

June 3, 1941.

S. CLAUSEN

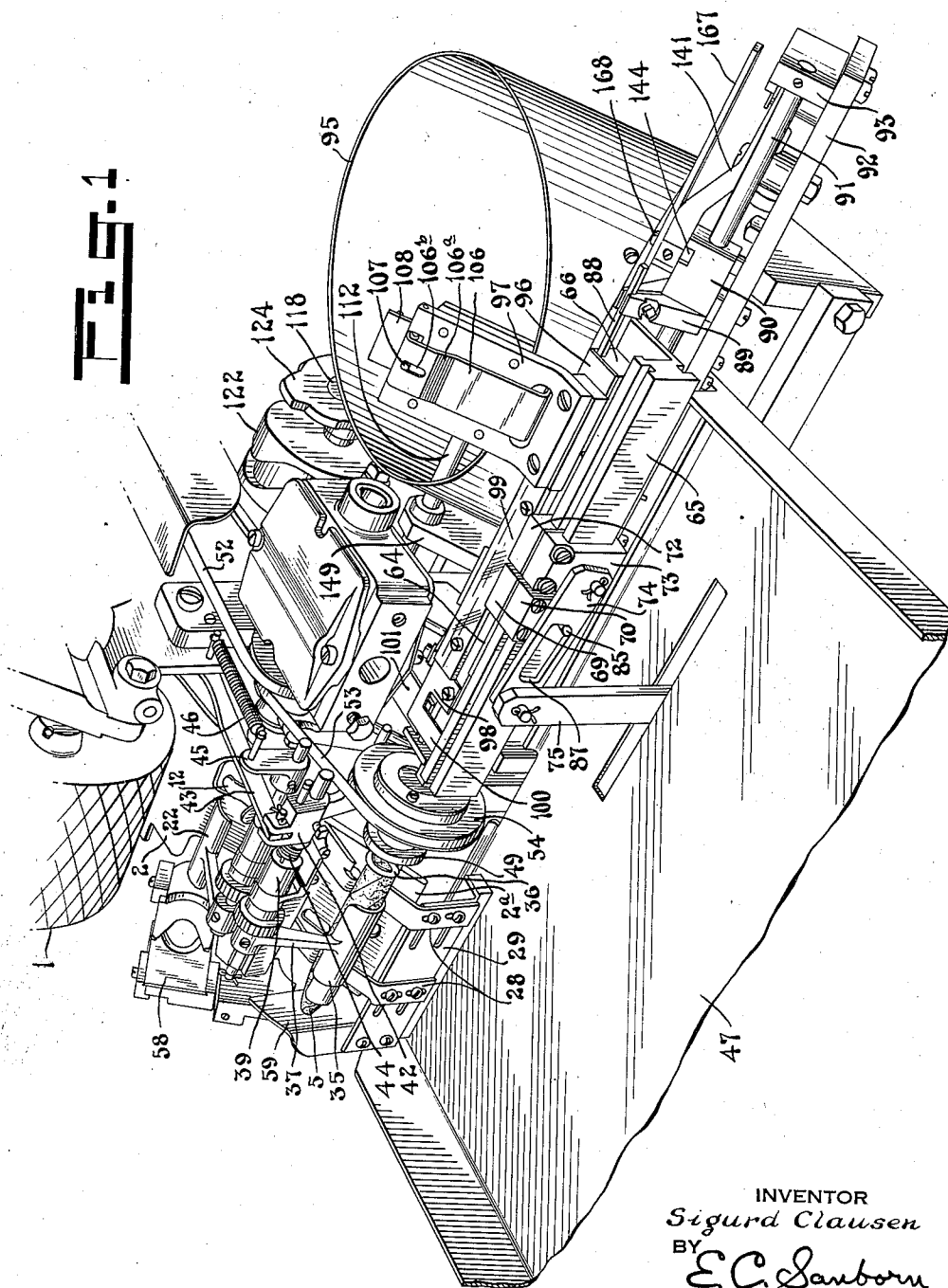
2,244,142

METHOD AND APPARATUS FOR INSERTING DRAFT ELEMENTS IN CIGARS

Filed June 24, 1937

6 Sheets-Sheet 1

Fig. 1



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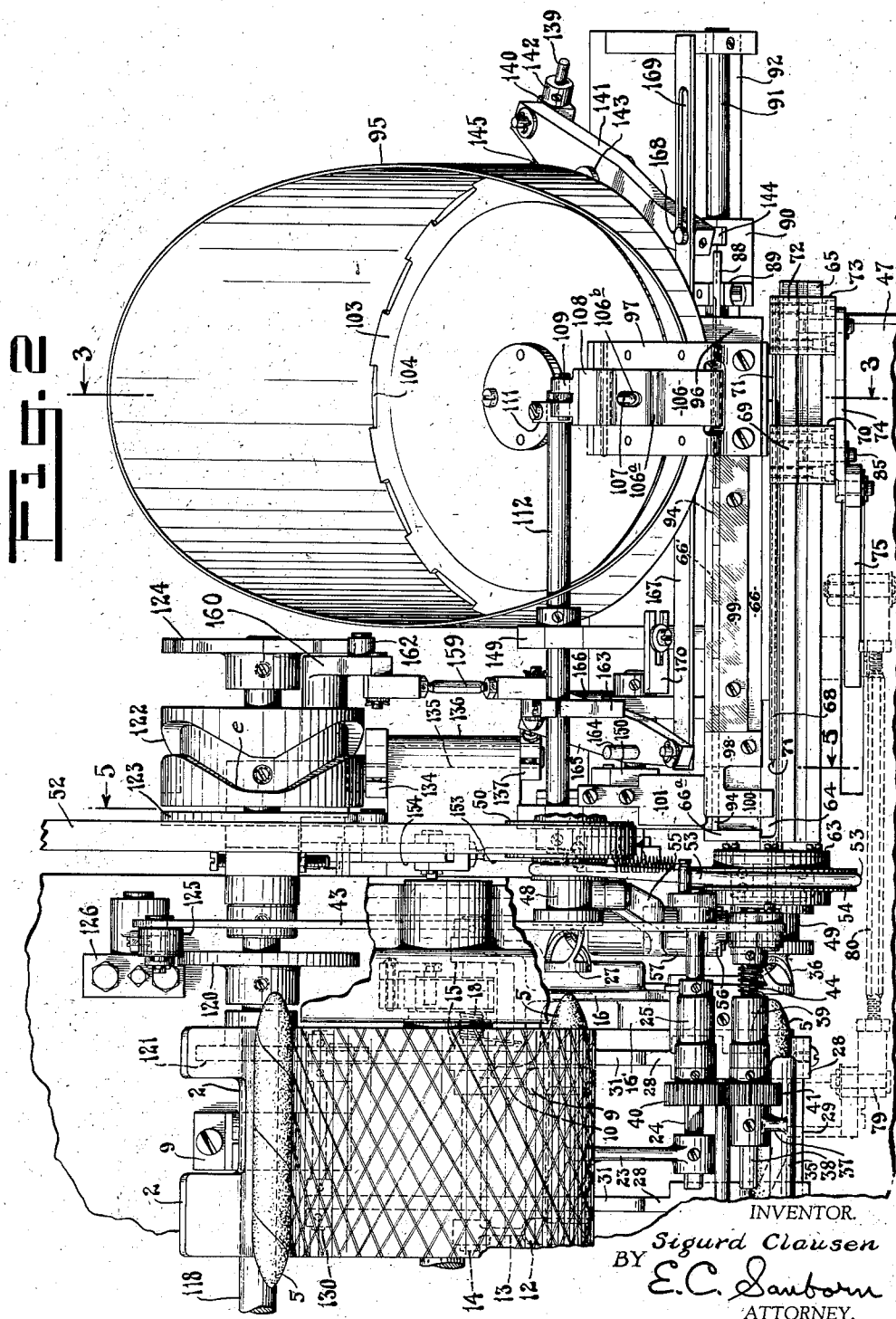
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Fig. 3

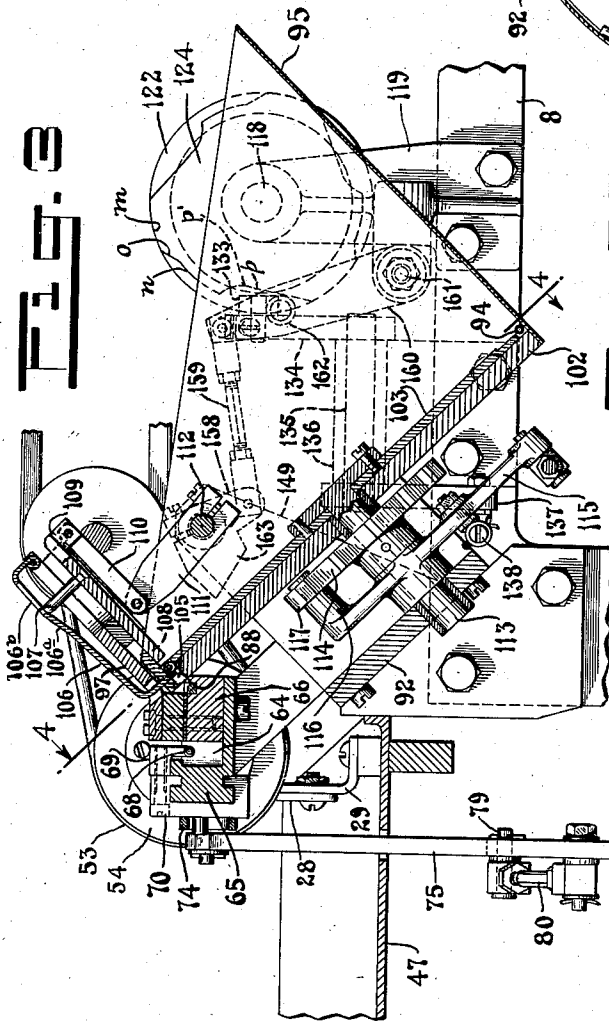


Fig. 4

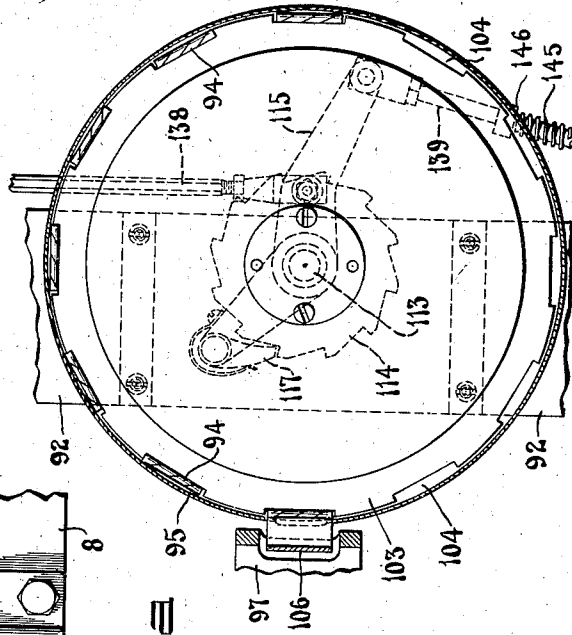


Fig. 3a

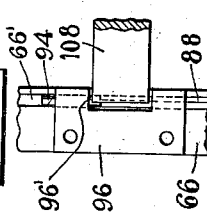
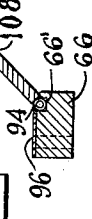


Fig. 3b



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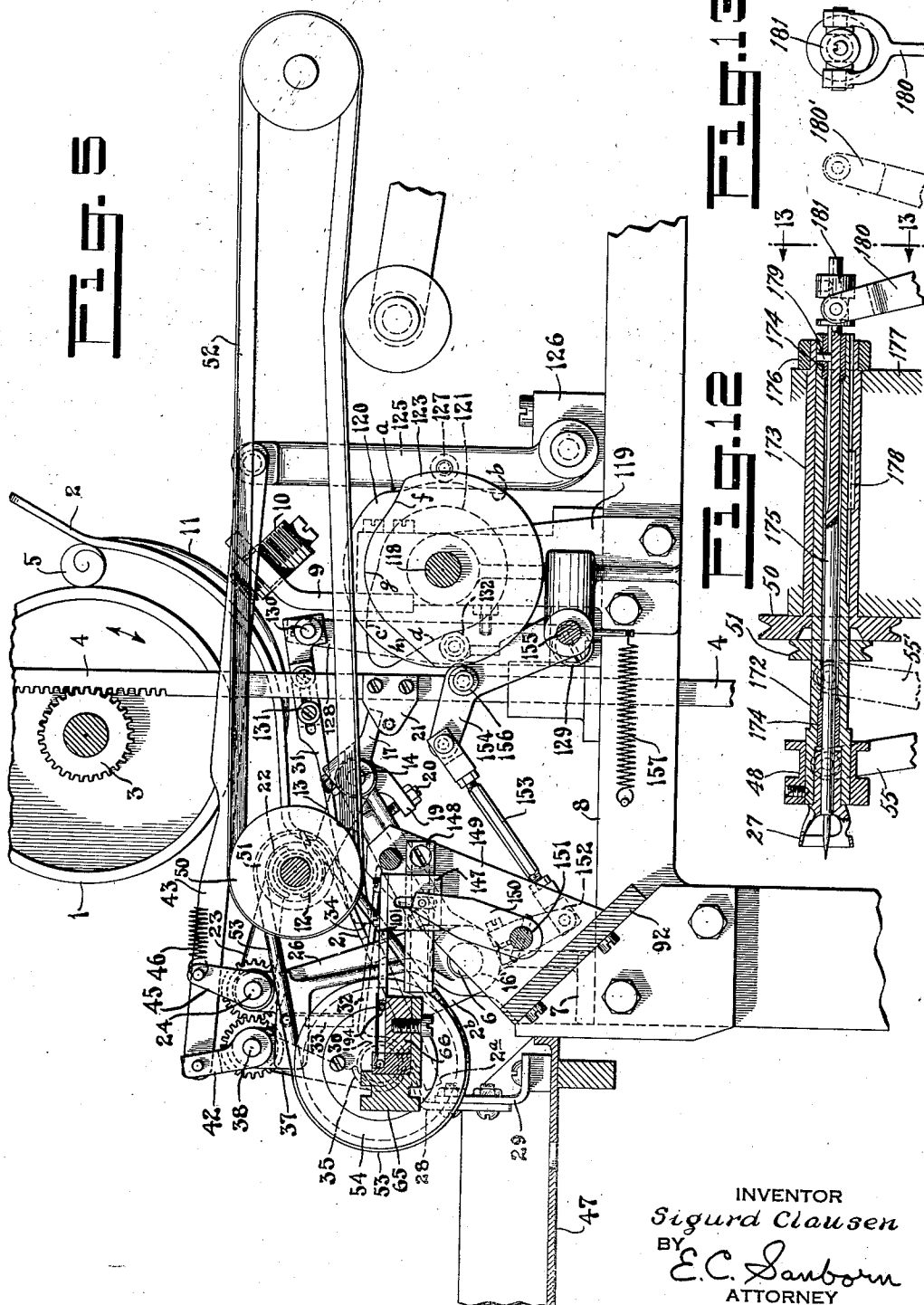
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METHOD AND APPARATUS FOR INSERTING DRAFT ELEMENTS IN CIGARS

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6 Sheets-Sheet 4



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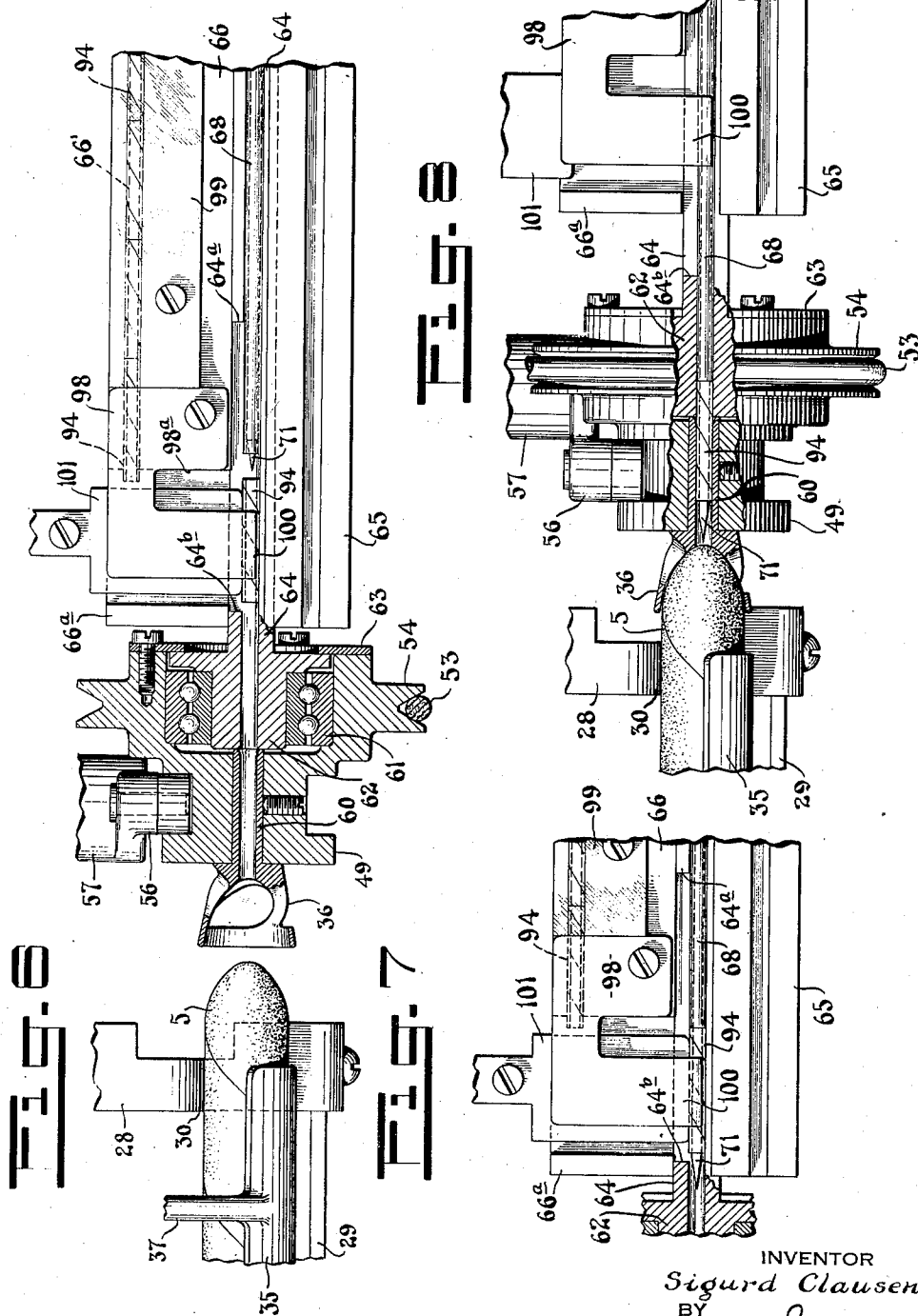
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METHOD AND APPARATUS FOR INSERTING DRAFT ELEMENTS IN CIGARS

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6 Sheets-Sheet 5



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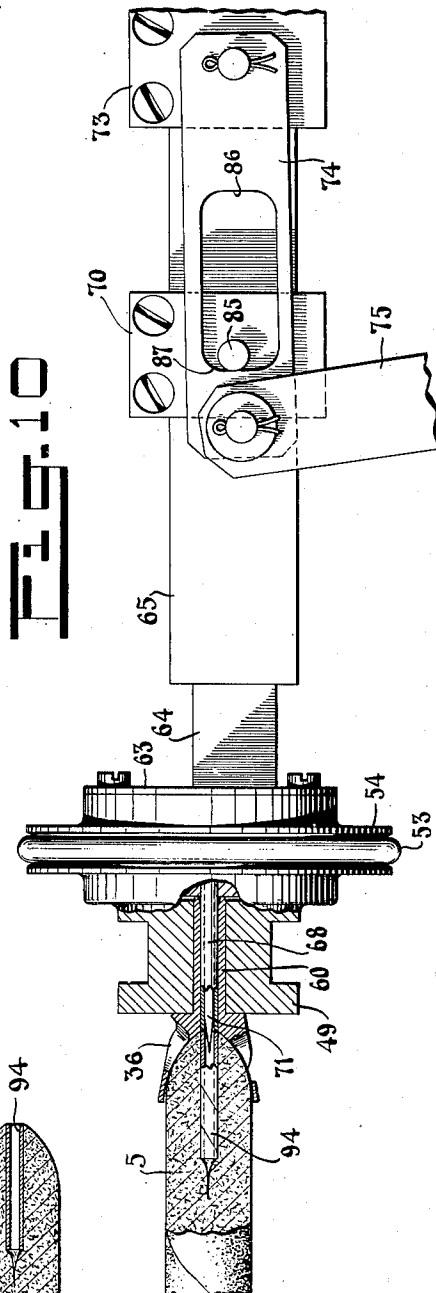
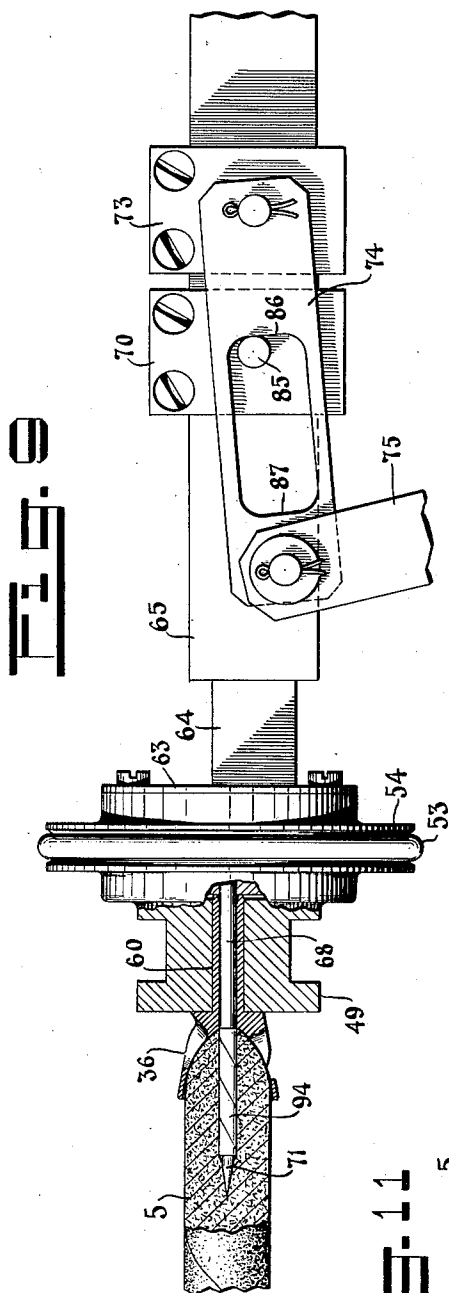
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METHOD AND APPARATUS FOR INSERTING DRAFT ELEMENTS IN CIGARS

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,244,142

METHOD AND APPARATUS FOR INSERTING
DRAFT ELEMENTS IN CIGARSSigurd Clausen, Brooklyn, N. Y., assignor to Inter-
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tion of New Jersey

Application June 24, 1937, Serial No. 150,074

51 Claims. (Cl. 131—21)

This invention relates to cigar making machines and has for an object to provide a mechanism coordinated with a cigar machine for inserting a draft element, such as a tube into the head of the cigar to make unnecessary the cutting or perforating of the head by the smoker.

A further object of the invention resides in provisions for automatically projecting a piercing element through a tube, then projecting the tube and piercing element into the cigar head, and then withdrawing the piercing element, all of such operations being in timed relation with the feed of cigars from the cigar machine. The invention also comprises rerolling and knurling means coordinated with the tube inserting and piercing means.

An important feature of the invention comprises inserting a tube into a cigar head and knurling said head after said tube has been inserted. The invention in this connection includes, more specifically, means for knurling said head during the withdrawal of a piercing element previously passed into said head with the tube.

In carrying a specific embodiment of my invention into effect, I have illustrated a rerolling and knurling mechanism of the usual type in combination with the cigar forming machine, and operatively combined with such rerolling and knurling mechanism I provide a second knurling device combined with a head piercing and tube inserting mechanism, including tube feeding and actuating means operating automatically and in timed relation with the cigar forming and rerolling mechanism.

Another feature of the invention comprises tube supply means, means for ejecting tubes therefrom, and means for feeding the ejected tubes to position for insertion into the cigar head. In this connection the invention further includes means for insuring the feed of tubes to provide a tube for each cigar. It also includes locking means under control of the tube feeding means for at times suspending operation of the ejecting means at the supply source to insure against an oversupply of tubes.

Other features and advantages of the invention will be hereinafter described and claimed.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view illustrating the rerolling, knurling, tube inserting and re-knurling mechanism and tube feeding mechanism adapted for application to a cigar forming machine.

Fig. 2 is a top plan view of the apparatus.

Fig. 3 is a vertical section of the tube feeding hopper and cooperating mechanism taken on the line 3—3 of Figure 2.

Figs. 3A and 3B are views of details.

Fig. 4 is a detail view of the hopper feed.

Fig. 5 is a vertical section on the line 5—5 of Figure 2 showing the re-rolling and knurling mechanism.

Fig. 6 is an enlarged elevation and partial section of part of the re-knurling, head piercing and tube inserting mechanism showing the position of the parts before a cigar enters the knurling tool.

Fig. 7 is an enlarged detail view showing an advanced step in the piercing and tube feeding operation.

Fig. 8 is an enlarged detail view of the parts shown in Figure 6 with the cigar head inserted in the knurling tool and the piercing tool advanced for piercing and feeding a tube into the cigar head.

Fig. 9 is an enlarged detail view showing the piercing tool and tip tube fully inserted in the head end of a cigar.

Fig. 10 is an enlarged detail view similar to Figure 9 with the piercing tool in a retracted position leaving the tube in the inserted position in the cigar head, and

Fig. 11 is a view of a cigar head and head tube in section illustrating the finished product of the machine.

Fig. 12 is a vertical sectional detail view of a modification comprising means combined with the first knurler for piercing the cigar head as a preliminary to insertion of the tube at the second knurler.

Fig. 13 is a view in rear elevation of the construction shown in Figure 12.

Referring to the drawings, and more particularly to Figures 1, 2 and 5, there is illustrated a re-rolling mechanism comprising rolling cylinder 1, apron 2, oscillating pinion 3 and rack 4 reciprocated by a cam (not shown) which is actuated by or in conjunction with the mechanism of the cigar making machine to which the mechanism shown in Figure 1 is designed to be attached and operatively connected therewith for continuous automatic operation.

A formed cigar 5 is fed from the forming machine to the apron 2 and dropped onto the apron as seen in Figure 2 for re-rolling between the apron and cylinder by the oscillating rotary motion of the cylinder. The apron at the entrance

end has a rectangular cut-out as seen in Figure 2 to afford clearance for the fingers of the feed mechanism (not shown) which convey the formed cigar from the forming machine. At the lower or exit end the apron is extended as seen at 2^a, Figures 1 and 5, and which extension has brackets 2^b by means of which the apron is pivoted on a rod 6, Figure 5, secured in a bracket 7 mounted on frame member 8. Underneath the forward end of the apron is a bracket 9 in which a tubular adjusting screw 10 is threaded, and seated in the screw is a coiled spring upon which the stiffening rib 11 of the apron rests and whereby the apron due to its pivotal support is caused to press the cigar against the cylinder 1 during the re-rolling operation. The timing of the oscillating rotary movement of cylinder 1 by its actuating cam is such that upon delivery of a cigar at the upper outwardly flared end of the apron the cylinder will roll the cigar downward beginning at the point shown in Figure 5, and then back and forth and finally a longer roll toward the exit end will free the cigar and permit it to roll down the apron and onto a pair of curved fingers 12 formed at the end of arms 13 fixed on stub shaft 14. This shaft is journaled in bearings 15 formed at the end of arm 16 projecting from hub 16' which is adjustably fixed on rod 6. On shaft 14 between bearings 15 a lever 17 is mounted in fixed position and sleeved on the shaft between this lever and one of the bearings is a torsion spring 18, one end of which engages with the bearing frame and the other end engages the lever or the stop arm 19, Figure 5, formed integrally with the lever. The purpose of spring 18 is to raise arms 13 carrying fingers 12 to the position shown in Figure 5. Stop arm 19 has an adjusting screw 20 which bears against arm 16 to adjust and limit the upward movement of fingers 12 to properly center the cigar carried thereby relative to the knurling tool. Lever 17 projects into the path of a pin on plate 21 secured to rack bar 4, Figure 5, so that as the rack reciprocates, lever 17 will alternately rise and fall due to the lift imparted by plate and pin 21 and return movement by spring 18, thereby imparting a rocking movement to shaft 14 in timed relation to the feed of cigars from the re-rolling apron 2, and thereby reciprocating fingers 12 to move first into the position of Figure 5 to catch a cigar for the first knurling operation, remain stationary during the knurling, then retract beneath the apron to allow the cigar to roll down toward the second knurling position, and then move upward again into the position of Figure 5.

The cigar is held in the first knurling position on fingers 12 by a wide gripper 22 carried by arm 23 which is fixed on rock-shaft 24 journaled in bearing 25 formed on arm 26 projecting from hub 16'. Shaft 24 is rocked by means herein-after described to oscillate the gripper in unison with the oscillations of fingers 12 to close upon a cigar and hold same upon fingers 12 against rotation when acted upon by the knurling tool 27, Figure 2, and to open and release the cigar for transfer to the second knurling position. The apron 2 is cut away at the sides to provide clearance for fingers 12 to pass up into the path of a cigar as shown in Figures 1 and 5, but in Figure 1 only one of the fingers 12 is seen, the second finger being obscured by the gripper 22 and its arm 23. As seen in Figure 5, the apron, where it passes under the first knurling position, is given a downward curve to allow the cigar to roll off the apron and onto the fingers 12. The clear-

ances at the sides of the apron are continued downward to afford clearance for a pair of skids 28 which are adjustably secured on a bracket 29 to receive the cigar when released by fingers 12 and gripper 22. The skids are flat metal strips bent at an angle to fit over the front of bracket 29, where they are adjustably secured by cross-slots and bolts as shown in Figure 1. From the bracket plate the skids project upward at a slight angle and then curve upward as shown at 30 to form fixed gripping surfaces for a cigar at the second knurling and tube inserting position. From the curved section 30 the skids extend in a straight line with a slight downward incline to a point approximately under the axial center of the first knurling position as seen in Figure 5. Cooperating with the skids are a pair of reciprocating push rods 31 which are positioned beneath the apron 2 and project through the plane of the apron at the side clearances to a point in advance of fingers 12 where the enlarged ends of the push rods rest on the skids and upon which they are adapted to slide. When fingers 12 and gripper 22 separate to release a cigar, the rock-shaft 14 is turned counterclockwise by lever 17 to a degree sufficient to swing fingers 12 below the apron, thereby depositing the cigar on the apron whereupon it rolls down the apron and onto the skid sections 32. The cigar comes to rest at the angle formed at the point where the skids pass through the plane of apron 2, that is, slightly in advance of the enlarged ends 34 of the push-rods 31. A hinged fender 33 insures the return to said point, of cigars rolling up the slight incline of the skid sections 32. When the push rods are moved forward the ends 34 engage the cigar and push it forward on the skids against the fender 33 causing it to swing forward to allow the cigar to roll over the curved edge and into the gripping sections 30 where it is caught by gripper 35 to be held thereby in axial alignment with the second knurling tool 36. Gripper 35 is carried by arm 37 having a hub keyed to rock-shaft 38 which is journaled in bearing 39 mounted parallel with bearing 25 on the arm 26. Rock-shafts 24 and 38 have pinions 40 and 41 constantly in mesh so that when either shaft is turned the other will turn in the opposite direction. To accomplish this movement either of the rock-shafts 24 or 38 may be actuated, and in the present arrangement, as best seen in Figure 5, shaft 38 is the actuated shaft. For this purpose shaft 38 is provided with lever 42 having a hub keyed on the shaft, and which lever is pivotally connected with pull-rod 43. When rod 43 is pulled to the right as viewed in Figure 5, lever 42 will turn rock-shaft 38 clockwise and through the engagement of pinions 41 and 40 turn rock shaft 24 counterclockwise. This rotary movement actuates arms 37 and 23 and moves grippers 35 and 22 out of their gripping positions. Sleeved on rock-shafts 38 between bearing 39 and the hub of lever 42 is a torsion spring 44, Figure 2, having its ends hooked into bearing 39 and the hub of lever 42, whereby when the lever is pulled by rod 43 the spring is placed under increased tension so that when the pull on rod 43 ceases the spring will turn shaft 38 in the opposite direction, and this movement will be transmitted to shaft 24 through pinions 41-40 and thereby move arms 37 and 23 toward each other and grippers 35 and 22 into gripping position. To aid in this return movement shaft 24 is provided with a lever 45 to which extension spring 46 is attached, the other end of the spring being at-

tached to a suitable frame member as seen in Figure 1. When a cigar receives the final operation at the second knurling position and is released by gripper 35 it rolls off the skids 23 onto tray 47.

The two knurling tools 27 and 36 are mounted on grooved hubs 48 and 49 respectively. Hub 48 has two grooved driving pulleys 50 and 51, the former being driven continuously by belt 52, and the latter of smaller diameter driving belt 53 which drives the larger grooved pulley 54 on hub 49. By this means the two knurlers are driven in unison, for successive operation upon the same cigar, and the second knurler 36 being driven at a slower speed for the finishing operation. Both knurlers are given a longitudinal movement to move them into and out of knurling position by rollers riding in the grooves in hubs 48 and 49, and these rollers are carried by arms 55 and 56, Figure 2, projecting from sleeve 57 journaled on a stub-shaft (not shown) and which sleeve is oscillated by the usual link and cam lever as employed in the usual knurl operating mechanism. The latter, in order to avoid complicating the drawings, is omitted. As usual the linkage which effects the reciprocation of the knurling tool also connects with the cutter 58, Figure 1, for moving the cutter laterally into position for clipping the tuck end of the cigar during the first knurling operation. A plate or fender 59 serves to back up the cigar in the second knurling position when said cigar is pressed against said plate by the re-knurler. Plate 59 is inclined at a slight outward angle, as shown in Figure 1, to avoid interference with cigars which might be slightly off center during the passage to the re-knurler and for enabling such cigars to move endwise into the correct position for engagement by the knurling tool and before the gripper 35 grips the cigar.

In Figures 6 to 10 the tube inserting mechanism is shown in detail. The knurling tool 36 has a tubular shank 60 which passes through the axial center of hub 49 and is fixed therein by a set screw as shown in section in Figure 6. Hub 49 is enlarged and grooved to form pulley 54, and the pulley is recessed to receive a ball bearing 61 which is sleeved on flanged arbor 62 and retained thereon by ring 63 secured to the pulley hub by screws. The arbor is formed at the end of a slide 64 which slides in a slot formed between the inner side of bar 65 and retaining block 66. The slide 64 has a longitudinal slot on its upper side in alignment with tubular shank 60, and in this slot a long tube 68 is fitted to slide through the bore of arbor 62 and through the length of the tubular shank 60 of the knurling tool 36 while the knurling tool rotates. Tube 68 is attached to a block 69, Figures 2 and 3, and which block is bolted to a slide 70 having retaining flanges working in slots on the upper and lower faces of bar 65 and whereby tube 68 is reciprocated within slide 64 independently of the reciprocation of the slide and knurling tool. Sliding within the tube 68 is a piercing needle 71 which is attached to a block 72 bolted to slide 73 having retaining flanges also working in the slots in bar 65, and capable of sliding on the bar independently of slide 70 so that needle 71 may be reciprocated within the tube 68 independently of the reciprocation of the tube. Slides 70 and 73 are actuated by link 74 and lever 75 which passes down through a slot in tray 47 and is pivoted to a frame member of the machine. Also pivoted on

the machine frame is a lever 79 directly in line with lever 75 and connected thereto by adjustable link 80 so that levers 75 and 79 will swing on their pivots with a parallel motion. Projecting downward from hub 78 of lever 79 is a cam lever 81 having a roller 82 working in the cam groove of disk 83 secured to shaft 84 which is driven from the main drive of the cigar forming machine. Cam 83 rotates continuously to impart oscillating motion to lever 81 and through lever 79 oscillating motion to lever 75. Link 74 has a wide slot as best seen in Figures 9 and 10 through which pin 85 projects from slide 70 whereby during part of the movement of slide 73 in either direction slide 70 will be carried along by the same movement of lever 75, the purpose of which will hereinafter be referred to. The swing of lever 75 moves slides 70 and 73 from the full retracted position of Figure 2 to the position of Figure 9 which indicates the limit of the forward stroke, and during the movement from the position of Figure 2 slide 73 is first moved forward without moving slide 70 until pin 85 strikes end 86 of the slot in link 74 whereupon both slides move in unison to the end of the forward stroke at which point the relative positions of the slides and link will be as indicated in Figure 9. Upon the return stroke of lever 75, link 74 will move slide 73 away from slide 70 as shown in Figure 10 until pin 85 engages end 87 of the slot whereupon both slides will move in unison to the relative position indicated in Figure 2.

In the block 66 which is secured upon the wide flange of bar 65 as shown in Figure 3, is a slot 66' (Figs. 3a and 3b) which extends under and beyond the discharge outlet for paper tubes 94 from hopper 95. Working in this slot is a push rod 88, Figures 1, 2, and 3, adjustably secured in clamp 89 attached to a block 90 which slides on rod 81 carried by two blocks secured upon frame plate 92, one of which, block 93, being shown in Figure 1, and the other being located at a point beneath bar 65. The purpose of push rod 88 is to advance the paper tubes 94 through the slot as they are discharged from the hopper into the slot. The paper tube slot in block 66 is partly covered by plate 96 upon which the frame 97 of the tube gate and ejector is mounted and secured to block 66. From the base of frame 97 to the metal plate 98, Figures 1 and 6, the slot is covered by a transparent plate 99 so that the feed of paper tubes may be readily observed. The paper tube feed slot and the needle and feed tube slot are of the same depth and their bottoms are in the same horizontal plane, and from the edge 98^a of plate 98 to shoulder 66^a, see Figure 6, the block 66 is recessed to the depth of the tube slot, that is, a depth equal to the diameter of tubes 94 to permit transfer of tubes from the feed slot to the needle and feed tube slot, and for the purpose of permitting the transfer the wall of slide 64 is cut away between the points 64^a and 64^b as more clearly seen in Figure 6. Plate 98 is made of spring metal and has an L-shaped extension to form blade 100. This blade is given a slight downward bend so as to contact the paper tubes with light pressure, and to insure that the tubes are held properly in the path of push blade 101. Sliding crosswise on block 66 under the blade 100 is the push blade 101 which is moved back to the edge of block 66 as seen in Figure 8 to permit a tube 94 to be fed under blade 100, and when blade 101 is moved forward it engages the length of the tube and pushes it across the block 66 and

through the gap in slide 64 into the needle and feed tube slot. This movement of blade 101 and paper tube 94 places a tube 94 in alignment with feed tube 68 and needle 71 as seen in Figure 6 so that as the needle and tube are moved forward by the movement of slides 73 and 70 as above explained, the needle will enter and pass through the paper tube 94 and the feed tube 68 following up will engage the paper tube (see position indicated in Fig. 7) and push it forward from under retaining blade 100 and through the bore of arbor 62 and into the tubular shank 60 of the knurling tool 36, see Figure 8. It will be noted that the movements of the needle and feed tube are such that when the two slides 73 and 70 begin moving together the relative positions of the needle, paper tube and feed tube will be as indicated in Figure 7. That is, the needle will protrude beyond the end of paper tube 94 and all three will move together to the position of Figure 8. This brings the needle in position to pierce the head of the cigar as lever 75 continues the forward movement of slides 73 and 70. As the movement continues the needle point enters the cigar head and the paper tube 94 follows into the perforation until feed tube 68 reaches the cigar head, that is, when the paper tube is fully inserted in the cigar as indicated in Figure 9. This position indicates the limit of the forward movement of lever 75, link 74, slides 73 and 70, needle 71 and feed tube 68. Lever 75 now starts on its return movement due to the continuous rotation of cam disk 83, and the first step is the movement of slide 73 away from slide 70 to the position indicated in Figure 10 which movement withdraws the needle from the paper tube 94, except its pointed end, while the feed tube still abuts the paper tube holding it in position within the cigar head, and the filler tobacco due to the action of the knurler will be compressed about the tube. The continued movement of lever 75 now moves both slides 70 and 73 in the return movement withdrawing the point of the needle from the inserted paper tube 94 and feed tube 68 from contact therewith, and both the needle and feed tube will move together at the same rate and are returned to the position of Figure 6 to permit the next paper tube to be fed into position by push blade 101 the instant the needle and tube 68 arrive at the position of Figure 6. During this entire operation the pulley 54 and knurler 36 are in continuous rotation. The re-knurling operation thus takes place simultaneously with the insertion of the needle 71 and paper tube 94, and continues throughout the withdrawal of the needle from the cigar; the knurler 36 being projected into engagement with the cigar head (Figure 8) prior to entry of the needle into said head, and said knurler remaining in engagement with said head until after the needle is withdrawn.

The hopper 95 for paper tubes 94 is circular in form and has a flat bottom set at an angle and mounted rigidly on frame plate 92. The purpose in setting the hopper bottom at an angle is to cause the small paper tubes to gather at the lower angle. Bottom member 102 of the hopper may be solid as shown in section in Figure 3, or of any other form, but the circumferential edge must be continuous and of sufficient width to prevent tubes 94 dropping through (except for the tube passing notch or discharge slot 105 hereinafter mentioned). Seated on bottom member 102 is a rotating bottom or collector plate 103 having spaced notches 104 on its

periphery and of a length to freely admit the paper tubes. As the bottom rotates the tubes are tumbled about in the lower angle of the hopper and as the tubes level off on plate 103 they move toward the hopper drum 95 and assume positions tangential to plate 103 and eventually drop into the notches or pockets 104 and rest on the rim of bottom member 102. The rotating plate 103 at its periphery is of a thickness sufficient to form pockets at the notches of a depth approximately equal to the diameter of the tubes, so that, once the tubes are caught by the pockets they will be retained therein and be carried around to the upper section of the hopper to the discharge slot 105 in the rim of bottom member 102, Figure 3. Through this slot the tubes drop successively onto the gate 106 which projects through a slit in the wall of hopper 95 and into the slot 105. The gate is loosely hinged at the top of frame 97 so that its weight will tend to maintain it in the closed position. At approximately its mid-section the gate has a slight outward bend as indicated at 106^a to form a cam surface which is engaged by pin 107 on the ejector plate 108 sliding in frame 97 and of a width and thickness to freely enter slot 105. At the top of ejector plate 108 are a pair of knuckles 109 (Fig. 3) between which is hinged a link 110 which is pivotally connected to lever 111 clamped on rockshaft 112. As the lever 111 oscillates downward from the position shown in Figure 3 it draws the ejector plate 108 downward, and this movement causes pin 107 to swing the gate 106 out of the path of paper tube 94 in the discharge slot 105 and the ejector continues downward into slot 105 to eject the tube 94 therefrom and insure its deposit in the tube slot 66' in block 66 to be engaged by push rod 88 as above described. The plate 96, on which the frame 97 is mounted, is cut away as shown in Figures 3 and 3A, to permit the tube to pass from discharge slot 105 with the feed slot 66'. It may also be noted that the edge of slot 66' opposite the discharge slot 105 is preferably cut away, as shown at 66'', so that it is inclined and aligned with the lower wall of said slot 105, thereby facilitating the ejection of the tubes. On the upward oscillation of lever 111 the ejector is returned to the position of Figure 3 allowing the gate to fall back to its trapping position to catch the next tube 94, which enters the discharge slot 105. In the operation of this apparatus the feed of tubes 94 to the discharge slot 105 may be irregular, that is, pockets 104 may miss catching a tube and this contingency is taken care of by the timing of the feed mechanism as hereinafter described.

The rotating bottom or collector plate of the hopper is secured to an arbor 113 journaled in bearings in the hopper bottom member 102 and frame member 92, Figure 3, and fixed on the arbor is a ratchet wheel 114, and sleeved on the arbor is a lever 115 from an end of which projects arm 116 to which is pivoted ratchet dog 117. Oscillating motion is imparted to lever 115 to move ratchet dog 117 one notch at each oscillation for intermittent rotation of the collector plate 103.

The movements of the grippers 22 and 35, cigar push-rods 31, paper tube push-rod 88, tube transfer blade 101, ejector 108, and ratchet lever 115, are all controlled by cam shaft 118 journaled in bearings 119, one of which is shown in Figures 3 and 5 mounted on frame member 8. This shaft is driven in clockwise direction

from the main drive of the cigar making machine and has adjustably secured thereon cams 120, 121, 122, 123 and 124 (Figs. 2, 3, and 5) all rotating continuously in unison.

Cam 120 (see Fig. 5) actuates lever 125 which is pivotally connected with pull rod 43 which actuates grippers 35 and 22 as above explained. Lever 125 is pivoted on block 126 mounted on a frame member and has a roller follower 127 which engages the periphery of disk 129 and is held toward the same by the pull of springs 44 and 46. Cam 120 has a long concentric surface or dwell of approximately 280° and a relatively short concentric surface of about 60° connected by a short quick rise and fall as seen in Figure 5. In the position shown roller 127 is in contact with the concentric surface of shorter radius and consequently grippers 35 and 22 are held in gripping position by the pull of springs 44 and 46 for holding cigars in position in alignment with the knurling tools 36 and 27. As cam roller 127 rides up on surface *a*, lever 125 is moved to the right pulling link 43 in the same direction and rocking shafts 38 and 24, respectively, clockwise and counterclockwise to raise arms 37 and 23 and move grippers 35 and 22 out of gripping position to release the cigars held thereby and allow the finished cigar to roll down skids 23 onto the tray 47 and a cigar from the first knurling position to roll onto the skids to be pushed into position for gripping at the second knurling position, the grippers remaining in open position during the travel of roller 127 on the long concentric surface of the cam 120. Coincidentally with the start of the movement of lever 125 to raise grippers 35 and 22 out of gripping position, oscillating rack-bar 4 through pinplate 21 in its upward stroke engages lever 17 to move arm 13 and fingers 12 down so that these fingers will recede below apron 2 to allow the cigar at the first knurling position to roll onto the apron and from the apron onto skids 28 as above explained. During the continued dwell of roller 127 on the long concentric surface of cam 120 rack-bar 4 will start on its downward stroke allowing lever 17 to recede due to the pull of its spring 13 thereby returning fingers 12 to the receiving position of Figure 5 in readiness to catch the next cigar from the re-rolling operation. Also during this period rack-bar 4 will make several short oscillations (without engaging lever 17) for the re-rolling of a cigar, and as roller 127 is about to roll down surface *b* of cam 120, rack-bar 4 will make its long downward stroke to impart a longer roll to the cigar being re-rolled so as to carry it beyond the point of engagement between the apron and cylinder and thereby allow the cigar to roll down the apron to be caught by fingers 12 at which time cam roller 127 rides down cam surface *b* and grippers 35 and 22 are brought down into gripping position. As roller 127 rides down on cam surface *b* and grippers 35 and 22 move toward the gripping position through the action of springs 44 and 46, and simultaneously with the feed of a cigar from the re-rolling operation to the first knurling position, the cigar previously released by fingers 12 from the first knurling operation which comes to rest at the angle formed by the skids and apron intermediate the two knurling positions, will be pushed under fender 33 by rods 31 into position to be engaged by gripper 35 for the second knurling and tube inserting operation.

Cam 121 actuates the push-rods 31 through lever 128 pivoted at 129 in a bearing secured to a

frame member and located behind bearing 119, Figure 5. Lever 128 has a rod 130 fixed in a hub at the upper end and projecting horizontally therefrom, and on this rod push-rods 31 are hinged. Each push-rod 31 is made in two sections joined by two clamping screws passing through a slot in one section as seen at 131 in Figure 5 to permit adjustment of the rods for length and uniform engagement of a cigar by both rods. Lever 128 has a roller follower 132 for engaging the periphery of cam plate 121 and is held in contact therewith by a spring which to avoid confusion in the drawings has been omitted. Cam 121 comprises a long concentric surface or dwell of approximately 250°, a slow forward drive cam surface *c* and a quick return surface *d*. In the position shown in Figure 5, cam lever 128 is at the limit of its return stroke with roller 132 at the beginning of the concentric surface. As the cam rotates clockwise from the position shown in Figure 5, roller 132 will ride on the concentric surface, and hence push-rods 31 will be held stationary at the position shown in Figure 5, and when roller 132 is engaged by cam surface *c* the roller will ride outward and cause lever 128 to swing forward, that is, to the left as viewed in Figure 5, and push the rods 31 forward on skids 28 to a point near the curve 30 to roll a cigar over the edge into the seat 39 to meet gripper 35 as it is moving into gripping position. It will be noted by reference to Figure 5 that cam 121 will rotate approximately 250° before the push rods 31 begin to operate, and that during that period the inclined portion *a* of cam 120 will have rocked the lever 125 to open the grippers 35 and 22 to release the cigars held thereby. The forward movement of the push-rods 31 will bring the cigar over the upper edge of the curve or bend of seat 39 after gripper 35 has started toward gripping position and has reached a position wherein, while its upper longitudinal edge is spaced sufficiently from the curve of seat 39 to permit the cigar to pass through the gap therebetween, the lower longitudinal edge of the gripper is sufficiently close to the lower part of seat 39 to prevent the cigar from rolling beyond said lower edge of the gripper. In other words, at the time that the cigar is pushed over the upper curve of seat 39, the gripper is so positioned that its upper edge permits the cigar to pass over said curve and down into said seat, but the lower edge of the gripper prevents the cigar from rolling off said seat. Continued movement of the gripper brings it into the position shown in Figure 5, the push-rods 31 being meanwhile retracted toward their normal (Fig. 5) position as cam 121 continues its rotation.

Cam 122, see Figures 2 and 3, is a grooved cam having three cam surfaces *e* which engage roller 133 journaled on a stud clamped at the end of arm 134. This arm is secured on the end of rock-shaft 135 journaled in bearing 136. At the opposite end of shaft 135 is secured arm 137, which with arm 134 and rock-shaft 135 forms a crank as seen in Figure 3, and which crank is connected with hopper lever 115, Figure 4, by an adjustable link 138. By this operative connection between cam 122 and lever 115, the hopper collector disk 103 is rotated intermittently through ratchet and pawl 114—117 three notches to each complete revolution of cam 122.

Lever 115 has pivotally connected to its outer end a rod 139 which slides in block 140 (Fig. 2) pivoted at the end of lever 141. On rod 139 at

its free end is a collar 142 adjustably secured to the rod by a set screw and which collar engages block 140 to positively draw the lever 141 in one direction. Lever 141 is pivoted at 143 on the frame plate 92, and pivoted to the other end of this lever is a slide block 144 which slides in a slot in block 90 to which feed rod 88 is attached as above explained. Sleeved on rod 139 is a compression spring 145 which is seated between adjustable stop 146 and pivoted block 140 so that movement of lever 141 to effect the forward feed movement of rod 88 is obtained through compression spring 145. Rod 88 feeds one paper tube 94 at a time in the tube slot as it is discharged from the hopper 95, and also the line of tubes as seen in Figure 2, until the first tube in the line abuts against shoulder 66^a (Fig. 5), the tubes being held in alignment between the walls of the feed slot and plates 99 and 98. The tension of spring 145 is sufficient to impart the necessary motion to lever 141 to feed the light paper tubes, but when the tube slot is full and feed rod 88 cannot be further advanced, the pressure of rod 139 will be taken up by the compression of spring 145 and the rod will slide through its bearing block 140. The return movement of lever 141 for the feed stroke of rod 88 is made by the engagement of collar 142 with bearing block 140. Thus for each feed step of collector plate 103 lever 141 imparts a feed stroke to rod 88 regardless of whether or not a tube has been discharged from the hopper.

Cam 123, Figures 2 and 5, controls the cross-feed of paper tubes 94 from the feed slot in block 66 to the feed slot in slide 64 by means of blade 101. Blade 101 is attached to a slide 147 which reciprocates on rail 148 secured to bracket 149 projecting from frame plate 92. Slide 147 is actuated by lever 150 which has a pin working in a vertical slot in the slide as seen in Figure 5, and lever 150 is secured on rock-shaft 151 which works in bearings in a pair of brackets 149. Shaft 151 passes through one of the brackets 149 and on the opposite end a lever 152 is secured and to which is pivoted an adjustable link 153. This link is pivotally connected to lever 154 which is pivoted at 155 on bearing 119. Lever 154 has a roller follower 156 which contacts the periphery of cam plate 123 and is held in contact therewith by a spring 157 connected between a pin projecting from frame member 8 and a pin projecting from the hub of lever 154. Cam 123 has a long concentric surface or dwell of approximately 210° which holds lever 154 in its forward position, the position shown in Figure 5, against the pull of its spring 157, and through link 153 and levers 152 and 150 holds slide 147 and blade 101 in the retracted position in readiness for the cross-feed of a paper tube 94. As roller 156 rides in on cam surface *f*, lever 154, through the pull of spring 157, draws link 153 and lever 152 rearward, that is, to the right as viewed in Figure 5, moving lever 150 forward and shifting slide 147 and blade 101 forward to transfer a tube 94 from the feed slot position under spring blade 100 to the feed slot in slide 64 in position to be engaged by the piercing needle and feed tube as above explained, the limit of the forward or transfer shift of blade 101 being reached when roller 156 rides onto the low point *g* of the cam surface *f* which has a dwell of about 100°. The purpose of this dwell is to hold transfer blade 101 in the forward position, and thereby to hold a tube 94 in alignment with the piercing needle 71 as seen in Figure 6, a sufficient period to allow the needle

to enter the tube. The roller 156 then rides outward on cam surface *h* moving lever 154 to retract slide 147 and blade 101, and, when the roller rides onto the long concentric dwell, blade 101 will be held in the full retracted position of Figure 5 during which time the operations above described in connection with Figures 7 to 10 take place.

Cam 124, Figures 2 and 3, controls the movements of gate 106 and ejector 108. As above explained the gate and ejector are actuated by lever 111 secured on rock-shaft 112 which is journaled in brackets 149. On the shaft 112 is clamped a lever 158 to which is pivoted adjustable link 159 pivotally connected to lever 160 which is pivoted at 161 on cam-shaft bearing 119. Lever 160 has a roller follower 162 which is held in contact with the periphery of cam plate 124 by a spring (not shown) connected to lever 160. Cam plate 124, as seen in Figure 3, has three identical sets of cam surfaces for successively actuating lever 160 three times for each revolution of the cam plate, the three actuations corresponding to and being performed in timed relation with the three actuations of the hopper collector plate 103 for each revolution of the hopper control cam 122. That is, during each interval of rest of collector plate 103 (at which time a tube is or may be held in the discharge slot 105 by gate 106) one of the sets of cam surfaces of cam plate 124 actuate lever 160 to effect the movements of gate 106 and ejector 108 as above explained. Each set of cam surfaces on cam plate 124 comprises a high concentric surface *m* of approximately 30°, low concentric surface *n* of approximately 30°, connecting cam surface *o* between *m* and *n* of approximately 10°, and cam surface *p* of approximately 50°. In the position shown in Figure 3, a cam surface *p* has completed the active or ejector stroke of the levers, and gate 106 is partly closed (enough to insure catching a tube 94 deposited by the collector plate into discharge slot 105) and as roller 162 continues to ride up on cam surface *p*, lever 160 will continue moving forward to raise ejector 108 slightly higher to allow pin 107 to enter slot 106^b in the gate and permit the gate to completely close discharge slot 105. As the roller 162 rides on the high concentric surface *m* the ejector will remain stationary and the gate fully closed. As the roller rides down on cam surface *o* the ejector movement starts, without, however, opening the gate, that is, to approximately the position shown in Figure 3 (the purpose of which will be later explained) and then the roller rides on low concentric surface *n* and holds the levers and connected parts for a short interval in approximately the position shown in Figure 3. When roller 162 rides down cam surface *p* the ejector movement is completed by a rapid inward movement of lever 162 to the limit as the roller contacts the curved part of cam surface *p*, and as roller 162 starts to ride up on the straight part of cam surface *p* the ejector mechanism returns to the position shown in Figure 3.

During this movement of cam 124 and co-operating levers in the operation of the gate and ejector, stop-lug 163, which forms part of lever 158 and the clamp whereby the lever is secured on rock-shaft 112, oscillates in a vertical plane into and out of the path of pin 164 on lever 165, Figure 2. This lever is pivoted on a stud 166 projecting from plate 92 and has a spring (not shown) attached to a pin project-

ing from the pivot end of the lever which tends to constantly draw the lever to the right from the position shown in Figure 2 to move pin 164 against stop 163 or under it as will be presently explained. To lever 165 is pivotally connected a bar 167 which projects under the hopper and rests on tube feed lever 141 to which it is linked by a headed pin 168 the shank of which works in slot 169. Pin 168 is free to move back and forth in slot 169 as lever 141 swings on its pivot to reciprocate the tube feed rod 88, and as lever 141 swings to the right after having imparted the full feed stroke to rod 88 (the position shown in Figure 2) rod 167 will follow lever 141 due to the pull of the spring connected to lever 165 until pin 164 abuts against stop-lug 163. Under certain conditions, hereinafter pointed out, if lug 163 is not in the path of movement of pin 164, lever 165 will move further until it abuts against stop 170 which is adjustably mounted on bracket 149. In this latter position of lever 165 pin 164 will stand under stop-lug 163 and prevent the oscillation of rock-shaft 112 and interrupt the ejector movement.

The purpose of control lever 165 is to insure the proper feed of paper tubes to the transfer position; to make certain that a tube will be in position for cross-feed to the tube inserting position in slide 64; and to prevent an oversupply of tubes at the discharge slot 105.

It may be noted more specifically that, upon the completion of the downward stroke of the ejector, the arm 115 and rod 139 (Figs. 2 and 4) are actuated by cam 122 to rock the lever 141 and shift the plunger 88 to the left (Fig. 2) for feeding the ejected tube forwardly in the slot 66'. Preferably the cam surface *p* is formed with a slight dwell *p'* (about 10° for example) between its curved and straight portions so that the ejector 108 remains briefly in its lowermost position, until the ejected tube has been moved forward beneath the adjacent edge 95' of plate 96 which overlies slot 66' immediately beyond the discharge slot 105 (see Figs. 3A and 3B). The straight portion of the cam surface *p* then acts upon roller 162 and lever 160 to restore the ejector 108 to its uppermost position.

After the plunger 88 has completed the forward feeding movement of the ejected tube the cam 122 actuates rod 138 to feed the hopper plate 103 one step and concurrently to restore the plunger 88 to the right, into its retracted position. During the retraction of said plunger, the lever 165 is swung by its spring so that its pin 164 moves to the right, but before said pin can pass under the stop lug 163, the next cam surface *o* of cam 124 comes opposite roller 162, and the ejector 108 drops slightly into the position shown in Figure 3, at which time the lug 163 has dropped sufficiently to come into the path of pin 164 and thus block further movement of the latter to the right. Then, when surface *n* of cam 124 passes out of engagement with roller 162, and the curved surface of cam portion *p* of said cam comes under said roller, the ejector completes its downward movement and ejects another tube from slot 105, into position between the previously ejected tube and the plunger 88.

When the feed slot 66' is not full the foregoing action is repeated. When, however, said feed slot is full, and the arms 115 and 139 are actuated by cam 122 in the direction for advancing the plunger 88, the forward movement of the latter is blocked by its engagement with the tube which

has just been ejected from discharge slot 105 into feed slot 66'. The spring 145 on rod 139 is now compressed and allows said rod to slide in its pivot block without imparting further movement to lever 141 and plunger 88. However, during said actuation of arms 115 and 139 in plunger feeding direction, the straight portion of cam surface *p* on cam 124 engages roller 162 and raises the ejector 108 to its highest position. Stop lug 163 is thereby also raised into its uppermost position, so that the lever 165 can be swung by its spring sufficiently to bring its pin 164 beneath said stop lug 163, at which time further movement of said lever 165 under the action of its spring is stopped by engagement with said lever with stop 170. It may be noted that when the advance of plunger 88 is blocked by a full line of tubes, as above described, pin 168 of lever 141 is positioned sufficiently to the rear of the forward end of slot 169 to permit lever 165 to remain stationary with the pin 164 under the stop lug 163.

With a full line of tubes in slot 66' as aforesaid, plunger 88 cannot feed forwardly the tube last ejected from discharge slot 105 until after crosshead 101 has fed the foremost tube out of slot 66' and has been retracted into its position shown in Figure 5. Then, in the next actuation of arms 115 and 139 to advance the plunger 88, the latter feeds the line of tubes forwardly. In this operation of said plunger, pin 168 of lever 141 strikes the forward end of slot 169 in link 167 and restores lever 165 into its left hand position shown in Figure 2, releasing the stop lug 163. Thereafter, as the operation continues, plunger 88 is retracted as previously described, and lever 165 is drawn to the right by its spring, but before pin 164 can come under stop lug 163 the next cam surface *o* of cam 124 comes opposite roller 162 and lug 163 drops back into the path of said pin 164, freeing the ejector mechanism for operation to feed a tube through discharge slot 105 into slot 66'.

As above stated, the piercing of the cigar tip and insertion of a paper tube 94 takes place while a cigar is held in position at the second knurling tool 35, and during that operation no cross-feed or transfer of paper tubes from the feed slot in block 66 to the slot in slide 64 takes place. But in order to insure a supply of tubes to the transfer position, the hopper feed acts three times to one transfer movement. This takes care of the occasional failure of pockets 104 to catch a tube for delivery to the discharge slot 105. When the feeding of tubes into the discharge slot 105 is constant and the feed slot in block 66 is full with a tube in position to be released by the gate, push rod 88, as previously noted, will abut the line of tubes and be arrested in its forward movement and spring 145 on rod 139 will be compressed and allow the rod to slide in its pivot block 140 without imparting further movement to feed lever 141. At such time lever 141 would come to rest at a point further to the right as viewed in Figure 2, i. e., the length of a paper tube 94, and consequently rod 167 will be free to slide on lever 141 a corresponding distance and permit lever 165 to move pin 164 under stop-lug 163. In that position of pin 164, as above stated, the turning of rock-shaft 112 will be arrested and prevent the operation of the ejector. In such case, the tube carried in the pocket 104 which happens to be in alignment with the discharge slot 105 will not be released by the gate and will be carried around the hopper by the collector plate. Thus

jamming of paper tubes at the discharge slot of the hopper is avoided.

The timing of cam 124 is such that as the ejector stroke begins by the opening of gate 106, stop-lug 163 will have moved down into the path of pin 164 and prevents lever 165 from moving the pin under the stop-lug and thereby permits rock-shaft 112 to complete the full ejector stroke to place a tube 94 in position in the feed slot 66' to be advanced by push-rod 88. This insures the regular constant feed along the feed slot 66' when tubes are regularly and constantly deposited in discharge slot 105 by the collector plate 103, if the feed slot is not already filled. When the pockets 104 of the collector plate happen to miss catching a paper tube in regular order, and therefore the discharge slot 105 would be empty when the ejector passes down through that slot, the feed slot 66' would not be full up to the discharge point at the hopper and consequently push-rod 88 would make an idle stroke. It is for this purpose that the hopper collector plate and the ejector mechanism are actuated three times in each revolution of the control cams 122 and 124 during the single operation of the cross-feed blade 101 and the piercing needle and tube inserting mechanism for each revolution of their control cams 123 and 83. This enables the hopper and ejector mechanism to catch up on the supply of paper tubes to the feed slot and permits push-rod 88 to feed tubes forward to the transfer position.

The operation of the complete apparatus will be clear from the foregoing description of the re-rolling, knurling, re-knurling and paper tube inserting mechanism and their functions, and may be summarized as follows: The mechanism above described being operatively connected with a cigar forming machine of the usual type, such, for example, as a machine of the general type illustrated in the patent to Tyberg, No. 1,134,246, dated April 6, 1915, or, as shown in the patent to Rundell, No. 1,582,545, dated April 27, 1926, a cigar produced by that machine is deposited upon the apron of the re-rolling mechanism, and since the re-rolling and knurling mechanism and the cam shaft controlling the actuation of cigar feed, grippers and paper tube inserting mechanisms are all driven in unison with the cigar forming machine, all parts will begin operating simultaneously, and, as the first cigar is undergoing the re-rolling operation, the paper tube feeding mechanism starts supplying tubes in readiness for feeding into position for insertion into the cigars as they arrive at the re-knurling position. When the re-rolling operation on the first cigar is completed the cigar is delivered to the first gripping fingers for the first knurling operation. During this time should the paper tube slot become filled before the first cigar reaches the tube inserting position, the feeding of tubes into the feed slot will be skipped as above explained. When the first knurling operation is completed the cigar is passed along to the second knurling and tube inserting position while the tube feeding mechanism continues to operate. At that point the tube insertion and second knurling takes place simultaneously, and in the meantime a second cigar has been delivered to the first knurling position, and a third cigar is delivered for re-rolling. At this time four operations will be under way, i. e., tube inserting, re-knurling, first knurling and re-rolling. As the tube inserting and re-knurling operation is completed the first cigar is discharged onto the re-

ceiving tray and the second cigar advances to the second knurling position and this cycle of operations continues as long as the entire apparatus is in operation.

Means may be provided for piercing the head of the cigar as a preliminary to the insertion of the needle 71 and tube 94 in the second knurling position. The entry of the needle and tube may thereby be facilitated in cigar heads in which the filler is tightly compressed. This pre-piercing means, shown in Figures 12 and 13, may be associated with the first knurler 27 and may take the form of the piercing mechanism illustrated in my copending application, Serial No. 12,720, filed March 23, 1935. Thus, referring to Figures 12 and 13 of the drawings of the present application, the knurler 27 is shown attached to a sleeve 172, sliding in the sleeve hub 173 of pulleys 50, 51. In bushings 174 within the sleeve 172 is mounted the piercing pin 175, which thus is concentric with knurler 27. A collar 176 on sleeve hub 173 retains said hub in position in the frame bearing portion 177 in which it is journaled. A key 178 projects from hub 173 into a long keyway in sleeve 172 whereby rotation of pulley 50 is transmitted to said sleeve 172 and knurler 27. Rotation of sleeve 172 is transmitted to pin 175 through pin 179 which projects from sleeve 172 into an extended keyway in pin 175. It will be apparent from the foregoing description that sleeve 172 and pin 175 can both move axially, independently of each other. Pin 175 may be reciprocated by any suitable means, such as cam operated lever 180 which engages shifter collar 181 on said pin, and is operated to and from its rest position 180' (Fig. 12). Sleeve 172 is reciprocated by cam arm 55 previously mentioned, which is actuated to and from its rest position 55' (Fig. 12). As in my co-pending application, No. 12,720, above referred to, the operation of lever 180 and pin 175 is so timed with respect to the operation of sleeve 172 that said pin 175 is caused to pierce the cigar head after the knurler 27 engages said head, said pin 175 being withdrawn from the cigar head before knurler 27 is disengaged therefrom.

In the example illustrated in Fig. 12 the needle 175 is projected only a slight distance into the cigar head, and the needle 71 is projected further into said head to the distance necessary for insertion of the tube. It will be clear that, if desired, the stroke of needle 175 may be such as to carry the latter into the cigar head to the same extent as needle 71. It will be furthermore seen that needle 175 may be of smaller diameter than needle 71, so that the piercing of the cigar head may be accomplished in stages producing both increased length and diameter of the hole in the cigar head; or, if both of said needles be projected the same distance into the head, the piercing stages may correspond simply to increasing diameters.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

I claim:

1. The method of treating a cigar comprising inserting a piercing element through a tube, introducing said tube and element into the head of said cigar, withdrawing said piercing element

from said head, and knurling said head during said withdrawal of said element.

2. The process of treating the head of a cigar, comprising passing a piercing element through a tube, forcing the element and tube into the cigar head to deposit the tube therein, withdrawing said element, and knurling said head during said insertion and withdrawal of said element.

3. In combination, means for knurling the head of a cigar, means for inserting a draft element through said knurling means and into said head, and means for withdrawing said inserting means while said draft element is maintained in said head.

4. In combination, means for knurling the head of a cigar, puncturing means, means for passing said puncturing means through the knurling means and into said head, and means for feeding a tube into the path of said puncturing means for travel therewith into said head.

5. In combination, means for supporting a cigar, means for puncturing the head of said cigar while the latter is engaged with said supporting means, means for moving said puncturing means into and out of engagement with said head, means for depositing a tube between said puncturing means and said head, and means for causing said tube to travel with said puncturing means into said head.

6. In combination, means for supporting a cigar, means for puncturing the head of said cigar while the latter is engaged with said supporting means, means for moving said puncturing means into and out of engagement with said head, means for depositing a tube between said puncturing means and said head, means for inserting said tube into said head, and means for operating said tube inserting means independently of said puncturing means.

7. The process of inserting a tube into the head of a cigar, comprising projecting a puncturing element beyond an inserting element and into the tube, projecting both the puncturing element and the inserting element to insert the puncturing element and tube into the cigar, retracting the puncturing element from the tube and into said inserting element, and withdrawing said puncturing and inserting elements to a position for acting upon a new tube.

8. In combination, means for supporting a cigar, puncturing means, tube-inserting means surrounding said puncturing means, means for feeding a tube into a position between said puncturing and inserting means and said supporting means, and means for first projecting the puncturing means through said tube, then projecting both the puncturing and the inserting means to carry the puncturing means and the tube into the head of the cigar, then withdrawing the puncturing means from the tube and into the inserting means, and then retracting the puncturing and inserting means to their initial position.

9. The process of treating a cigar comprising rerolling the same, then knurling the head of said cigar, and then concurrently knurling said cigar head and inserting a tube into the same.

10. The process of treating a cigar comprising rerolling the same and thereafter concurrently knurling the head of said cigar and inserting a tube into said head.

11. Cigar treating mechanism comprising rerolling means, means for knurling a cigar subsequent to the action of said rerolling means thereon, and means cooperating with said knurl-

ing means for inserting a tube into the head of said cigar.

12. The process of treating a cigar, comprising depositing a tube in the cigar head after application of the wrapper thereto, and knurling said head after said tube has been deposited.

13. The process of treating a cigar comprising depositing a tube in the cigar head and knurling said head during the depositing of said tube and after said tube has been deposited.

14. Cigar treating mechanism comprising rerolling means, means for knurling a cigar subsequent to the action of the rerolling means thereon, and means for passing a tube along the axis of the knurling means and into the head of the cigar.

15. The process of treating a cigar comprising projecting a puncturing element beyond an inserting element and into a tube, projecting both the puncturing element and the inserting element to insert the puncturing element and tube into the cigar, retracting the puncturing element, maintaining the inserting element in engagement with the tube while knurling the cigar head to compress the filler tobacco about the tube, and withdrawing the puncturing and inserting elements to a position for acting upon a new tube.

16. The process of treating a cigar comprising depositing a tube in the cigar head after application of the wrapper thereto, and knurling said head to compress the filler tobacco about the tube after the latter has been deposited.

17. Cigar treating mechanism comprising cigar supporting means, means for feeding cigars in succession to said supporting means, draft element inserting means, means for feeding draft elements in succession to said inserting means, and means for actuating said inserting means to insert the draft elements in succession into the heads of successive cigars on said supporting means.

18. Cigar treating mechanism comprising cigar supporting means, means for feeding cigars in succession to said supporting means, draft element inserting means, means for feeding said elements rectilinearly in succession toward said inserting means, and means for actuating said inserting means to insert said elements in succession into the heads of successive cigars on said supporting means.

19. Cigar treating mechanism comprising cigar supporting means, means for feeding cigars in succession to said supporting means, tube supply means, means for feeding tubes in a given path from said supply means toward said supporting means, means for feeding a tube transversely of the first mentioned path into alignment with a cigar in said supporting means, and means for inserting an aligned tube into said cigar.

20. Cigar treating mechanism comprising cigar supporting means, draft element supply means, means for ejecting draft elements successively from said supply means into a feed channel, means for feeding ejected draft elements through said channel and toward said supporting means, means for inserting said elements into cigars in said supporting means, and means controlled by said feeding means for rendering said ejecting means ineffective when said channel is filled.

21. Cigar treating mechanism comprising cigar supporting means, draft element supply means, means for ejecting draft elements successively from said supply means, means for feeding

ejected draft elements through said channel and toward said supporting means, means for inserting said elements into cigar in said supporting means, and interlocking means between said feeding means and said ejecting means for controlling the effectiveness of said ejecting means.

22. Cigar treating mechanism comprising cigar supporting means, means for feeding cigars in succession to said supporting means, means for piercing the head of a cigar, means for feeding tubes in succession toward said piercing means, means for projecting said piercing means through a tube, and thence into the head of a cigar in said supporting means, and means for projecting said tube into said head concurrently with the passage of said piercing means into said head.

23. Cigar treating mechanism comprising knurling means, means cooperating with said knurling means for piercing the head of a cigar, a second knurling means, means for transferring said cigar from the first to the second knurling means, and means cooperating with the second knurling means for inserting a tube into the head of said cigar.

24. Cigar treating mechanism comprising knurling means, means cooperating with said knurling means for piercing the head of a cigar, a second knurling means, means for transferring said cigar from the first to the second knurling means, and means comprising a second piercing means cooperating with the second knurling means for introducing a tube into the head of said cigar.

25. Cigar treating mechanism comprising cigar supporting means, means for piercing the head of a cigar in said supporting means, a second supporting means, means for transferring said cigar from the first to the second supporting means, and means cooperating with the second supporting means for inserting a tube into the head of said cigar.

26. Cigar treating mechanism comprising means for piercing the head of a cigar to a given extent, and means comprising other piercing means for piercing said head to a further extent and introducing a tube into said head.

27. Cigar treating mechanism comprising re-rolling means, means for receiving a cigar from said re-rolling means, means for knurling the head of the cigar in said receiving means, means for releasing said cigar from said receiving means, a second receiving means, means for transferring said released cigar to said second receiving means, and means cooperating with said second receiving means for inserting a tube into the head of said cigar.

28. Cigar treating mechanism comprising means for supporting a cigar, means for successively feeding cigars to said supporting means, tube supply means, means for ejecting tubes from said supply means, means for feeding ejected tubes in a given path, means for inserting tubes into cigars in said supporting means, and means movable transversely to said tube feed path for transferring tubes successively from said path to said inserting means.

29. Cigar treating mechanism comprising a support, means for feeding cigars successively to said support, a source of tube supply, means for ejecting tubes from said supply source, means for transferring tubes sequentially from said source to said ejecting means, means for operating said ejecting means, means for feeding along a given path tubes ejected by said eject-

ing means, means for inserting said tubes into cigars in said support, and means for transferring tubes from said path to said inserting means.

30. Cigar treating mechanism comprising cigar feeding means, a source of tube supply, means for ejecting tubes from said source, said source comprising means for receiving tubes and carrying the same sequentially to said ejecting means, means for feeding along a given path tubes ejected by said ejecting means, means for inserting said tubes into cigars supplied by said feeding means, means for transferring tubes from said path to said inserting means, and means for operating said tube receiving means with greater frequency than said transferring means to insure the provision of a tube for each cigar.

31. Cigar treating mechanism comprising a cigar support, means for feeding cigars to said support, draft element supply means, means for ejecting draft elements therefrom, means for inserting said elements into cigars in said support, and means for feeding ejected draft elements from said supply means to said inserting means.

32. Cigar treating mechanism comprising cigar feeding means, a tube supply source, means for ejecting tubes from said source, said source comprising movable means for conveying tubes successively to said ejecting means, means for inserting tubes into cigars supplied by said feeding means, and means for transferring tubes from said ejecting means to said inserting means.

33. Cigar treating mechanism comprising cigar feeding means, a tube supply source, means for ejecting tubes from said source, said source comprising movable means for conveying tubes successively to said ejecting means, means for inserting tubes into cigars supplied by said feeding means, means for transferring tubes from said ejecting means to said inserting means, and means for operating said tube conveying means with greater frequency than said tube inserting means.

34. Cigar treating mechanism comprising cigar feeding means, a tube supply source, means for ejecting tubes from said source, said source comprising movable means for conveying tubes successively to said ejecting means, means for inserting tubes into cigars supplied by said feeding means, means for transferring tubes from said ejecting means to said inserting means, means for operating said tube conveying means with greater frequency than said tube inserting means, and means for suspending operation of said ejecting means in response to the accumulation of a full line of tubes between said ejecting means and said inserting means.

35. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for feeding tubes longitudinally along a given path from said supply source, and means for feeding tubes transversely from said path to said inserting means.

36. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said source, means operable for intermittently conveying tubes successively to said ejecting means, and means operable during intervals between successive operations of said conveying means for feeding ejected tubes toward said inserting means.

37. In combination, cigar feeding means, a source of draft element supply, means for inserting draft elements into cigars supplied by said

feeding means, and means for transferring draft elements from said source to said inserting means.

38. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said source, means for feeding ejected tubes toward said inserting means, and means comprising a yieldable connection for operating said tube feeding means.

39. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said supply source, means operable at greater frequency than said inserting means for conveying tubes to said ejecting means, means for feeding ejected tubes toward said inserting means, and means responsive to accumulation of a full line of tubes between said ejecting means and said inserting means for disabling said ejecting means.

40. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said supply source, means operable at greater frequency than said inserting means for conveying tubes to said ejecting means, means for feeding ejected tubes toward said inserting means, and means controlled by said feeding means and responsive to accumulation of a full line of tubes between said ejecting means and said inserting means for disabling said ejecting means.

41. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said supply source, means operable at greater frequency than said inserting means for conveying tubes to said ejecting means, means for feeding ejected tubes toward said inserting means, and means responsive to accumulation of a full line of tubes between said ejecting means and said inserting means for suspending action of said feeding means.

42. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said supply source, means operable at greater frequency than said inserting means for conveying tubes to said ejecting means, means for feeding ejected tubes toward said inserting means, and means responsive to accumulation of a full line of tubes between said ejecting means and said inserting means for suspending action of said feeding and ejecting means.

43. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said source, means operable at higher frequency than said inserting means for conveying tubes to said ejecting means, means for feeding ejected tubes toward said inserting means, yieldable means for operating said tube feeding means, and stop means controlled by said feeding means, said stop means being constructed and arranged to block operation of said ejecting means when feeding of tubes by said feeding means is obstructed.

44. In combination, cigar feeding means, a source of tube supply, means for inserting tubes into cigars supplied by said feeding means, means for ejecting tubes from said tube supply source, said tube supply source comprising a hopper and a plate therein having means for receiving tubes, means for actuating said plate step by step to bring tubes successively to said ejecting means, means for operating said ejecting means, and means for feeding ejected tubes toward said inserting means.

45. In combination, cigar feeding means, a tube supply source comprising a hopper, a plate rotatably mounted in said hopper and provided with tube-receiving recesses, means for ejecting tubes from said hopper, means for intermittently rotating said plate to convey tubes successively to said ejecting means, means for feeding ejected tubes, and means for inserting said tubes into cigars supplied by said cigar feeding means.

46. In combination, cigar feeding means, a tube supply source comprising a hopper, a plate rotatably mounted in said hopper on an inclined wall thereof for rotation about an axis inclined to the vertical and provided with tube-receiving recesses, means for ejecting tubes from said hopper, means for intermittently rotating said plate to convey tubes successively to said ejecting means, means for feeding ejected tubes, and means for inserting said tubes into cigars supplied by said cigar feeding means.

47. In combination with a cigar machine comprising rerolling means and means for receiving a cigar from said rerolling means and knurling the same, means for receiving a cigar from the first mentioned receiving means, and means adjacent the second receiving means for inserting a tube into the cigar held thereby, contemporaneously with the rerolling of a cigar by the rerolling means and the knurling of a cigar in the first receiving means.

48. In combination with a cigar machine comprising rerolling means and means for receiving a cigar from said rerolling means and knurling the same, means for receiving a cigar from the first mentioned receiving means, and reknurling said cigar, and means adjacent the second receiving means for inserting a tube into the cigar held thereby, contemporaneously with the rerolling of a cigar by the rerolling means and the knurling of a cigar in the first receiving means.

49. The method of treating a cigar which comprises first rerolling the same, then knurling said cigar, and then inserting a tube into the head of said cigar and reknurling the same.

50. The process of treating the head of a cigar, comprising knurling said head and concurrently depositing a tube therein.

51. In apparatus for inserting tubes into cigars, a tube supply source, means for ejecting tubes successively from said source, means for feeding ejected tubes, and operating means for said ejecting and feeding means, said operating means being so constructed and arranged as to cause an ejected tube to be fed forwardly a predetermined distance while the ejecting means dwells in its ejecting position.

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