

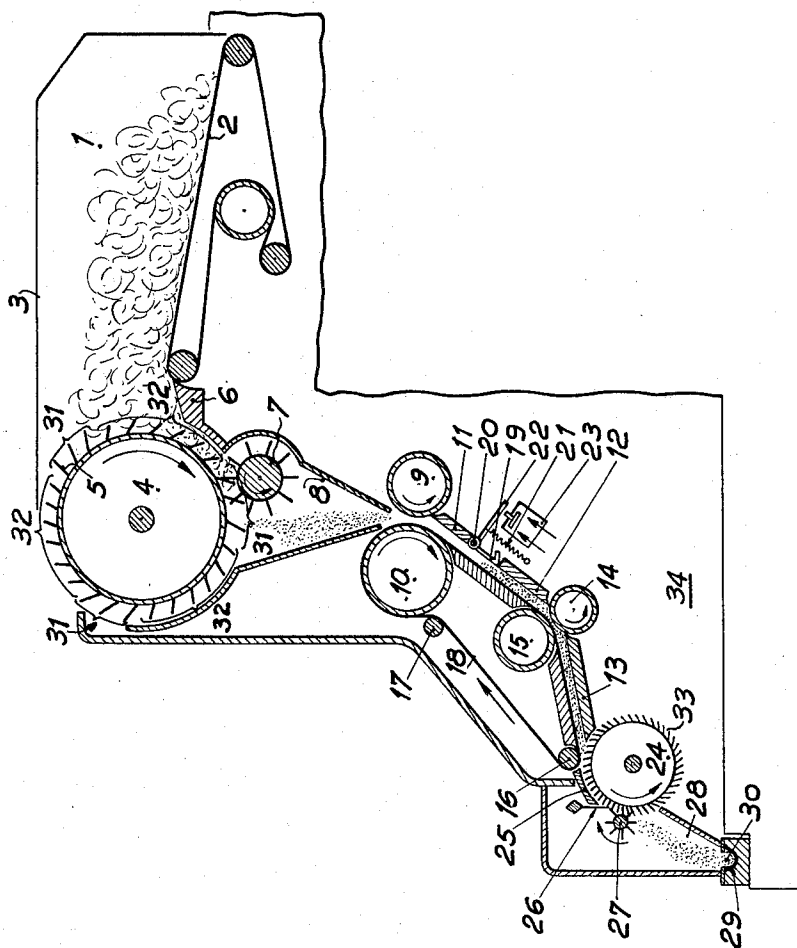
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TOBACCO DISTRIBUTOR FOR CONTINUOUS-ROD CIGARETTE MAKING MACHINES

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TOBACCO DISTRIBUTOR FOR CONTINUOUS-ROD CIGARETTE MAKING MACHINES

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This invention relates in general to cigarette making machines and more particularly to the tobacco distributors of machines of this character.

In the distributors of cigarette making machines the chief difficulty is to obtain at the distributor outlet a tobacco feed in the form of a layer or mat having the maximum regularity while avoiding as much as possible the tearing up of the tobacco blades.

It has already been proposed to this end to form a preferably flat mat of tobacco having its lower and upper edges substantially parallel to the rod of tobacco to be formed, which is fed in a direction inclined towards the rod to be formed, in a width substantially equal to the distributor width, bound laterally by smooth walls and a substantially constant length, to feed this mat with non-broken tobacco blades showered on its upper edge immediately as the latter becomes lower than a predetermined minimum height, and to shower in a continuous and uniform manner the lower edge of said mat in the direction of the tobacco rod to be formed.

Now it has been found, according to this invention, that the quality and uniformity of the tobacco rod could be improved considerably by ramming the tobacco blades forming this mat, in the plane of the mat itself, by means of a pressure exerted in this plane. Said pressure is preferably such that the tobacco density in the region of its lower edge be close to that obtained in the finished cigarette.

Distributors of this type comprise successively, in the direction of feed, a feed device adapted properly to loosen the tobacco by handling it as delicately as possible, a device for forming a tobacco mat having the width of the distributor and a substantially constant length in a relatively wide chute or like constricted passage, a carding or brush cylinder at the outlet end of said chute, and a conventional-type scattering or showering device adapted to extract the tobacco from this cylinder and shower same in the direction of the rod-forming channel.

The distributor according to this invention is characterized in that the chute or like constricted passage in which the tobacco mat is formed comprises a first section constituting a constant-level tobacco reserve and having means for maintaining the height of the tobacco mat to the desired constant level, a second section constituting a rectilinear passage, the tobacco being fed through this rectilinear passage, means for feeding this rectilinear passage with tobacco from the lower end of the constant-level reservoir, and other means for advancing the tobacco therein and ramming same longitudinally until a uniform mat of a density close to that of the tobacco in the finished cigarette is obtained. The various means consist of a specific arrangement of parts whereby the tobacco can be fed to the aforesaid passage at a rate considerably greater than that at which it is discharged in the form of a compressed mat of relatively great cohesion which is capable of exerting a substantial longitudinal thrust, and an arrangement adapted to maintain and amplify this thrust throughout the length of the aforesaid passage. These means may consist for example of an endless belt having a sufficiently rough surface which constitutes the upper wall of the passage and travels at a speed greater than that at which the layer of tobacco is

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discharged, the lower wall of the passage consisting, on the contrary, of an extremely slippery surface. Means are provided for discharging in a continuous and uniform manner the mat issuing from this passage at a speed corresponding to the rate of tobacco feed necessary for manufacturing the cigarettes; these means may consist, according to the known method, of a cylinder lined with card clothing or pins co-acting with a showering cylinder adapted to shower the tobacco loosely into an underlying hopper at the lower end of which an endless belt travelling in a channel-sectioned member, disposed parallel to the distributor, leads the tobacco rod being formed thereon towards the cigarette-forming members.

In order to afford a clearer understanding of the present invention and of the manner in which the same may be carried out in the practice, reference will now be made to the single figure of the accompanying drawing illustrating diagrammatically by way of example a typical embodiment of the tobacco distributor of this invention.

The cut tobacco is poured into a reservoir 1 consisting of a travelling bottom member 2 (in the case illustrated an endless belt) and two stationary side walls 3. The tobacco is constantly urged towards the feed drum 4 by the belt 2. The thrust imparted to the tobacco by the endless belt 2 moving at a very slow speed is quite moderate and is furthermore reduced by the frictional contact of the tobacco with the stationary bottom plate 6. The feed drum 4 is provided with parallel rows of inclined pins 5. This feed drum 4 exerts a moderate and slow pulling action on the tobacco fed by the feed belt 2 and carries along a layer of tobacco. The direction of rotation of this feed drum 4 is such that both long and short tobacco blades are carried along regularly, thereby avoiding any undue accumulation, and the intermittent passage, of short blades.

In three equally spaced zones 31 of the periphery of the feed cylinder 4 the pins are about .4" longer than in the intermediate zones 32. With this arrangement the tobacco is fed more regularly and therefore the delivery of tobacco on the inclined plate 6 is not attended by intermittent voids or holes.

The tobacco is loosened by the cylinder 7 carrying radial pins and rotating at a relatively low speed, for example of the order of 350 r.p.m., the radial pins advancing the tobacco in its direction of feed. With these specific arrangements the tobacco blades are disentangled while reducing to a minimum the breakage of these blades.

The assembly comprising the endless conveyor belt 2, feed drum 4 and pin roller 7 constitutes a tobacco feeding and loosening device driven from a separate motor and operated intermittently according to the requirements of the device disposed thereafter.

The loosened tobacco is showered into a first hopper 8 leading it to the inlet of the device in which a compact and uniform layer or mat of tobacco is subsequently formed.

This mat-forming device consists of an inclined chute comprising two sections inclined at different angles. The upper wall of this chute comprises an endless belt 18 having a slightly rough surface. The endless belt 18 is driven from the roller 10 and passes over guide rollers 15, 16 as well as on a tension roller 17. The lower wall comprises very smooth stationary walls 11, 12 and 13 as well as a smooth-surfaced roller 14 driven continuously from adequate means (not shown). On its sides, this chute is bound laterally by stationary and polished vertical walls which are parts of the inner lateral walls of the distributor, one of which is seen at 34 on the drawing.

The first section of the chute of this distributor extends from rollers 9 and 10, on the one hand, and rollers 14 and 15, on the other hand, and constitutes a

constant-level tobacco reservoir. Its inclination to the horizontal is of the order of 50 degrees.

The tobacco showered from the hopper 8 is directed firstly between the rollers 9, 10 and then down the chute, by gravity and also by the action of the rough-surfaced belt 18 moving in the direction of feed. The gap between these rollers 9 and 10 is about $\frac{1}{4}$ ". This first section of the chute is divergent in the direction from its inlet or upper end to its lower end. The belt 18 is spaced about $\frac{5}{16}$ " from the upper end of wall 11 and about $\frac{7}{16}$ " from the lower end of wall 12.

The length of the aforesaid first section of the chute is about 10", the upper level of the tobacco therein being situated 4" to 6" above the lower end. The hinged plate 19 is pivoted on the transverse pin 20 and urged to the position in which it is co-planar with the walls 11, 12 by a spring 21 to detect the presence or absence of tobacco in the thus defined region. This hinged plate is formed with an integral lever 22 controlling a switch 23. Thus, when no tobacco is present in the chute portion registering with the hinged plate 19, the lever 22 closes the switch 23 and the motor driving the tobacco feeding and loosening device is thus started; when the tobacco enters the plate region and actuates this plate the lever 22 opens the switch 23 and the motor of the aforesaid device is stopped. The speed of the feed and loosening device is so selected that the motor is energized during 75% to 95% of the distributor operating time.

The second section of the chute which extends from rollers 14 and 15 to rollers 16 and 24 is adapted to form a dense mat of tobacco of uniform density; its inclination to the horizontal is about 15 degrees.

The gap between rollers 14 and 15 is about $\frac{1}{4}$ ". This chute section is about 8" long and also divergent in the direction of feed. The belt 18 is spaced about $\frac{5}{16}$ " from the upper end of wall 13 and about $\frac{7}{16}$ " from its lower end.

The tobacco advances in this chute section under the action of the rough-surfaced endless belt 18 and also of the movable roller 14 compacting to a thickness of about $\frac{1}{4}$ " the tobacco issuing from the upper reservoir; as the tobacco is delivered from the chute it is carried along by a drum 24, also lined with card clothing or pins 33, under a stationary concave 25. The mat of tobacco retained by the comb 26 is extracted by the showering roller 27 according to a conventional process. The tobacco showered into the hopper 28 falls onto an endless belt 29 travelling in channel-sectioned member 30 to feed the thus formed stream of tobacco towards the cigarette forming members.

In order to cause the mat of tobacco formed in the second chute section to advance continuously so that it engages the lower part of the chute with a high uniform density of the order of the tobacco density obtained in the finished cigarette, the speed of the endless belt 18 must be 3.5 to 4.5 times the peripheral velocity of drum 24, and the speed of roller 14 must be 2.5 to 3 times that of drum 24.

The rollers 9, 10, 14 and 24 are driven from the main driving shaft of the machine through the medium of a speed variator (not shown) in order to accommodate the velocity of operation of the assembly to the desired average weight of the finished cigarettes.

In an assembly comprising a distributor 24" wide, that is, wherein the useful length of rollers 9, 10, 14 and 24 is 24", the diameter of the cylinder 14 being 6", the velocity of rotation of drum 24 is of the order of 4 r.p.m., which corresponds to a peripheral speed of approximately 75"/mn.

Of course, the embodiment described hereinabove with reference to the accompanying drawing should not be construed as limiting the purpose of this invention as many modifications may be brought thereto without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A distributor for feeding tobacco to an endless belt from a reservoir, which comprises rotative feeding means for causing the fall of loosened tobacco taken from said reservoir, a mat forming device made of an inclined chute, said chute having an inlet arranged to receive said fall of loosened tobacco, a rough-surfaced upper wall moving continuously from said inlet and a smooth bottom wall, said chute comprising a first section having a strong inclination to the horizontal, regulating means in said first section of the chute to control the rotation of the rotative feeding means, said regulating means co-operating with the bottom wall of the chute in said first section of the chute responsively to the mass of tobacco in said first section of the chute to maintain said mass of tobacco at a constant level in said first section of the chute, and said chute comprising further another section moderately inclined to the horizontal, said other section being connected through a restricted passage to said first section, the bottom wall of the chute being movable in said restricted passage in the direction of movement of said upper wall, and said chute having an outlet for the matted tobacco, and means adapted to shower as an unbroken stream the matted tobacco issuing from said outlet of the second section of said chute onto said endless belt.

2. A distributor for feeding tobacco to an endless belt from a reservoir, which comprises a hopper disposed beneath said reservoir, rotative feed means disposed between said reservoir and said hopper and so arranged as to cause the loosened tobacco to fall into said hopper when said means are put in rotation, control means for putting said rotative feed means in rotation, a compacting passage bound by two lateral walls and a smooth bottom wall and a rough-surfaced upper wall moving continuously from the inlet end to the outlet end of said compacting passage, rotary discharge means arranged at the outlet end of said compacting passage and actuated continuously for delivering to said endless band and in the form of a continuous shower the tobacco fed to the outlet end of said compacting passage, a cylinder mounted transversely at the inlet end of said compacting passage and having a peripheral portion projecting somewhat from said bottom towards said upper wall to limit the width of said compacting passage inlet, said cylinder being driven for continuous rotation in the direction to cause said projecting peripheral portion of the cylinder to move in the direction of said rough-surfaced upper wall, said compacting passage having a bent configuration and comprising, in the direction from its inlet end to its outlet end, a first section having a pronounced inclination to the horizontal and another section extending with a moderate inclination to the horizontal down to said outlet of the compacting passage, means responsive to the mass of tobacco which, in said first section of the compacting passage, exceeds a predetermined level, said responsive means being adapted to actuate said control means for putting the rotative feed means in rotation when the tobacco is below said predetermined level in said first section of the compacting passage and releasing said rotative feed means when the tobacco exceeds said predetermined level in said first section of the compacting passage, and another cylinder disposed transversely under said bottom wall of said compacting passage between said first and second sections of said compacting passage, said other cylinder having a peripheral portion projecting above said bottom wall towards said upper wall to reduce the cross-sectional area of the passage between said first section and said other section of said compacting passage, said other cylinder being driven for continuous rotation in the direction to move said peripheral portion of said other cylinder in the direction of movement of said upper, rough-surfaced wall.

3. A distributor for feeding tobacco to an endless belt

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as set forth in claim 2, wherein said upper wall of said compacting passage consists of an endless belt having a rough lower face and an opposite upper face, a driving roller and a pair of guide rollers co-acting with said upper face of said endless belt, and a belt-tightening roller co-acting with said lower face of said endless belt.

4. A distributor for feeding tobacco to an endless belt as set forth in claim 2, wherein said first and second sections of said compacting passage are inclined to the horizontal at angles of about 50 and 15 degrees respectively.

5. A distributor for feeding tobacco to an endless belt as set forth in claim 2, wherein said upper and lower walls of said compacting passage are slightly

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divergent in each of the two sections of this passage, said two walls being spaced from each other at the inlet and outlet ends of each of said two sections of the compacting passage by about $\frac{5}{16}$ " and $\frac{7}{16}$ " respectively.

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