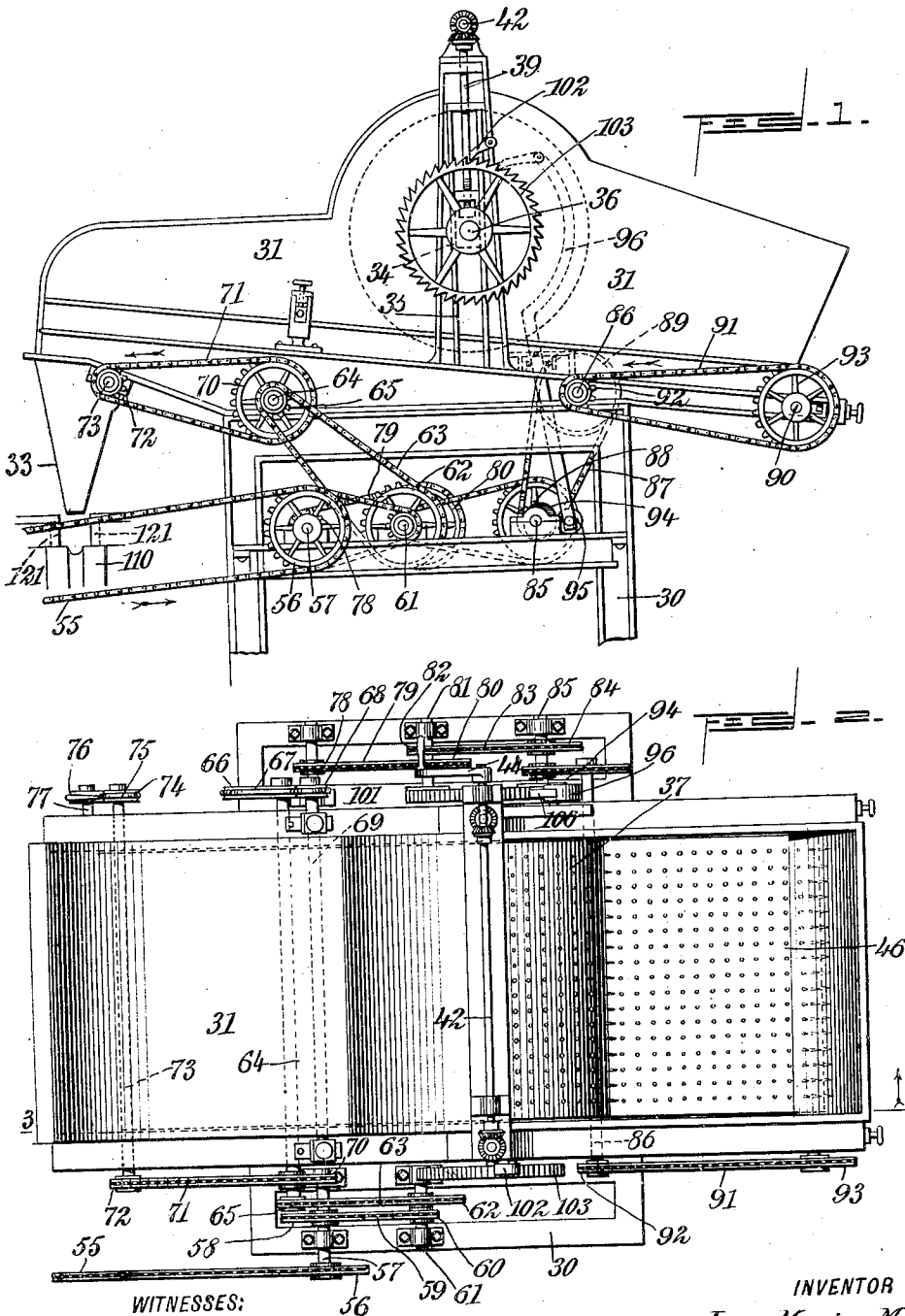


No. 836,519.

PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 1.



WITNESSES:

William F. Goebel.

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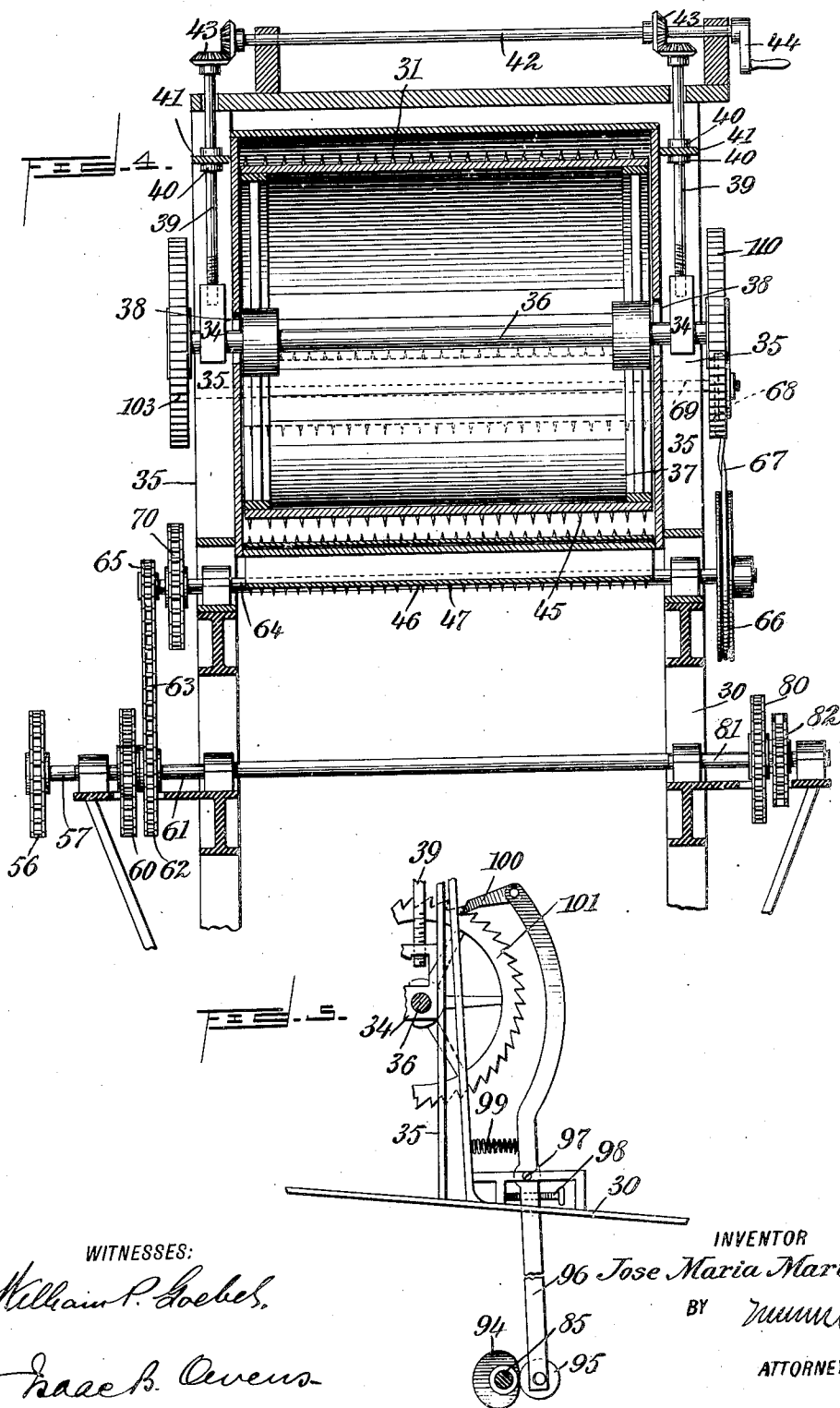
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J. M. MARTINEZ.
CIGARETTE MACHINE.

APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 3.



WITNESSES:

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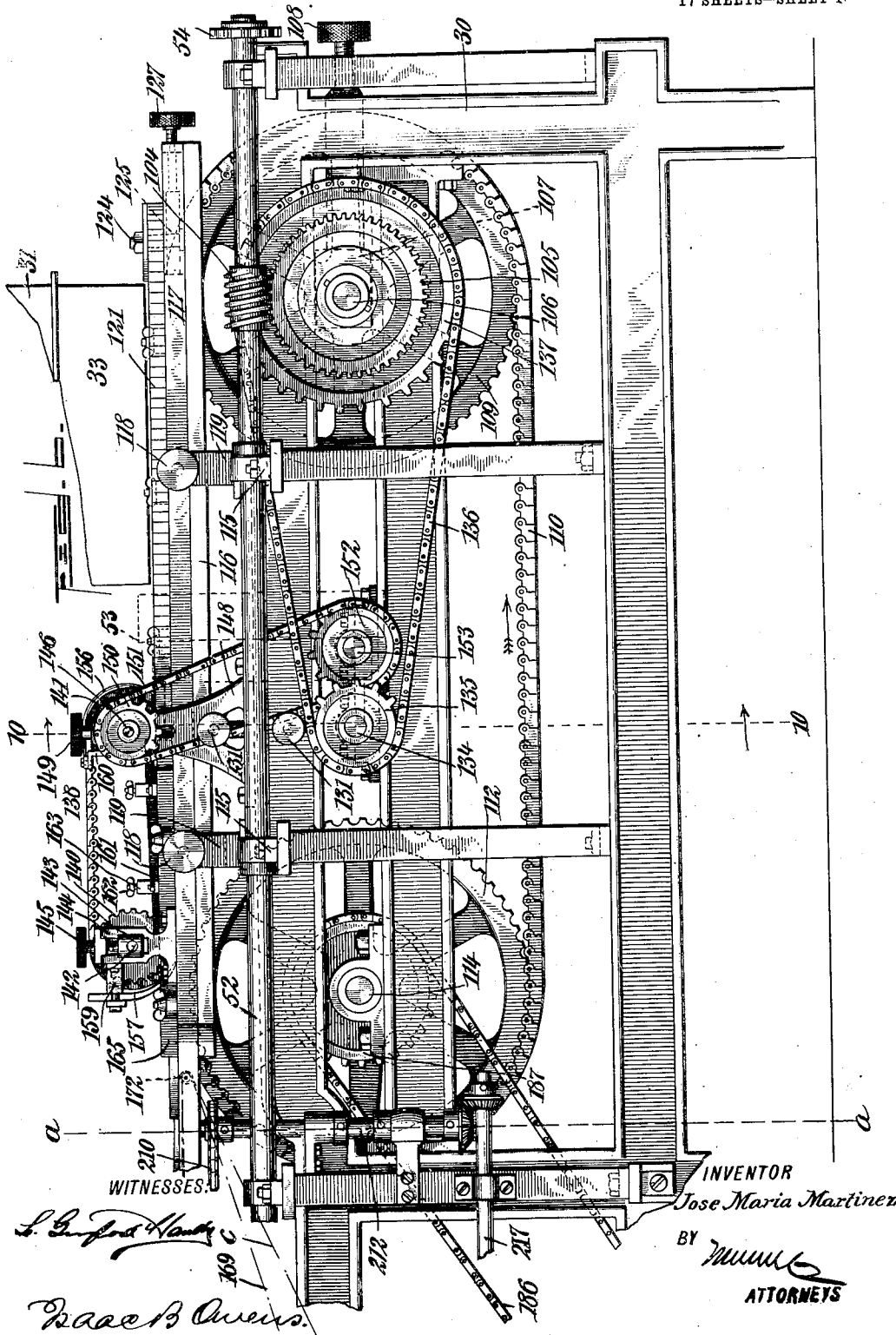
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PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.

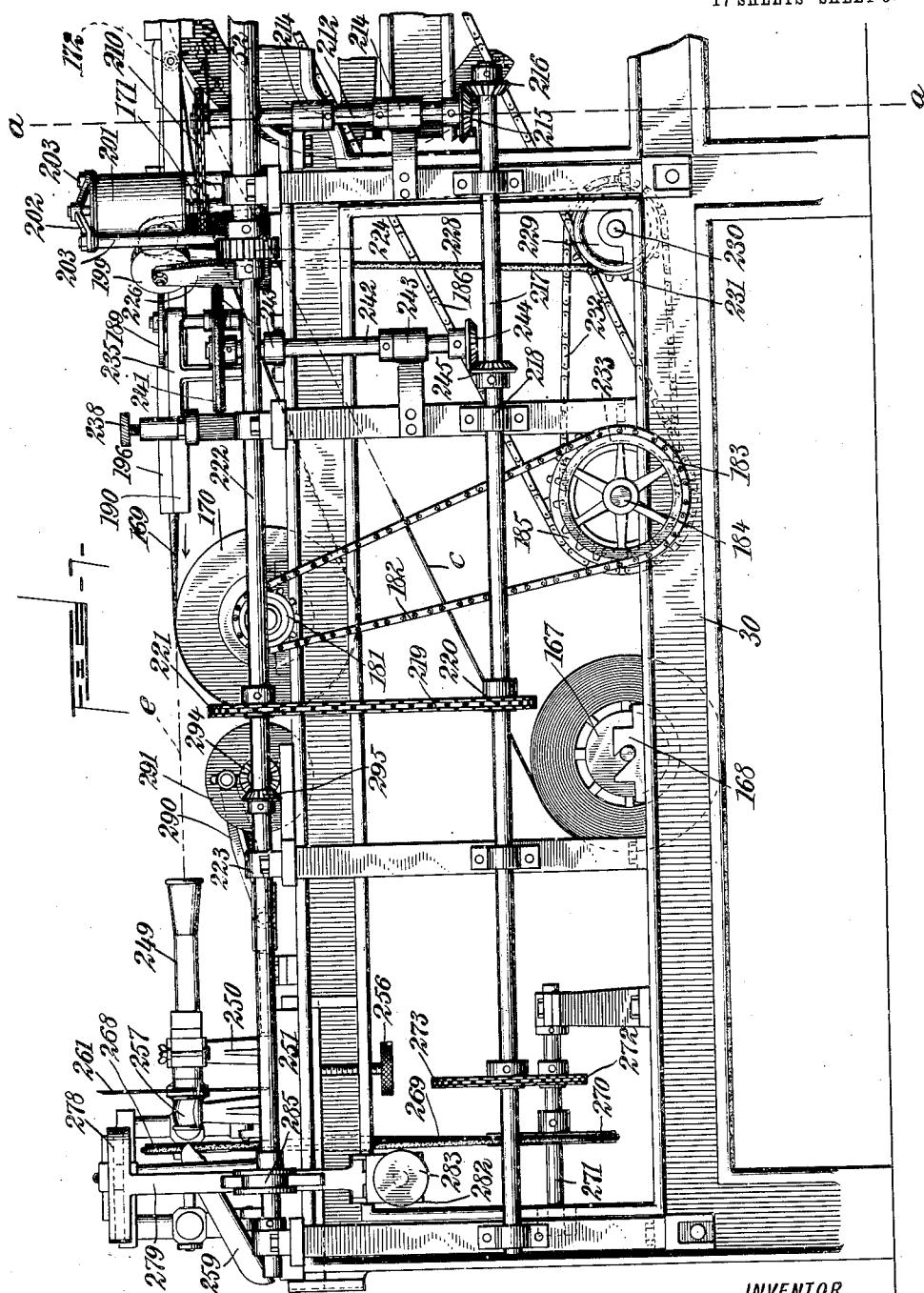
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 4.



PATENTED NOV. 20, 1906.

17 SHEETS—SHEET 6.



WITNESSES:

L. Gifford Handy

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INVENTOR

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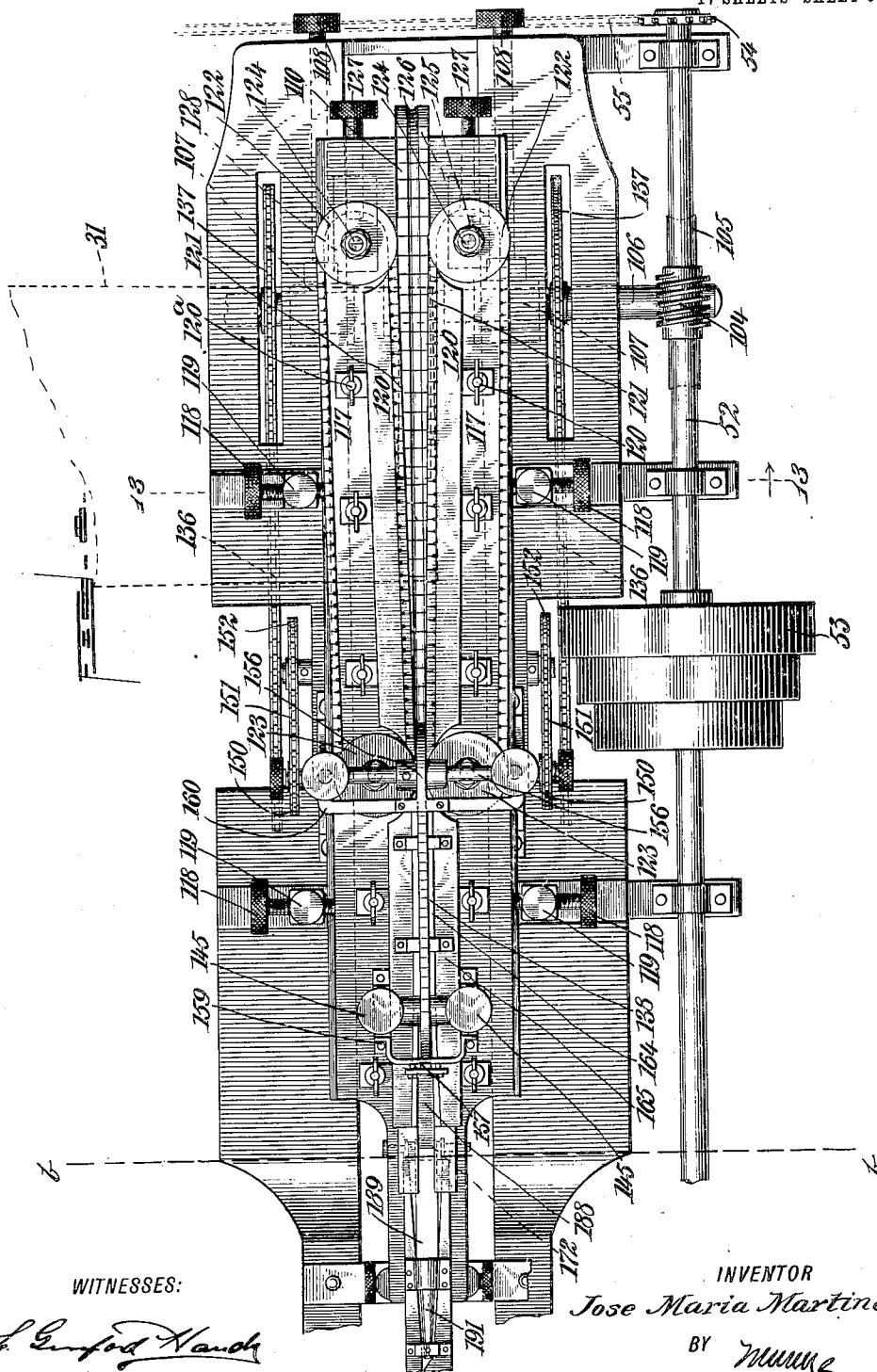
BY *Mumma*
ATTORNEYS

No. 836,519.

PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 6.



WITNESSES:

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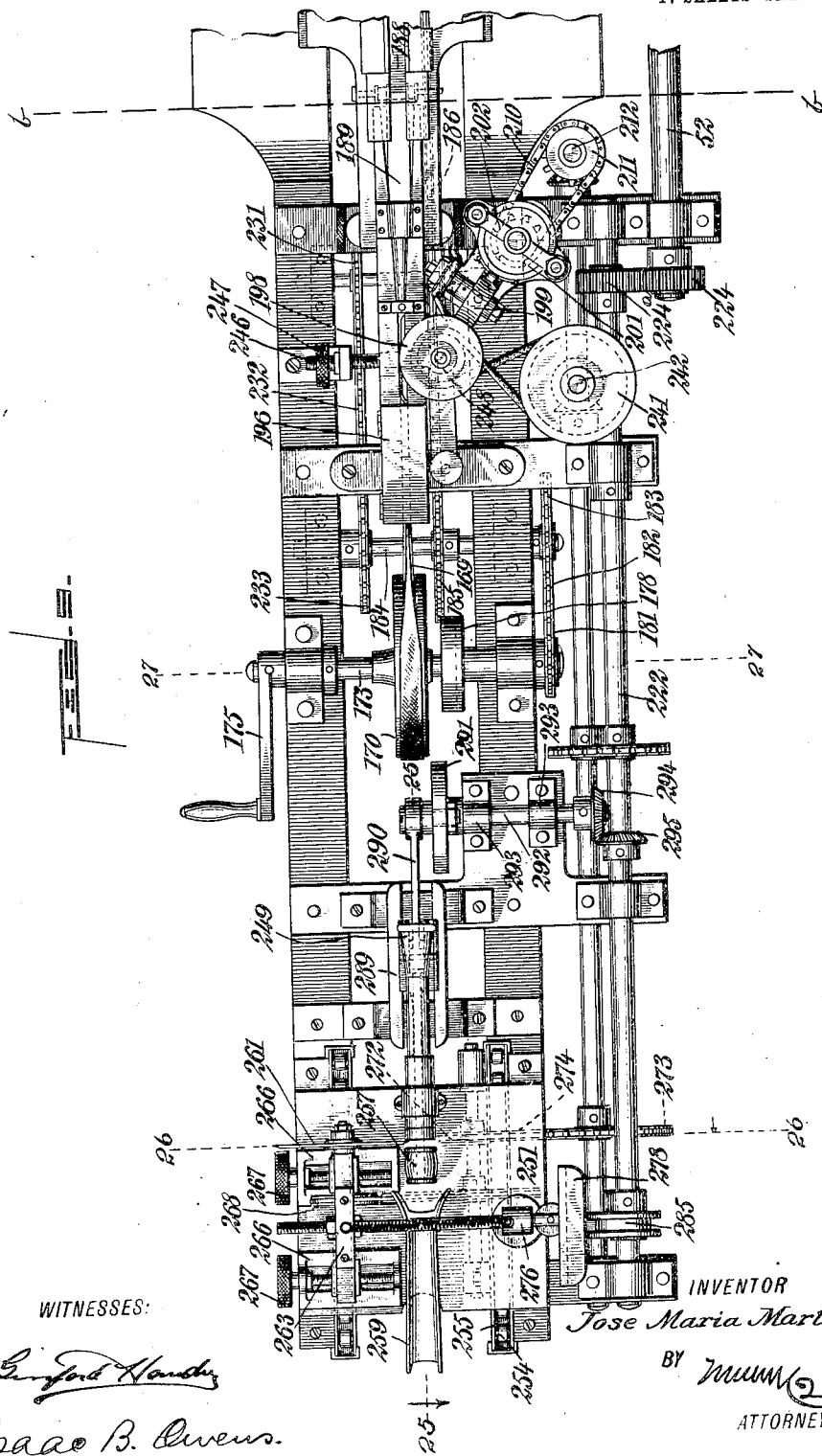
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J. M. MARTINEZ.
CIGARETTE MACHINE.

APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 7.



WITNESSES:

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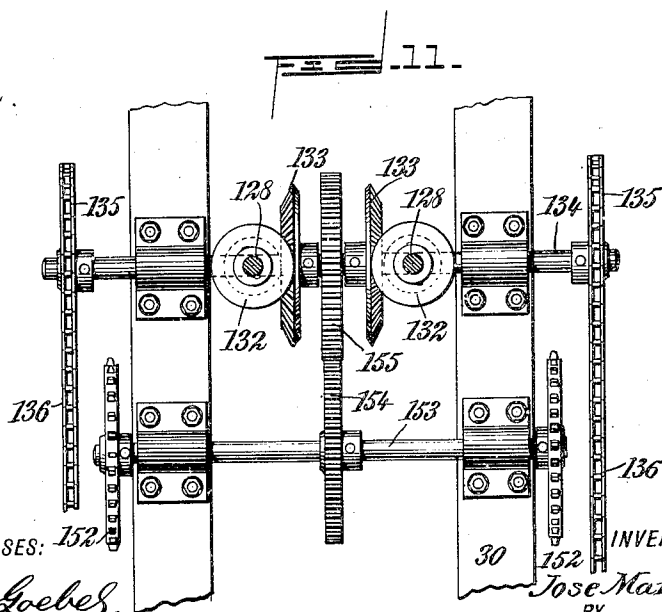
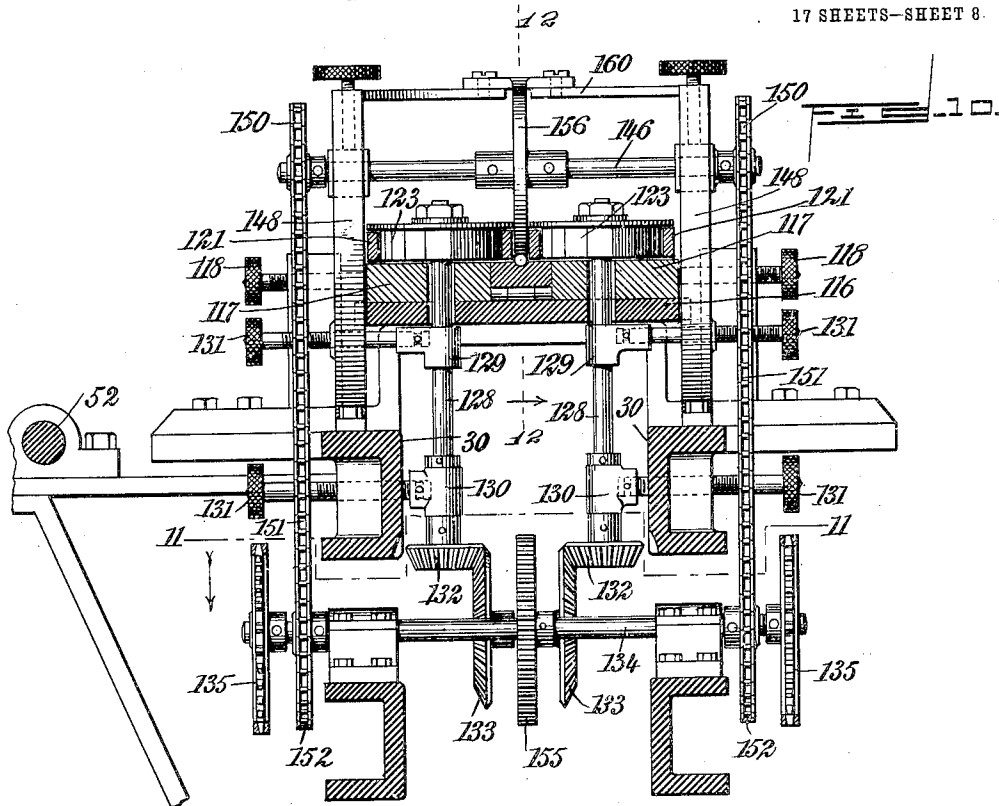
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PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.

APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 8.



WITNESSES:

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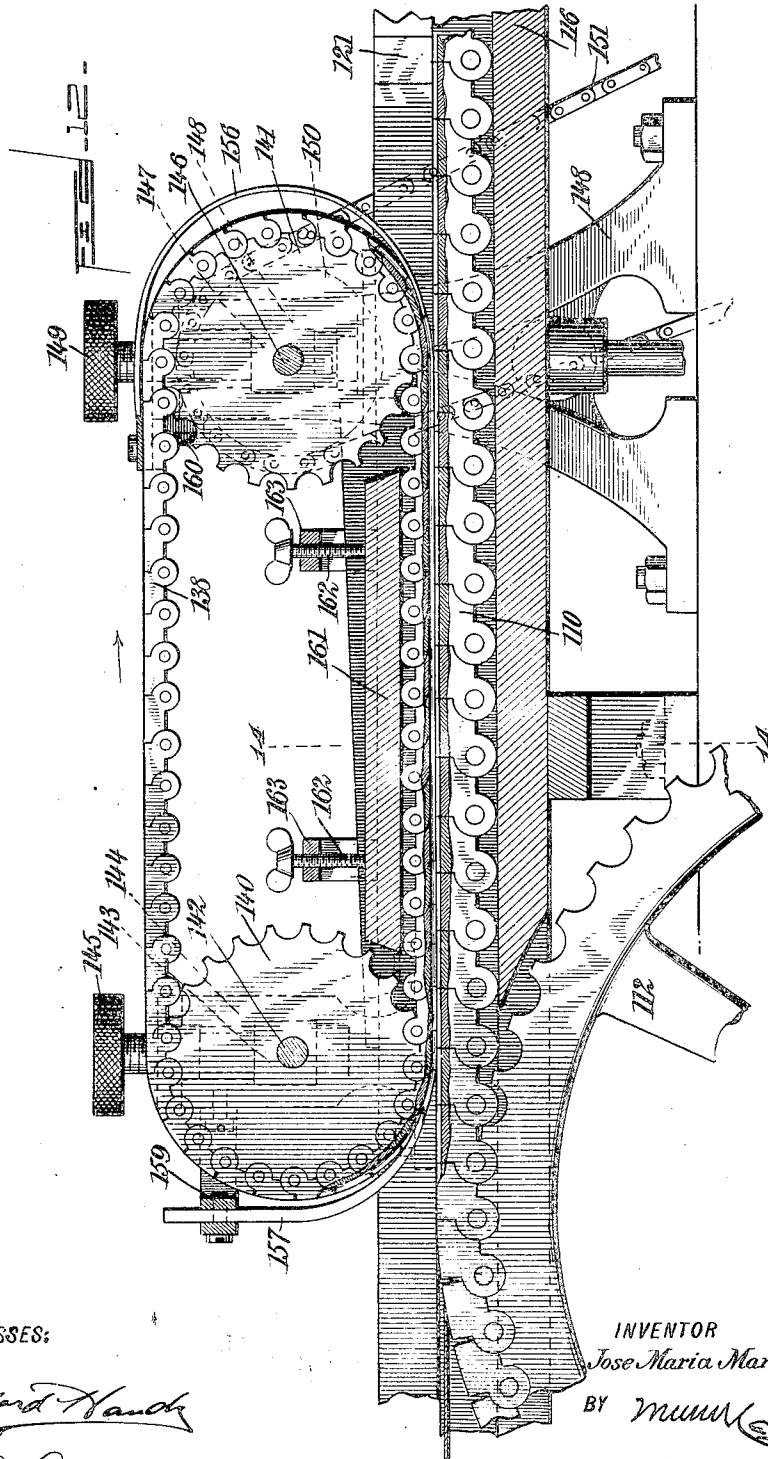
ATTORNEYS

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PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 9.



WITNESSES:

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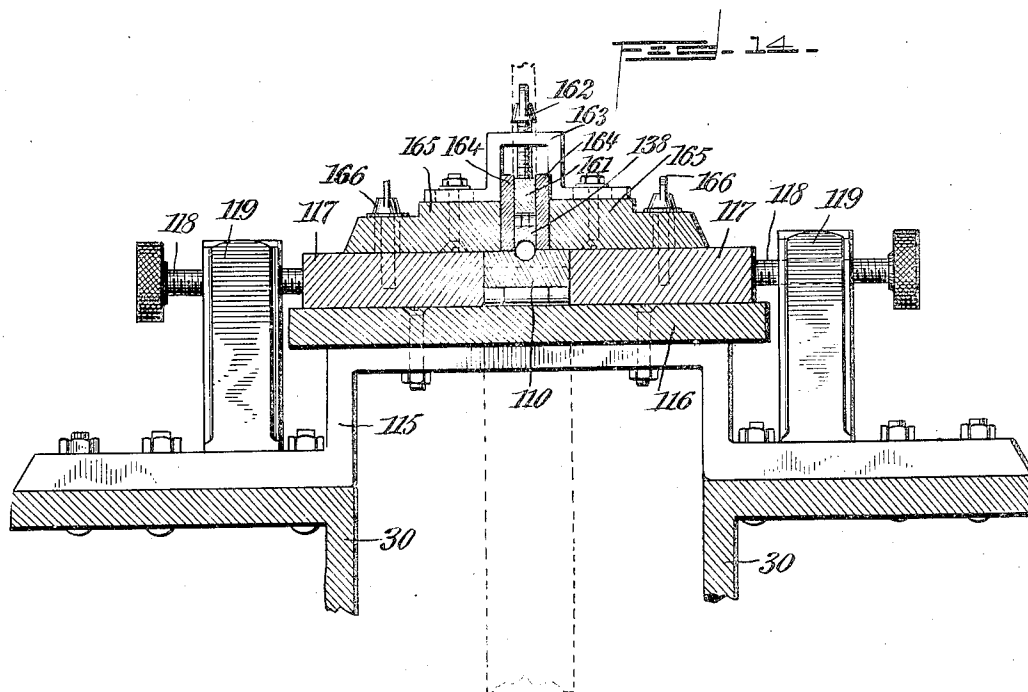
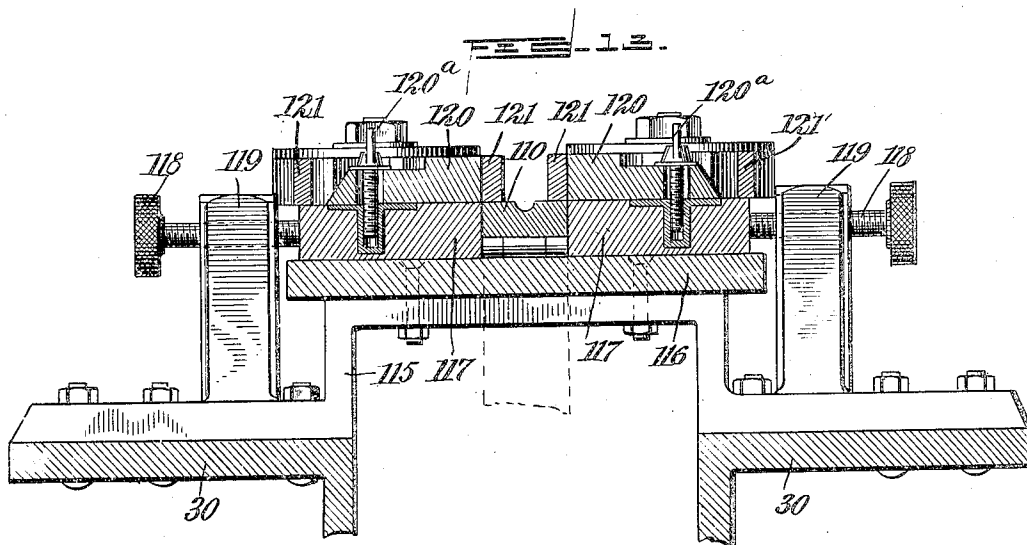
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PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.

APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 10.



WITNESSES:

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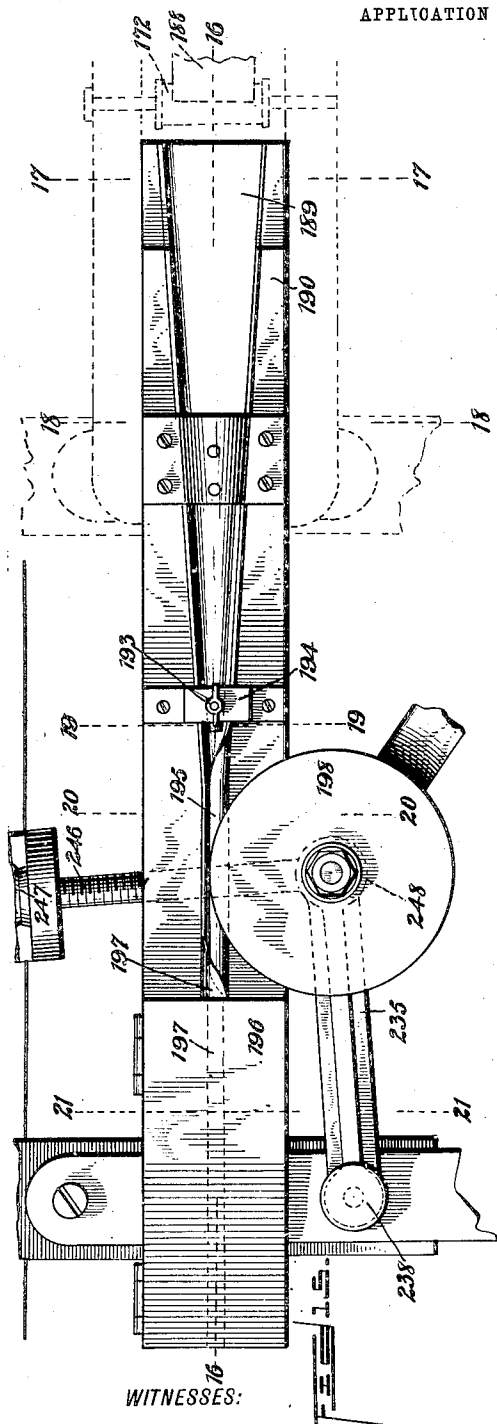
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CIGARETTE MACHINE.

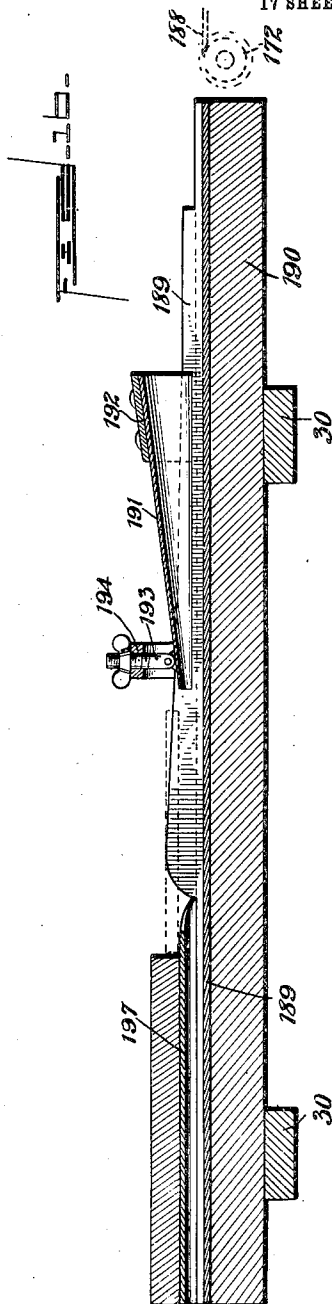
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 11.



WITNESSES:

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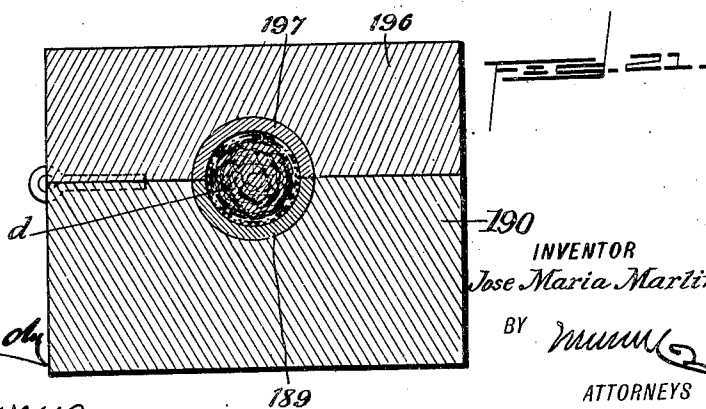
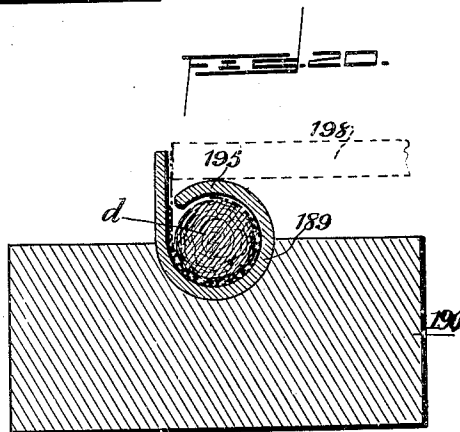
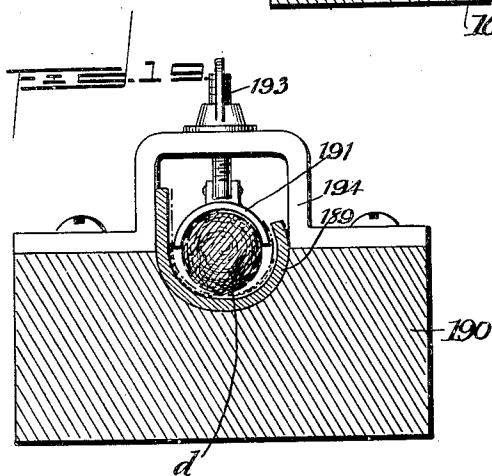
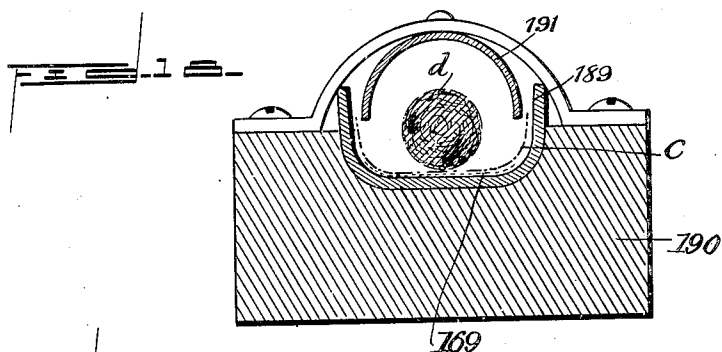
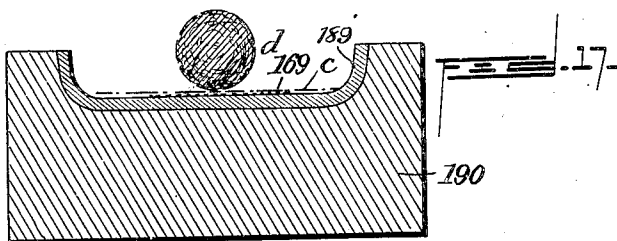
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PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.

APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 12.



WITNESSES:

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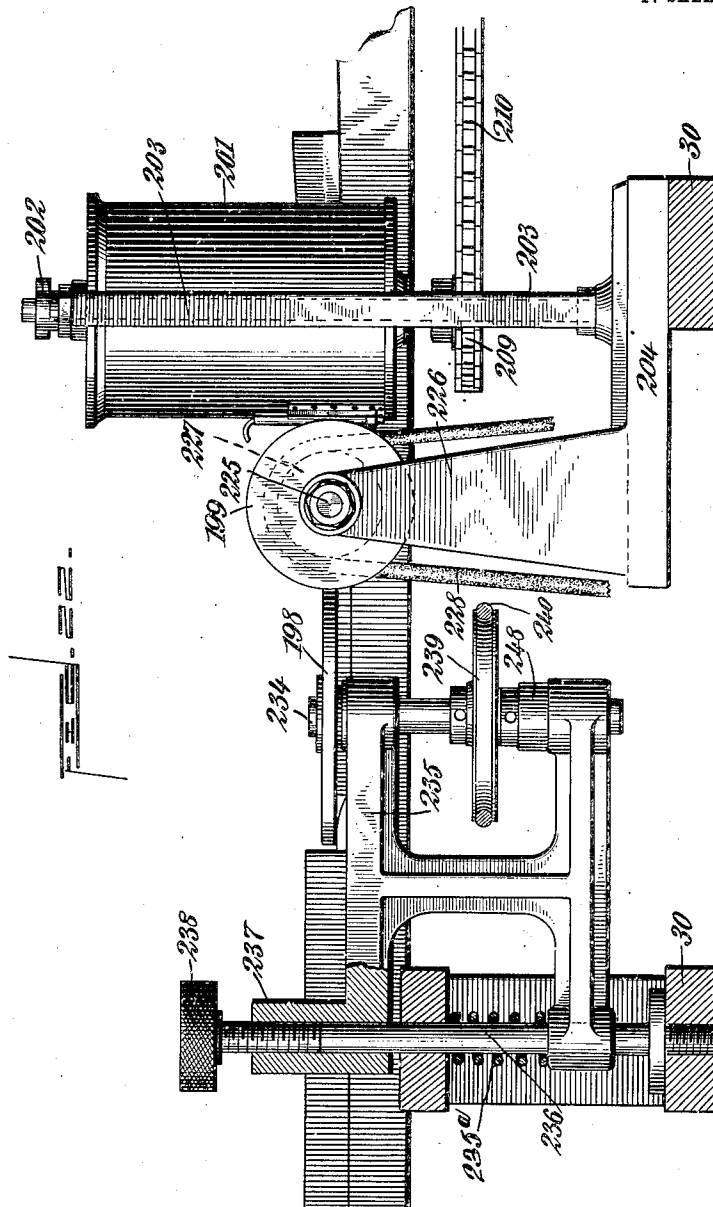
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No. 836,519.

PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 13.



WITNESSES:

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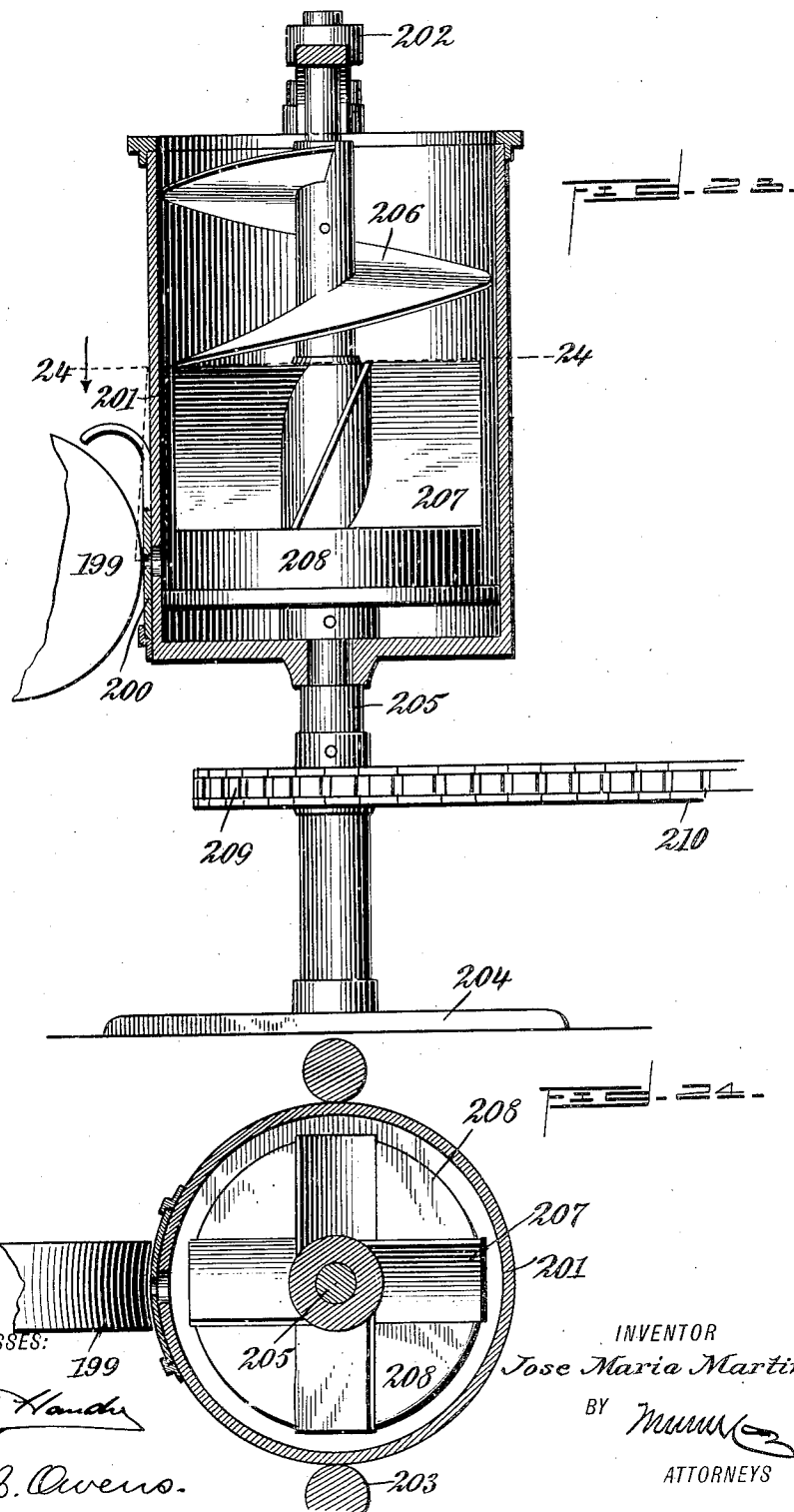
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No. 836,519.

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J. M. MARTINEZ.
CIGARETTE MACHINE.
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 14



WITNESSES:

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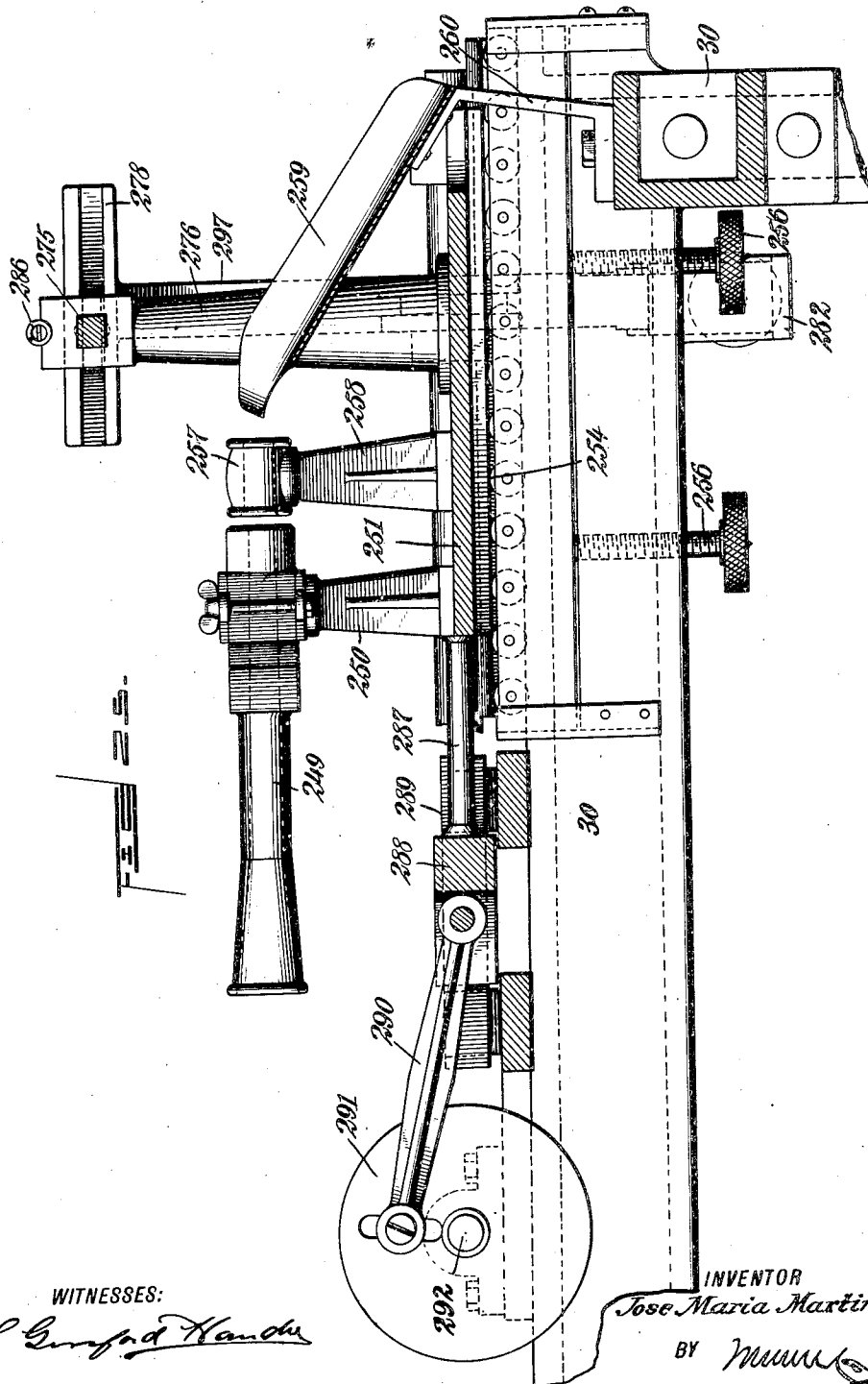
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PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.

APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 15.



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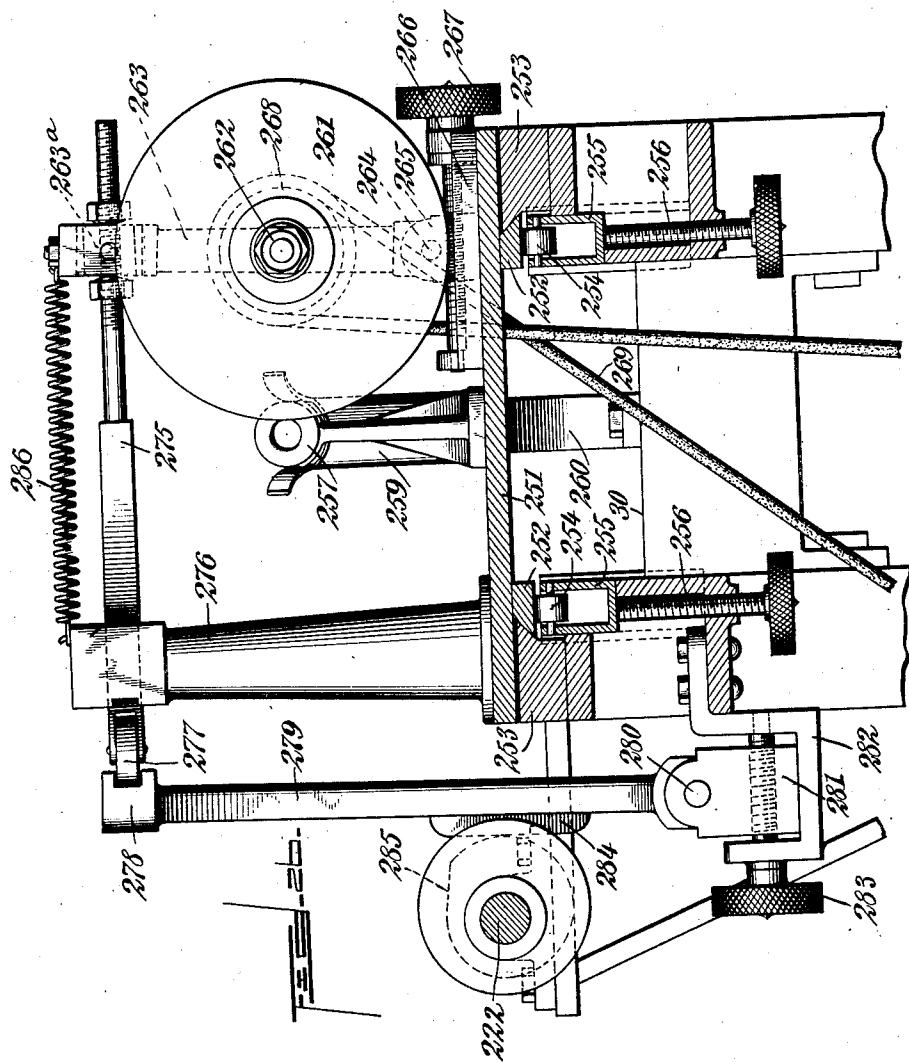
ATTORNEYS

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PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.
APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 16.



WITNESSES:

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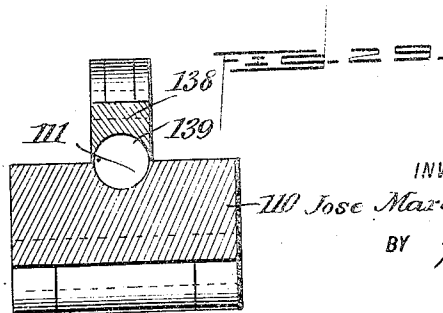
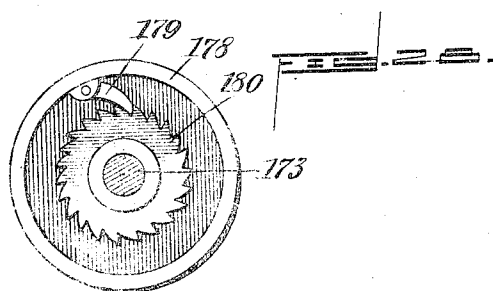
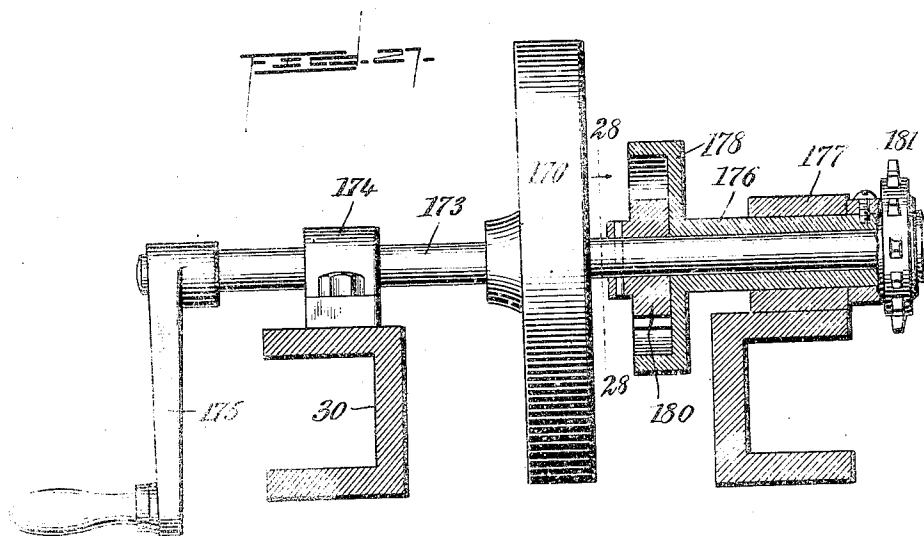
No. 836,519.

PATENTED NOV. 20, 1906.

J. M. MARTINEZ.
CIGARETTE MACHINE.

APPLICATION FILED OCT. 31, 1904.

17 SHEETS—SHEET 17



WITNESSES:

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UNITED STATES PATENT OFFICE.

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CIGARETTE-MACHINE.

No. 836,519.

Specification of Letters Patent.

Patented Nov. 20, 1906.

Application filed October 31, 1904. Serial No. 230,674.

To all whom it may concern:

Be it known that I, JOSÉ MARIA MARTINEZ, a subject of the King of Spain, and a resident of Guanajay, Cuba, have invented a new and Improved Cigarette-Machine, of which the following is a full, clear, and exact description.

The underlying object of my invention is to construct an organized cigarette-making machine by means of which the fibered tobacco may, in a continuous operation, be fed uniformly, molded into stick or cigarette form, enveloped and sealed in paper or other wrapper, cut into the requisite lengths, and discharged finished from the machine. In attaining this end I provide an organism of elements comprising a receiving-hopper in which are located peculiar devices for uniformly disposing and feeding the fibered tobacco, these devices discharging between peculiarly - arranged forming - chains, which travel continuously and together, so as to form the tobacco into a roll or stick, which passes continuously through the various succeeding operations. After this the roll or stick of tobacco is enveloped by a continuously-supplied web of paper or other material forming the wrapper of the cigarette, and as this wrapper is closed around the tobacco it is, without arresting the movement of the tobacco, sealed securely, and from the point of sealing the long stick of tobacco and paper is carried on without interruption to a mechanism for automatically cutting this stick into lengths to produce the finished cigarette. All of these elements are geared with a single prime mover to operate in true synchronism, thus producing a strictly automatic and continuously-operating mechanism.

The invention resides in certain features of structure and organization, which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is had to the accompanying drawings, which illustrate, as an example, the preferred embodiment of my invention, in which drawings like characters of reference indicate like parts, and in which—

Figure 1 is a front end elevation showing the mechanism for distributing and feeding the tobacco in position with respect to the device for forming or molding the fibered tobacco. Fig. 2 is a plan view of these parts. Fig. 3 is an enlarged section on the line 3 3 of Fig. 2. Fig. 4 is a cross-section on the line 4 4 of Fig. 3. Fig. 5 is a fragmentary eleva-

tional view illustrating in detail the devices for imparting to the distributing-drum its characteristic movement. Figs. 6 and 7 constitute a side elevation of the entire machine, excepting the whole of the distributing and feeding devices, said Figs. 6 and 7 dividing the machine into two lengths along the broken lines *a a* in Figs. 6 and 7. Figs. 8 and 9 constitute a plan view of the entire machine, excepting the distributing and feeding devices, these figures dividing the machine into two parts on the broken line *b b* in Figs. 8 and 9. Fig. 10 is a cross-section of the machine on the line 10 10 of Fig. 6. Fig. 11 is a fragmentary sectional plan looking down from the line 11 11 of Fig. 10. Fig. 12 is an enlarged side elevation showing the two forming or molding chains, parts of the chains being broken away where they directly coact and other parts being shown in section along the line 12 12 of Fig. 10. Fig. 13 is an enlarged section on the line 13 13 of Fig. 8, showing the bottom mold-chain and the converging side mold-chains, together with devices for guiding and supporting them. Fig. 14 is an enlarged section on the line 14 14 of Fig. 12, showing the engagement of the upper and lower forming-chains and illustrating the adjacent supporting and guiding parts. Fig. 15 is an enlarged plan view of the device for rolling up the paper and the carrier-apron in tubular form around the tobacco and also illustrating the position of the gumming-roller with respect to these parts. Fig. 16 is a section on the line 16 16 of Fig. 15. Figs. 17, 18, 19, 20, and 21 are respectively cross-sections on the lines 17 17, 18 18, 19 19, 20 20, and 21 21 of Fig. 15, these views illustrating the said means for rolling up the paper and its carrier-apron and also illustrating the formed stick of tobacco and the various operations incident to the sealing of the paper around the same. Fig. 22 is a fragmentary elevation of the gumming devices. Fig. 23 is a section through the receptacle for the gum or other sealing substance and showing the agitating and gum-feeding devices therein. Fig. 24 is a section plan on the line 24 24 of Fig. 23. Fig. 25 is a sectional elevation showing the devices for cutting the stick of tobacco and paper into lengths to form the finished cigarette, the section being on the line 25 25 of Fig. 9. Fig. 26 is a cross-section of the same parts on the line 26 26 of Fig. 9. Fig. 27 is a detail cross-section on the line 27 27 of Fig. 9, par-

particularly showing the mechanism by means of which the paper-carrying apron may be moved independently of the other parts of the machine to facilitate starting the operation. Fig. 28 is a detail sectional elevation on the line 28 28 of Fig. 27, and Fig. 29 is an enlarged cross-section showing the upper and lower tobacco-forming chains and illustrating particularly the matching grooves therein which form the cylindric roll or stick of tobacco.

The apparatus is provided with a suitable framing 30, furnishing supports for the various parts. This framing is of any desired construction.

I will first describe the devices for receiving, distributing, and feeding the tobacco, which are illustrated best in Figs. 1 to 5. Sustained on the frame 30 is a hopper 31, ranging transversely of the line of movement of the cigarette-making materials through the machine and having a receiving-opening 32 and a discharge-spout 33, which latter is elongated or duck-bill in form and lies directly over the tobacco-forming devices, as indicated in Figs. 1, 3, and 6. In Fig. 8 the position of the hopper 31 with respect to the other parts is indicated by broken lines. Mounted in bearings 34, which slide in vertical guides 35 rising from the frame 30, is a shaft 36 of the distributing-drum 37, the drum lying within the hopper 31 approximately midway the length thereof and the shaft 36 passing through openings 38, formed in the sides of the hopper to allow for the vertical adjustment of the drum. This adjustment is effected by means of threaded shafts 39, engaged in the bearings 34 and mounted, by means of collars 40, to turn, but not to slide, in a cross-piece 41 at the top of the guides 35. The shafts 39 are connected by means of a second shaft 42 and miter-gears 43, so that the said shafts turn in unison, and 44 indicates a crank or other means for manually imparting rotary movement to the parts 42 and 39, thus raising or lowering the bearings 34. As shown in Figs. 2, 3, and 4, the drum 37 is provided on its periphery with cards or teeth 45, which are adapted to engage the tobacco and assist in distributing the same, as will be hereinafter fully set forth.

Running along the bottom of the hopper 31 below the drum 37 is an endless apron 46, having on its surface cards 47, similar to the cards 45. This apron travels around the rollers 48, suitably mounted on the hopper. Over the apron 46, toward the discharge end thereof, is a second drum 49, having cards 50 on its periphery. This drum is adapted to rotate, as indicated by the arrow, and coacts with the carded apron. The carded apron 46 leads to the discharge-chute 33, and at this point a rotary brush 51 is located, which serves to clear from the apron the fibered tobacco. The tobacco being charged into the

hopper through the opening 32 will be taken up by the apron 46 and in passing under the drum 37 will be evenly distributed thereby. The roller 49 assists in this operation and carries upward and back to the apron any particles which do not lie in proper position. From this point the tobacco goes on to the discharge-spout 33, where it is thrown from the apron by the action of the roller 51.

The main drive-shaft or prime mover 52 is best shown in Figs. 6 and 8 and is mounted alongside of the frame in suitable bearings sustained thereon. This shaft, as shown by broken lines in Fig. 6 and full lines in Fig. 8, is provided with the usual cone-pulleys 53 or with other means for imparting rotary movement to the shaft. At its front end the shaft is provided with a sprocket 54, (see Figs. 6 and 8,) and over this sprocket runs a chain 55. (See full lines in Figs. 1 and 2 and broken lines in Fig. 8.) Said chain 55 passes around a sprocket 56 on a shaft 57, revolvably mounted in the frame 30 below the hopper 31. Said shaft 57 (see Figs. 1 and 4) carries at one side of the hopper 31 a sprocket 58, (see Fig. 2,) over which runs a chain 59 to a sprocket 60 on a short shaft 61, revolvably mounted in the frame. The shaft 61 carries a sprocket 62, over which runs a chain 63 to a sprocket 65 on the shaft 64. The shaft 64 passes transversely under the hopper 31 and at the end opposite the sprocket 65 carries a grooved wheel 66, over which a belt 67 passes to a grooved wheel 68 on the shaft 69 of the roller 49, thereby driving the roller. The shaft 64 also carries a sprocket 70, over which runs a chain 71 to a sprocket 72 on a shaft 73, revolvably mounted in the discharge end of the hopper and carrying at the end opposite the wheel 72 a grooved pulley 74, over which runs a belt 75 to a corresponding pulley 76, attached to the shaft 77 of the brush 51. In this manner the brush is driven. The shaft 57 also carries a sprocket 78 at the end opposite the sprocket 56, and over this sprocket a chain 79 runs to a sprocket 80 on a shaft 81, revolvably mounted in the frame 30. Fastened to the shaft 81 is a sprocket 82, carrying a chain 83, which leads to a sprocket 84 on a shaft 85, also revolvably mounted in the frame 30 and driving a shaft 86 (mounted just below the bottom of the hopper 31) by means of a chain 87 and sprockets 88 and 89. From this shaft 86 the shaft 90 of the roller 48 is driven through the medium of a chain 91 on sprockets 92 and 93. In this manner the apron 46 is driven. The shaft 85 carries a cam 94, (see Figs. 1, 2, and 5,) which acts against a roller 95, mounted on the lower end of a lever 96, which is fulcrumed at the point 97 on the frame 30. The lever 96 extends vertically and carries a screw 98, which limits its movement in one direction. 99 indicates an expansive spring bearing against the lever to move it contrary

to the cam 94. In this manner a vibratory movement is imparted to the lever. At its upper end the lever carries a pawl 100, engaging a ratchet-wheel 101, fastened to the shaft 36 of the drum 37. By these devices the drum is given the intermittent rotary movement above described. 102 (see Figs. 1 and 2) indicates a dog suitably mounted on the frame and acting against a ratchet 103, attached to said shaft 36 and serving to prevent backward movement of the drum 37.

I will next describe the devices for forming the fibrous tobacco into the roll or stick mentioned hereinbefore. The prime mover 52 carries a worm 104 in mesh with a worm-wheel 105, fastened to the shaft 106, revolvably mounted transversely on the frame 30 by bearings (indicated by the broken lines 107 in Figs. 6 and 8) and adjustable by means of screws 108, also shown in said views. This shaft 106 carries a large sprocket-wheel 109, on which runs the forward end of the lower forming-chain. This chain is constructed of lags 110, hingedly connected and provided, as shown best in the detail Fig. 29, with a semicircular groove 111, running along the face of the chain. The rear end of the chain is carried on a large sprocket 112, mounted on a transverse revoluble shaft 114, suitably mounted in the frame. The lower forming-chain is thus given a continuous movement in the direction of the arrow indicated in the drawings, particularly Fig. 6.

As shown best in Figs. 6, 10, and 13, two or more bridge-pieces 115 run from the frame 30 and support a table 116, which extends longitudinally of the machine and over the top of which passes the upper run of the lower forming-chain. On the table 116 at each side of said chain are located guide-pieces 117, which are adjustable toward the chain by means of screws 118, operating in arms 119, rising from the frame. These guide-pieces 117 form a passage through which the chain runs. Lying on top of the guide-pieces 117 are guide-pieces 120, which are adjustably held by means of screws 120^a, passing into the guides 117. The guide-pieces 120 converge toward the discharge end of the machine, and running along their inner or adjacent faces are horizontally-extending endless lag-chains 121, which following the guides 120 also converge toward the discharge end of the machine. The inner runs of the lag-chains 121 travel over the top of the bottom chain, 110 and form, with said bottom chain, a trough adapted to receive the fibred tobacco from the discharge-chute 33 of the hopper 31. The lag-chains 121 pass around carrying-rollers 122 and 123. The guide-rollers 122, located toward the receiving end of the machine, are mounted on stub-shafts 124, which pass through slots in the guides 117 and are carried in sliding blocks. (Indicated by the broken lines 125 in

Fig. 8.) These blocks fit in elongated cavities in the guides 117, said cavities being indicated by the broken lines 126 in Fig. 8, and engaged with the blocks 125 are adjusting-screws 127, by means of which the stub-shafts 124 and the rollers or sheaves 122 may be adjusted to regulate the tension of the chains 121. The rollers 123, as best shown in Fig. 10, are carried on vertically-extending revoluble shafts 128, which are mounted in bearings 129 and 130, these shafts extending through the guides 117 and table 116 and the bearings 129 and 130 being located below the same. Said bearings are supported by adjusting-screws 131, operating in the framing of the machine, and by these means the shafts 128 and sheaves or rollers 123 may be adjusted slightly toward and from each other. The forming or guiding belts or chains 121 are driven through the medium of the shafts 128 and sheaves 123, and the said shafts receive their rotary movement through bevel-gears 132, attached to their lower ends and meshed with corresponding gears 133, attached to a shaft 134, revolvably mounted in the frame. The said shaft is driven through sprockets 135, attached to the ends of the shaft and carrying chains 136, which run over sprockets 137, attached to the shaft 106. The top run of the chain 110 and the inner runs of the chains 121 moving, therefore, at the same speed and converging at their rear ends the tobacco delivered into the space between these chains from the spout 33 is gradually contracted in bulk and forced together tightly, and at the rear ends of the chains 121 the chains disengage the tobacco, while the top forming-chain 138 then runs into engagement with the tobacco. This top chain is formed of lags hinged together the same as the bottom chain 110, and the face of the chain is formed with a groove 139, matching with the groove 111 in the chain 110, so as to form a circular inclosure. (Best illustrated in Fig. 29.) The top forming-chain 138 extends from the termination of the chains 121 to the termination of the lower or main chain 110, and said chain 138 is carried on sprockets 140 and 141. (See Figs. 6 and 12.) The sprocket 140 is mounted on a shaft 142, extending horizontally, and is carried in boxes 143, vertically movable in supports 144 at each side of the sprocket 140. Said boxes 143 are adjustable by means of screws 145. The sprocket 141 is carried on a shaft 146, revolvably mounted in boxes 147, that in turn slide in guides 148, and the boxes are adjustable by screws 149, similar to the parts described in connection with the sprocket 140. Movement is imparted to the chain 138 through the sprocket 141, and thus in turn is driven by sprockets 150, attached to the shaft 146. Over the sprockets 150 a chain 151 runs, which is driven from the sprockets 152, fast on the ends of a shaft 153,

which is revolubly mounted transversely in the frame. The shaft 153 takes its motion from the shaft 134 through the medium of spur-gears 154 and 155, fastened, respectively, on the shaft and meshed with each other, as best shown in Fig. 11.

156 and 157 indicate guards which pass around the outer portions of the sprockets 140 and 141 to prevent particles of tobacco from engaging all parts of the chain 138 excepting the bottom run thereof. These guards are sustained in position by means of brackets 159 and 160, projecting from the supports 144 and 148. The bottom run of the chain 138 is pressed down tightly on the top run of the chain 110 by means of a shoe 161, which bears on the upper side of the bottom run of said chain 138 and is itself held in position by screws 162, operating in bridge-pieces 163, attached to the frame. (See Figs. 12 and 14.)

The guides 117, as shown in Figs. 8, 13, and 14, pass rearward to the rear extremity of the chain 138, while the guides 120, as shown in Fig. 8, terminate at the sheaves 123. The lower run of the chain 138 is prevented from lateral displacement by means of guiding-walls 164, lying vertically along each side of the guide-chain and alongside of the shoe 161. (See Figs. 8 and 14.) Outside of the guide-walls 164 guide members 165 are adjustably placed on top of the guides 117 and are held by means of screws 166. It will therefore appear that when the loose fibered tobacco is deposited into the machine upon the chain 110 and between the guide-chains 121 it is carried rearward by these chains and is gradually compressed until finally the chains 121 leave the tobacco and the chain 110 carries the compressed tobacco under the chain 138, whereupon the two chains 110 and 138, co-acting as described, finish the compression of the tobacco and form it into a tight roll or stick of circular cross-sectional form.

I will next describe the devices for inclosing this stick of tobacco in its wrapper of paper or other material and for sealing the same. 167 indicates a reel which is removably and revolubly placed in bearings 168, attached to the frame, this reel carrying the paper wrapper *c* in a continuous web. 169 indicates a paper-carrying apron which may be formed of any desired material, such as linen. The apron 169 is endless and passes around a pulley 170 over a guide-roller 171 and around a small roller 172, located at the rear end of the chain 110, as shown best in Figs. 6 and 7. The upper extremities of the rollers 170 and 172 lie in the same horizontal plane, so that the upper run of the paper-carrying belt passes horizontally. The web of paper *c* from the reel 167 passes also around the roller 172 outside of the apron 169 and passes along the upper run of said apron on top of the same, as will hereinafter fully ap-

pear. Rotary movement is imparted to the pulley 170 to cause the continuous movement of the apron 169 and of the paper web in the direction of the arrow. (Indicated in Fig. 7.) To impart this movement and to allow also for the manual driving of the apron 169, I provided devices. (Best shown in Fig. 27.) The shaft 173, carrying the pulley 170, is mounted at one side of the frame 30 in a bearing 174 and carries at its side a hand-crank 175. On the other end of the shaft 173 a sleeve 176 is loosely mounted. This sleeve in turn is mounted in a box 177, attached to the frame. The sleeve 176 carries a drum 178, inside of which is pivoted a pawl 179. (See Fig. 28.) This pawl coacts with a ratchet 180, keyed to the shaft 173. Power is imparted to the pulley 170 through a sprocket 181, which is keyed on the sleeve 176. It will be observed that in this manner the pulley 170 may be power-driven in one direction only. It also will be observed that by turning the drum 178 until the pawl 179 lies at the bottom and drops from engagement with the ratchet 180, and then operating the hand-crank 175 the pulley 170 may be turned in either direction independently of the driving-sprocket so as to start or adjust the belt 169. This arrangement is useful particularly upon starting the operation of the machine when it may be desired to move the belt 169 independently of the other parts so as to bring the paper *c* into the tubulating or curling device, which will be hereinafter described. Passing over a sprocket 181 is a chain 182, which extends downward around the sprocket 183, carried on the shaft 184, revolubly mounted transversely in the machine. This shaft 184 carries a second sprocket 185, over which passes a chain 186, running up to the sprocket 187, fastened on the shaft 114. (See Fig. 6.) In this manner the pulley 170 is driven during the normal operation of the machine.

Referring now to Figs. 15 to 21 in connection with Figs. 7 and 9, the broken lines 188 in Figs. 15 and 16 and full lines 188 in Fig. 9 illustrate a small bridge on which the compressed stick of tobacco moves as it passes from between the chains 110 and 138. This bridge extends to the roller 172, and the paper-apron 169 and paper *c* pass up over the roller 172 and under the bridge 188, so that the tobacco will be deposited on the paper and will run longitudinally along the center thereof. Just rearward of the roller 172 is located a tapering trough 189, over which the apron 169, paper web *c*, and tobacco-stick pass in the manner indicated in Fig. 17. In Figs. 17 to 21 *d* indicates the tobacco. This trough 189 is carried on a support 190, suitably mounted on the frame of the machine, and, as shown in Figs. 15, 16, and 18, above the trough is located a hood 191, which is sustained by a bridge 192, passing over the trough 189 and which has owing to

its resiliency a slight movement at its free end, said movement being controlled by an adjusting-screw 193, operating in a bridge 194, also carried on the support 190. The apron, paper, and tobacco pass under this hood 191, and the trough tapers to the rear extremity of the hood 191, at which point it assumes the cross-sectional form. (Indicated in Fig. 19.) Rearward of this point the trough 189 is provided with a lip 195, (see Figs. 15 and 20,) which curls over the trough to produce an almost tubular cross-sectional form, the lip, however, being spaced from the opposite side of the trough sufficiently to allow one edge of the paper and one edge of the apron to pass freely between the same. Rearward of the lip 195 the trough assumes true semicircular form, as shown in Fig. 21, and hinged to the support 190 is a lid 196, adapted to lie over the rear end of the support and carrying a semicircular inverted trough 197, which matches with the trough 189 to form a true circular guide, as Fig. 21 illustrates. This trough 197, as shown in Fig. 15, projects forward over but spaced from the rear extremity of the lip 195 for a purpose which will hereinafter appear. It will be seen that the paper carried on the apron 169 and the tobacco lying on the paper will be passed through the tapering part of the trough 189, and the paper and its carrying-apron will be gradually raised up, as shown in Figs. 18 and 19. When the lip 195 is reached, the lip will throw down one edge of the paper and apron, as shown in Fig. 20, leaving the other edge exposed, however, so that this second edge running along the gumming-wheel 198 will receive the gum. In this connection it will be observed that the paper lies next to the gumming-wheel. The apron is protected from the gum by the paper alone, the tobacco, paper, and apron continuing their movement until the apron and paper strike the forward end of the inverted trough 197, where the same overlaps the lip 195. This serves to throw down the edge of the paper on which the gum is placed, causing the same to engage the other edge of the paper and finishing the enveloping and sealing of the tobacco. The apron 169, the paper *c*, and the tobacco then pass through the complete tubular guide illustrated in Fig. 21 and emerge from the same at its rear end, the apron then unfolding and lying down flat on the pulley 170 and returning to its work, while the long and continuously-running strip or stick of tobacco incased in paper passes rearward in the machine along the broken line *e* in Fig. 7. It will be observed by reference to Figs. 17 and 21 that the paper web *c* is wider than the apron, so that when the gummed edge of the paper is thrown down onto the other edge of the paper the edges of the apron are not touched

by the gummed portion of the paper, but this instead engages the paper and forms therefor a correct wrapper.

The gumming devices are illustrated best in Figs. 7 and 9, 22, 23, and 24. The gumming roller or disk 198 receives the gum from a feeding-roller 199, which in turn is supplied through a gate 200, removably fitted against the orificed side of a gum-cup 201. In practice several gates 200 are made with different-sized orifices, and by the substitution of these gates the feed may be regulated. The gum-cup 201 is sustained by a cross-piece 202, in turn supported on pillars 203, rising from a bracket 204, mounted on the frame. Within the gum-cup 201 is a vertically-extending revoluble shaft 205, which is fitted with a feed-screw 206 and having blades 207, the latter being set obliquely to the axis of the shaft 205, so as to perform the double function of agitating and feeding the gum. Below the blades 207 and within the cup 201 is located a disk 208, attached to the shaft 205 and having two diameters, as shown in Figs. 23 and 24. The larger diameter is at the lower face of the disk and contacts snugly with the inner walls of the gum-cup and is located below the discharge-orifice of the gum-cup, so as to allow the gum to reach the orifice, but to prevent the gum from reaching the bottom of the gum cup or disk 208, forming a false bottom within the cup. The shaft 205 is mounted at its upper end on the cross-piece 202, and its lower end is stepped in the bracket 204. Said shaft is driven through a sprocket 209, attached to the shaft below the cup 201, and over the sprocket passes a driving-chain 210, which extends also around a sprocket 211, attached to the vertical shaft 212. This shaft is revolubly mounted in boxes 214, supported from the frame, and at its lower end it is provided with a miter-gear 215, meshed with a similar gear 216, attached to the shaft 217. The shaft 217 is mounted in bearings 218, attached to the frame 30, and the shaft extends horizontally along one side of the machine. Said shaft 217 is driven by a sprocket-chain 219, passing over a sprocket 220 on the shaft 217 and a sprocket 221 on a shaft 222, which is mounted in bearings 223 at the top of the frame 30 at one side of the machine and is driven from the prime mover 52 by spur-gears 224 and 224^a. The gum-feeding wheel 199 is mounted on a shaft 225, carried on a pedestal 226, rising from the bracket 204, and this shaft 225 carries a pulley 227, over which a belt 228 passes downward to a pulley 229 on a shaft 230. The shaft 230 extends transversely of and is revolubly mounted on the frame and is driven from the shaft 184 by means of a sprocket 231, over which a chain 232 passes to a sprocket 233 on said shaft 184. The gum-applying wheel 198 is attached to a vertical shaft 234, which is

mounted in a swinging arm 235, loosely sustained on a vertical pin 236, which is rigidly supported on a part of the frame. The arm 235 is provided with a sleeve 237, which projects above the pin 236 and is interiorly threaded to receive a screw 238, the lower end of which bears on the upper end of the pin. 235^a indicates a spring for yieldingly holding the arm in its proper place. By adjusting the screw 238 the elevation of the wheel 198 may be regulated at will without interfering with the swinging movement of said arm. Attached to the shaft 234 is a pulley 239, over which runs a belt 240 to a pulley 241. This pulley is carried on a vertical shaft 242, which is sustained in bearings 243, attached to the frame 30, and which is driven by miter-gears 244 and 245, attached, respectively, to the shafts 242 and 217. The arm 235 is adjustably held in the correct position, and the tension of the belt 240 is maintained by means of a screw 246 and adjusting-nut 247, (best shown in Fig. 9,) the screw having an eye 248 loosely encircling the shaft 234, as shown by broken lines in Fig. 9 and full lines in Fig. 22. The periphery of the feeding-wheel 199, as shown best in Fig. 9, is concave, so as to snugly engage the periphery of the feeding-roller 198, and the parts 198 and 199 revolving, as described, will cause the gum to be fed continually to the periphery of the wheel 198, the contact between the parts 198 and 199 being such as will permit a proper deposit of gum upon the wheel 198. Therefore with these devices gum will be continually supplied to the wheel 198 and by the wheel 198 it will be applied to the paper, and this wheel, it will be observed, may be adjusted both vertically and horizontally to bring about the proper contact between it and the paper.

I will next describe the devices for cutting into the desired lengths the continuously-supplied stick of tobacco inclosed in the paper, thus producing the finished cigarette. These parts are illustrated best in Figs. 7, 9, 25, and 26. As the continuously-supplied stick or cord of the paper and tobacco passes from engagement with the apron 169 it moves over the space indicated by the broken line *e* in Fig. 7 and enters a tubular horn 249, the inherent stiffness of the paper and tobacco permitting it to bridge the space between the pulley 170 and horn 249. The horn 249 (shown best in Fig. 25) is sustained by a pillar 250, which rises from a carriage 251. This carriage has rails 252 secured to its under side and extending longitudinally of the machine, (see Fig. 26,) which rails have beveled outer edges engaging corresponding beveled guides or tracks 253, attached to the frame, so that the carriage is mounted to reciprocate longitudinally. Under the rails 252 supporting-rollers 254 bear, these rollers in turn being sustained on bars

255, and are vertically adjustable by means of screws 256, working in the frame 30, as shown. At the rear of the horn 249 and in line therewith is a thimble 257. (See Fig. 25.) This thimble is spaced slightly from the rear end of the horn to enable the knife to operate between the two, as will hereinafter fully appear. The thimble is supported by a pedestal 258, attached to the carriage 251, and rearward of the thimble is a discharge-chute 259, which is sustained on the frame by a bracket 260. The parts 249 and 257, it will be observed, move with and are supported by the carriage 251; but the discharge-chute 259 is stationary with the frame.

The knife 261 is in the form of a continuously-rotating circular blade and is attached to a shaft 262, revolubly mounted in an arm 263, which has its lower end joined by a pivot 264 to a supporting-block 265. Said block is carried in guides 266, mounted on the carriage 251, and is adjustably held by means of screws 267, operating in said guides. In this manner the arm 263 is mounted on an adjustable pivot, so as to permit moving the arm bodily between the thimble 257 and horn 259.

Attached to the shaft 262 is a pulley 268, over which runs a belt 269 to impart rotary movement to the knife. The pulley 268 may be splined on the shaft 262, or the belt 269 may be slightly elastic to allow for the movement of the carriage. Said belt passes downward to a pulley 270, attached to the shaft 271, revolubly mounted in suitable bearings on the frame 30 and which is driven from the shaft 217 by sprocket-wheels 272 and 273, connected by a chain 274. (See the full and dotted lines in Figs. 7 and 9.) In its upper end the arm 263 carries a yoke 263^a, in which is adjustably fastened a transverse sliding rod 275, which runs through a guiding-pillar 276, attached to the carriage 251, which carries at its outer end a roller 277. This roller is engaged with a horizontally-elongated head 278 of an arm 279. Said head is horizontally grooved to receive the arm, so that the rod 275 and roller 277 may move longitudinally of the machine with the carriage 251 without interfering with the engagement between the roller 277 and the head 278. The said arm 279 has a pivot 280 joining it to a supporting-block 281, which slides on a bracket 282, projecting rigidly from the frame 30, and which is adjustably held by means of a screw 283. In this manner the arm 279 is mounted on an adjustable pivot. The arm is provided with a wear-rib 284, engaged by a cam 285, which is attached to the before-described shaft 222.

286 indicates a retractile spring which is connected to the upper end of the arm 263 and to the pillar 276. The cam 285 moves the arm 279 rightward, referring to Fig. 26, and the spring 286 returns the arm and the

connected slide-rod 275 to its leftward position. The horn 249 and thimble 257 loosely receive the stick or cord of tobacco and paper, and as the carriage 251 reciprocates the horn and thimble move freely over said cord. The knife 261 is rotating continuously, and it is periodically moved in and out of engagement with the tobacco and paper by the action of the spring 286 in one direction and the cam 285 in the other. The operation of the guiding device therefore is that at the end of the forward movement of the carriage 251 the knife 261 is moved inward to engage the tobacco and paper and cut off a length forming the finished cigarette. During the operation the knife moves bodily backward with the carriage faster than the movement of the tobacco and paper through the horn and thimble, and this rearward movement of the knife continues until the cam 285 moves the knife outward by swinging the arm 263, causing it to disengage the cord of paper and tobacco. The carriage then moves forward again, bringing the knife into position to cut off a second cigarette. By properly timing these operations a cigarette of any desired length may be formed.

It will be observed that the knife in addition to its continued rotary movement is reciprocated bodily longitudinally of the machine, and at the end of each longitudinal movement the knife receives a lateral movement, bringing it in and out of the path of the cord of tobacco and paper. This allows for continually feeding said cord and for rapidly cutting the same into the necessary lengths without interfering with the continuous movement of the cord of tobacco and paper. The finished cigarette receives a thrust from the knife, tending to accelerate its movement through the thimble 257, and the cigarette is thus caused to fall upon the chute 259 and is ejected from the machine. The carriage 251 is given its reciprocal movement by means of a slide-rod 287, attached to the carriage and to a cross-head 288, running in guides 289, longitudinally disposed on the framing of the machine. Joined to the cross-head is a connecting-rod 290, which is also attached to a crank-disk 291. The crank-disk is attached to a rotating shaft 292, mounted on bearings 293, driven by miter-gears 294 and 295, attached, respectively, to the shafts 292 and 222.

The organized operation of the machine may be traced as follows: The tobacco in fibered or other form, if desired, is charged into the hopper 31 and under the action of the distributing devices is discharged from the chute 33 into the tapering cavity formed for its reception by the chains 110 and 121. It is compressed in these chains and travels under the chain 138, which finishes the compression, producing the round rod or stick of tobacco shown at *d* in Fig. 17. It then

passes in company with the paper and paper-carrying apron into the trough 189 and is rolled up with the paper around it. The paper is next gummed and sealed, as described, and the cord or stick of tobacco incased in paper is projected across the line indicated at *e* in Fig. 7 and entered in the tubular horn 249. In passing through this horn and through the thimble 257 the stick of tobacco and paper is severed into lengths by the action of the knife 261, and the completed cigarettes are ejected from the machine in succession and with a rapidity depending upon the speed of the various parts. In starting the machine to properly enter the paper into the various devices for curling up or tubulating it the belt 169 may be moved independently of the other parts of the machine by actuating a hand-crank 175, as before described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A cigarette-machine having a hopper provided with an elongated discharge-spout, an apron running along the bottom of the hopper, means for mounting and driving the apron, cards attached to the apron, a brush located at the discharge end of the apron to remove the tobacco from the apron, means for rotating the brush, a drum coacting with the apron, cards attached to the drum, means for mounting and driving the drum, a second drum coacting with the apron and located intermediate the first-named drum and the discharge end of the apron, cards attached to the second drum, and means for revolvably driving the second drum.

2. A cigarette-machine having means for carrying paper and tobacco, a gum-applying wheel, a swinging arm mounting the wheel, a pin mounting the arm, the arm being adjustable axially on the pin, and a screw threaded in the arm and engaging the end of the pin whereby to adjust the arm.

3. In a cigarette-machine, the combination with means for forming the paper around the tobacco and for feeding the same in a continuous cord or stick, of a carriage, means for reciprocating the carriage along the line of movement of said tobacco and paper, a swinging arm mounted on the carriage, a knife carried by the arm, means for actuating the arm in one direction, a slide-rod connected to the arm to actuate it in the other direction, a second swinging arm mounted independently of the carriage and having an elongated head engaged by a part of the slide-rod, and a driven cam for periodically actuating the second arm.

4. A cigarette-machine having devices for forming and wrapping the tobacco, a feeding means delivering the tobacco to said forming and wrapping means, the feeding means comprising a hopper having a discharge at one end, the discharge directing the tobacco to

said means for forming and wrapping it, an apron running along the bottom of the hopper toward the discharge thereof, said apron having cards on its exposed surface, a revolvable drum mounted in the hopper over the apron and having cards on its periphery, a second rotary drum mounted in the hopper over the apron between the first-named drum and the discharge, a brush mounted at the discharge of the hopper directly adjacent to the discharge end of the apron, and means for driving the operative parts in unison.

5. In a cigarette-machine, the combination with devices for forming the tobacco and for turning the wrapper around the same, of a paste-supplying means comprising a wheel, means for delivering the paste to said wheel, a shaft on which the wheel is mounted, means for driving the shaft, an arm on which the shaft is revolutely carried, a pin on which the arm is loosely mounted, a spring tending to move the arm longitudinally on the pin, and a screw engaged with the arm and bearing against the pin to adjust the arm against the tension of said spring.

6. In a cigarette-machine, the combination with a means for forming and wrapping the tobacco, of a carriage, means carried thereon for guiding the continuous cigarette, means for reciprocating the carriage longitudinally of the cigarette, an arm mounted to swing on the carriage, a knife carried by the arm, a rod in connection with the arm and adapted to slide on the carriage whereby to move the knife in and out of engagement with the cigarette, a member mounted independently of the carriage and elongated in the direction of reciprocation thereof, which member is engaged by said rod and means for vibrating said member to operate the rod.

7. In a cigarette-machine, the combination with a frame for forming and wrapping the tobacco, of a carriage reciprocal on the frame, a device mounted on the carriage for guiding the continuous cigarette, an arm mounted to swing on the carriage, a knife carried by the arm, a rod attached to the arm and reciprocal on the carriage transversely of the line of movement thereof, a swinging arm mounted on the frame and having a portion elongated in the direction of reciprocation of the carriage, said elongated portion being engaged by said rod, and means for swinging the arm.

8. A cigarette-machine having a framing including a table, a main or lower filler-forming chain having its upper run arranged to move over said table, the chain being constructed of hinged lags having a groove along the face thereof, an upper filler-forming chain also constructed of hinged lags with a groove along the face thereof, said chain running in a vertical plane and having its lower run engaging the upper run of the main chain, whereby said chains when engaged

form an inclosed passage for the filler, the lower or main chain projecting beyond the receiving end of the upper chain, a charging-hopper having an elongated discharge-spout delivering the tobacco to the exposed part of the upper run of the lower or main chain, side forming-chains running in a horizontal plane over the table and having their adjacent runs respectively at the sides of the exposed part of the upper run of the main or lower chain, the side forming-chains converging toward and extending to the receiving end of the upper forming-chain, whereby the tobacco received on the exposed part of the upper run of the lower or main chain is compressed by the side forming-chains and caused to enter the said inclosed passage between the coacting runs of the upper and lower forming-chains, means for driving all of said chains in unison, a guideway in which the lower run of the upper chain travels, and an adjustable shoe within the guideway and bearing on the upper side of the lower run of the upper chain.

9. A cigarette-machine having a framing including a table, a main or lower filler-forming chain having its upper run arranged to move over said table, the chain being constructed of hinged lags having a groove along the face thereof, an upper filler-forming chain also constructed of hinged lags with a groove along the face thereof, said chain running in a vertical plane and having its lower run engaging the upper run of the main chain, whereby said chains when engaged form an inclosed passage for the filler, the lower or main chain projecting beyond the receiving end of the upper chain, a charging-hopper having an elongated discharge-spout delivering the tobacco to the exposed part of the upper run of the lower or main chain, side forming-chains running in a horizontal plane over the table and having their adjacent runs respectively at the sides of the exposed part of the upper run of the main or lower chain, the side forming-chains converging toward and extending to the receiving end of the upper forming-chain, whereby the tobacco received on the exposed part of the upper run of the lower or main chain is compressed by the side forming-chains and caused to enter the said inclosed passage between the coacting runs of the upper and lower forming-chains, means for driving all of said chains in unison, a shoe arranged to bear on the upper side of the lower run of the upper forming-chain, means for adjusting said shoe to vary its pressure on the chain, guide members arranged to bear on the outer side of the inner runs of the side forming-chains, and means for adjusting said guide members to vary their pressure on the chains.

10. A cigarette-machine having a framing including a table, a main or lower filler-forming chain having its upper run arranged to

move over said table, the chain being constructed of hinged lags having a groove along the face thereof, an upper filler-forming chain also constructed of hinged lags with a groove along the face thereof, said chain running in a vertical plane and having its lower run engaging the upper run of the main chain, whereby said chains when engaged form an inclosed passage for the filler, the lower or main chain projecting beyond the receiving end of the upper chain, a charging-hopper having an elongated discharge-spout delivering the tobacco to the exposed part of the upper run of the lower or main chain, side forming-chains running in a horizontal plane over the table and having their adjacent runs respectively at the sides of the exposed part of the upper run of the main or lower chain, the side forming-chains converging toward and extending to the receiving end of the upper forming-chain, whereby the tobacco received on the exposed part of the upper run of the lower or main chain is compressed by the side forming-chains and caused to enter the said inclosed passage between the coacting runs of the upper and lower forming-chains, means for driving all of said chains in unison, guide members mounted on the table respectively at the sides of the upper run of the lower forming-chain, means for adjustably holding the guide members in place, additional guide members mounted respectively on the first-named guide members and bearing against the outer side of the inner runs of the side forming-chains, and means for adjustably holding said additional guide members on the first-named guide member.

11. A cigarette-machine having a framing including a table, a main or lower filler-forming chain having its upper run arranged to move over said table, the chain being constructed of hinged lags having a groove along the face thereof, an upper filler-forming chain also constructed of hinged lags with a groove along the face thereof, said chain running in a vertical plane and having its lower run engaging the upper run of the main chain, whereby said chains when engaged form an inclosed passage for the filler, the lower or main chain projecting beyond the receiving end of the upper chain, a charging-hopper having an elongated discharge-spout delivering the tobacco to the exposed part of the upper run of the lower or main chain, side forming-chains running in a horizontal plane over the table and having their adjacent runs respectively at the sides of the exposed part of the upper run of the main or lower chain, the side forming-chains converging toward and extending to the receiving end of the upper forming-chain, whereby the tobacco received on the exposed part of the upper run of the lower or main chain is compressed by the side forming-chains and

caused to enter the said inclosed passage between the coacting runs of the upper and lower forming-chains, means for driving all of said chains in unison, guide members mounted on the table and arranged respectively at the sides of the upper run of the lower forming-chain, means for adjustably holding said guide members in place, side guide-walls lying on the upper run of the lower forming-chain and respectively against the sides of the lower run of the upper forming-chain, guide members supported on the first-named guide members and bearing against the side guide-walls, and means for adjustably holding the second-named guide members.

12. A cigarette-machine having a framing including a table, a main or lower filler-forming chain having its upper run arranged to move over said table, the chain being constructed of hinged lags having a groove along the face thereof, an upper filler-forming chain also constructed of hinged lags with a groove along the face thereof, said chain running in a vertical plane and having its lower run engaging the upper run of the main chain, whereby said chains when engaged form an inclosed passage for the filler, the lower or main chain projecting beyond the receiving end of the upper chain, a charging-hopper having an elongated discharge-spout delivering the tobacco to the exposed part of the upper run of the lower or main chain, side forming-chains running in a horizontal plane over the table and having their adjacent runs respectively at the sides of the exposed part of the upper run of the main or lower chain, the side forming-chains converging toward and extending to the receiving end of the upper forming-chain, whereby the tobacco received on the exposed part of the upper run of the lower or main chain is compressed by the side forming-chains and caused to enter the said inclosed passage between the coacting runs of the upper and lower forming-chains, means for driving all of said chains in unison, guide members mounted on the table and arranged respectively at the sides of the upper run of the lower forming-chain, means for adjustably holding said guide members in place, side guide-walls lying on the upper run of the lower forming-chain and respectively against the sides of the lower run of the upper forming-chain, guide members supported on the first-named guide members and bearing against the side guide-walls, means for adjustably holding the second-named guide members, a shoe bearing on top of the lower run of the upper forming-chain between said guide-walls, and means for adjustably holding the shoe in position.

13. A cigarette-machine having means for carrying the table and tobacco, a gum-applying wheel, an arm on which said wheel is mounted, means for rotating the wheel, a

frame part, a pin mounted in said frame part, the arm being arranged to swing on the pin and to move axially thereof, a spring bearing between the frame part and arm to hold the arm yieldingly in position, and a device 5 carried by the arm and engaging the pin to engage the arm axially against the tension of the pin.

14. In a cigarette-machine, the combination with devices for forming and wrapping 10 the filler, of a carriage, means for reciprocating the same along the line of movement of the filler and wrapper, a tubular guide on the carriage through which the filler and wrapper 15 pass, a swinging arm mounted on the carriage, a rotary knife mounted on said arm, means for driving the knife irrespective of the motion of the carriage, said arm being capable of moving the knife in and out of en- 20 gagement with the filler and wrapper whereby to sever the same into lengths to form the cigarettes, a sliding member mounted on the carriage and having connection with the arm, a swinging arm mounted independently of 25 the carriage and having an elongated portion engaging said sliding member, and means for periodically swinging the second-named arm.

15. In a cigarette-machine, the combination with the means for forming and wrap- 30 ping the filler, of a carriage mounted on the frame of the machine to move along the line of movement of the filler and wrapper, a tubular guide mounted on the carriage through which the filler and wrapper pass, an arm arranged to swing on the carriage, a rotary 35 knife carried by the arm, said arm being adapted to move the knife in and out of en-

gagement with the filler and wrapper, means for driving the knife independently of the motion of the carriage, a sliding member having connection with the arm and mounted on the carriage, a spring in connection with the arm to move the arm in one direction, a swinging arm mounted on the frame of the machine independently of the carriage, the second-named arm having an elongated portion engaged by said sliding member, and a cam coacting with the swinging arm for periodically moving the same to swing the first-mentioned arm against the tension of the spring.

16. A cigarette-machine having a hopper provided with an elongated discharge-spout, an apron having its upper run arranged to move over the bottom of said hopper, the apron having cards thereon to engage and advance the tobacco, means at the discharge-spout for dislodging the tobacco from the cards of the apron, a drum coacting with the apron, cards attached to the drum, said drum being located over the top run of the apron intermediate its ends, and means for driving the operative parts, said means including devices for rotating the drum contrary to the direction of movement of the top run of the apron.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSÉ MARIA MARTINEZ.

Witnesses:

A. MOLINA,
EVERARD BOLTON MARSHALL.