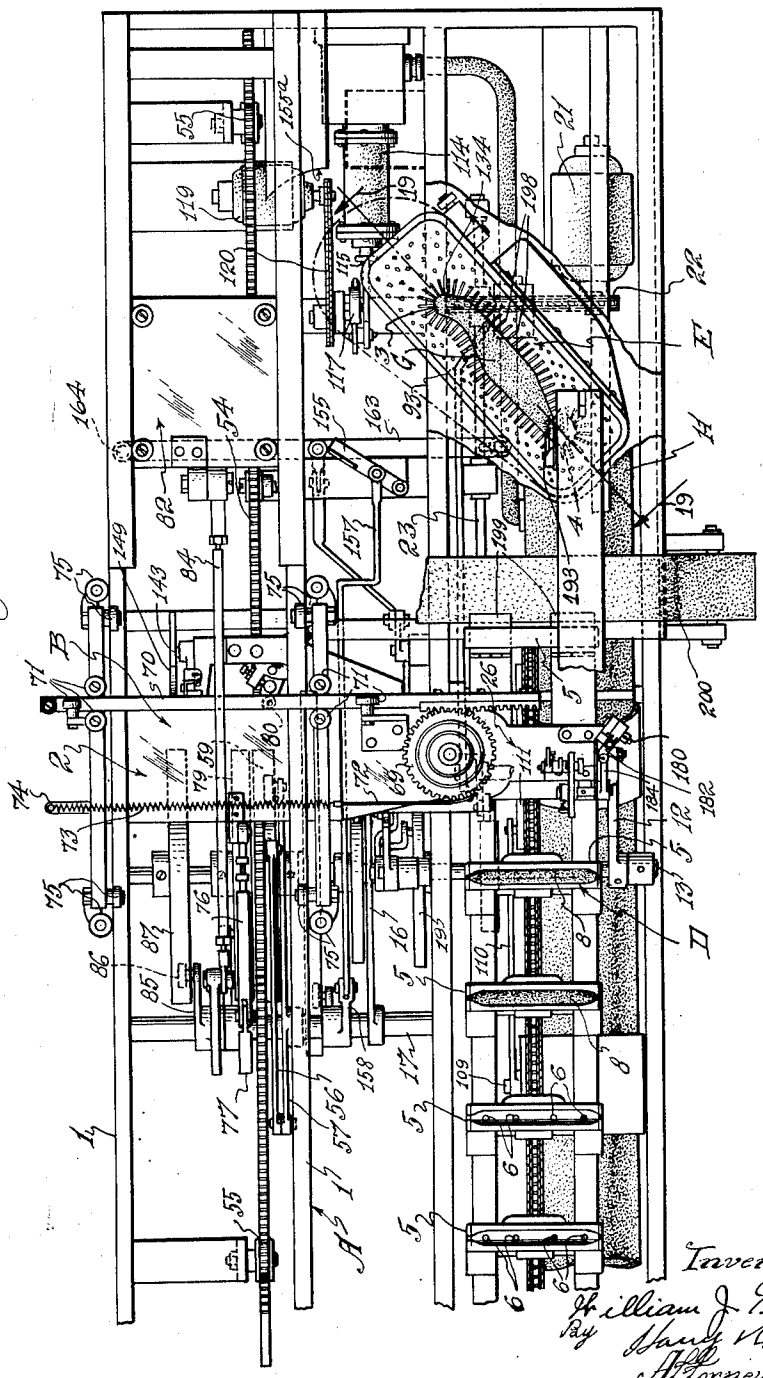
July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

Filed May 28, 1947 18 Sheets-Sheet 1

Fig. 1



Inventor:
William J. Giles
By Hauff & Wolcott
Attorney.

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CIGAR WRAPPING MACHINE

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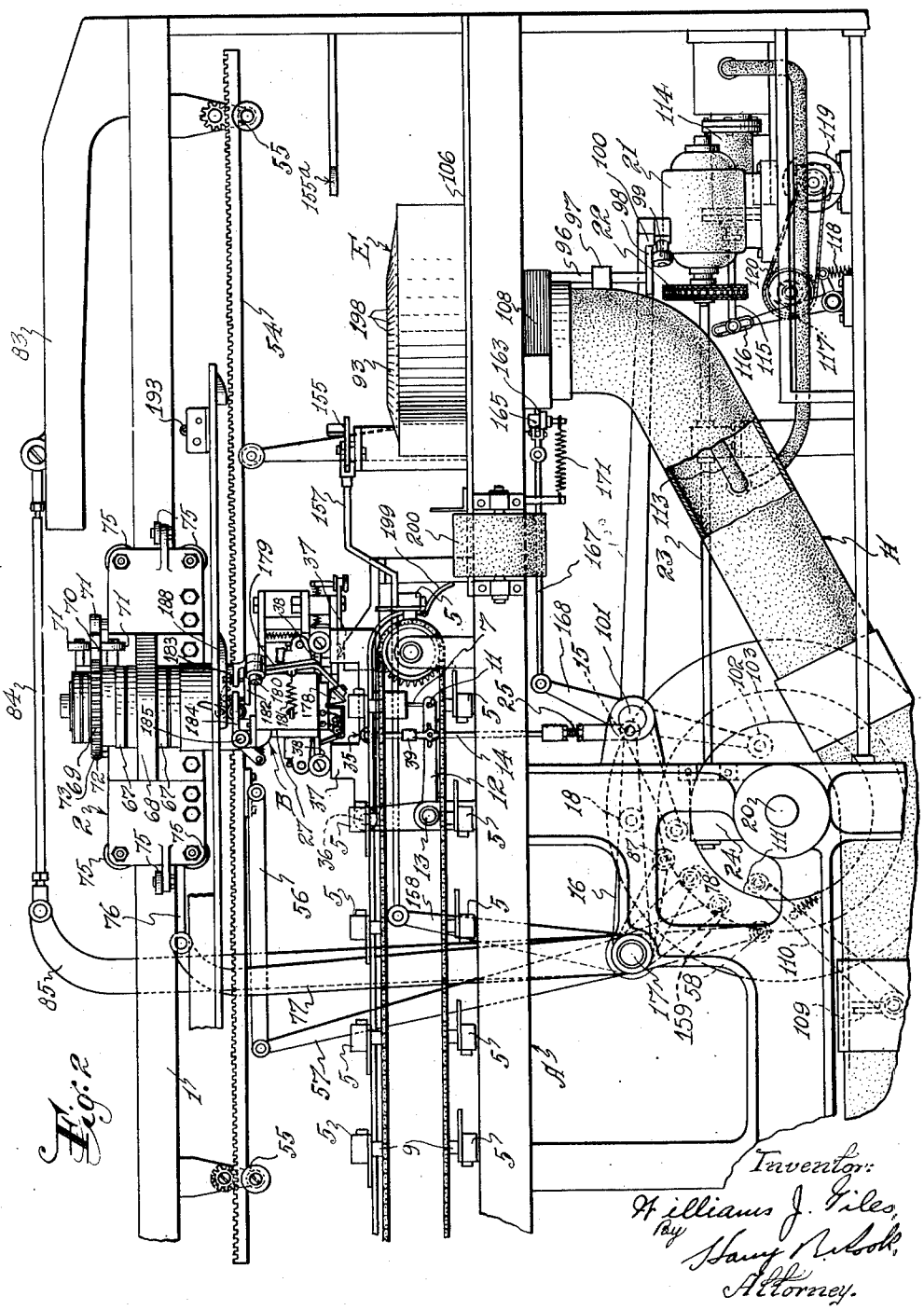


Fig. 2

Inventor:
Williams J. Giles,
By Harry Nilsook,
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

Filed May 28, 1947 18 Sheets-Sheet 3

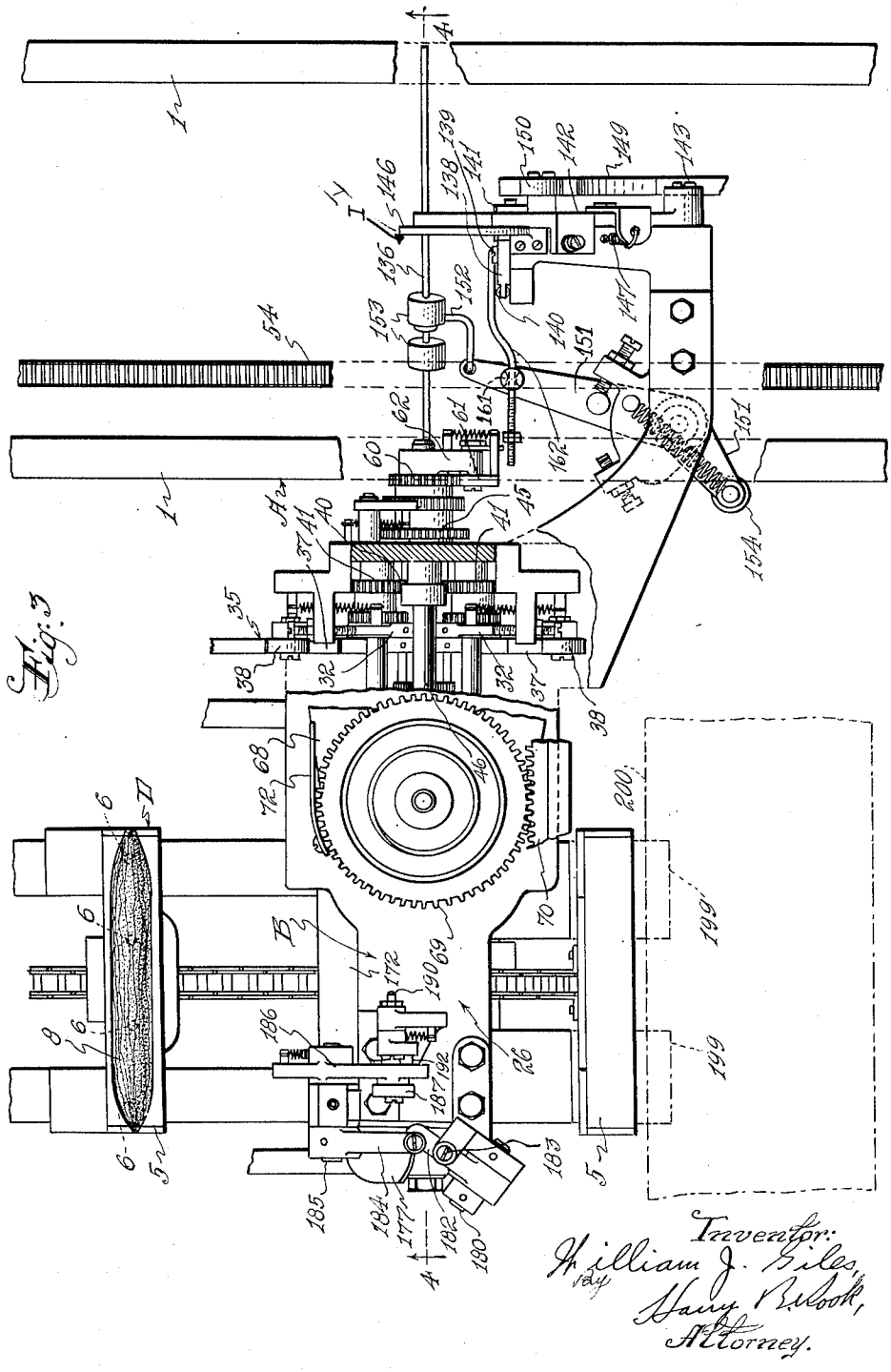


Fig. 3

Inventor:
William J. Giles,
by Harry R. Cook,
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

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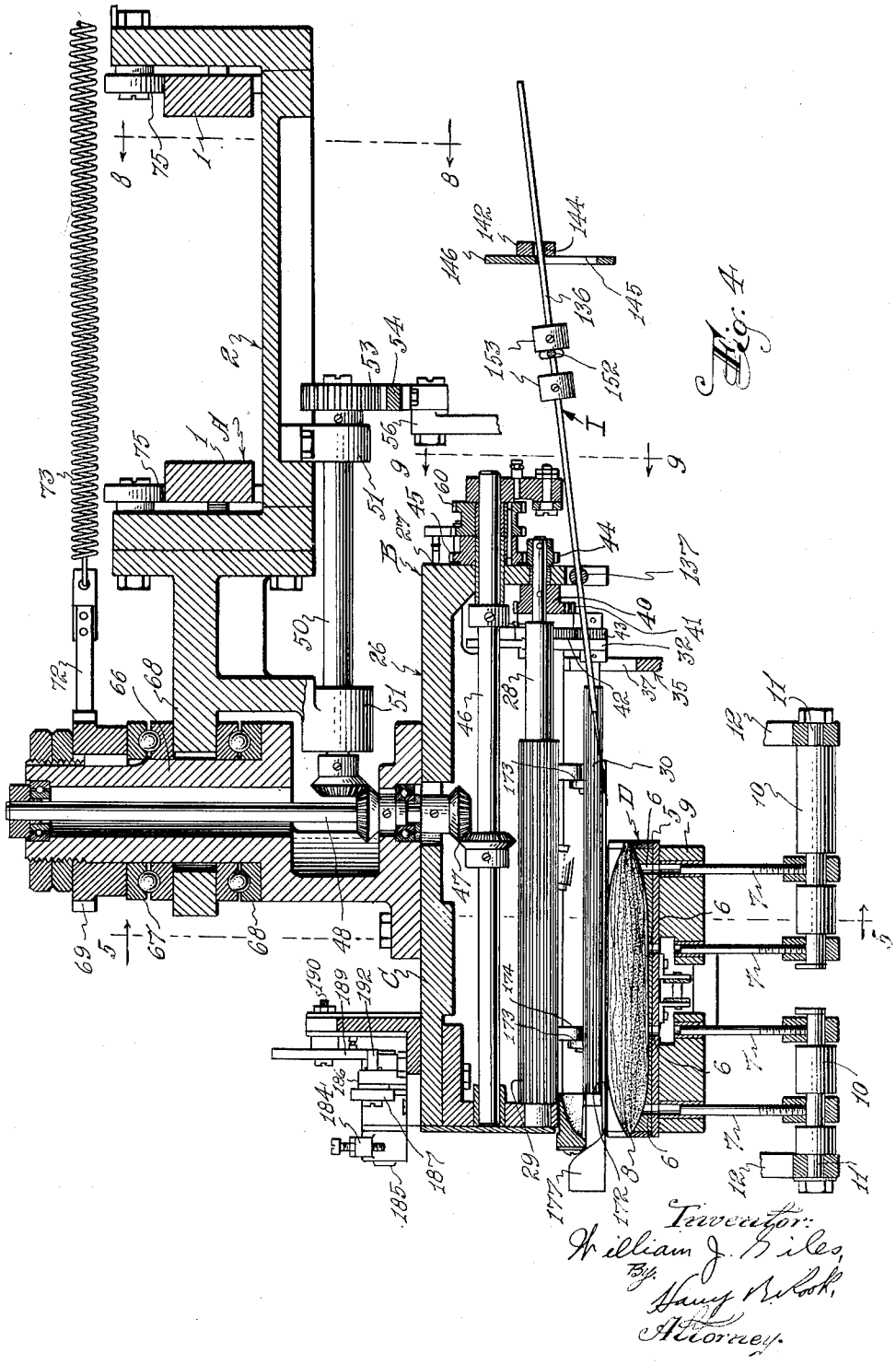


Fig. 4

Inventor:
William J. Giles,
By Harry Nilsson,
Attorney.

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CIGAR WRAPPING MACHINE

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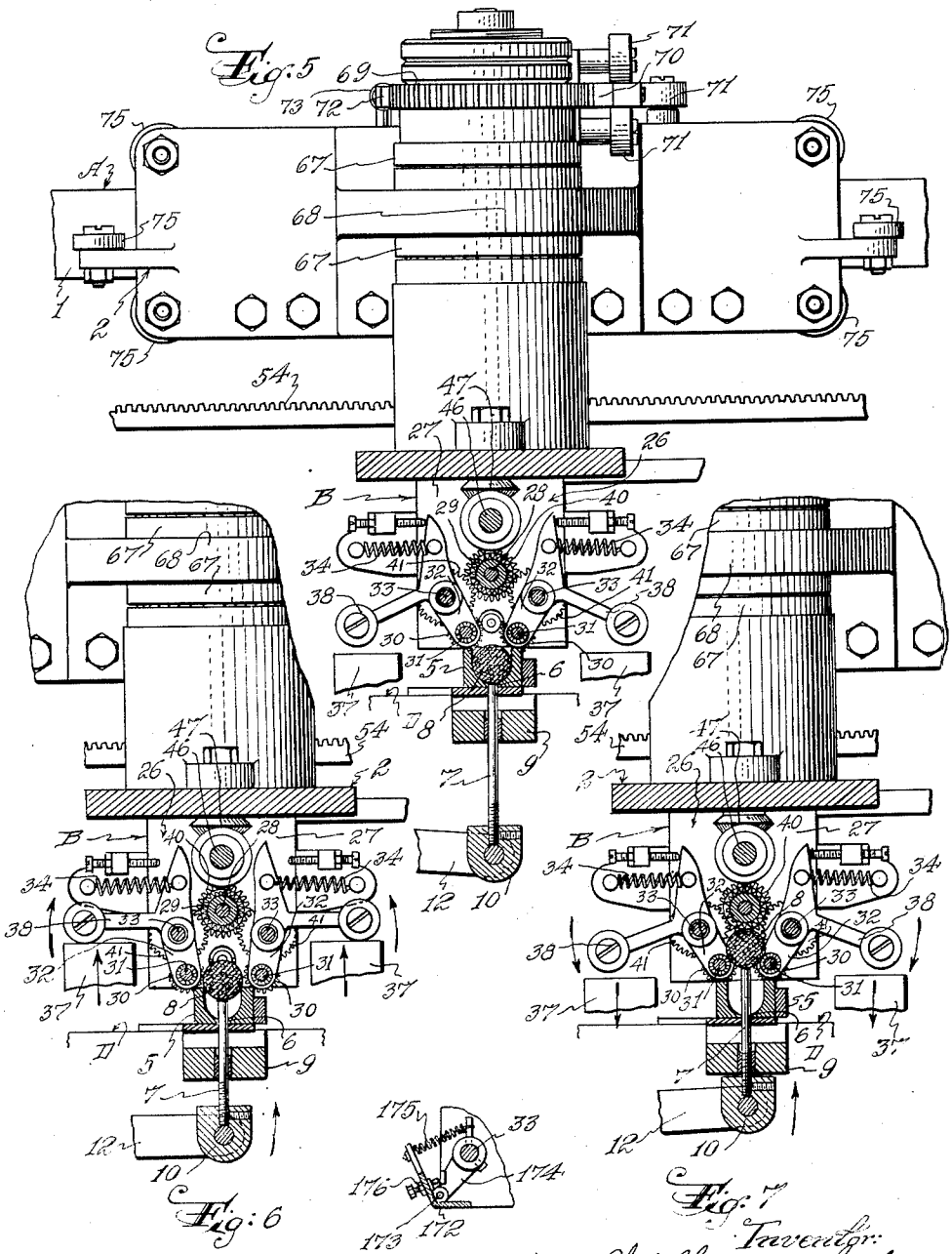


Fig. 5

Fig. 6

Fig. 7

Fig. 7a

Inventor:
William J. Giles,
by Harry Nesbit,
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

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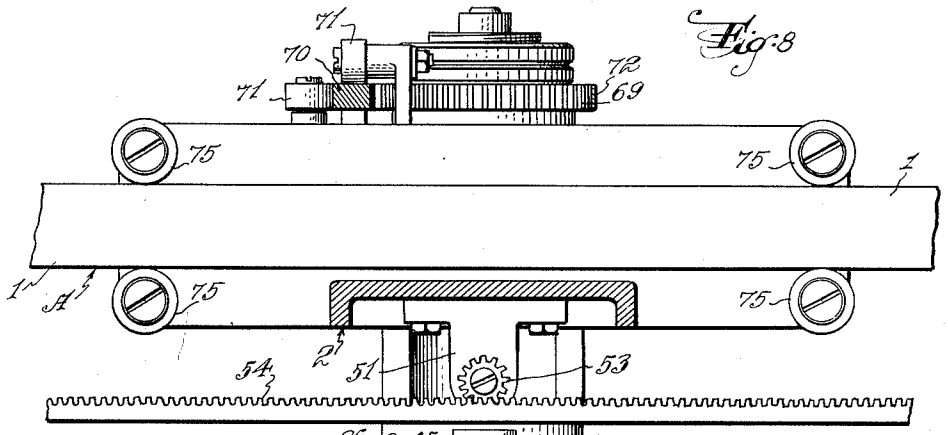


Fig. 8

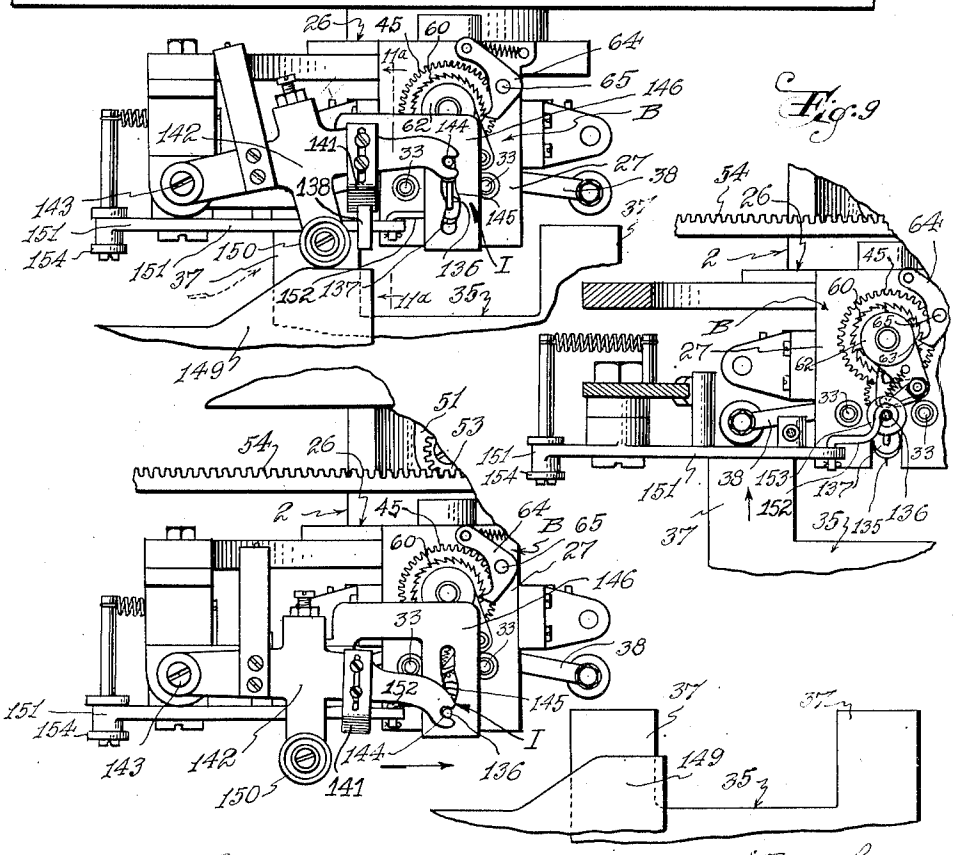


Fig. 9

Fig. 10

Inventor:
William J. Giles,
Harry Nilsolk,
Attorney.

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CIGAR WRAPPING MACHINE

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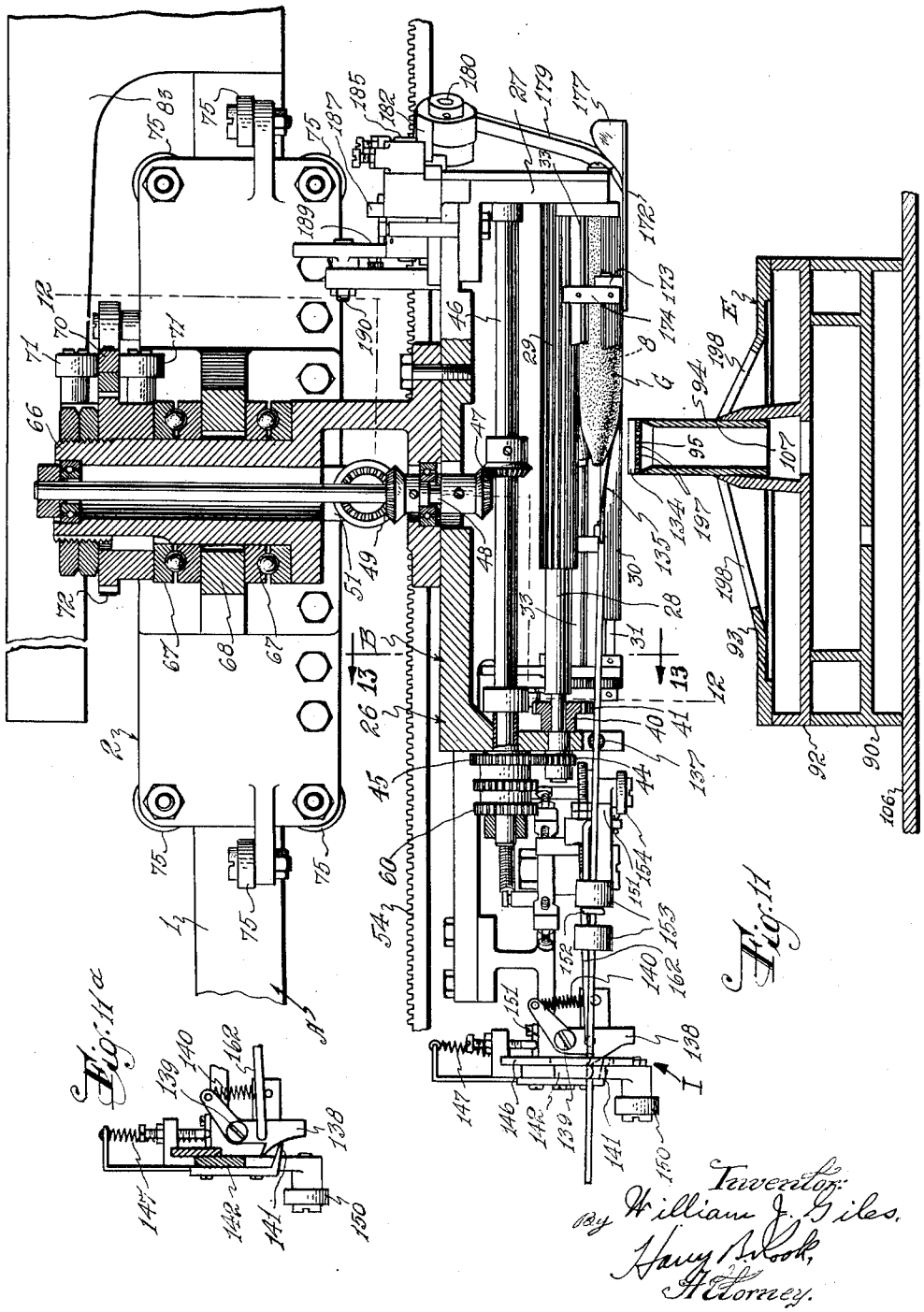


Fig. 11

Fig. 11a

Inventor:
William J. Giles,
By Harry Brook,
Attorney.

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CIGAR WRAPPING MACHINE

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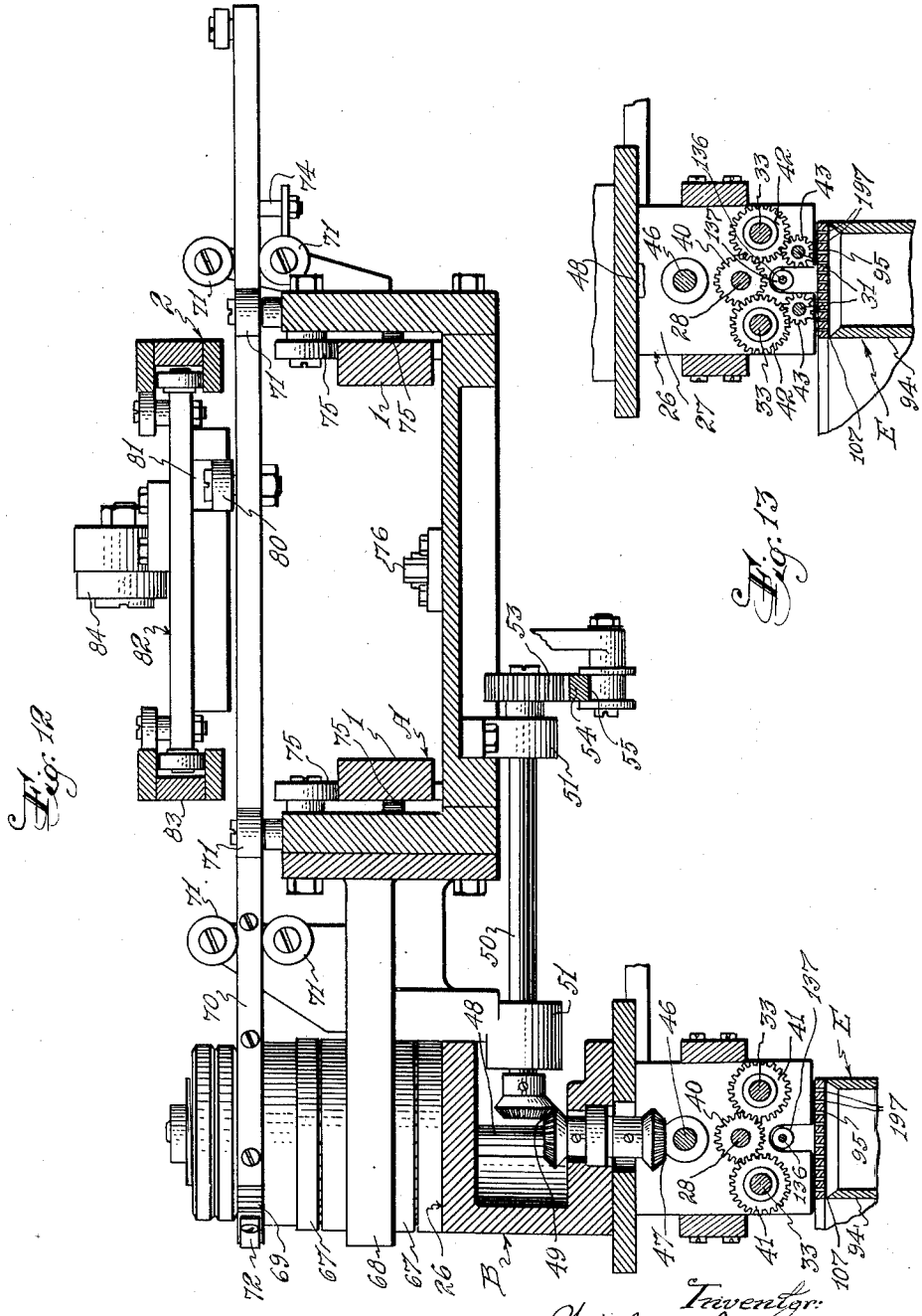


Fig. 12

Fig. 13

Inventor:
William J. Giles,
By
Harry A. Rook,
Attorney.

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CIGAR WRAPPING MACHINE

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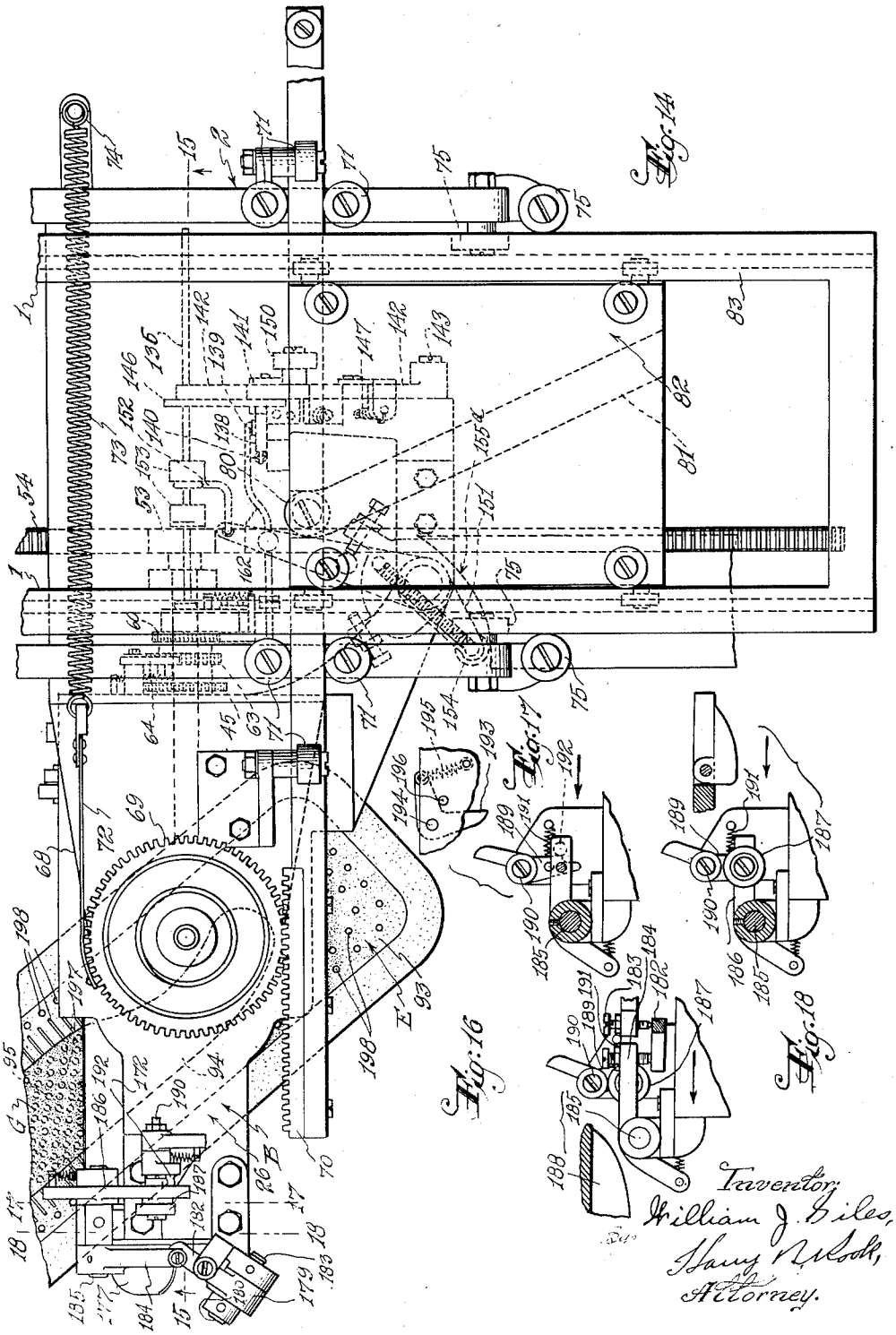


Fig. 14

Fig. 16

Fig. 17

Fig. 18

Inventor:
William J. Giles,
Harry Nicholl,
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

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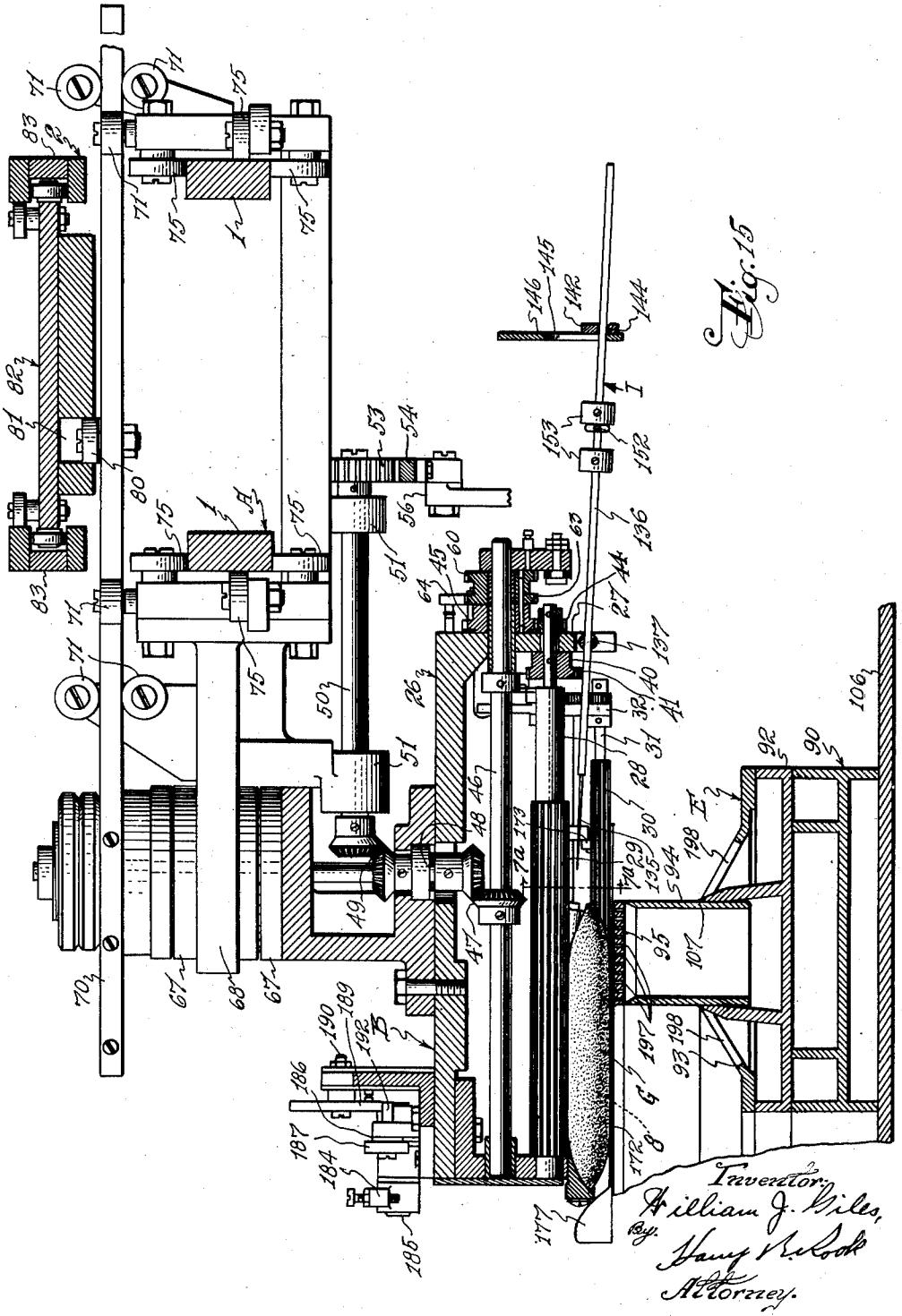


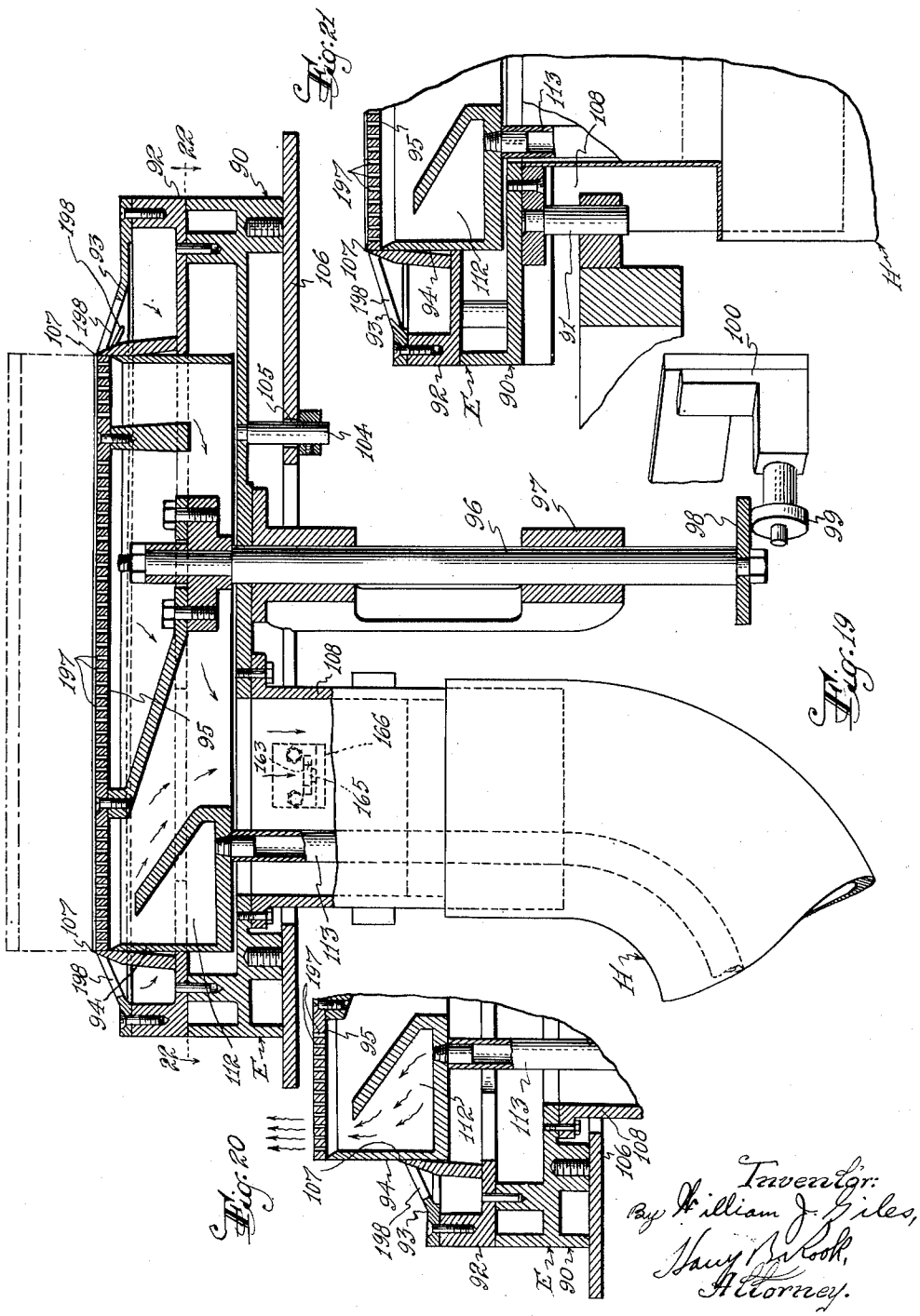
Fig. 15

Inventor:
William J. Giles,
By: Harry R. Cook
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

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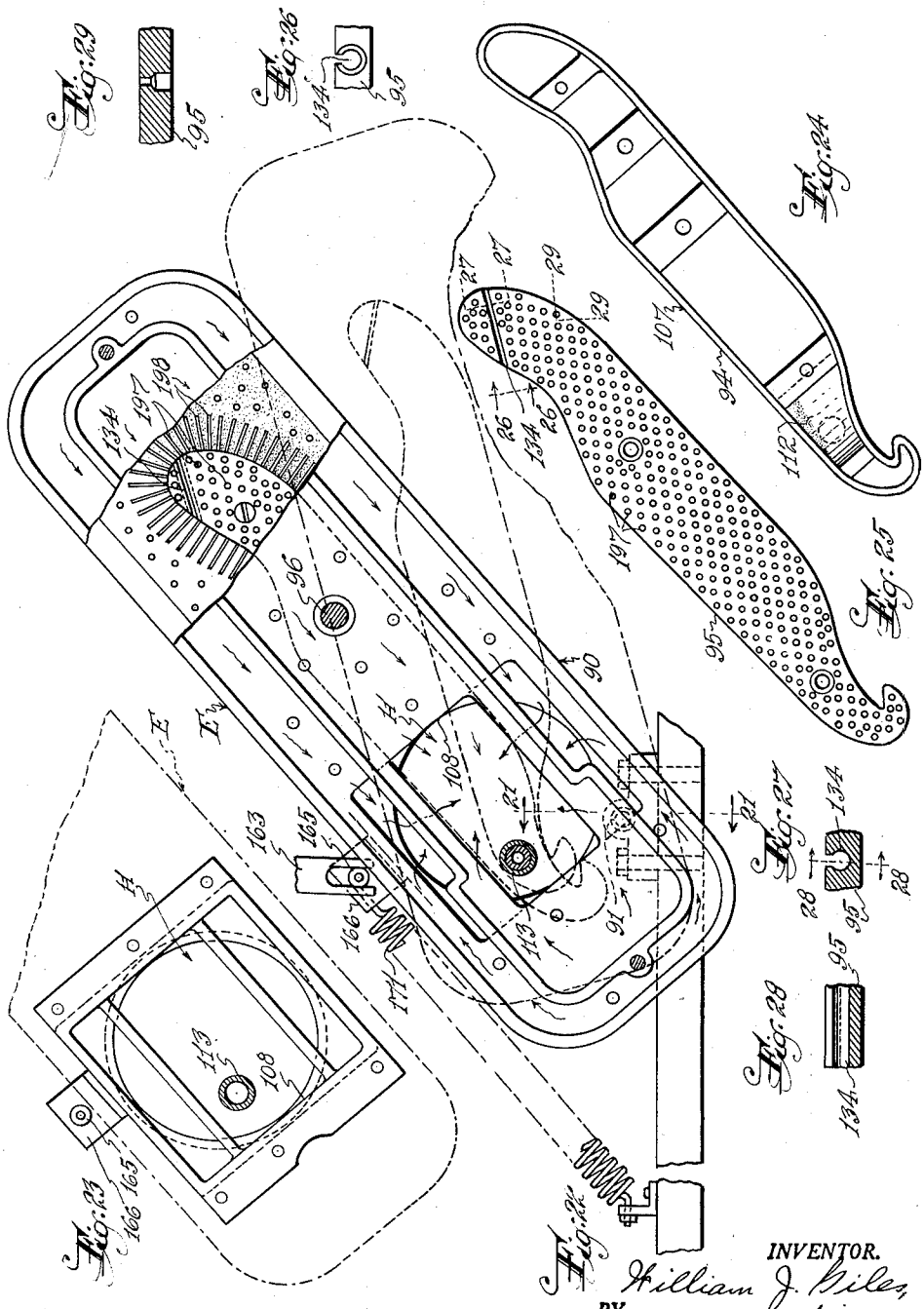


Inventor:
By William J. Giles,
Harry B. Cook,
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

Filed May 28, 1947 18 Sheets-Sheet 12



INVENTOR.
William J. Giles,
BY
Harry N. Cook,
ATTORNEY

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

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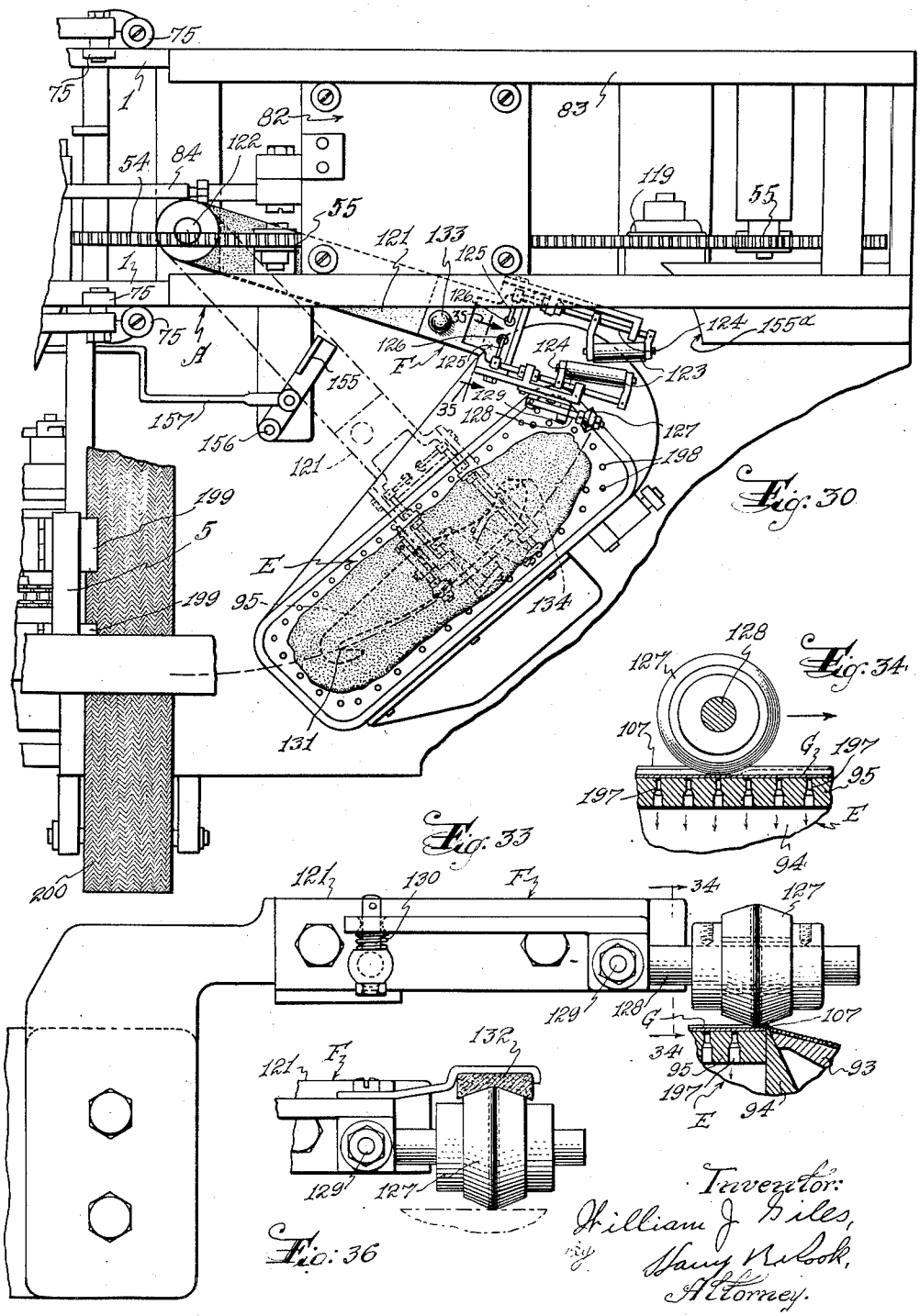


Fig. 30

Fig. 34

Fig. 33

Fig. 36

Inventor:
William J. Giles,
by Harry Rubook,
Attorney.

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CIGAR WRAPPING MACHINE

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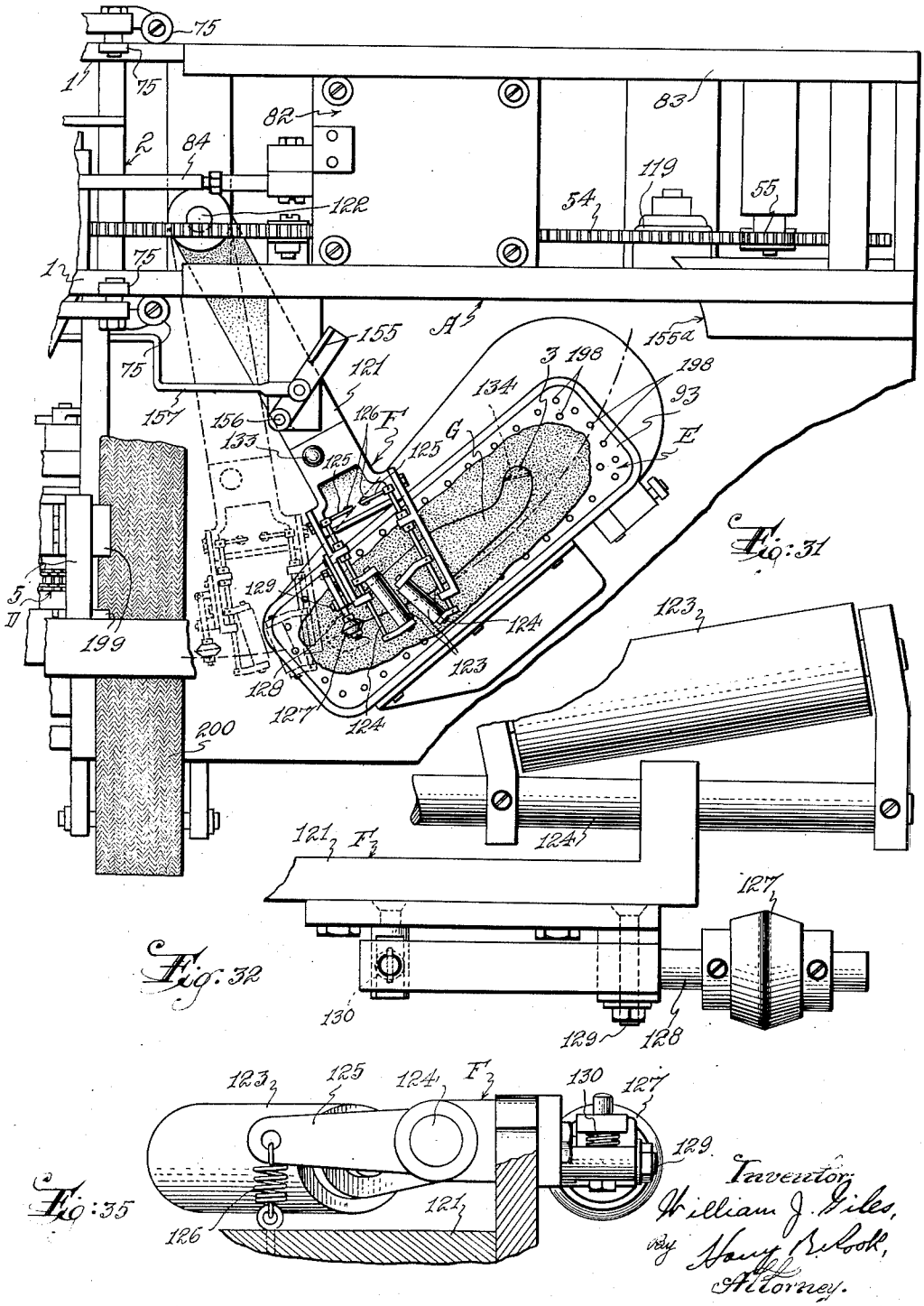


Fig. 31

Fig. 32

Fig. 35

Inventor
William J. Giles,
By Hart & Cook,
Attorney.

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CIGAR WRAPPING MACHINE

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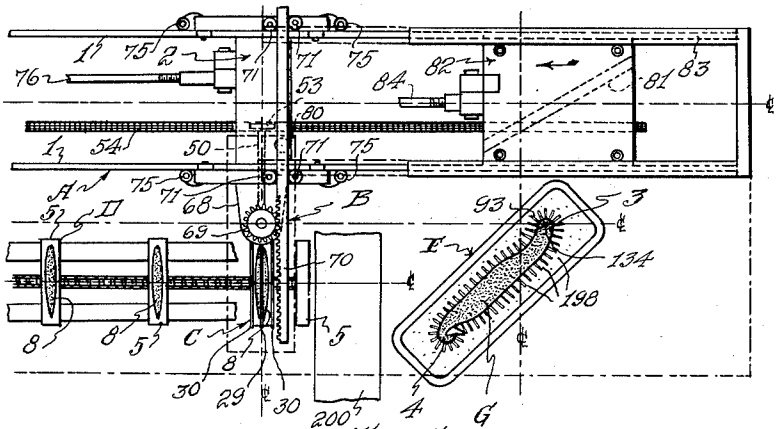


Fig. 37

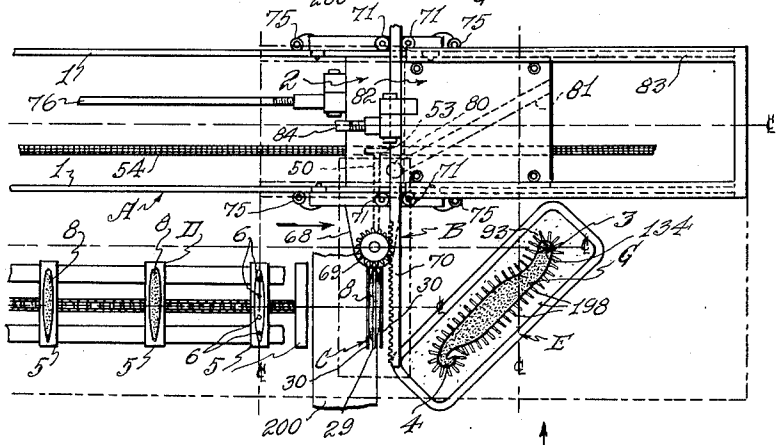


Fig. 38

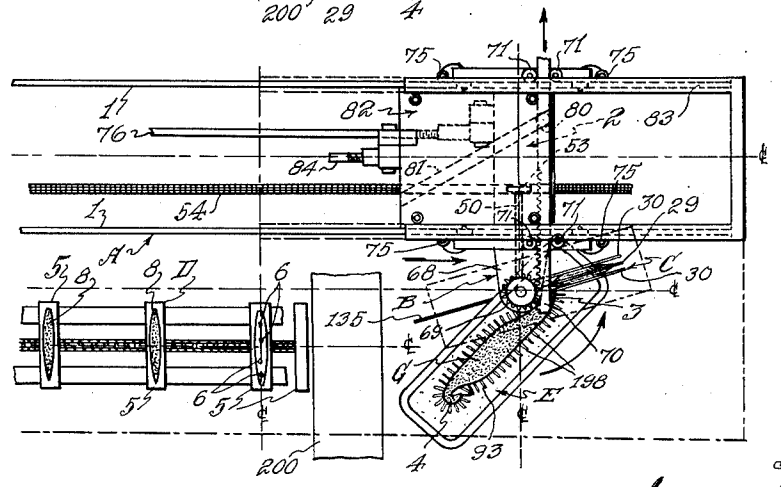


Fig. 39

Inventor:
William J. Giles,
By Harry A. Cook,
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

Filed May 28, 1947 18 Sheets-Sheet 16

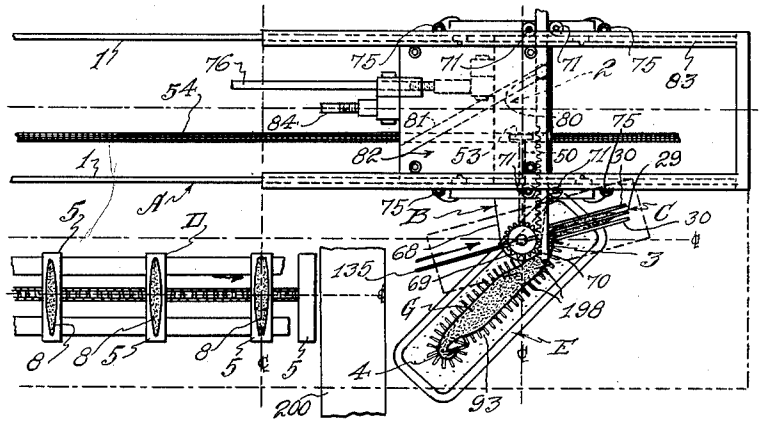


Fig. 40

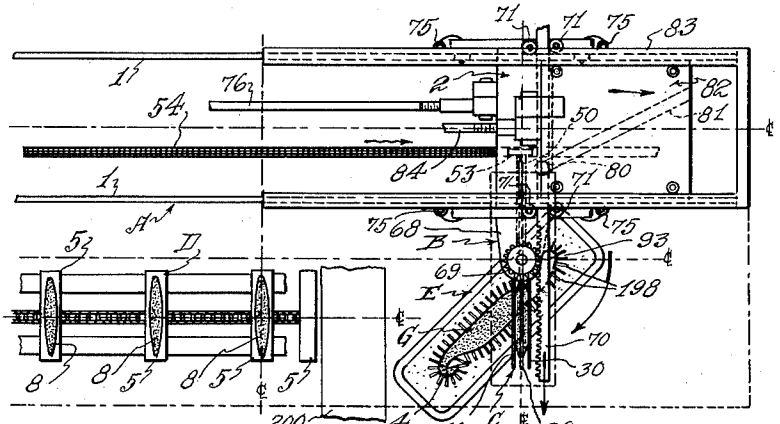


Fig. 41

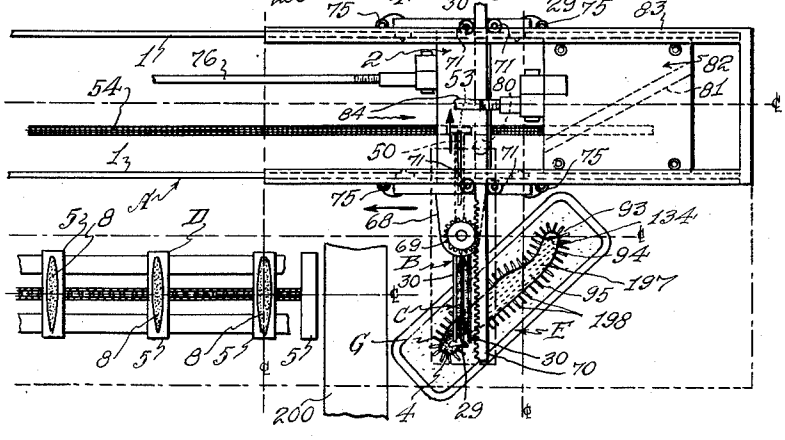


Fig. 42

Inventor:
William J. Giles,
By Harry Nicholl,
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

Filed May 28, 1947 18 Sheets-Sheet 17

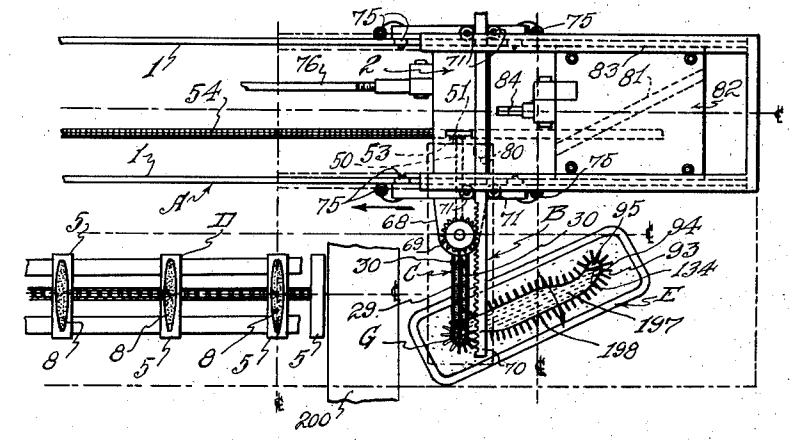


Fig. 43

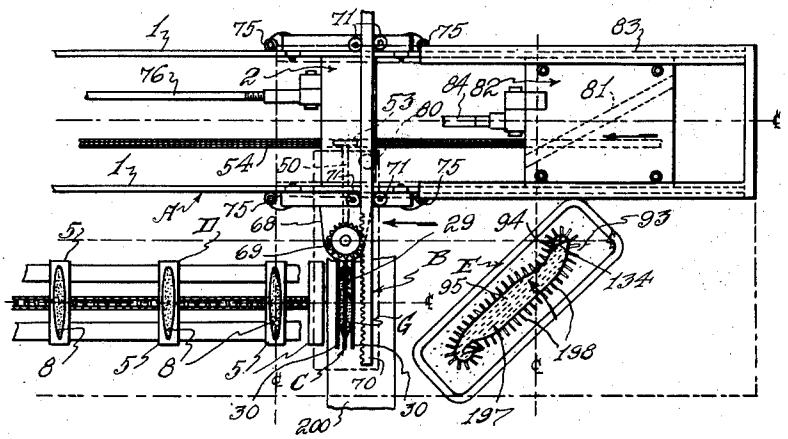


Fig. 44

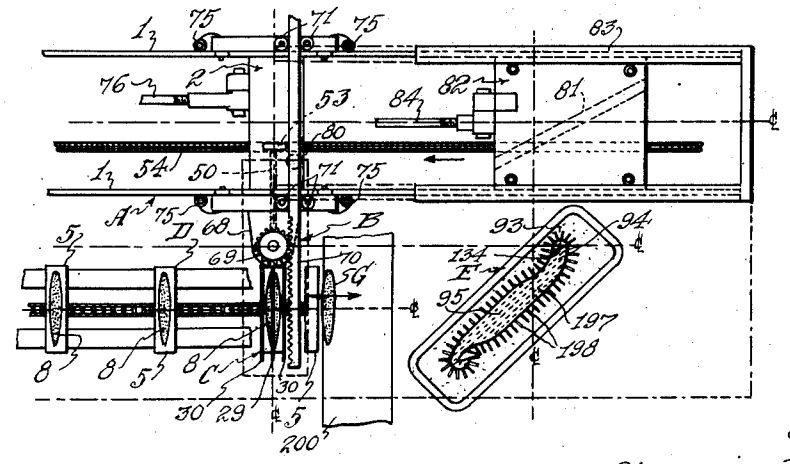


Fig. 45

Inventor:
William J. Giles,
By Harry Babcock
Attorney.

July 1, 1952 W. J. GILES 2,601,856

CIGAR WRAPPING MACHINE

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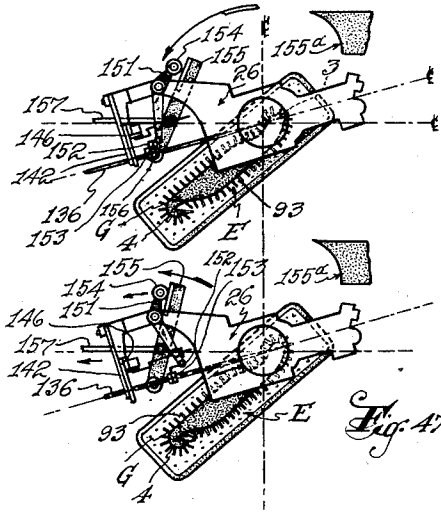


Fig. 46

Fig. 47

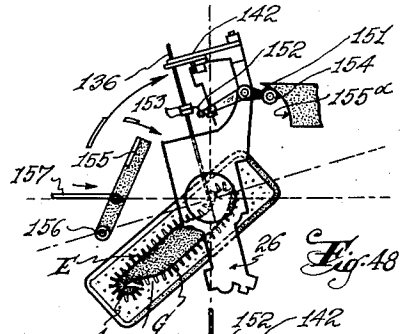


Fig. 48

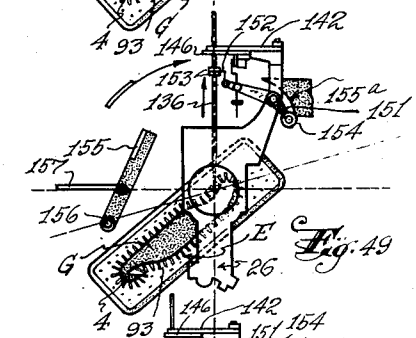


Fig. 49

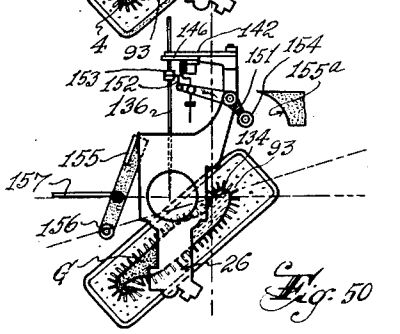


Fig. 50

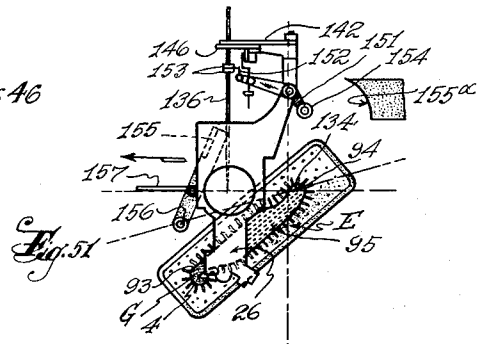


Fig. 51

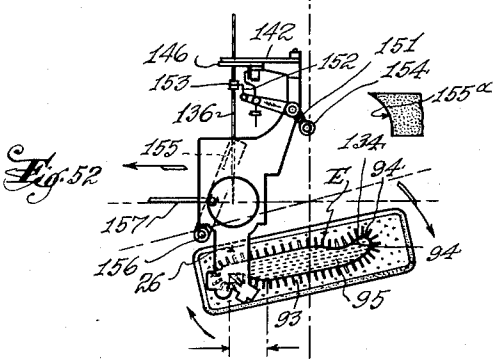


Fig. 52

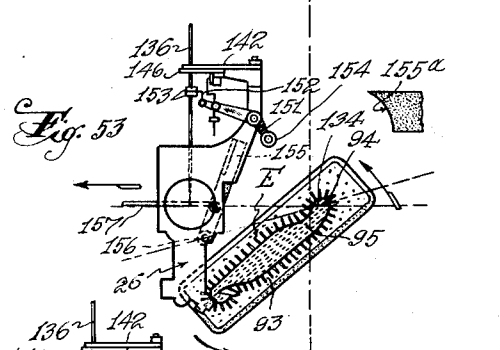


Fig. 53

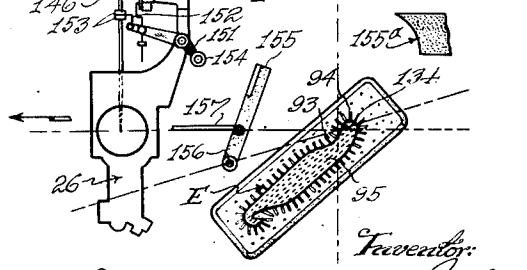


Fig. 54

Inventor:
William J. Giles
by
Harry Nicholson
Attorney.

Patented July 1, 1952 2,601,856

UNITED STATES PATENT OFFICE

2,601,856

CIGAR WRAPPING MACHINE

William J. Giles, Belleville, N. J., assignor to Tobacco Machine Supply Company, Inc., a corporation of New Jersey

Application May 28, 1947, Serial No. 751,031

8 Claims. (Cl. 131—33)

1

This invention relates in general to cigar wrapping machines of the type that includes a bunch carrier which carries a bunch from a bunch conveyor to a leaf or wrapper die and moves the bunch laterally over the wrapper while simultaneously rotating the bunch to wind or roll the wrapper thereon. More particularly, the invention contemplates a machine for wrapping cigars of the type that have tapered or conical ends, for example, cigars of the perfecto shape.

The wrapping of cigars of this nature poses a difficult problem, as compared with the wrapping of straight cigars, such as the panetelas, in that great accuracy and delicacy of operations are required in cutting the leaves to form the irregularly shaped wrapper and in nicely and firmly wrapping the ends of the wrapper at the tuck end and head end of the cigar, respectively; and a prime object of my invention is to provide a machine wherein the complicated and nice movements incident to hand wrapping shall be imitated as closely as possible.

Other important objects of my invention are to provide in a machine of this character, a novel and improved bunch carrier and means for operating it, whereby the bunch shall be moved through an irregular path over the wrapper die so that the movement of the bunch shall compensate for the irregular shape of the wrapper, particularly at the tuck end of the cigar, and thereby ensure accurate and firm application of the wrapper to the bunch; and thus to provide a rolling mechanism movable linearly above the wrapper die and having a bunch carrier mounted thereon to rotate about a vertical axis.

Another object is to provide such a machine which shall include novel and improved means for swinging the wrapper die in approximately its own plane during a portion of the movement of the bunch over the die during the rolling operation, whereby to ensure accurate wrapping of the flag end of the wrapper around the head end of the bunch.

A further object is to provide novel and improved means for linearly moving the rolling mechanism carriage and rotating the bunch carrier thereon, whereby the movements shall be rapid, positive and accurate.

Still another object is to provide novel and improved means for normally holding the leaf or wrapper on the die by suction and for automatically forcing the flag end of the wrapper out of contact with the die as the bunch is brought into juxtaposition to said flag end by the rolling mechanism.

2

Further objects are to provide novel and improved actuating mechanism for the tucking needle, whereby the needle shall be positively and accurately moved with respect to the wrapper die and the tuck end of the bunch; to provide a bunch carrier which shall embody a novel and improved, simple and reliable combination of parts.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the accompanying drawings, wherein:

Figure 1 is a schematic top plan view of a cigar wrapping machine embodying my invention, with portions broken away;

Figure 2 is a side elevational view of the machine;

Figure 3 is an enlarged fragmentary top plan view of the rolling mechanism in normal position, and with parts broken away and shown in section;

Figure 4 is a transverse vertical sectional view, on the plane of the line 4—4 of Figure 3;

Figure 5 is a transverse vertical sectional view, approximately on the plane of the line 5—5 of Figure 4, showing the bunch carrier in position to receive a bunch from the bunch conveyor;

Figure 6 is a similar view, showing the insertion of the bunch into the carrier;

Figure 7 is a like view, showing the bunch completely supported in the carrier;

Figure 7*a* is a fragmentary transverse vertical sectional view, approximately on the plane of the line 7*a*—7*a* of Figure 15;

Figure 8 is a vertical sectional view, approximately on the plane of the line 8—8 of Figure 4, showing the bunch carrier in end elevation and with the tucking needle in normal position;

Figure 9 is an end elevational view of the bunch carrier, from approximately the plane of the line 9—9 of Figure 4;

Figure 10 is an end elevational view of the bunch carrier similar to Figure 8, but showing the tucking needle in its position assumed just prior to or after the rolling operation;

Figure 11 is a vertical longitudinal sectional view through the bunch carrier and transversely of the wrapper die, with the carrier in the position immediately following the lifting of the wrapper from the wrapper die by the tucking needle;

Figure 11*a* is a fragmentary vertical sectional view, approximately on the plane of the line 11*a*—11*a* of Figure 8;

Figure 12 is a sectional view, approximately on the plane of the line 12—12 of Figure 11;

Figure 13 is a fragmentary vertical sectional view, approximately on the plane of the line 13—13 of Figure 11;

Figure 14 is a fragmentary top plan view of the machine, with the rolling mechanism at the beginning of its return linear movement during the rolling of the wrapper on the bunch;

Figure 15 is a vertical sectional view, approximately on the plane of the line 15—15 of Figure 14;

Figure 16 is an enlarged fragmentary side elevational view of the trip mechanism for the header roll;

Figure 17 is a fragmentary vertical sectional view, approximately on the plane of the line 17—17 of Figure 14, showing a part of the trip mechanism for the header roll;

Figure 18 is a similar view, approximately on the plane of the line 18—18 of Figure 14;

Figure 19 is an enlarged vertical longitudinal sectional view through the leaf or wrapper die, approximately on the plane of the line 19—19 of Figure 1, showing the die lift or wrapper support in its normal lower position;

Figure 20 is a fragmentary view similar to Figure 19, showing the die lift in its elevated position;

Figure 21 is a view similar to Figure 20 but taken approximately on the plane of the line 21—21 of Figure 22, showing the pivotal mounting for the die;

Figure 22 is an enlarged top plan view of the wrapper die, with portions of the top section removed along the plane of the line 22—22 of Figure 19;

Figure 23 is a top plan view of the plate for connecting the suction pipe to the bottom of the die;

Figure 24 is a top plan view of the die lift with the wrapper-supporting plate omitted;

Figure 25 is a top plan view of the wrapper-supporting plate;

Figure 26 is a fragmentary elevational view, approximately on the plane of the line 26—26 of Figure 25;

Figure 27 is a similar view, on the line 27—27 of Figure 25;

Figure 28 is a sectional view, on the line 28—28 of Figure 27;

Figure 29 is a similar view, on the line 29—29 of Figure 25;

Figure 30 is an enlarged top plan view of the die and leaf cutting mechanism which is omitted for clearness in Figure 1, and showing the cutting mechanism in its normal position at the beginning of the cutting operation;

Figure 31 is a similar view, showing the operation of the cutting mechanism;

Figure 32 is an enlarged fragmentary top plan view of the cutting rollers;

Figure 33 is a side elevational view of the parts shown in Figure 32, with a portion of the die shown in section;

Figure 34 is a fragmentary sectional view, on the line 34—34 of Figure 33;

Figure 35 is an enlarged fragmentary sectional view, on the line 35—35 of Figure 30;

Figure 36 is a view similar to Figure 33, showing a modification of the invention;

Figure 37 is a diagrammatic fragmentary top plan view of the bunch carrier, the operating mechanism therefor, and the wrapper die, showing the bunch carrier in its normal or loading position;

Figures 38–44, inclusive, show successive steps in the movement of the bunch carrier from its loading position through its rolling operation and returning to its normal position;

Figure 45 shows the bunch carrier returned to its normal position and discharging the finished cigar;

Figure 46 is a diagrammatic top plan view of the tucking needle, the operating mechanism therefor, and the wrapper die, showing the parts in the relative positions assumed just prior to the raising of the tuck end of the wrapper by the needle, and

Figure 47–54, inclusive, are similar views, showing successive steps in the movement of the needle from its tucking position back to its normal position.

Specifically describing the illustrated embodiment of the invention, the machine includes a main frame A which includes parallel guide rails 1 on which is mounted for linear movement the carriage 2 of a cigar rolling mechanism B. On said carriage 2 is mounted a bunch carrier C for rotation about a vertical axis, whereby a tobacco bunch can be inserted into the carrier from a bunch conveyor D and said bunch may then be moved by linear movement of the carriage 2 to a position above a wrapper die E, whereupon the carrier may be rotated about its vertical axis and the bunch can be simultaneously rotated by and in the carrier while the carrier is being so rotated and during the return linear movement of the rolling mechanism to its initial or loading position above the bunch conveyor D.

Prior to the cigar-rolling operation, a tobacco leaf is placed on the leaf die and cut by pressing thereof against a knife blade on the die by the rollers of a leaf-pressing mechanism F (see Figures 30–35, inclusive) to form a wrapped G for the bunch which has a curved tuck end 3 and a sharply hook-shaped head end 4, the leaf and wrapper being held on the die by suction applied to the die through a conduit H from a suitable source. During the cigar wrapping operation, the wrapper is elevated in the die into juxtaposition to the bunch in the bunch carrier when the latter is disposed above the die; and the tuck end of the wrapper is snugly pressed against the tuck end of the bunch by a tucking needle mechanism I so that during continued rotation of the bunch in the carrier and simultaneous movement of the carrier over the die, the wrapper will be wound upon the bunch. When the head end of the bunch reaches the head end 4 of the wrapper, commonly called the flag, a jet of compressed air forces the flag upwardly from the die to ensure against tearing of the flag from the die by the bunch carrier.

After the rolling operation, the wrapped cigar is automatically discharged from the carrier as the latter moves to its loading position.

More specifically describing the invention, while any suitable means or manual operations may be used for inserting the tobacco bunches into the bunch carrier, I prefer an endless conveyor which has a plurality of bunch molds 5 mounted thereon and moved by the conveyor step by step in properly timed relation to the rolling mechanism, so as to locate the bunches in succession at the loading station beneath the bunch carrier. Each mold has a plurality of holes 6 in its bottom wall through which ejector pins 7 are pushed to raise the tobacco bunch 8 (Figure

4) from the mold into the bunch carrier. These pins have one end slidable in a block 9 mounted on the frame, while their other ends are connected to rods 10 that in turn are connected at 11 to arms 12 which are pivoted on a shaft 13. The arms 12 are swung by a link 14 which is connected at 15 to one end of a lever 16, the other end of which swings about a shaft 17, said lever carrying a cam roller 18 which follows a cam 19 mounted on a cam shaft 20 which may be driven in any suitable manner but for simplicity is shown as driven by an electric motor 21, chain and sprocket gearing 22, a drive shaft 23, and suitable gearing 24. Preferably, the link 14 is adjustable at 25.

It will be understood by those skilled in the art that the shapes, placement and manner of driving the various cams involved in the machine are within the skill of the art, and in the interest of clearness and simplicity, no attempt has been made to accurately delineate the cams in the drawings.

Now referring to the bunch carrier, it includes an auxiliary frame 26 having a top piece and end pieces 27 in which is journaled a shaft 28 that carries a fluted roller 29 with which cooperate two fluted rollers 30 for holding and rotating the bunch 8. The two rollers 30 are mounted on the shafts 31 which in turn are journaled in rocker bearings 32 that are rockably mounted on shafts 33 so that the rollers 30 can be so related to the roller 29 as to grip the bunch between the rollers, as shown in Figure 7, or said rollers 30 can be swung apart to permit a bunch to be inserted into the carrier or discharged therefrom, as shown in Figure 6. The rollers are normally held in the bunch-gripping position by tension springs 34, and at the proper time are actuated into bunch-receiving or discharging positions by an actuator 35 that is pivotally mounted at one end at 36 on the frame of the machine and has spaced arms 37 to cooperate with the respective arms 38 on the rocker bearings 32 so as to swing the latter to separate the rollers 30, as best shown in Figure 6. The actuator 35 is shown as operated by an extension 39 of the link 14 so that the ejecting pins 7 force the bunch upwardly into the carrier substantially simultaneously with the separation of the rollers 30 to receive the bunch.

The bunch is rotated in the carrier through a pinion 40 on the shaft 28 which meshes with idler pinions 41 on the shafts 33 on which are pinions 42 which mesh with pinions 43 on the shafts of the rollers 30. The shaft 28 is driven through a pinion 44 which meshes with a gear 45 rotatable on a countershaft 46 which is geared by bevel pinions 47 to a vertical jack shaft 48 that is in turn geared by bevel pinions 49 to a drive shaft 50 which is journaled in bearings 51 on the carriage 2 of the rolling mechanism. The shaft 50 has a gear 53 thereon which meshes with a gear rack 54 that is longitudinally movably mounted in suitable bearings 55. The rack bar in turn is actuated through a link 56 which is connected to a cam lever 57 pivoted on the shaft 17 and carrying a follower roller 58 which cooperates with the cam 59 on the shaft 20. The gear 45 is rigidly connected to a ratchet 60 with which cooperates a spring pawl 61 (Fig. 3) mounted on a crank arm 62 which is fast connected to the shaft 46, so that when said shaft is rotated in one direction, the gear 45 will rotate therewith and drive the shaft 28. For preventing rotation of the shaft 28 in the opposite direction, a stop ratchet 63 is also connected to the gear 45 and has cooperating therewith a stop pawl 64 (Figs. 8, 9, 10 and 15) which is pivotally mounted at 65 on the auxiliary frame 26.

The auxiliary frame 26 has a tubular bearing post 66 connected thereto which is journaled in thrust bearings 67 on a bracket 68 forming a part of the carriage 2 of the rolling mechanism. At the upper end of the post 66 is keyed a gear 69 with which meshes a rack bar 70 which is longitudinally movable in roller guides 71 on the carriage 2. To the side of the gear opposite the rack is connected one end of a flexible strap 72, the other end of which is connected to a tension spring 73 which has its other end attached to a bracket 74 on the carriage, whereby the spring 73 constantly tends to rotate the gear 69, and consequently the carrier frame 26, in one direction. The carriage 2 has roller guides 75 by which it is mounted on the guide rails 1 for linear movement, and during a portion of the linear movement of the carriage, the rack bar 70 is actuated to rotate the bunch carrier about the vertical axis of the post 66.

As shown, the carriage is moved along the rails 1 through a link 76 which is pivotally connected to a cam lever 77 that is journaled on the shaft 17 and has a roller 78 following a cam 79. Assuming that the carriage is in its loading position and has received a bunch to be wrapped, when the carriage is moved toward the die E by the cam and lever mechanism, a roller 80 (Figs. 1, 12, 14 and 15) on the rack bar 70 enters a diagonal groove 81 on the underside of an actuating slide 82 which is longitudinally movable in a guide frame 83 above the plane of the top of the carriage. Then upon continued movement of the carriage in the same direction, said roller rides through said guide groove so as to actuate the rack bar in such a manner as to rotate the carrier frame 26. This rotation occurs as the carrier frame reaches a point above the head end of the wrapper on the die E. Thereupon, the slide 82 is actuated further in the same direction so as to swing the carrier frame back to its original position. Then the carriage begins its return movement which continues until the carriage reaches its loading position.

For reciprocating the actuating slide 82, I have shown a link 84 (Fig. 1) connected to a cam lever 85 that is mounted on the shaft 17 and carries a follower roller 86 which cooperates with a cam 87.

Now referring to the die E, it comprises a base 90 (Figures 19, 20 and 21) which is pivotally connected at its end nearest the bunch conveyor to the main frame, as indicated at 91, and has mounted thereon a top piece 92 which is closed by a cover plate 93. The top piece and cover plate have registering openings through which is vertically slidable the die lift 94, the top of which comprises a perforated plate 95 that serves as a support for the cigar wrapper G. The die lift is vertically reciprocable by means of a rod 96 which is journaled in bearings 97 on the main frame and has a foot plate 98 at its lower end riding upon a roller 99 mounted on a lever 100 which is pivotally mounted on the stub shaft 101 and has a roller 102 following a cam 103. The foot plate 98 permits swinging of the die without disengagement of the foot plate from the roller 99. A guide pin 104 slides in a slot 105 in a bed plate 106 on the frame to guide the swinging end of the die. The opening through which the die lift is elevated is surrounded by a knife blade 107 which cooperates with a pressing mechanism for cutting

a wrapper from a tobacco leaf; and for holding the leaf on the die while the leaf is being cut, the cover plate 93 is perforated and the top piece of the die and the die lift have air passages which are connected to the suction pipe H through a box-like connecter 108, whereby a leaf may be firmly held on the die by suction. The application of suction to the die is controlled by a suitable valve, such as a butterfly valve 109, actuated by a cam lever 110 cooperating with a cam 111, the operation of this valve being in proper timed relation to the other parts of the machine.

When the bunch carrier is disposed in proper relation to the die to begin the wrapping operation, the die lift is elevated, as indicated by dot and dash lines in Figure 19 and in Figure 11, so that the wrapper can be picked up from the die and applied to the bunch; and when the carrier has moved the bunch to the flag end of the wrapper, a jet of compressed air is forced upwardly through the die plate 95 so as to positively force the flag out of contact with the die plate. This operation is effected by conducting a jet of air to a chamber 112 in the die lift immediately beneath the flag end of the die plate, through a flexible tube 113 which passes through a portion of the suction conduit H and is connected to a pump 114. This pump is shown as comprising a piston and cylinder device, the piston rod 115 of which is connected to a cam lever 116 which normally follows a cam 117 under the influence of a spring 118. The cam is continuously driven by a motor 119 through chain and sprocket gearing 120, said motor 119 being synchronized with the motor 21. The cam is so shaped that the piston is slowly moved outwardly of its cylinder and then is suddenly released under the influence of the spring 118 so that the piston is quickly pushed in the opposite direction in the cylinder to compress the air in the cylinder with a snap action and force the air through the tube 113 and the die plate 95.

The pressing mechanism F which cooperates with the knife blade 107 for cutting a wrapper from a leaf may be manually or automatically operated, but is shown for manual actuation. It is illustrated in Figures 31–36, inclusive, and comprises an arm 121 pivotally mounted at 122 on the main frame and having a pair of elongated rollers 123 rockably mounted by shafts 124 on said arm, the rollers being so related to each other that one or the other will cooperate with various portions of the knife blade to completely cut a wrapper from a leaf. The rollers are yieldingly held in contact with the leaf by arms 125 on the shafts 124 connected to springs 126. Not only do the rollers cut the leaf, but they smooth out the wrapper on the die plate 95.

To ensure proper cutting of the leaf at the flag or hook-shaped end, I provide a third roller 127 which has a V-shaped circumferential rib on its periphery and is journaled on a stub shaft 128 which is pivotally mounted at 129 on the arm 121 and is normally influenced by a spring 130 so as to hold the roller in contact with the die plate and knife blade, as best shown in Figure 33. The roller is so mounted on the arm that as the latter swings over the die, the V-shaped periphery of of the roller will traverse the sharp angle or re-entrant curve 131 at the base of the notch which forms the hook-shaped flag, whereby to ensure complete severance of the wrapper from the leaf at that point. If desired, a wiper pad 132 may be provided for cleaning the roller 127, and similar properly shaped wipers may be provided for the other rollers. For conveniently swinging the arm 121, it may have a hand-grip or knob 133.

In operation, the operator will lay a leaf on the die under the influence of suction and then swing the arm 121 from its normal position shown in Figure 30, across the die to the other end of its movement, as indicated by dot and dash lines in Figure 31, after which the arm should be swung back to its initial position, this whole operation being performed while the rolling mechanism is at the loading station.

The tuck end of the die plate 95 has a groove 134 therein into which the tucking needle is inserted for lifting the tuck end of the wrapper into contact with the bunch preliminary to the rolling operation. A tucking needle 135 is carried by the end of a small rod 136 which is reciprocable and rotatable in a guide block 137 (Figs. 4, 8, 9, 10 and 11) which is in turn oscillatable about a horizontal axis in a notch in one end piece 27 of the carrier frame 26, so that the needle may be swung in vertical planes, rotate about its axis and slide longitudinally. Normally, the needle is in the position shown in Figure 4, withdrawn beyond the tuck end of the bunch and underlying the bunch in spaced relation thereto when the bunch is in the carrier. The needle is held in this position by a detent 138 (Figs. 8, 11 and 11*a*) pivotally mounted at 139 on the carrier frame and normally influenced by a spring 140 into the path of movement of a detent plate 141 which is carried by an operator lever 142 pivotally mounted at 143 on the carrier frame and having a bifurcated end 144 in which is seated the outer end portion of the needle rod 136. A guide slot 145 in a guide plate 146 holds the rod against displacement from the notch 144. This operator lever 142 is normally influenced downwardly by a spring 147 so as to swing the tucking needle upwardly into the position shown in Figures 11 and 15, and said operator lever is swung in the other direction by an inclined lug 149 on the main frame which cooperates with a roller 150 on the operator lever, as best shown in Figure 8. The operator lever is held in its upper position by engagement of the detent pawl 138 with the detent plate 141.

During the loading of the carrier, the needle is held in that position, shown in Figures 4 and 8, but when the carrier has been moved to its position over the die for beginning of the rolling operation, the needle is longitudinally slid into groove 134 in the die plate beneath the wrapper, immediately after which the detent pawl 138 is actuated to release the operator lever 142 so that the needle is swung upwardly and lifts the tuck end of the wrapper into snug contact with the tuck end of the bunch, as best shown in Figure 11. For accomplishing these operations, a bell crank lever 151 is pivotally mounted on the carrier frame and has one end flexibly connected by a wire connector 152 to the needle rod 136 between stop blocks 153. The other end of the lever carries a roller 154 with which cooperates a lever 155 (Figs. 1, 2 and 31) pivotally mounted at 156 on the main frame and actuated by a link 157 that is connected to a crank arm 158 that is pivoted on the shaft 17 and has a follower roller 159 cooperating with a cam 160, said lever 155 being operated in proper timed relation to the movement of the carriage and serving as a cam for the roller 154. The lever 151 has a lost motion connection 161 with a link 162 which is in turn connected to the detent pawl 138, so that as the lever 151 is swung to longitudinally move the needle, the detent pawl will be actuated to re-

lease the operator lever 142 so that the latter can swing the needle upwardly into the position shown in Figures 10 and 11, to thereby lift the tuck end of the wrapper from the die and hold it in snug contact with the tuck end of the bunch. The tucking needle being pressed against the bunch rotates with the latter in the carrier at the beginning of the operation, and after the end of he leaf has been tucked in, the needle is withdrawn by engagement of the roller 154 with a stationary cam surface 155a (Figs. 1 and 2) on the frame of the machine, which swings said lever 151 to longitudinally withdraw the needle into the position shown in Figure 15, where the needle remains until the operator lever 142 is actuated by the cam lug 149 upon the return of the carrier to the loading position.

As hereinbefore indicated, an important feature of the invention is the swinging of the wrapper die as the bunch approaches the head end of the wrapper during the rolling operation, so as to ensure accurate and snug wrapping of the flag of the wrapper on the bunch and with a minimum of possibility of tearing of the wrapper. For swinging the die about its pivotal connection 91 with the frame, I have shown a lever 163 (Figs. 1 and 22) which is pivotally mounted at one end 164 on the main frame and has its other end bifurcated and cooperating with a roller 165 that is mounted on a bracket 166 secured to the side of the box-like connector 108 of the suction pipe. This lever is actuated in one direction through a link 167 (Fig. 2) by a cam lever 168 pivoted on the stub shaft 101 and carrying a follower roller 169 which follows a cam 170. A tension spring 171 swings said lever and the die in the other direction, movement of the die in said direction being limited by a suitable stop, for example, by engagement of the guide pin 104 with the end of its slot 105. The normal position of the wrapper-cutting die is shown in Figures 1, 22 and 37, and this is the position of the die during the major portion of the rolling operation. However, as the head end of the bunch approaches the flag of the wrapper, the die is swung into the position shown by dot and dash lines in Figure 22 and in Figure 43.

During the rolling operation, it is desirable to provide means to prevent slipping of the wrapper on the die plate during the wrapping operation and to maintain the wrapper under tension, especially during the application of the head end of the wrapper to the bunch. For this purpose, I utilize a tension plate 172 (Figs. 7a, 4, 11, 15 and 16) which is pivotally mounted at 173 on bracket arms 174 secured on one of the shafts 33, the plate being normally influenced to swing downwardly into contact with the wrapper on the die plate, by a tension spring 175, movement of the plate in said direction being limited by suitable stop means such as an adjusting screw 176 carried by the plate to abut one of the brackets 174. The end of the tension plate adjacent the head end of the bunch has an upturned flange 177 (Figs. 14 and 15) to which the flag of the wrapper slidingly adheres when it is blown upwardly from the die plate, so as to ensure smooth wrapping of the flag on the bunch.

To further ensure smooth wrapping of the flag, the usual conical heading roll 178 (Fig. 2) is provided, being carried by a lever 179 which is pivotally mounted at 180 on the carrier frame and is normally influenced by a spring 181 to move the roll into engagement with the bunch. Connected to the lever 179 is an arm 182 (Fig. 16) which normally abuts a stop screw 183 for limiting movement of the lever 179 under the influence of the spring. Said arm 182 also underlies an arm 184 pivoted at 185 on the carrier frame and rigidly connected to an actuator arm 186 which carries a roller 187 to cooperate with the cam 188 on the main frame so as to actuate the heading roll away from the cigar as the carrier reaches its unloading position. For holding the heading roll in this position, a dog 189 is pivoted at 190 on the carrier frame and is normally influenced by a spring 191 to engage a detent stud 192 on the rear side of the arm 184. This dog is actuated out of engagement with the stud 192 to release the heading roll into engagement with the cigar, by a trip lever 193 pivoted at 194 on the main frame and normally influenced in one direction by a spring 195 against a stop pin 196, whereby when the carriage moves from its loading position toward the wrapper die, the trip lever 193 will yield as the dog 189 passes without actuating the latter, but upon return of the carriage, the trip lever will actuate the dog to release the heading roll for engagement with the cigar. The trip lever is so related to the die that the heading roll engages the bunch after completion of the wrapping of the body of the bunch and prior to the release of the flag of the wrapper from the die plate so that the heading roll will guide the flat onto the head of the bunch.

The operation of the machine may be generally described as follows: A leaf of tobacco is manually applied over the die plate 95 with the edges of the leaf overlying the top plate 93 of the top piece of the die, the leaf being held by suction through the holes 197 and 198 in the die plate and cover plate, respectively. Then the leaf is cut to form the wrapper by swinging of the rollers 123 and 127 over the knife blades of the die, and the excess leaf is manually stripped off the cover plate of the die, after which paste is applied to the head end of the wrapper. During this operation the die lift is in its lowermost position, as shown in Figure 19. The machine is started and stopped by suitable mechanism such as a one revolution clutch (not shown) on the cam shaft 20. Upon starting the machine, the bunches of tobacco are moved in succession and intermittently by the bunch conveyor to the loading position and the bunch carrier is disposed with its rollers 30 directly above one of the bunch molds 5, whereupon the levers 12 and 37 are operated to elevate the bunch into the carrier and simultaneously swing the rollers apart to receive the bunch, after which said levers are retracted and the rollers 30 grip the bunch.

The carriage 2 moves forwardly, as shown in Figures 37 and 38, under influence of the cam lever 77, and as it approaches the position above the die where the wrapping operation is to be started, the roller 80 on the rack bar enters the groove 81 in the slide 82 so as to rotate the carrier, as shown in Figure 39. At this time, the die plate 95 will have been elevated, as shown in Figure 11 and by dot and dash lines in Figure 19, and the tucking needle is in alinement with the end of the groove 134 in the die plate, as shown in Figure 46; and the lever 155 is operated to actuate the bell crank 151 and successively slide the needle into said groove beneath the tuck end of the wrapper and release the operator lever 142 to swing the needle to lift the leaf into contact with the bunch. Then the rack bar 54 is operated to rotate the bunch through the fluted rolls in the carrier and simultaneously the slide

82 is retracted to rotate the carrier into its initial relation to the carriage, as shown in Figure 41. During these movements, the tuck end of the wrapper is wound on the bunch and the tucking needle is withdrawn by engagement with the stationary cam 155a, as shown in Figure 48. The rearward movement of the carriage toward the unloading position is continued and the bunch is rotated by the rack 54 preferably at a ratio to the linear movement of the bunch such as to obtain the desired stretch in the leaf. As the head end of the cigar approaches the head end of the wrapper, the die is swung by the lever 163, as shown in Figures 43 and 52, so as to orient the flag end of the wrapper relatively to the bunch and compensate for the irregularly curved shape of the flag end of the wrapper and imitate as nearly as possible a manual rolling operation. Approximately simultaneously and slightly before the carriage reaches the position shown in Figure 43, the flag of the wrapper is forced upwardly by the jet of air from the tube 113 into contact with the flange 177 on the tension plate to which the leaf slidingly adheres due to the paste applied to it. The heading roll is then released by the detent 193 into contact with the bunch and as the motion of the carriage continues, the flag is guided accurately to its proper relation to and is ironed smoothly on the head of the bunch and the carriage continues to its position over the unloading station, whereupon the heading roll is withdrawn and the fluted rolls 30 are moved apart to release the finished cigar which falls by gravity onto guide plates 199 just ahead of the leading mold D on the bunch conveyor. Here the cigar may be gripped by suitable means and subjected to the action of a smoothing cone at the head end and a cutter at the tuck end, if desired. The finished cigar falls from the guide plates onto a take-off conveyor 230 or a receptacle for removing the cigars from the machine.

In the meantime, the bunch carrier will have moved to its initial loading position, the slide 82 will have been returned to its initial position, and the next bunch to be wrapped will have been moved into the loading station by the bunch conveyor D ready to be elevated into the bunch carrier.

From the foregoing, it will be seen that with my machine, the compicated and nice movements that are incident to hand wrapping are closely imitated, particularly at the tuck end and head end of the cigar, these movements being effected by the rotation of the carrier and the swinging of the die, respectively.

It will be understood by those skilled in the art that other attachments and accessories may be utilized, for example, automatic means for applying paste to the head end of the wrapper. Also, while I have shown the invention as embodied in certain details of construction, it should be understood that this is primarily for the purpose of illustrating the now preferred embodiment of my invention, and that the structure of the machine can be widely modified and changed within the spirit and scope of the invention.

Having thus described the invention, what I claim is:

1. In a cigar wrapping machine, a main frame, a wrapper-supporting die thereon, a bunch carrier reciprocable from a loading position to and over said die and including a frame having means for rotating a bunch in the direction for winding a wrapper thereon, a tucking needle mechanism including a rod mounted between its ends for rotation, longitudinal movement and swinging in vertical planes and having a needle at one end, means including a lever on said carrier frame and a cam on the main frame for swinging said rod in one direction, a detent for holding said rod against swinging in the other direction, means for longitudinally moving said needle alternately in opposite directions including a lever on said carrier frame, cams on said main frame cooperating with said lever and an operative connection between said lever and said rod, and a lost motion connection between said lever and said detent for actuating the latter to release said rod for swinging in the second-mentioned direction.

2. A cigar wrapping machine comprising a wrapper-supporting die, a rolling mechanism including a carriage horizontally reciprocable over said die and a bunch carrier rotatable on said carriage about a vertical axis, means for reciprocating said carriage, means for rotating said carrier including a gear connected to said carrier and a rack reciprocable on said carriage and meshing with said gear, means for reciprocating said rack, and means on said carrier for rotating in one direction a bunch to be wrapped, said means for reciprocating said rack including a slide reciprocable in directions at an angle to the directions of reciprocation of said rack, and an operative connection between said slide and said rack bar to cause longitudinal movement of the rack upon relative movement of said slide and said carriage, and means for actuating said slide in timed relation to the movement of said carriage.

3. A cigar wrapping machine comprising a wrapper-supporting die, a rolling mechanism including a carriage horizontally reciprocable over said die and a bunch carrier rotatable on said carriage about a vertical axis, means for reciprocating said carriage, means for rotating said carrier including a gear connected to said carrier and a rack reciprocable on said carriage and meshing with said gear, means for reciprocating said rack, and means on said carrier for rotating in one direction a bunch to be wrapped, said rack being reciprocable in directions at right angles to the direction of movement of said carriage, and said means for reciprocating said rack including a slide adjacent to and reciprocable in the same directions as said carriage and having a diagonal groove therein, a projection on said rack to enter said groove upon relative movement of said carriage and said slide to reciprocate said rack, and means for reciprocating said slide in timed relation to the reciprocation of said carriage to initially cause said slide to remain stationary as said carriage moves in one direction and thereby move the rack in one direction and thereafter to cause said slide to move relatively to said carriage to actuate the rack in the opposite direction.

4. A cigar wrapping machine including a horizontal wrapper support for a wrapper having a flag end, a bunch carrier linearly movable and rotatable over said support, means for linearly moving said carrier in one direction to a point above the tuck end of the wrapper support and for rotating the carrier about a vertical axis first in one direction and then in the opposite direction above said tuck end, means on said carrier for rotating a bunch in a direction to wind a wrapper on said bunch during the rotation of said carrier in the second-mentioned

direction, and a tucking needle mechanism for tucking the tuck end of a wrapper from said support onto the tuck end of said bunch, the first-named means linearly moving said carrier from said tuck end over and beyond the head end of the wrapper support and said bunch-rotating means continuing rotation of said bunch to apply the wrapper to the bunch, and means for swinging said wrapper support in its own plane during rolling of said bunch over said head end of the wrapper support to orient said flag end of the wrapper relatively to said head end of the bunch.

5. A cigar wrapping machine including a wrapper-supporting die, a rolling mechanism including a carriage horizontally reciprocable over said die and a bunch carrier including a frame having a vertical post projecting from the top thereof, a bearing on said carriage in which said post is revoluble about a vertical axis, means on said carrier for rotating a bunch, and means for reciprocating said carriage and for revolving said carrier about said vertical axis, said post being tubular and said means for rotating a bunch including a plurality of parallel rollers and shafts therefor, a countershaft on said carrier frame, geared driving connections between said countershaft and said roller shafts, a vertical jack shaft journaled in said tubular post, a geared connection between said jack shaft and said countershaft, and means for driving said jack shaft.

6. The cigar wrapping machine as defined in claim 5, wherein the last-named means comprises a horizontal drive shaft journaled in said carriage, a geared connection between said drive shaft and said jack shaft, a reciprocable rack bar, a pinion on said drive shaft meshing with said rack bar, and means for reciprocating said rack bar in timed relation to the reciprocation of said carriage.

7. The cigar wrapping machine as defined in claim 6, wherein the means for revolving said carrier includes a gear on said tubular post, a second rack meshing with said gear and reciprocable on said carriage, and a slide reciprocable on said frame, and cooperating parts on said second rack and said slide for reciprocating the second rack.

8. A cigar wrapping machine including a frame, a horizontal wrapper support thereon for a wrapper having a flag end, a bunch carrier movable over said support and including means for rotating in one direction a bunch to be wrapped during said linear movement of the carrier to apply said wrapper to said bunch, and means for swinging said support in its own plane as said bunch carrier moves thereover to orient said flag relatively to said bunch, the last-named means including a pivotal connection of the wrapper support on said frame, a lever pivoted on said frame and having a pivotal connection with said wrapper support and means for oscillating said lever in timed relation to the movement of said bunch carrier.

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