, and blending progressively, said shredded tobacco as it advances from conveyor to conveyor through the chamber.

2. Apparatus for the preparation of tobacco for the manufacture of cigarettes comprising in combination an intermeshing disc cutter for shredding unstemmed tobacco leaves, means for delivering the cut tobacco to a drying chamber having a series of conveyors by which the cut tobacco is caused to travel through the chamber, rotary winnowing means serving during the drying within the chamber, for acting positively upon pieces of mid-rib as the tobacco travels through the drying chamber, to expel said pieces mechanically from the tobacco, and means for passing dry air through the chamber in contact with the tobacco.

3. Apparatus for the preparation of tobacco for the manufacture of cigarettes, comprising in combination an intermeshing disc cutter for shredding unstemmed tobacco leaves, means for delivering the shredded tobacco to a drying chamber having a series of conveyors by which the shredded tobacco is caused to travel through the chamber, winnowing means acting during the drying within the chamber for removing pieces of mid-rib, means for passing dry air through the chamber in contact with the tobacco, and means for heating the dry air prior to its contact with the tobacco.

4. Apparatus for the preparation of cut tobacco comprising in combination means for shredding tobacco leaves without subjecting them to a bruising pressure, means for delivering the cut tobacco to a drying chamber, conveying means for conveying the tobacco through the chamber, winnowing means within the chamber for removing pieces of mid-rib, and means for passing dry air through the chamber in contact with the tobacco.

5. Apparatus for the preparation of cut tobacco comprising in combination an intermeshing rotary disc cutting machine, a drying chamber having a plurality of superposed conveyors arranged to convey the cut tobacco through the chamber along a serpentine path, means associated with the conveyors for winnowing the tobacco to remove the pieces of mid-rib and open out the tobacco, means for supplying dry air to the chamber and baffles between the conveyors to direct the flow of drying air through the chamber, said drying and winnowing cooperating to produce complete separation of the stems from the remaining structure of the leaves.

6. Apparatus for drying tobacco for cigarette manufacture comprising a drying chamber, a disk shredder adapted to shred unstemmed tobacco leaves and deliver the shredded tobacco to said chamber, and air-conditioning means for reducing the moisture content of atmospheric air and circulating the same through said chamber to dry the tobacco therein, and means for winnowing out the stem fragments from the shredded tobacco in said chamber.

7. A method of preparing tobacco for the manufacture of cigarettes, consisting of shredding unstemmed tobacco leaves, allowing the stem parts to remain, advancing said shredded tobacco, including said stem parts, through a drying environment consisting exclusively of dry air, and expelling said stem parts forcibly by the application of a rotary mechanical force directly to said parts.

8. The method of preparing tobacco for the manufacture of cigarettes, said method consisting of shredding unstemmed tobacco leaves, allowing the stem parts to remain, expelling said stem parts forcibly by the application of rotary mechanical forces directly to said parts, and drying the shredded tobacco exclusively by means of dry air, said rotary mechanical forces being applied at intervals during said drying of the shredded tobacco.

9. The method of preparing tobacco for cigarette manufacture, consisting of shredding unstemmed tobacco leaves, allowing the stem parts to remain, advancing the shredded tobacco in a stream under exposure to a drying flow of exclusively dry air, and expelling said stem parts forcibly by the application of rotary mechanical forces directly to said parts at intervals during said drying operation, and utilizing said rotary mechanical forces also to turn over and blend said shredded tobacco.

ARTHUR PODMORE.