Nov. 24, 1931. W. F. GRUPE 1,833,285

HOPPER FEEDING MEANS FOR CIGARETTE MAKING MACHINES

Filed July 19, 1929

Fig. 1.

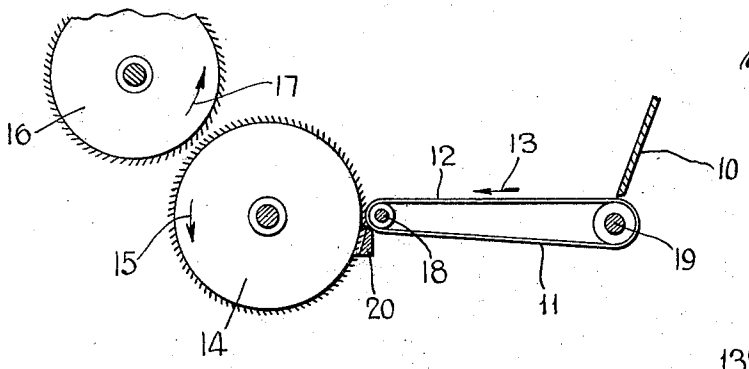


Fig. 2.

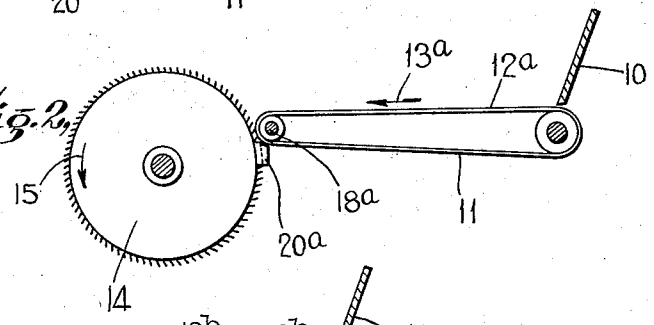


Fig. 3.

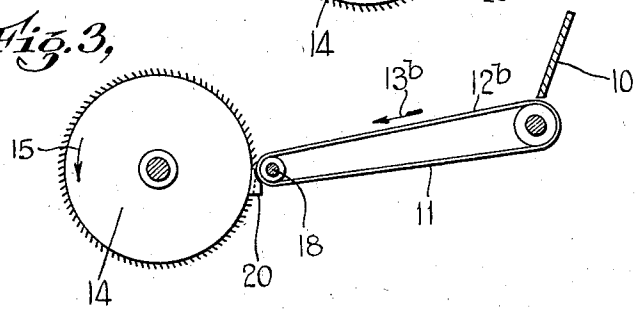


Fig. 4.

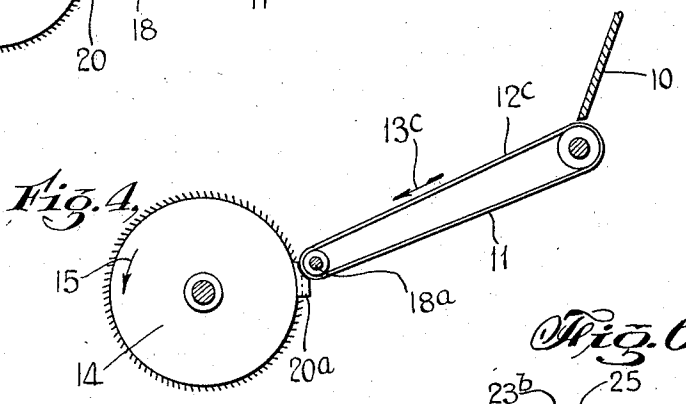


Fig. 5.

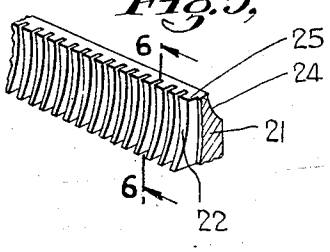
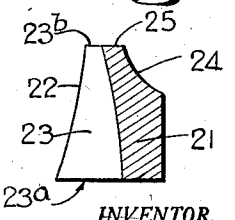


Fig. 6.



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UNITED STATES PATENT OFFICE

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HOPPER FEEDING MEANS FOR CIGARETTE MAKING MACHINES

Application filed July 19, 1929. Serial No. 379,371.

This invention is for improvements in or relating to tobacco-feeding machines, and is concerned with machines of the type having a feed hopper to receive the bulk supply, and a horizontally-pivoted carded roller which extracts the tobacco from the hopper through a feeding aperture at which the base of the hopper terminates, and towards which the tobacco is urged along the hopper base. In tobacco-feeding machines of this type, as heretofore constructed, it has been found that the "shorts" or fine particles of tobacco are apt to segregate themselves from the remainder of the tobacco and to collect at the bottom of the hopper. This results in the "shorts" being fed all together to the carded roller, to the partial but excessive exclusion of the other constituents of the tobacco, which follow later. This irregular take-up by the carded roller is impressed on the stream of tobacco which leaves the carded roller, and the irregularities persist in the stream throughout the feeding machine with the result that the final product from the machine is irregular and lacking in uniformity, thereby causing rejection of a percentage of the output, and consequent loss of efficiency of the machine.

I have found that the separation of the "shorts" from the remainder of the constituents of the tobacco which occurs in the feed hopper is due to the mass of tobacco therein being set into rotation bodily by the operation of the carded roller and the means which urge the tobacco towards the latter, and also by the dressing and brushing roller which usually co-operates with the main carded roller, and this rotation of the mass of tobacco shakes and shifts it and separates the "shorts" from the remainder of the constituents, and allows them to fall to the bottom of the hopper. It is therefore, an object of the present invention to prevent this rotation taking place, and, at the same time, to enable the carded roller to operate efficiently in extracting its charge of tobacco from the hopper.

According to one feature of the present invention, there is provided a tobacco-feeding machine of the type above described, which is characterized in that at the said aperture the hopper base is located at or above the level of the axis of the carded roller. This ensures that no portion of the surface of the carded roller will overhang the tobacco on the base of the hopper, but the surface will, on the contrary, slope in the other direction, thereby removing the tendency for rotation which would be created if the said overhang were present, because, due to overhang, the tobacco, as it moves upwardly with the carded roller, would also be forced towards the back of the hopper, and would tend to topple over and fall down to the base of the hopper again, thus accomplishing a complete rotation. Furthermore, the effect of the overhang is to crowd the particles of the tobacco together and create a dense layer at the level of the axis of the carded roller which layer extends across to the back of the hopper. This dense layer is caused to rise by the movement of the carded roller, lifting the whole mass of the tobacco with it and forming a kind of "bridge" under which there is no, or practically no, tobacco. After a time, this bridge collapses, and the part of the tobacco near the carded roller moves upwardly, while the tobacco towards the back of the hopper falls, thereby setting up the aforesaid mass rotation. Moreover, this creation of the bridge with the empty space below it, results in blank spaces being left upon the surface of the carded roller. On the other hand, by having the base of the hopper located at or above the level of the axis of the roller, the upward movement of the tobacco carries it forwardly, so that its weight is supported upon the carded roller, and there is no tendency to force it back towards the rear of the hopper or to cause it to topple over. Movement of the mass of tobacco in the hopper is inevitable to a certain extent, because there is a constant feed, due to the take-up of the carded roller, but the present invention aims at controlling the nature of that movement and preventing it taking the form of a mass rotation, which not only tends to shake the "shorts" down to the bottom of the hopper, but, as the mass tumbles about, frequently causes the tobacco to be dragged from the

surface of the carded roller and leave bare patches thereon.

According to another feature of the invention, there is provided a tobacco-feeding machine of the type above described, which is characterized in that the hopper base is so disposed relatively to the horizontal plane that it makes an angle not less than a right angle with that portion of the carded roller surface which is immediately above it. This feature of the invention may be employed in conjunction with the other feature just mentioned, if desired, but even when used alone, it will be found to be of considerable advantage in tending to prevent the occurrence of the mass rotation discussed above. In machines of the aforesaid type as heretofore constructed, it is usual to have the base of the hopper constituted by a travelling belt which slopes downwardly towards the carded roller and is located below the level of the axis of the carded roller. The downward slope of the belt is, therefore, at an acute angle with the surface of the carded roller which is immediately above it, and the effect of this acute angle may be to cause the tobacco to jam into it and make a hard mass which, after a time, extends right across to the back of the hopper and creates the aforesaid objectionable "bridge". If the arrangement is such, however, that there shall be a right angle or an obtuse angle between the belt or the base of the hopper and the surface of the carded roller immediately thereabove, this tendency for the creation of a hard roll of tobacco at the bite between the base of the hopper and the roller, will be overcome, and, therefore, there will not be any "bridging" effect produced so that mass rotation of the tobacco will not be set up, nor will there be the liability of blank spaces being left on the surface of the carded roller.

The invention is more particularly described with reference to the accompanying drawings, in which

Fig. 1 is a diagrammatic side elevation of a regulation main carded drum of the carding mechanism of a tobacco feeder of a cigarette making machine, associated with a back feed belt and co-operating back comb, embodying my invention;

Figs. 2, 3 and 4 are similar views of modifications;

Fig. 5 is a perspective view of a preferred form of back comb, pursuant to my invention; and

Fig. 6 is a sectional elevation on line 6—6 of Fig. 5.

Pursuant to the present invention, and referred to Fig. 1 of the drawings the so-called back end of the hopper comprises the back board 10 and the back feed or conveyor belt 11, its upper stretch 12, actuated in the direction 13, serves as the effective bottom of the hopper.

A regulation main carded roller is indicated at 14, rotated in the direction of the arrow 15. The axis of the main carded roller 14 is shown located in substantially a horizontal plane. A regulation carded dressing or brushing roller is shown at 16, rotated in the direction of the arrow 17.

Pursuant to the arrangement shown in Fig. 1, the feeding aperture of the hopper base is located substantially at the level of the axis of the main carded roller 14, the roll 18 of the forward end of the upper stretch 12 of the back feed belt 11 being located in close proximity to the carding of the main carded roller 14 and substantially in horizontal alignment with the axis of the roller 14. The co-operating and driving roll 19 is located at the rearward end of the belt 11.

Preferably, a back comb 20 is employed to effectively close the clearance between the forward end of the conveyor belt 11 and the carding of the main carded roller 14.

The forward roll 18 is preferably of as small diameter as is practicable. In this form of my invention, the upper stretch 12 is substantially in a horizontal plane.

In the arrangement shown in Fig. 2, the main carded roller 14 is supplied by the back feed belt 11, whose upper stretch 12*a* is disposed substantially in a horizontal plane and its forward end, passing about the forward roll 18*a*, is disposed above the horizontal plane passing through the axis of the main carded roller 14. The back comb 20*a*, in such arrangement, is suitably located in close proximity of the carding of the carded roll 14 and with relation to the forward end of the conveyor belt 11, similarly as in the arrangement shown in Fig. 1, as above described.

In the arrangement shown in Fig. 3, the forward roll 18 is located in substantially horizontal alignment with the axis of the main carded roller 14, the upper stretch 12*b* of the back conveyor belt 11 being disposed and actuated downwardly, as indicated by the arrow 13*b*. The back comb 20 is similarly as in Fig. 1.

In the arrangement shown in Fig. 4, the upper stretch 12*c* of the back conveyor belt 11 is tilted downwardly toward the main carded roller 14 as indicated by the arrow 13*c*, the forward roll 18*a*, similarly as in Fig. 2, being located above the horizontal plane passing through the axis of the main carded roller 14. The comb 20*a* is similarly arranged as in Fig. 2.

A preferred form of back comb is shown in Figs. 5 and 6, and comprises a body portion 21 having a forward face 22 curved in conformity to the effective carded peripheral surface of the body material, usually of leather, of the carding of the main carded roller 14.

This forward curved face 22 is effectively formed of spaced facial portions as above described, with intermediate grooves 23, spaced from one another and respectively embracing the respective rows of the carding teeth of the main carded roller 14, the teeth of which are disposed in correspondingly spaced common planes cutting the circular periphery of the roller at right angles to the axis of the driving shaft of the carded roller.

The grooves 23 are deeper and wider at their bottom apertures 23*a* as compared with their top apertures 23*b*, as appears in Figs. 5 and 6, for the purpose of re-conditioning the carding teeth, that is to say, to bend laterally any laterally dislocated carding teeth and to bend radially toward the carded roller 14 any radially outwardly dislocated carding teeth, thus restoring and maintaining the carding teeth in their normal functioning positions.

In addition to the carding restoring faces of the back comb, the latter is further provided with the convex face 24 extending uniformly across the upper rearward portion of the body 21 of the comb, located in close proximity to the convex path of the conveyor belt 11 about the small roll 18 (18*a*) combining therewith and with the uppermost and substantially horizontal face 25 to form an effectively complete barrier to "shorts" and other shred lengths of the shredded tobacco charged into the hopper of the cigarette making machine.

Suitable means are employed for securing the back comb in proper position for attaining the above stated function, such securement being usually effected by suitable attachment to the frame of the carding mechanism of the machine, as will now be understood by those skilled in the art.

From the above it will be apparent, upon charging shredded tobacco upon the upper stretch of the back conveyor belt, the forward end of the charging conveyor is disposed above the overhanging peripheral portion of the main carded roller 14, and the forward portion of the advancing mass of the tobacco charge, including all the "shorts" as well as the remaining shreds, is positively fed to a non-overhanging portion of the main carded roller, which is under upward actuation, and therefore away from the bulk, i. e., succeeding portion of the mass of the charge. By such procedure of feeding, the forward portion of the charge is continuously fed upon the upper peripheral portion of the carding in proper quantity relation to the tooth spaces for attaining, in co-action with the dressing or brushing roller more uniform complete filling of the tooth spaces, the surplus brushed by the brushing roller being readily controlled in quantity to preclude the formation of any "bridges" or creating any rotation of the mass of the charge, and thereby also preventing any tendency to unduly "sift" out the "shorts".

From the above, it will also be apparent that the continuously progressing back conveyor belt, serving as the virtual bottom of the hopper advances the charge substantially without unfavorable countermotion or mass rotation. The form of my invention represented typically in Figs. 3 and 4, providing for the downwardly sloped movement of the upper stretch of the back conveyor belt has the additional advantage of applying an increased feeding pressure of the charge, advantageous for certain kinds of tobacco.

I claim:—

1. In a feeder for a cigarette making machine, the combination of a carded roller having its axis disposed in substantially horizontal plane, a conveyor belt having its discharging end disposed above the horizontal plane passing through the axis of said carded roller and below the apex of said carded roller and in close proximity to the carding of said carded roller, and a back comb effectually interposed between the charging end of said conveyor belt and the carding of said carded roller, said back comb including projections fixedly carried by said back comb and disposed respectively between the rows of carding of said carded roll.

2. In a feeder for a cigarette making machine, the combination of a carded roller, a conveyor belt having its charging length disposed in upwardly extending position and its discharging end disposed above the horizontal plane passing through the axis of said carded roller and below the apex of said carded roller and in close proximity to the carding of said carded roller, and a back comb effectually interposed between the charging end of said conveyor belt and the carding of said carded roller, said back comb including projections fixedly carried by said back comb and disposed respectively between the rows of carding of said carded roll.

3. The combination with a carded roller and an effectively upwardly charging conveyor belt for feeding tobacco to said carded roller, of a back comb interposed between the discharging end of said conveyor belt and the carding of said carded roller, said comb having grooves corresponding to and embracing the respective annular sets of carding teeth of said carded roller, each of said grooves having a relatively increased depth and width at one end relative to the opposite end.

4. The combination with a carded roller and an effectively upwardly charging conveyor belt for feeding tobacco to said carded roller, of a back comb interposed between the discharging end of said conveyor belt and the carding of said carded roller, said comb having grooves corresponding to and embracing the respective annular sets of carding teeth of said carded roller, said comb further

having an upwardly disposed face corresponding substantially in contour to the contour of said conveyor belt at its discharging end.

5. The combination with a carded roller and an effectively upwardly charging conveyor belt for feeding tobacco to said carded roller, of a back comb interposed between the discharging end of said conveyor belt and the carding of said carded roller, said comb having grooves corresponding to and embracing the respective annular sets of carding teeth of said carded roller, said comb further having an uppermost face substantially bridging the clearance between the discharging end of said conveyor belt.

In testimony whereof I have signed this specification this 12th day of June, 1929.

WILLIAM F. GRUPE.