

Oct. 16, 1951

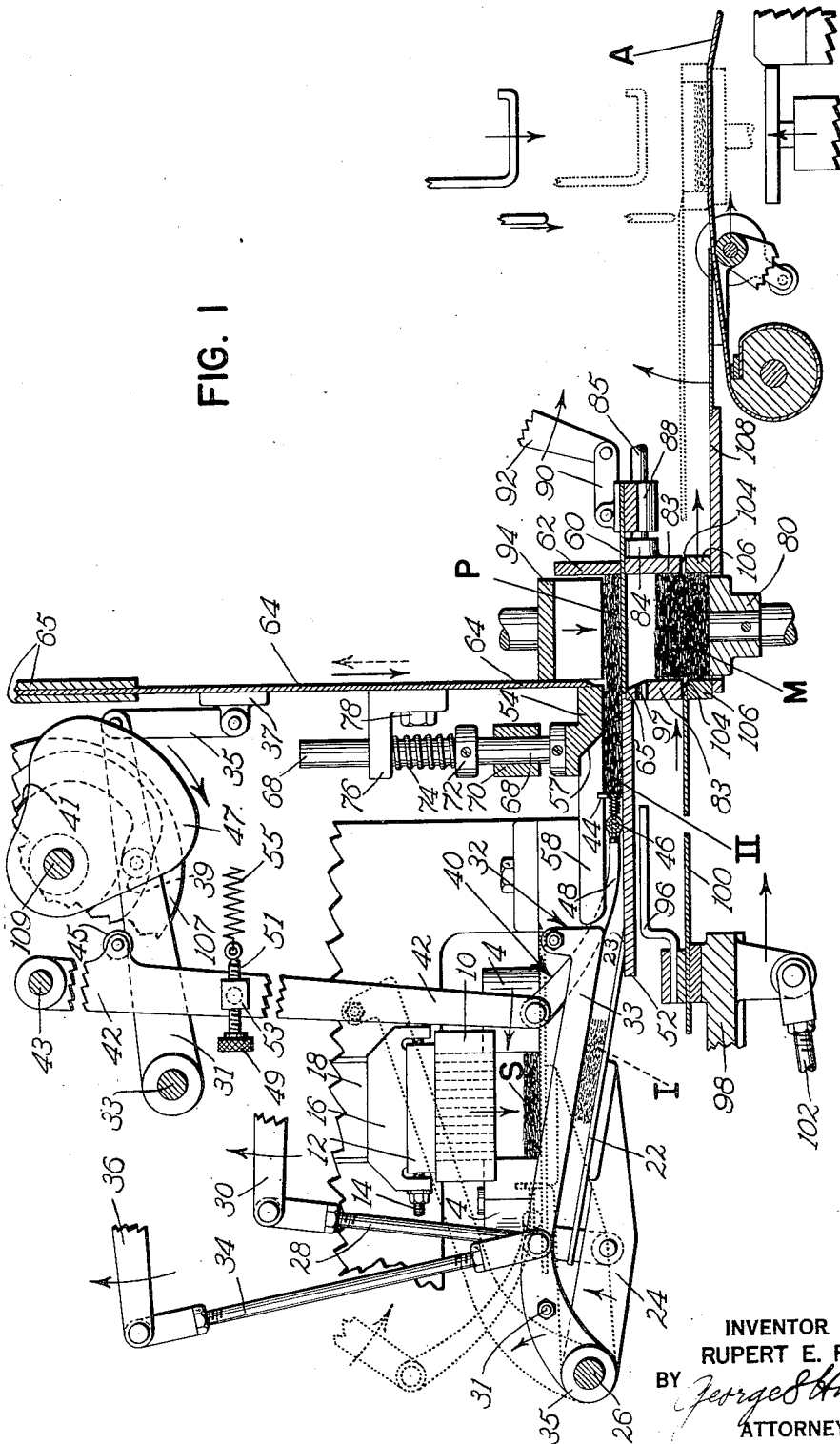
R. E. RUNDELL

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BUNCH CHARGE FORMING MECHANISM

Filed June 30, 1945

2 SHEETS--SHEET 1



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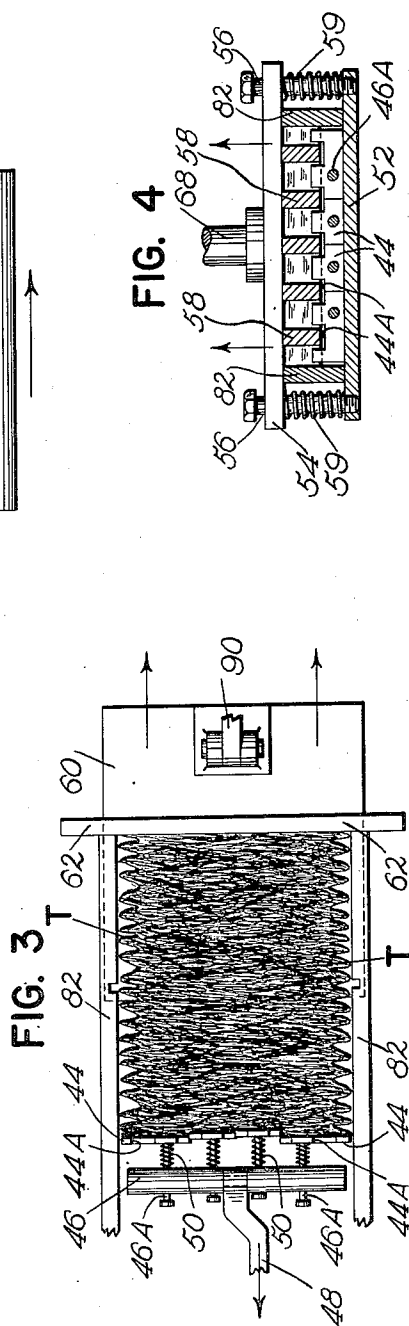
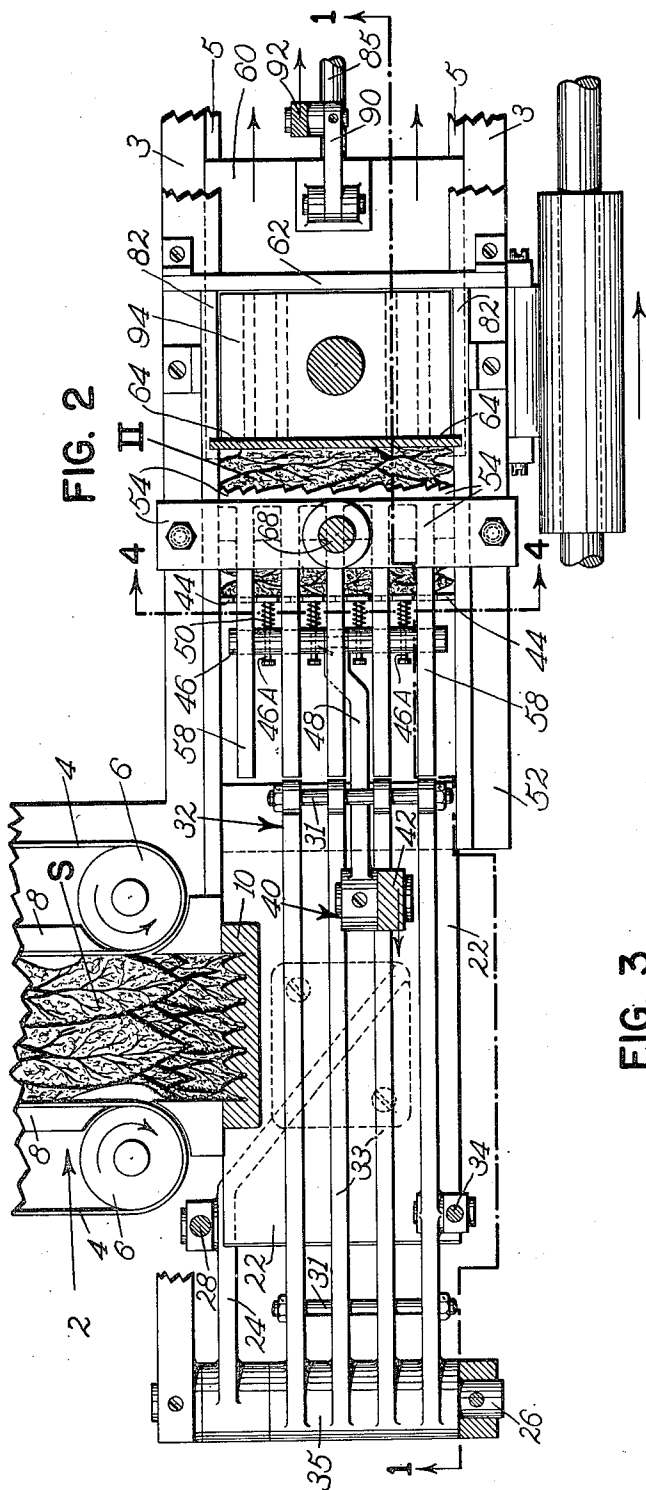
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2 SHEETS—SHEET 2



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2,571,618

BUNCH CHARGE FORMING MECHANISM

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Application June 30, 1945, Serial No. 602,491

11 Claims. (Cl. 131—80)

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This invention relates to cigar machines and more particularly to improvements in the method of feeding and handling cigar filler tobacco and mechanism for use in feeding and associating cigar filler tobacco, in such a manner that more uniform measured bunch charges are produced for formation into cigar bunches.

In feeding cigar filler tobacco to a cigar machine and especially in feeding long filler tobacco leaves or leaf portions, the personal equation generally enters into the deposition of tobacco leaves and portions thereof in the cross feed. This means that although considerable regularity in feeding is obtained by an experienced operator, from time to time there may be variations in the thickness or height of the layer or stream formed in the cross feed; the stream of tobacco formed may not at all times extend completely between the two belts which make up the cross feed or there may be curling or arching of tobacco leaves therebetween so that there are variations in the stream width which results in openings or voids in the stream. Therefore, as the stream of tobacco is advanced endwise to a bunch length cutting device, it happens that although bunch lengths cut therefrom are uniform as to length, they may vary insofar as quantity and distribution of tobacco in each bunch length is concerned.

When a succession of bunch lengths is moved sidewise out of the path of travel of the stream of tobacco fed by the cross feed, voids and irregularities remain and are present in finished cigar bunches. It is, therefore, a highly desirable and important factor in cigar making to form cigar bunch charges as uniform in density as possible in order that the resulting cigars may be free of soft or hard spots or portions, and will burn uniformly when smoked.

In one type of cigar machine where each bunch length is moved sidewise to a point where it is associated in superimposed relationship with previously formed bunch lengths and formed into a column of tobacco, it is apparent that the width of the column may vary because of irregularities present in the feed of tobacco in the cross feed and the only constant factor is that of length.

In another type of cigar machine where each bunch length is moved sidewise against measuring fingers and a charge cut therefrom, it is also apparent that due to irregularities or voids in the tobacco from which a charge is cut, although such charge is cut off to a constant width, there are undesirable variations in density.

According to the present invention, I provide

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a novel method of handling tobacco, and mechanism which overcomes these undesirable features because filler tobacco after being cut to bunch length is fed sidewise from the cross feed along a supporting table or surface. Each length, as moved sidewise, is compacted laterally by resilient pressure in such a manner that the several leaves or portions thereof constituting each bunch length are repositioned so as to effect a substantially uniform distribution of tobacco leaves or portions thereof being moved sidewise.

The treatment described results in the formation of a sheet of filler tobacco which is substantially uniform in width and thickness as well as uniform in density as regards thickness and width. The method, therefore, results in the removal of inequalities due to hand feeding, or irregular distribution of tobacco in the feeding mechanism.

According to the novel method, a plurality of bunch lengths are associated together, resiliently compacted laterally, and formed into a uniform sheet from which measured sections are cut, superimposed to form a column of substantially regular dimensions insofar as length and width are concerned so that when measured bunch charges are cut therefrom, the quantity of tobacco in each charge formed is substantially constant because the column has uniform density both in thickness and width.

It is, therefore, an object of my invention to provide a novel method of and apparatus for feeding and handling cigar filler tobacco by forming a succession of bunch lengths of filler tobacco into a substantially continuous sheet having substantially uniform thickness and density from which are cut sections of uniform width which are superimposed to form a column of tobacco of substantially regular dimensions, which column is substantially uniform in density as regards height and width from which measured bunch charges are separated.

It is a further object of my invention to provide a novel method of feeding and handling long filler cigar tobacco in such a way that a plurality of bunch lengths of tobacco are moved sidewise, compacted to form a substantially uniform continuous sheet of filler tobacco substantially free of voids, and in which irregularities due to feeding are substantially eliminated.

With these and other objects not specifically mentioned in view, the invention consists in certain combinations and constructions 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 wherein the several reference characters designate the same or like elements:

Figure 1 is a side, partially sectional view, on line 1—1 of Figure 2, partly diagrammatic, showing mechanism suitable for carrying out the method of the invention;

Figure 2 is a sectional plan view of Figure 1;

Figure 3 is a partial plan view of a detail showing the operation of the side compacting device with respect to the tobacco being compacted; and

Figure 4 is a sectional end elevation taken on line 4—4 of Figure 2.

In Figures 1 and 2, which disclose a preferred embodiment of the invention, there is shown a portion of a cross feed mechanism designated generally 2, which may be similar in construction and operation to that shown in Bronander patent, No. 1,740,571, issued December 24, 1929. The cross feed 2 consists of spaced side belts 4, running on driven pulleys 6 and idler pulleys (not shown) located at the entrance to the cross feed. The tobacco engaging laps of belts 4 are supported in proper spaced relationship by means of suitable supports 8 extending along the sides of the cross feed. A bottom belt (not shown) coacts with belts 4 in forwarding a stream of tobacco S preferably arranged in shingled relationship, as shown in Figure 2, to a vertically reciprocating knife 10 provided with corrugations of known design, which is operative to cut bunch lengths from the advancing end of the stream of tobacco in the cross feed.

Knife 10 is of the type shown in Halstead patent, No. 2,156,284, granted May 2, 1939, and is mounted on a block 12 secured by screws 14 to cross head 16 carried on slide 18 operated in proper timed relationship by means of a cam and lever mechanism (not shown). The operation of the knife is such that whenever a predetermined length of filler tobacco sufficient to form a bunch length has been fed by the cross feed, the knife is moved downwardly to shear off that portion, after which it moves upwardly and dwells pending the advancement of another length.

Each bunch length of tobacco cut from the stream S is positioned on a plate 22 fixed to lever 24 pivotally mounted on shaft 26. Connected to lever 24 is an adjustable connecting rod 28 pivotally attached to lever 30 which is provided with a cam follower (not shown) tracking a cam (not shown) which operates in timed relation with the movement of the cross feed belts 4 and bottom cross feed conveyor belt to move plate 22 from receiving position, indicated in dotted lines in Figure 1, to delivery position, shown in full lines.

A lever designated generally at 32 holds bunch lengths in place on plate 22 for movement by pusher 40 along plate 22 onto support plate 52. This lever consists of a plurality of arms 33 on hub 35 connected together by cross pins 31 which give rigidity and prevent vibration and twisting of arms 33 in operation. The clamp lever is oscillated in timed relation with plate 22 by means of a connecting rod 34 attached to a cam lever 38 provided with a cam follower (not shown) tracking a cam (not shown) much in the manner disclosed in the above referred to Bronander patent.

In feeding filler tobacco to a cigar machine, and especially in manually feeding long filler

tobacco, it is difficult at times to maintain substantial uniformity of distribution of tobacco leaves or portions thereof in the cross feed 2. This is because tobacco leaves vary in size and shape, some leaves are curled, some are broken, and the result is that even with considerable care in feeding there may be variations in thickness of the stream formed on the bottom conveyor between the belts 4, and voids occur in the shingled relationship of the leaves or portions, and especially adjacent the active laps of belts 4 there is a tendency for the leaves to arch. All of these features contribute to irregularity in the distribution of the tobacco. When therefore a bunch length is cut therefrom at position I (Figure 1) and displaced laterally to position II, these inequalities will remain in the bunch charges as they are displaced sideways for delivery to the cigar forming mechanisms. According to my invention there is provided mechanism for overcoming and removing inequalities and variations present in the leaf distribution of each bunch length.

As shown in Figure 1, pusher 40 is actuated by means of a cam lever 42 pivoted to shaft 43 mounted in suitable lugs of the cross feed frame (not shown). Lever 42 is provided with a cam follower 45 which runs on the periphery of an open cam 47 except at the extreme end of the forward stroke of lever 42 where cam follower 45 loses its contact with the lower portion of cam 47, mounted on a cross feed cam shaft 109, due to the resistance created by the density of the tobacco being compacted in the restricted passageway formed by support plate 52 and bars 58 on clamp plate 54, described hereinafter.

The density or lateral compaction of the sheet formed in the restricted passageway by the addition of successive bunch lengths advanced thereinto by pusher 40 may be varied to any desired degree by turning an adjusting knob 49 which is secured to one end of a threaded stud 51 mounted in a threaded support 53 attached to one side of lever 42. To the free end of stud 51 is hooked one end of a tension spring 55, the other end of which is anchored to the cross feed frame (not shown).

By turning knob 49 it is possible to effect an increase or decrease in the tension of spring 55, the action of which is transmitted to pusher 40 and the spring mounted pusher plates 44, described more in detail hereinafter, which are pressed against the rear edge of the bunch length being moved from position I to position II in the restricted passageway where it is associated with previously compacted bunch lengths.

Spring 55, in addition to supplying the desired lateral pressure or compacting force to the sheet of tobacco being formed in the restricted passageway also maintains cam follower 45 in engagement with cam 47 during the rearward and the greater part of the forward stroke of lever 42 except as described hereinabove.

Mounted on pusher 40 are a plurality of yieldingly tobacco engaging face plates, each of which is mounted on a rod 46a slidably supported in cross head 46 attached to pusher element 48 carried by lever 42. As shown in Figures 1, 2 and 3, each plate 44 is urged outwardly into contact with the rear edge of each bunch length of tobacco which is compacted to predetermined density. By means of springs 50, acting in conjunction with spring 55, and the arrangement of the pusher plates, varying resilient pressures are applied along the rear edge of each bunch length

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advanced from position I to position II, and the leaves and portions thereof are compacted uniformly so as to form a substantially continuous sheet of tobacco T in which the leaves and portions are redistributed so that the resulting sheet T is substantially uniform in density both in thickness and also in the direction of its length.

As shown in Figure 1, plate 22 is provided with a beveled face 23 which coacts with support plate 52 in forming a smooth surface along which each bunch length is advanced by pusher 40. Fixed to a clamp bar or plate 54, which is yieldingly supported on studs 56 for movement to and from support plate 52, are a plurality of rearwardly extending spaced hold-down bars 58 which are mounted above and coact with support 52 to form a restricted passageway for tobacco being compacted by pusher plate 44 into the sheet T of desired thickness and density.

As shown in Figures 1 and 4, pusher plates 44 are provided with recess 44a into which extend bars 58. This arrangement allows a predetermined amount of vertical travel to bars 58 when pusher 40 occupies its innermost position (as shown in Figure 1) when clamp plate 54 moves downwardly to compress the sheet T prior to the cutting of a section P.

As shown in Figures 2 and 3, the sheet T is advanced by pusher 40 along support 52 over a slidable supporting plate 60 and against an abutment plate 62. It will be seen that a plurality of bunch lengths can be associated on support 52 and in practice it is desired to have at least two or more bunch lengths associated in order that the best possible distribution and repositioning of tobacco can be effected in order to obtain the desired uniformity in density of the sheet T. When the pusher 40 reaches its innermost position (as shown in Figure 1), the advancing end of the sheet presses against stop 62. At this time the desired section of tobacco P is ready to be cut from the sheet T and associated with tobacco in the magazine M. However, prior to the operation of knife 64, clamp plate 54 moves downwardly to the position shown in full lines in Figure 1 and clamps the sheet of tobacco so that upon rearward movement of pusher 40 to the position indicated in dotted lines in Figure 1, there can be no rearward movement of the sheet T, which might tend to disturb the tobacco and possibly cause a variation in density.

Clamp plate 54 is provided with a beveled edge 57 which directs downwardly any pieces of tobacco which tend to project upwardly from the top of sheet T during the compacting operation of pusher 40. Clamp plate 54 is fixed to a rod 68 slidably supported in a bearing bracket 70 forming a part of the machine frame (not shown). Fixed to rod 68 is a collar 72 against which bears one end of a tension spring 74 encircling rod 68, the other end of which presses against an arm of bracket 76 secured by screws 78 to knife 64.

Springs 59 encircling studs 56 are compressed during the operation of clamp plate 54 as the result of the downward movement of knife 64. However, as knife 64 travels upwardly and clamp plate 54 releases its pressure on the tobacco sheet T, springs 59 which bear against clamp bar 54 raise this bar and clamp fingers 58 preparatory to the advancement of the next bunch length from position I to position II.

The upper end of vertically reciprocating knife 64 is guided between spaced plates 65 suitably attached to the frame of the machine (not shown) and is activated by means of a cam lever

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31 pivoted to a suitable shaft 33 (Figure 1) mounted in the cross feed frame (not shown). Cam lever 31 carries on its free end a link 35 connected to a suitable bracket 37, attached to knife 64. Lever 31 also carries a cam follower 39 running in a track 41 of a cam 107 mounted on cross feed cam shaft 109. Rotation of cam 107 causes clamp plate 54 and bars 58 to move downwardly into clamping engagement with the top of sheet T. Immediately thereafter knife 64 is moved downwardly into shearing coaction with ledger plate 65 and cuts the desired section from the advancing end of sheet T. It will be seen that each section P cut from the sheet T is substantially uniform in density, thickness and width.

As the knife moves downwardly, slide plate 60 begins to move to the right (Figure 1) in order to clear the path of the knife and also to allow the section P to drop vertically onto other sections previously deposited on plunger 80 which forms the bottom supporting member of the magazine M.

The construction and operation of the several elements constituting the magazine M, which are employed for forming a column of tobacco from which measured bunch charges are separated can be the same as that disclosed in co-pending Durning application, Serial No. 522,701, filed February 17, 1944, for Cigar Machine, now Patent No. 2,470,766, issued May 24, 1949. Magazine M is formed by spaced end members 82 supported by the frame of the machine B and spaced side members 83 suitably attached to the frame of the machine.

Mounted in a hub 84 formed on one of the side members 83 is a rod 85 on which can move a slide 88 supported by guides 5 on frame members 3 carrying support plate 60. Connected to slide 88 is a link 90 which is pivotally attached to a lever 92 which is oscillated in proper timed relationship to advance and retract plate 60 into and out of magazine M by means of a cam (not shown). The coaction between the two cams which operate plates 60 and knife 64 is such that plate 60 is retracted slowly as knife 64 moves vertically downward so that the cutting edge of knife 64 can coact with ledger plate 65 and cut a charge of tobacco from the sheet of tobacco T. Each section P deposited in magazine M is subjected to the pressure of the plunger 94 constructed and operated in conjunction with bottom plunger 80 in the manner disclosed and described in the above referred to Durning patent. Plunger 94 is provided with a plurality of spaced, downwardly projecting fingers through which project a plurality of horizontal fingers 96 attached to a slide 98 which carries knife 100. Slide 98 is reciprocated in proper timed relation by means of a connecting rod 102 attached to a lever (not shown) operated by a cam (not shown), similar to that disclosed in the above referred to Durning patent, to move knife 100 through slots 104 formed in side walls 83 of magazine M to separate a measured bunch charge therefrom, after which carrier 106 (indicated in full lines in Figure 1) moves the measured charge out of the magazine along plate 108 onto apron A where the charge is associated with a binder and rolled into a bunch.

It will be seen that during the sidewise movement of carrier 106, knife 100 occupies a position shown in dotted lines in Figure 1 and supports the column of tobacco in the magazine M. At the same time, the upper surface of the column

of tobacco in the magazine M is held by fingers 96 which project through slots 97 in side wall 83 (Figure 1).

It will be evident from a consideration of Figures 1, 2 and 3, that sections P cut from sheet T are substantially uniform in thickness and width so that all tobacco being formed into a column in magazine M, has substantially regular linear dimensions due to the compaction of the tobacco in forming sheet T and the repositioning of the leaves and portions thereof prior to the separation of a section P from the sheet T. This method of handling filler tobacco and mechanism employed contribute materially to the formation of extremely uniform bunches.

The invention above described may be varied in construction within the scope of the claims, for the particular device, selected to illustrate the invention, is but one of many possible concrete embodiments of the same. It is not, therefore, to be restricted to the precise details of the structure shown and described.

What I claim is:

1. The method of feeding cigar filler tobacco for formation into measured bunch charges of uniform density which comprises forming a continuous tobacco stream of varying width and density consisting of long filler tobacco leaves and portions thereof, moving said stream to a cutting station, cutting predetermined lengths from the advancing end of said stream, moving each length as cut sidewise from said station and applying varying yielding lateral compacting force to said length to reposition said leaves and portions thereof to substantially eliminate inequalities and voids in said lengths in order to form a continuous sheet of long filler tobacco substantially uniform in length, thickness and density, cutting sections of uniform width from the advancing end of said sheet and associating said sections in superimposed relation to form a column of long filler tobacco substantially uniform in density as regards height and width.

2. The method of feeding cigar filler tobacco for formation into substantially uniform measured bunch charges which comprises forming a stream of shingled long filler tobacco leaves, advancing said stream to a cutting station, cutting predetermined lengths from the advancing end of said stream, moving each length cut from said stream laterally along a supporting surface, associating each length with a plurality of previously cut lengths, yieldingly compacting each length laterally upon association with said previously cut lengths to reposition said tobacco in said length, remove voids from said length and equalize the distribution of the tobacco in each length to form thereby a continuous sheet of tobacco having substantial uniformity in length, thickness and density, cutting sections of predetermined width from the advancing end of said sheet, associating each section as cut with previously cut sections to form a column of tobacco substantially uniform in density as regards height and width, and separating measured bunch charges from said column.

3. The method of forming substantially uniform bunch charges which comprises forming a continuous stream of filler tobacco, moving said stream in the direction of its length to a cutting station, cutting predetermined lengths from the advancing end of said stream, moving each length sidewise from said cutting station and applying resilient lateral varying compacting pressure to each length, thereby associating each

of said resiliently compacted lengths with previously cut lengths and forming a sheet of tobacco having substantial uniformity in thickness and density, cutting sections of substantially uniform width from said sheet, arranging said substantially uniform sections in superimposed relationship to form a column of filler tobacco substantially uniform in density as regards width and height, and separating measured bunch charges of substantially uniform density in width and thickness from said column for rolling in binders to form cigar bunches.

4. The method of feeding cigar filler tobacco for formation into measured bunch charges which comprises forming a continuous stream of filler tobacco, said stream varying in width and thickness, moving said stream endwise to a cutting station, cutting predetermined lengths from the advancing end of said stream, moving each length sidewise from said station and applying resilient compacting force at spaced points along the rear base thereof to associate said length with previously cut lengths to reposition the filler tobacco thus associated and form a sheet of filler tobacco substantially uniform in length, thickness and density, clamping said sheet to hold said sheet for cutting of a section of predetermined width therefrom, cutting a section of predetermined width from said clamped sheet, superimposing each section as cut on previously cut sections to form a column of tobacco substantially uniform in width and density, and severing bunch charges of uniform density in width and thickness from said column.

5. Steps in the method of feeding tobacco and forming bunch charges therefrom which comprise associating a succession of predetermined lengths of filler tobacco in side by side relationship, applying varying lateral resilient compacting pressure to the rear side of each of said lengths to reposition the tobacco in each length, and remove voids present therein as the result of the varying sidewise resilient compaction in order to form a sheet of substantially uniformly distributed tobacco, cutting a succession of sections of predetermined width from an end of said sheet, and associating said sections in superimposed relationship to form a column of filler tobacco having substantially uniform density in width and height.

6. Steps in the method of feeding tobacco and forming bunch charges therefrom which comprise associating a succession of predetermined lengths of filler tobacco in side by side relationship, applying lateral compacting pressure to the rear side of each of said lengths to reposition the tobacco in each length and remove voids present therein as the result of the sidewise compaction in order to form a continuous sheet of vertically, substantially uniformly distributed tobacco within a restricted elongated substantially horizontal passageway, clamping said sheet of tobacco, cutting a section of predetermined width from the front end of said clamped sheet, displacing each section downwardly out of the plane of said sheet and associating said section in superimposed relationship to the preceding section to form a column of filler tobacco having substantially uniform density in width and height, and separating bunch charges of uniform density in width and thickness from said column for formation into cigar bunches.

7. Steps in the method of making cigars, which comprise advancing a succession of bunch lengths of filler tobacco over a supporting surface into

a restricted passageway, and associating each length fed with prior fed lengths; including, applying varying resilient sidewise pressure to each length to cause a redistribution of the tobacco and substantially complete removal of voids in each length as it becomes associated with prior fed lengths in said passageway in order to form a sheet of tobacco substantially uniform in density and thickness, cutting sections of predetermined width from said sheet, and forming said sections into a column of tobacco having substantially uniform density in height and in width.

8. The method of making cigars which comprises advancing a succession of bunch lengths of filler tobacco sidewise over a supporting surface, associating each of said lengths with prior fed lengths to form a sheet, applying resilient compacting pressure to an edge of said sheet to compact said sheet and equalize the density thereof in thickness and in length, releasing said compacting pressure and substantially simultaneously with the release of said pressure securing the tobacco of said sheet against uncontrolled lateral expansion, cutting measured sections of tobacco from said sheet, laminating said sections to form a column of tobacco substantially uniform in density as regards height and width, and separating measured bunch charges from said column of tobacco.

9. In a cigar bunch forming mechanism, a support including a bottom tobacco sheet supporting plate, a yieldingly mounted upper clamping member spaced from said support and forming therewith a passageway for a sheet of tobacco, mechanism for moving bunch lengths of filler tobacco along said support for association in said passageway with previously fed lengths forming said sheet, said mechanism including resiliently mounted pressing members, and means for advancing said members against the rear edge of a bunch length to move the same laterally into said passageway whereby to associate said length with said sheet for repositioning and densifying said tobacco in said length and sheet, means for retracting said pressing members from said passageway, and means connected to the retracting means operative substantially simultaneously with said last-named means for moving said clamping member into engagement with the top of said sheet to prevent lateral expansion of said sheet prior to cutting a measured length therefrom.

10. In a cigar bunch forming mechanism, a support including a bottom tobacco sheet supporting plate, a yieldingly mounted upper clamping member spaced from said support and forming therewith a passageway for a sheet of tobacco, mechanism for moving bunch lengths of filler tobacco along said support for association in said passageway with previously fed lengths forming said sheet, said mechanism including a plurality of spring mounted pressing plates, and means for advancing said plates against the rear edge of a bunch length to move the same laterally into said passageway where-

by to associate said length with said sheet for repositioning and densifying said tobacco in said length and sheet and advance a portion of said sheet out of said passageway, a knife adapted to cut measured sections from said sheet, means for retracting said plates from said passageway, means connected to the retracting means operative substantially simultaneously with said last-named means for moving said clamping member into engagement with the top of said sheet to prevent uncontrolled lateral expansion of said sheet prior to cutting each measured length therefrom, and means for operating said knife to cut a measured section from said portion of said clamped sheet.

11. In a cigar bunch forming mechanism, a support including a bottom tobacco sheet supporting plate, a yieldingly mounted upper clamping member spaced from said support and forming therewith a passageway for a sheet of tobacco, mechanism for moving bunch lengths of filler tobacco along said support for association in said passageway with previously fed lengths forming said sheet, said mechanism including a plurality of spring mounted pressing plates, and means for advancing said plates against the rear edge of a bunch length to move the same laterally into said passageway whereby to associate said length with said sheet for repositioning and densifying said tobacco in said length and sheet and advance a portion of said sheet out of said passageway, a knife adapted to cut measured sections from said sheet, means for retracting said plates from said passageway, means operative substantially simultaneously with said last-named means for moving said clamping member into engagement with the top of said sheet to prevent uncontrolled lateral expansion of said sheet prior to cutting each measured length therefrom, means for operating said knife to cut a measured section from said portion of said clamped sheet extending beyond said passageway, a magazine arranged to receive said sections in laminated columnar arrangement, and a knife adapted to separate measured bunch lengths from said column.

RUPERT E. RUNDELL.

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