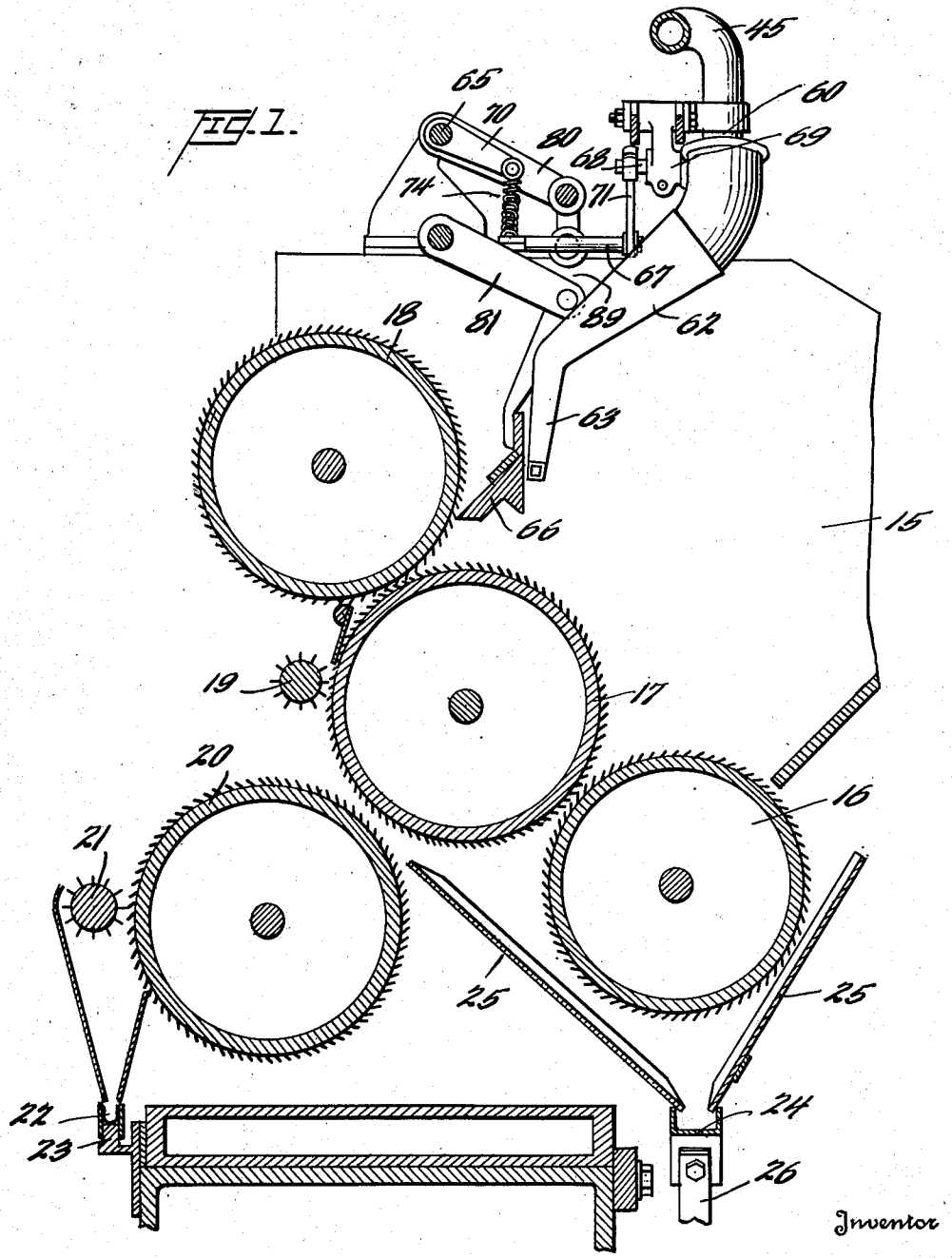
April 7, 1953 A. V. WILLIAMS 2,634,171

APPARATUS FOR FEEDING TOBACCO

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FIG. 1.



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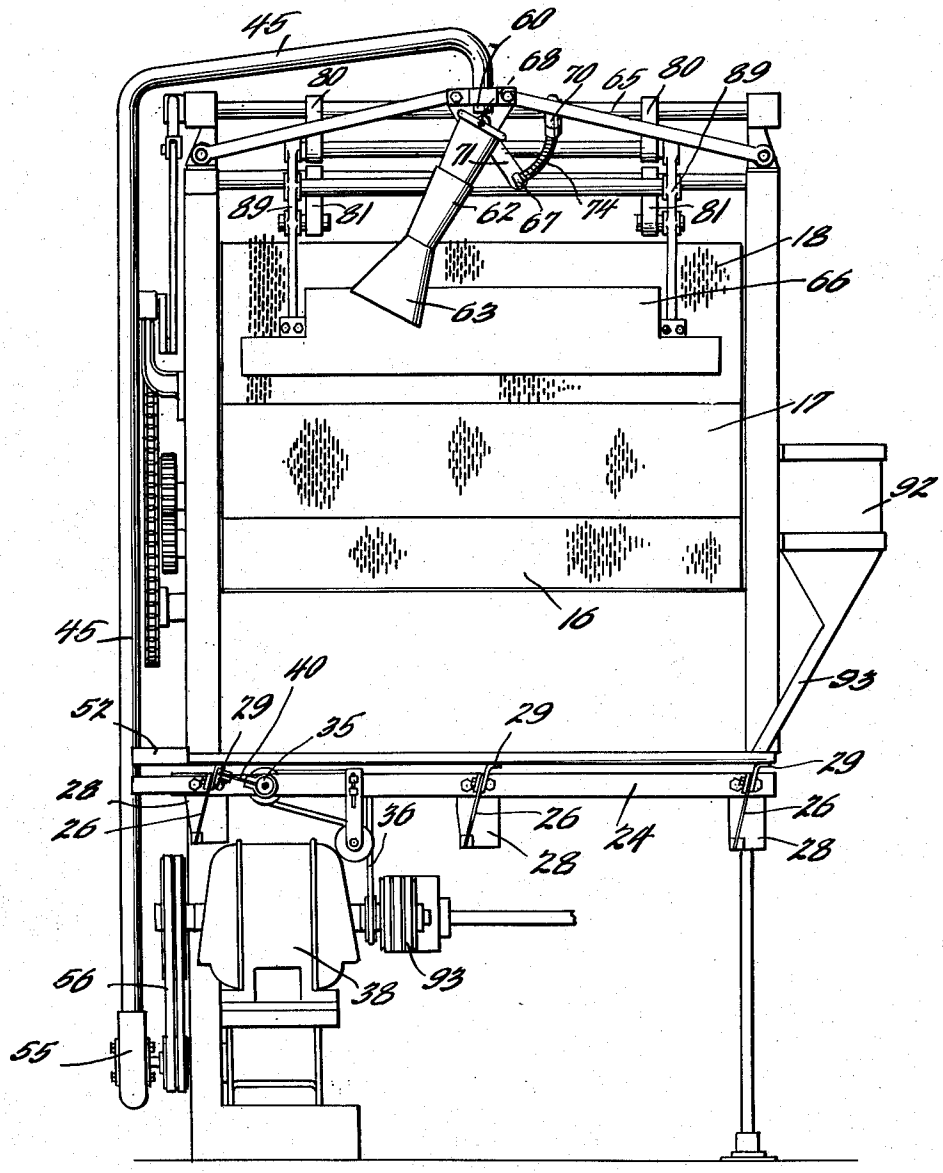
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APPARATUS FOR FEEDING TOBACCO

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FIG. 2.



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APPARATUS FOR FEEDING TOBACCO

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FIG. 3.

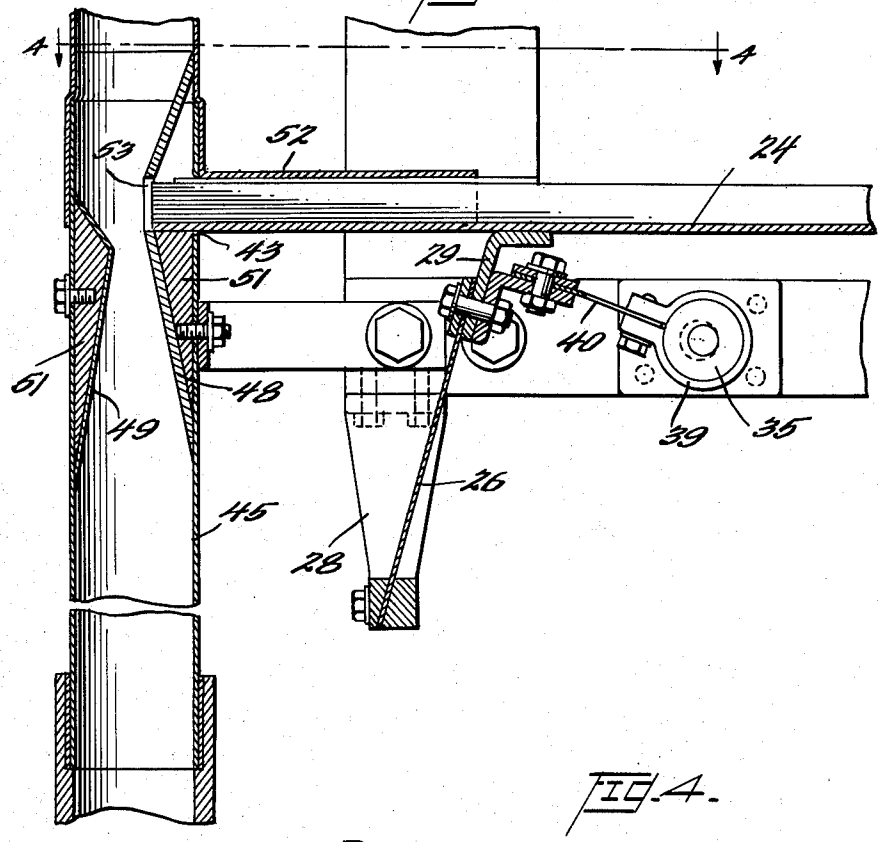
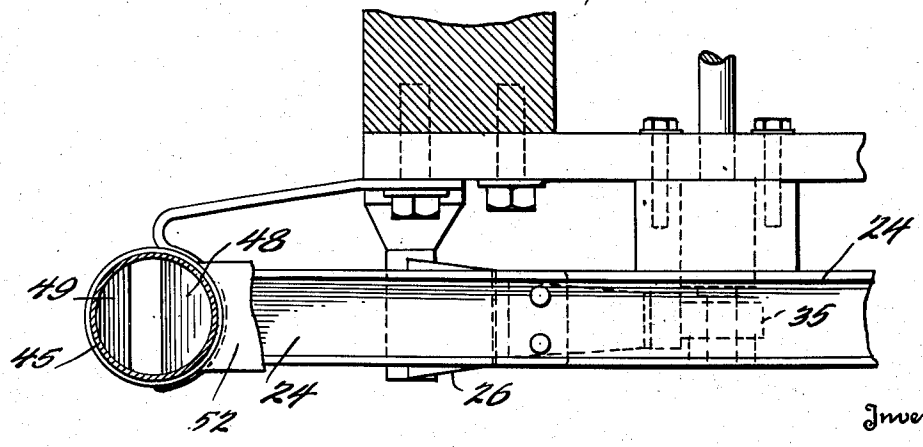


FIG. 4.



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2,634,171

UNITED STATES PATENT OFFICE

2,634,171

APPARATUS FOR FEEDING TOBACCO

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Application October 23, 1947, Serial No. 781,621

2 Claims. (Cl. 302—51)

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This invention relates to tobacco feeding apparatus for cigarette machines. In the conventional apparatus, a mass of shred tobacco is placed in a hopper, from which it is fed, usually by a carded conveyor, to the forward side of a carded combing roller for the purpose of forming thereon a layer or carpet of tobacco. An oppositely rotating brushing roller is located above the combing roller and brushes back any excess tobacco so as to insure uniformity in the depth of the tobacco carpet on the combing roller. The tobacco forming the carpet is removed by a rapidly rotating picker roll, located at the rear of the combing roller, and the tobacco so removed is showered downwardly onto a moving web or a strip of paper, the paper then moving through folding mechanism which wraps and seals the paper strip about the tobacco to form a continuous rod, which is then severed into cigarette lengths.

Ordinarily the tobacco placed in the hopper of the machine contains a certain percentage of tobacco of relatively short length, commonly referred to as shorts, and much of this short tobacco falls from between the feed conveyor and the combing roller, or is otherwise separated from the longer tobacco, in the course of forming the tobacco carpet. Previous attempts to return this short tobacco to the feeding apparatus so that it may ultimately be distributed in the cigarette have not proved to be entirely successful. It is the principal object of the present invention to overcome the difficulties hereinbefore encountered and to provide simple and improved apparatus for returning to the feeding apparatus short tobacco which has separated out in the course of formation of the tobacco carpet.

In its preferred form, the invention contemplates the use of a pneumatic elevator which receives the short tobacco sifted downwardly in the course of carpet formation, the elevator conveying the short tobacco in a stream of air to the upper part of the machine, preferably above the tobacco carpet. Distributing mechanism at the upper terminal end of the pneumatic elevator serves to effect uniform distribution of the shorts on the tobacco carpet at the upper side of the combing roller, whereby the shorts are carried with the bulk of the tobacco forming the carpet into the trough of the cigarette making machine.

More specifically, it is an object of the invention to provide pneumatic conveying means for conveying separated short tobacco collected below the tobacco feeding apparatus of a cigarette machine to a distributing point above the tobacco carpet, the pneumatic means comprising a generally upstanding passage through which air is caused to flow, the passage having a constricted portion or Venturi tube into which the separated short tobacco is fed. Preferably the airflow is produced by a blower located below the constriction or venturi, whereby movement of the tobacco through the blower is eliminated, and the resultant disintegration of the tobacco and wear on the blower are avoided.

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It is a feature of the invention that the separated short tobacco is fed to the Venturi tube of the pneumatic conveyor by a vibrating plate conveyor located below the hopper and extending transversely of the tobacco feeding apparatus. The use of belts to convey the tobacco is undesirable, since unfavorable climatic conditions may cause sticking of the tobacco to the belts, and scrapers for removing the tobacco from the belts cause excessive wear. Again, belts often pick up and transfer to the tobacco the grease employed to lubricate the belt pulleys and associated mechanism. These and other defects of prior equipment in this field are obviated by the present invention, in the practice of which no conveyor belts need be employed.

As an adjunct to the arrangement just described, tobacco of a character differing from the bulk of the tobacco forming the carpet may be added readily to the latter by delivering such tobacco to the vibrating plate conveyor. This affords a convenient method of introducing additional shorts in the cigarette, if desired, or of incorporating therein tobacco from a different source for the purpose of flavoring the cigarette. Alternatively, the apparatus contemplated herein may be used solely for the purpose of feeding an added tobacco ingredient onto the main carpet, the separated short tobacco being otherwise dealt with.

Further objects and features of the invention will be apparent from the following description, taken in connection with the accompanying drawings, in which

Figure 1 is a diagrammatic longitudinal sectional view of a conventional cigarette feeding machine to which the invention may be applied;

Figure 2 is a front elevation of a machine of the type shown in Figure 1, illustrating a preferred embodiment of the invention;

Figure 3 is a transverse sectional view of the constricted portion or Venturi tube of the pneu-

matic elevator and the delivery end of the vibrating plate conveyor; and

Figure 4 is a sectional view of the Venturi tube taken substantially on the line 4—4 of Figure 3.

In order that the invention may be readily understood, a preferred embodiment is selected for the purpose of illustration and is described in detail hereinafter. It will nevertheless be appreciated that no limitation of the scope of the invention, as defined in the appended claims, is thereby intended.

Referring first to Fig. 1 of the drawing, a simple and conventional type of tobacco feeding apparatus is shown. In hopper 15 is placed a mass of tobacco which is forwarded by the carded feed roller 16 to a carded combing roller 17, on which the tobacco carpet is formed. The tobacco layer carried upwardly by the combing roller 17 passes beneath a carded brushing roller 18 which is arranged to sweep back surplus tobacco from the surface of the combing roller and thus to insure the formation of a tobacco carpet of substantially uniform depth at the rear side of the combing roller 17. After passing the brushing roller, the tobacco is carried on the surface of the combing roller 17 to a rapidly rotating picking roller 19, which removes the tobacco from the combing roller and showers the same downwardly onto a carded distributor roller 20. The tobacco is again picked from the surface of the distributor roller 20 by a second fast moving picking roller 21, and is showered downwardly onto a web or paper strip 22 continuously fed along and supported by the trough 23 of a continuous rod cigarette making machine.

The elements thus far described are entirely conventional, and the details thereof form no part of the instant invention. For instance, the feed roller 16 and the distributor roller 20 may both be replaced by endless band or vibrating plate conveyors, and other elements of the feed mechanism may also be widely altered. Broadly expressed, the invention is applicable to any cigarette tobacco shred feeding machine employing a conveyor on which a tobacco carpet is formed, and in which short tobacco may separate out in the course of forming the carpet.

In the machine thus far described, short tobacco may fall downwardly from any of the carded rollers, and is separated principally at the juncture of the feed roller 16 and the combing roller 17. The short tobacco so separated falls downwardly and is guided by transversely extending partitions or aprons 25, onto a transversely extending, trough-shaped, vibrating plate conveyor 24.

As shown in Fig. 2, vibrating plate conveyor 24 is mounted for oscillatory movement on a plurality of supporting links 26, each of which may be constituted by a flat spring inclined away from the delivery end of the plate, the links being rigidly connected at their opposite ends through brackets 28, 29 to the machine frame and to the conveyor 24 respectively, as shown more particularly in Fig. 3. Alternatively, rigid links, pivotally connected to the frame and the plate 24, may be employed. In either event, endwise reciprocation of the plate 24 will cause the plate to move upwardly toward the left, in the direction of the pneumatic elevator, and downwardly toward the right, owing to the inclination of the supporting links 26. This movement imparts to the tobacco on the conveyor 24 the desired movement along the conveyor and toward the pneumatic elevator.

To achieve this result it is necessary that the

oscillatory movement of the plate be fairly rapid, for instance of the order of 1,000 to 2,000 cycles per minute. In one embodiment of the invention, optimum results are achieved by reciprocating the plate conveyor 24 at the rate of 1,600 cycles per minute, and at an amplitude of ⅛ inch. It will be appreciated that these factors may be varied considerably and that if the amplitude of vibratory movement of the plate is increased, the rate of reciprocation can be reduced, and vice versa.

Reciprocation of the plate conveyor 24 is effected by an eccentric 35 journaled on the machine frame, and driven by a belt 36 from the main driving motor 38 for the whole machine. Connection between the eccentric 35 and the plate conveyor 24 is effected by a strap 39 and link 40, the latter being secured to the strap and to one of the brackets on the vibrating plate conveyor 24 as shown more particularly in Fig. 3. The link 40 may be constituted by a flat spring element, similar to the spring elements 26 employed to support the conveyor 24.

At its delivery end, the vibrating plate conveyor 24 extends through an opening 43 in the tube 45 which defines the air passage of the pneumatic elevator, at which point the tube 45 is constricted or otherwise formed to provide a Venturi tube. In the preferred form of the invention, the Venturi tube is constituted by opposed flat plates 48 and 58, bent to the shape shown in Fig. 4, and secured at opposite sides of and within the tube 45. Lead or other suitable filler 51 is preferably poured behind plates 48 and 49 as shown to strengthen the same. It will be appreciated that this is merely a convenient way of forming the constriction in the tube 45 and that the details of this structure may vary widely, it being sufficient if the shape of the tube at the delivery end of the vibrating conveyor plate 24 be such that the velocity of air flow through the tube is thereby greatly increased and the pressure correspondingly reduced, whereby the short tobacco delivered by the conveyor 24 is drawn upwardly in the tube, and carried with the moving air. The plate 48 is provided with an aperture 53 through which the delivery end of the conveyor 24 extends, and the latter is preferably so positioned that at the left-hand end of its stroke, the delivery end of the conveyor is approximately flush with the inner face of the plate 48. A hood 52, rigid with tube 45, fits over the conveyor 24 adjacent its delivery end, so that air admitted to tube 45 at the constricted portion aids movement of tobacco into the tube.

The air is caused to flow upwardly in the tube 45 by a blower 55, located below the constriction or Venturi tube just described, the blower being driven by a belt 56 from the main driving motor 38 at a velocity sufficient to insure the suspension of the short tobacco in the air stream and the upward flow of tobacco with the air in tube 45. It will be perceived that with this construction the tobacco does not pass through the blower, so that the advantages outlined hereinbefore are obtained. As shown in Fig. 2, the tube 45 extends upwardly at the side of the machine and transversely above the machine to a delivery point 60, preferably located adjacent the longitudinal axis of the machine and above the combing roller 17 on which the tobacco carpet is formed.

The short tobacco emerging from tube 45 at the delivery point falls into the upper end of an oscillating chute 62, provided with a flared dis-

charge portion 63. The chute 62 is supported for oscillation transversely of the machine and lengthwise of the combing roller 17, and for convenience is oscillated from shaft 65 which forms a part of the driving mechanism for the conventional reciprocating tamper 66. Thus the chute 62 may be mounted on a stub shaft 68 journaled in bearing 69 carried by the machine frame. An arm 70, secured to shaft 65, is operatively connected with chute 62 through a flexible link or spring 74 and a rod 67 rigid with an arm 71, in turn secured to stub shaft 68. The points of connection of the spring 74 with the arm 70 and rod 67 are slightly displaced laterally of the machine when the arm 70 occupies its uppermost position. Thus as the arm 70 descends from the uppermost position, the spring 74 exerts a lateral thrust on rod 67 and arm 71, thereby displacing the chute 62 transversely of the machine. A rigid link may be substituted for the spring 74 if desired, but it is found that shock and vibration are materially reduced by the employment of a flexible element at this point. The details of the oscillating distributing mechanism just described are not claimed herein and may be modified widely.

The mechanism for reciprocating the tamper may be constructed as shown and described more particularly in the patent to Ruau 1,962,036, granted June 5, 1934. Thus the tamper 66 is carried by a parallel linkage system including arms 80 and 81, pivotally mounted on the machine frame and connected at their outer ends by pivoted links 89, arms 80 being secured to oscillating shaft 65. Shaft 65 is oscillated by suitable linkage, not shown, from the machine motor 38, and the tamper 66 is secured to the links 89 for rising and falling movement therewith in a substantially vertical plane. At the lower limit of movement of the tamper 66, the tobacco carried on the upper surface of the combing roller 17 is tamped or pressed so as to insure that the carding on the combing roller is completely filled with tobacco.

As hereinbefore pointed out, the vibrating plate conveyor may be supplied with tobacco from a separate source for incorporation with the bulk of the tobacco carried on combing roller 17. To this end a hopper 92, mounted at one side of the machine, may be employed to deliver to conveyor 24 the tobacco to be admixed, for instance through chute 93 directly onto vibrating plate conveyor 24, suitable means (not shown) being employed to regulate the rate of feed. I am thus enabled to supply the pneumatic elevator with additional short tobacco or with a flavoring ingredient, and to effect uniform distribution thereof on the tobacco carpet through oscillating chute 62.

Machines of the character herein described are commonly provided with a clutch whereby the machine may be drivingly connected to the main motor. Preferably the mechanism for conveying and redistributing shorts as described herein is directly driven from the motor 38, rather than through the main clutch shown schematically at 93 through which the feeding apparatus is driven. Thus the redistribution of shorts is initiated as soon as the motor 66 is energized, and before the clutch 93 is engaged. Overloading and jamming of the conveyor 24, occasioned by the separation of shorts due to vibration of the machine prior to the operation of the tobacco feeding apparatus, is thereby avoided.

It will be perceived that in the practice of the instant invention, the short tobacco which normally separates out in the course of forming the tobacco carpet is redistributed on the carpet by simple and inexpensive conveying equipment which is subject to a minimum of wear during use. The equipment functions uniformly despite variation in the character and condition of the tobacco, and the tobacco thus conveyed is subjected neither to destructive beating or agitation nor to contamination by grease or other impurities. Furthermore, the conveying equipment lends itself readily to the admixture, with the bulk of the tobacco on the carpet, of tobacco of different character or from a different source.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a tobacco feeding apparatus for cigarette machines, the combination with a vibrating conveyor plate for conveying short tobacco, of an upwardly directed passage having a Venturi tube intermediate its ends, said Venturi tube having an opening adjacent that portion thereof of at least transverse area, said passage being otherwise closed intermediate its ends, said conveyor plate communicating with the said opening in said Venturi tube to deliver the short tobacco thereto, a hood extending laterally from said Venturi tube adjacent said opening and over said conveyor to form with the latter an air passage leading to said opening, and a blower in closed communication with the lower end of said passage for delivering air to said passage below said Venturi tube, whereby the short tobacco is blown upwardly in said passage.

2. In apparatus for use in cigarette tobacco shred feeding machines of the type employing a carded conveyor on which a tobacco carpet is formed, and wherein short tobacco is separated out during the formation of such carpet, the combination with a pneumatic elevator having a Venturi tube intermediate the ends thereof, of a vibrating plate conveyor extending transversely of the machine for receiving the separated shorts and conveying the same laterally to said elevator at said Venturi tube and a hood extending laterally from said venturi and over said conveyor to form with the latter an air passage leading to said tube.

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