

May 15, 1962

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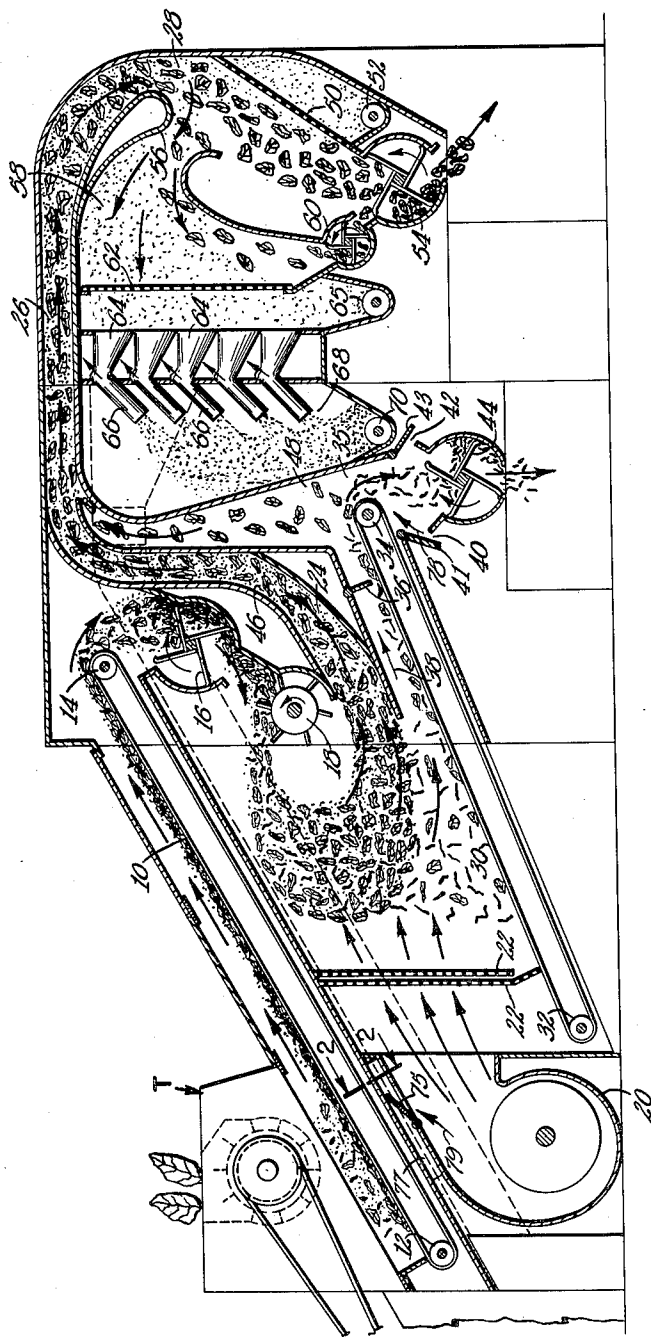
3,034,646

TOBACCO CLASSIFYING APPARATUS

Filed Aug. 27, 1959

2 Sheets-Sheet 1

FIG. 1



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FIG. 3

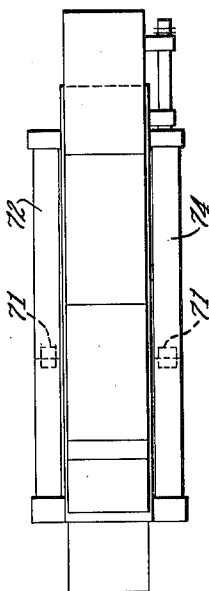


FIG. 2

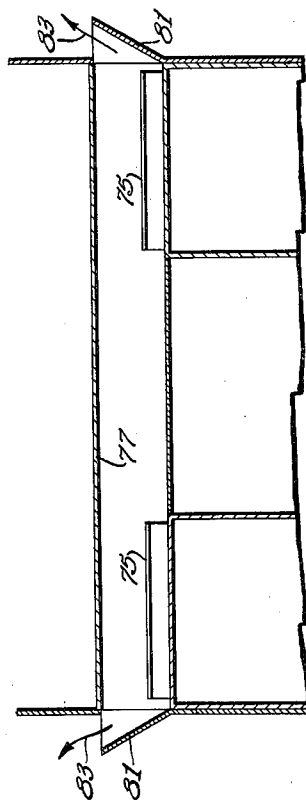
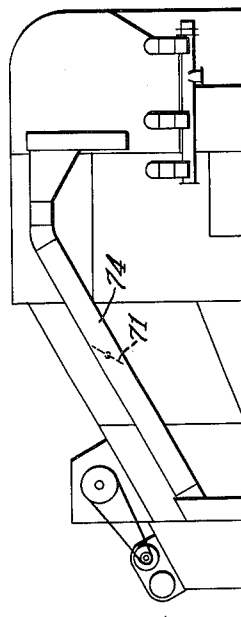


FIG. 4



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3,034,646

TOBACCO CLASSIFYING APPARATUS

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Filed Aug. 27, 1959, Ser. No. 836,525
5 Claims. (Cl. 209-133)

This invention relates to an improved classifying apparatus for pneumatically separating lamina without stems from stems as a stream of torn tobacco leaves is conveyed pneumatically through the apparatus.

In separating apparatuses heretofore developed it has been found that the separated lamina often had stems intermingled with the lamina and that the stems which were separated likewise had pieces of lamina intermingled therewith. This often necessitates sending the classified material through a second classifying apparatus.

It is the purpose of the present invention to avoid this disadvantage by more efficiently separating lamina and stems from each other as they are pneumatically carried by an air stream in one classifying machine.

A further object of this invention is to subject the torn tobacco leaves to two separate and distinct classifying operations in the separating machine to more efficiently classify lamina and stems.

Another object of this invention is to provide cross currents of air so that air will be passed through the torn tobacco leaves in a direction transverse to the direction of travel of the leaves to remove the lamina and to then deliver the classified stems to a discharge station where they are again subjected to a pneumatic classifying operation to remove lamina therefrom.

Another object of this invention is to subject the lamina and the stems that were removed from the lamina to a second air stream so as to separate from the stems any stem-free lamina that may have become intermingled therewith.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention progresses. In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings.

FIG. 1 shows a side elevation of our tobacco separating apparatus.

FIG. 2 is a cross section taken on line 2-2 of FIG. 1.

FIG. 3 is a top view of our separator showing the dampers mounted in the air return ducts.

FIG. 4 is a side view showing the air return ducts and damper mounted therein.

Tobacco leaves are delivered from a suitable source of supply, such as the thresher T onto a collecting belt 10. Instead of the thresher T, a suitable tearing operation could have been performed at some other location and the torn tobacco leaf would then be conveyed and deposited pneumatically in a continuous stream on the belt 10. The belt 10 travels over pulleys 12 and 14 in the direction indicated by the arrow and delivers the torn tobacco it receives into an air gate pocket 16 which in turn discharges the torn tobacco leaves onto a picker roller 18 which rotates in the direction indicated by the arrow.

The picker roller 18 serves to break up any clumps of tobacco and as this tobacco is hurled in the manner shown by the arrows, one or more fans 20 blows air through a suitable diffuse composed of sheets 22 which directs stratified streams of air in a horizontal path through the torn tobacco which has been hurled by the picker roller 18 in a direction which is substantially transverse to the direc-

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tion of the stratified air. These sheets have 2 3/4" holes on 4" centers and the sheets themselves are staggered relative to each other, meaning that if there is a hole on the back sheet—then the front sheet has its solid part in that location.

When the air from the fan 20 passes through the hurled tobacco in this manner it carries off stem free lamina and this is carried into an air passageway 24, where it is conveyed upwardly into duct 26 from where it passes into the expansion chamber 28. Stems that are attached to lamina are heavier and as a result they are hurled a further distance away from the picker roller 18, and travel downwardly towards the belt 30 without interfering with the majority of stem-free leaf pieces which are lighter and therefore travel a shorter path.

The belt 30 travels over pulleys 32 and 34 and moves in the direction indicated by the arrow. This belt 30 receives stems that are free from lamina and also stems that have lamina intermingled therewith, and discharges it into the area above hinged door 36. The hinged door 36 acts as a control valve for the amount of air going through in direction of arrow 38. That door is heavy enough that the air cannot pick it up but it is sufficiently light that if a lump of tobacco should be on the conveying belt—it will be lifted up by that lump of tobacco so the lump can go through rather than holding the tobacco back on the conveyor belt, and so choking up the machine. In this area there is an upward movement of air which enters through the openings 40 and 42 which effects a further removal of any lamina still remaining intermingled with the stems.

The stems that have no lamina, fall into the discharge gate 44 from which they are discharged into either a suitable bin or onto a suitable mechanical or pneumatic conveyor which removes the stems from the machine. Any lamina which is intermingled with the torn tobacco leaves is conveyed upwardly through the duct 46 into the passageway 26. A small expansion chamber 48 allows any stems that still have some lamina attached thereto to fall downwardly so as to permit them to be discharged from the machine through the gate 44 without being drawn upwardly through passageway 46.

When the stem free lamina reaches the expansion chamber 28, any sand particles that might be intermingled with the tobacco leaves fall out of the air stream and slide downwardly over the perforated screen 50. In sliding downwardly over the screen 50, the sand particles pass through the openings of screen 50 and are then removed by means of a suitable screw conveyor 52 from the separating apparatus.

The lamina which enters the expansion chamber 28 also settles downwardly into the rotating vanes of the air gate 54 and are discharged onto a suitable conveyor or into a pneumatic conveying system which removes the stem free lamina from the separating apparatus. The air leaves the expansion chamber 28 around the tear drop configuration 56 and passes into the expansion chamber 58. Any lamina that is still intermingled with the air is then permitted to settle downwardly and by means of the air gate 60 is discharged into the range of operation of the air gate 54 which permits the same to be removed from the machine. The screen 62 prevents any lamina which enters the chamber 58 from passing beyond this point.

Any dust that is still carried in the air stream passes through the screen 62 into the intake ducts of the cyclone separators 64. Any particles of dust which are sufficiently heavy fall downwardly before entering the cyclones into the range of operation of the screw conveyor 65 which removes them from the separating apparatus. The dust which enters into the small diameter cyclone separators is spun around the tubes 66 and the dust is discharged into

the chamber 68 where it falls downwardly into the range of operation of the screw conveyor 70 which removes the dust from the separating apparatus.

The clean air then passes through suitable ducts 72 and 74 into the blower 20 where it is again circulated through the machine, thus forming a substantially closed circuit. A manually air adjustable damper 75 is mounted in the outside walls connected to each of the fans 20.

The amount of air discharged is controlled by the opening of the damper 75 and enters the expansion chamber 77 in the direction of arrow 79. The air is discharged from the chamber 77 out through the louvres 81 back into the room in the direction of arrows 83. Additional air controls in the form of dampers 71 are provided in each of the two air return pipes 72 and 74.

Damper 75 is set for the total amount of air to be moved through the machine on a closed circuit basis. The hinged doors 41 and 43 are opened sufficiently wide to let outside air in direction of arrows 78 enter area 35 which in turn will separate and remove the lamina mixed with the stems. Louvres 81 are also opened, letting a certain amount of air escape into the room. The amount of air discharged into the room through louvres 81 will be equal to the amount of air taken into the machine through spaces 40 and 42 created by opening hinged doors 41 and 43. In that way we have a closed circuit but also a continuous exchange of air by "bleeding" air in and "bleeding" air out so that the portion of air which continues to recirculate cannot saturate itself with heat or moisture.

It will be seen from the foregoing description, that we have provided an approved separating apparatus which allows a transverse stream of air to pass at substantially right angles through a stream of torn tobacco leaves and affect a removal of the clean lamina from the torn leaves.

The stems that may have lamina adhering thereto are then passed to a second separating chamber wherein the required amount of air is permitted to pass so as to allow any lamina without stems to be carried upwardly and to allow stems with lamina to fall downwardly into the range of operation of an air discharge gate.

The invention hereinabove described may therefore be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible embodiments of the same. The invention, therefore, is not to be restricted to the precise details of the structure shown and described.

What we claim is:

1. A tobacco classifying apparatus comprising a first classifying chamber, a blower having an intake and an exhaust duct for blowing a stream of air through said classifying chamber, means for directing a continuous stream of torn tobacco leaves across said air stream, upper and lower receiving ducts into which said stream of air passes, the air stream entering the upper duct carrying off with it stem-free lamina and the lower duct carrying off the remainder of the torn leaves, an expansion chamber connecting with said upper duct to receive a stem-free tobacco leaf lamina removed through said upper duct to separate the lamina from the air stream conveying the same, a second classifying chamber connecting with said lower duct to receive torn tobacco leaves from said lower duct, a revolving door positioned under said second classifying chamber for receiving and discharging tobacco received from said second classifying chamber, an air gate adjacent said revolving door for allowing air to enter said second classifying chamber to effect a removal of any stem-free lamina that was intermingled with the tobacco received in said second classifying chamber, and a duct connected with said second classifying chamber to deliver classified stem-free lamina received from said second classifying chamber into said upper duct, an air channel interconnecting said expansion chamber and the intake of said blower, a damper adja-

cent said exhaust duct for discharging a portion of air discharged from said blower to the outside atmosphere.

2. A tobacco classifying apparatus comprising a housing, a blower for blowing air transversely across a first separating chamber formed in said housing, damper means adjacent the blown air stream to discharge part of the blown air to the outside atmosphere to control the total amount of air passing through the said apparatus, means for showering tobacco transversely across the air stream, a pair of upper and lower ducts for receiving the air blown by said blower and torn tobacco pieces carried by said air stream, the upper duct being arranged and positioned to receive light stem-free lamina particles and a lower duct being positioned and arranged to receive heavier particles of torn tobacco leaves having stems adhering thereto, a second separating chamber connected with said lower duct in which stem-free lamina will be conveyed upwardly while heavier tobacco pieces having stems fall downwardly, an air gate mounted in said housing below the second separating chamber to receive and discharge said heavier tobacco pieces having stems from said housing without allowing air to enter there-through, said housing being provided with openings on each side of said air gate through which the air enters and passes upwardly in said second separating chamber to assist in separating stem-free lamina in the second separating chamber and carrying the same upwardly, and a third duct interconnected with the upper duct and the second separating chamber for pneumatically separating lamina received from said upper duct and the second separating chamber, a third separating chamber connected with said third duct for effecting a discharge of stem-free lamina from the classifying apparatus, and a dust separator for removing dust from said air stream disposed in the housing from the third separating chamber, and means connecting the clean air discharged from said dust separator back into the intake side of said blower.

3. A tobacco classifying apparatus comprising a receiving belt, a device for showering torn tobacco leaves downwardly towards said belt, an air diffuser, means for directing a stream of air through said diffuser and across said downwardly showered tobacco leaf particles, a damper adjacent said means and said diffuser for allowing part of said stream to escape from being directed across the downwardly showered tobacco to thereby control the total amount of air passing through said apparatus, an upper and lower duct positioned above said belt through which said air stream is blown together with tobacco particles that are carried suspended in said air stream, the upper duct being positioned and arranged to carry off stem-free lamina while the lower duct is positioned and arranged to carry off lamina having stems and lamina having adhering stems, a first separating chamber interposed in said lower duct, an air gate for receiving and discharging stems separated from the torn tobacco carried by the air stream in said lower duct, air inlets on opposite sides of the air gate to allow air to enter into said first separating chamber to carry stem-free lamina upwardly from the first separating chamber to join with the lamina which passed through the upper duct, and a second separating chamber for removing lamina carried upwardly in said upper and lower ducts from said air stream and directing said air stream back to the first named means to thus form a substantially enclosed circuit.

4. In a tobacco classifying apparatus, means for delivering a shower of torn tobacco leaves thereto, a source of air having an inlet and an outlet for directing air transversely through said shower of torn tobacco, a damper adjacent said outlet of said source for controlling the total amount of air passing through said apparatus, a first and a second superimposed air passageway positioned in front of said source of air and torn showered tobacco to receive classified lamina and stems, a travelling belt forming one side of the lower air passageway to assist

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in carrying torn tobacco leaves falling downwardly through said lower passageway, a classifying chamber positioned to receive torn tobacco material conveyed through the lower air passageway having said belt, a common lamina receiving chamber connected to the upper air passageway and the classifying chamber and disposed above the classifying chamber, an air gate positioned below said classifying chamber to remove tobacco material falling downwardly therefrom, said air gate being spaced from said classifying chamber a distance to allow a sufficient amount of air to enter said classifying chamber to convey any stem-free lamina upwardly to the common lamina receiving chamber, means for separating said lamina in the common lamina receiving chamber from said air stream and means connecting said common lamina receiving chamber with the inlet of said source of supply of air.

5. In an apparatus for separating lamina from stems in a stream of torn tobacco leaves, a source of supply of air having an inlet and outlet for passing air transversely through said stream of torn tobacco leaves, a damper adjacent said outlet of said source for controlling

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the total amount of air passing through said apparatus while allowing the air drawn into said source to remain constant, a divider for separating said air stream into two parts, an upper one for separating lamina without stems and a lower one for separating lamina having stems attached thereto, an expansion chamber associated with said lower path of travel to affect a further separation of stem-free lamina from stems, an air gate for receiving and discharging said stems from said apparatus, means for allowing air to enter said expansion chamber adjacent said air gate to elevate stem-free lamina and a lamina separating station connected with said expansion chamber and said divider for separating lamina from said air stream and means connecting said lamina separating station with the inlet of said source of supply of air.

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