May 9, 1933. A. PODMORE 1,907,575

CIGARETTE MACHINE FEED

Filed Aug. 22, 1929

Fig. 1.

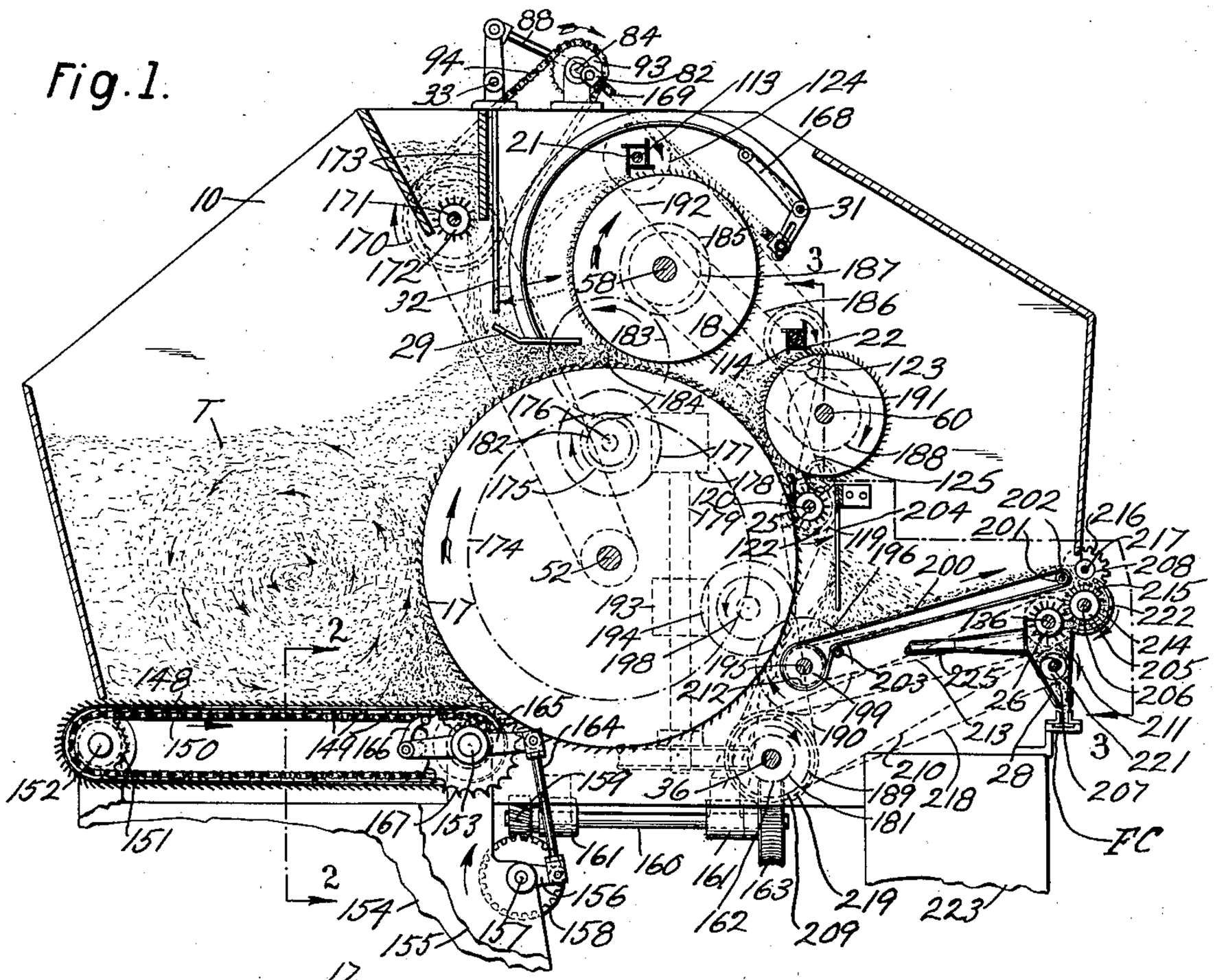


Fig. 2.

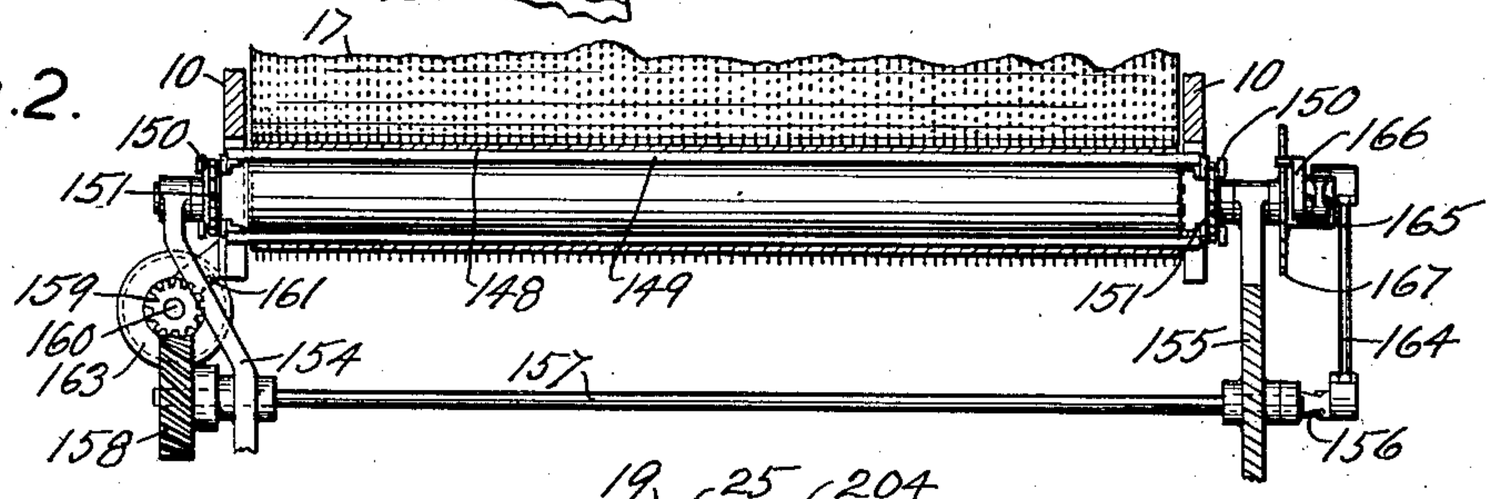
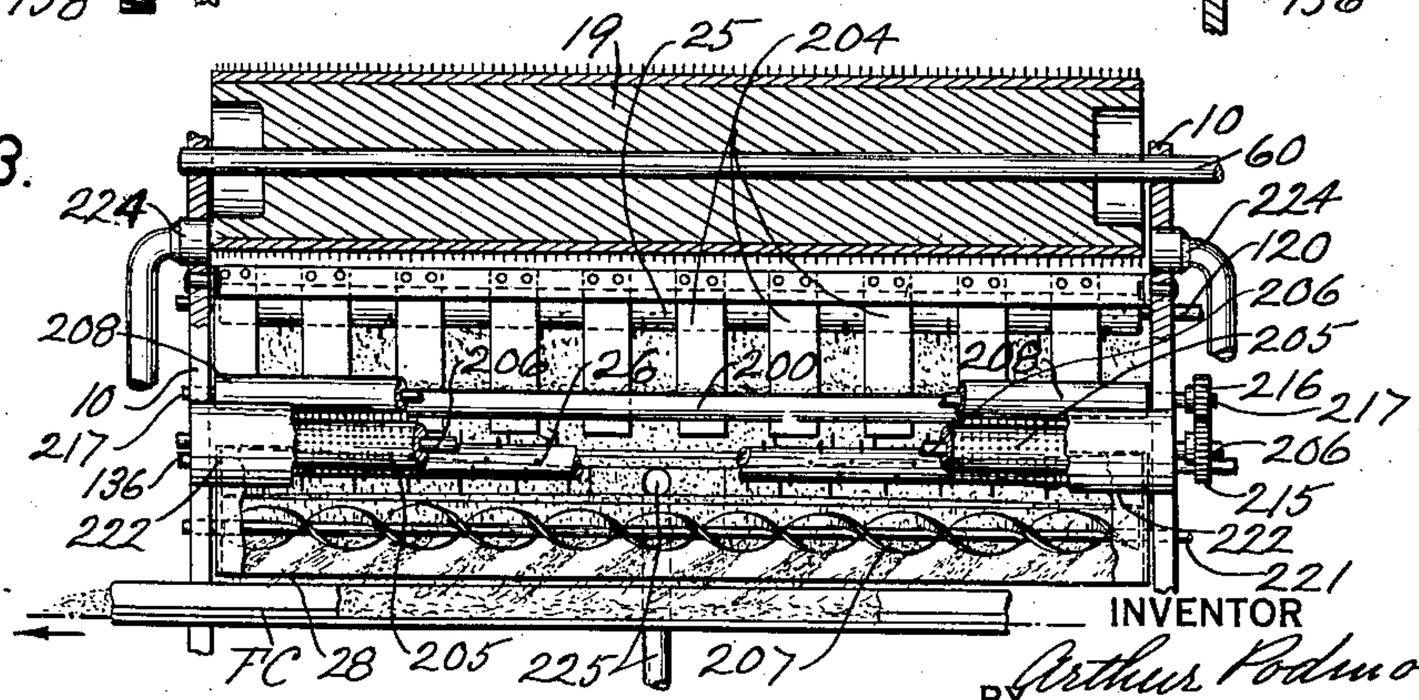


Fig. 3.



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UNITED STATES PATENT OFFICE

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CIGARETTE MACHINE FEED

Application filed August 22, 1929. Serial No. 387,686.

This invention relates to improvements in a tobacco feed for high speed cigarette machines and constitutes a modification of the feed disclosed in my prior application filed November 21, 1928, S. N. 320,871, the object of the modified or additional parts shown in the present feed being to adapt the old feed to high speed cigarette machines in which an equally smooth and uniform layer of tobacco must be supplied to the passing wrapper, though in much shorter time than for the low speed machines heretofore in use.

Generally speaking, the floor of the tobacco hopper is, for this purpose, formed by a carded horizontal belt upon which the tobacco rests and on which it is intermittently pressed against the main feed drum to fill the space between the teeth of the latter. By the forward motion of the hopper floor and the rotation of the feed drum, the tobacco in the hopper is given a rotary motion as indicated by the arrows in the drawing. As the weight of the tobacco in the hopper and with it the pressure on the hopper floor decreases, the speed of rotation gradually varies from a maximum to a minimum, and then when the hopper is refilled suddenly, rises again to the maximum, thus presenting ever-changing conditions. Since the uniform final delivery of the tobacco depends principally on the even filling of the toothed surface of the feed drum, an intermittent motion is given to the hopper floor, the teeth of which are rearwardly inclined, for the purpose of periodically arresting the rotary motion of the tobacco so that there will be an increased relative motion between the feed drum and the tobacco, and a positive action of the feed drum surface will take place during the stopping periods of the hopper floor, the feed drum itself rotating continuously.

The action of the feed drum and of the two surplus removing drums, in conjunction with the tobacco tamping and leveling means, is the same as in the original tobacco feed and is described in the previous application referred to.

The tobacco in being taken off the feed drum is thrown by the picker roll against an interrupted baffle composed of equally spaced vertical baffle plates. By allowing portions of the tobacco to be thrown the same distance forward on the delivery belt through the spaces between the baffle plates as it would be thrown if they were not present, while deflecting other portions thereof and affecting its deposition on the belt on their near side, these plates cause the tobacco to be distributed over a much greater combined area of the delivery belt than when they are omitted, since in that case all the tobacco would be thrown well forward and an empty space would exist on the belt in the rear of the present position of the baffle plates. The same irregularities in the homogeneity of the tobacco being thus divided over a greater area, will produce a more uniform tobacco sheet, while the baffle plates even act to reduce such irregularities.

Heavy particles, such as pieces of stem and foreign matter which strike the baffle plates, bounce back and fall between the feed drum and the delivery belt, while all light particles or desirable tobacco either pass through the spaces between the baffle plates and fall directly upon the delivery belt or slide down to the belt along the surface of the plates. The single tobacco streams passing through the spaces between the baffle plates spread out more or less in going down so that the tobacco forms a continuous and uniform sheet as it is built up on the belt.

The delivery belt forwards the tobacco to the top of a small slow speed feed drum from which a picker roll throws the tobacco onto a rapidly revolving screw propeller interposed in its path down the chute to the cigarette wrapper running along the cigarette feed channel. This propeller turns in a clockwise direction when viewed from the wrapper emerging end of the machine and its pitch and speed are so chosen that the falling tobacco on striking the propeller is thereby thrown forward in the general direction of wrapper travel. Without this propeller the tobacco would fall on the rapidly moving wrapper perpendicularly and would thus necessitate a sudden change of direction from vertical to horizontal and to have a full forward speed of the wrapper given to it at the

moment of landing on the same. This, at high speed, would cause slippage between the tobacco and the paper, resulting in irregular heaping of the tobacco and causing uneven distribution which is detrimental to the formation of a uniform cigarette rod. With the tobacco arriving on the wrapper at the proper angle and with the proper speed already imparted to it, it will settle on the paper in an even layer, without slippage, and thus a uniform rod will result. All of these features of improvement contribute their proper quota of usefulness in adapting the earlier feed for use with high speed cigarette machines.

In the accompanying drawing which forms a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a sectional side elevation of the improved tobacco feed showing the location of the tobacco equalizing baffle plates and of the tobacco forwarding propeller in relation to the various picking and surplus removing drums, and illustrating a modified arrangement of the tobacco tamping and leveling means;

Fig. 2 is a partial rear elevation taken on the line 2—2 of Fig. 1 showing the arrangement of operating means for the hopper floor; and

Fig. 3 is a partial front elevation taken on line 3—3 of Fig. 1 showing the arrangement of the baffle plates and of the tobacco directing propeller.

In carrying the invention into effect there is provided a cigarette machine feed channel along which the paper wrapper runs, mechanism for producing from a mass a shower of tobacco over said channel, and means for intercepting the tobacco and imparting to it a movement in the general direction of wrapper travel. In the best constructions contemplated, the intercepting means includes a rotating spiral propeller extending along and above said channel, and a suction device for removing dust from the shower of tobacco, while the mechanism includes a series of spaced baffle plates permitting free passage of portions of the tobacco and deflecting other portions thereof to spread it over a wider area and produce a more uniform sheet to be showered, and a continuously rotating feed drum and an associated hopper floor intermittently traveling toward said drum. The parts above indicated may be widely varied in construction within the scope of the claims, for the drawing illustrates but one of numerous possible concrete embodiments of the invention which, therefore, is not to be restricted to the precise details of the illustrated structure shown and described.

Referring to the drawing: The supply of tobacco T rests on an intermittently moving endless carded belt 148 which is supported by cross bars 149 secured to brackets carried by chains 150 on sprockets 151, as shown in Fig. 2, the latter being mounted on cross shafts 152 and 153 supported by frames 154 and 155. A crank 156 on a cross shaft 157 is operated by means of spiral gears 158 and 159, the latter being on a side shaft 160 journaled in brackets 161 and driven by means of a worm 162 on the main shaft 36 in mesh with a worm wheel 163 on the side shaft 160. The crank 156, by means of a rod 164, is connected with the lever 165 which is loosely mounted on the cross shaft 153 and carries on its end a pawl 166 in engagement with a ratchet 167. This pawl and ratchet mechanism intermittently rotates the cross shaft 153 and gives the hopper floor 148 its intermittent movement toward the feed drum 17. There is therefore a positive non-slip mechanically interlocked driving connection with the belt so that the movement thereof is subject to no variations in extent of movement due to creeping or slippage.

The feed drum 17 rotates continuously and takes tobacco from the arrested tobacco mass T in the periods while the carded belt 148 is stationary, delivers the same to the throat formed by the feed drum 17 on the cross shaft 52 and a surplus removing drum 18 on the cross shaft 58 where it is compacted by the tampers 29 pivoted on the cross shaft 31, the oscillating rods 32 on the cross shaft 33 leveling its surface on the up-stroke of the tampers. The oscillating levers 168 on the cross shaft 31 carry a roller engaging the under side of the curved portion of the tampers 29, as shown in Fig. 1, thereby providing a lost motion connection for actuating the tampers 29 which permits them to move upwardly when the height of the tobacco mass on the feed drum 17 is increased, and are operated by a crank 82 on the stud 84, the latter being mounted in a bearing 85 on top of the tobacco hopper 10 by means of a rod 169. The stud 84 carries the sprocket 93 which by means of a chain 94 is driven from a sprocket 170 on a cross shaft 171. This cross shaft carries a slowly moving and coarsely carded feed drum 172 located between converging walls 173 and is driven by the shaft 52 of the feed drum, which shaft has an internal gear 174 in mesh with the gear 175 on a short shaft 176 which also carries a worm gear 177 driven by a worm 178 and a vertical side shaft 179. This vertical side shaft has a worm wheel 180 in mesh with the worm 181 on the main drive shaft 36. A gear 182 on the short shaft 176 is in mesh with the gear 183 on another short shaft 184 and by means of spur gears 185 drives the surplus removing drum 18 on the shaft 58, while a chain 186 running over a sprocket 187 on the shaft 58 drives the sprocket 188 on the cross shaft 60 which carries the compensating drum 19.

The main drive shaft 36 has a pulley 189 which by means of a pulley 190 drives a pulley 119 on the picker roll shaft 120, while another pulley 122 on the same shaft is connected by the crossed belt 125 with the pulley 123 on the fan shaft 114 and thus drives the fan 22. A pulley 191 on the shaft 114 drives the pulley 124 of the fan shaft 113 by means of a belt 192 and thus drives the fan 21. The worm 193 on the vertical shaft 179 by means of a worm wheel 194 drives a belt shaft 195 through the intermediate gears 196 and 197 on the shafts 195 and 198 respectively, the former of which carries the pulley 199 of the tobacco delivery belt 200. This belt runs over a pulley 201 on a cross shaft 202 and over an idler pulley 203.

The picker roll 25 throws portions of the tobacco directly on an area of the delivery belt 200 through the spaces between stationary baffle plates 204, but these plates arrest and deflect other portions of the tobacco and cause it to fall on another area of the belt 200, thereby spreading the tobacco over a greater area and reducing the percentage of non-uniformity produced in a given length. Heavy particles hitting the plates bounce back and fall between the drum 17 and the pulley 199, while the lighter particles deflected by the plates slide down the same and fall on the belt. The plates thus also act partly as a winnower, weeding out most of the stems and foreign matter. The tobacco which leaves the delivery belt 200 falls onto a small feed drum 205 on a shaft 206 from which it is taken off by a second picker roll 26 on the shaft 136 and thrown onto a rapidly rotating screw propeller 207 located within the feed chute 28 and along and above the feed channel marked FC. By the action of the propeller, the tobacco is thrown in the general direction of wrapper travel.

Above the feed drum 205 is located a compression roller 208 which forces the tobacco against this feed drum. A pulley 209 on the main shaft 36, by means of a belt 210, drives the pulley 211 on the picker roll shaft 136, while pulley 212 on the shaft 195, by means of a belt 213, drives the pulley 214 on the feed drum shaft 206. A spur gear 215 on the shaft 206 drives the spur gear 216 of the compression roller shaft 217, while the belt 218 connects the pulley 219 on the main shaft 36 with a pulley 220 on the propeller 221. A housing 222 partly surrounds the feed drum 205. The tobacco hopper 10 is supported by frames 154, 155 and 223.

Suction pipes 224 and 225, the former two located at the ends of the hopper 10 opposite the spaces between the surplus removing drum 19 and the picker roll 120, and the latter placed in the middle of the chute and having a funneled head embracing the space between the picker roll 26 and the propeller 207, are connected to a pump not shown but operated from the machine drive and serve to collect dust from the tobacco and carry it to a suitable receptacle.

In view of the foregoing, a detailed description of the operation of the device is deemed unnecessary and is, therefore, omitted in the interest of brevity.

What is claimed is:

1. The combination with a cigarette machine feed channel along which the paper wrapper runs, of mechanism for producing from a mass a shower of tobacco over said channel, and means for intercepting the tobacco and imparting to it a movement in the general direction of wrapper travel, said means including a rotating spiral propeller extending along and above said channel.

2. The combination with a cigarette machine feed channel along which the paper wrapper runs, of mechanism for producing from a mass a shower of tobacco over said channel, and means for intercepting the tobacco shower before it reaches the channel and imparting to it a movement in the general direction of wrapper travel, said means including a rotating spiral propeller extending along and above said channel and a suction device for removing dust from the shower of tobacco above said propeller.

3. The combination with a cigarette machine feed channel along which the paper wrapper runs, of mechanism for producing from a mass a shower of tobacco over said channel, and means for intercepting the tobacco and imparting to it a movement in the general direction of wrapper travel, said mechanism including a series of spaced baffle plates permitting free passage of portions of the tobacco and deflecting other portions thereof to produce a more uniform sheet to be showered.

4. The combination with a cigarette machine feed channel along which the paper wrapper runs, of mechanism for producing from a mass a shower of tobacco over said channel, and means for intercepting the tobacco and imparting to it a movement in the general direction of wrapper travel, said mechanism including a feed drum, a picker roll therefor, a belt receiving tobacco from said roll, and a series of spaced baffle plates permitting free passage of portions of the tobacco direct from said roll to an area on said belt and deflecting other portions thereof to another area on said belt.

5. The combination with a cigarette machine feed channel along which the paper wrapper runs, of mechanism for producing from a mass a shower of tobacco over said channel, and means for intercepting the tobacco shower before it reaches the channel and imparting to it a movement in the general direction of wrapper travel, said mechanism including a continuously rotating feed

drum, and a hopper floor intermittently traveling toward said drum.

6. The combination with a cigarette machine feed channel along which the paper wrapper runs, of mechanism for producing from a mass a shower of tobacco over said channel, and means for intercepting the tobacco and imparting to it a movement in the general direction of wrapper travel, said mechanism including a continuously rotating feed drum, and a hopper floor having rearwardly inclined teeth intermittently traveling toward said drum.

7. The combination with a cigarette machine feed channel along which the paper wrapper runs, of a rotating spiral propeller extending along and above said channel for imparting to tobacco delivered to said channel a movement in the general direction of wrapper travel.

8. The combination with a cigarette machine feed drum, of a picker roll therefor, and a series of spaced baffle plates permitting free passage of portions of the tobacco taken from the drum by said roll and deflecting other portions thereof to produce a more uniform sheet of tobacco.

9. The combination with a cigarette machine feed drum, of a picker roll therefor, a belt receiving tobacco from said roll, and a series of spaced baffle plates permitting free passage of portions of the tobacco taken from said drum by said roll direct from said roll to an area on said belt and deflecting other portions thereof to another area on said belt.

10. The combination with a continuously rotating cigarette machine feed drum, of a hopper floor having rearwardly inclined teeth intermittently traveling toward said drum.

11. The combination with a continuously rotating cigarette machine feed drum, of a hopper floor having rearwardly inclined teeth, and a pawl and ratchet mechanism for intermittently moving said floor toward said drum.

12. In a cigarette machine feed, a hopper, a continuously rotating feed drum therein, a surplus removing drum cooperating with said drum, tamping means operating on the upper side of said drum, auxiliary tobacco feeding mechanism arranged to drop tobacco on the upper side of said drum, means for providing an auxiliary supply of tobacco resting on said drum, a picker roll for finally removing tobacco from said drum, a carded belt having rearwardly inclined teeth forming the floor of said hopper, and means having a positive nonslip connection with said belt for driving the same toward said drum.

13. In a cigarette machine feed, a hopper, a feed drum therein, a carded belt having rearwardly inclined teeth forming the floor of said hopper and means having a positive nonslip connection with said belt for driving the same toward said drum.

14. In a cigarette machine feed, a hopper, a feed drum therein, a carded belt having rearwardly inclined teeth forming the floor of said hopper and means having a positive nonslip connection with said belt for driving the same toward said drum, said means including chains, cross members to which said belt is secured and a drive for said chain.

15. In a cigarette machine feed, a hopper, a feed drum therein, a belt forming the floor of said hopper and means having a positive nonslip connection with said belt for driving the same toward said drum, said means including bars secured to said belt and a chain connected to said bars to drive said belt.

16. In a cigarette machine feed, a hopper, a feed drum therein, a carded belt having rearwardly inclined teeth forming the floor of said hopper and means having a positive nonslip connection with said belt for driving the same toward said drum, said means including transversely spaced chains, brackets secured to said chains, cross pieces between said chains secured to said brackets, said belt being carried on said cross pieces.

17. In a cigarette machine feed, a hopper, carded tobacco feeding means therein, a picker roll cooperating with said means, a carded belt having rearwardly inclined teeth forming the floor of said hopper, and means having a positive nonslip connection with said belt for driving the same towards said feeding means, said means including transversely spaced chains, cross pieces between said chains, said belt being secured to said cross pieces.

18. In a cigarette machine feed, the combination with a pivoted tamper, of oscillating levers, and a roller carried by said levers and adapted to engage said tamper to actuate the same.

In testimony whereof, I have signed my name to this specification.

ARTHUR PODMORE