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TOBACCO FEED FOR AUTOMATIC CIGARETTE MAKER

Filed May 24, 1963

FIG. 3

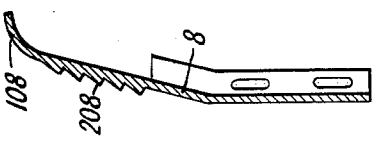


FIG. 2

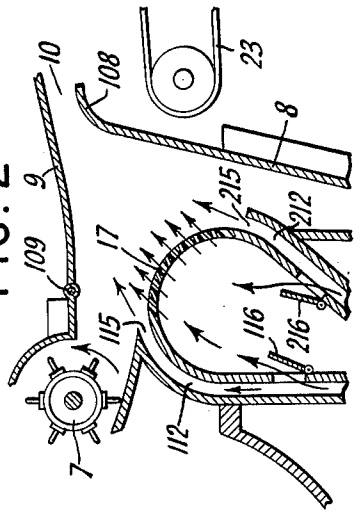
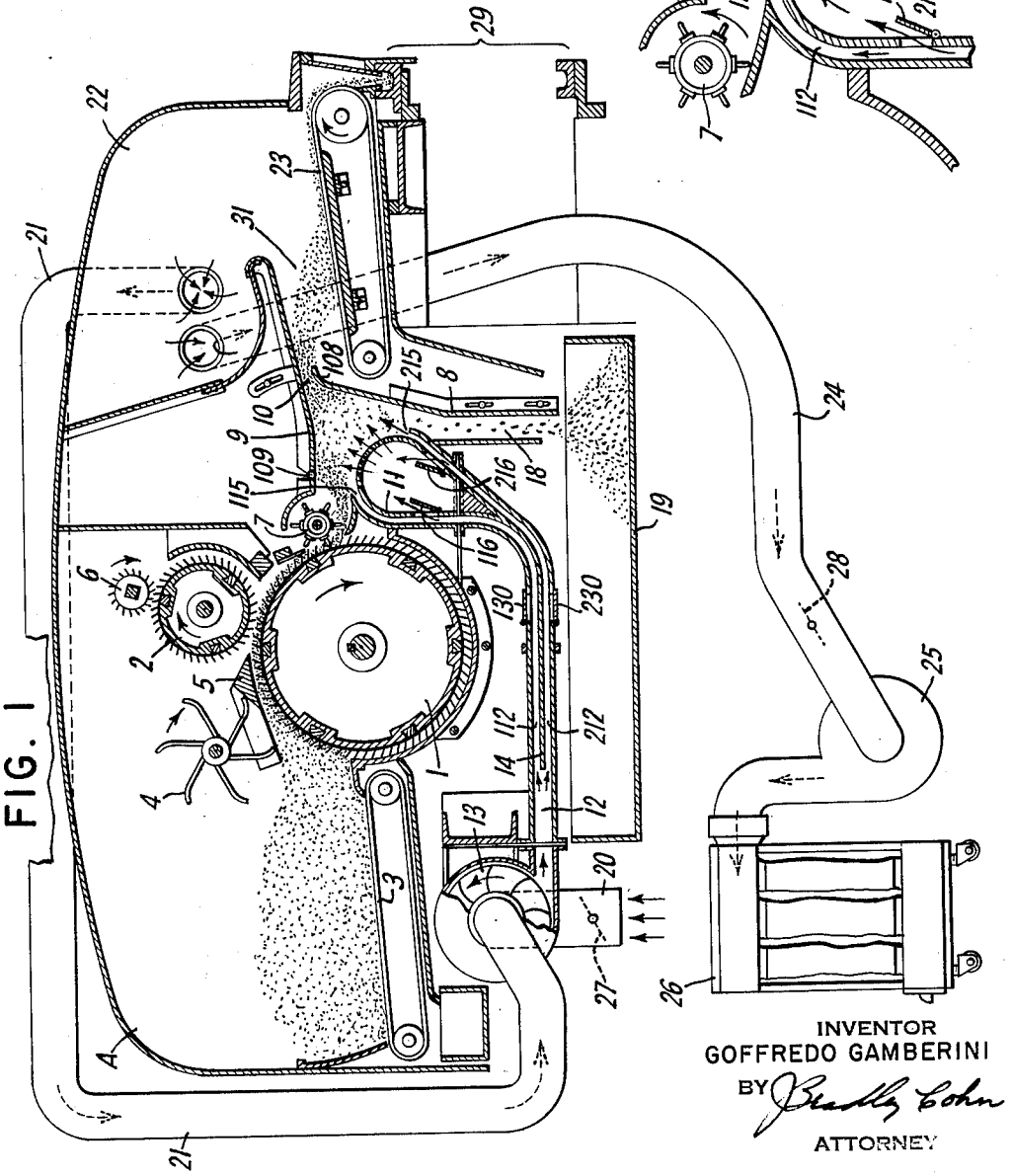


FIG. 1



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TOBACCO FEED FOR AUTOMATIC CIGARETTE MAKER

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6 Claims. (Cl. 131—109)

The present invention relates to a tobacco feed for automatic cigarette makers with a blower device to separate shredded fibers from the stems and heavy impurities, which is disposed between the main carding drum and the feed formation line.

The object of the invention is to control the tobacco delivered to the feed belt, which conveys the tobacco to the feed formation line, in a manner to insure better homogeneity and thereby to produce a cigarette rod which will be uniformly compressed and will be of constant density.

According to the invention, separation of the shredded fibers from the stems and other heavy impurities is obtained in part by means of two convergent air jets, both directed toward a duct formed between a vertical or subvertical interceptor element, constituting a front wall of the duct, and hereinafter called at times the duct wall, and an upper horizontal or slightly slanted ceiling-like element, hereinafter called at times the duct top. One of the air jets, hereinafter called at times the first jet, is directed so that it grazes the duct top. The shreds, which are detached from a main carding drum are projected in a slightly slanted direction with respect to this first jet, and substantially perpendicular with respect to the duct wall. The other air jet, hereinafter called at times the second jet, is directed upwardly, so that it grazes the duct wall and is slightly slanted in respect to it. This upward passage of the second jet extends through a chute designed to receive the stems and heavy impurities which is disposed in front of the duct wall.

Under these conditions both air jets, and particularly the first jet which grazes the duct top, deflect the shredded fibers detached from the main carding drum upwardly, accelerating them so that they will have sufficient momentum to pass above a sill formed by the upper edge of the duct wall and effect their passage through an opening or duct, hereinafter called the jet duct between the top of the duct wall and the duct top. The falling shredded fibers are subsequently collected on a conveyor belt and added to a tobacco layer being formed on the belt, and are eventually transported to the feed formation unit. The stems and other heavy impurities are deflected by the air jets to a lesser degree and insufficiently to pass over the sill. Consequently they fall into the discharge duct either directly or after having hit the duct wall.

According to a preferred embodiment of the invention, one or more auxiliary nozzles can be disposed between the two blower outlets which eject the first and second air jets, through which additional air jets can be blown as desired. These additional nozzles would also be directed toward the jet duct. The tobacco selection may be adjusted, if desired, by inserting or shutting off such additional air jets. Another selection adjustment can be made by varying the velocity of the main and/or auxiliary air jets, or by shifting the duct wall and/or the duct top in such a manner as to modify the position and/or the size of the passage duct between the wall and top.

The invention will be further described below with reference to the accompanying drawing as a non-limiting example, in the course of which description still other features and advantages of the invention will appear.

FIG. 1 shows schematically in vertical section a feed means for automatic cigarette making machines according to the present invention;

FIG. 2 shows in vertical section a detail of FIG. 1;

FIG. 3 shows in vertical section a practical variant of an element of the device shown in FIG. 1, an interceptor screen.

In the present invention a large main carding drum 1 is disposed in the feeding hopper A of the maker. The drum 1 is surmounted by a smaller carding refuser cylinder 2. The drum 1 and the cylinder 2 revolve in the same direction, as indicated by the arrows. The tobacco shreds loaded in the hopper A are pushed towards and between both carding cylinders 1 and 2, by means of a conveyor belt 3 which forms the bottom of the hopper. A rotating rake 4 with curved points coacts with a fixed cross member 5. While passing under the cross member 5, the tobacco carried on the drum 1 is subjected to a compression between the member 5 and the cylindrical surface of drum 1 to fill the space between the pins on drum 1 completely and uniformly. The uniform tobacco filling on the carding drum 1 is then pressed, combed and gauged by means of the subsequent rotating carding cylinder 2, thus forming a relatively uniform web of carded tobacco. The rotating carding cylinder 2 is continuously cleaned by means of a rotating cylinder 6, which may, for example, carry bristles on its cylindrical surface.

The present invention is not limited, however, to the above described particular embodiment of the devices for placing tobacco shreds on main carding drum 1, but it may be used also in combination with any other suitable embodiment of these devices.

On the descending side of the carding drum 1 a detaching pointed roller 7 is disposed so that it removes the tobacco from the drum 1 and projects it forwardly in a direction which is substantially perpendicular to duct wall 8 which is located in front of carding drum 1 and spaced from it. The upper portion of duct wall 8 is bent slightly forwardly with respect to the vertical in the direction in which the tobacco is projected and near its upper edge, as shown in the drawing, it has a forwardly protruding lip 108. The height of the duct wall or interceptor screen 8 is adjustable.

Above the duct wall 8, the duct top 9 extends toward the right from a position adjacent the detaching roller 7. The top 9 is substantially horizontal over a short stretch adjacent hinge element 109 and then extends slightly upwardly. Duct top 9 is provided with a hinge 109 so that its inclination can be modified.

The duct top 9 and the top edge 108 of the duct wall 8 are so disposed that they form the upwardly slanted jet duct, which constitutes a gradually widening diffuser outlet. This is in part produced by an appropriate profiling of the upper forward bent edge 108 of the duct wall 8, as shown in the drawing.

Beneath the detaching cylinder 7, between the main carding drum 1 and the interceptor screen 8 a fixed hollow body 11 is disposed, extending transversely along the entire carding drum 1 and having a bulb shaped cross section. A duct with a rectangular section 12, connected to the delivery nozzle of a fan 13, is provided beneath the carding drum 1. The duct 12 has a width substantially equal to the length of the carding drum 1. From a certain point on, the duct 12 is divided by a gradually widening median baffle 14 into the two superposed ducts 112, 212. This widening takes place well after flow separates.

The flat rectangular duct 12 is directed at first substantially horizontally and then curves upwardly toward the hollow body 11. The median baffle 14 of the duct 12 gradually widens and is connected to the lower extremity

of the hollow body 11, whereby the two ducts 112, 212 become separated and extend peripherically along the hollow body 11, duct 112 on the side turned toward the carding drum 1 and duct 212 on the opposite side turned toward the interceptor screen 8. The ducts 112, 212 terminate near the top of the hollow body 11 with the blower outlets 115, 215 substantially directed toward the passage duct 10 between the two screens 8, 9.

The walls of the hollow body 11 preferably also constitute the inner walls of the ducts 112, 212 and the latter can be put in communication with the inside of the hollow body 11 by means of the valves 116, 216. As shown in FIG. 2, the hollow body 11 is provided on its free upper surface with holes which serve as nozzles 17 substantially directed toward the passage or jet duct 10 between the two screens 8, 9.

Between the hollow body 11 and the interceptor screen or duct wall 8 there is provided a substantially vertical duct 18 which extends downward and opens on top of the box 19 for collecting the stems and other heavy impurities. The fan 13 has two suction orifices, of which one is connected to the outside ambient air by means of duct 20, whereas the other is connected by means of a tubing 21 to the hopper 22 located downstream of the blower selector device and above the conveyor belt 23. To this hopper 22 is also connected, by means of the tubing 24, the suction opening of another fan 25, the delivery outlet of which is connected, for example by means of a hose, to a filter 26. In the suction duct 20 of the fan 13 and in the suction duct 24 of the fan 25 the valves 27, 28 are provided for flow adjustment.

The air delivered by the fan 13 into the duct 12 divides into two streams, passes through ducts 112 and 212 and leaves through the two blower outlets 115, 215 in the shape of two air jets extending over the entire length of the carding drum 1, both in a general upward direction toward the jet duct 10 between the two screens 8, 9. The air jet flowing from the outlet 115 is directed so that it substantially grazes along the slanted surface of the upper screen or duct top 9 and is moreover slightly slanted in respect of the trajectory of the tobacco projected onto the hollow body 11 from the detaching cylinder 7 toward the interceptor screen 8.

The air jet from the outlet 215 is in turn directed so that it substantially grazes the interceptor screen 8 and is slightly slanted with respect to this screen as it crosses the upper entrance to the chute 18.

Under these conditions, the two air jets leaving the blower outlets 115, 215 change the direction of the shredded fibers contained in the tobacco stream projected from the detaching cylinder 7, so that the stream is directed upwardly and substantially perpendicularly toward the interceptor screen or duct wall 8. The shredded fibers are accelerated by the two air jets to such an extent that they pass upwardly over the sill formed by the upper edge 108 of the duct wall 8, flow into the jet duct 10 between the duct wall 8 and top 9, pass through the duct 10, and eventually fall onto the collecting belt 23. The aforementioned deviation of the shredded fibers is achieved principally by the action of the air jet directed from blower outlet 115 which first engages the tobacco stream projected from the detaching roller 7. The tobacco stream deviating action of air jet 115 is intensified by the air jet directed from the second blower outlet 215. Moreover, this second air jet facilitates the conveying of the shredded fibers beyond the sill formed by the interceptor screen 8 and provides a path through which the fibers are projected onto collecting belt 23. The belt 23 conveys the tobacco layer thus built up on it to the feed formation unit 29.

The heavier particles, such as tobacco stems and other impurities, are not noticeably deflected by the air jets from blower outlets 115, 215 and, therefore, fall either directly through duct 18 and into collector box 19, or collide with interceptor screen 8 and fall thereafter through duct 18 into box 19.

In order to prevent possible bouncing of stems and impurities beyond the upper edge 108 of the interceptor screen 8, the surface of this screen, rather than being smooth, may be corrugated or serrated or otherwise provided with shapes such as horizontal ribs or serrations 208 or the like, as shown as an example in FIG. 3. The profile and inclination of these shaped formations 208 on the interceptor screen 8 are so selected that the angle of incidence of the stems and other impurities striking against screen 8 facilitates their bouncing into chute 18.

The above operation may be secured with only two main air jets directed from the outlets 115, 215 while valves 116, 216 are closed. However, the action of these two air jets may be intensified by opening valves 116, 216 and thereby putting the hollow body 11 in communication with the ducts 112, 212. As a consequence thereof, additional air jets are projected through the upper holes or nozzles 17 in the hollow body 11, which will be directed toward jet duct 10 between the two screens 8, 9. By adding or shutting off such additional air jets and/or varying their thrust by manipulating the valves 116, 216 thereby letting in more air or less air into the hollow body 11, it is possible to adjust the selection of the tobacco.

Another adjustment may be obtained by varying the degree of opening of the valves 130, 230 which connect the two ducts 112, 212 individually with the atmosphere ahead of the blower outlets 115, 215.

The air blown from the outlets 115, 215 also enters the hopper 22 between the two screens 8, 9 through the ducts 10, 31, the latter defined above by the screen 9, below by the collecting belt 23, and laterally by the sides of the hopper 22. As may be observed in FIG. 1, the outlet of duct 10 between the two screens 8, 9 widens gradually like a diffuser. Also the succeeding duct 31 widens gradually like a diffuser, because of the difference in spacing between the upper screen 9 and the collecting belt 23. Consequently, the velocity of the air blown into the hopper 22 gradually decreases and after serving its function as a vehicle for conveying the shredded fibers, it is sucked out of hopper 22 either by the fan 13 or the fan 25 by means of the tubing 21, 24. The fan 13 puts this air in circulation in the duct 12, mixing it with fresh air drawn by the other suction inlet 20. The air intake from the fan 25 is first purified by means of the hose filter 26 before it is again mixed with the ambient external air. This procedure prevents the air circulating in the duct 12, the hopper 22 and tubing 21, because of the action of the fan 13, from being increasingly polluted by tobacco dust carried by the selected shreds. The valves 27 and 28 permit the adjustment of the pressure in the hopper 22.

The present invention is, of course, not limited to the embodiment described and illustrated herein, but may be incorporated in a number of other embodiments, which may be suggested to those skilled in the art from a consideration of the present disclosure and the following claims in which the invention is defined.

What is claimed is:

1. A tobacco feed for automatic cigarette makers, said feed having a blower device having two main blower outlets to separate the shredded tobacco fibers from the stems and other heavy impurities, to form a stream of selected tobacco, said blower outlets constructed and arranged to direct a first and a second convergent air current to effect said separation, a first tobacco selecting duct, formed between an interceptor screen inclined slightly forwardly from the vertical and an upper screen inclined slightly upwardly from the horizontal, both said inclinations in the direction of the tobacco flow, means for directing said first air current so that it grazes the upper screen so as to tend to project the selected tobacco in a direction which is slanted slightly upwardly with respect to the horizontal and substantially perpendicular with respect

to the interceptor screen, means for directing said second air current so that its air stream is directed upwardly and grazes the interceptor screen before passing through said first duct, a substantially vertical wall opposing said interceptor screen to define, with said interceptor screen, front and rear walls of a second duct for selecting the heavier stems and impurities, said second current traversing across the entrance to said second duct in its path to said first duct, means for adjusting the height of the interceptor screen and means for adjusting the inclination of the upper screen.

2. A feed in accordance with claim 1 having a main carding drum and in which said blower outlets extend parallel to the axis of rotation of said drum and substantially throughout the entire length of the drum.

3. A feed in accordance with claim 1 having a fan with a delivery duct and having also two separate ducts connecting said two blower outlets individually to said delivery duct, said separate ducts each having an individual air valve.

4. A unit according to claim 3 in which each of said separate ducts has an individual lateral valve communicating with the outside air.

5. A feed in accordance with claim 1 in which the upper portion of said interceptor screen has serrations so constructed and arranged as to intercept heavier particles passing upwardly therealong and direct them into said second duct.

6. A feed according to claim 1 in which said first duct communicates with a third duct, said third duct constructed and arranged so that it widens in the fashion of a diffuser, said third duct being limited above by an extension of said upper screen and below by a conveyor belt on which the selected tobacco falls, said belt being in communication with the cigarette feed formation line of the automatic cigarette maker.

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