CIGARETTE TOBACCO PREPARATION

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This invention relates to the preparation of shredded cigarette tobacco from tobacco leaves. The main object is to produce shredded tobacco of a type superior to that hitherto available, which is more uniform, and hence produces more uniform cigarettes, and which duffers and less compacted than that made in the usual ways.

Great difficulty has been found in the past in making uniform cigarettes at high speed such that the weights of the cigarettes are uniform and their resistance high compared with the tobacco. Various attempts have been made to overcome this, which attempts usually consisted in elaborate feed structures. While these feed structures and other devices for overcoming this difficulty were effective to some extent, they did not fully overcome such difficulty. Applicant has found that by rendering the cigarette tobacco more uniform, particularly by cutting the tobacco so as to produce shreds of approximately the same lengths and lengths relatively shorter than ordinarily resulted from previous tobacco shredding methods, he has been able to produce a tobacco which lends itself to more uniform feeding. This tobacco tends to pour or feed more readily and uniformly than irregular or long shreds which tend to cling together in ropes or knots. It has long been known that by picking the tobacco frequently or more severely so as to break up the shreds, more uniform feeding of the cigarettes could be obtained, but this has the disadvantage of producing an excessive proportion of "shorts". The present invention makes possible more uniform feeding and thus more uniform cigarettes without producing an excessive amount of shorts.

Another object of the present invention is to offset one of the difficulties that arise in connection with the use of the gang disk type tobacco shredder which is that the tobacco shreds resulting are too long for the best manufacture of cigarettes. Hence it is an object of the invention to provide a convenient and effective mechanism which operates in conjunction with the disk shredder to cut the tobacco so that shreds of a shorter length result, and to do this without additional feeding operations.

From the above, it will be seen that one of the more general objects of the invention is to render more convenient and satisfactory the method of shredding tobacco which consists in sharring a thin layer of tobacco leaves into long shreds extending in the direction of movement of the leaves through the shredding means, in order to shred tobacco without compressing the same into a cheese and thus rendering the tobacco less fluffy and sometimes darkening it. In this connection, it is an object of the invention to eliminate certain feeding troubles had in connection with disk shredders. Disk shredders are quite sensitive to jamming as a result of large stem portions passing through, especially several at one time, and to stoppage as a result of bunches of tobacco going through at one time. Hence one purpose of the invention is to obviate this by crushing any stem portions remaining in the tobacco leaves after the shredding operation which is only intended to take out the large part of the stem as a rule. The stems so crushed and shredded are little different in physical qualities from the tobacco shreds and do not interfere with the making of the cigarettes. This has the further advantage in that when desired more of the stem portion can be left in, with a consequent saving of tobacco. Indeed, it is contemplated that where a certain type of product is desired all of the stem portion may be left in.

It is noted that once the tobacco leaves are shredded into thin shreds for cigarette use, they become very difficult to handle and hence it is one of the objects of the invention to provide for cross cutting the tobacco prior to shredding, and then delivering the cross-cut tobacco to the shredder by suitable means which will reliably deliver this tobacco to said shredder. To this end suction means are employed, together with means providing a blast of air to carry the cross-cut leaves into the nip of the shredding disks, and suitable means are provided for keeping the cross-cut means clear and for stripping the same of adhering leaf portions.

One of the most difficult operations in utilizing disk type shredders is the feeding of the leaves in suitable condition for shredding. As already pointed out, irregular feeding in bunches or knots jams the disks. Hence, an important object of the invention is the provision of means for feeding leaves a leaf at a time, or at least in a very thin layer, and for feeding the leaves in outspread disentangled flattened condition. To this end pneumatic leaf feeding means are provided which may or may not be associated with stem removing means and from which the leaves are delivered with their laminae outspread. The outspread stemmed leaves are then fed through the shredding rollers which flatten the stems and larger veins and deliver the leaves between opposed conveyor belts which continue to hold the leaves in outspread flat condition as they are delivered to the cross cutting means and thence to the shredder disks.

Another object of the present invention, particularly the crushing feature thereof is the elimination of so-called "match sticks", "birds-eyes", and losses due to excessive quantity of tobacco material being winnowed out in the cigarette feed. In using the disk type shredders, when a stem extends lengthwise of the plane of the disk, there is often produced a long sliver or "match stick" which is quite objectionable in a finished cigarette. When a good sized stem or veined...
portion passes through the disks crosswise, there is produced what is often termed a "birds-eye", namely a slice of the woody stem portion. In order to eliminate these stem pieces, modern feeds are commonly provided with winnowers, but to insure getting all this material out of the cigarette tobacco it is necessary to winnow out a considerable percentage of the weight of the tobacco, a percentage often running as high as 10%, and to keep this loss down winnowing is often cut down below that necessary to keep out these objectionable parts. In any case, there is a considerable loss in that a larger weight of tobacco is required to make the same quantity of cigarettes. With the present construction, however, a stickier or birds-eye forming material will be first crushed so that it loses its objectionable characteristics. Machine efficiency is increased because there is less opening of the seam of the cigarette rod by projecting stem parts, as occasionally occurs with ordinary shredded tobacco. Another advantage and object of crushing is to avoid jamming of the disk such as is likely to occur when a stem portion gets crosswise so that a large number of disks strike the stem at the same time.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations which will be hereinafter fully described and then set forth in the claims hereunto appended.

In the accompanying drawings which form 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 an apparatus illustrating the invention;
Fig. 1a is a detail in sectional side elevation of a bearing structure of the apparatus shown in Fig. 1;
Fig. 2 is an end elevation, partly in section and partly broken away of a portion of the apparatus shown in Fig. 1;
Fig. 3 is an end elevation, shown partly in section of the leaf opening and stem stripping mechanism; and
Fig. 4 is a side elevation, partly in section of the mechanism in Fig. 3.

Referring to the drawings, the apparatus selected to illustrate the invention includes a tobacco leaf opening device, as shown in Figs. 3 and 4, into which the leaves are fed one by one as illustrated, tip first. When feeding the tobacco leaves into said device which is described in detail in Letters Patent No. 1,604,765, granted to R. E. Bundell and G. E. Hagquist, the leaf is guided by means of a pair of flaring lips 10 into the mouth of a shallow air chamber 11 which is divided into two halves, one of which is connected by means of a pipe 12 to a suitable source of suction. A pair of belts 13 running over rollers 14 and 15 carry the tobacco leaf T through the chamber T1. The suction and the effect of the air drawn in along the center of the leaf and across its laminae towards the edges thereof, serves to uncurl and spread out the leaf and at the same time to subject the same to a powerful cleaning action, as is described in the above mentioned patent. The direction of this suction is shown by the arrows in Fig. 3.

As the upturned leaves pass from between the lower rollers 14, they are guided between two sets of belts 13a running in grooves of rollers 14 and 15 onto the surface of a perforated cylindrical suction drum 17 which rotates about a stationary hollow apertured suction box 18 communicating through a tube 19 with one of the suction pipes 12.

The leaf is then stemmed as follows: The tip of the leaf is carried around by the suction effect of the drum 17 and is held fast and carried to a point where the leaf is gripped between the drum and a loop 20a of a conveyor belt 20 (Fig. 4). This belt runs over suitable rollers 21, 22, 23, and 24. Parallel with and in opposition to the drum 17 is a rotating cylinder 25 having a series of axially spaced slotted cylindrical flanges 27. Mounted for axial movement on this drum are a plurality of plungers 28 each of which is provided with a row of inclined pins movable in slots of the flanges 27 to form transversely and circumferentially extending gangs of grippers which grip the portion of the stem projecting above the laminae of the leaf from the cylinder 17, as described in the above mentioned patent. The distance between the suction drum 17 and the gripper cylinder 25 is set to accommodate a shaft 40 to which top roller portion and so much of the small end of the stem as it is desired to leave in the leaf, without the same being gripped. Thus that portion of the stem larger than the distance between drum 17 and flanges 27 will be gripped. Since the surface of the drum 17 and the gripper flanges 27 of the drum 25 travel along diverging paths, the stem will be torn away from the laminae, as shown in Fig. 4. Suitable brushes 30 and 31 serve to strip any clinging leaf or stem portions from the drums 17 and 25, and the stems pass into the chute 32.

The stemmed leaf is then delivered in outstanding condition by the belt 20 to the stem crushing and leaf flattening device illustrated in Fig. 1. This flattening device consists of a bottom roller 33 and a top roller 34, said rollers spaced apart a distance which is about equal to the thickness of a tobacco leaf. Bottom roller 33 is mounted on a shaft 35 driven by means of a pulley 36 and a belt 37 from the main drive of the machine. Shaft 35 also carries a gear 38 engaging with a gear 39 mounted on a shaft 40 to which the roller 34 is attached. The latter is driven slightly faster than the bottom roller 33 in order to get a combination of sliding and pressing action of the rollers upon the passing leaf, thereby assuring a most efficient flattening of the stems and veins in the leaf L.

Each of said rollers 33 and 34 is equipped with a rotary moisture cleaner, each of which consists of a felt roller 41 engaging with and driven in a direction opposite to its roller 33 or 34 respectively. Each felt roller 41 is mounted on a perforated hollow shaft 42, the ends of which, by means of pipes 43, are connected to a water reservoir 44 supported by the main frame 45 of the machine. The water acts as a liquid solvent, and preferably is supplied under an adequate degree of pressure, afforded by the gravity head from reservoir 44 in the instance illustrated. The wiping action of the most rotating felt rollers 41 prevent any particles of tobacco or other foreign matter from adhering to any of said rollers and keeps the same clean at all times. A scraper 41a in engagement with each felt roller 41 is provided for the purpose of preventing accumulation of dirt on said felt rollers.

Each roller 33 and 34 is furthermore equipped with a rotating brush 46 for the purpose of directing the flattened leaf upon leaving rollers 33 and 34 onto a conveyor belt 47. The latter is driven in
the direction indicated by arrows in Fig. 1 and runs over rollers 48, 49 and 50.

In order not to disturb the flattened and stemmed leaf during conveying, an additional conveyor 51 is slung over rollers 52, 53 and 54 and is guided onto belt 47, both belts of course running in the same direction and at the same speed and guiding the leaf into the cross cutting device illustrated in Figs. 1 and 2. The cross cutting device consists of a cylinder 55 carrying a desired number of small fixed and/or moving knife blades 56, the cutting edges of which, during rotation of cylinder 55, engage with a cutting roller 57 mounted on a shaft 58 supported in bearings of main frame 45.

Shaft 58 carries a pulley 59 (Fig. 2) driven by means of a belt 60 from the main drive of the machine. Cylinder 55 is mounted on a shaft 61 which is actuated by shaft 58 through a pair of gears 62 (Fig. 2). To shaft 58 is attached a sprocket 63 driving, through a chain 64 and a sprocket 63a, a shaft 65 which carries the driving roller 50 of the conveyor belt 47. Shaft 65, through a pair of gears 66 (Fig. 2), drives also a shaft 67 which carries the roller 54 driving conveyor belt 51.

Referring to Fig. 1a, shaft 61 is supported by means of a bearing block 68 slidably mounted in guide channels 69 of frame 45. In order to assure proper alignment of the engagement of blades 56 with cutting roller 57, each bearing block 70 is equipped with a tension spring 71, the pressure of which is adjustable by means of adjusting screw 72 held by frame 45. Each block 70 is further provided with an adjustable stop stud 83 for the purpose of maintaining the reciprocation of shaft 61 and cylinder 55 during disengaging and re-engaging of blades 56 with rollers 57.

Cylinder 55 as well as cutting roller 57 is provided with rotating brushes 69 for the purpose of preventing any part of tobacco from adhering either to said cylinder or roller. Each rotating brush 69 is further subjected to an air blast coming out of nozzles 69 provided for the purpose of keeping the rotating brushes clean and directing the cut leaf pieces into the rotary disk shredder. The cross cutting of the leaf is done for the purpose of preventing the tobacco from forming long and undesirable strings likely to tangle after the leaf is cut by the rotary disk shredder.

The disk shredder consists of two engaging rows of disks 70, each of which is mounted on a shaft 71 connected to each other by means of a pair of gears 72 (Fig. 2). To one of the shafts 71 is mounted a pulley 73 driven by means of belts 74 from the main drive of the machine. Each one of the smaller disks 76a of each row is in engagement with a stripper plate 77 for the purpose of guiding the shredded tobacco into a suction conveyor 78 located under the said rows of disks. This suction from this conveyor also serves to feed the cross-cut leaf portions from the cutter rolls 55 and 56 to the disks. Gravity also aids in this since the disks are directly below said rolls. The cross cutting is thus, in part, being enclosed in a housing 77 connected to the suction conveyor 78. The air blast supplied to nozzles 69 is created by an exhaust fan (not shown) and directed to each nozzle by means of pipes 79 (Fig. 1).

In the operation of the machine selected for the purpose of illustrating the apparatus and method of the invention, tobacco leaves are fed between the flared lips 10 of the pneumatic leaf opening mechanism shown in Figs. 3 and 4. As the leaves are carried downwardly through the suction chambers 11, air is sucked in at the central slot between the chambers and drawn from the stem portion across the laminae towards the edges of the leaf. Since the air is closely confined, its velocity is considerable and it has a powerful straightening and disentangling effect. The opened and disentangled leaves are then delivered by belts 13a to the stem removing means shown in Figs. 3 and 4 which may be of any suitable construction such as that already described in connection with the drums 17 and 26. It is noted, however, that this stemming means removes the portion of the stem which is above a certain thickness and leaves the remainder in the leaf, and thus a certain predetermined portion of the stem is left in the leaf and ultimately forms a part of the shredded tobacco, and so far as this stem portion can be used in the making of a cigarette it constitutes a saving over completely removing the stem. The partly stemmed leaf is then delivered by belts 20 to the stem crushing rolls 32 and 34. These rolls are of conventional construction and are set apart a distance somewhat greater than the thickness of the laminae of the leaf, but less than the thickness of the stems and the larger veins in order to insure crushing of the stems and veins. Since the stem portions are crushed, there are no slivers or bird's-eyes in the ultimate shredded tobacco having a size sufficient to be objectionable to the smoker or to split open the sides of cigarette manufacture, and the use of a certain proportion of the stem in the manufactured cigarette is rendered unobjectionable. It is worth noting that one of the causes of burning of holes or slits in the direction of movement of the leaf, and grips the leaf to carry the same between the cutting rolls 55 and 57. The blades 56 acting against the roll 57 as a ledger surface, cut the leaves into predetermined lengths as shown in Fig. 1. While these lengths may be greatly varied to meet different conditions and kinds of tobacco and types of cigarettes, one satisfactory length for United States cigarettes has been found to be approximately 1-1/4".

The leaves cut to predetermined lengths are then fed directly in a vertical direction to the disks 70 of the multiple disk gang cutter. Since the length of the stems and the proper functioning of the disk shredder is dependent to a considerable extent on the uniform and orderly feeding of the leaf pieces edgewise, and approximately at right angles to the cut of the leaves, it is important that the leaves be delivered directly and in a controlled manner from the cutter to the shredder. For this purpose, the cutting rolls are arranged directly above the shredding disks and the leaves are dropped by gravity to the disks underneath. Also, brushes 68 are provided for insuring that the leaves will stay clean and that the cut leaves are stripped therefrom and forwarded into the nip of the disks 70. For this purpose the brushes constitute moving surfaces traveling in the direction of feeding of the cut leaves and assist in forwarding the same. The leaf pieces are also pneumatically fed to the shredder by means of a suction air current induced through the suction conduit 76. Movement of the leaves into the nip of the disks is further assisted by air blast nozzles 69, although these may in some forms be dispensed with. These
nozzles also have the advantage of cooling the disks which are subject to heating due to their intimate face to face contact.

The disks and spaces between the disks are of substantially the same thickness so that each disk fits closely in face to face contact between the two adjoining and opposing disks of the other gang. This produces a scissor like shearing cutting with-out compression, such as results from the so-called guillotine cutters wherein the shreds are cut by a guillotine knife from a thick cheese of tobacco, which tobacco is necessarily severely compressed. The disks are of a thickness equal to the desired shred thickness which is commonly though not necessarily in the neighborhood of 38 cuts to the inch in the United States and 48 cuts to the inch in Great Britain.

Since the leaves are cut to a predetermined length by the cutter blades 66 and these pieces are fed with the cut edges thereof approximately at right angles to the direction of feed into the disks, the shreds will not ordinarily materially exceed the length of the leaf pieces. Thus a relatively short shred will be produced as compared with that which would result from feeding whole leaves to the disk either crosswise or sidewise of their length, and a shred will be produced which is much more uniform in length and shorter in length than that which will result from guillotine cutting. Moreover, after shredding, there will be no stem or vein portions or slivers or birds-eyes of objectionable thickness, because of crushing prior to disk cutting. Due to this crushing the operation of the disk shredder is facilitated since there are few or no jams due to relatively thick stem portions striking the disks.

The method, apparatus and product above described and illustrated may be widely varied in construction within the scope of the claims, for the specific methods, products and structures selected to illustrate the invention are but certain of many possible embodiments of the same. The Ford Motor Co., therefore, is not to be restricted to the details illustrated and described nor to the particular embodiments chosen as illustrative of the invention.

From the foregoing it will be clear that the broad strips in moving from the cross cutter to the said disks are under constant control. It is also to be noted that the compressed air blasts from the nozzle 68 smooth and feed the leaves in close succession.

What is claimed is:

1. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks in face to face contact arranged to cut tobacco leaves into shreds of a width suitable for cigarette manufacture, of a cross cutting device arranged to cut the tobacco into long, broad strips, and means to feed the broad strips under control, while said strips are maintained transversely of the direction of cut of said disks, preliminary to said shredding operation.

2. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks in face to face contact arranged to cut tobacco leaves into shreds of a width suitable for cigarette manufacture, of a cross cutting device arranged to cut the tobacco into long, broad strips, and means to feed these broad strips under control, while said strips are maintained transversely of the direction of cut of said disks, and preliminary to said shredding operation, from one of said devices directly into the range of action of the other.

3. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks in face to face contact arranged to cut tobacco leaves into shreds of a width suitable for cigarette manufacture, of a cross cutting device arranged to cut tobacco transversely of the direction of cut of said disks and preliminary to said shredding operation, and pneumatic means including a suction conduit for feeding the broad strips of tobacco from one of said devices directly to the other, said feeding suction being applied after the forming operation and preliminary to the shredding operation and acting in the direction of the lengths of the shreds.

4. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks in face to face contact arranged to cut tobacco leaves into shreds of a width suitable for cigarette manufacture, of a cross cutting device arranged to cut the tobacco transversely of the direction of cut of said disks and preliminary to the shredding operation, one of said devices being placed above the other to feed the tobacco in the form of long strips, cut transversely to the leaf, edgewise into the bite of said interengaging shearing disks, with a gravity bias, and cooperating opposed pneumatic streams and complementary opposed brushes, adapted to supplement and control said vertical gravity feed to said disks.

5. In a machine of the character described, the combination with a cigarette tobacco shredding device comprising a plurality of gangs of interengaging shearing disks for cutting tobacco leaves into shreds for cigarette manufacture, of a cross cutting device operating to cut the tobacco in a direction transverse to the direction of cut of said shearing disks, and means for delivering the cross cut tobacco from said cross cutting device to said shredding device, said delivery means being adapted to maintain the cross cut tobacco in broad strips under constant control from the cutter to the shredder, with the leading and trailing edges of the successive strips in substantially a plane passing through the bites of the cutting and shredding devices in the order named.

6. A machine of the character described, having the features claimed in claim 5, and said delivering means including instrumentalities for supplying opposed blasts of compressed air in position to smooth and feed in close succession the broad strips of cross cut tobacco into said disks.

7. In a machine of the character described, the combination with a cigarette tobacco shredding device comprising a plurality of rotating gangs of interengaging shearing disks for cutting tobacco leaves into shreds for cigarette manufacture, of a cross cutting device operating to cut the tobacco in a direction transverse to the direction of cut of said shearing disks, means for delivering the cross cut tobacco from said cross cutting device to said shredding device, a pair of crushing rolls and means for delivering leaves from said crushing rolls under constant control directly to said cutting devices, the broad strips, in the order named, whereby the leaves are crushed to a substantially uniform condition for utilization of the entire leaf structure, are then cut into broad strips transversely of their length.
and are sheared into shreds of uniform length defined by the breadth of each strip.

8. In a machine of the character described, the combination with a shredder comprising a plurality of rotating gangs of interengaging disks for converting tobacco leaves into shreds for cigarette manufacture, a cross cutting device arranged to cut the tobacco in a direction transverse to the direction of cut of said disks, and a mechanism for spreading out tobacco leaves and delivering the tobacco leaves in outspread condition to said cutting and shredding devices, in the order named, maintaining said outspread condition after reduction of each leaf to a series of transversely disposed broad strip components by the cutting mechanism, and thereby insuring the production of a shredded product in which the shreds are of uniform length and unimpaired quality, and are delivered in the direction of the length of the shreds.

9. In a machine of the character described, the combination with a shredder comprising a plurality of rotating gangs of interengaging disks for converting tobacco leaves into shreds for cigarette manufacture, of means to remove the heavy stem parts of tobacco leaves, stem crushing means to act on horizontally traveling tobacco leaves, so partially stemmed, conveying means for receiving the horizontally traveling tobacco leaves from said crushing means and delivering the crushed tobacco leaves under constant control downwardly toward said disks, and a cross-cutter device adapted to divide said crushed and flattened partially stemmed leaves into broad strips preparatory to the shredding thereof by said disks.

10. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks, each leaf crushing means and leaf feeding means for feeding crushed tobacco leaves into said disks, cutter mechanisms for cutting the leaves transversely of the direction of their movement from the crushing means to the shredding device as they are delivered to the latter, and delivery means adapted to maintain the cross cut tobacco in broad strips with the leading and trailing edges of the successive strips disposed in edgewise succession substantially in a plane passing through the bites of the cutting and shredding devices in the order named.

11. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks in face to face contact arranged to cut tobacco leaves into shreds of a width suitable for cigarette manufacture, of a cross cutting device arranged to cut the tobacco transversely of the direction of cut of said disks, said cross cutting device being arranged above said disks to feed the cross cut tobacco into said disks with the aid of gravity, means acting positively in addition to the gravity bias to control said feed from the cutter to the shredder, and said cross cut tobacco being constituted of long strips cut transversely of the length of the leaf and being fed edgewise into the bite of said disks.

12. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks arranged to cut tobacco leaves into shreds of a width suitable for cigarette manufacture, of a cross cutting device arranged to cut tobacco leaves transversely of the direction of cut of said disks and auxiliary feeding means for delivering the cross cut tobacco leaves from said cutting device to said shredding device, said means having opposed surfaces for forming the direction to deliver the leaves to said shredding device between which the cross cut leaves are delivered by said cutting device.

13. In a machine of the character described, the combination with a cross cutting device for cutting tobacco leaves transversely of the direction of their travel into predetermined lengths, of a shredder comprising a plurality of gangs of interengaging shredding disks, and means for feeding tobacco leaves edgewise through said cutting device to said shredder, and delivering means adapted to maintain the cross cut tobacco in broad strips with the leading and trailing edges of the successive strips disposed in edgewise succession substantially in a plane passing through the bites of the cutting and shredding devices in the order named.

14. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks, of leaf crushing means and leaf feeding means for feeding crushed tobacco leaves into said disks, cutter mechanisms for cutting the leaves transversely of the direction of their movement from the crushing means to the shredding device as they are delivered to the latter, and delivery means adapted to maintain the cross cut tobacco in broad strips with the leading and trailing edges of the successive strips disposed in edgewise succession substantially in a plane passing through the bites of the cutting and shredding devices in the order named.

15. In a machine of the character described, the combination with a shredding device comprising a plurality of gangs of interengaging shearing disks, of leaf crushing means and leaf feeding means for feeding crushed tobacco leaves into said disks, cutter mechanisms for cutting the leaves transversely of the direction of their movement from the crushing means to the shredding device as they are delivered to the latter, means operating said cutting mechanism to give the same travel in the direction of movement of said leaves to the shredding device, and delivery means adapted to maintain the cross cut tobacco in broad strips with the leading and trailing edges of the successive strips disposed in edgewise succession substantially in a plane passing through the bites of the cutting and shredding devices in the order named.

16. The method of preparing shredded cigarette tobacco from tobacco leaves which comprises cutting the leaves crosswise of their length into a plurality of pieces and shredding said pieces in a direction transverse to the direction of said cutting to produce shreds not longer than a predetermined length, and maintaining the cross cut tobacco after cutting and shredding, in substantially a planiform arrangement of broad strips, each of substantially a length corresponding to a cross dimension of the leaf, and of a width corresponding to the desired shred length when extended, and auxiliary feeding means intermediate said cross cutting device and said disks, having opposing moving surfaces for feeding the leaf crosswise to the direction of said cutting as it is delivered from the cutting device and as it is delivered to the latter, and delivery means adapted to maintain the cross cut tobacco in broad strips with the leading and trailing edges of the successive strips disposed in edgewise succession substantially in a plane passing through the bites of the cutting and shredding devices in the order named.

17. The method of preparing shredded cigarette tobacco from tobacco leaves which comprises feeding the leaves endwise, cutting the leaves crosswise of
the direction of their feeding movement to a predetermined length, shredding the cut leaves lengthwise of their direction of movement to produce shreds not longer than a predetermined length, determined by the cross cut dimension, and maintaining the cross cut tobacco, after cutting and prior to shredding, in substantially a planiform arrangement of broad strips, each of substantially a length corresponding to a cross dimension of the leaf, and of a width corresponding to the desired shred length, by applying to said strips rotating forces and pneumatic forces from opposite sides of the strips, and operating in the general direction of travel toward the shredder.

18. The method of preparing shredded cigarette tobacco from tobacco leaves which comprises crushing the stem portions of the tobacco leaves, cross cutting said leaves into pieces of a predetermined length, and shredding the pieces, and maintaining the cross cut tobacco, after cutting and prior to shredding, in substantially a planiform arrangement of broad strips, each of substantially a length corresponding to a cross dimension of the leaf, and of a width corresponding to the desired shred length, by applying to said strips rotating forces and pneumatic forces from opposite sides of the strips, and operating in the general direction of travel toward the shredder.

19. The method of preparing shredded tobacco leaves which comprises continuously feeding the leaves, passing the traveling leaves between moving crushing surfaces to crush the stems, cutting the leaves crosswise of their direction of movement into pieces and shredding said cut pieces into shreds suitable for cigarette manufacture, and maintaining the cross cut tobacco, after cutting and prior to shredding, in substantially a planiform arrangement of broad strips, each of substantially a length corresponding to a cross dimension of the leaf, and of a width corresponding to the desired shred length, by applying to said strips rotating forces and pneumatic forces from opposite sides of the strips, and operating in the general direction of travel toward the shredder.

20. The method of preparing shredded tobacco leaves which comprises continuously feeding the leaves, passing the traveling leaves between moving crushing surfaces to crush the stems, cutting the leaves crosswise of their direction of movement into pieces and shredding said cut pieces into shreds suitable for cigarette manufacture, and partially stemming said leaves prior to crushing, and maintaining the cross cut tobacco, after cutting and prior to shredding, in substantially a planiform arrangement of broad strips, each of substantially a length corresponding to a cross dimension of the leaf, and of a width corresponding to the desired shred length, by applying to said strips rotating forces and pneumatic forces from opposite sides of the strips, and operating in the general direction of travel toward the shredder.

21. In a cigarette tobacco shredding machine, the combination with a shredder for shredding cigarette tobacco into narrow shreds of a width suitable for use in cigarette tobacco feeds for manufacturing cigarettes, of feeding means for feeding tobacco to said shredder, a cutter for cutting the tobacco fed to said shredder by said feeding means into predetermined lengths prior to delivery to the shredding means, said feeding means including mechanism for maintaining control of the length of the movement of said feeding positions to hold said lengths with their cut edges in substantially a predetermined position relative to the direction of cut of the shredder as said lengths are delivered thereto, by applying to said strips rotating forces and pneumatic forces from opposite sides of the strips, and operating in the general direction of travel toward the shredder.

22. The method of preparing tobacco for cigarette manufacture which comprises, forwarding the leaves, drawing a current of air over the surface of the leaves toward the opposite margins thereof to clean the same, cutting the forwarded leaves into a plurality of relatively large pieces, and cutting the pieces of the forwarded leaves in a direction transverse to that of the first mentioned cutting into narrow shreds suitable for cigarette manufacture, and maintaining the cross cut tobacco, after cutting and prior to shredding, in substantially a planiform arrangement of broad strips, each of substantially a length corresponding to a cross dimension of the leaf, and of a width corresponding to the desired shred length, by applying to said strips rotating forces and pneumatic forces from opposite sides of the strips, and operating in the general direction of travel toward the shredder.

23. In a machine of the character described, the combination with a shredder comprising knives for shearing tobacco leaves into shreds for cigarette manufacture, of a cross-cutting device arranged to cut the tobacco in a direction transverse to the direction of cut of said shearing knives, to form broad strips of tobacco, mechanism for spreading out tobacco leaves and delivering the tobacco leaves in outspread condition to said cross-cutting device and means acting upon said cut sections as they pass from the cutting to the shredding devices to smooth and feed in close succession said broad strips of the cut leaves for shredding, said broad strips being thus individually controlled as they pass to the shredder, whereby the shreds are likewise individualized and fed lengthwise in multiple.

24. A machine of the character described, having the features claimed in claim 5, in which provision is made of means for spreading out the tobacco leaves and delivering them to said cross cutting means.

25. In a machine of the character described, the combination with means to remove the butts and heavy stem parts of tobacco leaves, crushing rolls for crushing and flattening residual stem portions in the tobacco leaves, a moving conveyor for receiving the partially stemmed and crushed tobacco leaves from said crusher and delivering them to a cutting station, cross-cutting devices at said station acting to reduce said outspread leaves to the form of a substantially continuous succession of outspread flat strip components having each a width corresponding to the desired initial length of desired shreds, shearing knives for shearing said strips transversely of their length into shreds the major portion of which are of uniform width and length, suitable for use as cigarette tobacco, and means to control said strips in their passage from said cutting station to said shredder.

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