

April 21, 1970

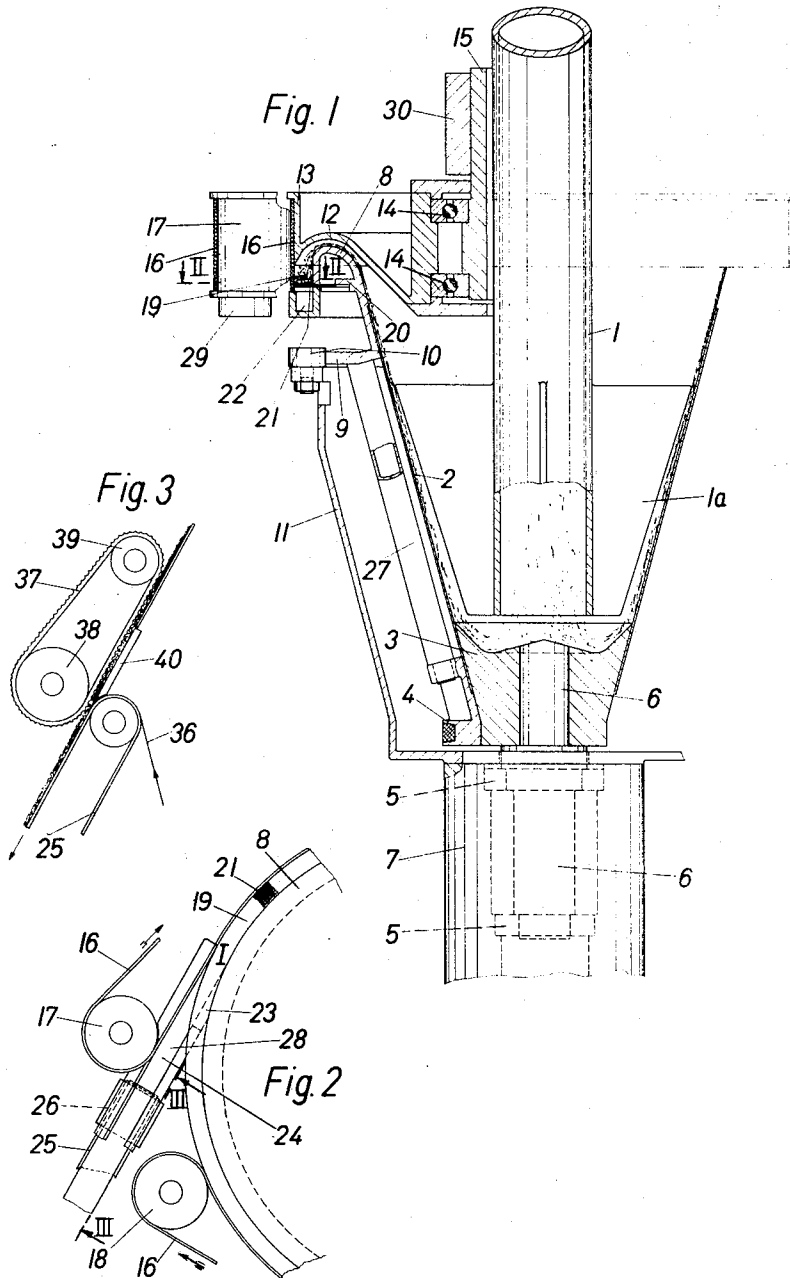
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3,507,289

TOBACCO MANIPULATING MACHINES

Filed May 24, 1965

4 Sheets-Sheet 1



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Fig. 4

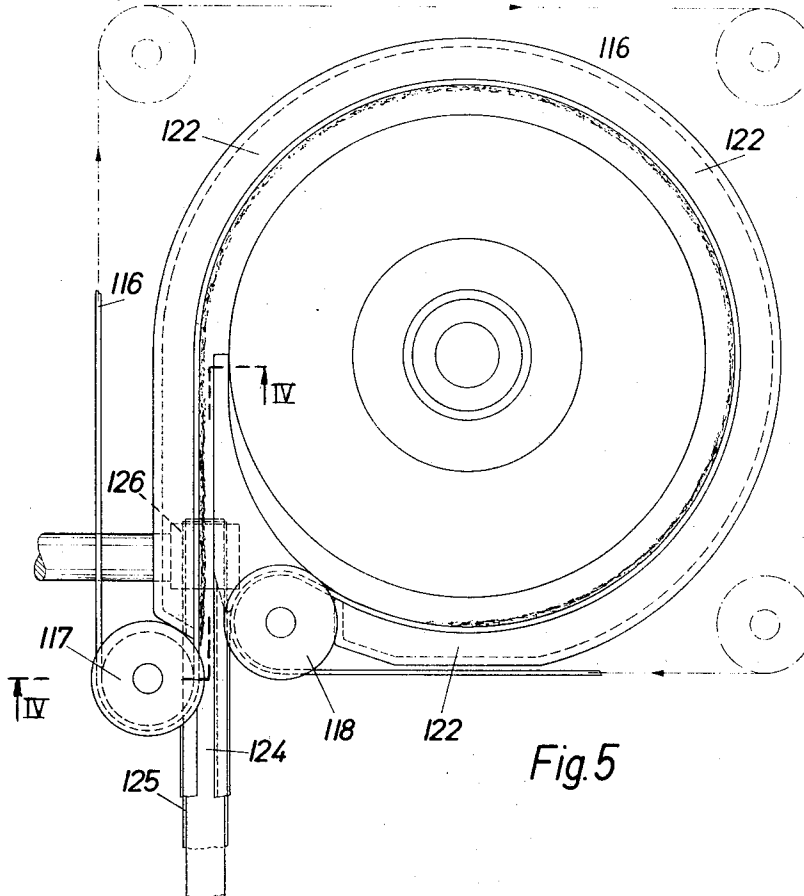
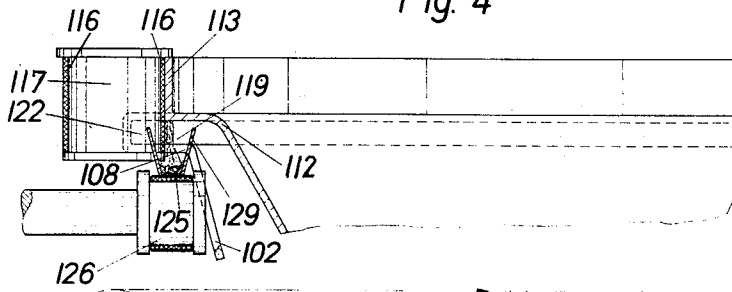


Fig. 5

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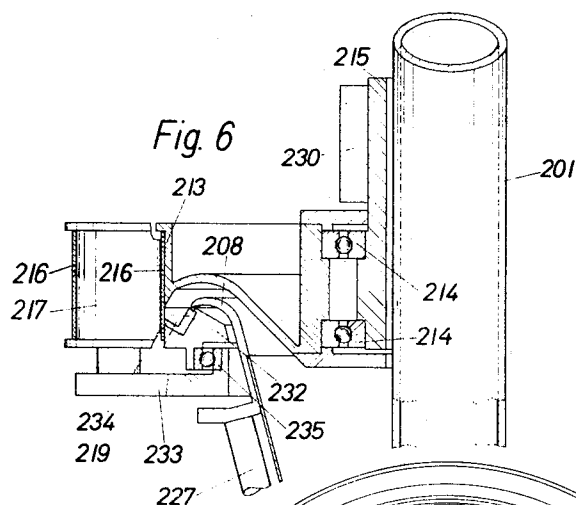
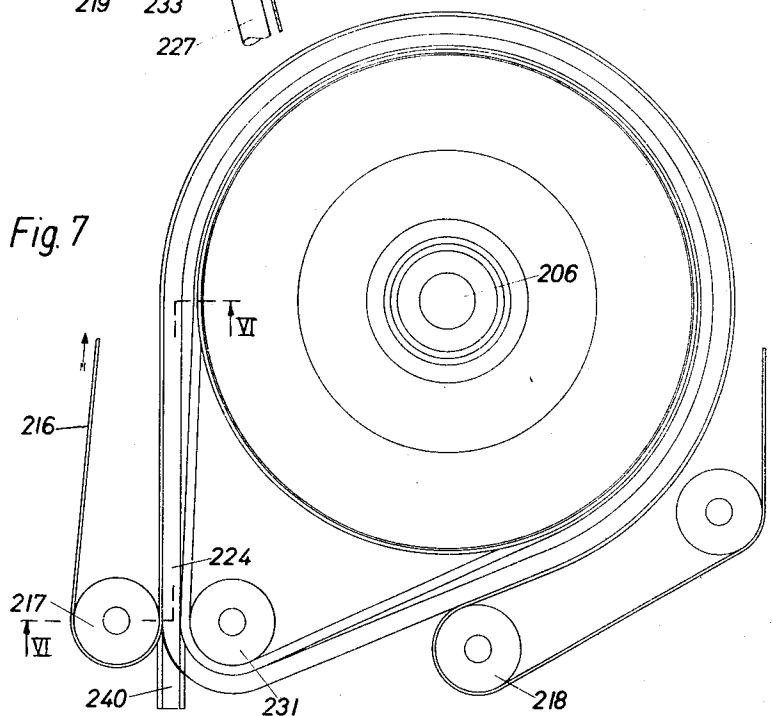


Fig. 7



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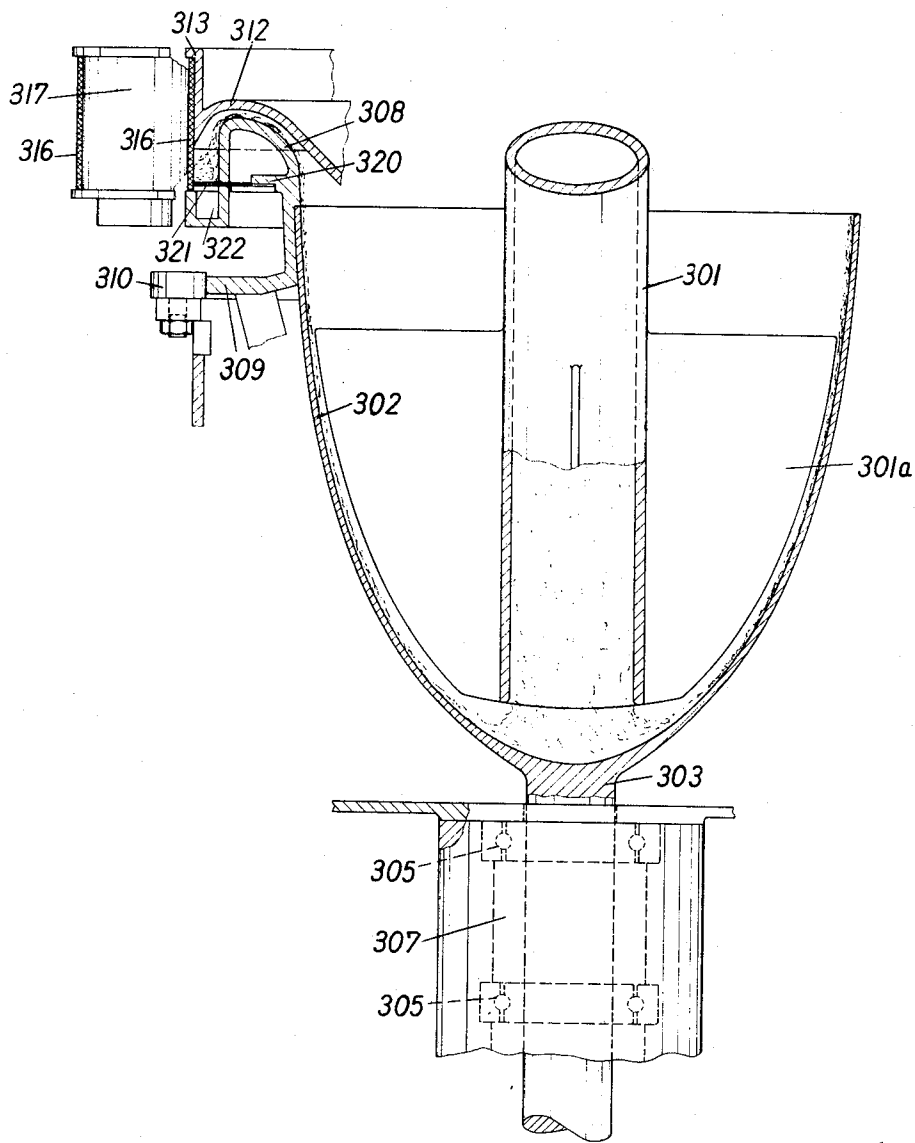
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Fig. 8



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TOBACCO MANIPULATING MACHINES

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3 Claims

ABSTRACT OF THE DISCLOSURE

Tobacco manipulators for forming rods in cigarette rod producing machines, each utilizing a rotary cone-like vessel having a vertical longitudinal axis, the narrow end of the cone being lowermost. A tube feeds tobacco shreds into the lower narrow end of the rotating vessel. Centrifugal force causes the shreds to disperse radially, and stationary vanes attached to the feed tube and radiating therefrom toward the internal wall of the conical vessel, in conjunction with the rotary motion imparted to the shreds, causes the shreds to rise over the outer rim of the vessel onto a horizontally disposed element which may be foraminous and subjoined by a suction chamber in one embodiment, and bound on opposite sides by rotating members forming a rod stream receiving channel. A tangential take-off permits removal of the rod stream, the stream then being conveyed to a rod wrapper thereby forming a wrapped cigarette rod.

The invention relates to tobacco manipulating machines for forming continuous tobacco rods such as are used in the manufacture of cigarettes.

It is an object of the invention to provide a tobacco manipulating machine, especially for forming a continuous tobacco rod, in which any violent acceleration of the loose tobacco is avoided, since such acceleration may lead to a non-uniform distribution of tobacco in the tobacco rod.

It is another object of the invention to provide a tobacco manipulating machine in which the tobacco need not be carried by an air stream which would tend to dry the tobacco and to influence its aroma.

With these objects in view the invention consists in the combination of features which will become apparent from the following detailed description of some embodiments of the invention when read in conjunction with the accompanying diagrammatical drawings which are given by way of example and in which:

FIGURE 1 shows a portion of a first embodiment of the invention in side view, partly in section, and partly broken away;

FIGURE 2 shows a portion of the invention shown in FIGURE 1, partly in plan and partly in section and taken substantially on the line II—II in FIGURE 1;

FIGURE 3 illustrates a partial side elevation of the device of FIG. 2, the view being taken substantially along line III—III;

FIG. 4 is a partial sectional view of a second embodiment of the device of the present invention, substantially as in FIGURE 1 taken on line IV—IV of subsequent FIG. 5;

FIG. 5 is a plan view of the aforementioned second embodiment of this invention;

FIG. 6 is a partial sectional view of a third embodiment of the device of this invention substantially as in FIGURE 1, taken on line VI—VI as shown in subsequent FIG. 7;

FIG. 7 is a plan view of the aforementioned third embodiment; and

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FIG. 8 illustrates a portion of a fourth embodiment in side view, partly in section and partly broken way.

The embodiment of FIGS. 1, 2 and 3 comprises a vessel 2 having conical side walls, the vessel 2 being so arranged that its axis is vertical and the narrow part of the conical side walls is lowermost. Within the vessel 2, a tube 1 is provided which is coaxial with the conical side walls of the vessel 2 for feeding shredded tobacco to the bottom of the vessel 2. The tobacco may be fed through the tube 1 by the action of gravity. The tube 1 is provided with vanes 1a extending from the tube 1 towards the conical side walls of the vessel 2 so as to leave a gap between said side walls and the said vanes, the gap narrowing towards the top of the vessel 2.

The conical side walls of the vessel 2 are fixed to a support 3 keyed to a rotatable shaft 6 mounted by means of roller or ball bearings 5 in a stationary frame 7. The upper surface of the support 3 and the shaft 6 form the bottom of the vessel 2. The vessel 2 is rotatable by means of a drive comprising a pulley 4 fixed to the support 3 and a driving belt engaging the pulley 4. (It should here be noted that FIGURE 1 shows only the left hand side of the embodiment in detail.)

The conical side walls of the vessel 2 are made of thin sheet metal stiffened and stabilized by a plurality of tubes 27 of light metal and equally distributed around the outside of said conical walls only one of the tubes 27 being shown in FIG. 1. The tubes 27 are attached to the support 3 and to an annular member 8 forming the top of the vessel 2. The annular member 8 has a convex upper surface and is fixed to the conical side walls of the vessel 2. The annular member 8 is provided with an outwardly directed flange 9 bearing against a roller or ball bearing 10 for stabilizing the annular member 8.

The vessel 2 is surrounded by a stationary conical guard member 11 carried by the frame 7.

Adjacent the convex upper surface of the annular member 8, a guide ring 12 is provided which is concave towards the annular member 8 so as to form a passage for tobacco between the annular member 8 and the guide ring 12.

The guide ring 12 is provided with a flange forming a pulley 13 for a driving belt 16 extending along the greater part of the periphery of the pulley 13 and being guided around idlers 17 and 18 (see also FIG. 2) each mounted in a support 29 to a drive (not shown) for the belt 16 and the guide ring 12. The guide ring 12 is mounted by roller or ball bearings 14 on a stationary support 15 so that the guide ring 12 is rotatable about the stationary support 15 independently of the rotation of the vessel 2 and the annular member 8 fixed to the vessel 2.

The driving belt 16 extends downwardly beyond the pulley 13 and forms part of a channel 19 for tobacco between the extending portion of the belt 16 and a bent-down portion of the annular member 8. The said member 8 has a horizontal flange 20 carrying a perforated ring 21 rotatable with the annular member 8 and forming a bottom of the channel 19. Underneath the perforated ring 21, a further ring of U-shaped section is provided, said further ring being stationary and forming an air duct 22 underneath said ring 21 through which duct 22 air can be sucked off by means of an air exhaust pump not shown. An edge of the belt 16 bears against an edge of said further ring so as to prevent the belt 16 from leaving the pulley 13.

The idler 17 is spaced from the pulley 13, and the idler 18 is positioned adjacent thereto as shown in FIG. 2. A stationary stripper rail 23 lies substantially tangential to the pulley 13 and parallel to a tangential portion of the driving belt 16, which portion together with the stripper rail 23 and a stationary bottom member 28 forms a guide path 24 for tobacco.

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Underneath the guide path 24, a belt 25 for forming a tobacco rod is provided (see also FIG. 3). The forming belt 25 being guided by a guide 26. Cigarette paper 36 is fed by means of a further roller to the forming belt 25 so that the cigarette paper lies between the forming belt 25 and tobacco thereon. A carding belt 37 guided and driven by rollers 38 and 39 is provided adjacent a support 40 leading to the forming belt 25. The forming of the tobacco rod and finally of cigarettes is effected by known means which need not be described.

The arrangement described operates as follows:

In use the support 3, the shaft 6 and the side walls of the vessel 2 are rotated by means of the pulley 4 and its driving belt at a comparatively high speed. The guide ring 12 is rotated by the driving belt 16 and pulley 13 at a lower speed. Shredded tobacco is fed to the bottom of the vessel 2 through the pipe 1 and is forced outwards across the bottom of the vessel 2 by centrifugal force, which forces the tobacco upwards along the conical side walls when the vessel 2 is rotated at a sufficiently high speed. The steeper the side walls are the higher is the speed of rotation required for the vessel 2 for forcing the tobacco up the side walls. The tobacco forced upwards forms a tobacco layer moving along the conical side walls and is spread along the side walls by the stationary vanes 1a. The tobacco may be fed through the tube 1 in any suitable manner, preferably under the action of gravity.

The tobacco reaching the top of the vessel 2 flows over the annular member 8 and is sucked downwards into the channel 19 by vacuum created in the air duct 22 so as to form a thin tobacco layer on the perforated ring 21. This layer reaches the stationary guide path 24 and the support 40, where the tobacco layer is retarded and thereby its thickness increased. The carding belt 37 feeds the tobacco layer from the guide path 24 to the forming belt 25 and to the cigarette paper 36 thereon. The tobacco is subsequently formed into a tobacco rod and into cigarettes in any known manner.

Many refinements and modifications of the embodiment described are possible. For example, the vanes 1a may be displaceable along the tube 1 for adjusting the width of the gap between the vanes 1a and the conical side walls of the vessel 2. The conical side walls may be curved when viewed in a section corresponding to that of FIG. 1 so that the vessel 2 is bell shaped. For example, the side walls may be curved in such a manner that the side walls are highly curved near the bottom of the vessel and less curved towards the top of the vessel (see FIG. 8). Thereby the action of the centrifugal force on the tobacco at different levels can be influenced in a desired manner. The reference numerals of FIG. 8 correspond to reference numerals of FIG. 1 but are increased by 300.

A further modification is illustrated in FIGS. 4 and 5 in which reference numerals which correspond to those of FIGS. 1, 2 and 3 are increased by 100. In this embodiment, the driving belt 116 is perforated at its portion extending beyond the pulley 113. Tobacco flowing over the annular member 108 at the top of the vessel 102 is collected on the perforated portion of the belt 116 by means of suction created by an air duct 122 connected to an exhaust pump. The tobacco layer on the perforated portion of the belt 116 is fed to the tangential guide path 124, where it drops from the belt 116 down onto the forming belt 125 and the cigarette paper thereon, since at this region the suction ceases.

In the embodiment of FIGS. 6 and 7, in which reference numerals which correspond to those of FIGS. 1, 2 and 3 are increased by 200, an L-shaped belt 234 is moved by means of a disc 232 having an L-shaped groove. The

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disc 232 is arranged below the annular member 208 and is slowly rotated on a bearing 235. The L of the belt 234 is inclined so that the belt 234 forms a trough-like channel 219 adjacent the lower portion of the driving belt 216 and underneath the annular member 208. The belt 216 is driven by a driving roller 217 and the belt 234 is driven by a roller 231. At the region where the belt 234 is tangential to the pulley 213 it is turned so that here one limb of the L is horizontal and the other vertical and a guide path 224 is formed leading to a further guide path 240 in which the tobacco is moved forwards by means of a carding belt not shown, but similar to the carding belt 37 of FIG. 3.

It will be noted that in the embodiment of FIGS. 6 and 7 no suction is required for acting on tobacco overflowing the annular member 208 of the vessel.

I claim:

1. In a tobacco manipulating machine of the kind utilizing centrifugal force for distributing the tobacco, the combination comprising a rotatably mounted vessel having a vertical axis, a closed bottom portion, an open top portion, and imperforate wall portions which are upwardly and outwardly inclined from said bottom portion, the height of said vessel being essentially greater than the width of said vessel at its bottom, means for feeding shredded tobacco downwardly within said vessel to said bottom portion thereof substantially around said vertical axis, means for receiving tobacco from said vessel, said receiving means being arranged at said top portion, and drive means for rotating said vessel about said axis for centrifugally forcing tobacco from said bottom portion to form a thin tobacco coat on said wall portions and to move upwards to said receiving means exclusively by the effect of the centrifugal force.

2. A combination as defined in claim 1, wherein the side walls of said vessel are curved in the direction from said top towards said bottom, the curvature of said side walls being less near said top than near said bottom.

3. A combination as set forth in claim 1 wherein said receiving means comprise an L-shaped belt arranged close to the periphery of said top portion for receiving the outgoing tobacco, a rotatable disc having an L-shaped groove for supporting and driving said belt, said L-shaped belt being adopted for cooperation with tobacco conveying means.

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