J. P. McCREADY.

PULP LAP FORMING MACHINE.

APPLICATION FILED MAR. 21, 1910.

967,035.

Patented Aug. 9, 1910.

7 SHEETS—SHEET 1.

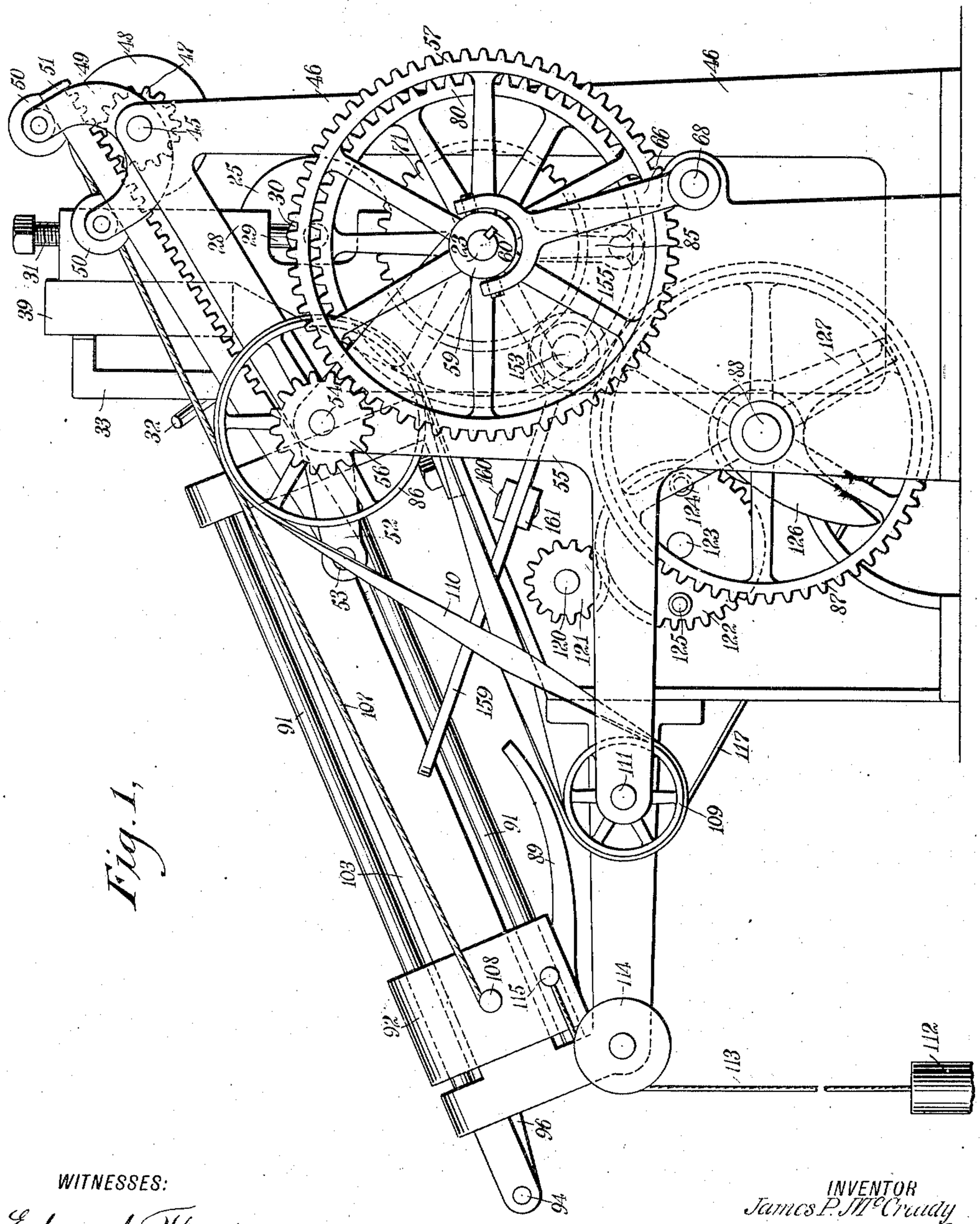

Fig. 1.

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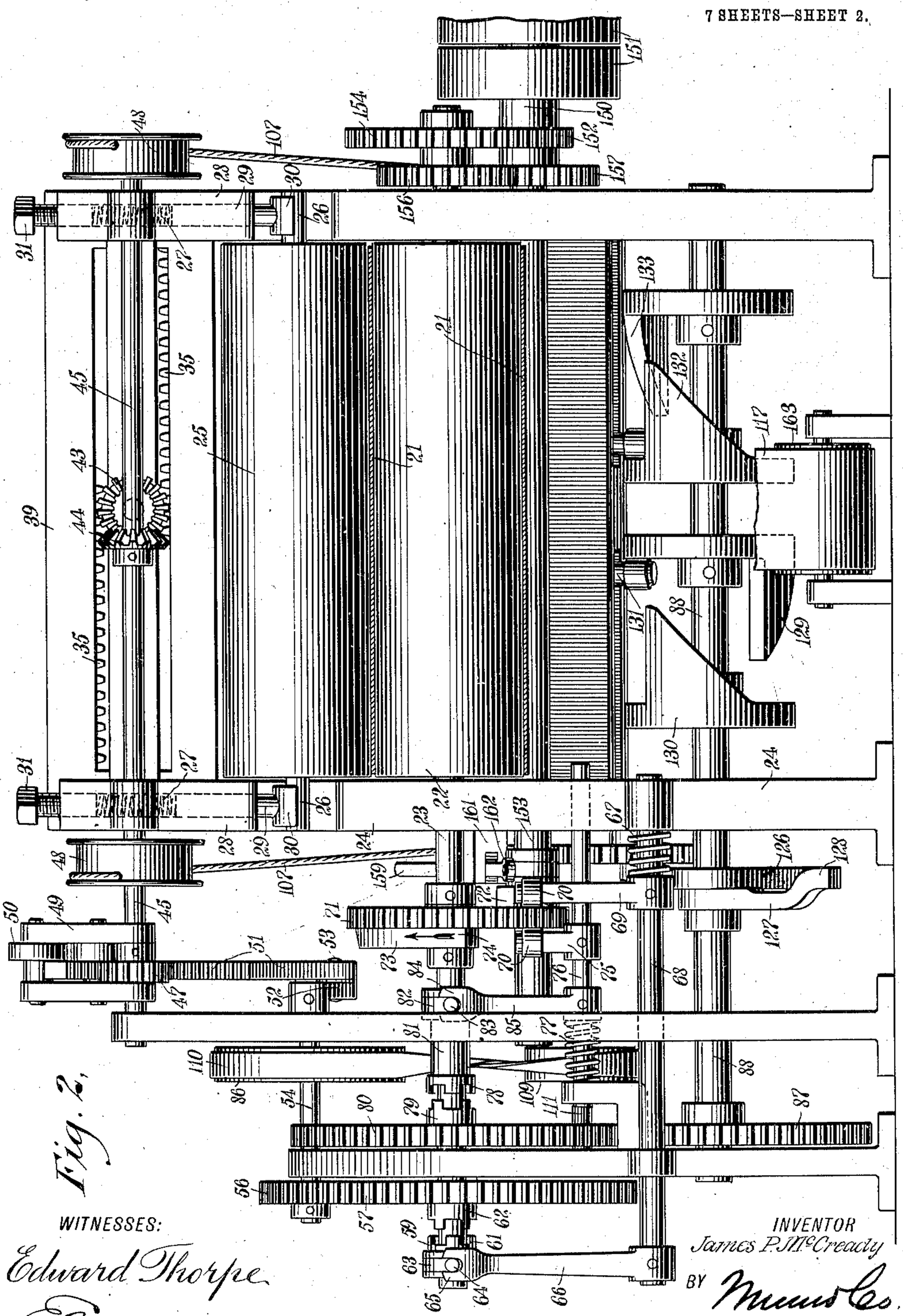

Fig. 2.

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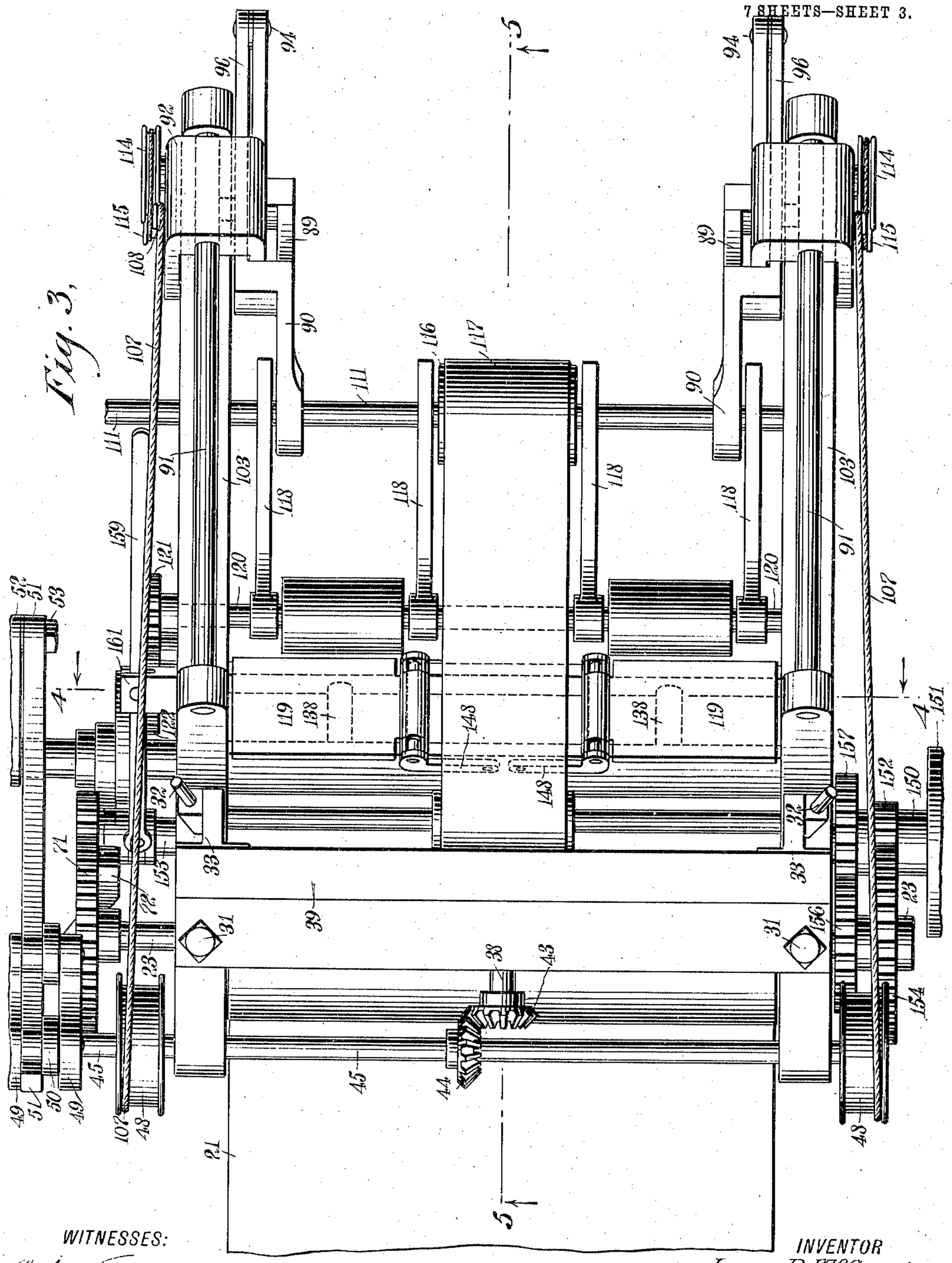
7 SHEETS—SHEET 3.

Fig. 3.



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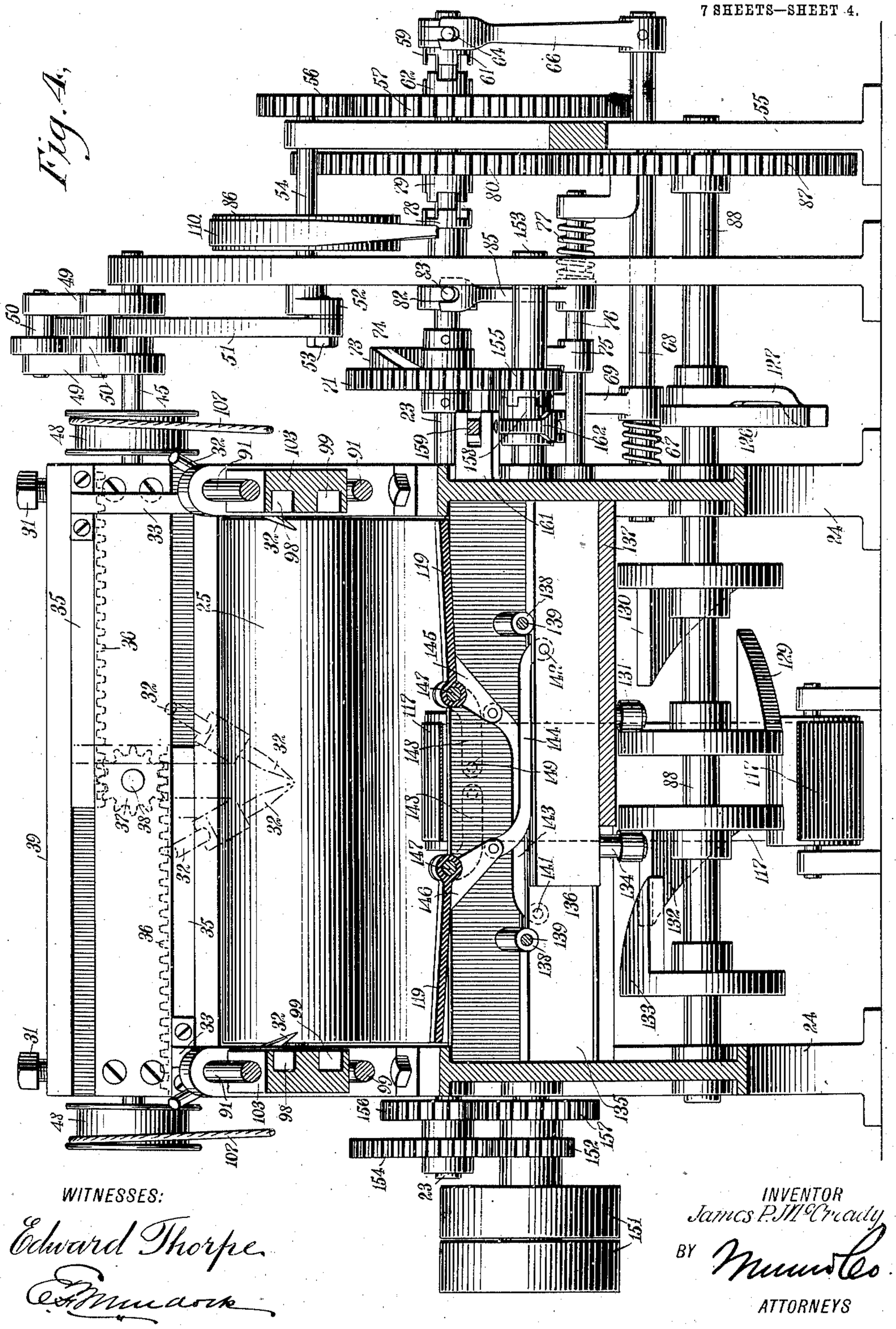
7 SHEETS—SHEET 4.

Fig. 4.



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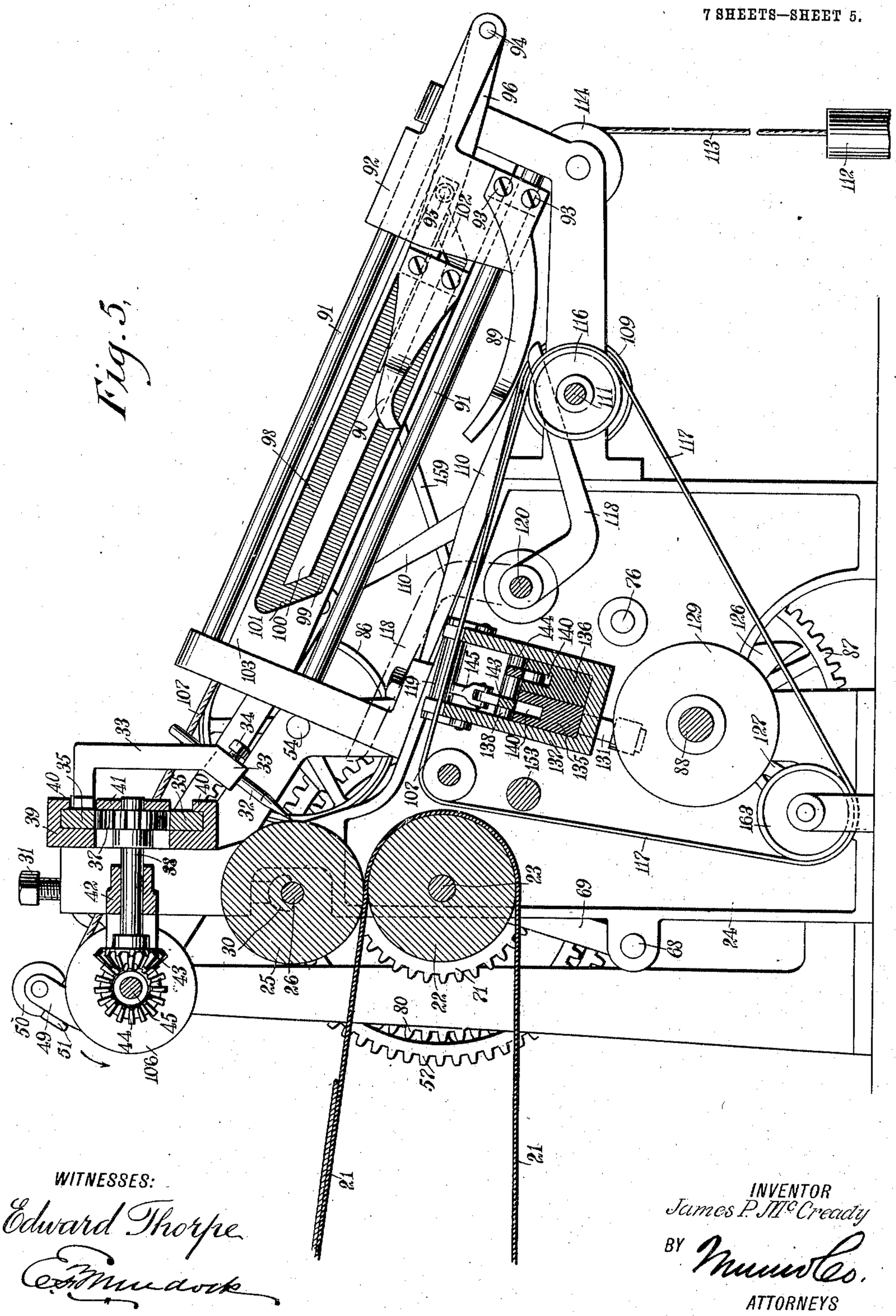
7 SHEETS—SHEET 5.

Fig. 5.



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7 SHEETS—SHEET 6.

Fig. 6,

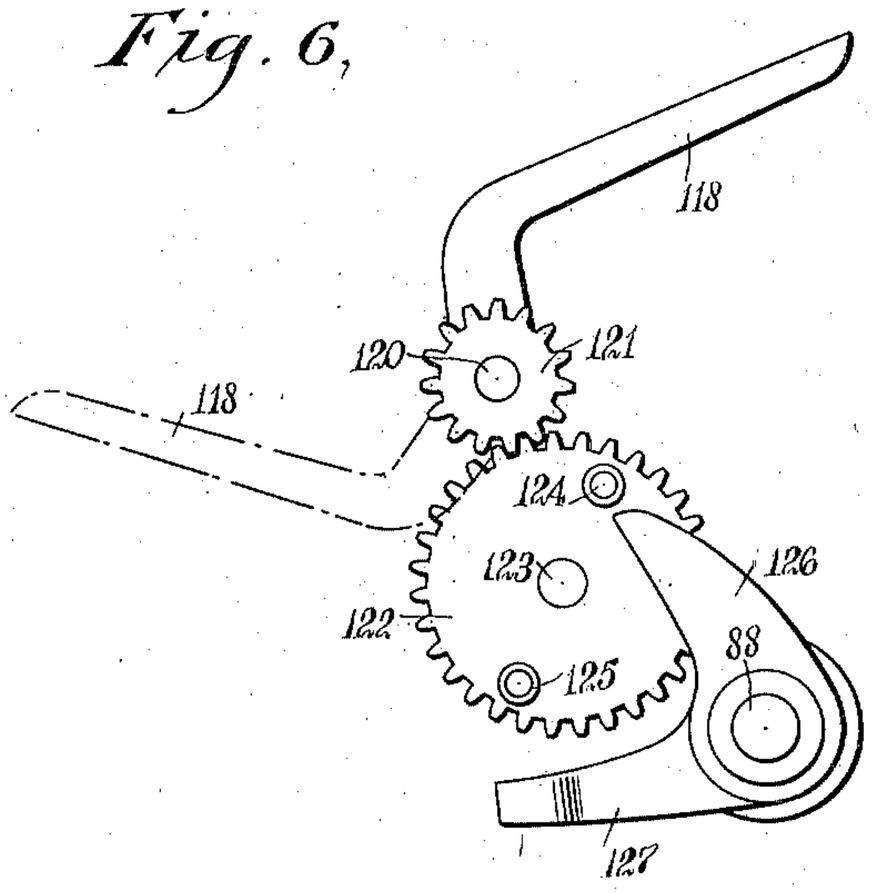


Fig. 7,

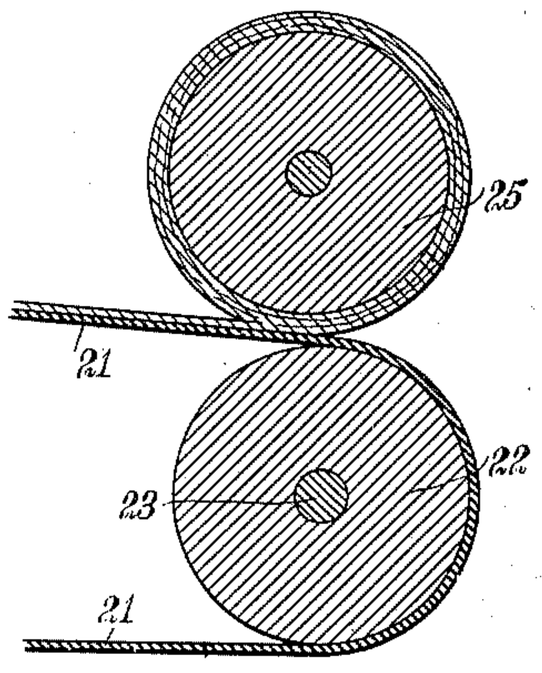
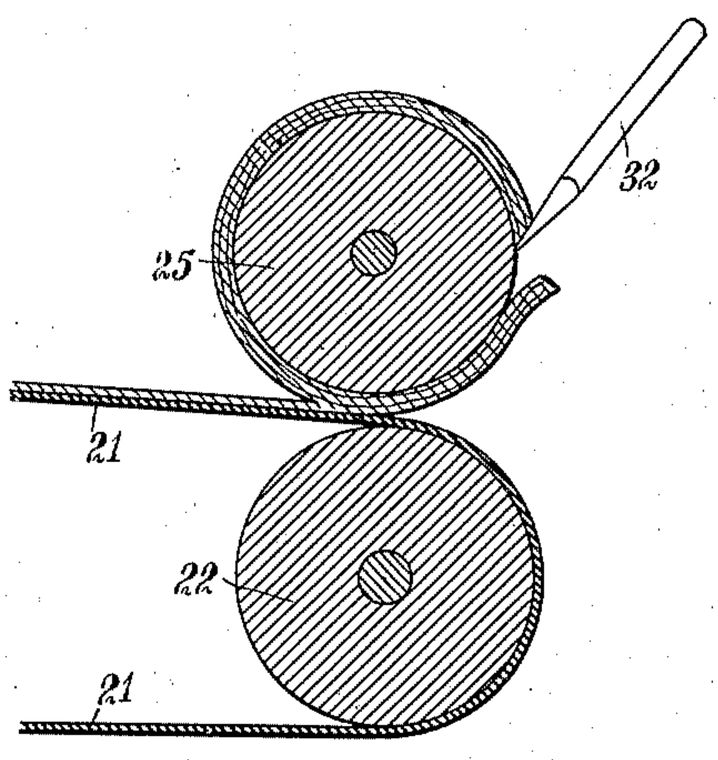


Fig. 8,



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7 SHEETS—SHEET 7.

Fig. 9.

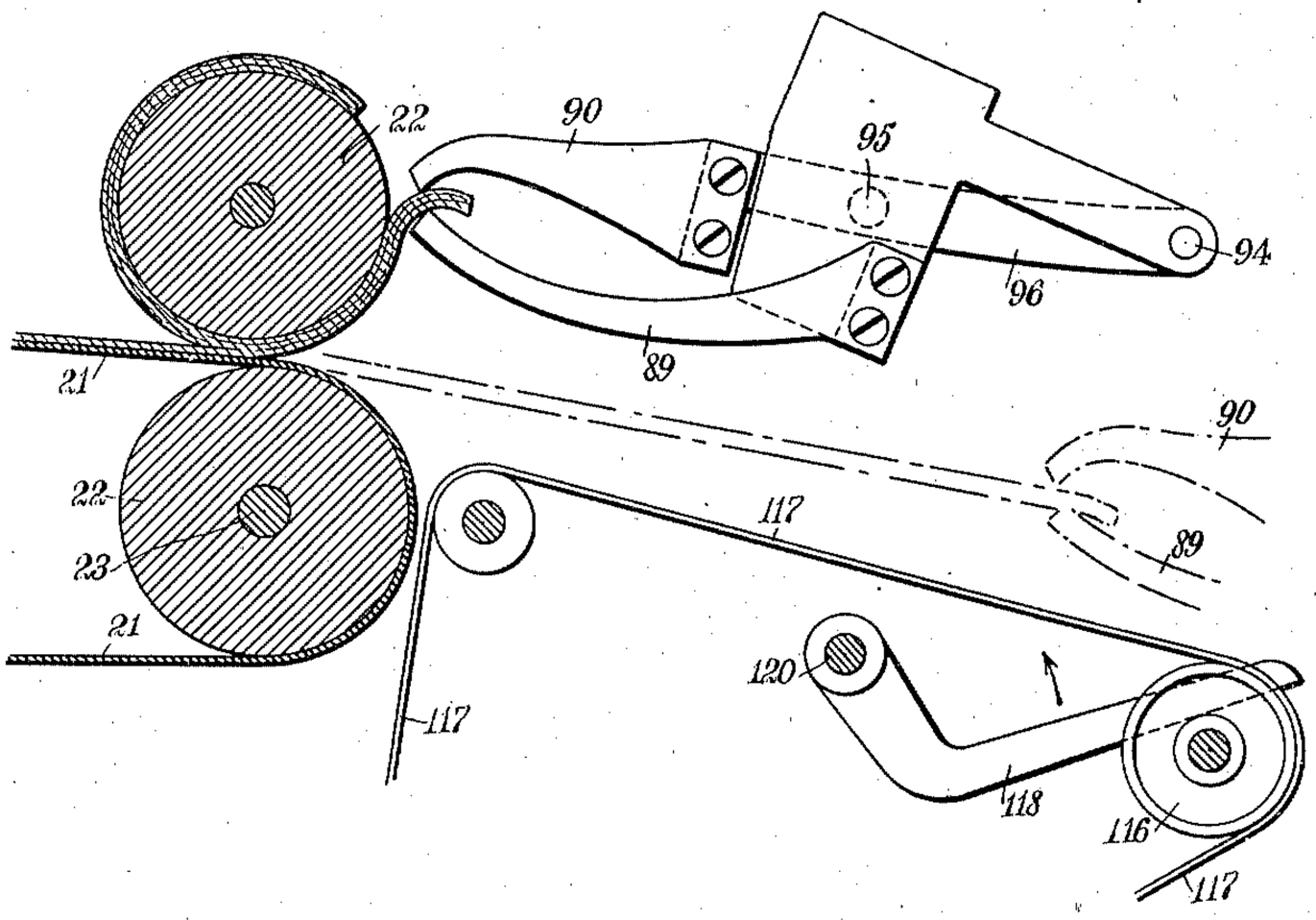


Fig. 10.

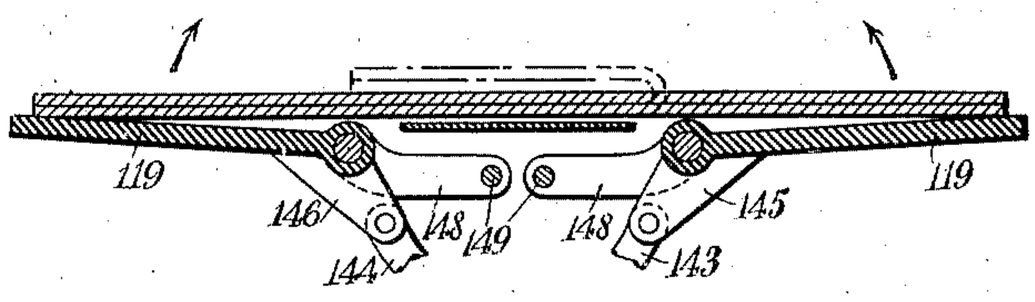


Fig. 11.

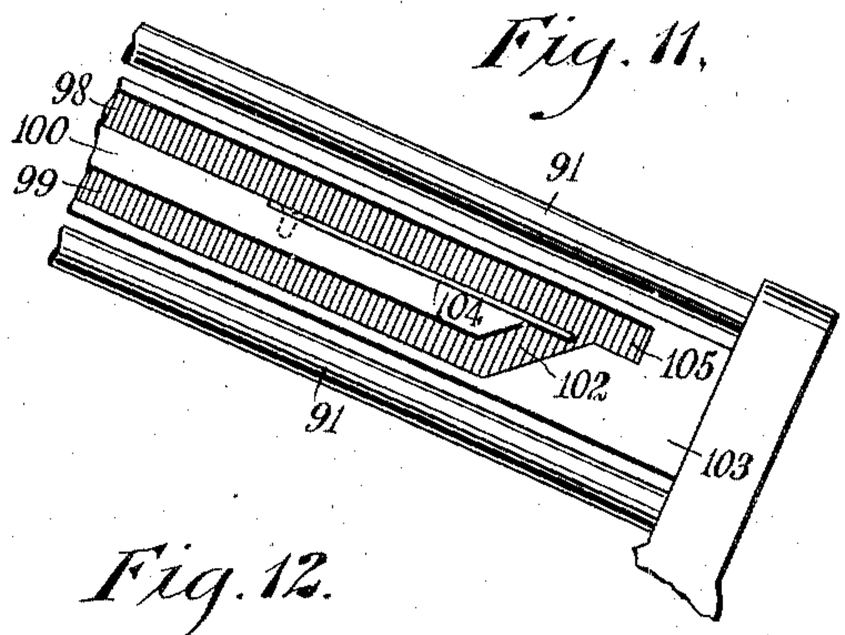
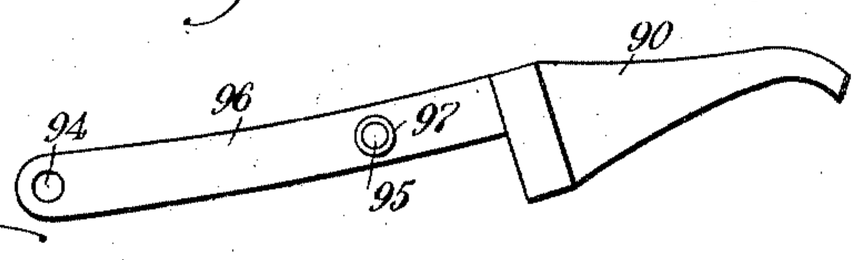


Fig. 12.



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UNITED STATES PATENT OFFICE.

JAMES PHILIP McCREADY, OF BERLIN, NEW HAMPSHIRE.

PULP-LAP-FORMING MACHINE.

967,035. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed March 21, 1910. Serial No. 550,646.

To all whom it may concern:

Be it known that I, JAMES P. McCREADY, a citizen of the United States, and a resident of Berlin, in the county of Coos and State of New Hampshire, have invented a new and Improved Pulp-Lap-Forming Machine, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a mechanism for forming laps of designed thicknesses and density, folded in compact form for further manipulation, storage or transportation; to provide a mechanism continuous in its operation for building up a lap of desired thickness, severing, and folding the same in shapes of constant dimensions; to provide in a mechanism of the character specified means for regulating the quantity of pulp utilized to form the laps; and to provide in a mechanism of the character specified automatic controlling devices for controlling the action of the said mechanism to harmonize the operations of the various sections thereof.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a side elevation of a machine constructed and arranged in accordance with the present invention; Fig. 2 is a rear view of the same, the felt conveyer belt for delivering to the said machine being shown in section; Fig. 3 is a plan view of the same; Fig. 4 is a vertical cross section of the machine taken on the line 4—4 in Fig. 3; Fig. 5 is a vertical longitudinal section of the machine taken on the line 5—5 in Fig. 3; Fig. 6 is a detail view of the folder arm and operating mechanism connected therewith; Fig. 7 is a view in cross section of the rollers for operating the conveyer for accumulating the pulp; the pulp being shown in the operation of upbuilding; Fig. 8 is a view similar to that shown in Fig. 7, illustrating the separation of the formed lap from the accumulator roller; Fig. 9 is a detail view in vertical section, illustrating in part the instrumentalities for stripping the accumulator roller of the formed lap, and for folding and delivering the same; Fig. 10 is a detail view in vertical cross section of the conveyer belt and folding table; Fig. 11 is a detail view in fragmentary form, illustrating the guide switch for controlling the action of the stripping clamps for removing the laps from the accumulator roller; and Fig. 12 is a detail view in side elevation showing the movable jaw of the said clamp.

The machine herein illustrated is designed to form the pulp after the same has been digested and washed into shapes for storage, further handling or transportation. These shapes are pad-like in form, being folded within as small on area as convenient, thereby increasing the thickness of the shapes. The folded article may, if desired, be pressed to eliminate any remaining moisture, and then stored or transported. This shape is termed in the art a "lap." In the present machine these laps are automatically removed from the feed belt and accumulated in sheet form of required thickness to produce the required weight. The laps, when dealt in by the pulp manufacturer, are sold by weight. From the accumulator roller the sheet of laminated pulp is removed, outspread on a suitable table, and there folded to the required dimensions. From the folding table the lap is delivered from the present machine to a suitable receptacle or conveyer, by which it is removed to be packed for storage, for transportation, or rehandled as by pressure, to remove any of the remaining sulfite or soda solution, if the pulp has been treated by the soda process. In the present employment the machine is used by me in conjunction with pulp mills in which is employed the sulfite process for digesting the cellulose.

From the digester, or mechanism immediately connected therewith, is extended the usual felt belt conveyer 21. The conveyer 21 is extended around and driven by a roller 22. The roller 22 is fixedly mounted on a shaft 23, supported in bearings in the sides 24, 24 of the frame of the machine. An accumulator roller 25 is provided with trunnions 26, 26. The roller 25 is rotated by the roller 22 because of the frictional contact with the surface of the conveyer 21 thereon. The roller 25 is held in frictional engagement with the roller 22 and conveyer 21 by springs 27, 27, which are mounted in hollow pedestals 28, 28 to bear upon rods 29, 29, at the lower ends whereof are provided suitable bearings 30, 30 which rest over and form bearings for the said trunnions 26, 26.

Mounted in the pedestals 28, 28 and in the hollow thereof, above the springs 27, 27, are set screws 31, 31. By means of the set screws 31, 31 the initial pressure of the roller 25 upon the roller 22 and conveyer 21 is varied. The pressure on the roller 25 is, during the operation, gradually increased as the accumulated pulp on the surface of the said roller is increased. The increment of the pulp gradually separates the rollers, thereby increasing in proportion the tension of the springs 27 and consequent pressure between the rollers.

By the mounting and arrangement above described with reference to the rollers 22 and 25, it will be seen that the movement of the rollers is harmonized, in that the rollers rotate simultaneously and at the same peripheral speed, and that the conveyer 21 is moved in perfect synchronism therewith. The action of the rollers and conveyer is intermittent. During the interruption of the rotation the accumulated pulp, which has been gathered upon the accumulator roller 25, is severed longitudinally on the accumulator roller by knives 32, 32, which, during the cutting operation, travel from the extreme periphery of the roller, as seen in Fig. 4 of the drawings in full lines, to the median line of the said roller, as seen in dotted lines in said Fig. 4.

According as the weight for the completed lap is varied, so is the thickness of the pulp cylinder varied. The thickness of the pulp cylinder depends upon the number of windings or convolutions of the pulp delivered by the conveyer 21 to the roller 25. This having been determined, the rollers 22 and 25 are arrested when the designed number of convolutions has been placed upon the roller 25. In the moment of arrestation of the said rollers the knives 32, 32 are advanced simultaneously and longitudinally across the roller 25 until the cutting edges meet on the median line, as shown in dotted lines in Fig. 4 of the drawings. Each of the knives 32 is mounted in a perforation formed in arms 33, 33, wherein they are adjusted by set screws 34. The arms 33, 33 are fixedly mounted upon racks 35, 35. The racks 35, 35 are provided with gear teeth 36, 36, meshed with the teeth of an interposed pinion 37. The pinion 37 is fixedly mounted on a shaft 38, by which the said pinion is rotated to move the said racks 35, 35 in a frame 39 wherein they are guided by a groove formed in the upper and lower edges formed in the said frame by inwardly extended flanges 40, 40.

The shaft 38 upon which the pinion 37 is mounted, is supported in bearings in a face plate 41 and a cross head 42, as shown in Fig. 5 of the drawings. At the end of the said shaft removed from the pinion 37 there is fixedly mounted a bevel gear wheel 43. The bevel gear wheel 43 is in meshed engagement with a companion bevel gear wheel 44, fixedly mounted upon a shaft 45. The shaft 45 is mounted in bearings formed in the sides 24, 24 and in a standing frame 46 beyond on the said sides 24 and alined therewith on the same bed plate. The said shaft is provided, between the standard 46 and the adjacent side 24, with a gear wheel 47, and a grooved pulley 48, both being fixedly mounted on the said shaft 45. Pivotally mounted on the shaft 45 is a swinging guide frame 49, the sides whereof straddle the gear wheel 47 and support rotatively at the end of the frame 49 guide wheels 50, 50. The wheels 50, 50 are provided with two extensions of different diameter, the smaller diameter serving to receive the thrust of a rack bar 51, and to maintain the same in meshed disposition on the gear wheel 47. The larger diameter or extension of the wheels 50, 50 depends at the side of the said rack and maintains the same in position against one side of the frame 49.

A rack 51 is employed to rock the shaft 45, and is maintained in constant engagement with the wheel 47, and therethrough with the shaft 45, the bevel gears 44 and 43, shaft 38, pinion 37 and racks 35, 35. Through this transmission mechanism the knives 32, 32 are moved to and from the median line of the roller 25 as and when the said rack 51 is reciprocated. The reciprocation of the rack 51 is produced by a lever 52, which is pivotally engaged at 53 with the said rack. The lever 52 is fixedly mounted on a shaft 54, which is supported in bearings in standards 55, 55. Fixedly mounted on the shaft 54 is a gear wheel 56, which is held in meshed relation with a large gear wheel 57. The gear wheel 57 is loosely mounted on the shaft 23, and is fixedly secured thereto by means of a clutch 59, which is slidably mounted on a feather 60. The clutch 59 is provided with a truncated face 61, to engage the truncated face 62 of the wheel 57. The clutch 59 is held in longitudinal disposition on the shaft 23 by a ring 63, which is mounted in a groove in the said clutch, and which is held therein by pins 64 set out from the side of the said ring and held within the yoke 65 of an arm 66. It is only when the arm 66 moves the clutch 59 to engage the gear 57 that the transmission mechanism for operating the knives 32 is set in motion. The arm 66 is normally maintained in disengaged position by a coiled spring 67 which infolds a shaft 68 and is disposed between the frame 24 and the hub of an arm 69, which is fixedly mounted on the said shaft 68. The arm 69 is extended, and at the upper end provided with a roller 70 which bears against the side of a gear wheel 71, which is fixedly mounted upon the shaft 23. Extended from

the opposite side of the said wheel 71, and in diametrically opposed arrangement thereon are cam risers 72 and 73. The risers are provided with inclined surfaces 74, 74, by which the rollers 70, mounted on the ends of the arms 69 and 75, travel. The arm 69, when moved by the riser 72, shifts the shaft 68 inward against the expansion of the spring 67, and through the arm 66 closes the clutch 59 upon the truncated face 62 of the wheel 57. In this position the transmission mechanism just above described is operated to rotate the pinion 37 to move the racks 35, 35 in such manner as to bring the knives 32, 32 to the median line of the roller 25, cutting through the accumulated pulp covering of the said roller 25, and severing the said cover to convert the cylindrical shape thereof to a flat like member. This operation is, in comparison with the travel of the periphery of the roller 25, relatively rapid, and the line of cut is substantially straight. In the operation of the machine as hereinafter set forth, the knives 32, 32 are arrested in the position at the center of the said roller 25. The rack 51 of the transmission mechanism just described is raised to project upward and outward through the guide frame 49. The cam 72 is formed to a length to pass from under the roller 70 at this instant, permitting the spring to shift the shaft 68 in such manner as to throw the clutch 59 out of engagement with the gear wheel 57. The transmission mechanism and knives 32 are returned from this position by the rotation of a wheel 86, which is fixedly mounted on the shaft 54, to which the lever 52 is likewise attached. The operation of the wheel 86 for the return of the knives 32 will be hereinafter described.

The stripping mechanism employed for removing the pulp from the roller 25 consists primarily in jaw members 89 and 90. There are duplicate sets of these jaws, mounted on opposite sides of the machine in guide frames, whereof the rods 91, 91 are extended through perforations in a carriage 92. The stationary jaw 89 is fixedly secured to the carriage 92 by screws 93, 93, or other suitable means. The jaw 90 is pivoted to the carriage 92 at 94, and is controlled in its movement to and from the jaw 89 by pins 95 extended from the side of an arm 96 of the said jaw 90, and provided with a small roller 97. The pin 95 and roller 97 thereon extend into the upper and lower track slots 98 and 99 respectively. The slots 98 and 99 are separated by a plate 100, and are connected at the ends by connecting slots 101 and 102. The connecting slot 101 is at the forward end of a plate 103, in which the above mentioned slots are formed, and is at all times free for the pin 95 to drop therethrough from the upper slot 98 to the lower slot 99. The connecting slot 102 is closed at the upper opening thereof by the overhanging end of a spring 104, as shown in Fig. 11 of the drawings. The slot 102 is upwardly and outwardly inclined, being disposed in such manner that when the jaw 90 is retracted the pin 95, and roller mounted thereon, are caused to lift upward from the slot 99 through the said slot 102 to the upper slot 98. In passing from the slot 102 to the slot 98 the pin 95 displaces the end of the spring 104. At the outer end of the slot 98 is an extension 105, into which the pin 95 is drawn at the extreme outward movement of the carriage 92, carrying the jaws 89 and 90. This movement of the pin 95 into the extension 105 permits the spring 104 to close the slot 102. On the return in a forward direction of the carriage 92, the pin 95 overrides the slot 102, and is maintained on the upper level of the slot 98. It is between the jaws 89 and 90 that the lower severed edge of the pulp on the roller 25 is engaged. This engagement occurs when the carriage 92 has been drawn forward to a position where the forward edge of the jaw 89 is under the outwardly hanging edge of the pulp which has been severed, and when the upper jaw 90 is extended over the said severed edge of the pulp. As extended at the forward end of the plate 103, the connecting slot 101 is open, so that the pin 95 drops into the said slot, and when the carriage 92 is retracted, the pin 95 is forced under the plate 100, and the outer end of the jaw 90 is forced into engaging relation with the pulp interposed between the said jaw and the jaw 89.

To advance the carriage 92, grooved pulleys 106, 106 are fixedly mounted upon the shaft 45. The shaft 45, it will be remembered, is the controlling shaft for the operation of the knives 32, 32. The rotation of the shaft 45 to advance the knives 32, 32 to the median line of the roller 25, rotates the pulleys 106, 106 in the direction shown by the arrow in Fig. 5 of the drawings. This rotation of the pulleys 106 winds the cables 107 thereon. The cables 107 are connected at 108 to the carriage 92. As above stated, the mechanism for moving the knives 32, 32 moves rapidly in comparison with the peripheral travel of the roller 25. The advance of the gripping jaws is regulated to assume the gripping position with reference to the pulp on the roller 25 simultaneously with the meeting of the knives 32, 32 at the center of the roller 25.

The carriages 92, 92 are retracted by weights 112, 112, which are mounted on the ends of cables 113, 113 passed over sheaves 114, 114 and connected to the carriages 92, 92 at 115, 115. The weights 112 are of any desired dimensions necessary to accomplish the retraction of the said carriages. The carriages are controlled in their

retrogressive movement by the wheel 86, which is mounted on the shaft 54 carrying the lever 52 and the rack 51. The wheel 86 is operatively connected to a pulley 109 by a crossed belt 110. The pulley 109 is fixedly mounted upon a shaft 111. The shaft 111 supports a conveyer roller 116, whereon is guidably supported a belt 117, which constitutes the delivery member of the table on which the sheet of pulp is spread by the stripping mechanism, and the jaws 89 and 90 thereof. As the sheet of pulp is delivered from the rollers 22 and 25 it rests upon the belt 117, and compels the same to travel therewith. Through the shaft 111, the pulleys 109 and 86 and the belt 110, the pull of the weight 112 is diffused and removed from the diminished areas gripped by the jaws 89 and 90, the body of the pulp sheet forming a drag on the belt 117 and transmission mechanism interposed between the shafts 111 and 45.

By reason of the disposition of the slot 102, when the jaws 89 and 90 have passed to the outer position necessary to place the sheet upon the belt 117 and parts connected therewith, to form a folding table, the jaw 90 is lifted, and the grip of the stripping mechanism is released from the sheet of pulp. From this point the further retraction of the carriages 92 is uncontrolled and actuated by the maximum pull of the weights 112, retracting the carriages 92 to their full outward limit, and placing the pins 95 at the end of the extension 105. With the return of the carriages 92 to the limit of their outward position the shaft 45 has been returned to its normal position wherein the racks 35, 35 have been laterally extended to carry the knives 32, 32 to the edge of the roller 25.

In the operation of this invention, as above stated, the pulp is received from the belt 21, and a number of layers are rolled upon the roller 25 under the pressure of the springs 27, prior to the action of the knives 32, and the stripping mechanism as above described. At the moment when the knives sever the cylinder of pulp, the said cylinder is provided with a layer on the forward section of the roller 25 not yet deposited on the rearward portion of the said cylinder. As the severed edge of the said cylinder is drawn outward to be placed on the folding table, the rotation of the roller 25 lays a single thickness of the pulp upon the section of the severed cylinder or sheet until the rearwardly disposed edge of the sheet passes from between the rollers. When the full weight of the carriages 92, 92 and the pulling weights 112, 112 are thus transferred to the single layer of pulp which follows the sheet drawn from the cylinder, the pulp is separated or torn as the compiled sheet passes from the grip of the rollers 22 and 25. From this moment, that portion of the pulp which consists of manifold layers, and which is above referred to as a cylinder, is placed on a folding table as a separate outspread sheet of the desired thickness, while the free torn end of the single thickness being delivered by the belt 21 is passed around the roller 25 to be overlaid by the required number of convolutions of added pulp to form the succeeding cylinder or sheet. The operation of the roller is continuous, having formed thereon successively the cylinder of pulp which is severed and stripped therefrom when and as the cylinders have received the designed number of pulp thicknesses. The subsequent folding of the sheet does not interrupt the formation of the succeeding cylinder. In this manner the operation of the present machine is automatic and continuous.

The folding mechanism whereby is formed the lap is operated by a mechanism embodying the wheel 80. The wheel 80 is loosely mounted on the shaft 23, with which it is fixedly engaged by means of the sliding clutch 81, the truncated face 78 whereof is adapted to engage the truncated face of the hub 79 formed on the wheel 80. The clutch 81 is connected to the arm 85 by means of a collar 82, pins 83 and a yoke 84, as seen in Fig. 2 of the drawings. The arm 85 is fixedly mounted on the shaft 76, having suitable bearings in the sides 24 and the standard 55. The shaft 76 is infolded by a spring 77 resting between one of the bearings for the said shaft and the hub of the arm 85, and disposed in such manner as to normally remove the clutch 81 from engagement with the hub 79 of the wheel 80. Fixedly mounted upon the said shaft 76 is a second arm 75, the upper end whereof is provided with a roller 70 adapted to rest against and track upon the side of the wheel 71, and in the path of the cam 73 mounted thereon. The cam 73 is disposed with reference to the cam 72 in timed relation. It will be remembered that the cam 72 operates upon the arm 69 to engage the wheel 57 to operate the knives 32 and lift the carriages 92. The subsequent operation of the knives and carriages has been described. It is at the moment when the said carriages 92 reach the end of their outward movement that the cam 73 passes under the roller 70, shifting the clutch 81 to engage the wheel 80, and thereby inaugurate the operation of folding.

The shaft 88 is extended beneath the folding table and mounted in suitable brackets formed in the sides 24, 24, and standards 55. Fixedly mounted on the said shaft, and in meshed engagement with the wheel 80, is a gear wheel 87 whereby, when the wheel 80 is rotatively engaged with the shaft 23, the shaft 88 is rotated by the wheel 87. The gears 80 and 87 are equal in diameter, there-

by causing the shaft 88 to rotate in unison with the shaft 23, imparting thereby a complete action of the folding mechanism as controlled by the cams carried on the said shaft 88 during the one revolution of the rollers 22 and 25.

The folding members of the folding mechanism consist primarily in forward folding fingers 118, 118 and laterally folding plates 119, 119. The operation of these members is successive, the initial operation being the lift of the fingers 118 to upwardly bend across the full width and at the median line thereof, the sheet after the same has been stripped from the roller 25. This bend folds the said sheet in two layers, the double sheet then resting above the belt 117 and the plates 119, 119. The plates 119, 119 are hingedly connected to a stationary structure substantially equal in length to the said plates 119. The folds formed by the said plates 119 are one-third of the length of the folded sheet, or the width of the original sheet. The plates 119 operate successively, folding from first the one side and then the other. It will be observed that the final folded lap is entirely supported upon the belt 117. When in the operation of the stripping mechanism succeeding the completion of the folding of the lap, the belt 117 is moved, the lap is, by the said belt, carried outward from the machine to be delivered over the outward extension of the said belt 117. The fingers 118 are fixedly mounted on a shaft 120, which is mounted in suitable bearings in the side 24 of the frame. At the outer end the shaft 120 has fixedly mounted thereon a small gear wheel 121, the teeth whereof are meshed with the teeth of a large gear wheel 122. The wheel 122 is mounted on a rocking shaft 123, and is provided with roller equipped pins 124 and 125 set out from the surface of the said wheel. It is by the manipulation of the wheel 122 by the cams 126 and 127 operating upon the said pins 124 and 125 successively, and in the order named, that the shaft 120 is regulated to lift the fingers 118, 118 from the recumbent position shown in Fig. 3, by and over the plates 119, 119, and bend and fold the sheet of manifolded pulp previously spread above the said fingers. The cams 126 and 127 are shaped as shown in Figs. 1, 2 and 4 of the drawings. The cam 126 is of the usual shape, the voluted face thereof playing upon the pin 124 to raise the same from the position shown in Fig. 1 of the drawings to a position sufficiently removed from the shaft 88 to permit the cam 126 to pass under the said pin 124. The movement of the pin 124 above described results in the rotation of the wheels 122 and 121 sufficient to raise the fingers 118, 118 over upon the plates 119, 119. The movement of the wheel 122 sufficient to accomplish this places the pin 125 in the path of the end 128 of the cam 127. The cam 127, following the cam 126, strikes upon the pin 125, and by it rotates the wheels 122 and 121 in the direction opposite that formerly produced by the cam 126, resulting in rocking the shaft 120 to return the fingers 118, 118 to their initial position. The cam 127 is bent, as shown in Figs. 2 and 4 of the drawings, in such manner that the said cam overrides the pin 124 in the position which the said pin 124 assumes when the pin 125 has been moved out of the path of the said end 128 of the cam 127.

Cams 129 and 130 are fixedly mounted upon the shaft 88, and alternately move the roller equipped pin 131 from and to the median line of the machine, or the normal position illustrated in Fig. 4 of the drawings. Cams 132 and 133 operate successively to shift the roller equipped pin 134 to and from the median line of the machine, or the position illustrated in Fig. 4 of the drawings. The two sets of cams are oppositely disposed, that is to say, at the moment when the cam 129 is moving the pin 131 outward, the cam 133 on the opposite side of the median line of the machine is moving the pin 134 inward. The pins, 131 and 134, are connected to slide plates, as shown in Fig. 4 of the drawings. The pin 131 is connected with a plate 135, while the pin 134 is connected with a plate 136, and both plates are mounted in an upturned channel 137. The channel 137 is fixedly connected to the sides 24 of the machine, and provided with guide rollers 138, 138, mounted on shafts 139, 139, separating the sides of the channel and disposed above the plates 135 and 136 to guide the reciprocation of the said plates in the said channel. The plates 135 and 136 are each provided in the upper surface with grooves 140, 140. Links 143 and 144 are pivoted at 141 and 142 in the said grooves, said links being respectively connected to the plates 135 and 136. The links 143 and 144 are pivotally connected to lugs 145 and 146, integrally formed with the plates 119, 119. The plates 119 are each pivoted at 147, 147 to hinged links 148, 148. The hinged links 148, 148 are pivoted at 149 to the frame of the channel 137. The links and lugs above mentioned are proportioned to produce in the plates 119 to which they are connected, a complete overfold of each of the plates above the belt 117. By reason of the alternate and successive action of the cams 129 and 130, and the cams 132 and 133, the plates 135 and 136 are alternately shifted to fold the said plates 119 alternately. As above stated, in thus folding the plates 119, the lap is completed, the result being a packet of pulp of a definite weight and dimension, the dimension being in area equal to one-half the length of the original sheet

and one-third the width of the said original sheet, and the height equal to six thicknesses of the original sheet.

The driving mechanism for the machine is transmitted from a sleeve 150, carrying driven pulleys 151 and a fixed gear wheel 152. The sleeve 150 is loosely mounted on a shaft 153. The gear 152 is held in meshed engagement with a gear 154, which is fixedly mounted on the shaft 23. The gears 152 and 154 are proportioned to time the rotation of the two shafts 23 and 153. The timing of the said shafts controls the number of layers of pulp placed on the roller 25 between the operations of the stripping mechanism. The operation of the stripping mechanism is directly resultant upon the rotation of the shaft 153 through the operation of the cam wheel 71, which is in mesh with the pinion 155 loosely mounted on the shaft 153 in line with the said wheel 71. A gear wheel 156 is fixedly mounted upon the shaft 23, and is in mesh with a gear wheel 157 fixedly mounted upon the shaft 153. The driving of the shafts 23 and 153 is obvious, being through the pulleys 151, gears 152, 154, 156 and 157, the said shafts rotating in definite timed relation due to the operation of the meshed gears 152 and 154, and each shaft continuously driven. The pulleys 151, as shown in the drawings, are the usual arrangement of fixed and loose pulleys.

Any suitable form of shifting device for the driving belt may be used in conjunction with this machine.

The operation of the stripping and folding mechanisms, inaugurated by the cam wheel 71, may be independently controlled by the clutch 158, which is slidably mounted on the shaft 153 and the truncated face of which meshes with the truncated face of the hub of the pinion 155. The clutch 158 is controlled by a lever 159, the end whereof is extended as shown in Fig. 1 of the drawings, which lever is pivotally mounted at 160 in brackets 161 set out from the side of the frame. The lever 159 is provided with a yoke 162 engaging the controlling collar of the clutch 158. By manipulating the lever 159 the stripping and folding operation may be controlled independently of the feeding and cylinder forming mechanism. In other words, if at any time it is desired to increase the thickness of the wall of the cylinder of pulp formed on the roller 25, this may be accomplished by manipulating the lever 159, discontinuing the operation of the stripping and folding mechanisms, allowing an added accumulation of pulp to the cylinder being formed on the roller 25. A further use for the control operated by the lever 159 is to set the time of operation of the knives 32, 32 with reference to the pulp accumulating mechanism.

The conveyer belt 117 is constructed in the shape of an endless belt, and is guided and supported on idler rollers 116 and 163, 163, said rollers being disposed to the best advantage with reference to the other mentioned mechanisms.

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

1. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; a device for severing the accumulated pulp longitudinally on said roller and in timed relation with the rotation thereof; a stripping mechanism adapted to engage the edge of the severed pulp as parted and to draw the same from engagement with said roller; a delivery table disposed to receive the pulp as and when delivered from said roller; a plurality of oppositely disposed pivoted members mounted in alined relation and laterally extended from the center of said table; a third member pivotally mounted in juxtaposed relation to said table and adapted to overlie the same, operated in line with the line of delivery of said pulp; and a driving mechanism for said pivoted members adapted to operate the same successively.

2. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; a cutting mechanism for severing the pulp on said roller embodying a plurality of knives normally held at the outer edges of said roller; a continuously operating driving mechanism for said roller; an intermittent operating driving mechanism for said knives; a transmission mechanism connecting said driving mechanisms for said roller and said knives adapted to advance said knives rapidly across said roller; and a retracting mechanism for returning said knives to their normal position.

3. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; a plurality of cutting knives disposed in contact with said roller and at the outer edges thereof; a guide frame extended parallel with the center of said roller; arms for mounting said knives supported in guided relation in said guide frame; a continuous driving mechanism for said roller; an intermittent driving mechanism for said knives; a clutch mechanism for connecting said roller driving mechanism and knife driving mechanism to advance the latter to the median line of said roller; and means for retracting the knives to the edges of said roller slowly.

4. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; a plurality of knives disposed in cutting relation on the surface of said roller at the ends

thereof; a guide frame disposed in parallel relation with said roller; a plurality of gear toothed racks supported in said guide frame; a gear wheel disposed between and in toothed engagement with said racks; a driving mechanism for continuously operating said roller; a transmission mechanism connecting said gear wheel between said racks and said driving mechanism; and a clutch for connecting said driving mechanisms.

5. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; a plurality of knives disposed in cutting relation on the surface of said roller at the ends thereof; a guide frame in parallel relation with said roller; a plurality of gear toothed racks supported in said guide frame; a gear wheel disposed between and in toothed engagement with said racks; a driving mechanism for continuously operating said roller; a transmission mechanism embodying a speed multiplying gear train connecting said driving mechanism and said gear wheel engaging said racks; and a clutch for intermittently connecting said driving and transmission mechanisms.

6. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; a plurality of knives disposed at the opposite sides of said roller and near the ends thereof, said knives adapted to impinge upon the surfaces of said roller; means for advancing rapidly the said knives to the median line of said roller and to there release the same; and means to retract said knives to their initial position at the sides of said rollers.

7. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; a plurality of knives disposed at the opposite sides of said roller and near the ends thereof, said knives adapted to impinge upon the surfaces of said roller; means for advancing rapidly the said knives to the median line of said roller and to there release the same; and means for retracting slowly the said knives to their normal position.

8. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; means operated in timed relation with said roller for severing the accumulated pulp thereon in a line substantially horizontal to the action of said roller; a receiving table disposed in receiving relation to said roller to hold the sheet of pulp as and when removed from said roller; a plurality of gripping jaws guidably mounted on opposite sides of said table; and means for closing and opening said jaws when advanced to said roller and when retracted to the outer edge of said table.

9. A pulp lap forming machine, comprising an accumulator roller; a feeding mechanism for delivering pulp to said roller; means operated in timed relation with said roller for severing the accumulated pulp thereon in a line substantially horizontal to the action of said roller; a receiving table disposed in receiving relation to said roller to hold the sheet of pulp as and when removed from said roller; a plurality of guide frames disposed at opposite sides of said table; a plurality of gripping jaws operatively mounted in said frames to close and open when impinged upon said roller and when retracted to the outer edge of said table; an operating mechanism connected with said jaws for advancing the same in unison with the forward movement of said knives; and a retracting mechanism for said jaws operating in unison with the driving mechanism of said roller.

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

JAMES PHILIP McCREADY.

Witnesses:
C. H. Morin,
H. G. Noyes.