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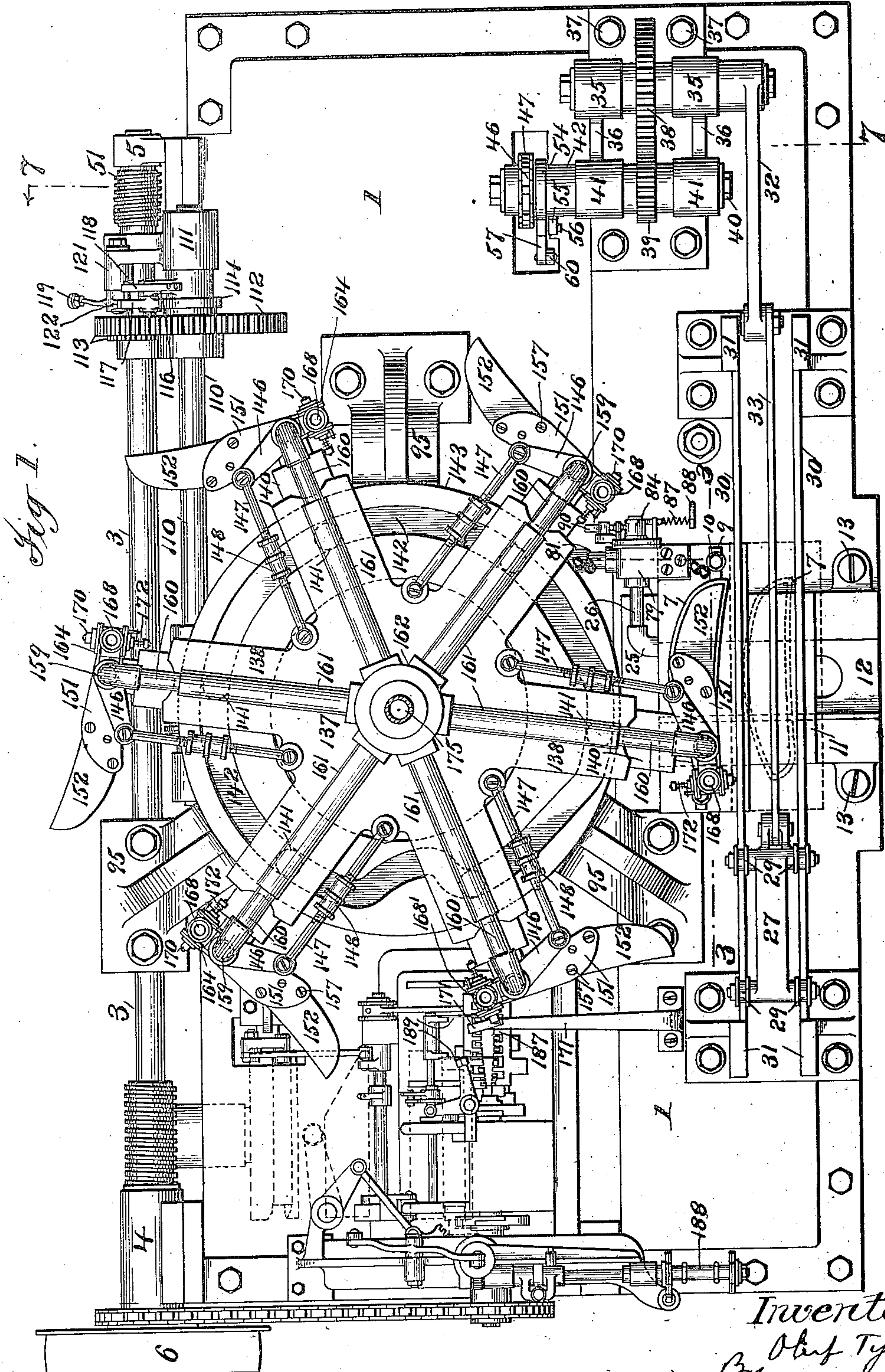
Patented July 24, 1900.

O. TYBERG.
CIGAR MACHINE.

(Application filed Feb. 5, 1900.)

7 Sheets—Sheet 4.

(No Model.)



Attest:
J. D. Brown
J. S. Kehoe

Inventor
O. Tyberg.
Philip Phelps Sawyer
Atty

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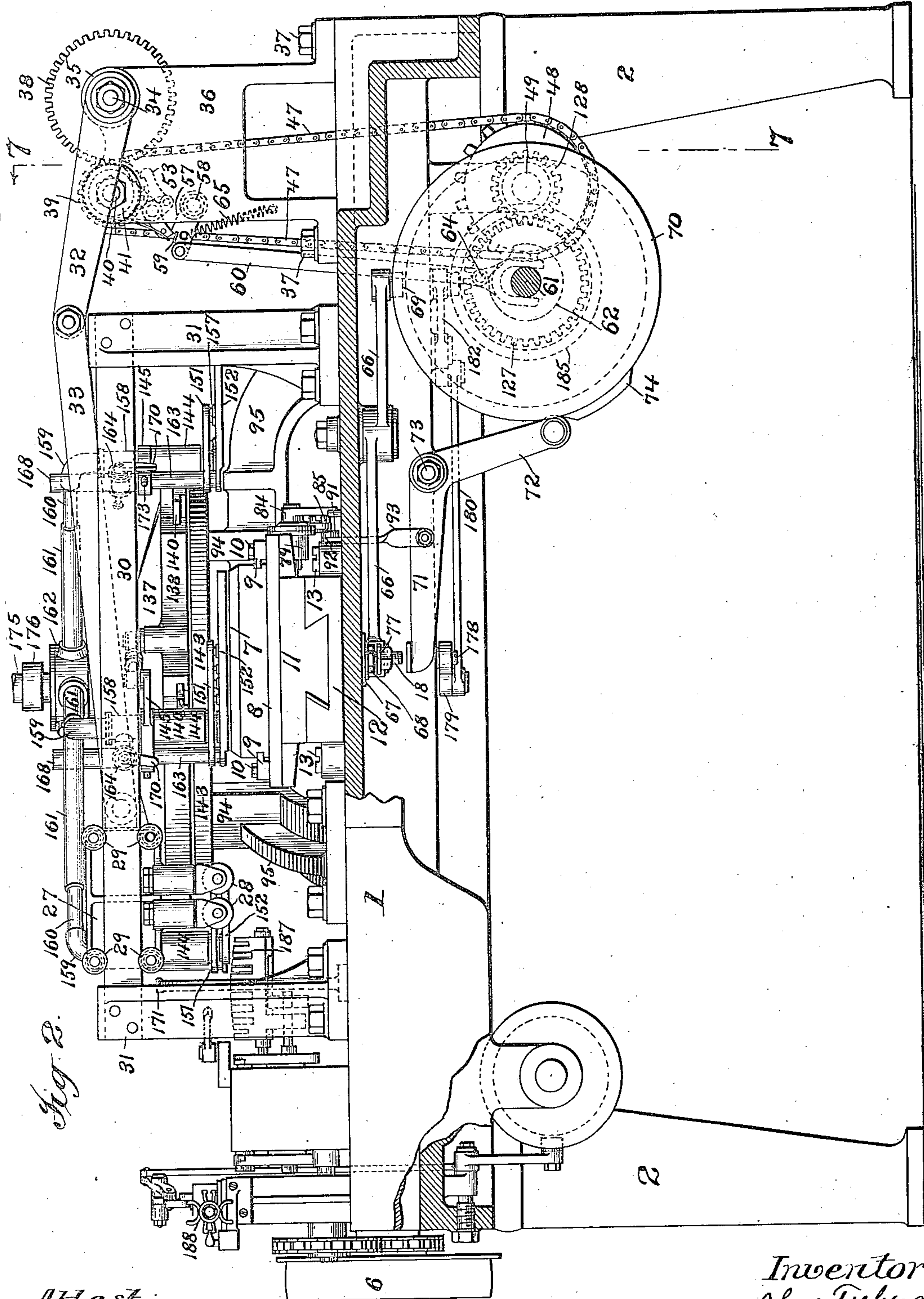
Patented July 24, 1900.

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(Application filed Feb. 5, 1900.)

7 Sheets—Sheet 2.

(No Model.)



Attest:
J. P. Bouché
J. A. Schoe

Inventor:
Oluf Tyberg
By
Philip Phelps Sawyer
Atty

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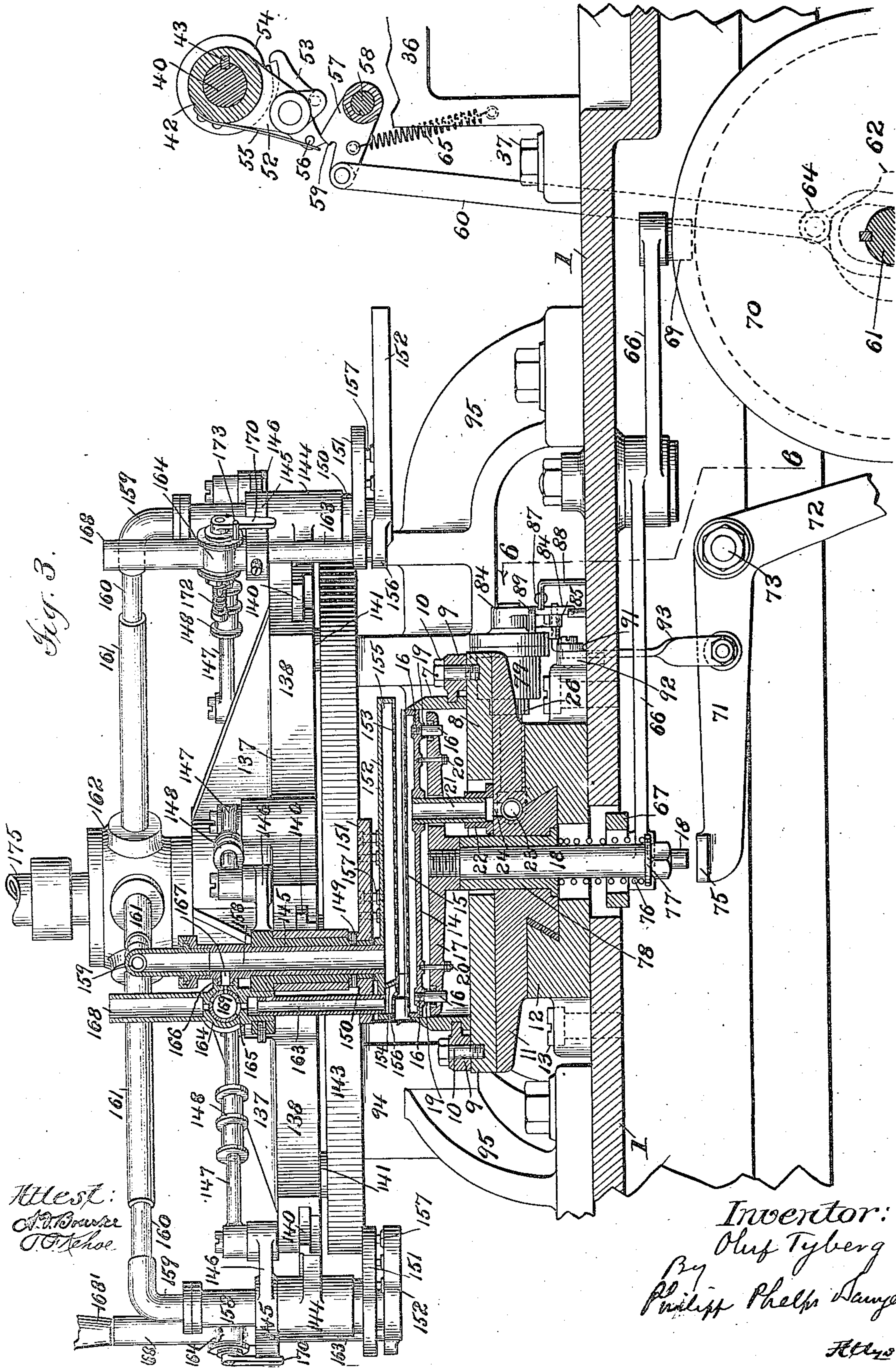
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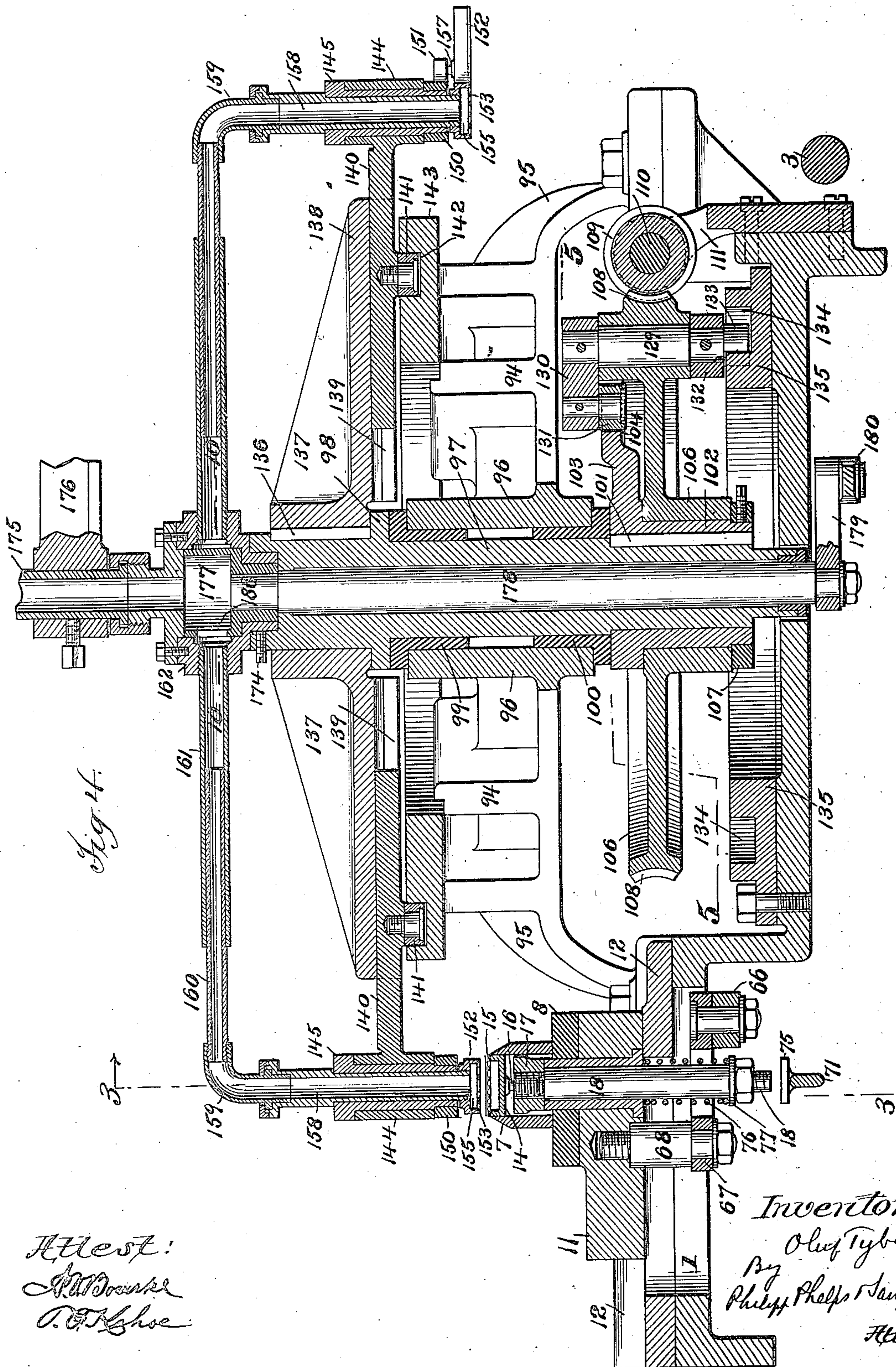
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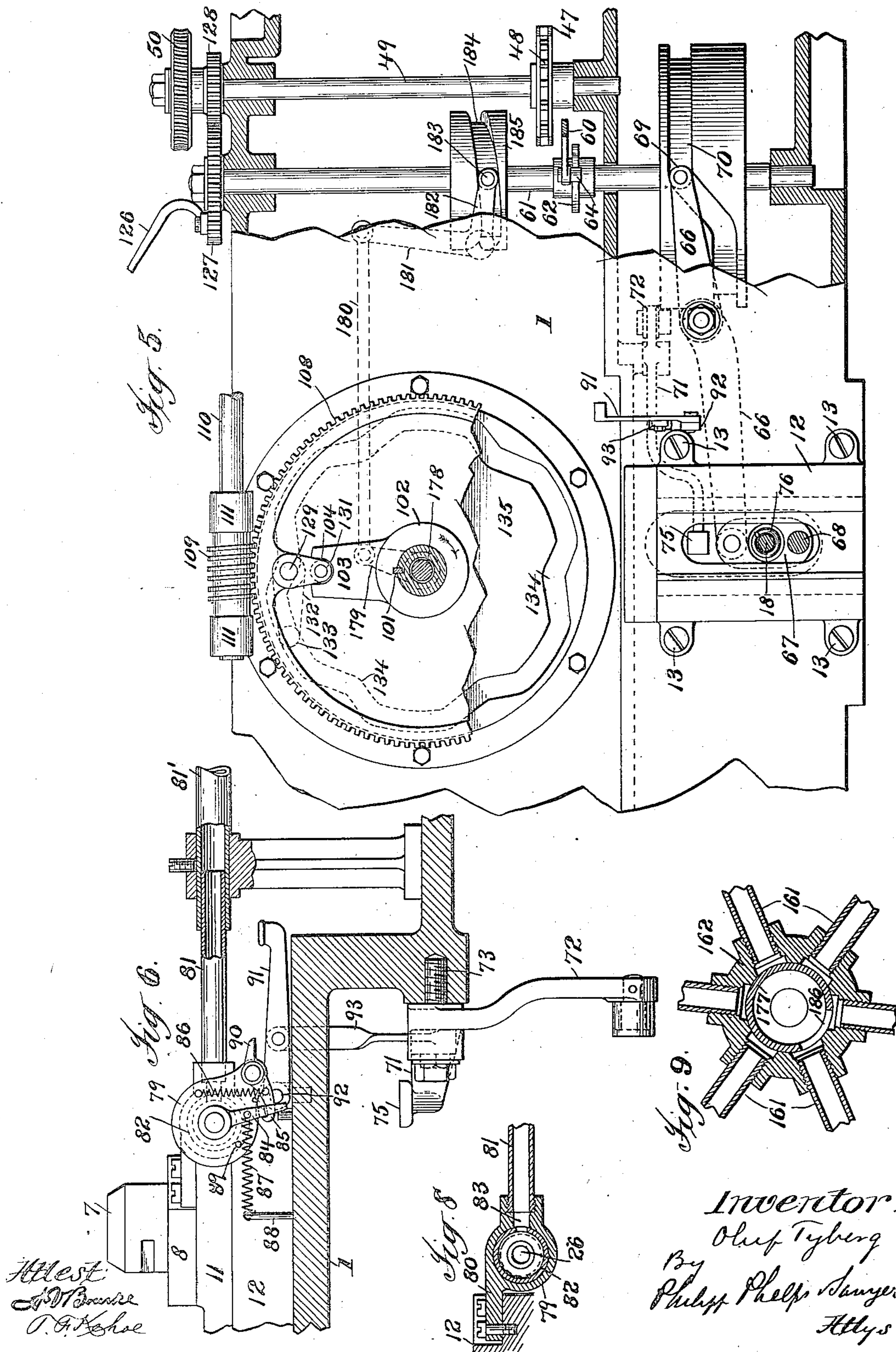
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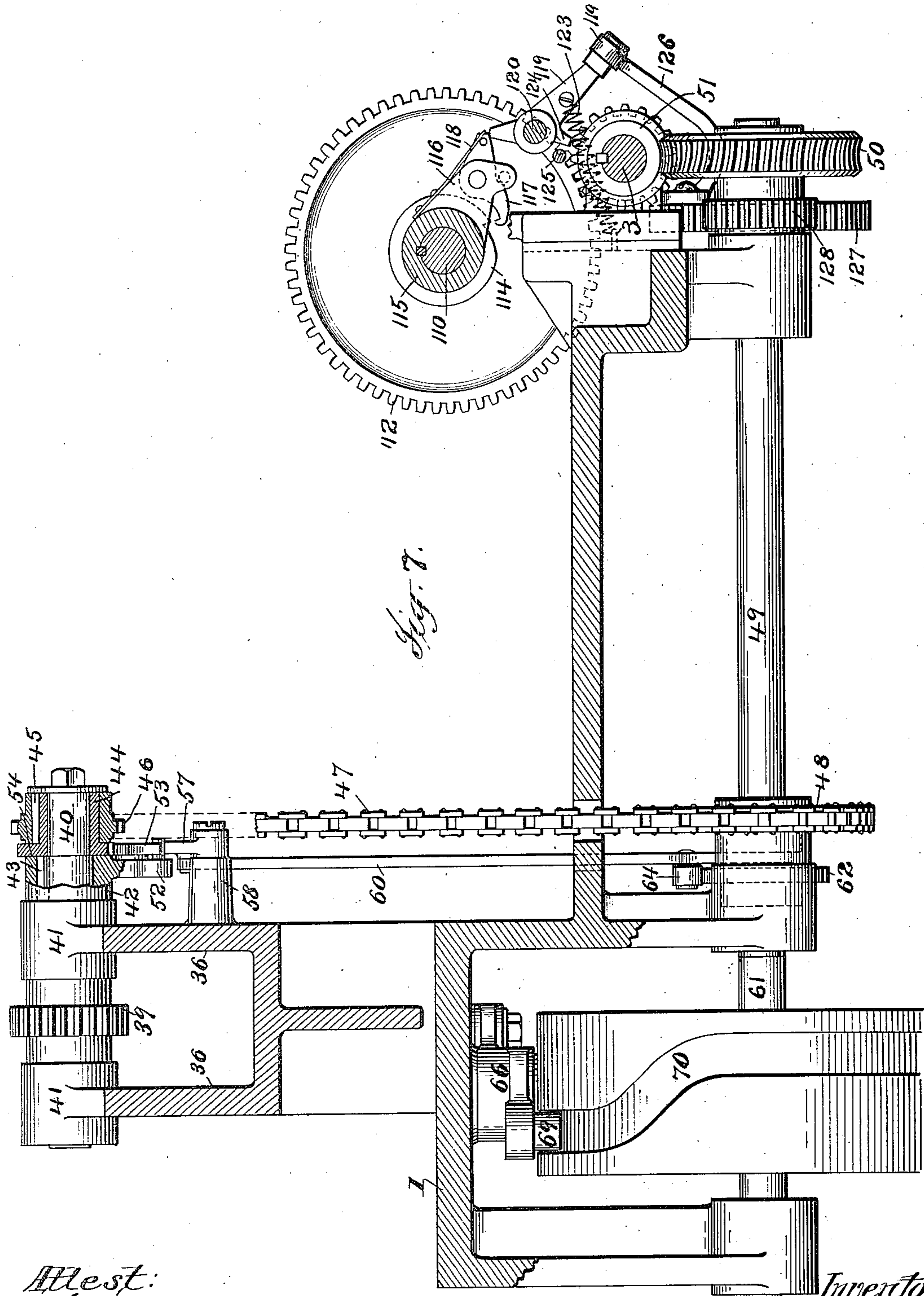
Patented July 24, 1900.

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(Application filed Feb. 5, 1900.)

(No Model.)

7 Sheets—Sheet 6.



Attest:
A. D. Bourke
T. A. Kehoe

Inventor
Olof Tyberg
Philip Phelps Sawyer
Atty.

No. 654,202.

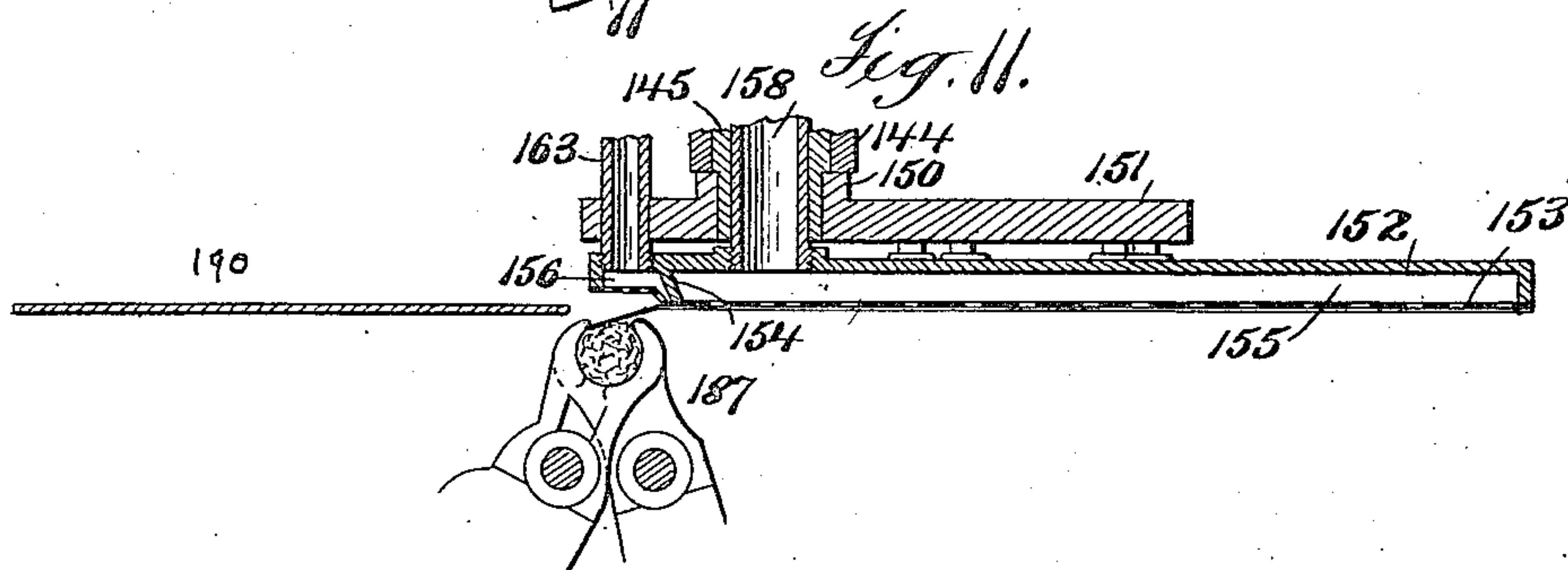
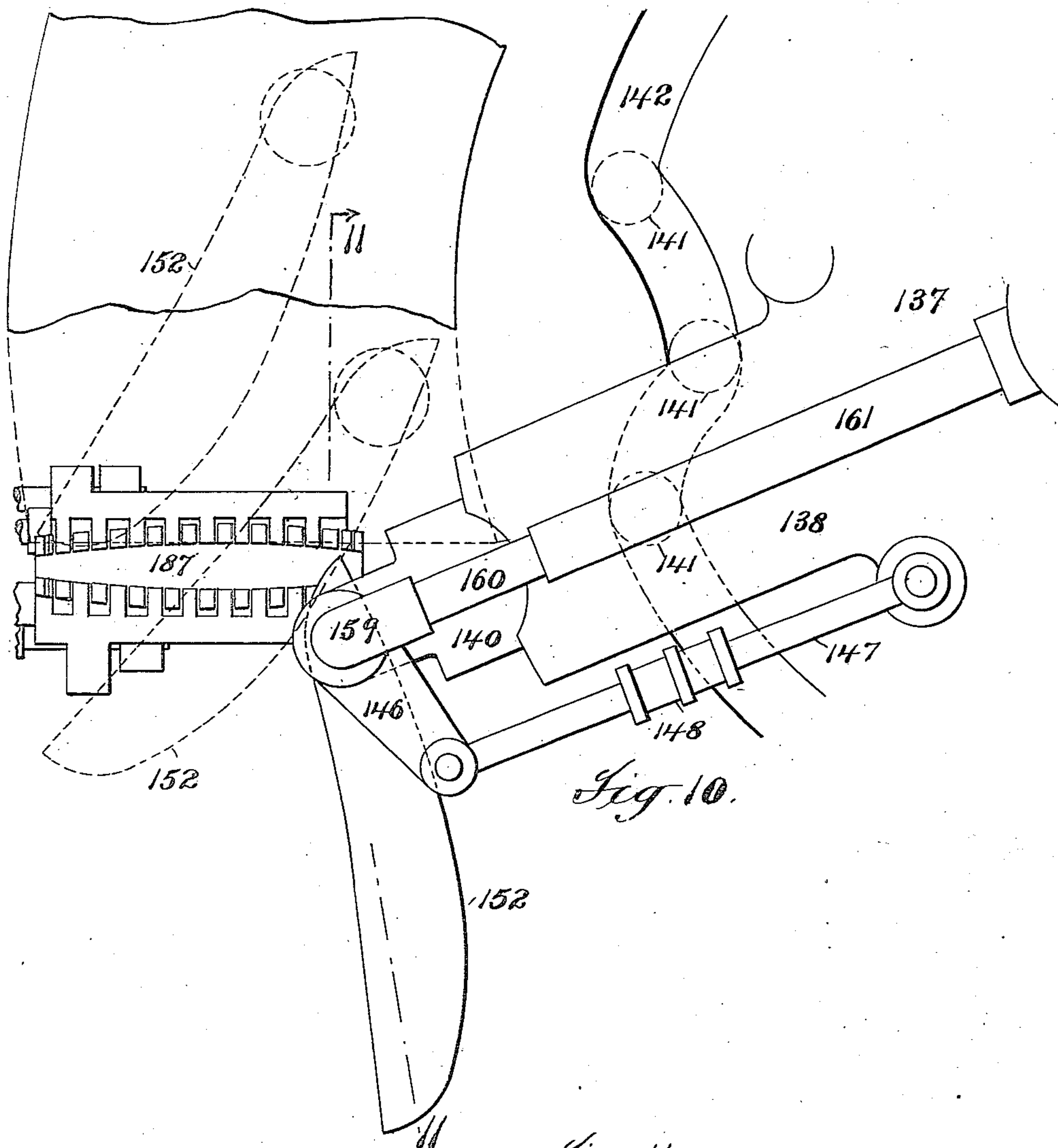
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(Application filed Feb. 5, 1900.)

(No Model.)

7 Sheets—Sheet 7.



Attest:
O. T. Bourke
O. F. Rhoe

Inventor:
By Oluf Tyberg
Philip Phelps Sanger
Atty

UNITED STATES PATENT OFFICE.

OLUF TYBERG, OF NEW YORK, N. Y., ASSIGNOR TO RUFUS L. PATTERSON
AND GEORGE ARENTS, JR., OF SAME PLACE.

CIGAR-MACHINE.

SPECIFICATION forming part of Letters Patent No. 654,202, dated July 24, 1900.

Application filed February 5, 1900. Serial No. 4,080. (No model.)

To all whom it may concern:

Be it known that I, OLUF TYBERG, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Cigar-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in cigar-machines.

One of the objects of this invention is to produce an improved cigar-machine in which a plurality of wrapper-supports operate to automatically deliver wrappers to a wrapping mechanism, a relative movement being produced between the wrapping mechanism and the plurality of supports.

A further object of the invention is to produce an improved cigar-machine in which a plurality of supports shall be operated to feed wrappers to a wrapping mechanism, each of said supports being given a movement with respect to the wrapping mechanism when it is delivering its wrapper thereto which is the resultant of an approaching movement, or a movement by which the wrapper is initially fed to the wrapping mechanism, a traversing movement, or a movement along the wrapping mechanism, and an angular movement or a movement by which the angle at which the wrapper is presented to the wrapping mechanism is varied.

A further object of the invention is to produce a cigar-machine in which a wrapper-support automatically feeds a wrapper to a wrapping mechanism, a relative movement between the two being produced for this purpose and the rate of movement being varied according to the part of the cigar which is being wrapped.

A further object of the invention is to produce an improved cigar-machine in which a plurality of wrapper-supports shall operate to automatically feed wrappers to a wrapping mechanism, said supports being caused to move over a cutting-bed, on which bed a wrapper is cut and from which it is transferred to a wrapper-support to be delivered by said support to the wrapping mechanism.

A further object of the invention is to pro-

duce improved mechanical devices by which the various operations to be performed by the machine may be effected.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described, and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a plan view of the machine. Fig. 2 is a front view of the machine. Fig. 3 is a sectional elevation, the plane of section being indicated by the line 3 3 of Figs. 1 and 4. Fig. 4 is a detail sectional elevation showing the wrapper-support carrier and the means for rotating it, the view being taken on a plane indicated by the line 4 4 of Fig. 1, some of the parts being omitted from this view. Fig. 5 is a plan view of a portion of a machine, illustrating the operating-cams for the wrapper-support carrier and devices for rotating them, said view being taken on planes indicated by the lines 5 5 in Fig. 4. Fig. 6 is a detail view of the valve-operating mechanism which controls the suction for the cutting-bed, the view being taken on the line 6 6 of Fig. 3. Fig. 7 is a detail sectional view of the devices for operating the cutter and also illustrating the clutch mechanism between the main shaft and the driving-shaft for the wrapper-support carrier. Fig. 8 is a detail view of the valve for controlling the suction which operates on the cutting-bed. Fig. 9 is a detail sectional view illustrating the valve which controls the suction leading to the wrapper-supports. Fig. 10 is an enlarged plan view illustrating diagrammatically the operation of the wrapper-support as it feeds the wrapper to the wrapping mechanism. Fig. 11 is a section on the line 11 11 of Fig. 10.

Referring to the drawings, which illustrate one embodiment of the invention, 1 indicates the machine bed or table, which is supported on suitable legs 2. The main shaft of the machine is indicated at 3, Fig. 1, the shaft being supported at one end in a bearing 4, suitably secured to the bed of the machine, and at the other end in a bracket 5, also secured to the

bed of the machine. The shaft 3 is provided with any suitable power-driven device—as, for instance, a pulley-wheel 6.

In the preferred form of this machine it will be arranged to automatically cut a wrapper from a leaf of tobacco. To this end there is provided a knife 7, which will be so shaped as to correspond with the wrapper to be cut. It will therefore be generally oval in form. The knife 7 may be secured upon a base 8 in any suitable manner. It is shown as secured by buttons 9, (see Fig. 3,) located at the ends of the knife, said buttons engaging grooves in the sides of the knife and being secured to the base 8 by means of screws 10. The base 8 rests upon a bed-plate 11, which is arranged to move in ways in a stationary block 12, secured to the bed-plate in any suitable manner, as by screws 13.

Suitable means are provided to hold the leaf of tobacco or other material in position during the cutting operation. While these means may vary, they will preferably consist of a suction mechanism. The suction mechanism may be varied considerably in construction. In the machine shown there is provided a suction-bed 14, said bed being located within the space surrounded by the oval knife and being preferably arranged to move therein. The suction-bed 14 supports a perforated plate 15, upon which the leaf of tobacco rests during the cutting operation. The bed 14 will preferably be yieldingly mounted. While this may be effected in various ways, in the construction shown the bed is provided with downwardly-extending guide-lugs 16, said lugs passing through perforations in a plate 17, said plate being secured in any suitable manner—as, for instance, by screw-threads—to a stem 18. The depending lugs 16 are surrounded by short coiled springs 19, said springs resting in recesses in the upper side of the plate 17 and operating to force the bed 14 away from the said plate. Bolts 20, which are secured to the under side of the plate 14 and pass through perforations in the plate 17, are provided to limit the movement of the suction-bed 14, caused by the springs. It is evident, however, that when pressure is applied to the perforated plate 15 the springs 19 will permit a slight yielding movement. The bed 14 is further provided with a pipe 21, through which suction is transmitted to the plate 15, said pipe 21 having a tight sliding connection with a fitting 22, which is secured to the bed-plate 11. The bed-plate 11 has a perforation 23 extending therethrough, said perforation communicating by an opening 24 with the fitting 22, before described. Fitting in the perforation 23 is a pipe 25, having a bent end. (See Fig. 1.) The pipe 25 fits snugly in the perforation in the bed, but is sufficiently loose therein to allow the bed to slide forward and back in a manner to be hereinafter described. Communicating with the pipe 25 is another

which will be hereinafter described, and from thence to a suitable suction-producing device—as, for instance, a fan. (Not shown.)

Any suitable means may be provided to cooperate with the knife 7, before described, in order to cut a wrapper from a leaf of tobacco held on the perforated plate 15, and this cooperating means may be either automatically operated or hand-operated. In the machine shown automatically-operated means are employed and include a carriage 27, carrying cutting-rollers 28. The carriage 27 will preferably be provided with a set of trolley-wheels 29, which engage on the upper and lower side of tracks 30, the said tracks being mounted on brackets 31, which extend upward from the bed-plate 1 of the machine. It will be readily seen that as the carriage 27 is reciprocated along its tracks it will pass over the knife 7, and the rollers 28 will cooperate with the knife and cut a wrapper from a leaf of tobacco lying on the perforated plate.

Any suitable means may be provided to reciprocate the carriage. Preferably, however, the reciprocation will be produced by means of a crank-arm 32, which is secured to the carriage by means of a link 33, the crank-arm being mounted on a shaft 34, supported in suitable bearings 35. The bearings 35 are formed on standards 36, (see Fig. 2,) which are secured to the bed-plate of the machine in any suitable manner—as, for instance, by screws 37. The shaft 34 is provided with a gear 38, which meshes with a pinion 39, said pinion being mounted on a shaft 40. The shaft 40 is mounted to rotate in bearings 41, which are also formed on or carried by the brackets 36, and this shaft has secured to it in any suitable manner, as by a key 43, a sleeve 42. (See Fig. 7.)

It is necessary to the operation of the machine that the cutting mechanism be brought into operation intermittently, so as to permit time for a cut wrapper to be delivered from the cutting bed and another leaf to be placed thereon. To this end, therefore, the shaft 40 is intermittently rotated. While the mechanism by which the shaft 40 is intermittently rotated may be varied widely in the machine shown, the shaft is provided with a collar 44, (see Fig. 7,) the collar being arranged to rotate loosely on the shaft and having secured to it in any suitable manner, as by a key 45, a sprocket-wheel 46. The sprocket-wheel 46 is driven by a sprocket-chain 47, said chain passing around another sprocket-wheel 48, which is mounted on a counter-shaft 49. (See Figs. 2, 5, and 7.) The counter-shaft 49 is provided with a worm-gear 50, said gear being driven by a worm 51 on the main shaft 3. (See Fig. 1.)

Inasmuch as the main shaft 3 and counter-shaft 49 are continuously driven, it is obvious that the sprocket 46 must be intermittently clutched to and unclutched from the shaft 40 in order that the said shaft may intermittently drive the shaft 34 and through it the

cutting-roller carriage. While various forms of clutch mechanism may be used for this purpose, the sleeve 42 (see Figs. 3 and 8) is provided with an arm 52, which is rigidly connected thereto, and to said arm is pivoted a pawl 53. The sleeve 4 is provided with a notched collar 54, the said collar being so arranged that the pawl 53 will engage the notch of the collar at suitable times. A spring 55 is secured to the sleeve 42 and bears against a pin 56 on the tail of the pawl, the operation of the said sleeve being to throw the pawl 53 into engagement with the notch on the collar. Suitable means must be provided to hold the pawl 53 out of engagement with the notched collar except when it is desired to rotate the shaft 40. While these means may be considerably varied, there is preferably provided an arm 57, which is pivoted on a stud 58, mounted on the side of the bracket 36. This arm 57 is provided with a shoulder 59, which in the raised position of the arm comes in contact with the tail of the pawl 53 and holds it out of engagement with the notch in the collar 54, the parts being shown in this position in Fig. 3. The arm 57 is held up in the position shown in Fig. 3 by means of a cam-rod 60, which is pivoted thereto, said rod having a fork at its lower end, which straddles a cam-shaft 61, to be hereinafter referred to. The cam-shaft 61 carries a cam 62, and the cam-rod 60 is provided with a pin 64, which runs on the periphery of said cam. A spring 65 is provided, against the stress of which the cam-rod holds the arm, the said spring being secured to the arm 57 and to the side of the bracket 36. When the cam permits it, the spring 65 draws down the arm 57, thus permitting the spring 55 to throw the head of the pawl forward, so that it engages the notched collar 54. When this engagement takes place, the shaft 40, the collar 44, the sleeve 42, and the pinion 39 are all rotated, and consequently the shaft 34 is rotated and causes the crank-arm 32 to reciprocate the carriage. The shape of the cam 62 is such that as soon as the pawl 53 has engaged the notched collar and the parts have begun to move the rod 60 will be lifted, bringing the arm 57 into the position shown in Fig. 3, so that when the shaft 40 has made a complete rotation the tail of the pawl 53 will come into contact with the arm 57 and the pawl will be thrown out of engagement with the notched collar. By this construction, therefore, the cutting-roller carriage is given one reciprocation and is then brought to a stop for each revolution of the shaft 61.

After a wrapper has been cut it is delivered to a transferring mechanism, which includes a wrapper-support, and the wrapper is by this transferring mechanism delivered to the wrapping mechanism. In the present machine the wrapper is delivered from the cutting-bed to the wrapper-support of the transferring mechanism by moving the cutting-bed into the path of said support, though

other constructions are possible. While this may be effected in various ways, it is preferably accomplished through the medium of a lever 66, which is pivoted to the under side of the machine-bed. (See Fig. 3.) The inner or operating end of the lever is connected to a link 67, (see Figs. 3, 4, and 6,) said link being connected to a stud 68, which is secured to the under side of the bed-plate 11, which has been before described as moving in ways in the block 12. The link 67 is provided with a central perforation which takes around the stem 18, before referred to. The other end of the lever 66 is provided with a roll 69, which engages a groove in a cam 70, mounted on the shaft 61, before referred to. As the lever 66 is reciprocated by the cam 70 it is obvious that the cutting-bed and the parts connected therewith will be given a movement in the ways in the block 12.

The transferring mechanism to which the wrapper is delivered will be hereinafter fully described. It may be here remarked, however, that said mechanism includes a plurality of suction-supports carried on a carrier, which is mounted to rotate about a central axis. The movement of the cutting-bed just described brings the suction-plate 15, carrying the wrapper, into the path of these suction-supports. While the parts may be adjusted so that no relative movement between the suction-support and the cutting-bed is necessary, the construction will preferably be such in order that free movement between these parts may be allowed that a relative vertical movement is given to one of these parts. In the construction shown the said relative movement will preferably be effected by moving the cutting-bed. To this end a rocking bell-crank lever 71, 72 is provided, said lever being pivoted to a rib on the base at 73. The arm 72 of this bell-crank is preferably provided with a cam-roll, which once in each revolution of the shaft 61 is struck by a cam projection 74 on the cam 70, before referred to. The other arm 71 of the lever is provided with a plate 75, which when the cutting-bed is in its inner position comes beneath the lower end of the stem 18. It may be here remarked that the stem 18 is normally held down in its lowermost position by means of a spring 76, which bears against a collar 77 on the stem and against a long sleeve or bushing 78, through which the stem passes. When the bell-crank lever 71, 72 is rocked by the projection 74 on the cam 70, the stem 18 will be raised and the plate 17, the suction-bed 14, and the plate 15 will be carried upward with it against the suction-support, any shock between the two parts being prevented by the spring 19, before described.

When the wrapper is to be delivered from the plate 15 to the suction-support, it is desirable that the suction be cut off from the plate 15. While this may be accomplished in various ways, the pipe 26, before referred

to, preferably terminates in a valve-casing 79, (see Figs. 1, 6, and 8,) said casing having an arm 80, which is secured to the block 12, before referred to. A pipe 81 extends from the casing 79 at an angle to the pipe 26 and has a telescopic connection with a pipe 81', supported in a suitable bracket 81'' and leading to any suitable suction mechanism, such as a fan. (Not shown.) The casing contains a rotating valve 82, having a port 83, which communicates with the pipe 81. The valve 82 is provided with an arm 84, (see Fig. 6,) which normally is held in a position in which the port 83 communicates with the pipe 81 by means of a spring-latch 85, which is pivoted to a projecting portion of the valve-casing 79. The spring-latch is normally held in engagement with the arm 84 by means of a spring 86. (See Fig. 6.) A spring 87 is connected at one end to the arm 84 and at the other end to a post 88, located on the bed-plate, the office of which is to swing the arm and close the valve when the arm is released from the latch 85, before referred to. A suitable stop 89 is provided on the valve-casing to limit the movement of the arm, and consequently the movement of the valve. The arm 84 may be released from the latch in various ways. Preferably, however, the latch 85 has a tail 90, which when the block 12 is in its innermost position lies in the path of the end of a lever 91, which is pivoted to the bed-plate at 92, as is shown in Figs. 5 and 6. The lever 91 is connected to the arm 71 of a bell-crank lever 71 72, before described, by means of a link 93. When the arms 71 72 are rocked, as has been before described, the lever 91 will be raised and strike the tail 90 of the latch 85, thus swinging the latch on its pivot and releasing the arm 84. The spring 87 will then throw the arm backward, turning the valve 82 and causing the port 83 to pass out of engagement with the pipe 81, thus cutting off the suction from the plate 15, so that the wrapper can be delivered therefrom.

In the present machine, as has been before said, the transferring mechanism by which the wrapper is taken from the cutting-bed and delivered to the wrapping mechanism includes a plurality of suction-supports. It is obvious that after the wrapper has been delivered to a suction-support there must be a relative movement between said support and the wrapping mechanism in order to enable the wrapper to be delivered. This relative movement is preferably effected in this machine by moving the suction-supports. The supports may be mounted and operated in various ways. Preferably, however, a supporting-frame 94, having feet 95, which rest upon the bed of the machine, is provided, the said supporting-frame being formed with a central hollow hub 96. A hollow shaft 97 is located in the said hub 96, said shaft having shoulders 98, by which it is supported on bushings 99, which rest in the hub 96. Other bush-

ings 100 surround the shaft near the lower part of the hub 96.

In this machine it is desired to give the shaft 97 an intermittent rotating movement which shall vary in speed. Various constructions may be used to drive the shaft in the manner desired. Preferably, however, the shaft 97 (see Figs. 4 and 5) has rigidly secured to it in any suitable manner, as by a key 101, a hub 102. Projecting from the hub 102 is an arm 103, which has a concave recess 104 in its outer end. Loosely mounted on the hub 102 is a driving-wheel 106, the said wheel being maintained in position in any suitable manner, as by a collar 107, secured to the hub 102 in any suitable manner—as, for instance, by a set-screw. The wheel 106 is given an intermittent movement in any suitable manner. In the machine shown it is provided at its outer edge with teeth 108, which are engaged by a worm 109. The worm 109 is mounted on a shaft 110, which is supported in suitable bearings 111. (See Figs. 1 and 5.) The shaft 110 is preferably arranged parallel to the main shaft 3 and carries a gear 112, which meshes with a gear 113, mounted on the main shaft 3. (See Fig. 1.) The gear 112 (see Fig. 7) is loosely mounted on the shaft 110, and its hub is provided with a notched collar 114. Keyed on the shaft 110 is a hub 115, from which extends an arm 116. Pivoted in the arm 116 is a pawl 117, said pawl being held forward by a spring 118, so that its hooked end engages the notched collar 114. When the pawl is in engagement with the notched collar, it is obvious that the gear 112 will be locked to the shaft and the two will rotate together.

In order to disengage the pawl and stop the shaft when desired, a lever 119 is provided, said lever being pivoted on a stud 120, which is mounted in a bearing 121, said bearing being carried on the arm extending from one of the bearings 111 before referred to. The lever 119 has a projecting nose 122, which may be thrown forward into the path of the tail of the pawl 117 in order to disengage it from the notched collar 114. The lever is normally held out of the path of the tail of the pawl by a spring 123, the lever being provided with a short projection 124, which takes against a stop 125 and limits the movement of the lever. In order to throw the lever forward into the path of the tail of the pawl, there is provided a bent arm 126, which is mounted on a gear 127, said gear being secured to the shaft 61, before referred to, and being in mesh with a gear 128, carried on the counter-shaft 49. The gear 127, it may be here remarked, is the driving means for the shaft 61. As the shaft 61 rotates, therefore, once in each revolution the bent arm 126 will strike the lever 119 and throw its nose into the path of the tail of the pawl 117. This disengages the pawl from the notched collar and allows the gear 112 to run free on the shaft 110.

The driving-wheel 106 has mounted in it a short vertical shaft 129. (See Figs. 4 and 5.) This shaft carries a horizontal arm 130 on its upper end, the said shaft being provided with a roll 131, which takes into the cavity 104 in the end of the arm 103. The lower end of the shaft 129 carries an arm 132, which is provided with a roll 133. This roll 133 engages a cam-groove 134 in a stationary cam 135, said cam being bolted to the bed-plate of the machine or secured thereto in any other suitable manner. If the groove 134 were in the form of a true circle, it would be seen that the driving-wheel 106 would transmit to the arm 103, through the shaft 129 and the arm 130, an unvarying movement, because the shaft 129 would be always stationary. Inasmuch, however, as the groove 134 is a cam-groove, it will be seen that as the driving-wheel 106 rotates, the cam 135, acting on the arm 132, will rock the shaft 129. When the roll 133 of the arm 132 is running in the concentric portion of the groove 134, the wheel 106 and the arm 103 will be rotating at the same speed. When, however, the roll 133 runs into that portion of the cam-groove which is farther from the center, the arm 132, the shaft 129, and the arm 130 will be rocked in a direction opposite to the movement of rotation of the wheel 106, and this rocking movement will operate to neutralize to a degree the rotating movement transmitted to the arm 103 through the wheel 106, so that the arm will run slower than the wheel. When, on the other hand, the roll 133 runs into that portion of the cam-groove which is nearer the center, the rocking movement of the arm 132, the shaft 129, and the arm 130 will be in the same direction as the rotating movement of the wheel 106 and will therefore cause the arm 103 to run somewhat faster than the wheel 106. The shaft 97, to which the arm 103 is rigidly secured, will of course partake of this varying movement of the arm and will at times be rotating faster than the driving-wheel 106, at times be rotating slower than the driving-wheel 106, and at times have the same speed as the said driving-wheel. The purpose of this varying movement will be hereinafter stated.

Secured to the upper end of the shaft 97 in any suitable manner, as by a key 136, is a circular carrier 137, having a series of arms 138. Each of these arms is provided on its under side with a pair of radial guiding-grooves 139, and in each pair of these grooves is mounted a slide 140, which is provided on its under side with a cam-roll 141, engaging a groove 142 in a stationary cam 143, mounted on the supporting-frame 94, before described. It is apparent that as the shaft 97 rotates the arms 138 and the slides 140 will be given a rotating movement, and, in addition, the slides will be given a reciprocating movement toward and from the center of rotation of the shaft 97 by means of the cam-groove 142.

The outer ends of the slides 140 are formed to provide bearings 144, in which are mount-

ed sleeves 145. From the upper ends of the sleeves 145 extend arms 146, (see Figs. 1 and 3,) these arms being connected to radius bars 147, which bars are pivoted to the carrier 137. The bars 147 for the purpose of adjustment are made in two parts connected by a turnbuckle 148. Secured to the sleeves 145 in any suitable manner, as by pins 149, (see Fig. 3,) is a collar 150, from which projects a plate 151. The plate 151 serves to carry the wrapper-support, which in this case is a suction-support. This suction-support consists of a casting 152, the lower side of which is closed by a perforated plate 153. A partition 154 (see Fig. 3) is arranged to divide the space inclosed by the casting into two chambers 155 and 156. The casting 152 is secured to the plate 151 in any suitable manner, as by screws 157. The upper side of the casting 152 is provided with two perforations. One of these perforations leads to the chamber 155, and by it said chamber communicates with a pipe 158, said pipe passing through and being supported by the sleeve 145. The upper end of the pipe 158 has an elbow 159 secured thereto, said elbow connecting with a pipe 160, which has a telescopic connection with a pipe 161. The pipe 161 communicates with a central hub or valve-chamber 162. The perforation leading into the chamber 156 communicates with a pipe 163, which pipe passes through an opening in the plate 151 and connects with a valve-chamber 164. This valve-chamber 164 is secured in an opening in a projection 165, extending from the sleeve 145, before described. The valve-chamber 164 has an opening in its side by which it is secured to a threaded boss 166, which communicates with the pipe 158 by an opening 167. (See Fig. 3.) From the upper side of the valve-chamber 164 extends a pipe 168, which is intended at suitable times to be brought into communication with a blast-pipe 168', communicating with any suitable blast mechanism. (Not shown.) The valve-chamber 164 contains a circular valve 169, which is provided with three ports, these ports being so arranged that at times the pipe 163 and the chamber 156 with which it connects are in communication with the pipe 158, this position of the parts being shown in Fig. 3, and at times the pipe 163 is in communication with the pipe 168 and through it with the blast mechanism before referred to.

The stem of the valve 169 (see Fig. 3) is provided with an arm 170, (see the right-hand side of Fig. 3,) which arm strikes a projection on an arm 171, (see Figs. 1 and 2,) said projection being located over the wrapping mechanism, to be hereinafter referred to. The valve 169 is normally held in the position shown in Fig. 3—that is, so that the chamber 156 is in communication with the pipe 158 by means of a torsion-spring 172, which surrounds a projection which extends from the side of the valve which is opposite

to that to which the arm 170 is connected. The movement produced by the spring is limited by a stop 173.

The valve-chamber 162, (see Fig. 4,) which has been heretofore referred to as the chamber with which the pipe 161 connects, is secured to the upper end of the shaft 97 in any suitable manner, as by a set-screw 174. This valve-chamber connects with a pipe 175, which may be suitably supported in an arm or bracket 176, only a part of which is shown, said pipe 175 leading to any suitable suction-producing device—such, for instance, as a fan. (Not shown.) The chamber 162 contains a rotary valve 177, said valve being operated by a rod or shaft 178, which extends down through the center of the hollow shaft 97 and has secured to its lower end an arm 179. The arm 179 is connected by a link 180 (see Fig. 5) to one arm 181 of the bell-crank lever 181 182. The other arm 182 of the bell-crank lever carries a stud 183, which engages with a cam-groove 184 in a cam-roll 185, mounted on the shaft 61, before referred to. The valve 177 (see Fig. 9) fits snugly in the chamber 162 and is provided with an opening 186, which is of sufficient extent so that it can simultaneously communicate with two of the pipes 161. The suction mechanism operating through the pipe 175, therefore, will be simultaneously operating on two of the pipes 161 and through these pipes upon two of the suction-supports before referred to.

The wrapping mechanism to which the supports deliver the wrappers may be of any desired character. A suitable wrapping mechanism is indicated at 187, said mechanism consisting of sets of coöperating wrapper-jaws of the type shown in the United States patent to J. Reuse, No. 552,447, dated December 31, 1895, to which reference is made for a full disclosure of the construction. The bunch to be wrapped may be placed in the wrapping-jaws by hand or in any suitable manner. Preferably, however, the machine will be provided with an automatic bunch-feed 188, which is similar in construction to that shown and described in my pending application, Serial No. 4,081, filed February 5, 1900. Suitable displacing-arms 189 are provided for lifting the wrapped cigar from the jaws, which will preferably be mounted and operated in the manner described in my said pending application.

It may sometimes be desirable to close the perforations in the plate 153 after the plate has delivered its wrapper to the wrapping mechanism. While this may be accomplished in various ways, in the machine shown there is provided a plate 190. (See diagrams Figs. 10 and 11.) This plate, which may be of plain sheet metal, as shown, or may be covered with rubber or felt, is located in the path of the suction-support and in such a position with respect to the wrapping mechanism that as the forward end of the support delivers its wrapper it will run onto the plate. As the

support delivers its wrapper to the wrapping mechanism the perforated plate 153 runs over the plate 190 and the perforations are closed. It may be here remarked that this plate 190 is not shown in Fig. 1, because it would obscure other important parts of the mechanism. While this plate 190 may under some circumstances be desirable, it is by no means a necessary feature of the machine, since the suction may be readily made sufficiently strong to be unaffected by the fact that the perforations in the plate 153 are left unclosed after the wrapper has been delivered from the plate.

The construction of the machine being as before described, the operation of the machine taken as a whole is as follows: The operator places a leaf of tobacco or other material from which a wrapper is to be cut on the suction-plate 15, the bed-plate 11 at that time being in its forward position and the perforated plate 15 being in the position shown in dotted lines in Fig. 1. The suction-chamber, which is closed by the plate, is also lowered, so that it is below the edge of the knife. As the leaf is spread on the plate 15 the suction, acting through the pipes 81' 81, the valve 82, the pipes 26 25, the perforation 23, and the pipe 21, operates to hold the leaf securely on the plate. After the leaf has been spread upon the plate the roller-carriage is actuated and runs over the knife, so as to cause it to cut a wrapper from the leaf. After the carriage has retreated the bed-plate 11 is slid inward, this operation being effected by the lever 66 and the cam 70, the plate 15 assuming the position shown in full lines in Fig. 1. As soon as the suction-support comes into position directly over the plate 15 the arm 126 strikes the lever 119 and disconnects the pawl 117 from the collar 114, thus disconnecting the worm-shaft from its driving-gear. At about the time this occurs the lever 71 72 is operated by the cam projection 74 and strikes the under side of the stem 18, thus raising the suction-bed 14 and the perforated plate 15 up against the under side of the perforated plate 153. By this movement of the lever 71 72 the link 93 is operated to raise the lever 91 against the tail 90 of the latch 85. This causes the latch to release the arm 84, and the spring 87 rotates the valve 82, shutting off the suction from the cutting-bed. The valves 177 and 169 are at this time in such position that the suction is operating in both the suction-chambers 155 and 156. The cut wrapper is therefore transferred from the suction-plate 15 to the suction-plate 153, which forms the operating-face of the suction-support. When these operations have been completed and the leaf has been transferred, the worm-shaft 110 is again clutched to its driving-gear 112 and the driving-wheel 106 is rotated, thus causing the shaft 97 to revolve, carrying with it the carrier 137. This moves the suction-support which has just taken a wrapper from a position over the cutting-bed

to a position over the wrapping-jaws. As the suction-support which holds the wrapper comes into position over the wrapping-jaws the arm 170 of the valve 169 strikes the projection on the arm 171, thus rotating the valve 169, so as to close the opening 167, through which the valve communicates with the suction-pipe 158 and uncovers the opening into the pipe 168, which at this time has come into communication with the blast-pipe 168'. The blast, acting through the pipes 168 163 and the chamber 156, blows the end of the wrapper down into the wrapping-jaws, so that it is seized by them. Just prior to the time when this occurs another suction-support has been brought into position over the cutting-bed, which by this time has had a new leaf placed thereon from which a wrapper has been cut, and the bed has been again moved into position to deliver its wrapper. At the time, therefore, when the blast operates to blow the end of the wrapper into the wrapping-jaws the shaft 110 has been disconnected from its driving-gear, and the shaft 97, which drives the carrier for the wrapper-supports, is stationary. When the head of the wrapper has been blown down into the jaws and a new wrapper has been transferred to the suction-support which is over the cutting-bed, the shaft 110 is again clutched to its driving-gear. As the shaft 97 begins to rotate the suction-support which is presenting a wrapper to the wrapping-jaws is now given a movement which is the resultant of three movements—that is to say, a movement by which the wrapper is fed to the bunch in the wrapping-jaws, a movement by which the wrapper is advanced along the bunch in the wrapping-jaws, and a movement by which the angle at which the wrapper is presented to the bunch is varied according to the shape of the cigar to be wrapped. The first of these movements of the wrapper-support may be termed an "approaching" movement, although it is to be understood that by this term it is not meant that all parts of the wrapper-support are at all times approaching the wrapping mechanism. Since, however, that part of the wrapper-support which is to deliver its portion of the wrapper to the wrapping-jaws approaches the said jaws, it is believed that this term defines the movement. This approaching movement is given by the rotating movement of the shaft 97, which causes the carrier 137, the slides 140, and the suction-supports to rotate. As this rotation begins it will be seen (see Fig. 1 and the diagram Fig. 10) that the cam-roll 141 is forced inward by the cam-groove 142, thus causing the slide 140 to move inward. This movement of the slide would tend to carry the suction-support inward were it not for the arm 146 and the radius-bar 147. These parts resist the inward movement of the suction-support, and consequently cause it to swing as the carrier 137 is rotated from the position shown in full lines in Fig. 10 to the position shown in dotted

lines in said figure. By this movement of the wrapper-support the wrapper is not only traversed along the cigar-bunch, but is also given an angular movement with respect thereto, so as to change the angle at which the wrapper is presented to the bunch. As the wrapper begins to be wound upon the middle of the bunch, where the bunch is larger, (for it is to be understood that the bunch to be wrapped by this machine is of the "perfecto" shape—that is, its greatest diameter is near the middle of its length and it tapers toward both ends,) more wrapper must be supplied to the bunch than when the ends are being wrapped. The shaft 97 is therefore at this time given a slightly-increased movement. This movement is effected by the engagement of the arm 132, carrying the roll 133, with the cam-groove 134, the said movement being transmitted to the shaft 97 through the shaft 129, arm 130, and the arm 103. After the wrapper has passed the center of the bunch and is being wound upon the tapered part the cam 134, acting through the same agencies, acts to retard the movement of the shaft 97 and so slow up the rotating movement of the shaft. As the wrapper-support which receives the various movements heretofore described delivers its wrapper to the wrapping mechanism it runs over the plate 190, and this plate closes the perforations in the said support. By the time the wrapper has been completely delivered to the wrapping-jaws the valve 177 is turned through the arm 179, the link 180, the bell-crank 181 182, and the cam-groove 184 into a position where the suction is cut off from the support which has delivered the wrapper. The shaft 97 continues its rotation, bringing the suction-support which has just received a wrapper into position to deliver the same and another support into position to receive a wrapper from the cutting-bed. The cycle of operations just described is now repeated.

It is to be understood that the mechanisms by which the various operations above described are carried into effect may be widely varied. It is also to be understood that some of the mechanisms may be used independently of others, and such independent use is contemplated. The invention is not, therefore, to be restricted to the specific mechanisms herein shown and described.

What I claim is—

1. The combination with a suction cutting-bed, of means for giving it a horizontal reciprocation between the cutting and delivery points, and means for vertically reciprocating the bed from its normal position into a position to deliver a wrapper, substantially as described.

2. The combination with a suction cutting-bed, of means for giving it a horizontal reciprocation between the cutting and delivery points, and means for vertically reciprocating the bed to move it into a position to deliver a wrapper and simultaneously cutting

off the suction therefrom, substantially as described.

3. The combination with a wrapping mechanism, of a moving wrapper-support operating to deliver a wrapper to the wrapping mechanism, a cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, and means for reciprocating the cutting-bed toward and away from the path of travel of the wrapper-support, substantially as described.

4. The combination with a wrapping mechanism, of a moving wrapper-support operating to deliver a wrapper to the wrapping mechanism, a cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, means for moving the cutting-bed toward the path of movement of the support, means for moving it toward and away from the support, and means for moving it away from the path of movement of the support, substantially as described.

5. The combination with a wrapping mechanism, of a moving suction wrapper-support operating to deliver a wrapper to the wrapping mechanism, a suction cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, and means for reciprocating the cutting-bed toward and away from the path of travel of the wrapper-support, substantially as described.

6. The combination with a wrapping mechanism, of a moving suction wrapper-support operating to deliver a wrapper to the wrapping mechanism, a suction cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, means for moving the cutting-bed toward the path of movement of the support, means for moving it toward and away from the support, and means for moving it away from the path of movement of the support, substantially as described.

7. The combination with a wrapping mechanism, of a plurality of wrapper-supports operating to feed wrappers to the wrapping mechanism, a cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, and means for moving the bed toward and away from the path of movement of the supports, substantially as described.

8. The combination with a wrapping mechanism, of a plurality of wrapper-supports operating to feed wrappers to the wrapping mechanism, a cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, means for moving the cutting-bed toward the path of movement of the supports, means for moving it toward and away from the supports, and means for moving it away from the path of movement of the supports, substantially as described.

9. The combination with a wrapping mechanism, of a plurality of suction wrapper-supports operating to feed wrappers to the wrapping mechanism, a suction cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, and means for moving the

cutting-bed toward and away from the path of movement of the supports, substantially as described.

10. The combination with a wrapping mechanism, of a plurality of suction wrapper-supports operating to feed wrappers to the wrapping mechanism, a suction cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, means for moving the cutting-bed toward the path of movement of the supports, means for moving it toward and away from the supports, and means for moving it away from the path of movement of the supports, substantially as described.

11. The combination with a wrapping mechanism, of a plurality of suction wrapper-supports operating to deliver wrappers to the wrapping mechanism, a suction cutting-bed, means cooperating with the cutting-bed for cutting a wrapper, means for moving the cutting-bed toward the path of movement of the suction-supports, means for moving it toward the supports, means for cutting off the suction as it is moved toward the supports, means for moving it away from the supports, and means for moving it away from the path of movement of the supports, substantially as described.

12. The combination with a wrapper-cutting knife, of a base upon which said knife is supported, a suction cutting-bed inclosed by the knife, means for reciprocating the bed and knife, means for reciprocating the bed from its normal position into a position to deliver a wrapper, said movement being at an angle to the movement of the base, bed and knife, and means for cutting off the suction from the bed, substantially as described.

13. The combination with a wrapper-cutting knife, of a base upon which said knife is supported, a suction cutting-bed inclosed by the knife, a suction-pipe leading to said bed, a cam-operated lever for reciprocating the base, bed and knife, a second cam-operated lever for reciprocating the bed at an angle to the reciprocation of the base, bed and knife, and means operated by said second lever for controlling the suction-pipe leading to the cutting-bed, substantially as described.

14. The combination with a wrapper-cutting knife, of a suction cutting-bed inclosed by the knife, a suction-pipe leading to said bed, a spring-operated valve for controlling the pipe, a latch for holding the valve in inoperative position, a lever for reciprocating the bed with respect to the knife, a lever for releasing the latch, and connections between the two levers, substantially as described.

15. The combination with a knife, of a base on which it is supported, means for reciprocating the base, a suction cutting-bed inclosed by the knife, a suction-pipe leading to said bed, a valve moving with the base, a lever in the path of movement of the valve, means thrown into operation by the lever for closing the valve, a lever and suitable connections for moving the bed with respect to the knife,

and connections between the two levers, substantially as described.

16. The combination with a plurality of arms, of means whereby each arm is caused to carry a suction wrapper-support, and a plurality of pipes independent of the arms, one connecting with each of the supports, substantially as described.

17. The combination with a wrapping mechanism, of a cutting-bed, means cooperating therewith to cut a wrapper, a plurality of wrapper-supports, means for transferring a wrapper from the cutting-bed to each of the supports, and means for causing each of the supports to deliver its wrapper to the wrapping mechanism, substantially as described.

18. The combination with a wrapping mechanism, of a suction cutting-bed, means cooperating with the bed to cut a wrapper, a plurality of suction wrapper-supports, means for transferring a wrapper from the cutting-bed to each of the supports, and means for causing each of the supports to deliver its wrapper to the wrapping mechanism, substantially as described.

19. The combination with a wrapping mechanism, of a cutting-bed, means cooperating therewith to cut a wrapper, a plurality of wrapper-supports, means for transferring a wrapper from the cutting-bed to each of the supports, and means for producing an approaching movement between each of the supports and the wrapping mechanism as it delivers its wrapper to the wrapping mechanism, substantially as described.

20. The combination with a wrapping mechanism, of a cutting-bed, means cooperating therewith to cut a wrapper, a plurality of wrapper-supports, means for transferring a wrapper from the cutting-bed to each of the supports, and means for producing a traversing movement between each of the supports and the wrapping mechanism as it delivers its wrapper to the wrapping mechanism, substantially as described.

21. The combination with a wrapping mechanism, of a cutting-bed, means cooperating therewith to cut a wrapper, a plurality of wrapper-supports, means for transferring a wrapper from the cutting-bed to each of the supports, and means for producing an angular movement between each of the supports and the wrapping mechanism as it delivers its wrapper to the wrapping mechanism, substantially as described.

22. The combination with a wrapping mechanism, of a cutting-bed, means cooperating therewith to cut a wrapper, a plurality of wrapper-supports, means for transferring a wrapper from the cutting-bed to each of the supports, and means for producing a movement between each of the supports and the wrapping mechanism as it delivers its wrapper to the wrapping mechanism which is the resultant of an approaching movement, a traversing movement and an angular movement, substantially as described.

23. The combination with a carrier provided with a plurality of guides, of a plurality of slides mounted in the guides, a plurality of wrapper-supports mounted on the slides, a stationary cam, means for rotating the carrier, and means whereby a stationary cam causes a movement of the slides toward and away from the center of rotation of the carrier, substantially as described.

24. The combination with a wrapping mechanism, of a carrier provided with a plurality of guides, a plurality of slides mounted in the guides, a plurality of suction wrapper-supports mounted on the slides, a stationary cam, means for rotating the carrier, and means whereby the stationary cam causes a movement of the slides toward and away from the center of rotation of the carrier, substantially as described.

25. The combination with a carrier provided with a plurality of guides, of a plurality of slides mounted in the guides, a plurality of pivoted wrapper-supports carried by the slides, means for rotating the carrier, a cam for causing the slides to move toward and from the center of rotation of the carrier, and a radius-bar connected to the carrier and the supports and operating to turn the supports on their pivots as the slides are moved by the cam, substantially as described.

26. The combination with a wrapping mechanism, of a carrier provided with a plurality of guides, a plurality of slides mounted in the guides, a plurality of pivoted suction wrapper-supports carried by the slides, means for rotating the carrier, a cam for causing the slides to move toward and from the center of rotation of the carrier, and a radius-bar connected to the carrier and the supports and operating to turn the supports on their pivots as the slides are moved by the cam, substantially as described.

27. The combination with a wrapping mechanism of a wrapper-support, means for producing a relative movement between the wrapping mechanism and the support during the wrapping operation, and a radius-bar for controlling the movement, substantially as described.

28. The combination with a wrapping mechanism, of a rotating carrier, a wrapper-support mounted thereon, means for moving the wrapper-support toward and away from the axis of the carrier during its rotating movement, and a radius-bar connected to the support and the carrier, substantially as described.

29. The combination with a shaft, of a carrier mounted thereon, a plurality of suction-supports, a valve-chamber with which all the suction-supports are connected, a valve in the chamber, and means for operating the valve so that the suction will operate on two of the supports, substantially as described.

30. The combination with a wrapping mechanism, of a cutting-bed, a carrier, a plurality of suction-supports, means for rotating the

carrier so as to cause the supports to pass in succession over the cutting-bed and the wrapping mechanism, the construction being so arranged that when one of the supports is over the cutting-bed another is over the wrapping mechanism, and means for cutting off the suction from all the supports, except the two which are cooperating with the wrapping mechanism and the bed, substantially as described.

31. The combination with a wrapping mechanism, of a cutting-bed, a carrier, a plurality of suction-supports, a valve-chamber with which all the suction-supports are connected, a valve in the chamber, said valve being constructed so as to communicate with two of the suction-chambers simultaneously, a cam, and suitable connections for operating the valve, substantially as described.

32. The combination with a wrapping mechanism, of a carrier, a plurality of pivoted suction wrapper-supports, each of said supports being divided into two chambers, a suction-pipe connected to one of the chambers, a pipe connected to the other chamber, a valve-casing connecting the two pipes, a blast-pipe also connected to the valve-casing, a valve in the casing, means for rotating the carrier, and means in the path of rotation of the carrier for operating the valve to close the connection with the suction-pipe and open the connection with the blast-pipe, substantially as described.

33. The combination with a wrapping mechanism, of a wrapper-support operating to present a wrapper to the wrapping mechanism, a carrier to which the wrapper-support is connected, and means for imparting a variable rotation to the carrier so that the movement of the support varies according to the part of the cigar-bunch being wrapped, substantially as described.

34. The combination with a wrapping mechanism, of a shaft, a carrier mounted on the shaft, a wrapper-support, a driving-wheel for the shaft, a rocking connection between the driving-wheel and the shaft, a cam for operating the connection, said cam and connection operating to vary the rotation of the shaft with respect to that of the driving-wheel, substantially as described.

35. The combination with a wrapping mechanism, of a shaft, a carrier mounted on the shaft, a wrapper-support, an arm extending from the shaft, a driving-wheel, a short shaft journaled in the wheel, said shaft having an arm which engages the arm extending from the shaft, an arm extending from the other end of the short shaft, and a cam with which said arm engages, said cam being arranged to rock the short shaft and thus vary the ro-

tation of the carrier-shaft with respect to the driving-wheel, substantially as described.

36. The combination with a shaft, of a driving-wheel therefor, an arm extending from the shaft, a cam, a short shaft journaled in the driving-wheel and having an arm which engages the arm extending from the first-named shaft and another arm which engages the cam, the cam being arranged to rock the short shaft and thus vary the rotation of the first-named shaft with respect to the driving-wheel, substantially as described.

37. The combination with a wrapping mechanism, of a wrapper-support, means for producing an approaching movement between the wrapping mechanism and the support, and means for varying the rate of said movement, substantially as described.

38. The combination with a wrapping mechanism, of a wrapper-support, means for giving the support an approaching movement with respect to the wrapping mechanism, and means for varying the rate of said movement.

39. In a cigar-machine, the combination with a wrapping mechanism, of a wrapper-support, means for causing the support to deliver the wrapper to the wrapping mechanism by a movement which is the resultant of an approaching movement, an angular movement and a traversing movement, and means for varying the rate at which the wrapper-support moves with respect to the wrapping mechanism according to the part of the cigar-bunch being wrapped, substantially as described.

40. The combination with a wrapping mechanism, of a suction wrapper-support having a perforated operating-face, means for causing the wrapper-support to deliver its wrapper to the wrapping mechanism, and means for successively closing the perforations in the support as the wrapper is removed therefrom, substantially as described.

41. The combination with a wrapping mechanism, of a suction wrapper-support having a perforated operating-face, means for moving the wrapper-support so as to cause it to deliver its wrapper to the wrapping mechanism, and a plate lying in the path of the wrapper-support and operating to close the perforations in the face of the support as the support delivers its wrapper to the wrapping mechanism, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OLUF TYBERG.

Witnesses:

A. L. KENT,
A. A. V. BOURKE.