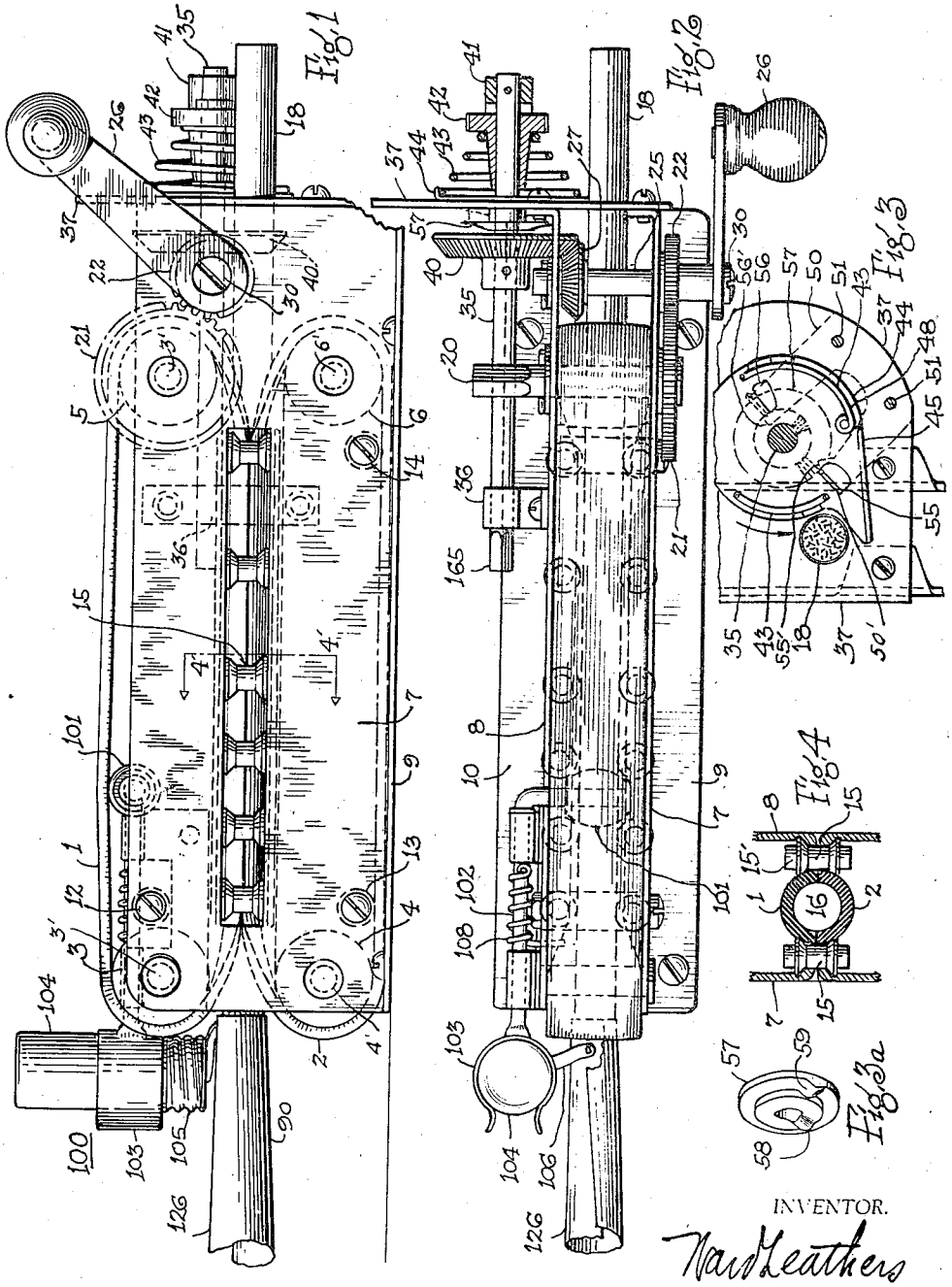
May 18, 1943 W. LEATHERS 2,319,611

CIGARETTE MAKING MACHINE

Original Filed Aug. 13, 1940 4 Sheets-Sheet 1



INVENTOR.

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CIGARETTE MAKING MACHINE

Original Filed Aug. 13, 1940 4 Sheets-Sheet 2

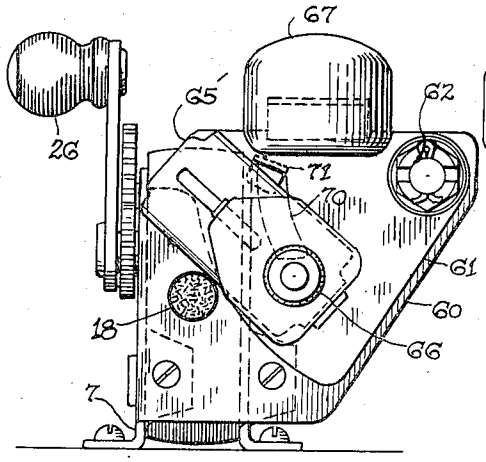


Fig. 5

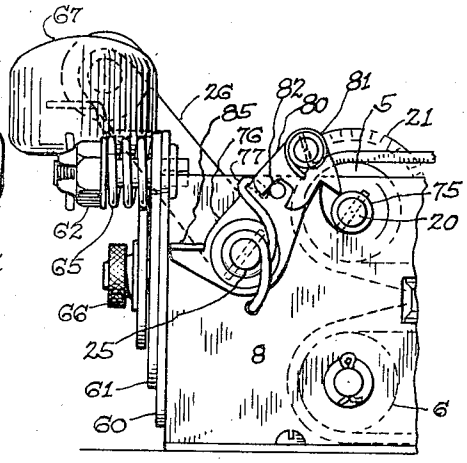


Fig. 6

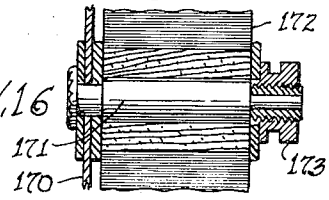


Fig. 16

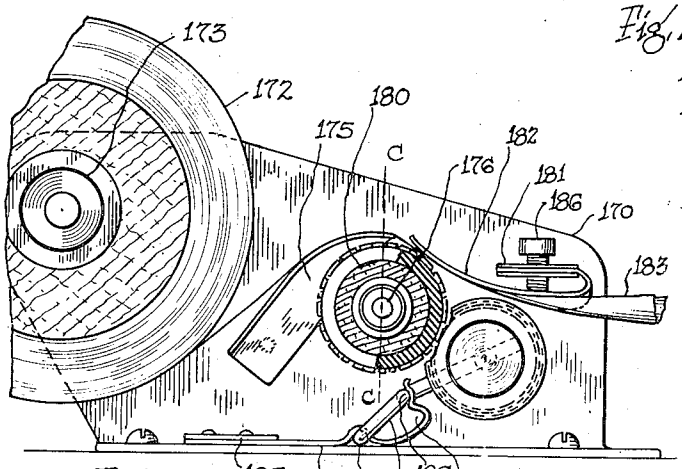


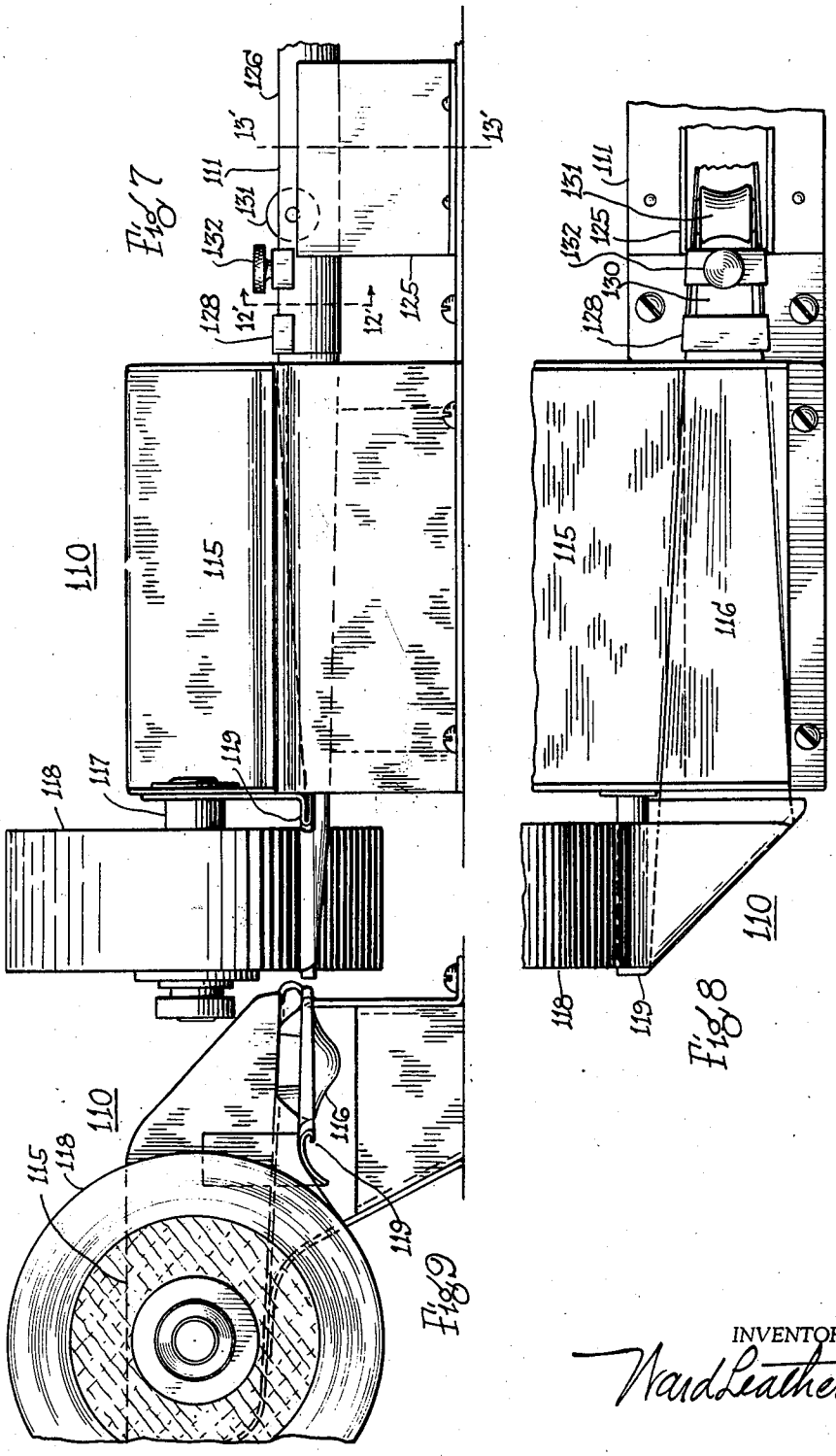
Fig. 15

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CIGARETTE MAKING MACHINE

Original Filed Aug. 13, 1940 4 Sheets-Sheet 3



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CIGARETTE MAKING MACHINE

Original Filed Aug. 13, 1940 4 Sheets-Sheet 4

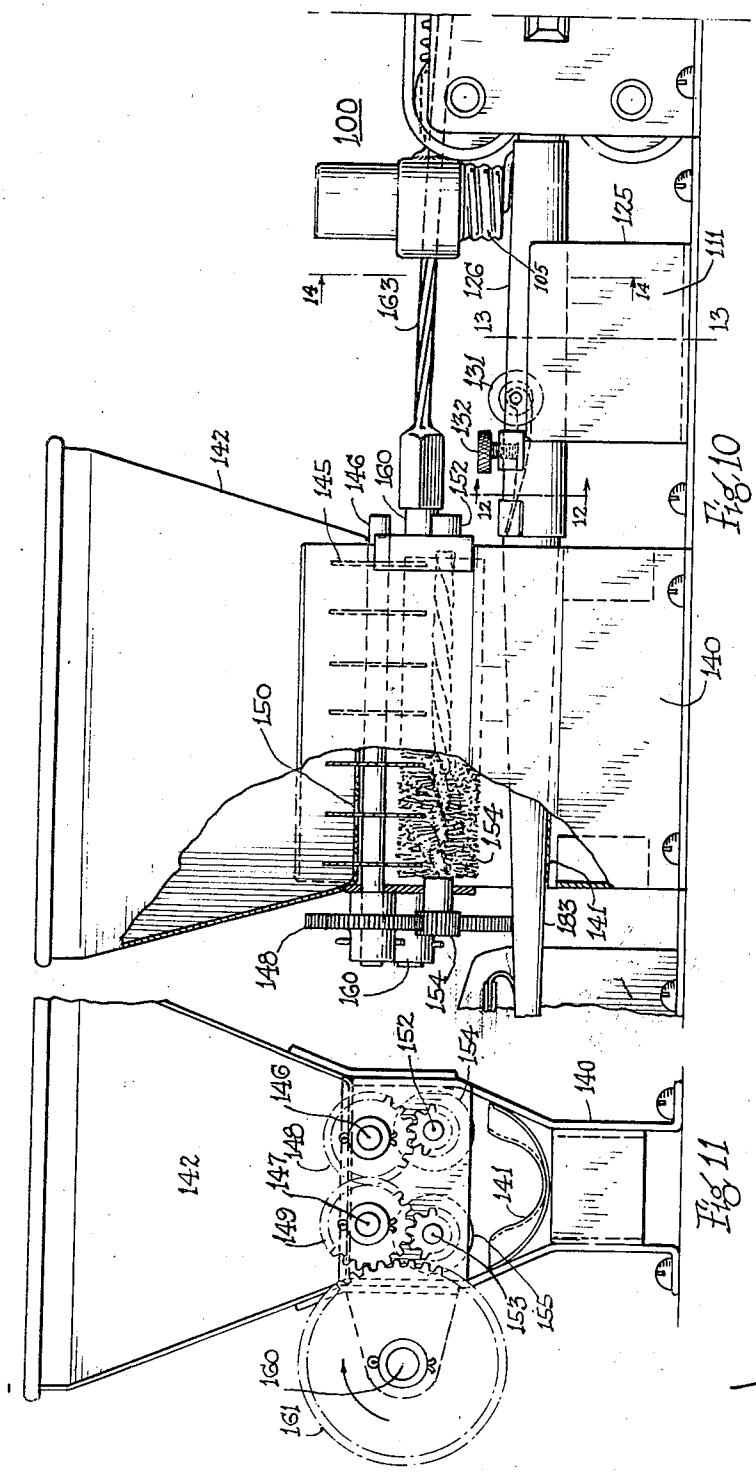


Fig. 10



Fig. 14

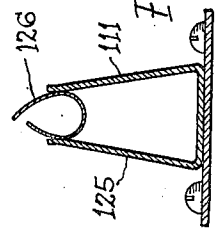


Fig. 13

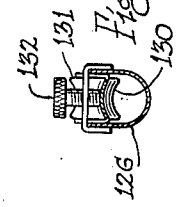


Fig. 12

Fig. 11

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UNITED STATES PATENT OFFICE

2,319,611

CIGARETTE MAKING MACHINE

Ward Leathers, Brooklyn, N. Y.

Substituted for abandoned application Serial No. 352,349, August 13, 1940. This application September 15, 1942, Serial No. 458,400

9 Claims. (Cl. 131—69)

This application is a substitute for my abandoned application Serial No. 352,349, filed August 13, 1940, and the same relates to cigarette machines of the type that produces a continuous tobacco-filled and sealed paper tube cut automatically as produced into desired lengths. Heretofore, continuous-tube type cigarette machines have been large, heavy, thoroughly non-portable, ultra-high-speed installations suitable exclusively for mass production.

An object of my invention is to produce a continuous-tube cigarette machine of such size and weight and such simplicity of construction and operation that it is truly portable, can be carried around by any one, put away when in disuse and brought out for occasional use exactly like any household appliance. Heretofore, privately owned and operated cigarette machines have been of the type that load and roll sidewise, one cigarette at a time—a process too slow to be desirable.

An object of the present invention is to make a tobacco-filled paper-tube between the opposed sides of two manually-driven rubber bands and periodically cut-off cigarettes.

An object of my invention is to provide means of so forming continuous cigarette stock and automatically cutting off suitable lengths without stopping the continuous movement of the stock.

Another object is to paste or seal the stock by means that automatically removes itself from the stock when continuous movement ceases.

Further objects are to automatically print, load, form, seal and cut-off continuous-tube cigarettes.

Numerous other objects of the invention not at this time enumerated will become readily apparent as the nature of the invention is better understood.

In the accompanying sheets of drawings one embodiment of the invention has been disclosed for illustrative purposes only. In the drawings:

Fig. 1 is a side elevational view of the drive, closure and cut-off portion of the machine.

Fig. 2 is a plan view of the same.

Fig. 3 is a partially broken and sectioned end view of the same with intermittent cut-off mechanism for continuous-motion cigarette cylinder.

Fig. 3*a* is a three-quarter perspective view showing under side of the compound cam in cut-off of Fig. 3.

Fig. 4 is a fragmentary sectional view taken transversely substantially along the line 4'—4' of Fig. 1 in the direction indicated by the arrows.

Fig. 5 is an end elevational view of a modified form of cut-off device.

Fig. 6 is a side elevational view of the same.

Figs. 7, 8 and 9 are side, top and end views respectively of a loading unit and paper holder.

Fig. 10 is a side elevational view of a "shaper" and motor-driven "feed" mechanism.

Fig. 11 is an end view of motor-driven "feed" unit.

Fig. 12 is a sectional view taken substantially along the line 12'—12' of Figs. 7 and 10.

Fig. 13 is a sectional view taken substantially along the line 13'—13' of Figs. 7 and 10.

Fig. 14 is a sectional view taken substantially along the line 14'—14' of Fig. 10.

Fig. 15 is a side elevation of a modified paper holder and printer.

Fig. 16 is a fragmentary sectional view through the paper-reel holding spindle taken on the line C—C of Fig. 15.

Two continuous cooperating carriers or endless belts, 1 and 2, formed of resilient material such as rubber or a rubber compound, each being approximately one-eighth inch thick and three-quarters inch wide, are disposed for drive by and travel over pulleys 3 and 5, and 4 and 6 respectively. The pulleys are journaled in side frames 7 and 8 which are provided with base flanges 9 and 10 and joined together by post-and-screw mountings at 12, 13 and 14. The pulleys 3, 4, 5 and 6 are mounted on horizontal shafts 3', 4', 5' and 6' respectively, with the band 1 disposed above the band 2 at such distance that when the sides of the bands next each other are compressed sidewise by spindles or rollers 15 the space between the two bands forms a cylindrical opening 16, Fig. 4. In this space the cigarette cylinder 18 is held while the glue for holding it together sets and whereby, owing to the forward movement of the belts, the cigarette cylinder, and hence the feed paper, are driven. The belts exert a very considerable outward pressure against the rollers 15, making it practical to mount them freely in notches 15' (Fig. 4) in inwardly turned flanges of the side frames 7 and 8.

In the present embodiment, the means of driving the cylinder 18, motor or manual, includes the shaft 5' upon which the pulley 5 is mounted for rotation about a horizontal axis in unison therewith. On one end of the shaft 5' a spur-gear 21, also joined to the shaft, is driven by a pinion 22 having half as many teeth as provided in the spur-gear 21. This pinion is found on a transverse shaft 25, to which are also secured a crank-and-handle 26 and a mitre-gear 27. The

shaft 5' is squared, on the end opposite the gear 21 as indicated by the numeral 20, thus providing means of attaching a motor-drive which may practically consist of an electric motor with integral reduction gearing of suitable speeds and ratios. When the motor drive is in use, it is preferable to remove the crank-and-handle 26, for which purpose assembly is made by means of a screw 30. A shaft 35, disposed longitudinally of the machine, is rotatably held in a bracket 36 which is joined in suitable manner to the side of the side frame 8, and held in an end plate 37, which is suitably joined to the ends of the side plates 7 and 8. The shaft 35 is driven by a mitre-gear 40 which engages the gear 27. To the outboard end of the shaft 35 is pinned a castellated collar 41 which engages a castellated, manually adjustable collar 42, to which is joined at its apex a conical (spiral-helix) spring 43. A flat steel cutter plate 44, Fig. 3, with a cutting edge 45, surrounds the shaft 35 and is held tight against the end plate 37 by the spring 43 which is secured to it at 43. A flat, substantially U-shaped, spring 50 (shown largely in dotted lines), having two legs, is joined to the inner side of the end plate 37 as by rivets 51. The tips of each spring leg are turned at right angles (toward the observer) as at 50' and are adapted to engage holes 55 and 56 in the cutter plate 44, stopping the rotation of the cutter plate by compression at the hole 55, and tensilely, hook-fashion, at the hole 56. A compound cam 57, shown in dotted lines in Fig. 3 and in perspective in Fig. 3*a*, having inner and outer sloping cam surfaces 58 and 59 respectively, is mounted on and rotatively driven by the shaft 35 and is disposed between the flat spring 50 and the inner face of the end plate 37 engages a projection on each of the legs of the spring 50 in such manner that the legs and their engaging portions are withdrawn, one at a time, from the engaging holes 55 and 56 in the cutter plate 44. The outer cam surface 59 disengages the spring leg from the edge of the hole 55 by sliding engagement with a projection 55' on the spring 50. The inner cam surface 58 disengages the other spring leg from the edge of the hole 56 by a similar sliding engagement with a projection 56' on the spring 50. This cut-off mechanism works as follows:

The crank-and-handle 26, and therefore the shaft 25, rotate two full revolutions, during which the shaft 20 and the pulley 5 rotate once. This is sufficient to advance the cylinder 13 the length of one cigarette. As the mitre-gear 27 on the shaft 25 makes two revolutions, the gear 40, and therefore the shaft 35, together with the collar 42 and the cam 57, make one revolution. As the collar rotates it winds the spring 43 which turns the cutter 44. In Fig. 3, the cutter has just cut-off a cigarette and has been stopped by one leg of the spring 50 at the opening 55 in the cutter plate. When the cam 57 now turns a suitable distance, such as 60° to 90°, it withdraws the stop spring at the opening 55 by means of the slope or hump 59. The spring 43 then turns the cutter plate a few degrees, such as 5° to 10°, at which time the other leg of the stop spring 50 catches and stops it at the opening 56. (There are suitable perforations, not shown in the end plate 37 through which the stop-springs project to engage the cutter plate.) When the cam 57 has turned the remainder of a full revolution, it releases the stop-spring at 56 and the cutter bar spring all the remainder of the way around to the position shown—during which latter motion it cuts-off a cigarette.

A modification of the automatic cut-off just described is a manual cut-off shown in Figs. 5 and 6.

In this modification, the longitudinal shaft 35 is entirely dispensed with. A modified end plate 60 supports a knife holder 61 at 62 in a manner hinged for arcuate movement. A coil spring 65 holds the knife-holder 61 tightly against the end-plate 60 and rotatively in its top position (as shown). The knife-holder releasably supports a safety-razor blade 65' used for cutting-off the cigarettes—the blade being manually attachable and removable by the thumb-nut 66. A strike-handle 67 enables the operator to cut-off a cigarette by a downward striking of the fist. A slot 70 in the end-plate 60, and a lanced-out, turned-in portion 71 of the knife-holder 61 limits the arcuate motion, top-and-bottom, of the holder 61. In order that an accurate and automatically measured length of cigarette may be obtained, I have devised means whereby when such length has been produced the machine is topped until the cigarette thus produced is cut-off. Rigidly joined to the outer end of the shaft 20, opposite the crank-and-handle 26, is rotatably attached a hook or latching-piece 76, while on the same end of the shaft 25 is mounted an arm 76 free for arcuate motion. This arm is turned toward the latching-piece 75 by a spring 77. Rotatably mounted on one end of the arm 76 is a latch-piece 80 which cooperates with the latching-piece 75. This piece 80 is turned (clockwise) by a spring 81 and stopped by a pin 82 firmly joined to the arm 76. Operation is as follows:

When the shaft 20 has turned (in the direction of the arrow) sufficiently far for the conveying of a cigarette of desired length, the latching-piece 75 engages the latch-piece 80, which, when turned (counter-clockwise) as far as the stop 82 will permit, stops the rotation of the shaft 20 and hence the machine. Operator then strikes down handle 67 cutting-off the cigarette. When the turned portion 71 of the knife-holder 61 engages a turned-over boss 85 integral with the arm 76, thus turning the arm 76 through a small arc, the latch mechanism 75—80 is released. When the latch-pieces separate, the latch-piece 80 springs clockwise sufficiently far to throw the latch past latching position when arm 76 is released by the knife-holder 61.

A paper ribbon of continuous strip stock, filled with tobacco by means presently to be described, is drawn, by the movement of the rubber belts 2 and 3, through a shaper or forming die where just before entering the advancing tubular passageway between the belts adhesive application must be made. At this point, I have provided a moistening device, such as a fountain type mucilage-spreader, generally characterized by the numeral 100, which ceases its applying moisture or adhesive the instant the driving torque on the drive-shaft 20 is relieved. A roller 101, engaging the inner and under side of the band 1, is tiltably mounted on one end of a shaft 102 disposed at right angles to the roller's axis, i. e., longitudinal to the machine, brackets for supporting the shaft being suitably joined to the frame member 8. To the other end of the shaft 102 is joined a holder 103 for a removable, refillable mucilage container 104. The container has a removable cap 105 having an applicator spout 106 (Fig. 14), the opening in the tip of which comes in contact with the edge of the cigarette paper as it moves into

the embrace of the bands. The roller 101 is caused to bear upward on the under side of the upper portion of the upper band by a spring 108. As the roller is raised or lowered, the spout 106 respectively makes and breaks contact with the paper. When driving torque is applied to the drive pulley 5, the under portion of the band 1 extends slightly, causing a looseness in the upper portion. This looseness permits the roller 101 to rise, causing contact of the spout 106 with the paper. When the torque is relieved, the upper portion of the band 1 tautens, thus lowering the roller and removing the spout from contact with the paper. This automatic removal is highly desirable since if contact is maintained while the machine is inoperative, the mucilage will spring (by capillary action) through paper and tobacco causing defect and breakage.

A tobacco loader and strip paper holder, generally characterized by the numeral 110, Figs. 7, 8 and 9, and a shaper 111, are disposed longitudinally and in tandem arrangement with the machine of Figs. 1 and 2. A wholly manual type of tobacco loader 110 has an open top bin 115 for holding the shredded tobacco, and trough 116 of gradually varied cross-section from end to end in which the paper slides and wherein it receives its load of tobacco. On one end of the bin 115 is firmly affixed a free end shaft 117 on which a roll of paper 118 is freely rotatably mounted. Paper from the roll is turned through 90° over a form 119. In operation, as the handle 26 is turned with the right hand, tobacco is dragged from the bin to the paper lined trough with the fingers of the left hand. A desired quantity of tobacco may thus be fed to the cylinder as it advances.

The shaper 111, (shown in elevation in Figs. 7, 8 and 10, and in cross-section in Fig. 13 taken on the dotted line 13'—13' of Figs. 7 and 10) comprises a support bracket or frame 125, to which is firmly joined a sheet metal cigarette shaping or forming piece 126. This piece is substantially an open-top trough having vertical and parallel sides at the entrance end, and with the sides so developed in form toward the exit end that they lean in until they are freely overlapping for causing the paper ribbon to ever more approach a lap-weld tubular form as it passes through it. At the entrance end of the shaper, a manually-adjustable, spring-actuated tobacco compressor is mounted on top edges of the forming piece 126 by means of a cross-bracket 128. The compressor comprises a spring 130, supporting a concave roller 131. Tension on the spring 130 is altered and maintained by the thumb-nut 132 supported on a cross-bracket similar to the bracket 128.

As a modification of the tobacco loader and paper holder of Figs. 7, 8 and 9, I have devised a motor-driven tobacco-feed for serving the same purpose in an automatic manner. A frame 140, Figs. 10 and 11, supports a loading trough 141, which in essential respects is similar to the trough 116 in Figs. 7, 8 and 9. Above the trough is disposed a hopper 142 having four sides and a bottom for holding the shredded tobacco. Between the trough and the hopper is located a mechanical measuring device comprising two series of toothed discs 145 mounted on and driven by shafts 146 and 147, which are geared together by means of gears 148 and 149 for rotation in opposite directions. These discs project through free slots 150 in the bottom of the hopper. The shafts 146 and 147 are geared respectively to shafts 152 and 153, which are the axes of cylindrical brushes 154 and 155 respectively. A further shaft 160 drives a gear 161, which meshes with 149, which in turn meshes with 155. 149 also meshes with 148, which meshes with 154. The shaft 160 is driven by a flexible shaft 163 joined to the end opposite the gear 161. The flexible shaft is driven by the shaft 35 (Fig. 2) to the end of which, at 165 it is suitably joined. The toothed discs 145 drag a predetermined quantity of shredded tobacco from the bin 142 for each revolution and which is thus proportionate to the linear movement of the paper, and hence they deliver a predetermined quantity of tobacco for each cigarette. The brushes 154, because of a suitable gear ratio, rotate faster than the disc and thus disengage the shreds from the teeth throwing them into the paper-lined trough 141. With this automatic loader driven by an electric motor, which also drives the cigarette-making mechanism of Figs. 1 and 2, this becomes a continuous operating machine.

A printing device and reel holder is shown in Figs. 15 and 16. Here a unitary sheet-metal frame or holder 170 supports a free-end spindle 171 upon which the reel of paper 172 is freely rotatably mounted. The reel is kept on by the thumb-nut 173. To the frame 170 there are also joined a paper guide 175, a fixed free-end spindle 176 for freely rotatably supporting a printing wheel 180, and a bracket 181 for holding a light-tension flat spring 182 against the paper 183 opposite the printing face of the wheel 180.

The print wheel is held on the shaft 176 by the thumb-nut 185, while the thumb-nut 186 determines the print-pressure. The wheel 180 prints in a manner unlike that common to conventional cigarette machines for it prints lengthwise of the cigarette a substantially continuous line of characters or marks. The print wheel is provided with an ink wheel 190 in a substantially closed case 191. The outer member of the case is firmly joined to a heavy bent wire 192, which is hinged at 193 by being inserted under a flat spring 194 held firmly to the frame 170 at 195. Bent notches 196 and 197 in the free end of the spring 194 provide for holding the wire and hence the inker in two positions, 196 operative and 197 inoperative. The case 191 has an outer, lid-like cover 199 through which projects inwardly a free-end spindle which holds freely, and rotatably, the inking wheel 190. The cover 199 is provided with a thumb-nut-like handle 200, by means of which the cover 199 may be turned with respect to the case 191. A suitable slot cut in the side wall of both case and cover permits contact of ink wheel with print wheel when slots are in a corresponding position. Since the slot in the case is in a suitable fixed position, the turning of the knob or handle 200 to a proper and marked position opens the slots for ink-wheel-to-print-wheel contact. When the machine is put in disuse, the inking mechanism is pressed down into notch 197 and the case closed by the knob 200. The ink in the felt wheel 190 will not now dry out or deteriorate before the machine is again brought out for use.

Having set forth in detail several embodiments of my invention, I wish it understood that variations may be made in the form and arrangement of the described parts thereof by those familiar with these arts without departing from the spirit of my invention.

What is claimed is:

1. In a cigarette making apparatus of the

character described, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including a resilient normally flat endless belt having continuous plane inner and outer surfaces, the outer surfaces of said belts being designed for cooperation in the straight-away portion in shaping cylindrical cigarette stock therebetween, means for moving said belts in synchronism at the same rate of speed and in the same direction in said straight-away portion, and means positioned in the path of movement of the outer edges of said belts in the straight-away portion for deflecting said edges inwardly into registry and opposing relationship, thus causing free unobstructed transverse flexing of the belts in opposite directions whereby a tubular stock confining and retaining void is created between the opposed surfaces thereof.

2. In a cigarette making apparatus of the character described, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including a flexible normally flat endless belt having continuous plane inner and outer surfaces, the outer surfaces of said belts being designed for cooperation in the straight-away portion in shaping cylindrical cigarette stock therebetween, means for moving said belts in synchronism at the same rate of speed and in the same direction in said straight-away portion, and traction rolling means positioned in the path of movement of the outer edges of said belts in the straight-away portion for deflecting said edges inwardly into registry and opposing relationship, thus causing free unobstructed transverse flexing of the belts in opposite directions whereby a tubular stock confining and retaining void is created between the opposed surfaces thereof.

3. In a cigarette making apparatus of the character described, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including a flexible normally flat endless belt, the outer surfaces of said belts being designed for cooperation in the straight-away portion in shaping cylindrical cigarette stock therebetween, means for moving said belts in synchronism at the same rate of speed and in the same direction in said straight-away portion, and opposed rollers positioned on opposite sides of said belts in the straight-away portion designed for engagement with adjacent edges of the belts for confining the latter into registry and opposing relationship, thus causing transverse flexing of the belts in opposite directions whereby a tubular stock confining and retaining void is created between the opposed surfaces thereof.

4. In a cigarette making apparatus of the character described, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including a resilient normally flat endless belt, the outer surfaces of said belts being designed for cooperation in the straight-away portion in shaping cylindrical cigarette stock therebetween, means for moving said belts in synchronism at the same rate of speed and in the same direction in said straight-away portion, and a series of spaced rollers engaging the adjacent edges of said belts in the straight-away portion thereof and on opposite sides of the same for deflecting said edges inwardly into registry and opposing relationship, thus causing transverse flexing of the belts in opposite directions whereby a tubular stock-confining and retaining void is created between the opposed surfaces thereof, each series of rollers being substantially coextensive with the straight-away portion.

5. In a machine for producing tubular cigarette stock, in combination, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including an endless flexible normally flat belt having continuous plane inner and outer surfaces, said belts in the straight-away portion of the carriers presenting cooperating opposed surfaces designed for shaping therebetween tubular cigarette stock, means for moving said belts in unison and at the same rate of speed in the straight-away portion from a receiving end to a discharge end thereof, means for confining the opposite edges of said belts in said straight-away portion to cause free unobstructed transverse flexing thereof in opposite directions and create a tubular void therebetween, means positioned adjacent the receiving end of the straight-away portion for retaining a supply of continuous paper strip stock, and a curved confining die positioned between the retaining means and said receiving end for progressively shaping the paper stock into tubular form and for directing the same into said void.

6. In a cigarette making machine, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including an endless belt formed of elastic material, a pair of rollers upon which the belt is mounted, and means for driving one of the rollers to move its respective belt, the outer surfaces of said belts being designed for cooperation in the straight-away portion for shaping cylindrical cigarette stock therebetween, means for supporting a supply of continuous paper strip stock for introduction to the belts, a moistening device mounted for movement into and out of operative engagement with the strip stock being fed to the belts and normally occupying a position out of engagement therewith, an arm on said moistening device engaging the driven belt, said arm being movable with the moistening device and being operable upon tensioning of the belt when the latter is set into motion to move the moistening device into operative strip engaging position.

7. In a cigarette making machine, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including an endless belt formed of elastic material, a pair of rollers upon which the belt is mounted, and means for driving one of the rollers to move its respective belt, the outer surfaces of said belts being designed for cooperation in the straight-away portion for shaping cylindrical cigarette stock therebetween, means for supporting a supply of continuous paper strip stock for introduction to the belts, a moistening device mounted for tilting movement in the vicinity of the strip stock being introduced to the belts, said moistening device being provided with an applicator spout designed to normally remain out of contact with the strip stock when the moistening device is tilted in one direction and to operatively engage the stock when the moistening device is tilted in the other direction, and means formed on the moistening device and engaging the driven belt for

tilting the moistening device in said latter direction upon tensioning of the belt due to the application of motive power thereto.

8. In a cigarette making machine, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including an endless belt formed of elastic material, a pair of rollers upon which the belt is mounted, and means for driving one of the rollers to move its respective belt, the outer surfaces of said belts being designed for cooperation in the straight-away portion for shaping cylindrical cigarette stock therebetween, means for supporting a supply of continuous paper strip stock for introduction to the belts, a moistening device mounted for tilting movement in the vicinity of the strip stock being introduced to the belts, said moistening device being provided with an applicator spout designed to normally remain out of contact with the strip stock when the moistening device is tilted in one direction and to operatively engage the stock when the moistening device is tilted in the other direction, an arm mounted on the moistening device and projecting therefrom, and a roller mounted on the arm and engaging the driven belt for actuating the moistening device upon tensioning and consequent distortion of the belt due to the application of motive power thereto.

9. In a cigarette making machine, a pair of cooperating carriers positioned adjacent each other and defining therebetween a common straight-away portion, each carrier including an endless belt formed of elastic material, a pair of rollers upon which the belt is mounted, and means for driving one of the rollers to move its respective belt, the outer surfaces of said belts being designed for cooperation in the straight-away portion for shaping cylindrical cigarette stock therebetween, means for supporting a supply of continuous paper strip stock for introduction to the belts, a moistening device mounted for tilting movement in the vicinity of the strip stock being introduced to the belts, said moistening device being provided with an applicator spout movable into and out of operative engagement with the strip stock when the moistening device is tilted in opposite directions respectively, spring means normally urging the moistening device to a position wherein the spout is in its inoperative position, an arm mounted on the moistening device and projecting therefrom, and a roller mounted on the arm and engaging the driven belt on the inside surface thereof for causing tilting movement of the moistening device against the action of said spring means upon tensioning of the belt due to the application of motive power thereto.

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