

June 11, 1940.

R. D. TOUTON

2,204,240

METHOD AND APPARATUS FOR CONDITIONING TOBACCO

Filed Feb. 11, 1936

2 Sheets-Sheet 1

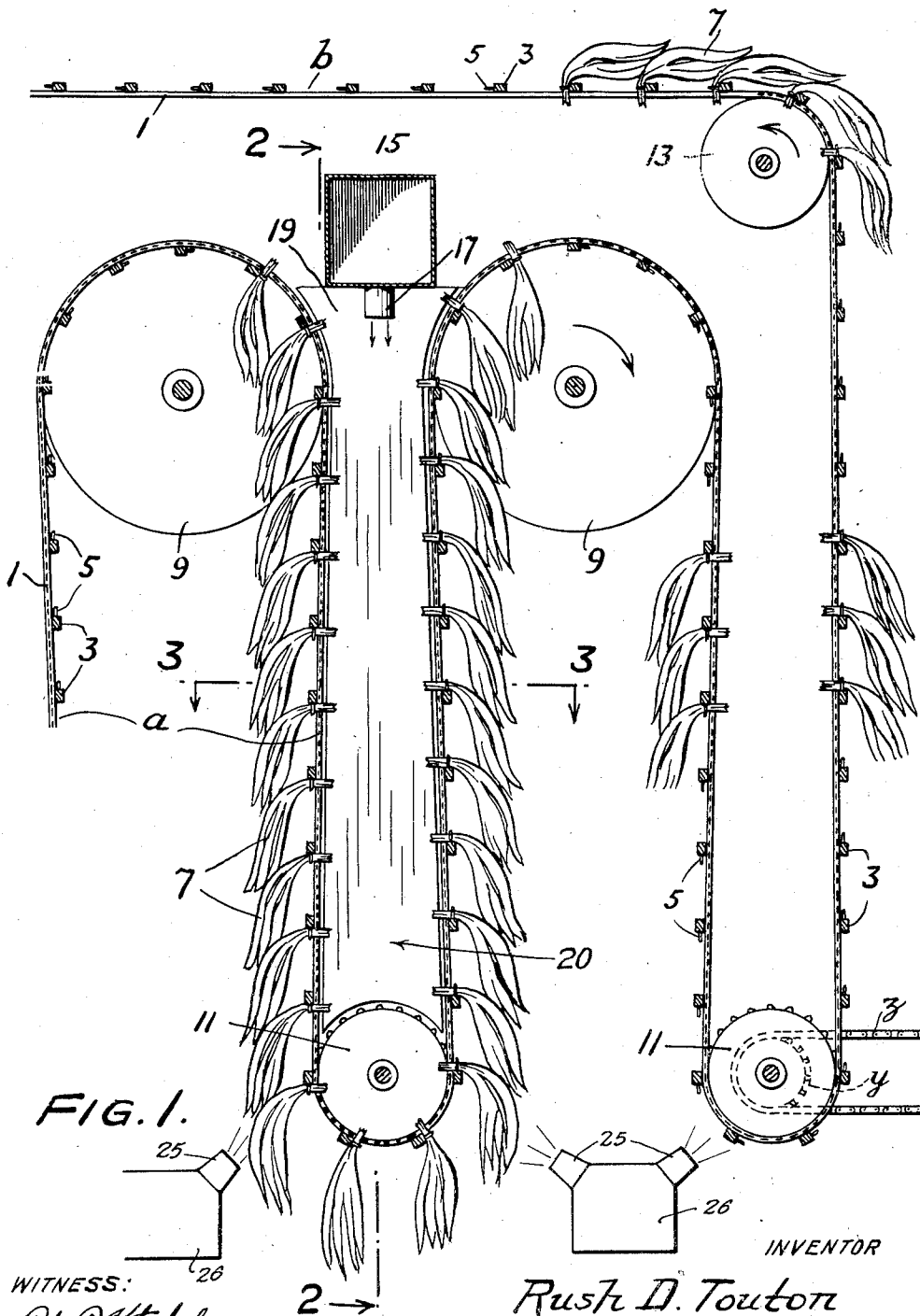


FIG. 1.

WITNESS:

R. D. T. Touton

INVENTOR

Rush D. Touton

BY

Russell Harding -
ATTORNEYS.

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R. D. TOUTON

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2 Sheets-Sheet 2

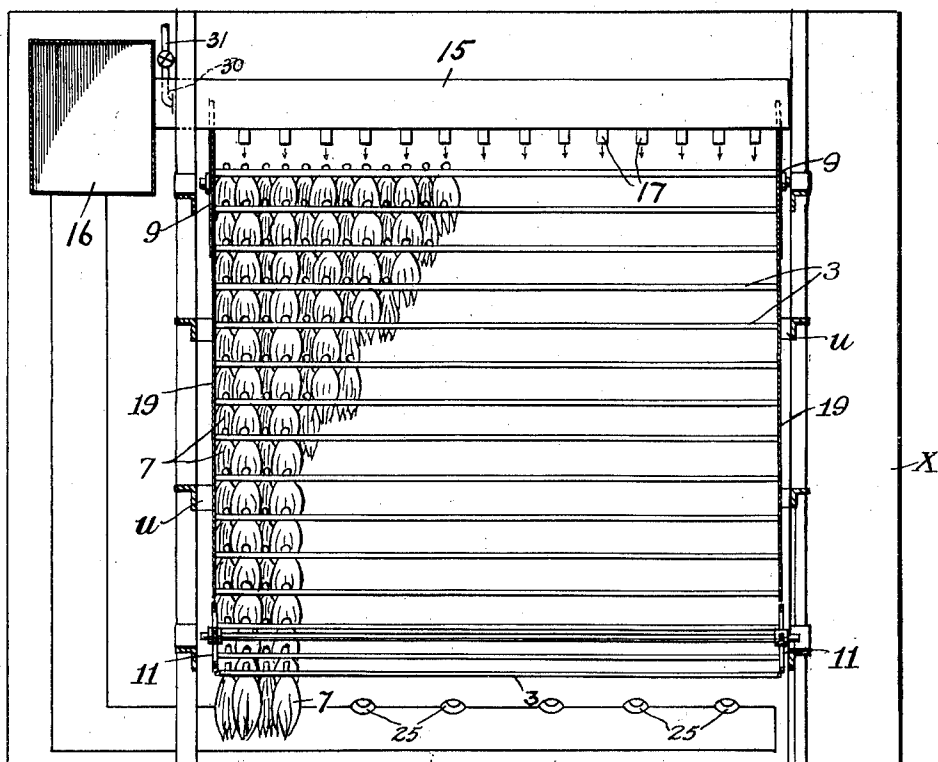


FIG. 2.

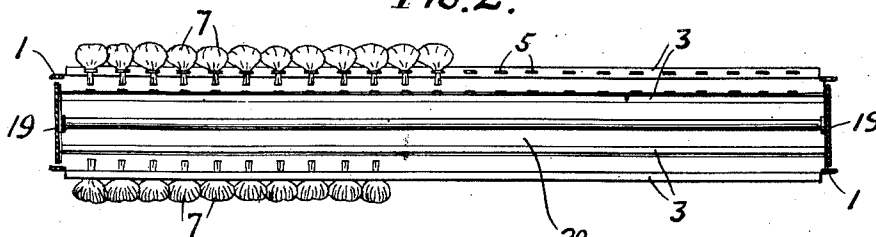


FIG. 3.

WITNESS:

Robt. R. Mitchell.

INVENTOR

Rush D. Touton

BY

Besser & Harding

ATTORNEYS.

UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR CONDITIONING TOBACCO

Rush D. Touton, Cynwyd, Pa., assignor to Wurton Machine Company, Philadelphia, Pa., a corporation of Pennsylvania

Application February 11, 1936, Serial No. 63,313

8 Claims. (Cl. 131—136)

This invention relates to method and apparatus for conditioning tobacco.

More particularly, in accordance with this invention a method and apparatus are provided whereby tobacco will be conditioned for any desired purpose. Thus, for example, tobacco may be conditioned by moistening or drying to adjust its moisture content for fermentation, by moistening to prepare it for sorting, packing, for use in the manufacture of cigars, or other use.

It is the principal object of this invention to provide a method and apparatus for conditioning tobacco that will insure that the butts of the tobacco hands will be adequately treated and properly conditioned.

In United States Patent No. 2,151,947, dated March 28, 1939, there is described and claimed a method and apparatus for conditioning hands of tobacco for various purposes. The apparatus there described comprises, broadly, a chamber in which travels a conveyor arranged with substantially vertical reaches and adapted to support bunches or hands of tobacco. Within the chamber there is arranged a system of ducts provided with outlets arranged with respect to the conveyor for the delivery to the chamber of conditioned gas in a manner to promote general circulation with respect to the tobacco and for the direction of conditioned gas into the bunches or hands. Means for the conditioning of gas, as air, with respect to temperature and humidity or moisture content are provided and are so arranged as to effect recirculation of air from the chamber through the system of ducts.

The conditioning of the tobacco is carried out by subjecting tobacco in bunches or hands to a gas, as air, conditioned with respect to the nature of the treatment of the tobacco, as moistening or drying. The gas, as air, is generally circulated with respect to the tobacco and may be forcefully directed into the hands or bunches for the purpose of opening or spreading the leaves, and, at the same time, the hands or bunches are subjected to movement through a circuitous path.

The present invention relates to improvements in the method and apparatus described in the above referred to application for accomplishing the objects referred to above.

From the broad method standpoint this invention contemplates subjecting the butt portions and the leaf portions of hands of tobacco to conditioned atmosphere at different pressures. Preferably the butt portions of the hands will be subjected to conditioned atmosphere at a higher

pressure than that to which the leaf portions are subjected at the same time.

The apparatus in accordance with the present invention comprise, in addition to the chamber, conveyor and conditioned gas distribution system described above, means for maintaining a higher pressure between opposing vertical reaches of the conveyor than outside of such reaches, as, for example, by introducing a large quantity of conditioned gas between the reaches or by partially enclosing the conveyor and tending to confine the conditioned gas, as it issues from the gas distribution system, between the vertical reaches of the conveyor, and so cause it to pass outwardly over the hands of tobacco on the conveyor from the butts toward the tips thereof.

The more specific details of the apparatus according to this invention will become apparent from the following detailed description of a preferred embodiment of the apparatus and its mode of operation with reference to the accompanying drawings in which:

Figure 1 is a fragmentary sectional view showing one end of a conveyor system provided with enclosing means in accordance with this invention,

Figure 2 is a fragmentary sectional view taken along the line 2—2 of Figure 1, and

Figure 3 is a horizontal sectional view taken on the line 3—3 of Figure 1.

In the drawings there is indicated an endless conveyor which, in the form illustrated, comprises a pair of endless chains 1, 1 from which are supported at spaced intervals cross bars or members 3. Secured to the crossbars 3 at closely spaced intervals are means 5 for holding hands of tobacco 7. These means may comprise, for example, bands of rubber secured at their ends to the crossbars.

The chains 1, 1 pass over a series of relatively large sprockets 9 secured on shafts journaled in the upper part of the conveyor frame, and also over a series of relatively small sprockets 11 secured on shafts journaled in the lower part of the conveyor frame. In Figure 1 only a pair of large sprockets 9 and a pair of small sprockets 11 at one end of the conveyor are shown, but it will be appreciated that the complete conveyor will comprise a plurality of sprockets 9 and 11, each type positioned in line in the upper and lower parts, respectively, of the frame and staggered with respect to one another.

By reason of this arrangement of the series of sprockets the conveyor will have a number of

vertical reaches *a* in its travel over the series of sprockets. The conveyor at the end of the series of sprockets 9, 11 will pass, as shown in Figure 1, over the sprocket 13, positioned in the upper part of the frame, and back in a horizontal return reach *b* to the other end of the conveyor system.

The conveyor may be driven through a driving sprocket *y* on one of the shafts of the sprockets 9 or 11 by suitable connection with any suitable prime mover, as through a chain *z* or belt from an electric motor.

It will be understood that the entire conveyor system is positioned within a substantially closed room or chamber *x*, in which, by means of any suitable air-conditioning apparatus, conditioned gas, as air, of desired temperature and moisture content for effecting the desired treatment of the tobacco, as moistening, drying, cooling, fermenting, etc., is generally circulated about the conveyor.

A main gas distributing duct 16 leads conditioned gas from the conditioning apparatus into a plurality of cross ducts 15 extending above and between each pair of relatively closely adjacent vertical reaches *a* of the tobacco conveyor. The conditioned gas is discharged from ducts 15 through a plurality of downwardly directed nozzles 17.

Supported by suitable means *u* from the conveyor frame *v* are a plurality of plates or shields 19, positioned preferably directly above and in line with the sprockets 11 and extending upwardly between the relatively closely adjacent vertical reaches of the conveyor chains 1 to a point adjacent the gas distributing duct 15. These plates 19, together with the closely arranged and lapped hands of tobacco on the conveyor and the ducts 15, form a plurality of partially enclosed spaces 20 in the conveyor system into which conditioned gas is discharged from the nozzles 17.

In operation, the conveyor will be put in motion, in the direction of the arrows, and charged with bundles or hands of tobacco 7 by inserting the butt ends thereof beneath the holding means 5, 5 on crossbars 3, 3 in such a manner that the butt ends will be directed toward the inside of the conveyor system. At the same time the air-conditioning apparatus is started and conditioned air is circulated from main duct 16 through the chamber in which the conveyor travels and is also discharged from the nozzles 17.

Air for general circulation is discharged from the nozzles 25 leading from a duct 26 connected with the main duct 16. The air discharged from duct 17 also, as will be appreciated, contributes to the air in general circulation.

In the travel of the conveyor through the vertical reaches *a* the leaves of the bunches or hands of tobacco will be, as they become progressively more moist and flexible, shingled with inversion of the hands by swinging through an arc of 180° in the passage of the conveyor about the sprockets 9 and 11. The shingled hands of tobacco, closely spaced along the crossbar 3, 3, will form, as it were, a mat and will so impede somewhat the passage of the conditioned air discharged from the nozzles 17 from the spaces 20 between the vertical conveyor reaches *a*.

The plates or shields 19 will, of course, prevent this conditioned air from passing out endwise between the conveyor reaches and so escaping from the spaces 20.

As a consequence, the conditioned air within the partially enclosed spaces 20 will be under a

slight positive pressure and will escape from these spaces by passing through and over the shingled bunches or hands of tobacco on the conveyor, and in so doing will first be forced directly against the butts of the hands, which project into the spaces 20. In this manner the butts of the tobacco hands will receive adequate exposure to the freshly conditioned gas, a point largely neglected in the operation of prior apparatus, and will so be properly conditioned.

As will be obvious, the gas passing through and over the shingled bunches or hands of tobacco on the conveyor on passing over the butts will not only be under a slight positive pressure, but will also have maximum moisture content as compared with its moisture content as it passes over the outer portions of the leaves of the hands, inasmuch as it will lose moisture to the butts and hence, as it progresses through and over the shingled bunches or hands, its moisture content as well as its positive pressure will decrease. As a result, the portions of the hands requiring initially the greatest moisture; i. e., the butts and the leaf portions adjacent thereto, will be subjected to the conditioned gas at its maximum pressure and moisture content, while the portions of the leaves more remote from the butts will initially be subjected to the gas with reduced or less moisture content and positive pressure.

If desired, the object can be obtained without provision of the plate 19 by providing for the introduction, through nozzles 17 into spaces 20, of such a large quantity of air as to maintain a positive pressure. It will be noted that even though plates 19 are omitted a sufficient quantity of air may be readily introduced into spaces 20 to maintain a positive pressure therein, despite the lateral escapes permitted by the omission of plates 19.

Further, if desired the condition of the air introduced through nozzles 17 and available to the butts may be different than that available to the leaves. Thus, variously it will be advantageous that the air introduced into spaces 20 and available to the butts be of higher moisture content than that available to the leaves. Such may be accomplished by the introduction of water into conduit 15 adjacent to its connection with conduit 16, as, for example, by means of a spray head 30 inserted in conduit 15 and connected by means of a valved conduit 31 with a source of water.

As will be appreciated, numerous and various modifications in detail may be made in the apparatus above described without departing from the scope of this invention.

What I claim and desire to protect by Letters Patent is:

1. In apparatus for conditioning tobacco including a chamber and means for circulating conditioned gas within the chamber, the combination of a conveyor for the tobacco positioned within the chamber and having a pair of substantially vertical reaches, a plurality of plates positioned between said vertical reaches adjacent the edges of said conveyor and extending substantially the entire length and width of the gap between said reaches, and means for introducing conditioned gas into the space between said reaches and inside of said plates.

2. In apparatus for conditioning tobacco including a chamber and means for circulating conditioned gas within the chamber, the combination of a conveyor for the tobacco positioned

within the chamber and having a pair of opposed reaches provided with means for the support of hands of tobacco in partially overlapped relation, a plurality of plates spaced from the walls of the chamber and positioned between said reaches adjacent the edges of said conveyor and extending substantially the entire length and width of the gap between said reaches, and means for introducing conditioned gas into the space between said reaches and inside of said plates.

3. In apparatus for conditioning tobacco including a chamber and means for circulating conditioned gas within the chamber, the combination of a conveyor for the tobacco positioned within the chamber and having a pair of substantially vertical reaches, means positioned between said reaches and adjacent the edge of said conveyor adapted to substantially close the gap between said reaches at said edge of the conveyor, and means for introducing conditioned gas into the space between said reaches and back of said last named means.

4. In apparatus for conditioning tobacco including a chamber and means for circulating conditioned gas within the chamber, the combination of a conveyor for the tobacco positioned within the chamber and having a pair of substantially vertical reaches, means for introducing conditioned gas into the space between said reaches, and means adapted to obstruct the outflow of conditioned gas laterally from between said reaches and cause said conditioned gas to flow principally outwardly from said space over and about the tobacco carried on said conveyor.

5. In apparatus for conditioning tobacco including a chamber and means for circulating conditioned gas within the chamber, the combination of a conveyor for the tobacco positioned within the chamber and having a plurality of substantially vertical reaches spaced in pairs relatively closely together, said conveyor including a pair of spaced apart endless chains and a plurality of crossbars extending between and carried by said chains, a plurality of plates positioned between said relatively closely spaced vertical reaches in line with the conveyor chains to substantially close the gap between said reaches, and means for introducing conditioned gas into the space between said reaches and inside of said plates.

6. The method of conditioning tobacco which includes moving hands of tobacco in partially overlapped relation through a chamber while subjecting a portion of the leaves of the hands and the butt portions thereof, respectively, to conditioned air from different sources at different pressures.

7. The method of conditioning tobacco according to claim 6 characterized by the fact that the butt portions of the hands and a portion of the leaves are subjected to conditioned air at a pressure and moisture content higher and from a different source than that to which the outer leaf portions are subjected.

8. In apparatus for conditioning tobacco including a chamber and means for circulating a conditioned gas within the chamber, in combination, a conveyor positioned within the chamber and having a pair of opposed reaches provided with means for the support of hands of tobacco thereon in partially overlapped relation, whereby said hands of tobacco are supported in partially overlapped relation on said opposed reaches and afford an obstruction to the passage of gas from between the reaches outwardly through said reaches and means for the introduction of conditioned gas into the space between said reaches.

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