

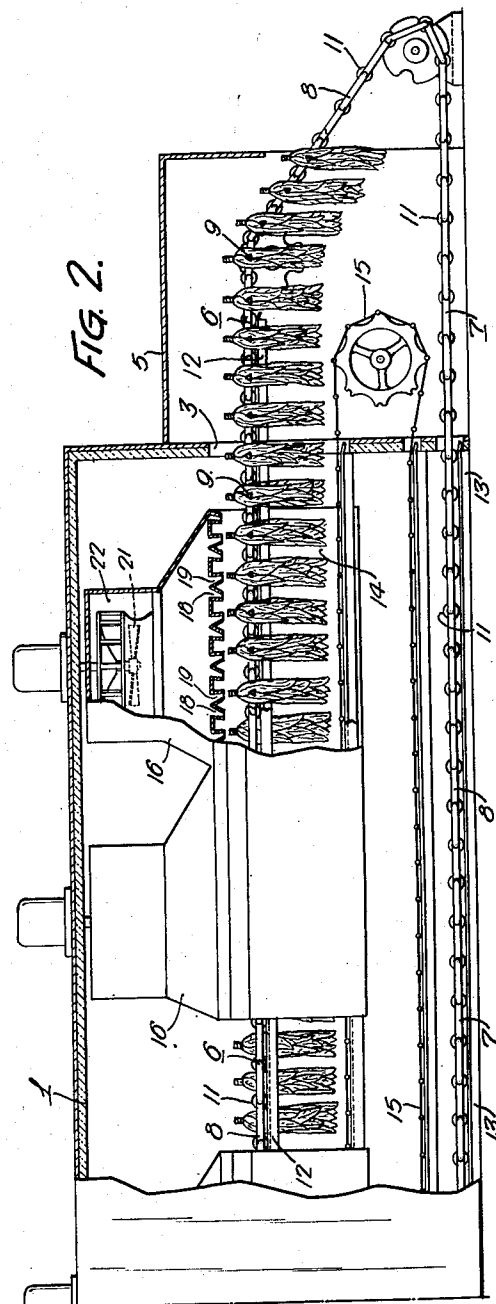
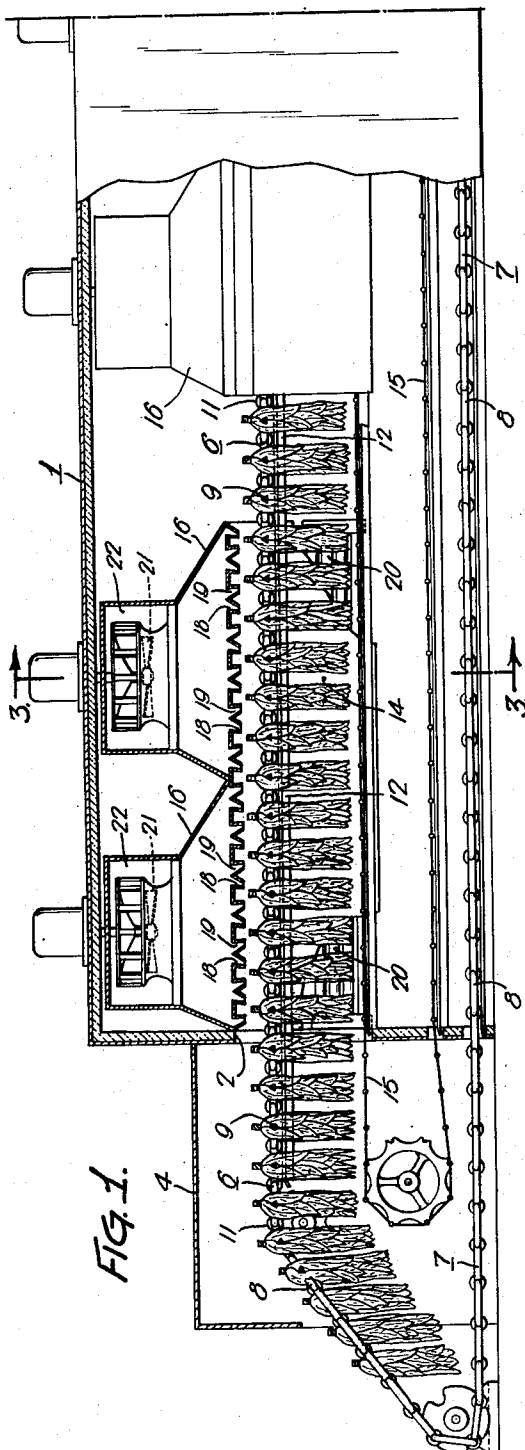
May 25, 1954

S. BOGATY ET AL
TOBACCO DRYING APPARATUS

2,679,115

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2 Sheets-Sheet 1



Inventors:-
Stanislaus Bogaty
Alpheus O. Hursthal
by their Attorneys
Hudson & Hudson

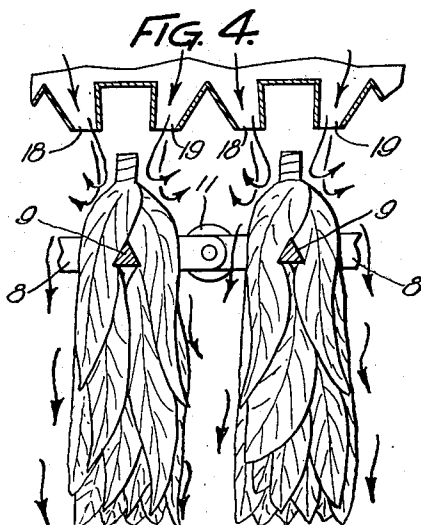
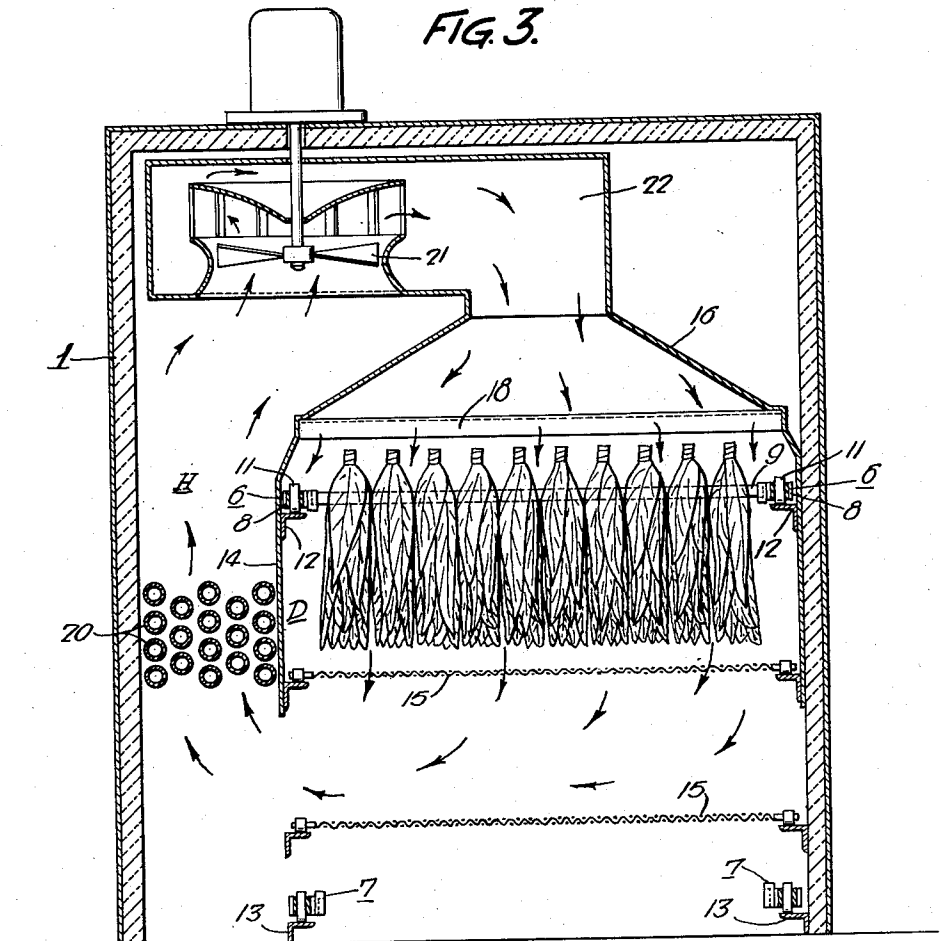
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Howson & Howson

UNITED STATES PATENT OFFICE

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TOBACCO DRYING APPARATUS

Stanislaus Bogaty, Philadelphia, and Alpheus O. Hurxthal, Wyncote, Pa., assignors to Procter & Schwartz, Inc., Philadelphia, Pa., a corporation of Pennsylvania

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5 Claims. (Cl. 34-225)

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This invention relates to new and useful improvements in apparatus for drying tobacco.

For many years it has been the practice to dry tobacco leaves by tying them in bundles and supporting the tobacco bundles on horizontal sticks supported between a pair of endless chains which operate to convey the sticks and tobacco bundles thereon continuously through a drying chamber. The bundles are mounted straddle-fashion on the sticks one against the other solidly along the length of each stick, and the sticks are spaced uniformly along the chains of the conveyor so that the arrangement forms a substantially continuous bed of bundled tobacco passing through the drying chamber.

In the present form of stick and apron tobacco dryer the temperatures which are usually employed are as high as the tobacco will stand without being damaged due to the excess temperature or over-drying of some portions of the tobacco. In addition to drying, the uniformity of the drying is highly important because after the tobacco has been passed through the dryer, and the cooling and ordering sections, it is then packed down in hogsheads and put in storage for ageing for a period of one to four years. If the heads and shoulders of the bundles of tobacco are under-dried this excess moisture will cause mold or rot and sometimes damage due to spontaneous combustion. On the other hand, to be certain of adequate drying of the heads and shoulders, if the leaves which are the important part of the bundle are over-dried or over-heated, damage occurs there.

With the present type of circulation, the air passes over the leaf part of the bundle with a greater velocity and with greater drying effect and it becomes necessary to retain the tobacco in the drying zone until the heads and shoulders are properly dried. Matters are made considerably worse by the fact that there is more moisture in the shoulders and in the head of the bundle by virtue of two reasons. In the shoulders there is more leaf and a larger bulk of tobacco and as this part of the stem is approached, there is a much greater percentage of stem. The stem carries a larger percentage of moisture than the leaf so that it is apparent that the over-drying of the rest of the leaf is brought about while trying to dry the shoulder and head.

According to the present invention, the drying air is directed angularly against the head and shoulder of the bundle. This produces a much more rapid rate of evaporation due to the pressure and velocity with which the air strikes the bundle at this point. The angular direction

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which the air is caused to strike the bundle produces a turbulence or recirculation so that the heated air is caused to do far more work at the head and shoulder of the tobacco than by the present method. This has the advantage that the temperature of the air which is impinged against the head and shoulders of the bundle may be at a higher temperature than heretofore, and due to the high rate of evaporation, the temperature of the tobacco itself will not be raised to a point resulting in damage to the tobacco.

Also, the air which then passes down through the lower part of the bundle of tobacco has been reduced in temperature because of the work done and has arrived at a higher humidity. In this way the lower part of the tobacco which is the most valuable and most sensitive portion is subjected to a lower temperature and the higher humidity retards the drying. This results in drying the tobacco not only at a much faster rate than it has been able to accomplish heretofore but also results in a more uniform moisture distribution in the bundle of tobacco.

Bearing in mind the foregoing, the principal object of the present invention is to provide in a drier for bundled tobacco, a novel means for circulating the heated drying air in a manner to produce a high rate of evaporation around and within the dense head and shoulder portions of the tobacco bundle without over-drying the tip and lower ends of the bundles of tobacco.

Another and equally important object of the invention is to provide in a drier for bundled tobacco, a novel means for circulating the heated drying medium to effect a strong direct impingement of the drying medium against the upper portion of the tobacco bundle with a resultant increase in the speed of drying and consequent lowering of the temperature of the drying medium so that, as the latter moves on downwardly around the bundles at a lower temperature and higher humidity, drying of the tips and lower ends of the bundles is completed substantially coincident with the drying of the more dense head and shoulder portions of the tobacco bundles.

Another object of the invention is to provide a drier for bundled tobacco as set forth which is characterized by a substantially faster rate of drying and greater uniformity of drying of the tobacco bundles.

These and other objects of the invention and the various details and features of the construction and operation thereof are hereinafter fully set forth and described with reference to the accompanying drawing, in which:

Figs. 1 and 2 are vertical sectional views taken longitudinally through the opposite end portions respectively of a conventional type bundled tobacco drier embodying the present invention;

Fig. 3 is an enlarged transverse sectional view on line 3—3, Fig. 1; and

Fig. 4 is an enlarged fragmentary vertical sectional view showing the details of the construction and arrangement of the discharge nozzles for the heated drying medium with respect to the bundles of the tobacco.

Referring now more particularly to the drawings, there is disclosed a novel stick and apron drier for bundles of tobacco. The drier illustrated comprises an insulated elongated enclosure 1 having an inlet opening 2 at one end and an outlet opening 3 at the opposite end thereof. The inlet and outlet openings 2 and 3 respectively are provided with outwardly projecting housings 4 and 5 in order to minimize the escape and loss of heat from within the main drier enclosure 1.

Movable longitudinally through the main drier 1 are the upper and lower courses 6 and 7, respectively, of an endless stick conveyor comprising the usual pair of side chains 8 and interconnected cross-sticks 9, the latter preferably being of triangular cross-sectional shape, for example, as shown in Fig. 4 of the drawings.

The side chains 8 of the conveyor are provided with the usual supporting rollers 11 which ride upon suitable sets of rails 12 and 13, respectively, extending longitudinally of the main drier housing 1 and arranged to support the upper and lower courses of the conveyor. These rails are secured to one side wall of the enclosure 1 and a vertical wall or baffle structure 14 which longitudinally sub-divides the interior of the main enclosure 1 into a drying chamber D (Figure 3) of relatively large cross-sectional area and a laterally adjacent heating chamber H in which the drying medium is heated or reheated, as the case may be, prior to circulation into contact with the tobacco bundles.

Mounted intermediate the upper and lower courses 6 and 7 of the stick conveyor is an endless apron conveyor 15 which serves to collect and remove from the drier particles of the bundled tobacco which may be broken off from the bundles and thereby perform a general filtering of the drying medium after it is passed through the bundles of tobacco preparatory to being recirculated.

Overlying the upper course 6 of the stick conveyor in the drying chamber D of the drier is a plurality of air discharge housings 16 which extend the entire width of the stick conveyor and also a predetermined distance lengthwise thereof.

In the particular embodiment of the invention which is shown in the drawings, the bottom or lower surface of each of these discharge housings 16 is constructed to provide a plurality of longitudinally spaced transversely extending series of discharge orifices or nozzles 18 and 19, respectively, for directing the heated drying medium into contact with the underlying bundles of tobacco. It is pointed out however, that the invention is not limited to the nozzle construction shown, and that other arrangements may be employed as desired so long as the nozzles operate to discharge drying air angularly downward and against the head and shoulder portions of the tobacco bundles according to the invention.

The tobacco bundles are mounted straddle-fashion on the conveyor sticks 9 in substantially

abutting relation and the sticks are relatively closely spaced longitudinally of the conveyor so that the arrangement forms a substantially continuous bed of bundled tobacco passing through the drying chamber beneath the pairs of discharge nozzles 18 and 19, respectively. Each of the nozzles 18 and 19 is of relatively narrow width in a direction lengthwise of the conveyor and extends continuously across the entire width of the bottom of the air discharge housing 16. The nozzles 18 are constructed and arranged to discharge the heated drying medium downwardly at an acute angle and in the general direction of travel of the upper course 6 of the stick conveyor on which the tobacco bundles are supported. The nozzles 18 are spaced at equal intervals longitudinally of their housing 16 and alternately with respect to the nozzles 19. In the illustrated embodiment of the invention, the nozzles 19 are constructed and arranged to discharge the heated drying medium downwardly at an acute angle but in a direction generally opposite to the direction of travel of the upper course 6 of the stick conveyor, for example, as shown in Fig. 4 of the drawings. By this construction and arrangement of the nozzles 18 and 19 streams of hot air or other drying medium are discharged angularly downwardly onto the head and shoulder portions at both sides of the tobacco bundles as the latter pass beneath the successive pairs of nozzles 18 and 19, respectively.

The air or other drying medium which is discharged by the nozzles 18 and 19 angularly downward onto the tobacco bundles is heated by means of one or more banks of steam coils or the like 20 arranged in the heating compartment H of the main drier housing 1 at one side of the drying chamber D. The air or other drying medium passes upwardly through the banks of steam coils 20 under the influence of a circulating fan 21 which operates to discharge the heated drying medium into a duct or the like 22 and thence into the top of each housing 16 from which it is discharged downwardly through the pair of nozzles 18 and 19 in the manner previously described.

By causing the heated drying medium to be discharged angularly downward from the nozzles 18 and 19 onto the head and shoulder portions of the tobacco bundles, the heated drying medium is caused to give up a large part of its heat at these points and to absorb a large part of the moisture that must be evaporated from the tobacco. In this manner a substantial amount of drying is accomplished at the head and shoulder regions of the tobacco bundles with the result that the drying medium which subsequently travels downwardly between and around the lower portions of the bundles is at a substantially reduced temperature of the drying medium passing in contact with the lower portion of the bundles and the fact that in this portion the drying medium is moving in a direction generally parallel to the tobacco bundles operates to produce less evaporation and drying action at the tips and lower ends of the bundles. Consequently the lower rate of drying which is produced at the tips and lower ends of the bundles coupled with the high rate of drying at the head and shoulder portions of the bundles results in a substantially uniform overall drying of the bundles of tobacco.

After passing downwardly entirely between the bundles of tobacco the drying medium passes through the upper course of the apron conveyor 15 and then moves laterally outward from the

drying chamber D and into the heating chamber H where it again passes upwardly through the banks of heating coils 20 which operate to re-heat the medium to the desired temperature for recirculation by the fan 21. In a typical drier installation made in accordance with the present invention the drying medium such as, for example, air, is discharged from the nozzles 18 and 19 at a temperature of from about 250° to 300° F. at a nozzle velocity of within the range from about 2000 to 4000 ft. per minute.

A drier for tobacco bundles constructed in accordance with the present invention is highly beneficial in that it provides not only a faster rate of drying of bundled tobacco but also a substantially more uniform drying of the tobacco in each bundle.

While certain embodiments of the invention have been illustrated and described herein, it is not intended to limit the invention to such disclosures, and changes and modifications may be made therein within the scope of the following claims.

I claim:

1. In a drier for bundled tobacco comprising an endless conveyor having a plurality of uniformly spaced transverse supporting sticks on each of which a plurality of bundles of tobacco are mounted straddle-fashion with the bundle heads and shoulder portions projecting upwardly, a structure overlying said conveyor having a plurality of longitudinally spaced series of transversely extending relatively narrow discharge nozzles therein for discharging a drying medium downwardly onto the tobacco bundles on said sticks, certain of said nozzles being directed angularly downward in the general direction of travel of the conveyor and operable to discharge a stream of the drying medium angularly downward onto the upper head and shoulder portions of the tobacco bundles and the others of said nozzles being directed angularly downward in general direction opposite to travel of the conveyor and operable to discharge the drying medium angularly downward onto the upper head and shoulder portions of the tobacco bundles at the opposite side thereof from the stream of drying medium discharged from said certain nozzles.

2. In a drier for bundled tobacco comprising an endless conveyor having a plurality of uniformly spaced transverse supporting sticks on each of which a plurality of bundles of tobacco are mounted straddle-fashion with the bundle heads and shoulder portions projecting upwardly, a structure overlying said conveyor having a plurality of longitudinally spaced series of transversely extending relatively narrow discharge nozzles therein for discharging a drying medium downwardly onto the tobacco bundles on said sticks the nozzles being directed angularly downward and arranged with respect to one another

to discharge the drying medium angularly downward onto opposite sides of the head and shoulder portions of the tobacco bundles.

3. A drier for bundled tobacco as claimed in claim 1 wherein the spacing of the series of transversely extending discharge nozzles longitudinally of the drier is substantially equal to the spacing of the supporting sticks of the conveyor.

4. A drier for bundled tobacco as claimed in claim 2 wherein the spacing of the series of transversely extending discharge nozzles longitudinally of the drier is substantially equal to the spacing of the supporting sticks of the conveyor.

5. In a drier for bundled tobacco comprising an endless conveyor having means to support a plurality of bundles of tobacco, said bundles being disposed in vertical position with the bundles equally spaced transversely of the drier and with the heads and shoulder portions of the bundles facing upwardly and their tips extending downwardly, discharge nozzles disposed transversely of the drier at spaced intervals longitudinally thereof, said nozzles being directed angularly downward and arranged with respect to one another to discharge the drying medium angularly downward onto opposite sides of the head and shoulder portions of each of the tobacco bundles, and means to discharge drying medium at an elevated temperature from said nozzles at high velocity onto the surfaces of the bundles creating turbulence at opposite sides of and adjacent the heads and shoulder portions of the tobacco bundles whereby the drying medium initially gives up a large part of its heat to said heads and shoulder portions with a resultant high rate of drying of said heads and shoulder portions and whereby cooling of the drying medium followed by passage of said medium at a lower velocity and temperature downwardly between the bundles and in contact with the top portions of the bundles is effected, thus providing a lower rate of drying of said tip portions so that the overall drying of the bundles is substantially uniform throughout the length of each bundle.

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