

May 21, 1935.

C. H. GIBSON ET AL

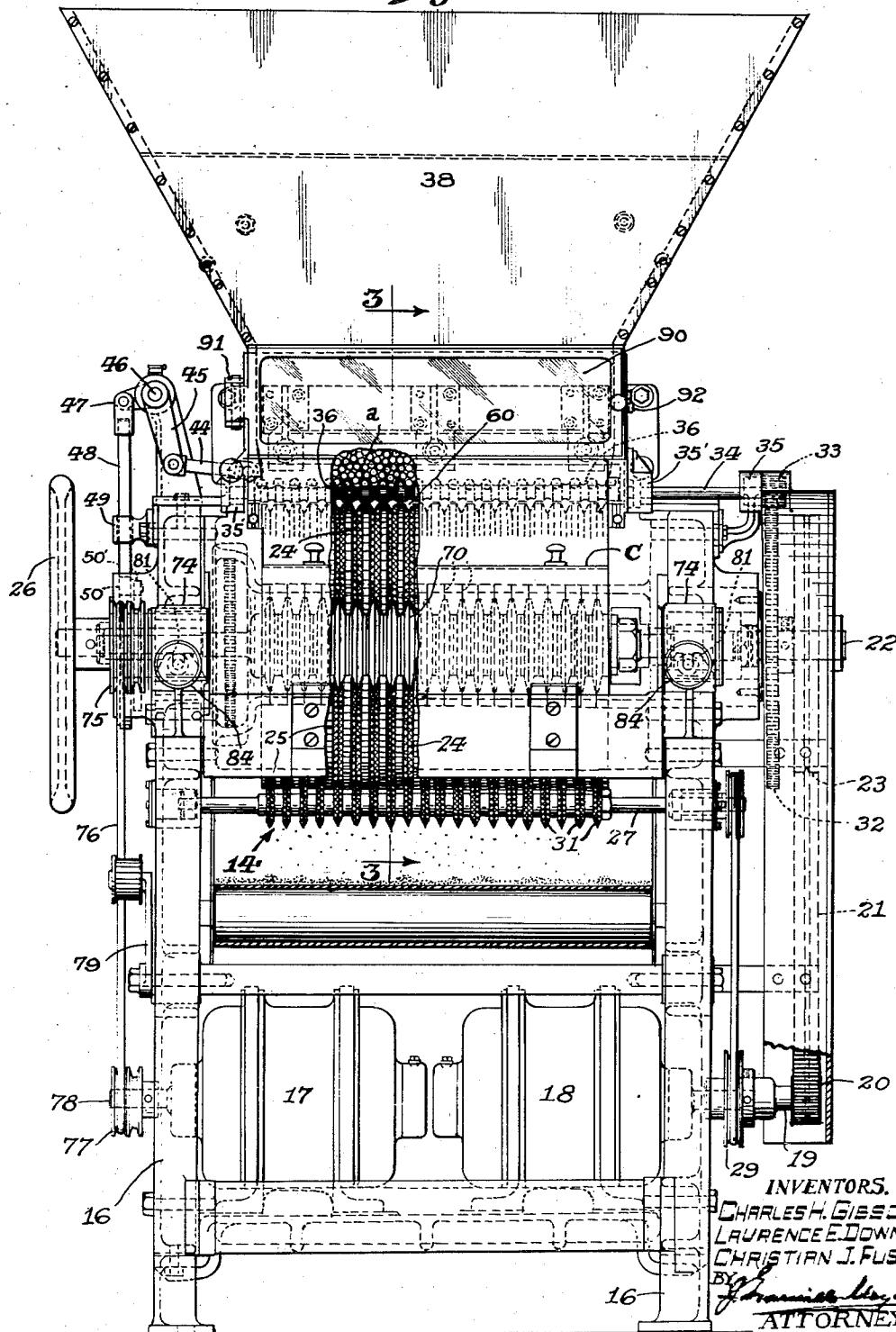
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CIGARETTE WRAPPER CUTTING MACHINE

Filed Oct. 6, 1933

5 Sheets-Sheet 1

*Fig. 1.*



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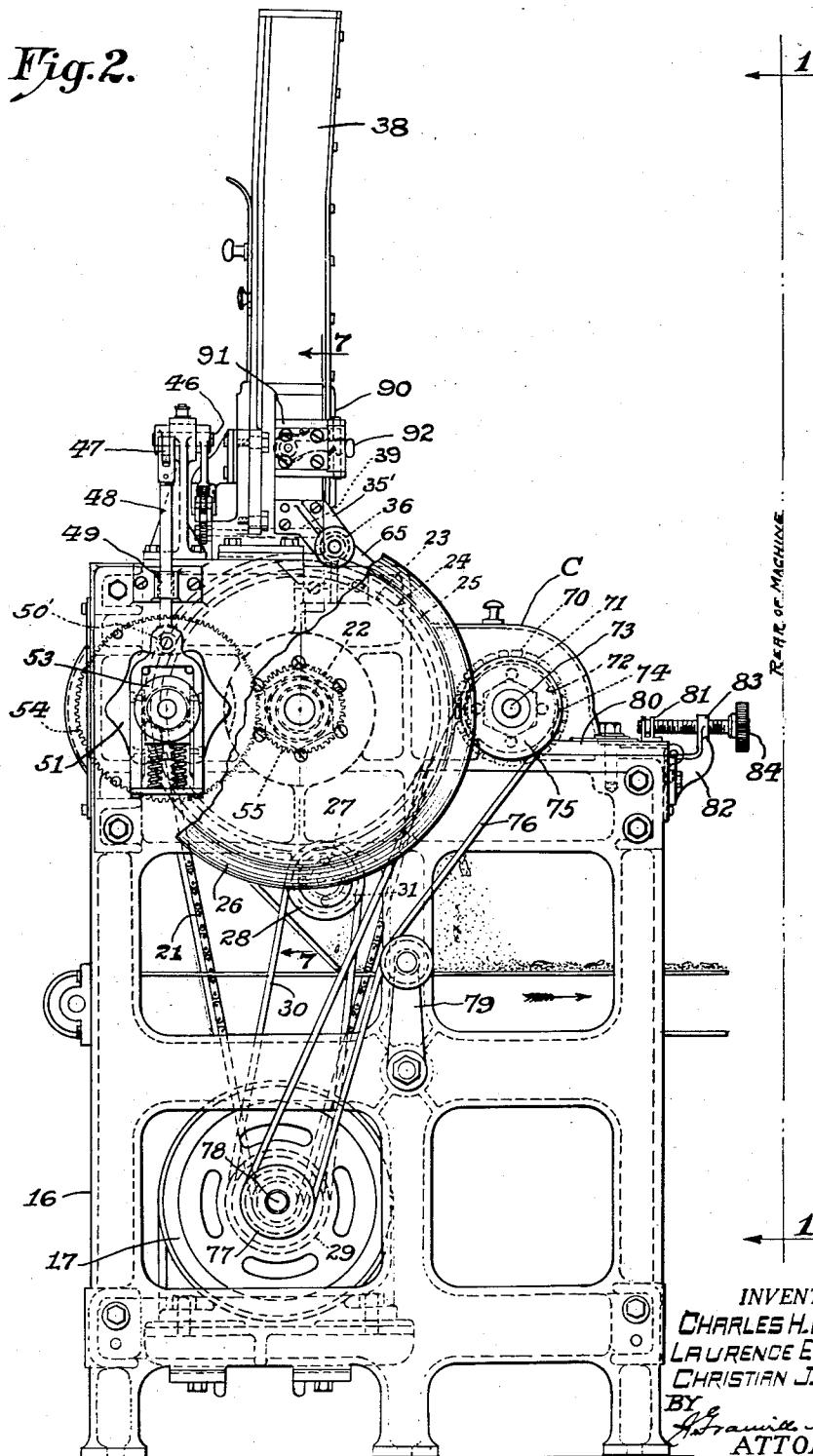
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*Fig. 2.*



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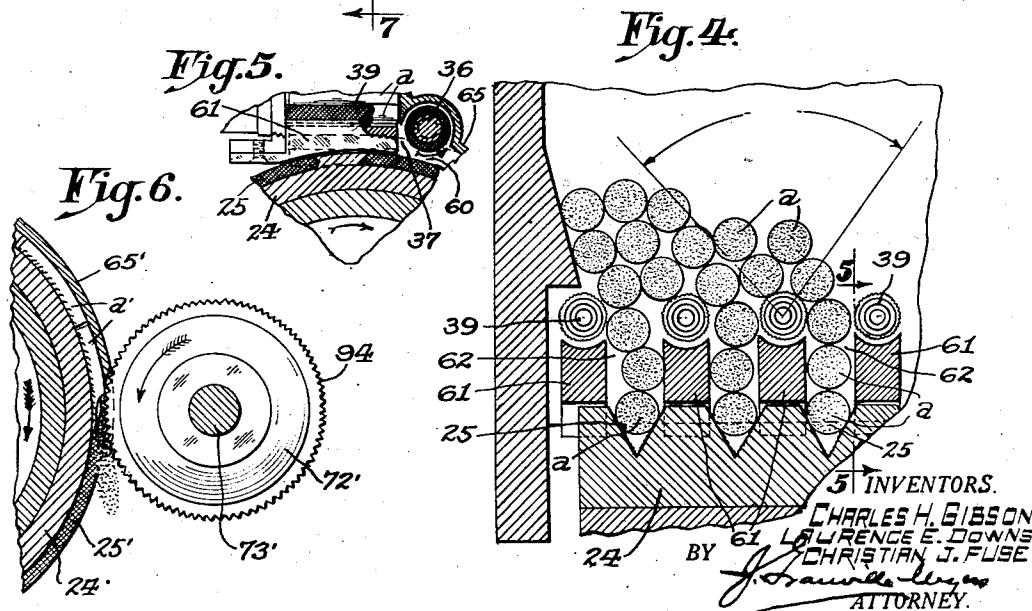
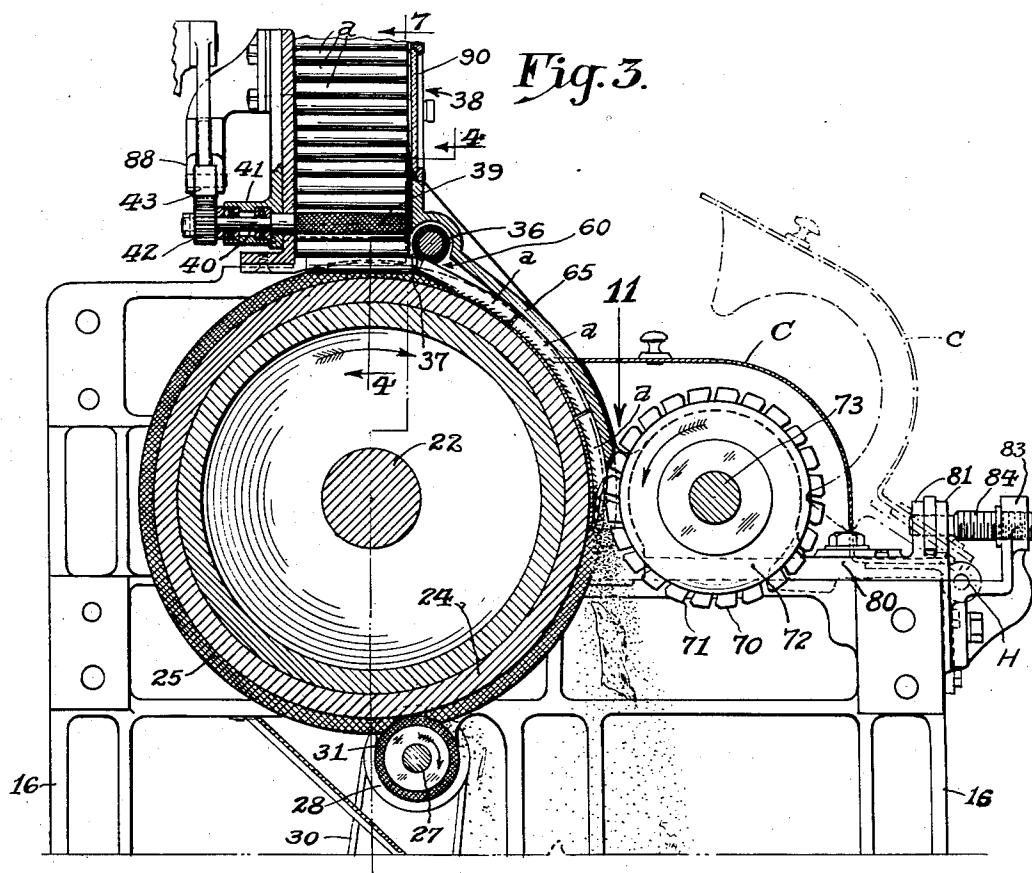
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## CIGARETTE WRAPPER CUTTING MACHINE

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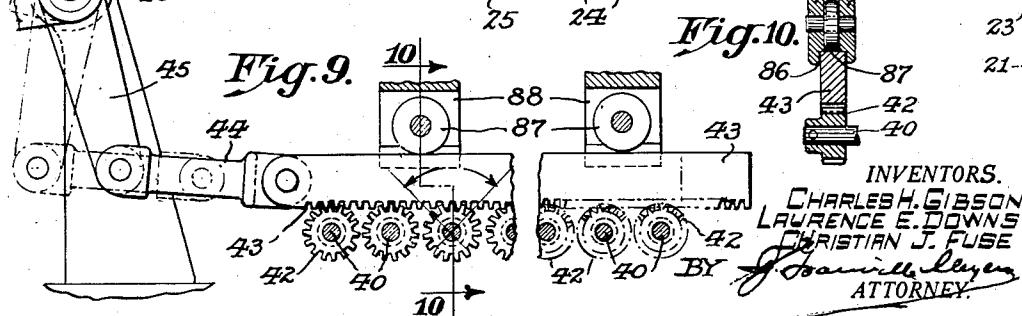
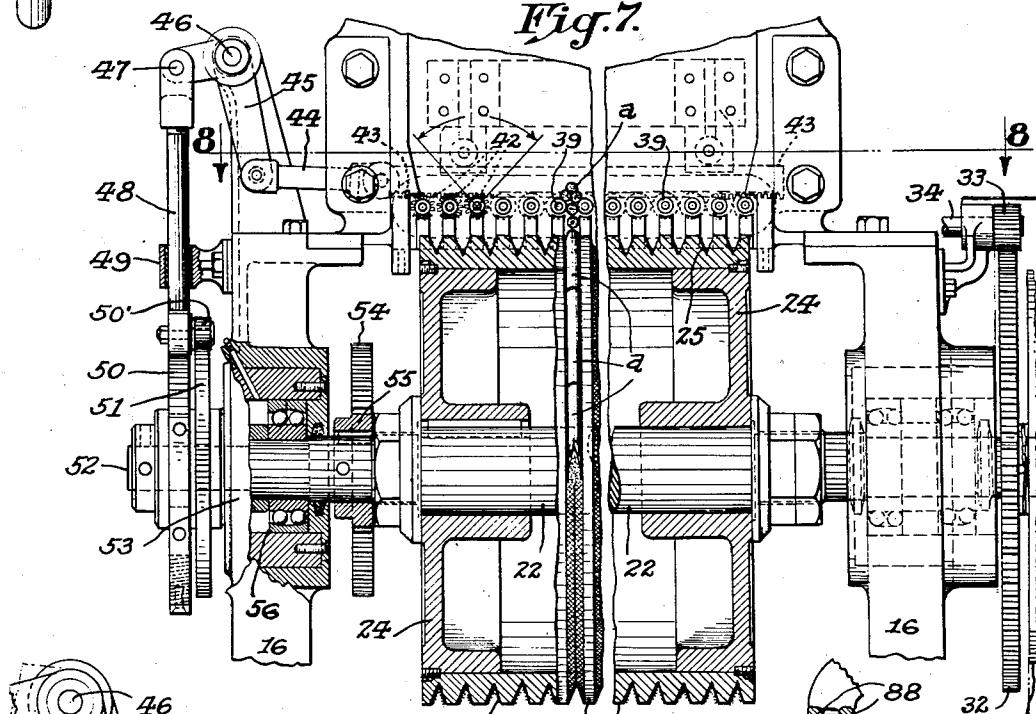
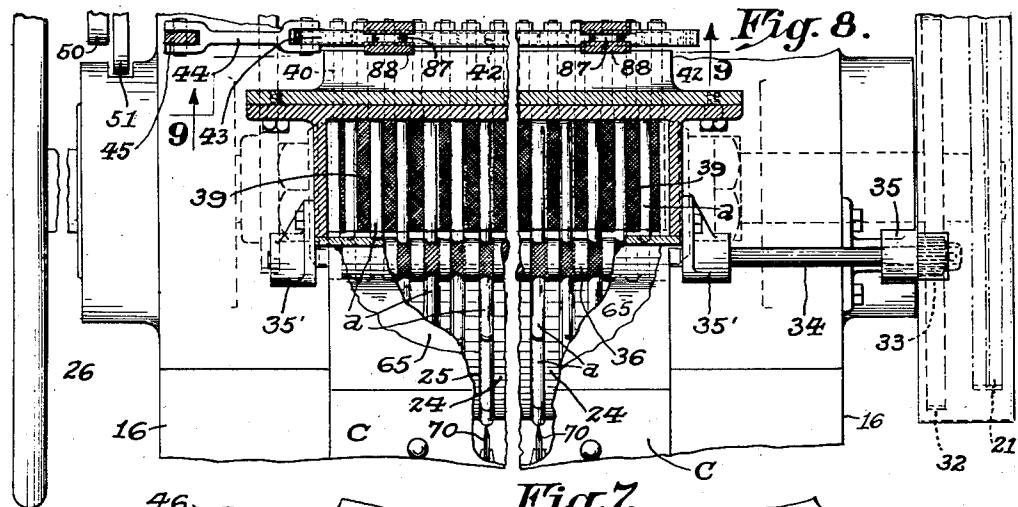
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## CIGARETTE WRAPPER CUTTING MACHINE

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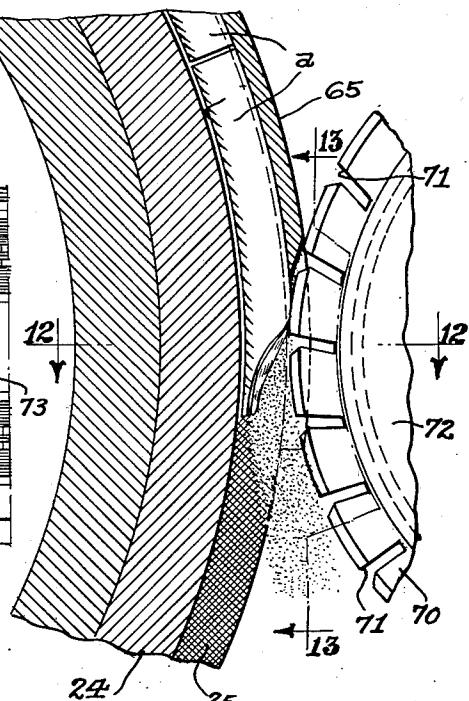
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CIGARETTE WRAPPER CUTTING MACHINE

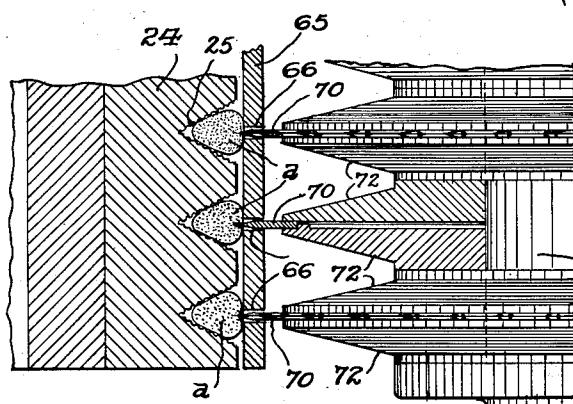
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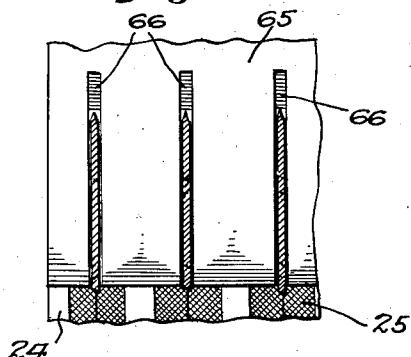
*Fig. 11.*



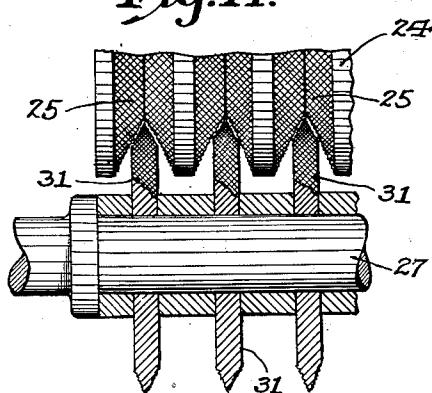
*Fig. 12.*



*Fig. 13.*



*Fig. 14.*



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## UNITED STATES PATENT OFFICE

2,002,142

## CIGARETTE WRAPPER CUTTING MACHINE

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Application October 6, 1933, Serial No. 692,542

12 Claims. (Cl. 131—37)

Our invention relates to means for and method of cutting the wrappers of defective cigarettes whereby the tobacco may be reclaimed and reused at the factories in making new cigarettes.

In cigarette factories automatic machinery is used for manufacturing cigarettes in large quantity and at a rapid rate of production. It sometimes happens that some of the cigarettes are imperfect due to the fact that the wrappers are not completely overlapped from end to end of the cigarette to completely enclose the tobacco, or to the fact that the completed cigarette is not sufficiently filled with tobacco, etc. Such imperfect cigarettes are not packaged but are reopened and the tobacco used again in the automatic machinery in the production of new cigarettes. It also sometimes happens that the number of imperfect cigarettes is relatively large and a considerable quantity of tobacco is present in such imperfect cigarettes. The usual manner or means of reclaiming the tobacco is to rip or cut the paper wrappers and subsequently to separate the paper and the tobacco. Up to the time of my invention, the means or mechanism for ripping or cutting the wrappers has been such that the shredded tobacco, or an appreciable quantity of it within the cigarettes is also cut. This is undesirable because the cutting of the tobacco breaks the shreds up into fine particles which are not desirable in the manufacture of perfect cigarettes. Therefore, there is a considerable loss of usable tobacco incurred during the ripping or cutting of the imperfect cigarettes.

With the foregoing in mind, the principal general object of my invention, as to structure, resides in the provision of a machine or automatic mechanism for ripping or cutting the wrappers of imperfect cigarettes with the parts so constructed and arranged as to effect the cutting of the wrapper without damaging the tobacco.

The foregoing object is accomplished by providing means for placing the cigarettes, and particularly their wrappers, under tension while feeding them toward cutting blades or implements. The cutting blades or implements are also preferably adjustable relative to the portions of the cigarette wrappers to be cut, so as to provide for cutting only the relatively fine wrapper without destroying any appreciable amount of the tobacco.

As to method the invention may be stated to reside in placing a longitudinal portion of the cigarette wrapper under tension or stress and advancing the so stressed or tensioned cigarette in the direction of its length past and into con-

tact with a cutting edge, such as a rapidly rotating or other cutting blade. By placing the wrapper under tension or stress the cutting edge or blade acts more positively or directly upon the paper cigarette wrapper and without unduly penetrating the tobacco filler of the cigarette, which penetration would result in unduly cutting the filler, and without shredding or unnecessarily cutting the wrapper into small fragments.

All of the objects and advantages of the invention will be described in detail and particularly pointed out during the course of the following detailed description of the accompanying drawings, in which

Fig. 1 is a rear elevation of a machine embodying the invention with parts broken away and looking at the machine in the direction of the arrows on line 1—1 of Fig. 2;

Fig. 2 is a side elevation of the machine shown in Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a view taken on the line 5—5 of Fig. 4;

Fig. 6 is a sectional view of a fragment of the cigarette feeding means showing a modification in the cutting blade;

Fig. 7 is a view taken on the line 7—7 of Fig. 3;

Fig. 8 is a fragmentary top plan view of the parts shown in Fig. 7 with parts broken away;

Fig. 9 is a view taken on the line 9—9 of Fig. 8;

Fig. 10 is a view taken on the line 10—10 of Fig. 9;

Fig. 11 is an enlarged fragmentary view illustrating the cutting operation as shown at the arrow 11 in Fig. 3;

Fig. 12 is a view taken on the line 12—12 of Fig. 11;

Fig. 13 is a view taken on the line 13—13 of Fig. 11; and

Fig. 14 is an enlarged fragmentary view of the wiper mechanism for the cigarette feed grooves indicated generally by the arrow 14 in Fig. 1.

Referring to Figs. 1 and 2 of the drawings, the numeral 16 designates generally the frame supporting the operative parts of the mechanism including the motors 17 and 18 located at the base of the frame. A shaft 19 is driven by the motor 18 and has keyed thereto a sprocket wheel 20 around which is a trained chain 21. A shaft 22 is journaled in suitable bearings, hereinafter described, in the upper portion of the frame, and has keyed thereto a sprocket wheel 23.

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around which the chain 21 is also trained. The shaft 22 also has keyed thereto, a cigarette feed drum 24 of considerable diameter and provided on its periphery with regularly spaced grooves or channels 25, the surfaces of which are knurled or roughened to frictionally engage the cigarettes "a". A hand wheel 26 is also attached to the shaft 22 so that the machine may be turned over by hand if desired. At the bottom of the drum 24 across the frame 16 is journaled a shaft 27 connected at one end to a pulley 28 around which and a second pulley 29 on shaft 19 is trained a belt 30. The shaft 27 has keyed thereto at regular intervals, discs 31, the peripheries of which conform to the shape of the channels 25 within which the edges of the discs 31 are disposed.

The shaft 22 also has keyed thereto a large gear wheel 32 (Figs. 1, 7 and 8) meshing with a small gear wheel 33 which drives the shaft 34 journaled through brackets 35, 35' and carrying the auxiliary feed roller 36 disposed above the main drum 24 and (Fig. 3) immediately in front of the outlet openings 37 at the bottom of the magazine 38 into which the cigarettes are dumped to be fed to the drum 24 and auxiliary rollers 36. The magazine 38 has parallel front and back walls and inclined side walls as shown in Fig. 1, the front and back walls being spaced apart a distance substantially equal to the length of the cigarettes. Feed rollers 39 in the bottom of the magazine are spaced apart a distance slightly greater than the circumference of each cigarette, so that the cigarettes may gravitate or fall through the spaces between the rollers. Referring to Fig. 8, each of the feed rollers 39 is carried by a shaft 40 journaled through a bearing 41 and connected at their outer ends to gear wheels 42. A toothed rack 43 is in mesh with each of the gears 42 and is connected to one end of a link 44, (Fig. 7), the other end of which is connected to a bell crank lever 45 pivotally mounted at 46 on a bracket at the top of the frame. The other end of the bell crank lever is pivotally connected at 47 to a rod 48 slidably mounted through a guide 49 on the frame and connected to a cam yoke 50, which is reciprocated by a roller 58 engaged by a cam 51 on the shaft 52 journaled through bearing 53 and carrying the gear 54 which meshes with a gear 55 mounted on and driven by the shaft 22, which shaft drives the feed drum and, as shown in Fig. 7, is journaled in bearings indicated generally by the numeral 56.

From the description of the parts thus far given and by reference particularly to Figs. 1, 3, 7 and 8, it will be seen that when the motor 18 rotates shaft 19, the sprocket 20 and chain 21 rotate sprocket 23 to rotate shaft 22 and consequently the main feed drum 24. At the same time the gear wheel 32 rotates gear 33 and shaft 34 and consequently the auxiliary feed roller 36. Furthermore, it will be noted that the auxiliary feed roller 36 is also grooved and has its grooves alined with those in the main feed roller, so that there are spaces 60 between the feed drum and auxiliary feed roller adjacent the opening 37 in the bottom of the magazine, through which the cigarettes are moved. It should also be understood that rotation of the shaft 22 causes reciprocation of the cam yoke 50 and rod 48 to oscillate the bell crank 45 on its pivot 46 reciprocating link 44 and rack bar 43, so that the agitator feed rollers 39 are rotated to agitate the cigarettes within the magazine to cause them to drop down through the spaces between the agitator feed rollers, which spaces are in aline-

ment with each of the grooves in the feed drum and auxiliary feed roller. Furthermore, as shown in detail in Figs. 4 and 5, there are guide plates 61 beneath each of the agitator feed rollers across the magazine and providing channels or spaces 62 also alined with the grooves in the feed drum and the spaces between the agitator feed rollers and through which the cigarettes drop into the grooves on the feed drum. A feed drum follower plate or cover 65 is secured over an arc of the surface of the feed drum and is provided in its lower end with slots 66 (Fig. 12) in alinement with the approximate centers of the grooves in the feed drum. The plate 65 is curved and provides in connection with the grooves in the feed drum a channel between the auxiliary feed roller 37 and the slitting device or rotary cutter about to be described which operates at the lower end of the plate 65. The cutters or slitting devices comprise, in the preferred form of the invention, circular blades shown in detail in Figs. 11 and 12 and designated generally by the numeral 70, each being provided with a plurality of notches 71 providing a plurality of cutting sections, each having a knife edge. These annular blades are clamped between discs 72 which are mounted on the shaft 73, Figs. 1 and 2, journaled in bearings 74. A protective cover C for the cutters is hingedly connected to the frame at H. The shaft 73 is keyed to a pulley 75 around which is trained a belt 76 also trained around a pulley 77 driven by shaft 78 from motor 17. A take-up 79 is mounted on the frame to engage the belt and tighten it when necessary.

Each of the blades 70 operates through a slit 66 in the follower plate 65 projecting very slightly into the channel through which the cigarettes run, so as to engage the paper wrapper and sever the same without injuring the tobacco and without shredding the paper for reasons hereinafter explained. The bearings 74 are carried by block or plate 80, on the outer ends of which are up-standing screw threaded ears 81. Brackets 82 on the frame have a threaded boss 83 through which and ears 81 is mounted an adjusting screw 84 which can be turned to move the plate 80, bearing 74, shaft 22 and parts carried thereby toward and away from the drum 24 to afford adjustment of the cutting edges of the knives relative to the cigarettes. Of course, the take-up 79 can be adjusted with respect to the bell crank to the position of the pulley 75 which moves with the shaft 22 during said adjustment of the cutting knives.

Other details which have not been herein-before described are shown in Figs. 9 and 10, wherein the rack bar 43 has guided movement in channels 86 with their upper edges in engagement with rollers 87 rotatably carried by the plates 88 which contain the channels 86. Also, as shown in Fig. 1, the lower part of the magazine or hopper is provided with a door 90 having a glass window, the door being mounted on a hinge 91 on one of the lower side walls of the hopper and being also provided with a latch 92 so that the operation of the cigarette feeding means within the hopper is visible and the parts thereof are accessible.

We have previously described generally the operation of the feed drum, auxiliary feed roller and the agitator rollers which effect discharge of the cigarettes into the openings 60 between the auxiliary feed roller and main feed drum and consequently along the channel between the feed

drum and the follower plate 65. With the said parts operating as described and the cigarettes traveling around the drum in the grooves thereof and against the follower plate, they are bent as shown in Figs. 3 and 11 so that the wrapper is under tension on the portions of the cigarettes nearest to the knives. With the knives adjusted to contact and sever the paper wrappers as shown in Fig. 11, the cleanly severed paper and uncut tobacco may be discharged on to conveyor belts or into a hopper where the tobacco is separated from the paper and conveyed to the cigarette machines so that the same may be utilized in making new cigarettes. With a relatively great number of grooves in the feed drum, and corresponding number of discharge openings in the magazine and cutters or knives, a greater quantity of cigarettes may be ripped or cut open and the tobacco reclaimed with less damage to the tobacco than is possible on the machines used prior to my invention. The grooves of the feed drum are kept clean and free from tobacco and paper by the wiper discs 31, which are rotating within the grooves at a point just beyond that where the cigarettes were ripped or cut open by the cutting knives. It is desirable to keep these grooves clean so that the cigarettes may be firmly frictionally held therein while feeding to and through the cutters.

30 We have found that with the cigarettes bent, substantially as shown and described, at the time that the wrappers are cut, that the cutting is accomplished more desirably and easily than otherwise, that is, it takes very little projection of the cutting edge into the wrapper to effect severance thereof with the cigarette and portion of the wrapper being bent, because said portion is under tension.

40 In Fig. 6, the primed numerals indicate the same unprimed parts of the other figures, but the numeral 94 designates a different type of rotary cutter showing the periphery of the knife as being saw-toothed. Of course, the cutter may have a plain or smooth knife edge instead of the ones illustrated, and Fig. 6 is merely to show one of the numerous possible modifications in the type of cutter.

50 Regardless of the type of cutting implement employed, it will be noted that the invention broadly provides for distorting the cigarettes, and in the actual embodiment shown and described the distortion takes place transversely in the grooves as well as longitudinally due to the bending of the cigarettes between their ends, (see 55 Figs. 12 and 11), wherein the former shows the cigarettes wedged in the grooves and the latter shows the longitudinal bending of the cigarettes with the portion of the wrapper next to the drum wrinkled and the outer portion taut.

60 It will be understood that the operation is continuous, the cigarettes being successively advanced in the manner and by the means already described. The invention may be practiced with a single groove and knife as well as with a plurality.

We claim:

1. In apparatus for cutting the wrappers of cigarettes, a cutter, a rotary member having a guide to receive and advance cigarettes to said cutter, and means adjacent said guide to bend the cigarettes therein to cause the portions of the wrappers to be cut to be under tension when they reach the cutter.

2. In apparatus for cutting the wrappers of cigarettes, a drum provided with circumferen-

tial guides to receive the cigarettes, means to feed the cigarettes into said guides, a cutter alined with each guide, means to rotate the drum whereby the cigarettes are advanced to the cutters, and means to bend the cigarettes and maintain them bent when their wrappers are engaged by said cutters.

3. In apparatus for cutting the wrappers of cigarettes, a drum provided with a circumferential groove to receive the cigarettes, means to feed the cigarettes into said groove, a cutter alined with said groove, means to rotate the drum whereby the cigarettes are advanced to the cutter, and means to bend the cigarettes in said groove and maintain them bent when their wrappers are engaged by said cutter.

4. The method of slitting the wrappers on cigarettes, which consists in curving the cigarettes longitudinally and advancing the curved cigarettes in the direction of their length with the wrapper in contact with a cutting edge.

5. The method of slitting the wrappers on cigarettes which comprises bending the cigarettes longitudinally to place a portion of the wrappers under tension, and slitting said portion of the wrapper while it is under tension.

6. In apparatus for cutting the wrappers of cigarettes, a drum provided with circumferential grooves, means to feed cigarettes into said grooves, a cutter alined with each groove, means to rotate the drum to cause the cigarettes to be advanced in said grooves to the cutters, means in advance of said cutters to cause the cigarettes advancing to the cutters to be bent longitudinally when the wrappers are engaged by said cutters.

7. In apparatus for cutting the wrappers of cigarettes, a drum provided with circumferential grooves to receive the cigarettes, means to feed the cigarettes into said grooves, a rotary cutter alined with each groove, means to compress a portion of the cigarettes in said grooves, and means to rotate the drum whereby the partly compressed cigarettes are advanced past the cutters with the cutters engaging their wrappers.

8. In apparatus for cutting the wrappers of cigarettes, a drum provided with circumferential grooves, a hopper above the drum adapted to contain the cigarettes, means to discharge the cigarettes from the hopper into the grooves of the drum, means to rotate the drum, means to bend the cigarettes in said grooves as they are carried by the rotating drum, and cutters arranged to engage the wrappers of the cigarettes as they are carried by the drum and while bent.

9. In apparatus for cutting the wrappers of cigarettes, a drum provided with circumferential grooves, a hopper above the drum adapted to contain the cigarettes, means to discharge the cigarettes from the hopper into the grooves of the drum, means to rotate the drum, means to bend the cigarettes in said grooves as they are carried by the rotating drum, cutters arranged to engage the wrappers of the cigarettes as they are carried by the drum and while bent, and means beyond said cutters to wipe said grooves.

10. In apparatus for cutting the wrappers of cigarettes, a drum provided with circumferential grooves to receive the cigarettes, a hopper above said drum to contain the cigarettes, means within said hopper to agitate the cigarettes and discharge them into the grooves of the drum, means to rotate the drum, means operable by rotation of said drum to operate the agitators, a plurality of rotary cutters each alined with

the grooves, and means to partly compress the cigarettes in said grooves whereby they are advanced to the cutters for engagement of their wrappers by the cutters.

5 11. In apparatus for cutting the wrappers of cigarettes, a drum provided with a plurality of circumferential grooves to receive the cigarettes, means to feed a succession of cigarettes into each of the grooves, a plate covering a portion of the surface of the drum and spaced therefrom for engagement by the cigarettes, means to rotate the drum to carry them under said plate and to effect longitudinal bending of the cigarettes, and a plurality of cutters each alined with a groove adjacent one end of the plate for engagement with the wrappers of the bent cigarettes.

10 12. In apparatus for cutting the wrappers of cigarettes, a drum provided with a plurality of circumferential grooves to receive the cigarettes, means to feed a succession of cigarettes into each of the grooves, a plate covering a portion of the surface of the drum and spaced therefrom for engagement by the cigarettes, means to rotate the drum to carry them under said plate and to effect longitudinal bending of the cigarettes, said plate having a plurality of slits in its end remote from said first means, and a plurality of cutters one arranged in each slit for engagement with the wrappers of the bent cigarettes.

15 13. In apparatus for cutting the wrappers of cigarettes, a drum provided with a plurality of circumferential grooves to receive the cigarettes, means to feed a succession of cigarettes into each of the grooves, a plate covering a portion of the surface of the drum and spaced therefrom for engagement by the cigarettes, means to rotate the drum to carry them under said plate and to effect longitudinal bending of the cigarettes, said plate having a plurality of slits in its end remote from said first means, and a plurality of cutters one arranged in each slit for engagement with the wrappers of the bent cigarettes.

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