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LEAF TRANSFER FOR TOBACCO STRIPPERS

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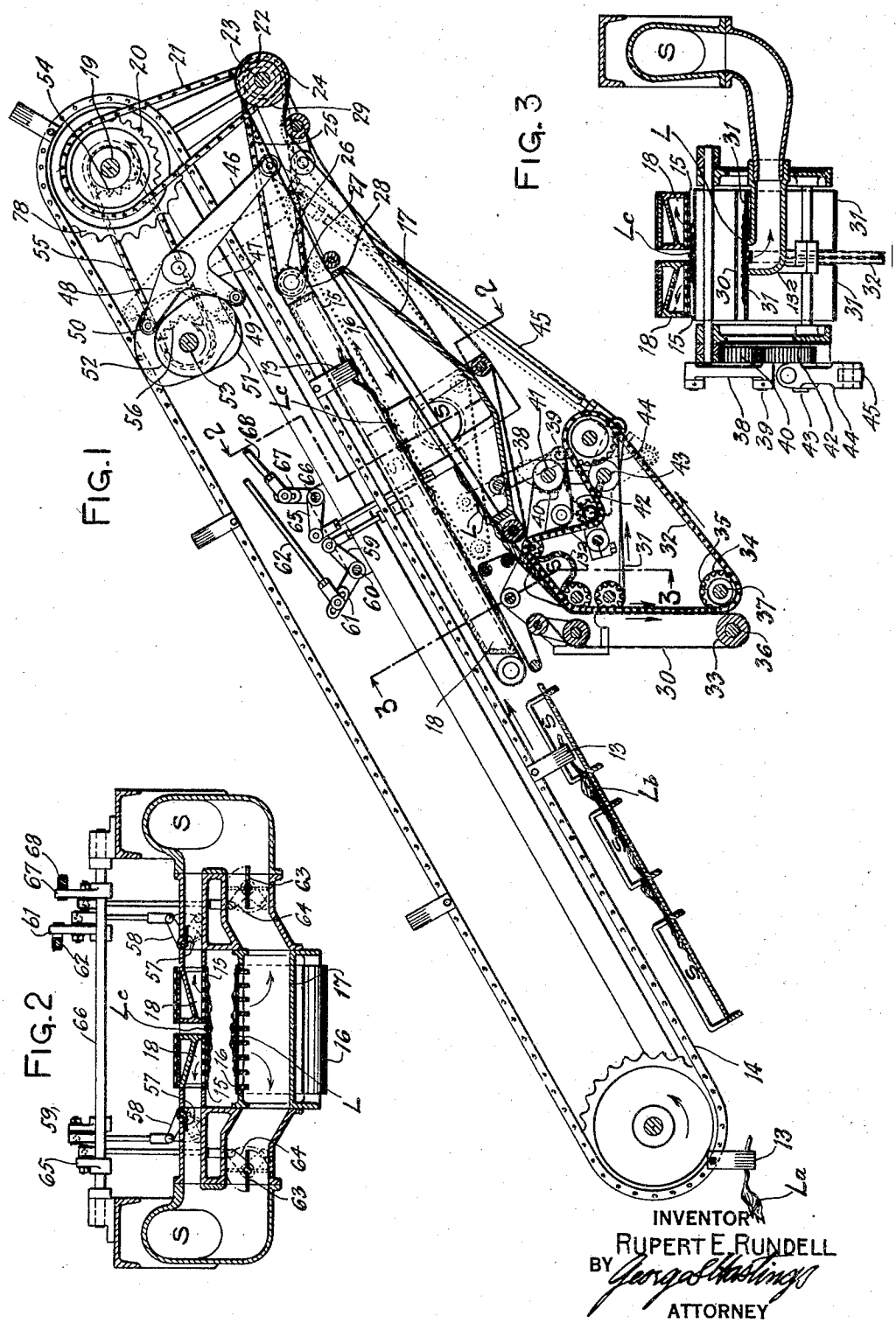


FIG. 1

FIG. 2

FIG. 3

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LEAF TRANSFER FOR TOBACCO STRIPPERS

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Application October 22, 1938, Serial No. 236,447

8 Claims. (Cl. 131—147)

This invention refers to machines for stemming tobacco leaves and more particularly to improvements in the leaf transfer mechanism thereof. In transfer mechanism of the general type shown in my prior Patent No. 1,981,470, issued November 20, 1934, the leaves are conveyed butt first through a pneumatic leaf opener into a position where they are caused to adhere suctionally on the bottom run of upwardly traveling suction belts. As the leaf continues traveling butt end first, and as the stemming operation requires entry of the leaf into the stemming unit tip end first, the leaf must be transferred from the suction belts while traveling in one direction, to a lower suction belt conveyor which travels in the opposite direction.

The construction disclosed in the above mentioned patent has the disadvantage that as the suction is cut off from the top suction belts and applied to the lower suction conveyor, the inrushing air tends to collapse the outspread leaves while they are dropping upon the latter and cause them to become crumpled thereon. In a situation, as just described, the leaf would enter the stripping mechanism in a very unfavorable condition for stemming. Moreover the action of the air currents so created occasionally tends to skew the leaf during its transfer to the lower suction conveyor.

In the particular embodiment selected to illustrate the present invention this difficulty may be overcome by imparting an oscillating motion to the lower suction box with its belt into a position wherein it is a minimum distance away from the upper conveyor. Thus there is no possibility of crumpling or skewing of the leaf when the lower conveyer and suction box swings up into close proximity and in parallelism to the leaf. Then when the suction for the upper conveyor is cut off and the suction in the lower box is turned on, the leaf will be exposed to an even suction over its entire surface and thus be properly transferred.

The main object of the invention, therefore, is to improve the transfer of the leaves from one suction conveyor to the other. In addition to a more positive transfer by the oscillating suction box, a further object is to improve the transfer of the leaf into the belt and chain conveyor which advances it on to the stripping mechanism.

The invention consists in certain constructions and combinations which will be hereinafter fully described and illustrated by the drawing.

In the accompanying drawing which forms a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a sectional elevation of a tobacco leaf stripping machine equipped with the improved leaf transfer mechanism;

Fig. 2 is a cross-section of the same on line 2—2 of Fig. 1; and

Fig. 3 is a cross-section of the same on line 3—3 of Fig. 1.

In Fig. 1 is shown a leaf L*a* shortly after it is picked up from the loading table by yieldingly mounted gripper 13 of conveyor chain 14. Another leaf L*b* is being pulled through suction boxes S by the next set of grippers. Further along a leaf L*c* is shown, held by suction to the bottom runs of the perforated conveyor belts 15 while being advanced into position to be transferred to the perforated conveyor belt 16. At this point, the grippers 13 release the leaf and the oscillating suction box 17 is swung up with the belt 16 into operative position, as indicated in dotted outline, the operation of which will be hereinafter fully described.

Conveyor chain 14 is driven by sprocket 18 on shaft 19. One revolution of sprocket 18 advances chain 14 an amount equal to the distance between adjacent sets of grippers 13, which for this construction is considered as one cycle. The mechanism for driving sprocket 18 and the construction of the grippers and members for separating the same to seize and release the stem butts is similar to that shown in the above mentioned patent, wherefore further description thereof is deemed unnecessary.

Sprocket 20 on shaft 19 drives a chain 21 running over a sprocket 22 which is attached to shaft 23. Sprocket 24, which is also attached to shaft 23, is connected by chain 25 to sprocket 26 fastened on shaft 27 to which is also attached a pulley 28 which drives the conveyor belts 15. A pulley 29 on shaft 23 drives conveyor belt 16.

Conveyor belts 30 and 31, which have opposed runs arranged to admit the leaves therebetween from the belt 16, and chain 32, which is disposed between the belts 31 to guide the leaves along the opposed run of belt 30, are driven by pulleys 33 and 34 and sprocket 35 respectively, on shafts 36 and 37 which are geared to run together. Conveyor chain 14 and conveyor belts 15, 16, 30 and 31 and chain 32 all travel at the same linear speed and in directions indicated by arrows.

The upper end of the oscillating suction box 17 is equipped with extensions pivotally mounted

on shaft 23, and its lower end is connected by a link 38 to a pin 39 on a gear sector 40 on shaft 41. Gear sector 40 meshes with a gear sector 42 on shaft 43 to which is adjustably clamped an arm 44 connected by rod 45 to a cam lever 46 which has two arms 47 and 48 each provided with a roller 49 and 50 which contact the periphery of plate cams 51 and 52, respectively, on shaft 53. Shaft 53 is driven with cams 51 and 52 from shaft 19 through sprocket 54 and chain 55 which drives sprocket 56 on shaft 53. The ratio of sprockets 54 and 56 is such to impart one revolution to shaft 53 for every revolution of shaft 19.

The suction in boxes 18 for the upper conveyor belt 15 is controlled by a cam (not shown) on shaft 53 actuating crank valves 57 in the conduits connecting suction boxes 18 with the main suction ducts S. For this purpose, levers 58 are fastened to the valves and connected to bell cranks 59 on shaft 60. Each bell crank 59 has a slotted arm 61 to which is adjustably attached one end of a rod 62, the other end of which connects with one arm of a cam lever (not shown) whose other arm has a cam roller (not shown) actuated by a cam on shaft 53.

Similarly, valves 63 in the conduits, which connect the oscillating suction box 17 with the main suction ducts S, have arms 64 connected to bell cranks 65 on shaft 66. Each crank 66 has a slotted arm 67 to which is adjustably attached one end of a rod 68, the other end of which connects with one arm of a cam lever (not shown) whose other arm of the bell crank has a roller which contacts a cam on shaft 53.

As mentioned before, cam shaft 53 rotates once in each cycle causing the suction in the upper suction boxes 18 and in the oscillating suction box 17 to be cut off and turned on, alternately at the proper moment. The transfer of the tobacco leaf L from the upper conveyor belts 15 to the conveyor belt 16 on the oscillating suction box 17 occurs after the leaf has advanced a short distance beyond the position indicated in Fig. 1. As the oscillating suction box 17 swings into position to almost contact the leaf L on conveyor belts 15, the grippers 13 release the stem, the suction in boxes 18 is cut off and the suction in suction box 17 is turned on causing the leaf to be drawn away from conveyor belts 15 and adhere to conveyor belt 16.

It will thus be seen that, as the leaf is transferred from conveyor belts 15 to conveyor belt 16, the direction of travel of the leaf is reversed and, as the oscillating suction box 17 swings back into its down position, the leaf enters, tip end first, between belt 30 and belts 31 on its way to the stripping mechanism (not shown). The function of chain 32 is to assist the feeding of the tip end of the leaf, after it has passed beyond the influence of the suction on conveyor belt 16, until it is gripped between belts 30 and 31, making certain of traction by applying suction through the inlet of a suction chamber 132 underlying the chain as shown in Fig. 3. During the period of one cycle all the elements involved in the mechanism will function once and will repeat once in each successive cycle. Occasionally the tip end of a leaf passing over the gap between the suction conveyor 16 and the converging runs of the belts 30 and 31 would curl, unless it were smoothed through the action of suction through the chain 32. Thus, the crumpling of the leaf which would result when its curled tip is gripped between the belts 30 and 31 is avoided. The chief advantage of this construction lies in the assurance of traction on the end of the leaf entering between the converging belt runs, so that every leaf will be advanced therethrough into position to be gripped between the belts. Otherwise a leaf being delivered from the suction belt 16 might slip on the converging run of the belt 31 and strike the opposed runs of the belts 30 whereby its further advance would be obstructed, causing the following leaves to pile up thereon as they are delivered from the suction belt. Moreover the central location of the chain 32 and the application of suction therethrough prevents transverse displacement of the leaf.

What is claimed is:

1. The combination with a continuously traveling suction conveyor adapted to maintain tobacco leaves in an outspread condition and advance the same endwise, of a perforated suction belt, a suction box underlying one run of said belt and adapted to apply suction to the perforations of said belt, means for applying suction to said conveyor until a leaf thereon reaches a position overlying said belt and then discontinuing the suction thereon while applying it to said suction box, and mechanism for moving said suction box and belt into the proximity of the overlying portion of said conveyor while suction is applied to said suction box.

2. The combination with a continuously traveling suction conveyor adapted to maintain tobacco leaves in an outspread condition and advance the same endwise, of a perforated suction belt, a suction box underlying one run of said belt and adapted to apply suction to the perforations of said belt, means for applying suction to said conveyor until a leaf thereon reaches a position overlying said belt and then discontinuing the suction thereon while applying it to said suction box, and mechanism for moving said suction box and belt into the proximity of the overlying portion of said conveyor while suction is applied to said suction box, and in parallelism therewith.

3. The combination with a continuously traveling suction conveyor adapted to maintain tobacco leaves in an outspread condition and advance the same endwise, of a perforated suction belt, a suction box underlying one run of said belt and adapted to apply suction to the perforations of said belt, means for applying suction to said conveyor until a leaf thereon reaches a position overlying said belt and then discontinuing the suction thereon while applying it to said suction box, mechanism for moving said suction box and belt into the proximity of the overlying portion of said conveyor while suction is applied to said suction box, and in parallelism therewith, a set of feed belts arranged to admit therebetween the tobacco leaves from said suction belt, and a traveling suction member for feeding the forward end of the leaf from said suction belt between said feed belts.

4. The combination with a pivoted suction box, of a perforated suction traveling over the top of said box, means for periodically applying suction to said box, mechanism for swinging said box upwardly on its pivot with said belt, a driven pulley concentric with the pivot of said box over which said belt runs and is driven therefrom, a pair of spaced feed belts arranged to receive leaves from said suction belt, a top belt overlying said feed belts and converging therewith to grip leaves thereon, and a chain traveling between said feed belts and arranged to engage and increase the traction on the forward end of the leaves entering between the feed and top belts.

5. The combination with a pivoted suction box, of a perforated suction belt traveling over the top of said box, means for periodically applying suction to said box, mechanism for swinging said box upwardly on its pivot with said belt, a driven pulley concentric with the pivot of said box over which said belt runs and is driven therefrom, a pair of spaced feed belts arranged to receive leaves from said suction belt, a top belt overlying said feed belts and converging therewith to grip leaves thereon, a chain traveling between said feed belts and arranged to engage and increase the traction on the forward end of the leaves entering between the feed and top belts, and a suction chamber having an inlet underlying the portion of the chain below the converging section of the top belt.

6. In a tobacco leaf conveyor structure, the combination with a leaf conveyor having an operative run moving in one direction, of a second leaf conveyor having an operative run adjacent to the run of the first leaf conveyor and travelling in a direction opposite to the same, means for periodically applying suction to said operative runs of said leaf conveyors and for cutting off the suction on one of said runs and at substantially the same time applying the suction on the other run to effect transfer of a leaf from one run to the other, and means for giving one of said adjacent conveyor runs movement from a position away from to a position in close proximity to the other run in timed relation to said suction application to facilitate said transfer.

7. In a tobacco leaf conveyor structure, the combination with a leaf conveyor having an operative run moving in one direction, of means for periodically applying suction to the operative run of said conveyor to cause tobacco leaves to adhere thereto and be advanced thereon to transfer position, a member having a flat perforated surface, mechanism for moving said member to bring its perforated surface into the proximity of said operative run and in parallelism therewith while the leaf is in transfer position, and means for applying suction through the perforations of said surface while it is in the proximity of said operative run to cause transfer of the leaves from the latter to said surface.

8. In a tobacco leaf conveyor structure, the combination with a leaf conveyor having an operative run moving in one direction, of means for periodically applying suction to the operative run of said conveyor to cause tobacco leaves to adhere thereto and be advanced thereon to transfer position, a traveling perforated member, a device for driving said member, mechanism for bodily moving said member while it is driven by said device to bring its perforations into the proximity of said operative run while the leaf is in transfer position, and means for applying suction through said perforations while they are in the proximity of said operative run to cause transfer of the leaves from the latter to said member.

RUPERT E. RUNDELL.

CERTIFICATE OF CORRECTION.

Patent No. 2,253,534. August 26, 1941.

RUPERT E. RUNDELL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 63, claim 4, after the word "suction" insert --belt--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of September, A. D. 1941.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal).