Nov. 28, 1939. C. W. GOOCH, JR 2,181,229

FEEDER FOR CIGARETTE MAKING MACHINES

Filed May 31, 1935 3 Sheets-Sheet 1

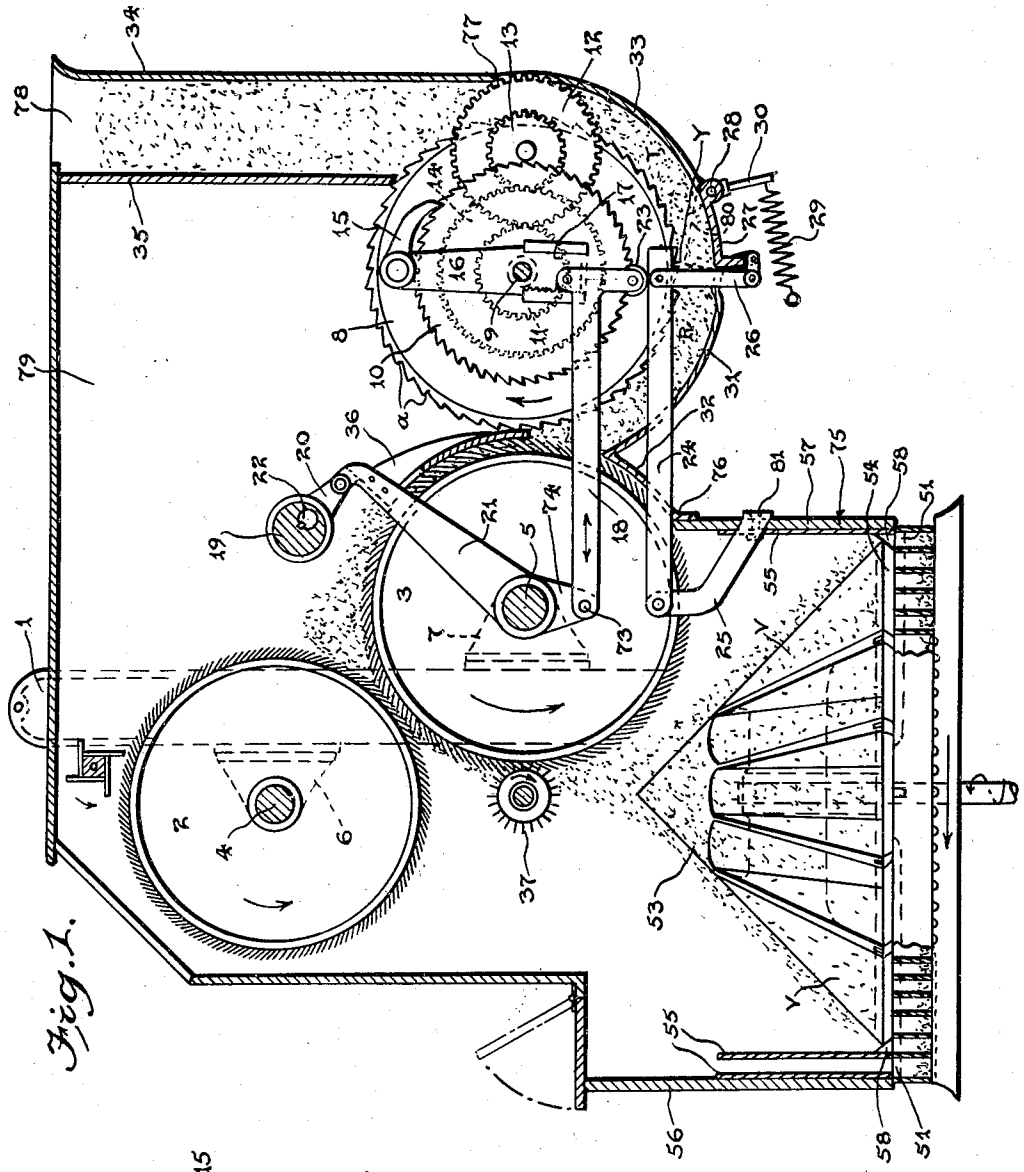


Fig. 1.

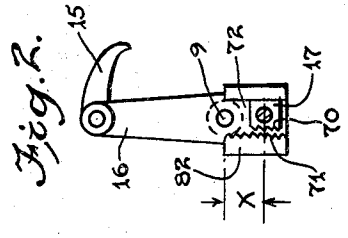


Fig. 2.

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Filed May 31, 1935 3 Sheets-Sheet 2

Fig. 3.

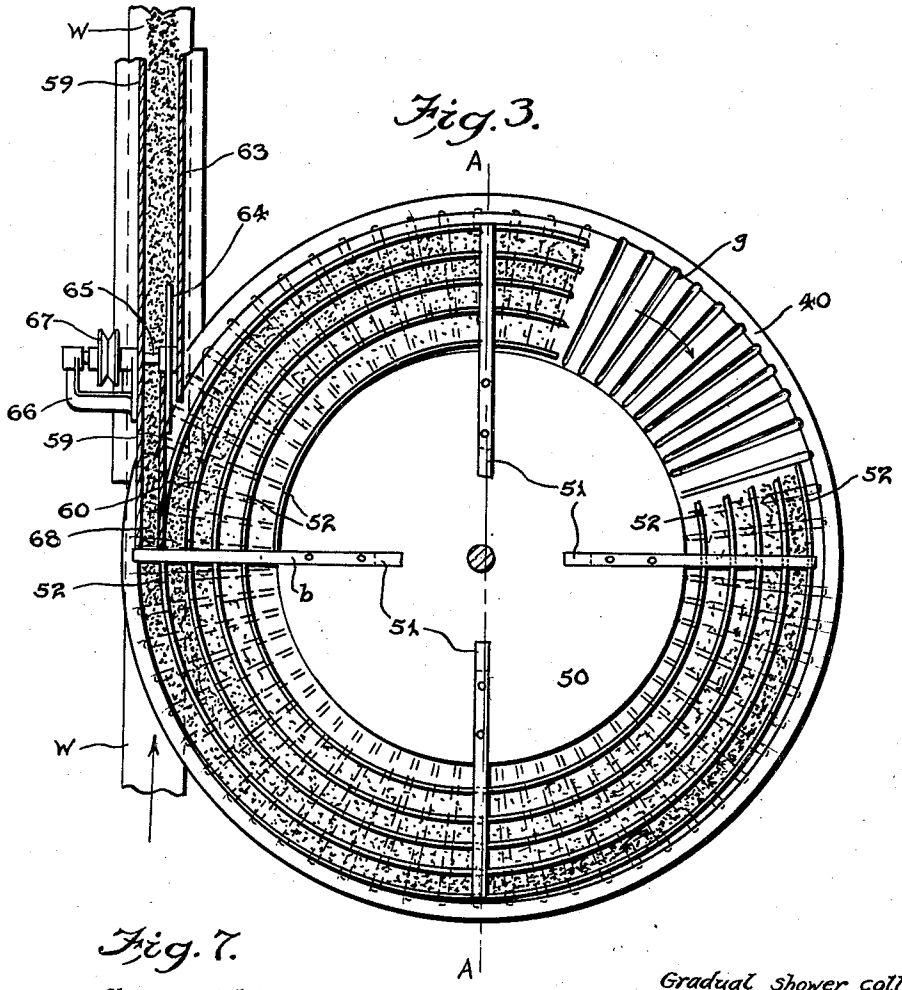
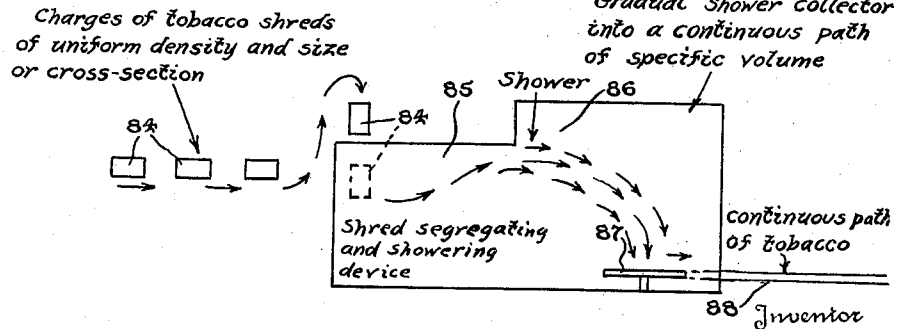


Fig. 7.



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Filed May 31, 1935 3 Sheets-Sheet 3

Fig. 4.

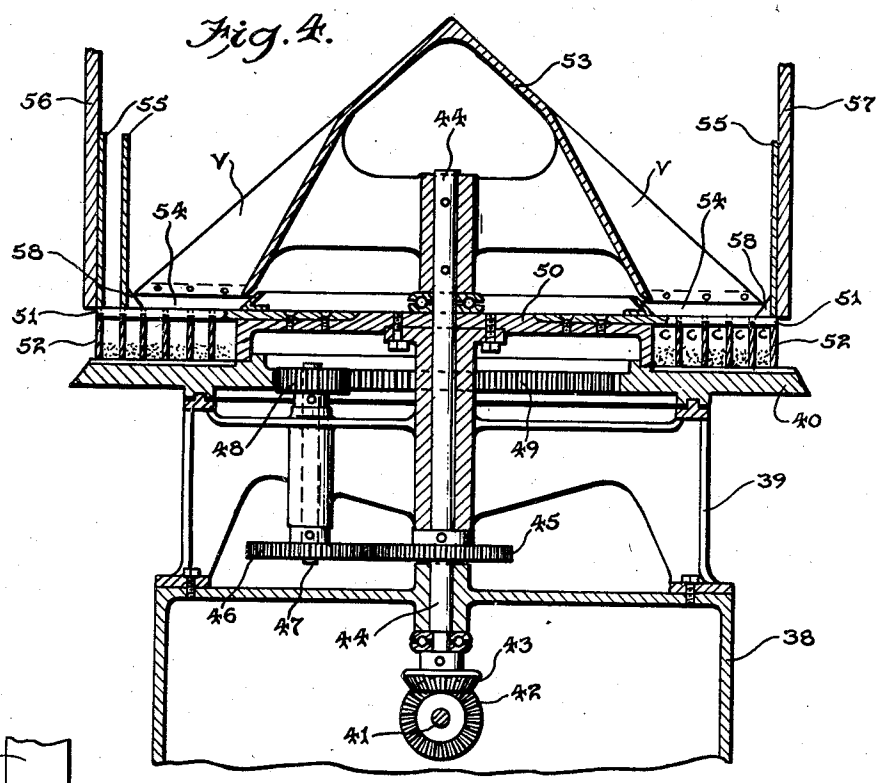


Fig. 6.

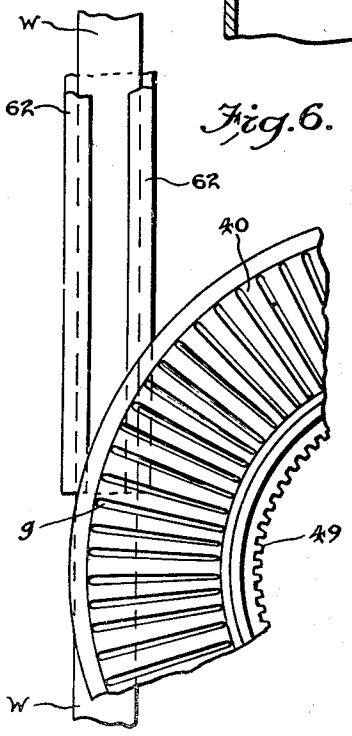
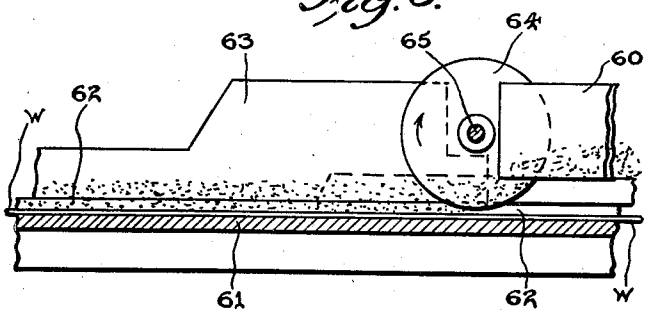


Fig. 5.



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UNITED STATES PATENT OFFICE

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FEEDER FOR CIGARETTE MAKING MACHINES

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Application May 31, 1935, Serial No. 24,448

16 Claims. (Cl. 131—39)

This invention relates to improvements in machines for feeding the prepared tobacco into cigarette-forming machines.

The object of the invention is to provide a machine which will control and regulate the amount of tobacco fed into tobacco rods for making cigarettes so as to provide uniform tobacco fillings and to accomplish this in such a way that the strands or shreds of tobacco are not broken up unduly. Broadly there are two steps in the accomplishment of this purpose. First, the presentation of a definite quantity of tobacco at all times to the main feeding rolls in such a way that it is not continuously rolled and churned around in a hopper, and second there is provided a very long channel into which the tobacco falls from the picking and feeding rolls. This channel, in which the tobacco gradually assumes the proper volume for the size of a cigarette, is, preferably, in the form of a spiral coil and is capable of being constructed with a length many times that of conventional machines, in which the channels are limited to a length approximately equal to the effective widths of the machines. The actual assembling of the shreds of tobacco into a moving strip of proper size is thus accomplished very gradually, thereby averaging up inequalities from the feeding rolls and giving the equivalent of a feed many feet in width without increase in the floor space required for machines now in use.

Referring to the drawings in which like reference characters indicate corresponding parts throughout:

Figure 1 is a side view, partly in section, of the complete machine,

Fig. 2 is a detail side view of the variable ratchet drive,

Fig. 3 is a plan view of the tobacco carrying disk, spiral channel, rotary scraper and take-off mechanism,

Fig. 4 is an axial sectional view of the tobacco carrying disk and distributor cone, including the drive,

Fig. 5 is a side view of the rotary scraper and take-off mechanism,

Fig. 6 is a partial plan of the take-off mechanism, and

Fig. 7 is a diagrammatic flow sheet illustrating a method of handling tobacco in accordance with this invention.

In carrying this invention into effect, the construction illustrated is selected as clearly showing the method and means of accomplishing the purpose but the invention is not to be restricted to this particular construction as there are many possible embodiments of the principles here disclosed. Further, various features are capable of independent application and the separate use of these features is contemplated.

In the drawings, 1 is a side of the feed frame supporting the usual carding or feeding rolls 2 and 3 on shafts 4 and 5 in bearing brackets 6 and 7. These rolls are driven in the direction of the arrows in the usual way. An auxiliary roller 8, having ratchet-like corrugations *a* which extend along its full length, is carried on shaft 9 in bearings, not shown. Driving ratchet wheel 10 has a gear 11 fastened thereto or rotating therewith both being freely rotatable on shaft 9. The roller 8 is driven through the train of reduction gears 11, 12, 13 and 14.

The drive for ratchet 10 is variable and is effected through pawl 15, mounted on lever 16, which pivots on and around the end of shaft 9. An automatically adjustable block 17 has a set of fine teeth 70 on one side, Fig. 2, and is movable in the slot 72 of lever 16. Block 17 is pivoted to connecting rod 18 which is reciprocated a fixed distance by eccentric 19 through strap 20 and lever 21. Eccentric 19 is keyed to shaft 22 which is positively driven by any convenient means. Connecting rod 18 is connected at one end to lever 21 with a pivot joint 73 on a short lever end 74. The other end of this rod is furnished with a roller 23 which rests on bar 24 which is hinged at one end to stationary bracket 25 secured at 81 to casing 75. The other end of the bar 24 is supported through link 26 which is hinged at both ends, the lower end being carried by the movable segment 27. Segment 27 is pivoted on rod 28 both of which extend the length of roller 8. This segment is continuously spring pressed by spring 29 which is attached at one end to arm 30, the other end being fastened to a stationary part of the machine, not shown. Segment 27 forms part of a curved housing which extends from 76 to 77 and which is substantially concentric with rollers 8 and 3, the parts of this housing consisting of the sections 27, 31, 32, and 33.

Above and to the rear of roller 8 is a tobacco hopper 78 having a rear wall 34, which is a continuation of the curved housing section 33, a front wall 35 and side walls formed by the sides 79 of the machine. Rear wall 34 may be of glass or other transparent material so that the amount of tobacco in the hopper can be observed at all times. Tobacco may be fed into this hopper by hand in the usual way or may be prepared

and brought to the machine in charges having the shape and size to fit into the hopper.

The operation of the feeding mechanism is as follows: Roll 8 intermittently driven by ratchet wheel 10 and pawl 15 compresses the tobacco at the bottom of the hopper and draws a layer of tobacco T around it in the space between it and the curved wall section 33. As this layer of tobacco passes over segment 27, shown in full lines in the lowest position, this segment is pushed upward, to the dotted line position 80 for instance, by the action of spring 29, the position taken by segment 27 being governed by the thickness of the compressed layer of tobacco T. This position varies with the variation in the tobacco layer and controls the height of the end of bar 24 supporting roller 23 and connecting rod 18. Rod 18 is reciprocated a fixed distance by eccentric 19 through lever 21. This constant stroke imparts an angular movement to ratchet lever 16 which varies according to the distance of block 17 from the center of shaft 9 (see Fig. 2). This distance x is controlled by segment 27 hence varies with the thickness of the layer of tobacco Y. The teeth 70 of block 17 engage the teeth 71 on the side 82 of the slot 72 in lever 16 during its leftward movement or power stroke (Fig. 1) and disengage on the reverse or idle stroke (Fig. 2). This permits block 17 to take a new position for each power stroke according to the thickness of the tobacco layer passing over segment 27 and keeps a constant quantity of tobacco passing into the reservoir passage R which is the wider portion between roller 8 and housing 31. The purpose of the teeth 71 and 70 is to prevent slippage of the block 17 in slot 72 when the teeth are in engagement that is during the power stroke. The tobacco in R is pushed along by the feed of the tobacco behind it and finally into engagement with the teeth of the carding roll 3 which comb it away from the mass and carry it up to the leveling roll 2. It is, of course, conceivable that if tobacco shreds which have been previously prepared so that the charges are of uniform density, are fed into the machine a uniform rotation, instead of variable, of the auxiliary roll 8 will be sufficient.

The concave shaped shield 36 is attached to lever 21 at its outer end and to a similar arm, not shown, on the other side of the machine. Shield 36 oscillates circumferentially with each feeding movement and pushes back into reservoir R any excess tobacco that may be picked up by the carding teeth of roll 3. Leveling roll 2 acts in the usual manner further regulating the tobacco in the carding teeth. The tobacco is then picked from roll 3 by the usual picker roll 37. The shield 36 travels in a circumferential reciprocatory path with the shaft 5 as its center.

The tobacco shreds as delivered by picker roll 37 from roll 3 are distributed as a continuously "raining" stream and assembled into a suitable shape for cigarette rod forming by the mechanism shown in Figs. 1, 3, 4 and 5. The construction is as follows:

In Fig. 4, the bed 38 of the cigarette making machine carries a housing 39 on which is rotatably mounted a disk carrier or conveyor 40. Disk 40 is driven in the direction of the arrow (Fig. 3) from the main shaft 41 of the machine through bevel gears 42 and 43, shaft 44, spur gears 45 and 46, shaft 47, spur gear 48 and internal spur gear 49 which is a part of disk 40. A stationary core 50 carries a plurality of radial arms 51, four of which are shown. Fastened to core 50 at b is a thin metal web 52, coiled to form a spiral, the upper edge of which is notched into supporting arms 51, so that the upper edge of coil 52 is flush with the top of arms 51 and its lower edge has a light contact with disk 40. The surface of the disk 40 is provided with radial grooves g and forms a moving bottom for the spiral, tortuous or curved channel c formed by coil 52. Mounted on the upper end of shaft 44 is a distributing cone 53 having vanes v. The under edges of vanes v are supplied with scrapers 54 which lightly contact the upper edge of coil 52 and the upper surfaces of arms 51. As shown, cone 53 turns in the same direction as disk 40 but at a different speed. The outer loop of coil 52 is extended upward to form an enclosing housing 55 which is attached to cross members of the feed 56 and 57. Triangular blocks 58 are fastened in the angles formed by arms 51 and housing 55. These blocks 58 prevent tobacco from lodging on the ends of arms 51 beyond the circular path of the scrapers 54.

In operation the tobacco falls from picker 37 (see Fig. 1) and is showered across distributing cone 53 approximately along line AA (see Fig. 3). The rotation of cone 53 distributes the tobacco around its circular path, allowing it to fall into the spiral channel c over the entire area of the channel. Such shreds of tobacco as may fall on arms 51 and the upper edge of coil 52 are dislodged by the scrapers 54 so that all the tobacco finds its way into the spiral channel. The disk 40 is rotating continuously and with its radial grooves g forms a tractive surface which carries the tobacco along in the spiral path defined by the coil 52 to the outer edge of the disk. When the stream of tobacco reaches the outer edge of the disk 40 it has been built up gradually to the desired volume for the tobacco rod for cigarette forming and is then transferred to a moving web W which conveys it to a cigarette former.

The mechanism for guiding the tobacco off disk 40 and on to web W is shown in Figs. 3, 5 and 6. The outer end of coil 52 is extended to form one guide or side 59 of a straight channel 68. A short piece 60, tangent to the next loop of coil 52, forms the beginning of the other side of straight channel 68. The bottom of the channel on which web W runs, is indicated by 61 (see Fig. 5). A flat spacer 62 (see Fig. 6) separates web W from disk 40, is shaped to the contour of the disk, where the tobacco is delivered on the web, and has extensions along the sides of the channel 68. A thin rotary scraping wheel 64 (see Figs. 3 and 5) is located between guides 60 and 63, being behind 60 and in front of 63. Wheel 64 is carried by shaft 65 in bearing 66 and driven by pulley 67 in the direction of the arrow. The peripheral edge of disk 40 is concave to fit the periphery of wheel 64. Thus the scraping edge of wheel 64 is continually moving with the travel of the tobacco and provides a self-cleaning scraping action.

As the stream of tobacco is pushed off the edge of disk 40 by the guide 60 it falls on the web W finally resting entirely on the moving web between the guides 59 and 63. From this point on the tobacco is carried forward and the cigarettes formed in the usual manner.

Referring to Fig. 7 illustrating a method of handling tobacco, the tobacco is formed into charges 84 of uniform density and size or cross-

section. The charges 84 are then fed individually or otherwise by hand or conveyor into the tobacco path forming device or machine 85 where the individual charges are separated and showered as at 86 as shreds which at 87 gradually build into a continuous path of tobacco 88 of the desired volume sufficient to form the tobacco rod.

I claim as my invention:

1. A feeder for cigarette making machines, comprising a spiral channel member of not less than one convolution to receive tobacco shreds and to gradually build up a desired volume of tobacco shreds in the channel to form a tobacco rod, said channel member having an effective length considerably greater than the greatest dimension of the horizontal spread of the feed of the shreds.

2. A feeder for cigarette making machines, comprising means for feeding tobacco shreds, a revolvable plate having a spiral channel thereon to receive tobacco shreds and gradually build up a desired volume of tobacco shreds in the channel to form a tobacco rod, said spiral channel being arranged between the center of the plate and the circumferential edge thereof, and a cone provided over the plate to direct the shreds of tobacco into the channel.

3. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, and a take-off device in the form of a rotatable disc provided adjacent the peripheral edge of the plate to guide the volume of tobacco shreds built up in the channel off of the plate.

4. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, and a take-off device provided adjacent the peripheral edge of the plate to guide the volume of tobacco shreds built up in the channel off of the plate, said take-off device being provided with a rotary scraping wheel contacting the peripheral edge of the plate to clean the shreds from the inside of the channel take-off.

5. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, the spiral channel being composed of a continuous thin metal web wound in spaced relation in spiral form and secured against rotation.

6. A cigarette making machine comprising a device for feeding tobacco shreds, and a tortuous channel member wherein a tobacco rod is formed to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form the tobacco rod, said channel member having an effective length considerably greater than the greatest dimension of the horizontal spread of the feed of the shreds.

7. A cigarette making machine having a carding roll, comprising automatically adjustable means for feeding a regulated amount of shredded tobacco to the carding roll, and a concave-shaped shield provided in cooperation with the carding roll to prevent excessive amounts of tobacco shreds to be picked up by the carding roll, and means for reciprocating the shield.

8. A cigarette making machine having a carding roll, comprising automatically adjustable means for feeding a regulated amount of shredded tobacco to the carding roll, and a reciprocating shield provided in cooperation with the carding roll to prevent excessive amounts of tobacco shreds to be picked up by the carding roll.

9. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, said spiral channel being composed of a continuous thin metal web wound in spaced relation in spiral form, and a plurality of radially arranged supporting arms to support the metal web and to maintain it against rotation on the revolvable plate.

10. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, a stationary core, and a plurality of radial arms secured to the core, said spiral channel being composed of a continuous thin metal web wound in spaced relation in spiral form and supported by the radial arms against rotation on the revolvable plate.

11. A feeder for cigarette making machines, comprising a revolvable plate having a spiral channel thereon of not less than one convolution to receive tobacco shreds and gradually build up a desired volume of tobacco shreds in the channel to form a tobacco rod, said channel having an effective length considerably greater than the greatest dimension of the horizontal spread of the feed of the shreds.

12. A feeder for cigarette making machines, comprising means for feeding tobacco shreds, and a channel member having a series of loops for receiving the tobacco shreds and gradually building up a desired volume of tobacco shreds in the channel member to form a tobacco rod, said channel member having an effective length considerably greater than the greatest dimension of the horizontal spread of the feed of the shreds.

13. A feeder for cigarette making machines, comprising a carrier having a spiral channel thereon of not less than one convolution to receive tobacco shreds and to gradually build up a desired volume of tobacco shreds in the channel to form a tobacco rod, said channel having an effective length considerably greater than the greatest dimension of the horizontal spread of the feed of the shreds.

14. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, said plate being provided with radially arranged grooves in the surface thereof to provide traction for tobacco shreds in the spiral channel.

15. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, said spiral channel being composed of a stationary thin metal web wound in spaced relation, and a pair of guide members provided

as tangential extensions at the end of the outermost convolution of the spiral channel and by means of which the completely built up tobacco rod emerges from the revolvable plate.

16. A cigarette making machine including a device for showering tobacco shreds, comprising a revolvable plate having a spiral channel thereon to receive the tobacco shreds and gradually build up a desired volume of tobacco shreds to form a tobacco rod, said spiral channel being composed of a stationary thin metal web wound in spaced relation, a pair of guide members provided as tangential extensions at the end of the outermost convolution of the spiral channel and by means of which the completely built up tobacco rod emerges from the revolvable plate, a further guide member arranged adjacent one of said guide members, and a scraping wheel rotatable between the two adjacent guide members to clean the shreds from the plate.

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