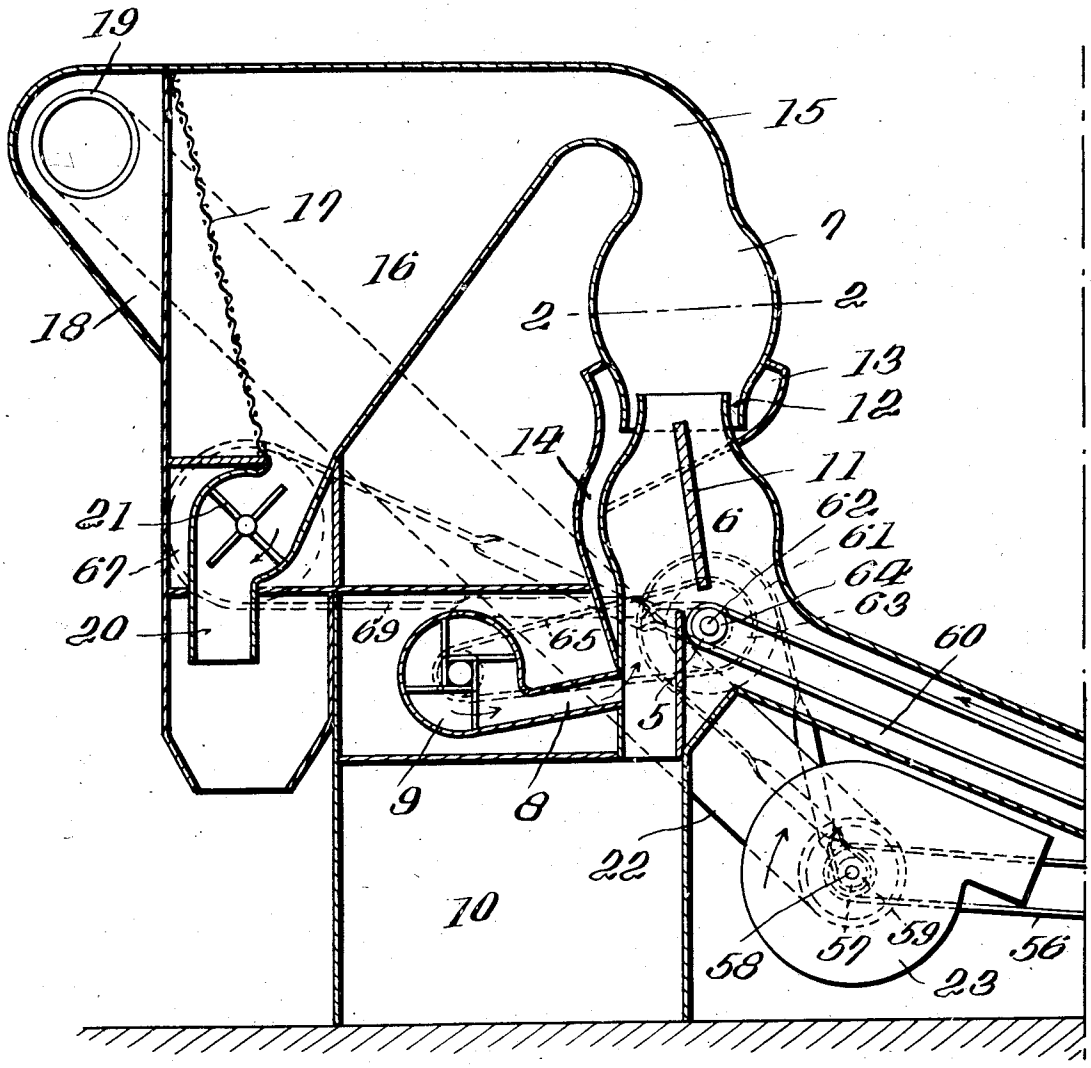
Jan. 9, 1940. E. EISSMANN 2,186,167

SEPARATION APPARATUS

Filed July 16, 1935 2 Sheets-Sheet 1

FIG. 1.



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Filed July 16, 1935 2 Sheets-Sheet 2

Fig. 2.

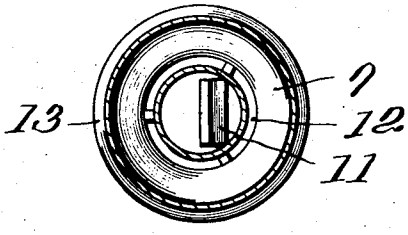
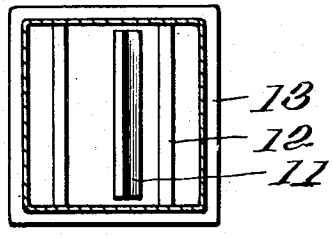


Fig. 3.



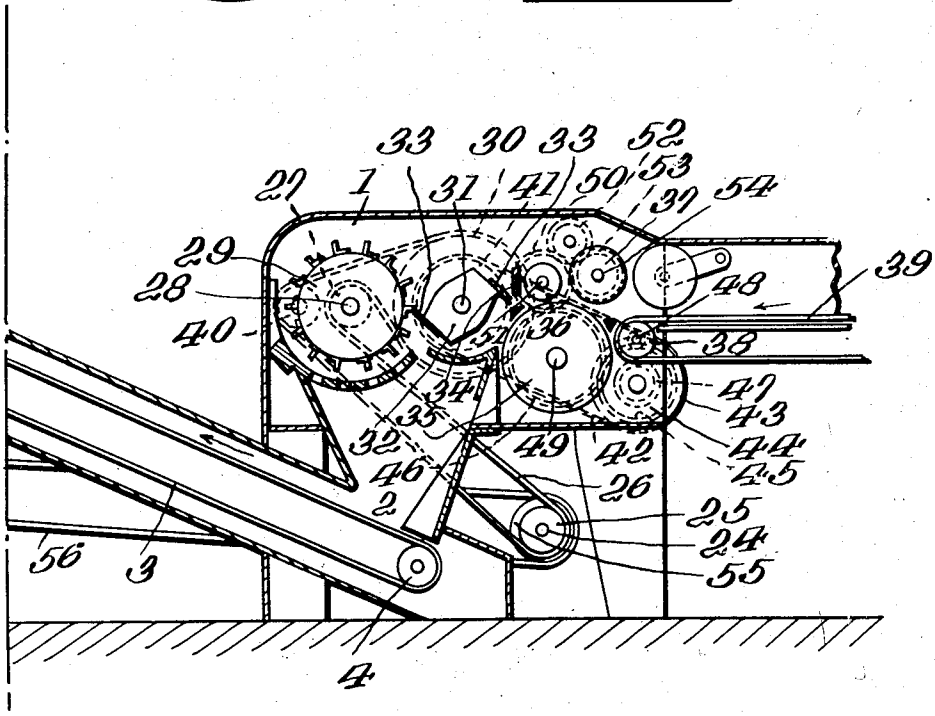


Fig. 1a.

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SEPARATION APPARATUS

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In Germany August 30, 1934

7 Claims. (Cl. 209—139)

This invention relates to an apparatus for separating the leaf portions from the stem and rib portions of raw tobacco leaves.

It is a purpose of the invention to secure an effective separation between the leaf portions and the stem and rib portions and at the same time remove dust and non-usable crumbled tobacco from the leaf portions.

Comminuting devices for raw tobacco leaves are known wherein the purpose is to comminute the tobacco leaves in such a manner that the body of the leaves are separated as completely as possible from the stem. It is then necessary to effect a separation of the tobacco leaf from the stem or rib portions. In order to accomplish this it has been proposed to connect a device for separating the leaf and rib portions to a comminuting device in such manner that the tobacco coming from the comminuting device is delivered on to a conveyor or a feeding device such as a shaking table from which it passes to a channel in which there is a current of air. This current of air is of such intensity that it entrains only the lighter leaf portions while the rib portions are discharged from the channel. There are various disadvantages inherent in such a construction and arrangement so that a proper separation of the rib portions and the leaf portions is not secured.

A purpose of the present invention is to provide an ascending channel having one or more successive enlargements therein which enlargements are provided at their lower ends with outlet openings for receiving the ribs and stems, thereby removing them from the effects of the air current.

A purpose of the present invention is to take advantage of the enlargements provided in the channel which produce eddy currents which in turn cause the heavier portions, which in the present case are the rib and stem portions, to be hurled against the wall of the enlargement and slide downwardly along this wall and then are discharged through the outlet openings provided at the lower end of the enlargements.

It is a purpose of the invention to provide a structure whereby it is possible to withdraw the ribs and stems from the current of air ascending in the channel so that only the lighter leaf portions are entrained by said current of air. It is particularly desirable that compressed air be introduced by means of a fan or similar construction into the channel below the inlet point of the material, the air effecting the separation of the rib and leaf portions in the enlargement, while the leaf portions which reach the upper end of the channel may be withdrawn into an adjoining receptacle or hopper by means of a supplementary suction air conduit.

It is a further purpose of the invention to solve the problem of separating the leaf portions from the stem and rib portions by means of two air conduits which may readily be so proportioned relative to each other that an eddy formation of adequate intensity is positively produced in the enlargements in one of said conduits and also that all of the upwardly carried leaf portions may be positively withdrawn from one of the channels by means of suction air.

It is a further object of the invention to provide means whereby the suction air current provided in the apparatus may be used to remove the dust and non-usable crumbled tobacco particles from the leaf portions such as by the interpositioning of a sieved hopper in the suction air conduit. With such construction the leaf portions delivered into the hopper will be simultaneously freed from the hopper through a sluice or other outlet device.

With the above and other objects in view which will become apparent as the description proceeds, the invention resides in the combination and arrangement of elements detailed below, claimed in the claims and shown in the accompanying drawings which illustrate an exemplary embodiment of the invention.

Figures 1 and 1A show a vertical diagrammatical view through the apparatus in association with a comminuting device.

Figure 2 is a horizontal section along the section line II—II of Figure 1, and

Figure 3 is a view similar to Figure 2 of a modified construction.

Referring to the drawings, the comminuted leaf portions and stem portions received from the stem or rib removing device 1 are delivered to a conveyor belt 3 through the funnel shaped passageway 2. The conveyor belt 3 passes over rollers 4 and 5 and carries the tobacco particles in the direction shown by the arrows. The upper guide roller 5 is disposed adjacent a channel 6 and is located somewhat above the lower roller 4 so as to cause the tobacco particles to travel in an ascending direction. The channel 6 is provided with enlargements 7 which may be of any desired number. The conduit 8 leads from the fan 9 and opens into the channel 6 below the point at which the tobacco particles are delivered by the conveyor 3.

The air current produced by the fan 9 is di-

rected against the leaf portions which fall over the top of the roller 5 and the lighter portions are carried along thereby up through the channel 6 while the heavier portions fall downwardly into a collector chamber 10.

In order to prevent the leaf portions from being blown back upon the conveyor belt 3, a wall 11 is provided as shown adjacent to the lower enlargement 7. The air current will also entrain the lighter rib portions and when a whirling of the tobacco portions takes place in the range of the upper enlargement 7 the heavier portions such as the ribs will be carried to the wall thereof and will slip back along the latter. An annular passageway 12 is provided in the constriction between the two enlargements 7 and the downwardly sliding rib portions are delivered into this passageway. The latter opens into a hopper 13, 14 which leads into the rib and stem collecting chamber 10. A tubular bend 15 is provided at the top channel 6 and this connects the channel 6 with the hopper-like chamber 16. The latter is subdivided by means of a sieve-like wall 17 made of wire gauze or the like and in back of which is arranged the suction chamber 18 having a suction conduit 19. Connected to the main portion of the hopper chamber 16 and in front of the sieve wall 17 is the outlet conduit 20 which is closed by means of an air sluice 21. The conduit 19 is connected by means of conduit 22 to the suction side of a fan 23, while the pressure side thereof leads to the exterior with filters being interposed which are not shown upon the drawings.

The current of air coming from the fan 9 is so directed that it will vary the leaf portions separated from the ribs up to the bend 15. From here the tobacco leaf portions are carried along by the suction current produced by the fan 23 in the chamber 16. In the chamber 16 the dirt is separated from the leaf portions which are stopped by the sieved surface 17 along which they slide downwardly so they may be delivered through the air sluice 21 into a suitable receptacle.

The embodiment shown in Figures 1 and 2 shows the channel 6 provided with enlargements which are of circular cross section. However, as is shown in the cross section in Figure 3, the channel 6 with the enlargements therein may be of rectangular or of any other desired cross sectional configuration.

The comminuting device illustrated more particularly in Figure 1A is driven from the main drive shaft 24 which in turn is driven by an electric motor or the like. Mounted upon the main drive shaft 24 is a sprocket wheel 25 over which the chain 26 passes. The latter passes over a sprocket wheel 27 fixed upon shaft 28 which in turn is journalled in the frame of the stem removing machine 1 and carries the pronged roller 29. The chain 26 also passes over the sprocket wheel 30 fixed on shaft 31 which is also journalled in the frame of the stem removing machine and carries the knife roller 32. The gripper-like knives 33 upon the roller 32 engage the leaf tobacco layer moving along the tobacco guide channel 34. The leaf tobacco layer is moved along by means of the rollers 35, 36 and 37 which are arranged in the manner shown so that the slot therebetween becomes constricted and narrow in the direction of feed.

The tobacco leaves are fed to the feeding rollers 35 and 36 by means of the conveyor belt 39 passing over guide roller 38. The chain 26 after passing over sprocket wheel 30 passes over the guide wheel 40 and returns to sprocket wheel 25.

A sprocket wheel 41 is mounted upon the shaft 31 and is connected to the sprocket wheel 43 upon shaft 44 by means of a sprocket chain 42. The shaft 44 is journalled in the machine frame. The conveyor belt guide roller 38 is driven from shaft 44 by means of the gears 47 and 48 and the feed roller 35 is driven from the shaft 44 by means of the gears 45 and 46. Gear 46 is mounted on the axle 49 which carries the feed roller 35 and gear 46 engages gear 50 mounted on axle 51 of the feed roller 36. The gear 50 engages gear 52 which in turn actuates gear 53 mounted upon the axle 54 which carries the feed roller 37. The main drive shaft 24 also carries the sprocket wheel 55 which is connected with the sprocket wheel 57 by means of a sprocket chain 56. The sprocket wheel 57 is mounted upon the axle 58 of the fan 23. The axle 58 also carries a sprocket wheel 59 over which the chain 60 passes which in turn passes over the sprocket wheel 61 which is fixed on the shaft 62 of guide roller 5 for the conveyor 3. The shaft 62 also has fixed thereto sprocket wheels 63 and 64. The fan 9 is driven over the sprocket wheel 63 through the medium of the sprocket chain 65 and the sprocket wheel 64 is connected with the sprocket wheel 67 by means of the chain 66. Sprocket wheel 67 is mounted upon the shaft of the air sluice 21.

The operation of the above described apparatus is believed obvious from the description above given.

I claim:

1. An apparatus for separating tobacco leaf and stem portions comprising an ascending classifying passage, a compressed air fan for producing an air current for driving the leaf portions upwardly in said passage, said passage having a discharge opening at the lower end thereof, for the heavier tobacco portions, such as the stem portions, a hopper with which the upper end of said passage communicates, a substantially upright separating screen located in said hopper, a suction passage communicating with said hopper at the rear of said screen, a sluice closure provided in said hopper, a suction fan operative in said suction passage and said suction fan being so regulated with respect to said compressed air fan that the compressed air current can raise the leaf portions just to a transition point between said classifying passage and said hopper while the suction air current extends to said transition point to engage such raised leaf portions.

2. An apparatus for separating tobacco leaf and stem portions comprising an ascending classifying passage having enlargements therein, means associated wth said enlargements for separating stem portions, a compressed air fan for producing an air current for driving the leaf portions upwardly in said passage, a hopper with which the upper end of said passage communicates, a substantially upright separating screen located in said hopper, a suction passage communicating with said hopper at the rear of said screen, a sluice closure which is airtight provided in said hopper, a suction fan operated in said suction passage and said suction fan being so regulated with respect to said compressed air fan that the compressed air current can raise the leaf portions just to the transition point between said classifying passage and said hopper while the suction air current extends to said transition point to engage such raised leaf portions.

3. An apparatus for separating tobacco leaf

and stem portions comprising in combination, an ascending classifying passage, a compressed air fan for producing an air current for driving the leaf portions upwardly in said passage, said passage having a discharge opening at the lower end thereof, for the heavier tobacco portions such as the stem portions, a hopper with which the upper end of said passage communicates, a substantially upright separating screen located in said hopper, a suction passage communicating with said hopper at the rear of said screen, a sluice closure provided in said hopper, a suction fan operative in said suction passage and said suction fan being so regulated with respect to said compressed air fan that the compressed air current can raise the leaf portions just to a transition point between said classifying passage and said hopper while the suction air current extends to said transition point to engage such raised leaf portions.

4. An apparatus for separating tobacco leaf and stem portions comprising an ascending classifying passage having constrictions therein, outlet means for the stem portions located adjacent a constriction in said passage, a compressed air fan for producing an air current for driving the leaf portions upwardly in said passage, a hopper with which the upper end of said passage communicates, a substantially upright separating screen located in said hopper, a suction passage communicating with said hopper at the rear of said screen, a sluice closure provided in said hopper, a suction fan operative in said suction passage and said suction fan being so regulated with respect to said compressed air fan that the compressed air current can raise the leaf portions just to a transition point between said classifying passage and said hopper while the suction air current extends to said transition point to engage such raised leaf portions.

5. An apparatus for separating tobacco leaf and stem portions comprising a classifying passage, a compressed air fan for producing an air current for driving the leaf portions through said passage, said passage having a discharge opening for the heavier tobacco portions such as the stem portions, a hopper with which one end of said passage communicates, a separating screen located in said hopper, a suction passage communicating with said hopper at the rear of said screen, airtight outlet means for the leaf portions of the tobacco freed from dust located in said hopper, a suction fan operative in said suction passage and said suction fan being so regulated with respect to said compressed air fan that the compressed air current can raise the leaf portions just to a transition point between said classifying passage and said hopper while the suction air current extends to said transition point to engage such raised leaf portions.

6. An apparatus for separating tobacco leaf and stem portions comprising an ascending classifying passage having enlargements therein, an annular outlet located substantially at the bottom of one of said enlargements through which the heavier tobacco portions such as the stem portions may be removed, a compressed air fan for producing an air current for driving the leaf portions upwardly in said passage, a hopper with which the upper end of said passage communicates, a substantially upright separating screen located in said hopper, a suction passage communicating with said hopper at the rear of said screen, a sluice closure provided in said hopper, a suction fan operative in said suction passage and said suction fan being so regulated with respect to said compressed air fan that the compressed air current can raise the leaf portions just to a transition point between said classifying passage and said hopper while the suction air current extends to said transition point to engage such raised leaf portions.

7. An apparatus for separating tobacco leaf and stem portions comprising an ascending classifying passage having enlargements therein, outlet openings for the heavier tobacco portions such as the stem portions located adjacent one of said enlargements, said outlet openings being formed by a tapering of the passage wall, which is then overlapped by a corresponding widened adjacent portion of the passage wall to form an intermediate annular passage-way, a compressed air fan for producing an air current for driving the large portions upwardly in said passage, a hopper with which the upper end of said passage communicates, a substantially upright separating screen located in said hopper, a suction passage communicating with said hopper at the rear of said screen, a sluice closure provided in said hopper, a suction fan operative in said suction passage and said suction fan being so regulated with respect to said compressed air fan that the compressed air current can raise the leaf portions just to a transition point between said classifying passage and said hopper while the suction air current extends to said transition point to engage such raised leaf portions.

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