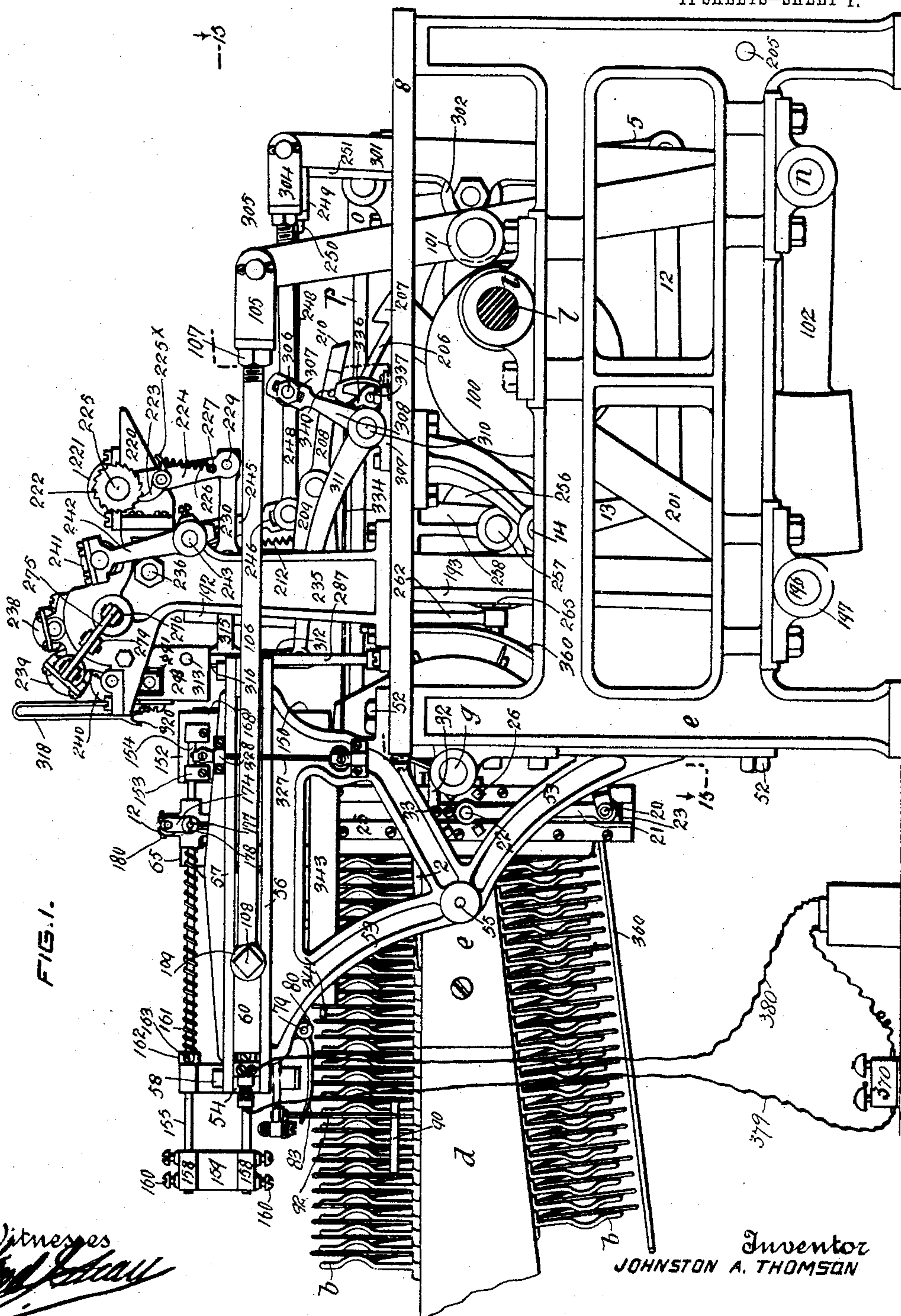


No. 786,069.

PATENTED MAR. 28, 1905.

J. A. THOMSON, DEC'D.
E. J. PRINDLE, ADMINISTRATOR.
PRINTING MACHINE.
APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 1.



151.

Witnesses
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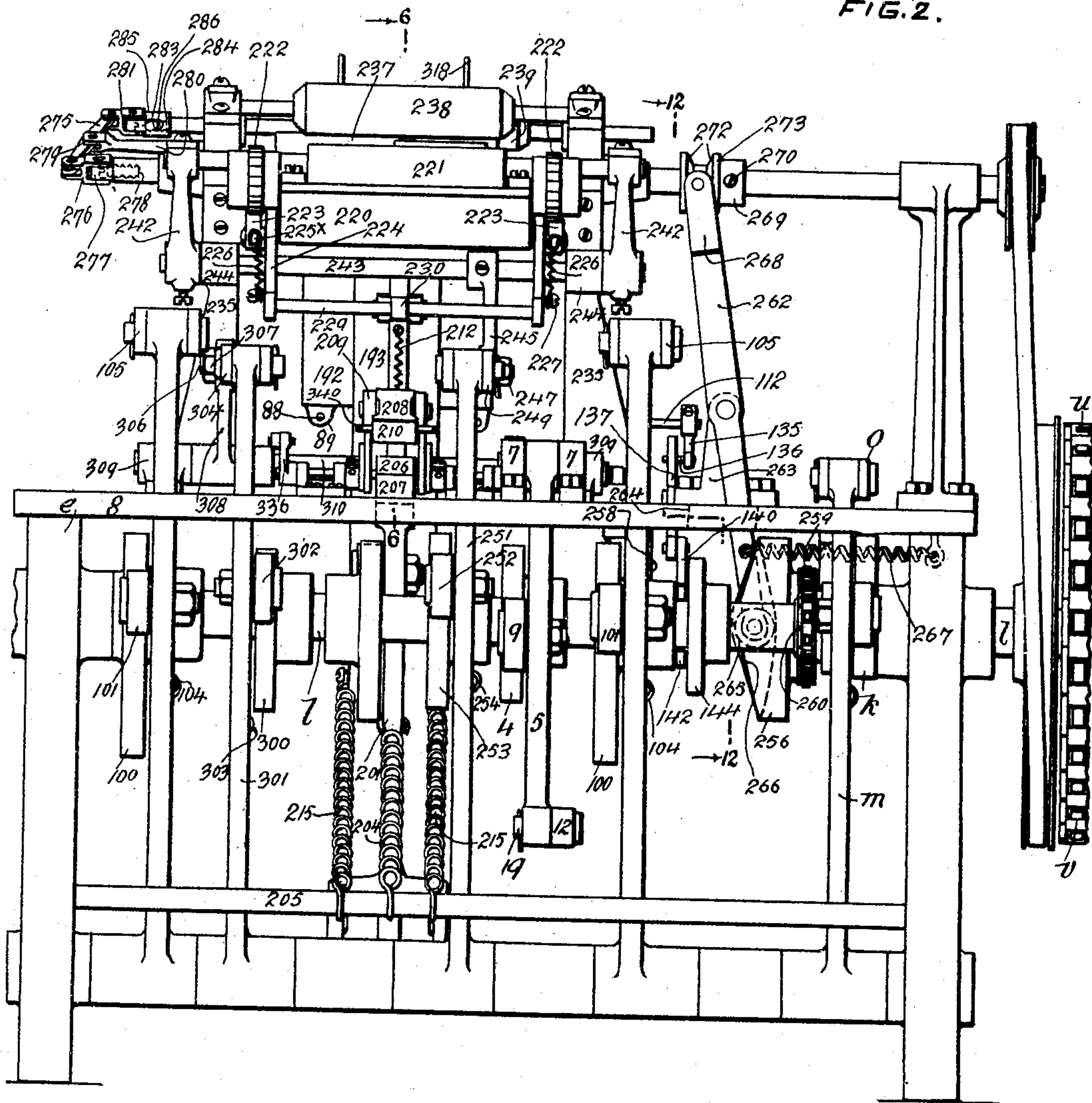
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PRINTING MACHINE.
APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 2.

FIG. 2.



Witness
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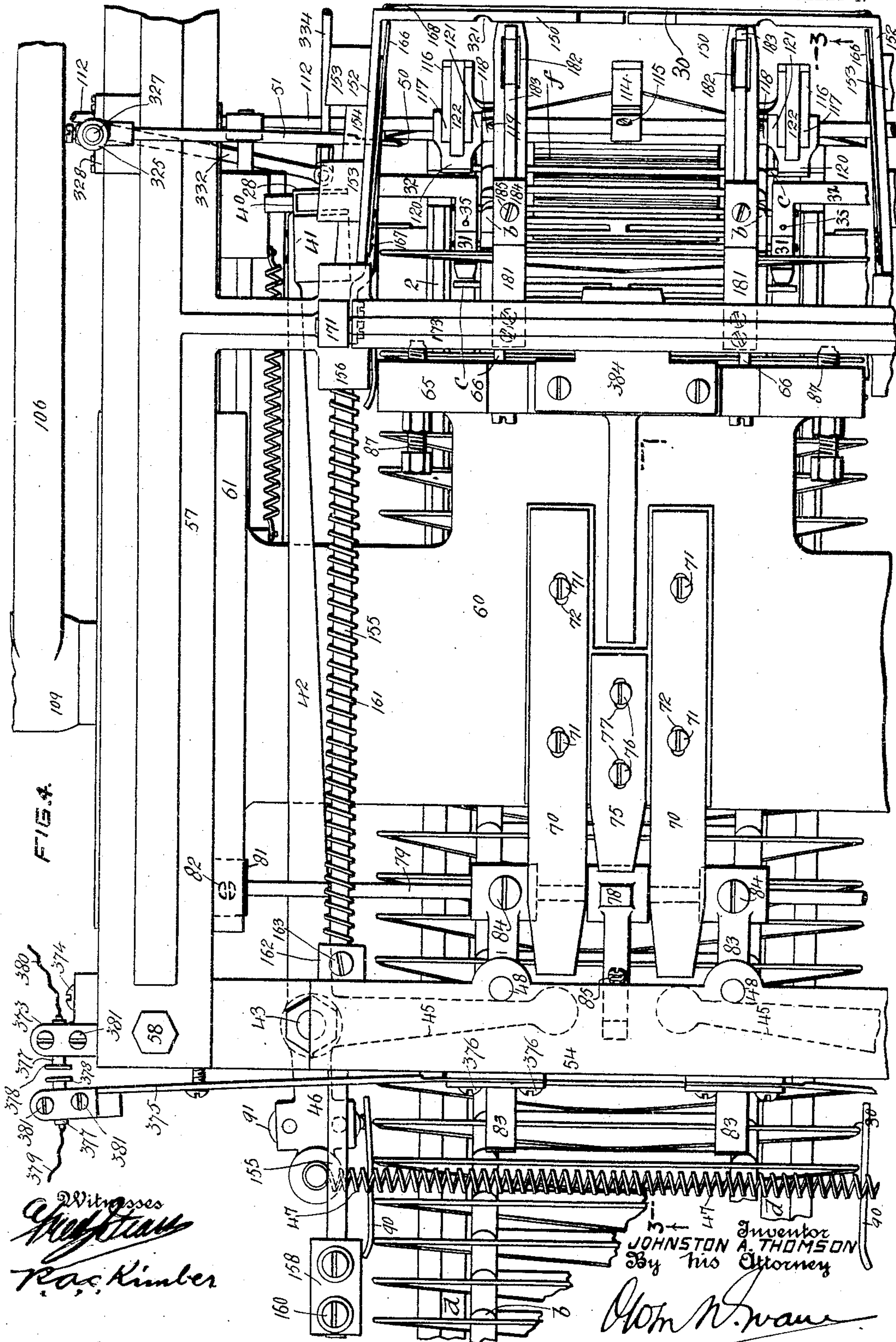
No. 786,069.

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J. A. THOMSON, DEC'D.
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PRINTING MACHINE.

APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 4.



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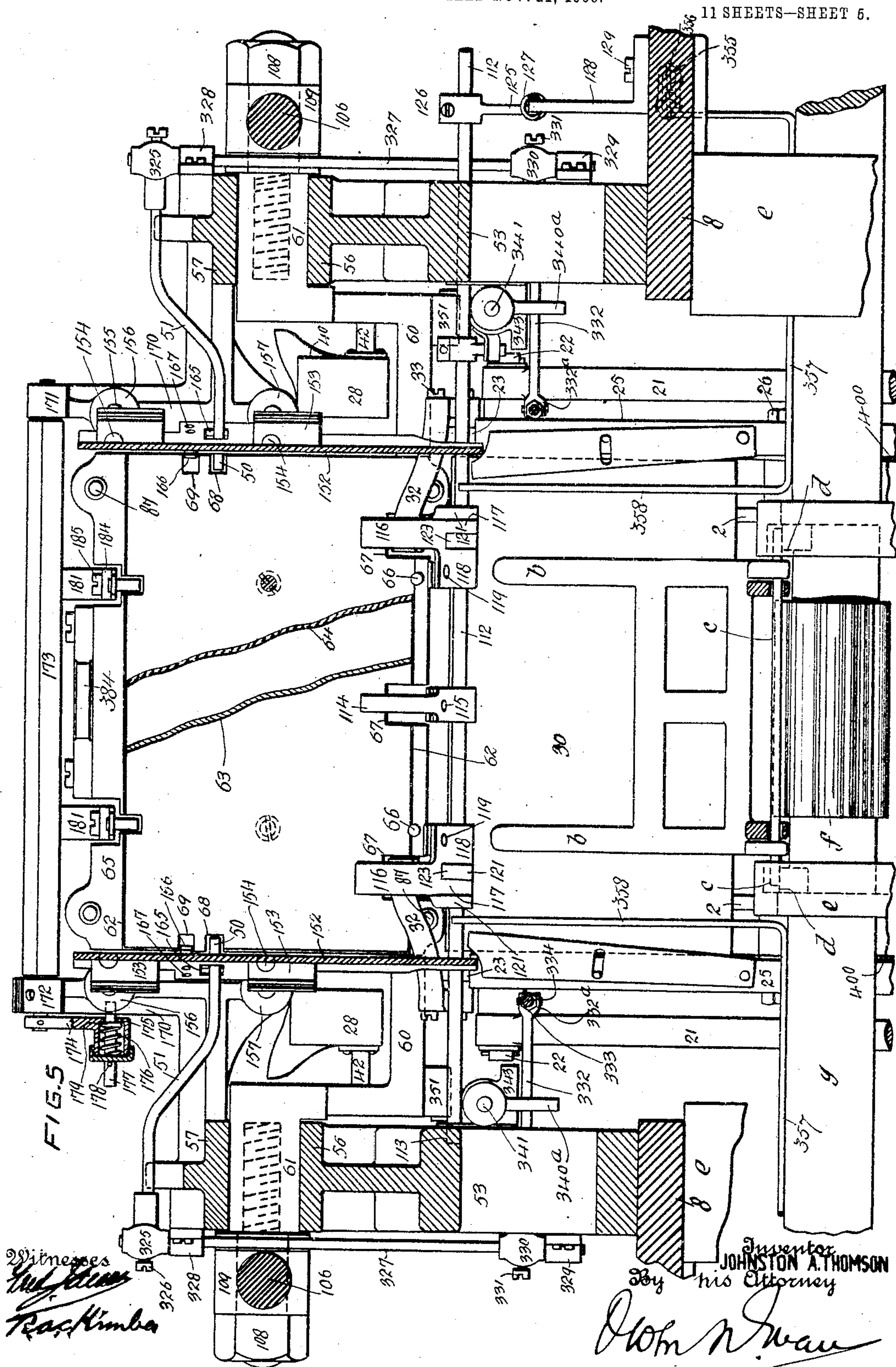
John H. Kimber

No. 786,069.

PATENTED MAR. 28, 1905.

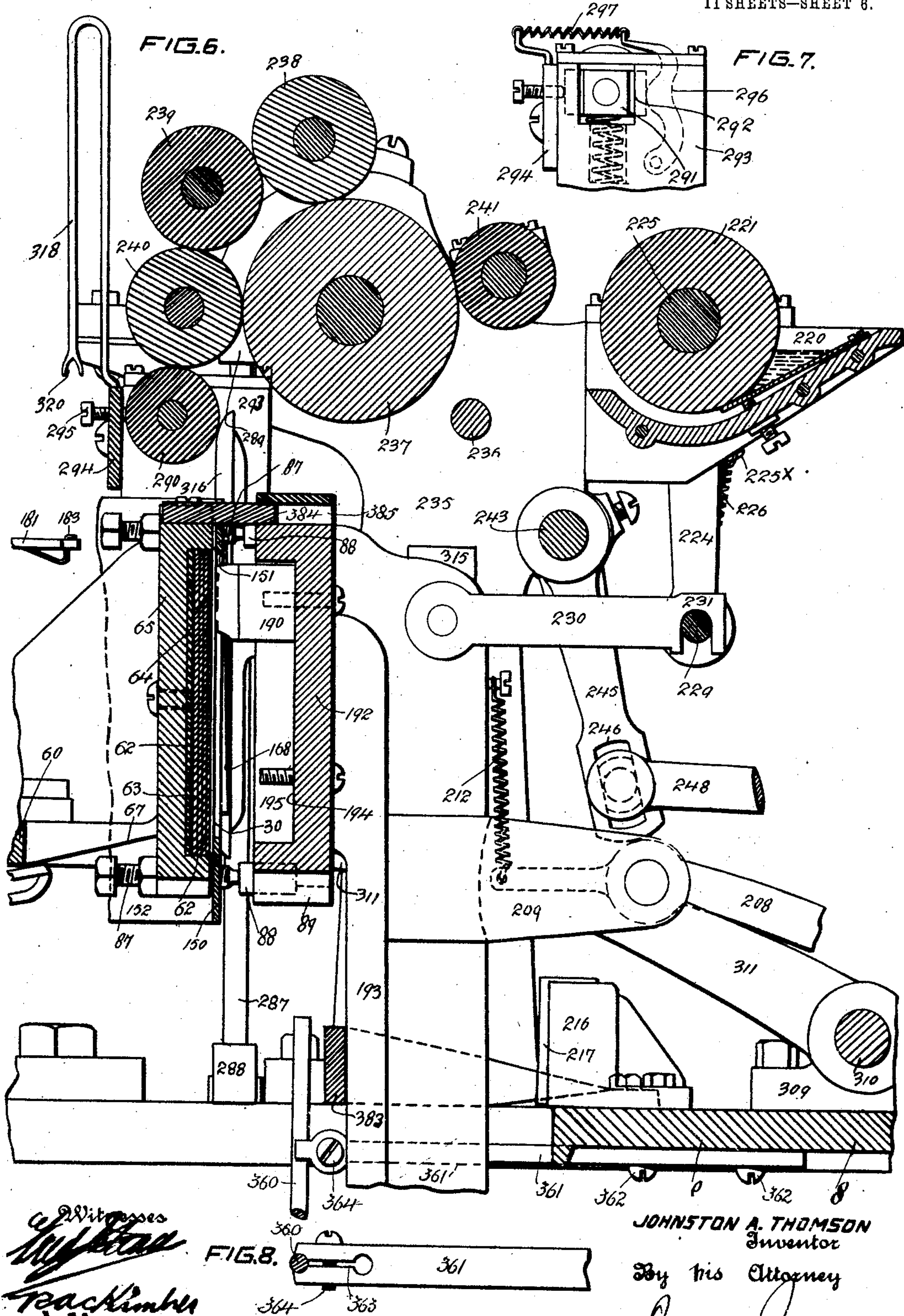
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PRINTING MACHINE.
APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 5.



J. A. THOMSON, DEC'D.
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APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 6.



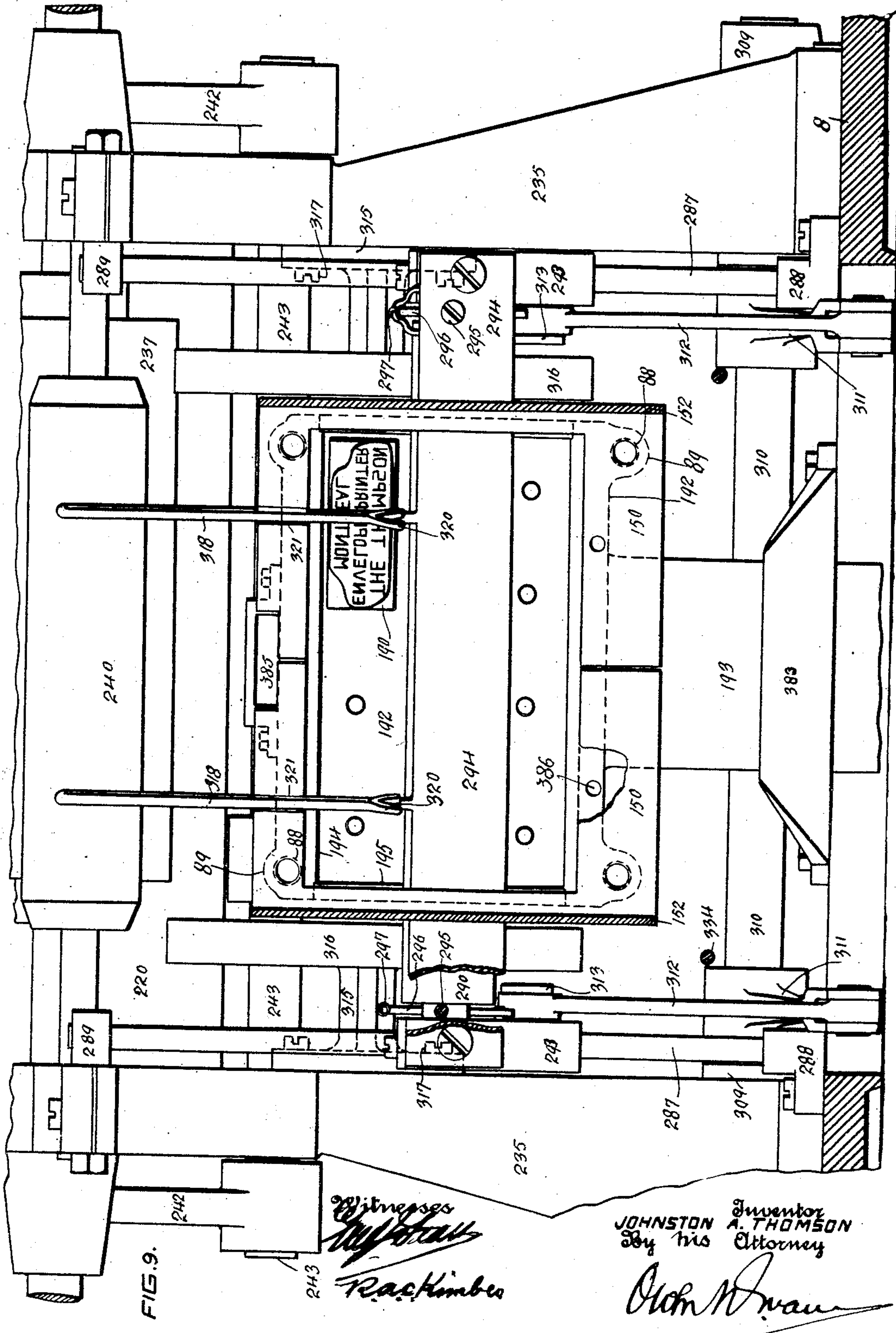
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APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 7.

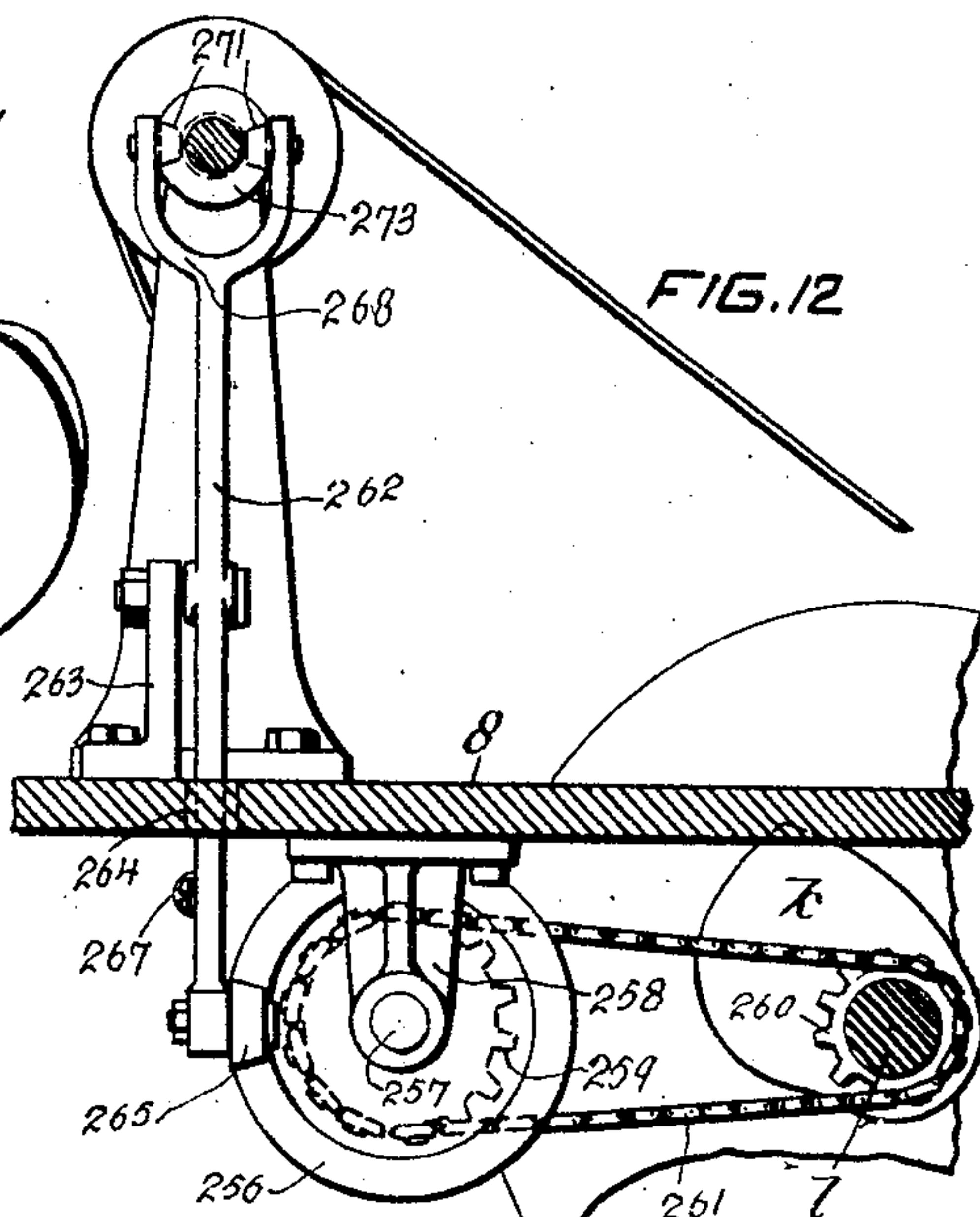
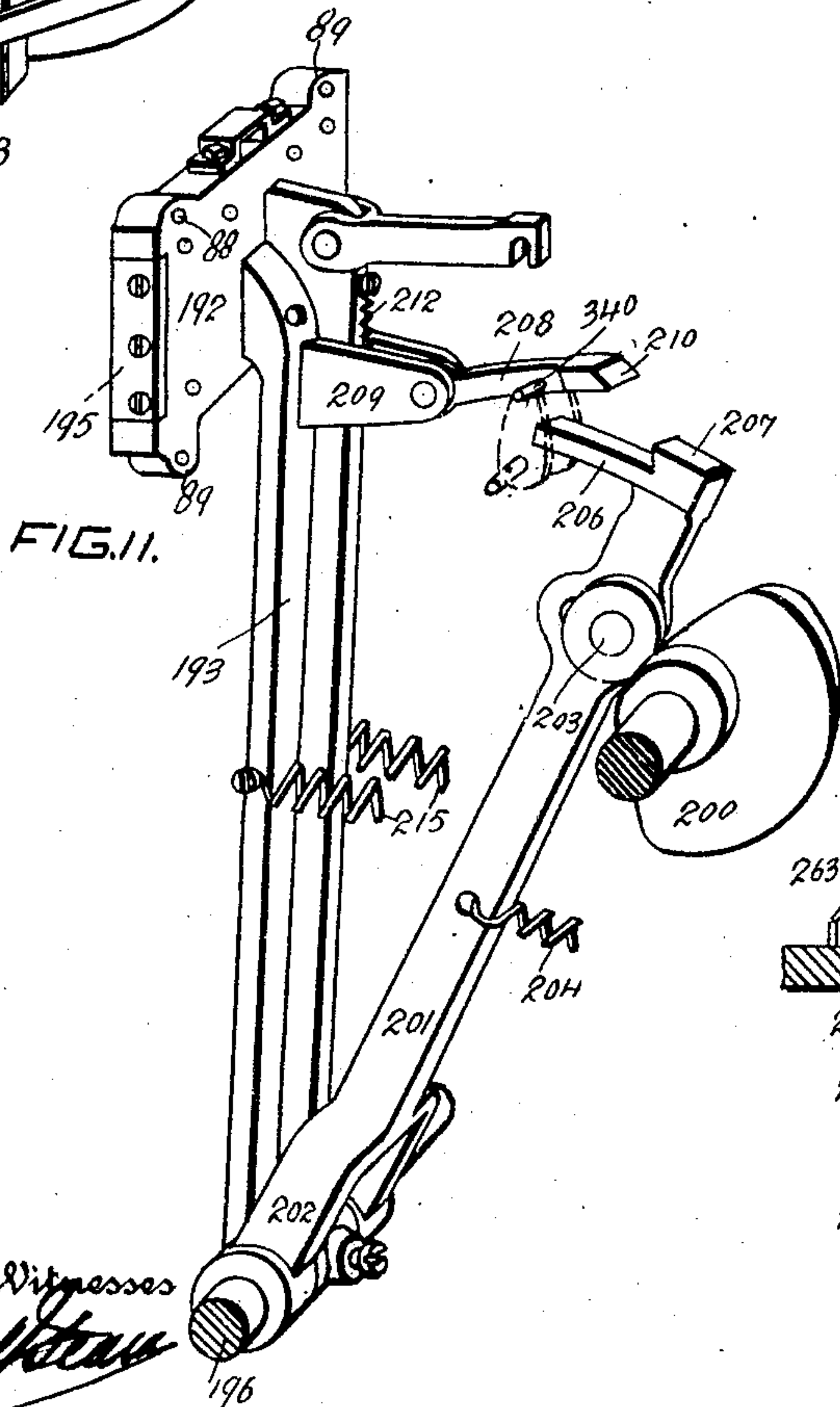
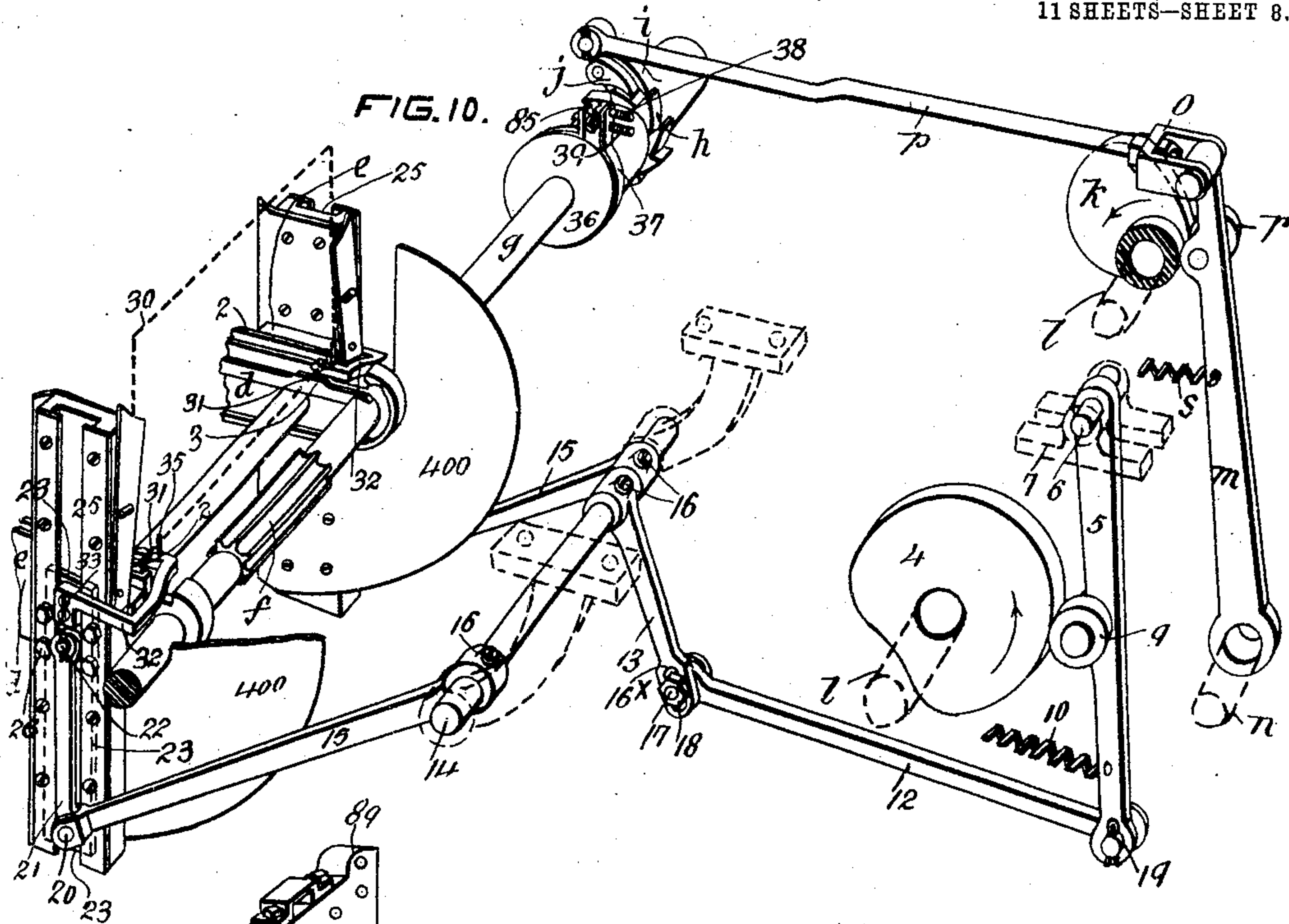


No. 786,069.

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J. A. THOMSON, DEC'D.
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PRINTING MACHINE.
APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 8.



Witnesses
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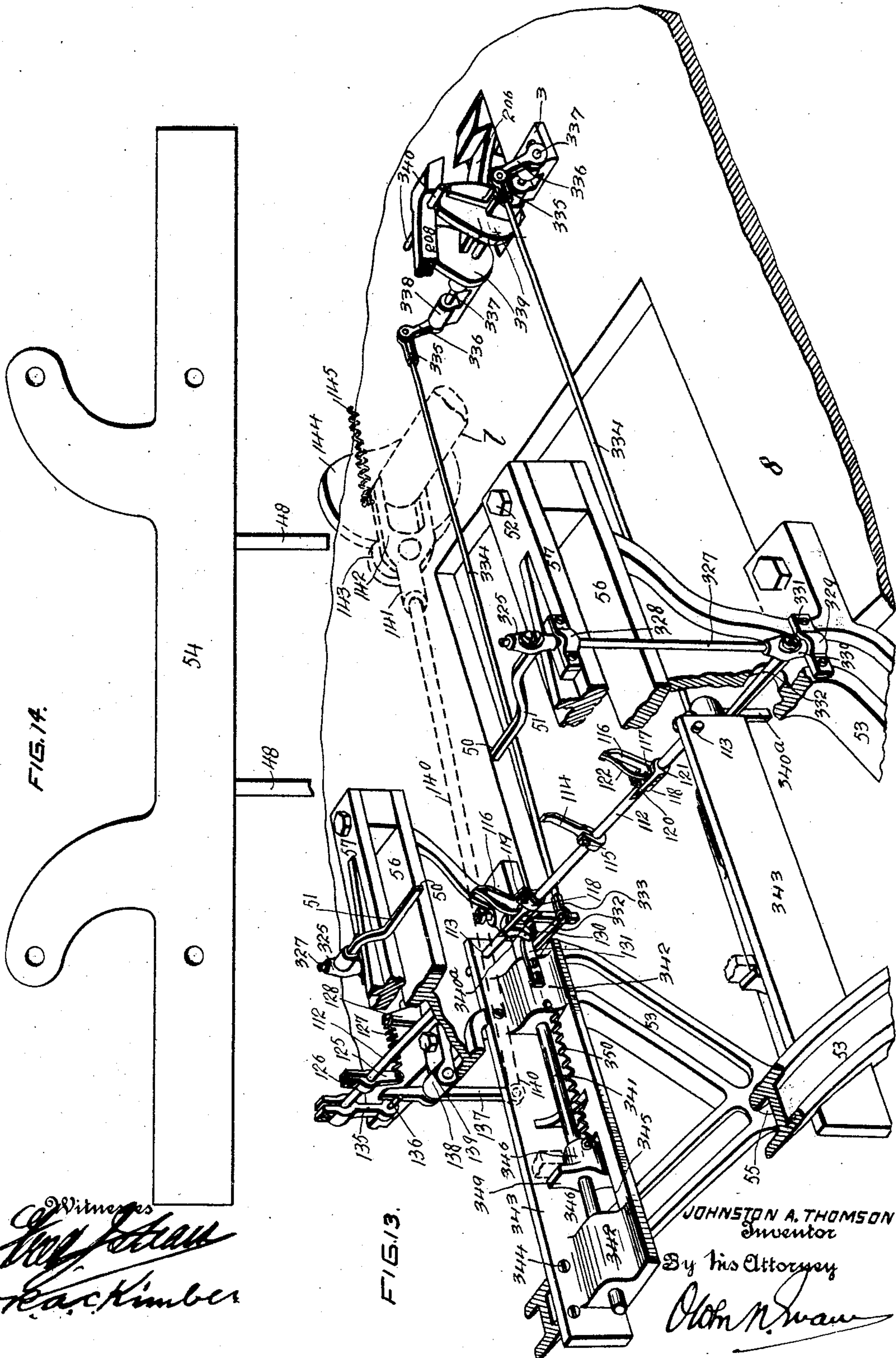
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PATENTED MAR. 28, 1905.

J. A. THOMSON, DEC'D.
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APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 9.



No. 786,069.

PATENTED MAR. 28, 1905.

J. A. THOMSON, DEC'D.
E. J. PRINDLE, ADMINISTRATOR.
PRINTING MACHINE.
APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 10.

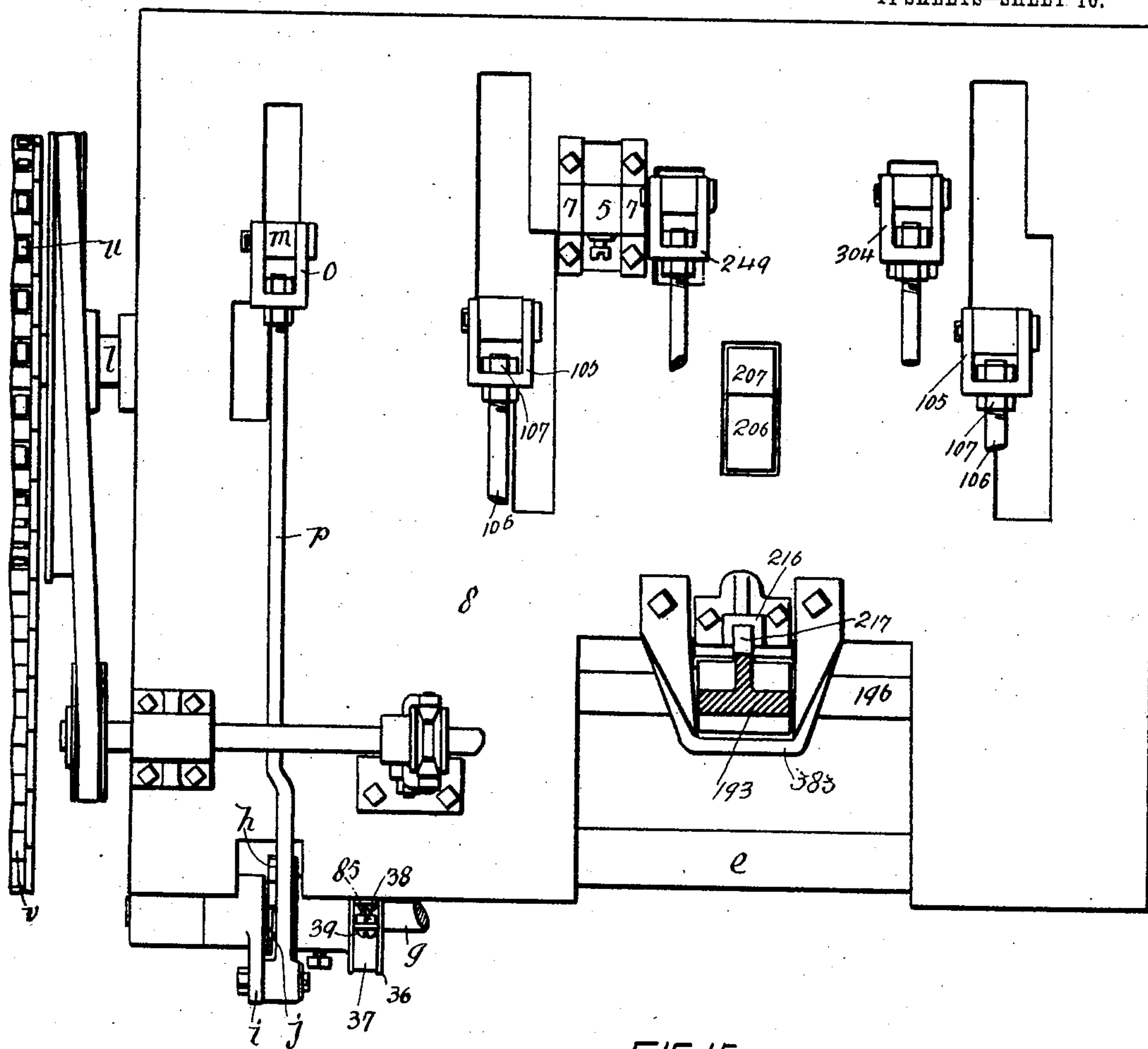


FIG. 15.

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No. 786,069.

PATENTED MAR. 28, 1905.

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PRINTING MACHINE.
APPLICATION FILED NOV. 21, 1900.

11 SHEETS—SHEET 11.

FIG. 16

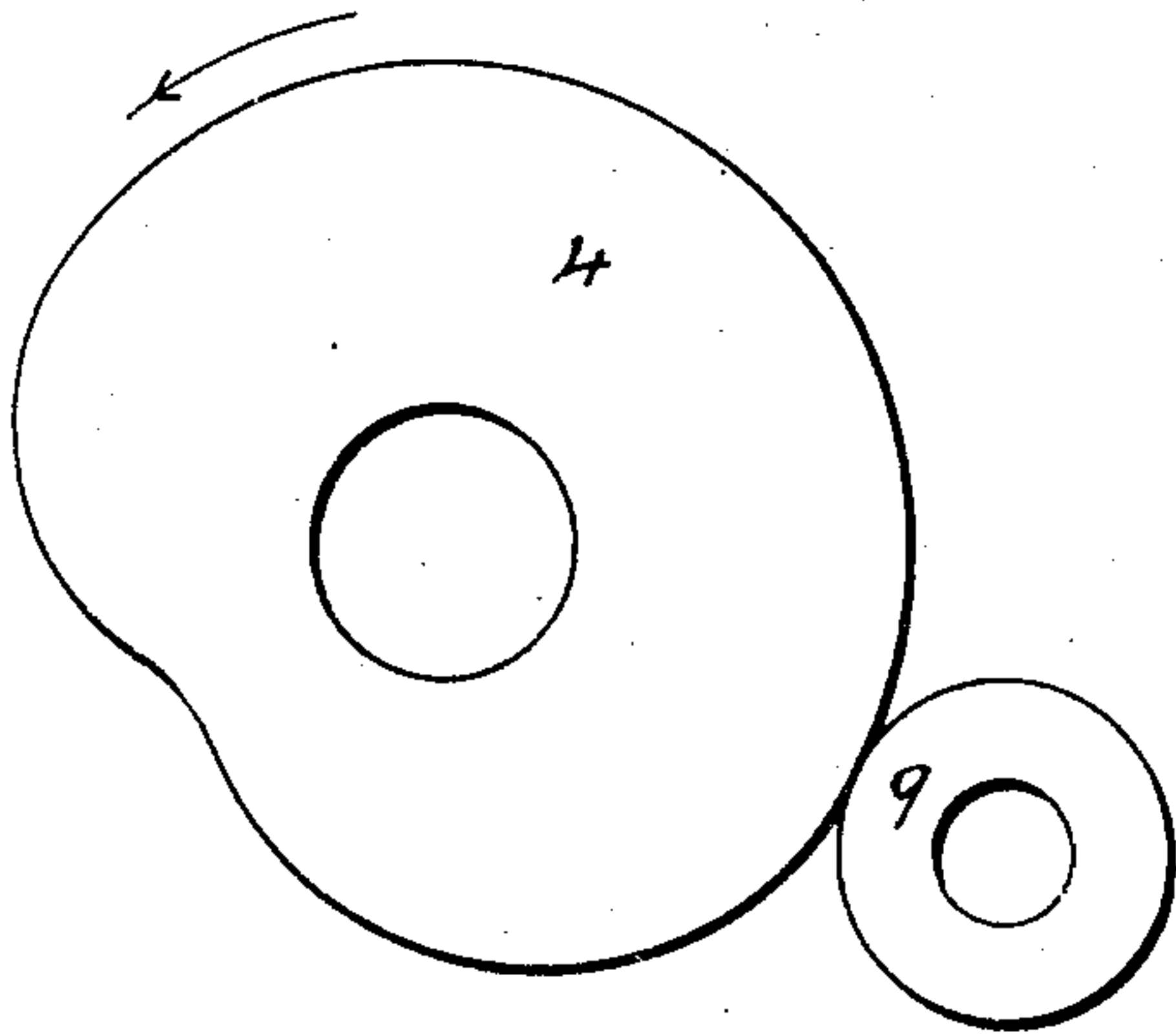


FIG. 17.

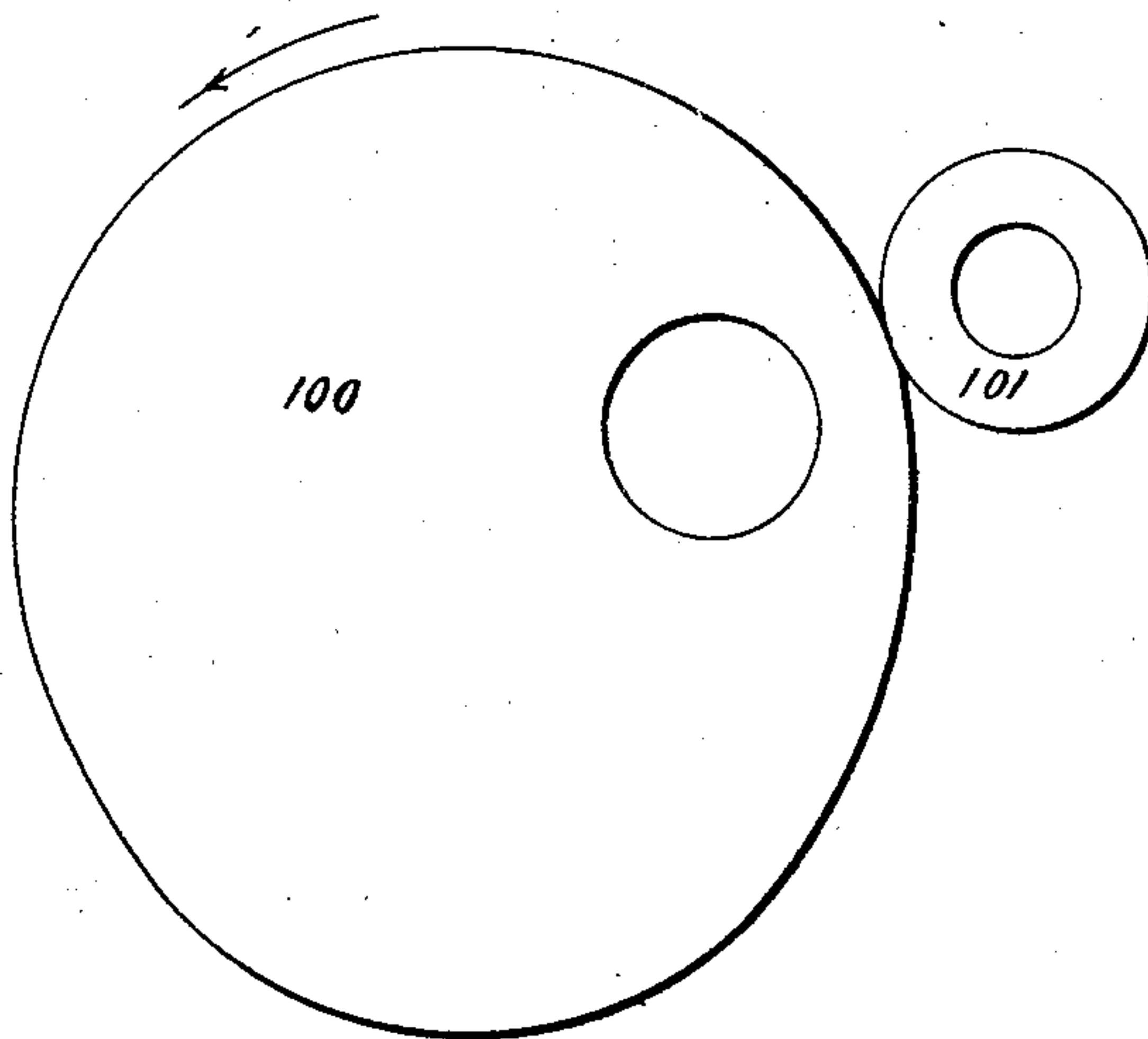


FIG. 18

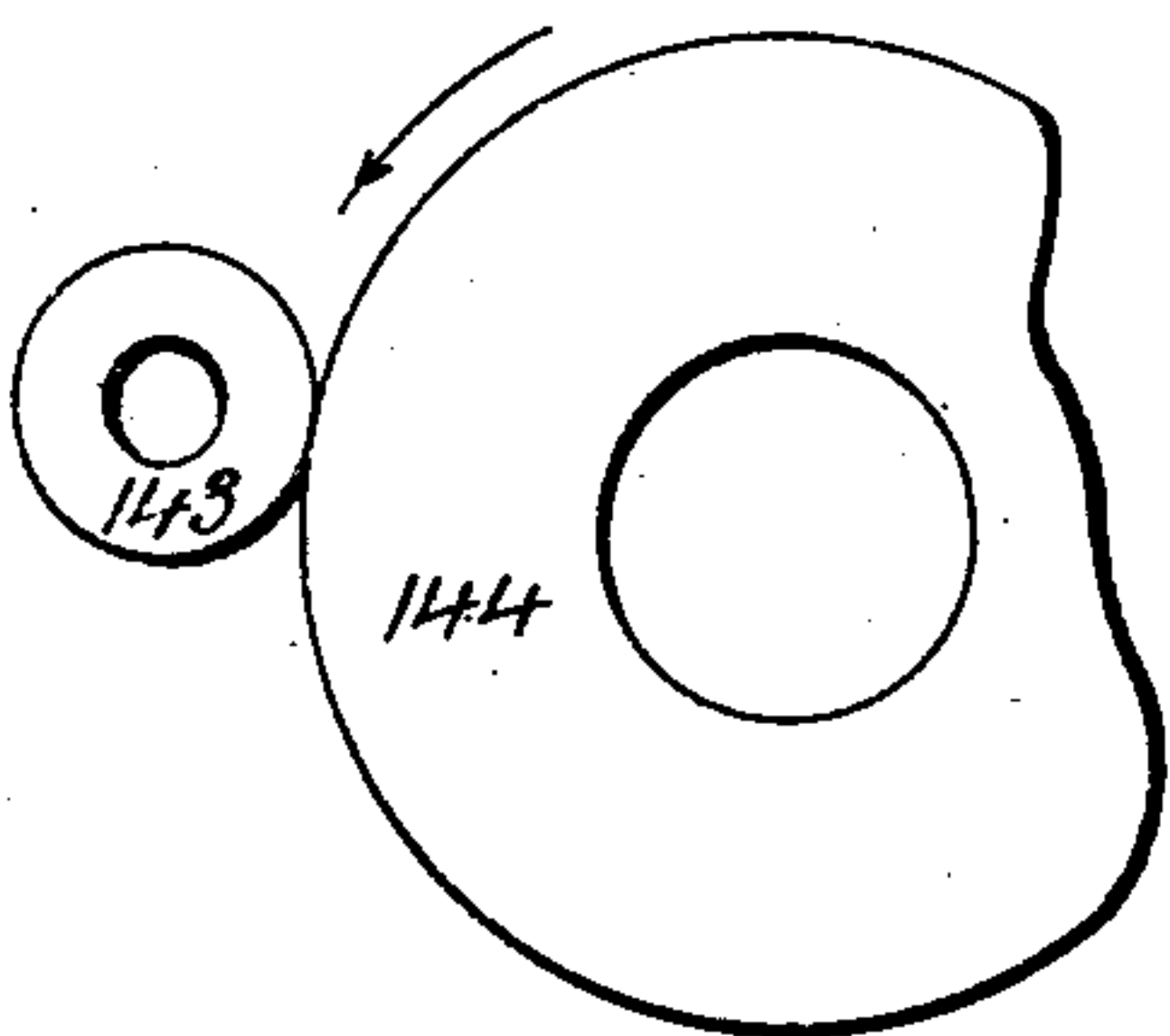


FIG. 19

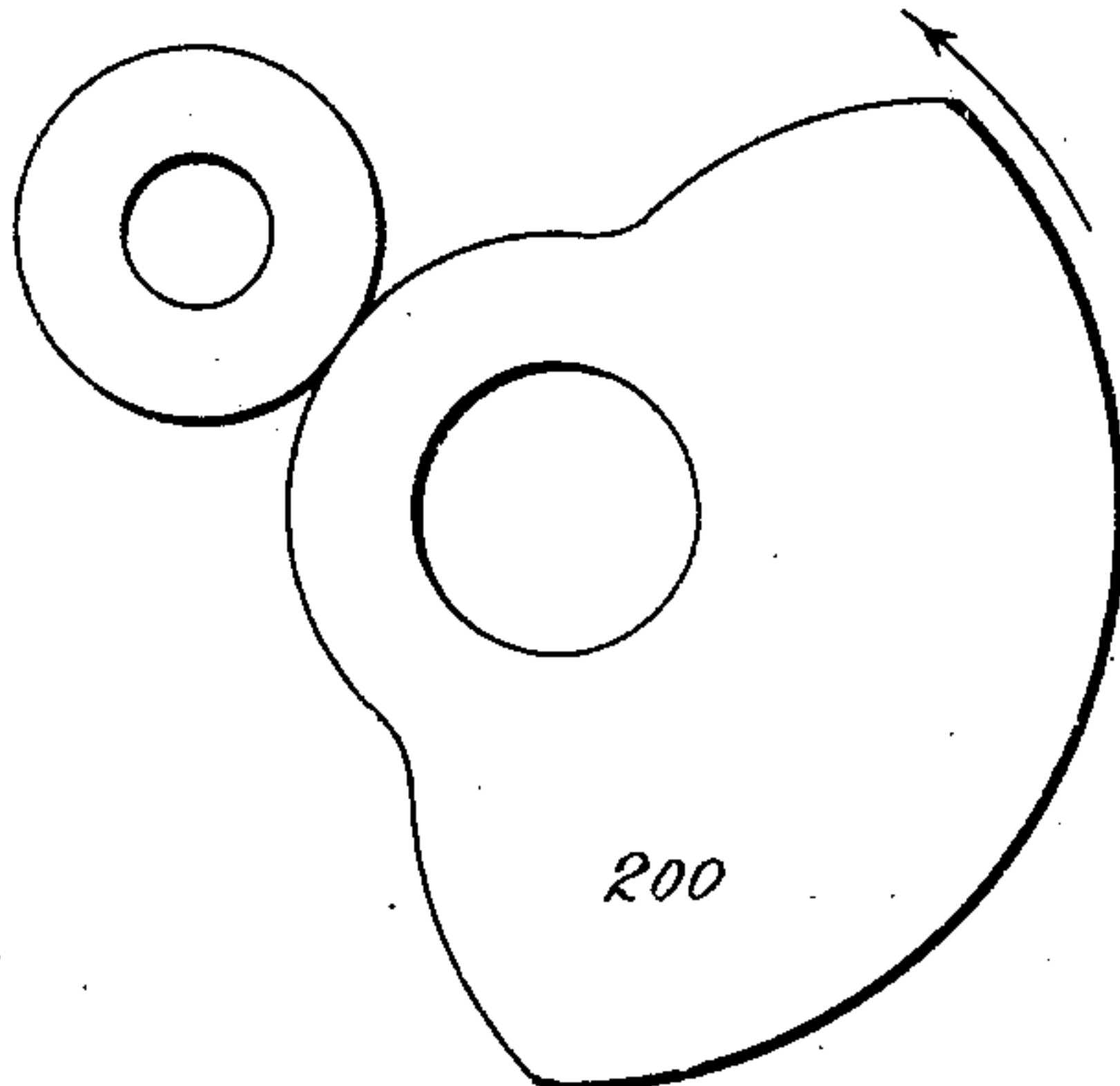


FIG. 20

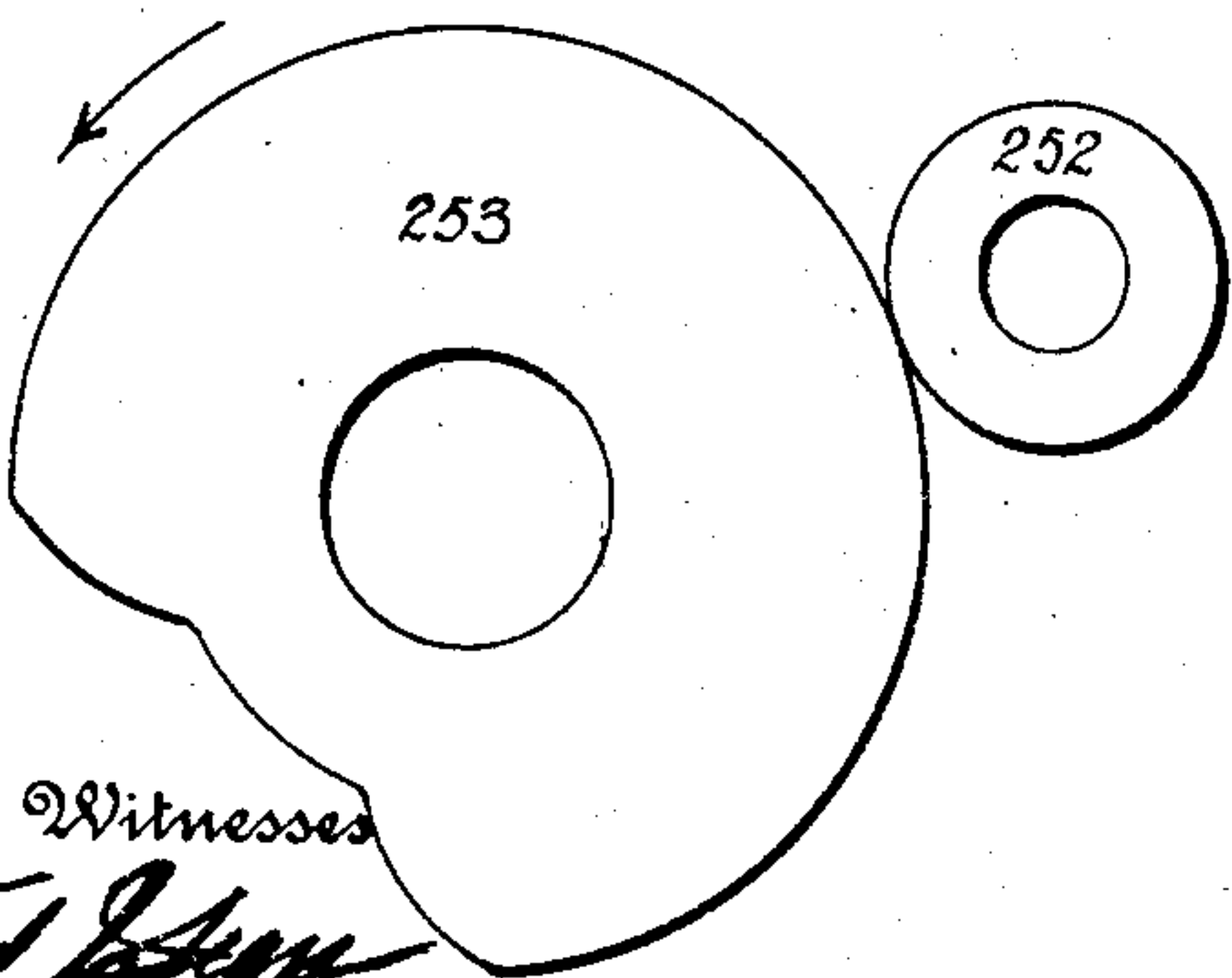
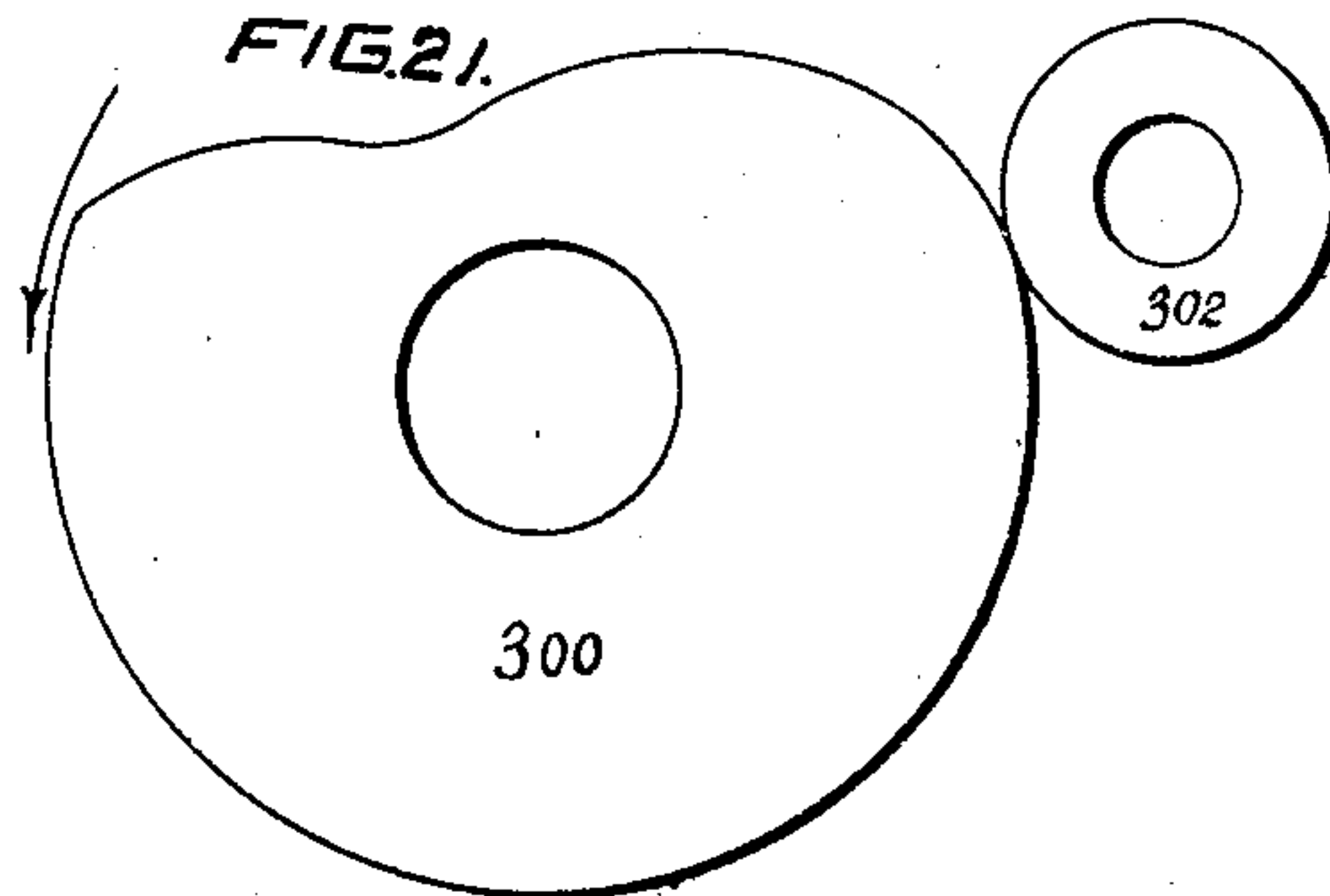


FIG. 21.



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[Signature]

UNITED STATES PATENT OFFICE.

JOHNSTON ALEXANDER THOMSON, OF MONTREAL, CANADA; EDWIN J. PRINDLE ADMINISTRATOR OF SAID JOHNSTON ALEXANDER THOMSON, DECEASED.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 786,069, dated March 28, 1905.

Application filed November 21, 1900. Serial No. 37,307.

To all whom it may concern:

Be it known that I, JOHNSTON ALEXANDER THOMSON, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Printing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to the printing of envelopes; and it has for its object to provide a printing-machine to be operatively connected to and work in conjunction with an envelop-making machine in order that the envelopes may have printed matter placed at any desired point upon or throughout the back thereof during the process of manufacturing and drying the envelopes.

The envelop-machine to which my printing-machine is particularly applicable is of the type well known in the art of envelop-making and comprises gumming mechanism, blank-folding means, mechanical counting means, and an endless drying-chain adapted to receive the completed envelopes from the folding means and convey them in an extended circuit to the mechanical counter.

The direct object of my invention is to provide a printing-machine that will automatically remove the envelopes from the drying-chain, print them, and return them to the chain again without in any way interfering with the operation of the envelop-making machine.

The invention may be said, briefly, to consist of a chase for carrying the electrotpe or other form from which it may be desired that the envelop receive an impression, means for inking the form, a device for taking each envelop individually from the drying-chain of the envelop-making machine and locating it in close proximity to the form, and means for causing the envelop and form to press one upon the other, the envelop being returned to the drying-chain after having been printed. I furthermore provide a device to control the printing means to automatically cause the failure of the machine to make an impression when no envelop is fed thereto, and an alarm device attached to the machine

automatically warns the operator of the envelop-machine when the printing-machine becomes clogged by the bunching of two or more envelopes or otherwise. I also provide means for varying the force or depth of the impression and for preventing the unnecessary inking of the form when no impression has been made.

More specifically speaking, my improved printing-machine comprises a chase, means for swinging the chase to a vertical position above the drying-chain, a lifting device for lifting an envelop from the chain and supporting it in a position in line with the form carried by the chase, a platen actuated by a cross-head for pressing the envelop upon the form and in its travel toward the form engages and carries with it a yielding frame which retains the envelop in place upon the platen during the printing thereof and supports it over its proper space in the drying-chain after having been printed. The inking of the form is done by a vertically-traveling form-roll having ink more perfectly distributed thereover by an improved arrangement of distributing-rolls which are controlled in their action to feed ink to the form-roll, and the form-roll to ink the form by an intermediary acted upon by the envelop carried by the platen in such a manner that the action of said rolls and the chase itself will be dependent upon the presence of an envelop upon the platen.

My improved printing-machine is adapted to accommodate the outer end of the loop of the drying-chain, and it is harnessed to and driven by and in unison with the envelop-making machine. When an envelop is accidentally folded or two or more thereof bunched between the platen and the retaining-frame, the retaining-frame will be abnormally moved, and the excessive movement thereof will cause an alarm to be given to the operator of the envelop-making machine in order that the envelop-making machine, and with it my improved printing-machine, may be stopped and damage to the work and machine obviated.

For full comprehension, however, of my invention reference must be had to the accom-

panying drawings, forming a part of this specification, wherein like reference characters indicate the same parts, and in which—

Figure 1 is a side elevation of my improved
 5 printing-machine and a portion of the drying-chain of the envelop-making machine with the parts in their normal positions—that is to say, in the positions they assume as the envelop is about to be raised. Fig. 2 is a rear elevation thereof. Fig. 3 is a longitudinal sectional
 10 view taken on line 3 3, Fig. 4, of a portion of my machine and illustrating the parts in the positions they assume when the envelop is in its raised position and just as the platen has taken it from the lifting device. Fig. 4 is a
 15 plan view thereof, partly broken away. Fig. 5 is a transverse vertical sectional view taken on line 5 5, Fig. 3, looking in the direction indicated. Fig. 6 is a longitudinal vertical
 20 sectional view taken on line 6 6, Fig. 2, and illustrating the parts in the positions they assume when the platen is pressing the envelop upon the form. Fig. 7 is a detail end elevation of the form-roll bearing. Fig. 8 is a de-
 25 tail plan view of the clamps for supporting the wire for supporting the printed envelops. Fig. 9 is a similar view to Fig. 5 and taken on the same line, but looking in the opposite di-
 30 rection and with the parts in the positions they assume as the envelop is being displaced from the retaining-frame and the form being inked. Fig. 10 is a detail perspective view of the envelop-raising means and chain-feeding
 35 means removed. Fig. 11 is a detail perspective view of the chase and its operating means removed. Fig. 12 is a detail sectional view taken on line 12 12, Fig. 2, and illustrating particularly the means for reciprocating the
 40 ink-distributing rolls. Fig. 13 is a detail perspective view of the means for causing the failure of the printer to perform its function, the means under the influence of the envelop being fed for causing the printer to perform
 45 its function, the yielding devices for temporarily retaining the envelop upon the platen and the yielding devices for stripping the printed envelops from the platen, and means for actuating these yielding devices, together
 50 with the portions of the frame and table immediately contiguous thereto. Fig. 14 is a detail face view of the end cross-piece of the cross-head. Fig. 15 is a horizontal sectional
 55 view taken on line 15 15, Fig. 1; and Figs. 16, 17, 18, 19, 20, and 21 are respectively diagrammatical views of the cams for actuating the envelop-lifters, the cross-head, the yielding fingers, the form, the oscillatory ink-car-
 60 rying roll, and the form-roll.

The drying-chain consists of a series of
 60 teeth *b*, pivotally connected together by wire rods *c*, the ends whereof rest upon the tops of a pair of side frames *d*, carried rigidly by the frame *e* of my improved printing-machine. This chain is in the form of a loop—that is to
 65 say, endless—and one end of the loop takes

over a sprocket-toothed roller *f*, carried rigidly upon a shaft *g*, mounted transversely of my machine and having a ratchet-wheel *h* mounted rigidly thereon, while a lever-arm *i* is fulcrumed upon said shaft adjacent to said
 70 ratchet-wheel, which it rotates intermittently in one direction by means of a pawl *j*. This lever-arm *i* is oscillated by a cam *k*, mounted upon the main shaft 1 and acting upon a lever-arm *m*, fulcrumed upon a counter-shaft *n* and
 75 having a forked casting *o* pivotally connected to the upper end thereof. A rod *p* has one end screw-threaded and taking into a tapped boring in said forked casting and its other end pivotally connected to the upper end of
 80 said lever-arm *i*, while a trundle-roll *r*, carried by the lever-arm *m*, is caused to yieldingly bear upon the cam *k* by a retractile helical spring *s*, connected at one end to the said lever *m* and at its other end to the frame *e* to
 85 the machine, near the front thereof. A flanged pulley 36 is also mounted rigidly upon this shaft *g*, and a friction-strap 37 takes around it and is connected rigidly at one end to the edge of the table by a screw 38, to which the
 90 other end of said strap is connected by an adjustable screw 39, set by a jam-nut 85, thus providing a brake to retard to a variable degree the rotation of the shaft *g*.

The main shaft 1 bears in pillow-blocks *t*,
 95 and a sprocket-wheel *u* is mounted rigidly upon the extreme left-hand end thereof looking toward the front of the machine, while a chain *v*, taking over and rotating this sprocket-wheel *u*, is driven from a corresponding
 100 sprocket-wheel upon the main shaft or other rotating part of the envelop-making machine. (Not shown.)

The side frames *d* of the chain-frame are formed with inclined planes 2, upon which
 105 the ends of the envelops ride to elevate them sufficiently to take over a pair of envelop-lifting devices, to be presently described, and these side frames *d* are formed each with a rise
 110 3, in the vertical plane of which the envelop is lifted to cause the joint in the chain to open at this point and free the envelop.

The envelop-lifting devices are constructed and operated as follows: A cam-disk 4 of the contour shown in Fig. 16 is mounted rigidly
 115 upon the main shaft and oscillates a lever 5, fulcrumed at its upper end upon a stub-spindle 6, mounted in a bearing-bracket 7 upon the table 8 of the machine. This lever carries a trundle-roll 9, caused to bear yieldingly upon
 120 said cam 4 by a retractile helical spring 10, connected at one end to the lever 5 and at its other end to a forward part of the machine-frame *d*. The lower end of this lever is connected by a link 12 to the lower end of a lever-arm 13, mounted rigidly upon a counter-
 125 shaft 14, having a pair of lever-arms 15 also mounted rigidly thereon. These lever-arms 13 and 15 are rigidly connected to the counter-shaft by set-screw 16 to allow of varia-
 130

tion of the angular positions thereof relatively to one another for purposes of adjustment when the machine is being assembled. The link 12 is for the same reason adjustably
 5 connected to the lever-arm 13 by boring the end of the link and longitudinally slotting the end of the lever-arm, as at 16^x, through which slot projects the diminished and screw-threaded end of a bolt 17, secured in any position to
 10 which it may be adjusted along said slot by a nut 18, while the larger portion of said bolt projects through the boring in the link and constitutes the pivotal connection therebetween and the lever-arm. The other end may
 15 be connected to the lever 5 by a forked bracket similar to the forked bracket *o*; but in the present embodiment I illustrate a plain pivotal connection 19. The lever-arms 15 have their outer ends forked to straddle and be pivotally connected, as at 20, to the lower ends
 20 of a pair of vertical links 21, the upper ends whereof are bored and take over rigid studs 22, projecting from slides 23, adapted to travel in vertical guideways 25, secured by bolts 26 to the frame *e* of the machine. These guides
 25 face outwardly, as shown, to prevent the lubricating-oil for the slides damaging the envelops 30. The lifting-hooks proper, 31, are each formed in one with a bar 32, connected
 30 rigidly at one end, as at 33, to one of the slides 23 and bent in rectangular form around the forward side of the guide to have its hooked end 31 extend at right angles to and beneath the ends of the envelops when they are elevated upon the inclined planes 2 of the chain-
 35 frame. A pin 35, projecting upwardly from each of these hooked ends 31 at the rear side of the notch that constitutes the hook, prevents the envelops being pushed beyond the
 40 said notches, while the beveled ends of these hooks obviate the chance of the ends of the drying-chain rods tripping thereupon as they are moved beneath them, and a shoulder 27 on the under side of the hook bears upon the
 45 chain-rod beneath it and steadies the link forward of the falling envelop to prevent it interfering with said falling envelop as it falls. The cam 4 is so timed in the cycle of operation that its operative function is to lower the lifting-hooks and allow the retraction of the heli-
 50 cal spring to lift them and the envelops.

A pair of triangular plates 40, each having one of its sides offset, as at 41, serve as guides to tilt the envelop toward the form,
 55 (to be hereinafter described,) and the other side of each is inwardly offset to form guides 28 to act in conjunction with guiding-plate to be presently described. These triangular guiding-plates are secured rigidly upon the ends
 60 of the long arms 42 of a pair of bell-crank levers fulcrumed, as at 43, to a transverse end frame-piece 54 of a bracket-frame to be presently described, while the short arms 45 thereof extend across the path of and are acted
 65 upon by the cross-head (to be presently de-

scribed) as it completes its return stroke. A third arm 46, formed in one with each bell-crank lever, projects toward the front of the machine, and a pair of retractile helical springs
 70 47 connect said lever-arms 46, and a pair of stops 48 upon the frame-piece 54 limit the movement of said bell-crank lever by the spring. The envelops are supported in their tilted positions by the flattened end 50 of a
 75 rod 51, constituting the initial part in the means to be hereinafter described for causing the failure of the printing means proper to work at times.

A bracket-frame before mentioned is secured rigidly by screw-bolts 52 to the front
 80 of the main frame and comprises side frames 53, braced together by cross-piece 54 and 55, the former constituting the ends of the cross-head guides 56, and a pair of caps 57, the latter being secured in place by screw-bolts 58.
 85 The cross-head 60 has its sides diminished, as at 61, to take into the guide 56, while the portion 65 constitutes the tympan-plate and is extended in height and width to be of somewhat greater area than the envelop and is
 90 formed with a facial recess 62, of slightly greater height than the envelop and extending from side to side of the tympan-plate to receive the tympan 63 and platen 64, the tympan preferably consisting of one or more
 95 layers of cardboard gummed to the face of the tympan-plate within said recess 62. A pair of rigid dowel-pins 66 project from the face of the tympan-plate in a plane slightly
 100 below the level of the lifting-hooks when in their raised position, the function of these pins being to support the envelop when taken from the said lifting-hooks, as will be shown in the description of the operation. A series
 105 of three inclined notches 67 are formed in the lower edge of said tympan-plate to accommodate a series of yielding envelop-holders to be presently described and a pair of notches 68 and 69, respectively, in each side
 110 edge thereof to accommodate the said flattened ends 50 of the rods 51 and a pair of spring-clips, to be presently described, for supporting the envelop in a yielding retaining frame, also to be presently described. A
 115 pair of bars 70 are rigidly secured upon the top of the cross-head by screws 71 taking through slots 72 in said bars into the cross-head, and the function thereof is to bear upon the short arms 45 of and actuate the bell-
 120 crank levers that operate the before-mentioned envelop-guides. This connection (the slots and screws) enables the bars to be adjusted for initial fitting. A bar 75, also (and for the same reason) adjustably connected by
 125 screws 76 and slots 77 to the top of the cross-head, engages each time the cross-head completes its return movement one leg 78 of a lever of U form mounted rigidly upon a spindle 79,
 130 mounted rotatably in bearing-brackets 80 upon the side frames 53 and retained against lon-

itudinal displacement by collars 81, secured rigidly upon said spindle by set-screws 82. This U-lever is yieldingly supported by a retractile helical spring 85, connected at its lower end thereto and at its upper end to the frame-piece 54, upon which the end of one arm of the U-lever impinges to limit the upward movement thereof under the influence of said spring 85. A pair of curved arms 83 are mounted upon this spindle 79 and rigidly secured thereto by set-screws 84. The function of these arms is when the U-lever is borne upon by the bar 75 and moved against the spring 85 to lightly stroke the tops of and replace any envelopes that may happen to project upwardly out of their proper places in the drying-chain.

To replace any envelopes that should happen to become endwise displaced, I secure a pair of curved strips 90 to the arms 46 of the levers for carrying the triangular guiding-plates by brackets consisting of fastening-plates 91 and rods 92, secured rigidly at their upper ends to said fastening-plates and depending therefrom, said curved strips 90 being secured rigidly upon the lower ends thereof, while said rods 92 are of a length to have said strips stroke the ends of the envelopes about midway of their height and replace any of them that may happen to become endwise displaced.

The cross-head is reciprocated by a pair of cams 100, mounted rigidly upon the main cam-shaft 1 and acting upon a pair of angular levers fulcrumed at their angles upon the counter-shaft *n* and having an antifriction-roller 101 upon its vertical arm, which is held yieldingly in bearing relation with said cams 100 by the horizontal arm 102 thereof, which is weighted, augmented by retractile helical springs 104, connected at one end thereto and at their other ends to the frame *e* of the machine. The upper ends of these levers are each pivotally connected between the prongs of a forked bracket 105, through borings in which brackets the screw-threaded rear ends of a pair of rods 106 project and are adjustably held therein by nuts 107. The forward ends of these rods are formed with eyes 109, pivotally connected by screw-bolts 108 to the laterally-projecting portions 61 of the cross-head, and the adjustable connection of these rods to the forked brackets enables the extent of forward movement of the cross-head to be varied. The cams 100 are timed to impart the movement of the cross-head toward the form, while the springs return it.

An oscillatory spindle 112 is mounted in perforations 113 in the bearing-brackets of a portion of the means for causing the failure of the printing means proper to act at times, to be hereinafter described. This oscillatory spindle 112 carries a series of yielding devices serving the double purpose of retaining the envelop upon the pins for a short interval and later in the operation strips the envelopes

from said pins, and these yielding devices, of which there are three, comprise a middle one, consisting of a bent finger 114, having its lower end turned around the spindle and clamped thereto by a screw 115, and two side retainers, each consisting of a bent finger 116, formed with an eye 117 to take over the spindle, and a strap 118 to be bent around the spindle and be clamped thereto by a screw 119, like the finger 114, and a straight finger 120, having its lower end forked and perforated, as at 121, to take loosely over the spindle and straddle the eye 117 of the finger 116. A bow-spring 122 keeps said fingers 116 and 120 normally yieldingly apart, and the finger 120 is limited in its movement from the finger 116 by a stop 123 upon the finger 120. A downwardly-projecting finger 125 is clamped to this spindle by a screw 126, and a retractile helical spring 127 connects the lower end thereof to a bracket 128, bolted, as at 29, to the table of the machine, the function thereof being to normally yieldingly maintain these yielding devices in their positions in the path of the cross-head, while a dog 130, carried rigidly by the spindle, engages a stop 131 upon the inside of the bracket-frame just mentioned, adjacent to the perforation 113, and limits the turning movement of said spindle under the influence of said retractile spring 127. These yielding devices are caused to dip out of the path of the cross-head at the proper time by a second downwardly-projecting arm 135, secured rigidly at its upper end to said spindle and having a lateral and inwardly-projecting pin 136, with which the upper end of a cam-actuated lever 137 engages. This cam-actuated lever is fulcrumed midway of its length upon a bracket-arm 138, secured, as at 139, to the table of the machine, and the lower end thereof is pivotally connected to one end of a rod 140, the other end whereof is screw-threaded to take into a tapped sleeve 141, integral with a fork 142. This fork straddles the main cam-shaft and carries a trundle-roll 143, kept yieldingly in contact with a cam 144 upon said main shaft by a retractile helical spring 145, having greater power of retraction than the spring 127, the cam being of a contour and timed to allow the spring 145 to cause the retaining devices to dip.

The frame for retaining the envelopes upon the platen during the printing thereof and for holding them in position over the proper space in the drying-chain to receive them after having been printed consists of a pair of angular plates arranged to have a wing 150 of each project across the face of the cross-head, with their ends abutting one another, these wings being correspondingly cut away, as at 151, to expose a portion of the platen (and of an envelop when carried thereby) of an area slightly less than the envelop. The other wings 152 of these angular plates are arranged diagonally, but approximately in the

vertical longitudinal plane of the machine, and each angular plate is rigidly secured by straps 153 to the bent ends 154 of a pair of sliding rods 155, supported in sleeve-bearings 156 and 157, integral with the standards 170 of an opening bridge-piece (to be presently described) and the before-mentioned rigid frame-piece 54, respectively. The rods 155 of each angular plate are secured together by a yoke consisting of a pair of sleeves 158, connected by a web 159, said sleeves 158 taking upon the ends of the rods and being secured thereto by set-screws 160. Each rod is encircled by an expansile helical spring 161, which bears between the bearing-sleeves 156 and a collar 162, set rigidly upon the rod by a screw 163, said collars also serving, in conjunction with the sleeve 157, to limit the movement of the angular plates under the influence of the spring 161. Each of the wings 152 is slotted, as at 165, to accommodate the flattened ends 50 of the before-mentioned rods 51, and a bow-spring 166 is secured at one end by screws 167 to the inside of each of these wings and is adapted to bear upon the ends of the envelop and prevent it falling from the retaining-frame until it is displaced at the proper time, as will be hereinafter shown. The wings 150 have a pair of vertical wire springs 168 connected at their upper ends to the outside thereof adjacent to the opening 151. The lower ends of said springs project through perforations in the wings and are bent downwardly, as at 169, to prevent the printed envelop when falling from the retaining-frame rubbing and smearing the wet ink upon the lower edge of the said wings 150, and also consists in guiding the envelop into its proper space in the drying-chain, this guiding being principally done by a pair of plates 400, secured to the inside faces of the envelop-lifter guides.

To augment the springs 166 in the performance of their function of holding the envelop against accidental displacement in the retaining-frame after the envelop has been printed, the standards 170, before mentioned, are cast in one with the capping-plates 57 of the cross-head guides, and the upper end of one is formed with a transverse sleeve 171 and the other with a fork-bearing 172. A bar 173 has its ends diminished to take into said sleeve 171 and fork 172, and one end has integral therewith a downwardly-projecting arm 174, formed with a seat 175 for a coiled spring 176 and an opening for a bolt 177, carrying a pin 178 to limit its movement through said opening, and a collar 179, upon which the spring 176 bears. A pin 180 prevents the accidental displacement of the bar 173 from its bearings, and the inner end of the bolt takes into a socket in the adjacent standard 170, while a pair of rigid arms 181, integral with said bar 173, project toward the retaining-frame and are slotted, as at 182, to allow a pair of latches to project downwardly therethrough. These

latches each consist of a flat spring 183, held in place by a block 184 and screw 185, taking through the block and spring into its carrying-arm. The latches are forced up by the envelop as it is pushed toward the retaining-frame by the cross-head and drop behind the envelop when it passes them and retain the envelop in the frame when the cross-head recedes therefrom.

The form 190 is in the present embodiment of my invention an electrotpe of an outside measurement to be projected through the opening 151 in the retaining-frame and is carried in a recess in the chase, which consists of a plate 192, carried rigidly at the upper end of an arm 193 and horizontally recessed, as at 194, the ends of the recess being closed by plates 195. The cross-head has a screw 87 at each corner thereof, which bears upon a hardened peg 88, carried rigidly in a lug 89 at each corner of the chase to relieve the form of an excessive pressure. The arm 193 is fulcrumed at its lower end upon a second counter-shaft 196, supported in bearings 197, bolted to the under side of the machine-frame. The chase is actuated by a cam 200, mounted rigidly upon the cam-shaft 1, and a lever 201, having its lower end 202 forked and bored to straddle the lower end of the chase-carrying lever and be fulcrumed upon the shaft 196. This lever 201 carries in a slot therein an adjustable stud 203, upon which is mounted a trundle-roll, through the medium of which said lever is kept yieldingly in bearing relation with said cam by a retractile helical spring 204, connected at one end to said lever and at its other end to a bar 205, constituting a stay for the rear of the machine-frame, while the upper end of the lever has a laterally-projecting lip 206 near its upper end, and the projecting portion 207 intervening said lip and the end of the lever is inwardly beveled. A pawl 208 is pivotally connected near one end to a bracket 209 upon the chase-carrying lever, and its other end is beveled, as at 210, to at times be engaged by the beveled projection 207 of the lever. A retractive helical spring 212 is connected at one end to the portion of the pawl within the bracket and at its other end to the lever above said pawl, the function thereof being to yieldingly maintain the pawl in a position to be engaged by the lever. The arm 193 is yieldingly held in its lowermost position by a pair of retractile helical springs 215, connected at one end thereto and at their other ends to the bar 205, said arm being supported in such position by a cushioned stop consisting of a bracket 216 of U form, secured upon the table and carrying a filling 217, of leather or other yielding substance, to cushion the blow of the arm thereupon when it is drawn back by the springs 215.

The inking mechanism consists of a fountain 220 and fountain-roll 221 of ordinary construction, the roll being intermittently rotated by

a pair of ratchet-wheels 222, mounted rigidly one upon each end of the spindle 225 thereof, and a pair of pawls 223, engaging said ratchet-wheels and mounted each upon a lever 224.

5 These pawls are each formed with a tail 225^x, to each of which the upper ends of a pair of retractile helical springs 226 are connected, the other ends thereof being connected to pins 227 upon said levers 224, and said levers are

10 fulcrumed at their upper end upon the said spindle of the fountain-roll, while their lower ends are yoked together by a rod 229, connected rigidly thereto at its ends. A link 230, pivotally connected at one end to the upper

15 end of chase-carrying arm, is hooked at its other end 231 over the rod 229 and upon the movement of the said arm causes the vibration of the fountain-actuating levers 224. The fountain is secured to the rear side of the up-

20 per end of a fountain-frame bolted to the top of the table, the sides 235 whereof are stayed by a bracing-bolt 236. The cylinder-roll 237 and distributing-rolls 238, 239, and 240 of usual construction are mounted at the upper

25 end of the fountain-frame, the intermediate distributing-roll 239 and the cylinder-roll 237 being simultaneously oppositely longitudinally reciprocated by means to be presently described. The usual carrying-roll 241 for

30 carrying the ink from the fountain-roll to the cylinder-roll is mounted in the upper ends of a pair of oscillating levers 242, secured at their lower ends upon a spindle 243, carried in bearings 244 integral with the sides

35 235 of the fountain-frame, while an arm 245, rigidly mounted upon said spindle 243, projects downwardly therefrom and is slotted at its lower end, as at 246, in which a bolt is adjustably set by a nut 247. This adjustable

40 connection is to allow of initial fitting. A link 248 is pivoted at one end upon this bolt and is screw-threaded at its other end and projects through a hole in the crotch of a fork 249, adjustably connected thereto on

45 each side of said crotch by a pair of nuts 250. This fork straddles and is pivotally connected to the upper end of a lever 251, fulcrumed at its lower end upon the counter-shaft *n* and carrying a trundle-roll 252, maintained yield-

50 ingly in contact with a cam 253 by a retractile helical spring 254, connected at one end to said lever 251 and at its other end to a forward portion of the frame. The intermediate roll 239 and the cylinder-roll 237 are op-

55 positely longitudinally reciprocated by a cam 256 rigidly upon a counter-shaft 257, mounted in bearing-brackets 258, hung from the under side of the table and driven by a pair of sprocket-wheels 259 and 260 upon said

60 counter-shaft and the main cam-shaft 1, respectively, and operatively connected together by a chain 261. A lever 262, fulcrumed to a bracket 263, bolted upon the table adjacent to a slot 264, projects through

65 said slot and carries at its lower end a trun-

dle-roll 265, of truncated conical form and caused to bear upon said cam, the bearing-face whereof is beveled, as at 266, by a retractile helical spring 267, connected at one end to said lever and at its other end to the frame of the machine. The upper end 268 of this lever is

70 forked to straddle a sleeve 269, secured rigidly upon the spindle of the cylinder-roll by a set-screw 270, and a pair of trundle-rolls 271, also of truncated conical form are carried by the prongs of said fork and take be-

75 tween the oppositely-beveled adjacent faces 272 of a pair of annular flanges 273 upon said sleeve. The truncated conical trundle-roll and beveled annular face upon which it bears,

80 just described, I find very efficacious, in that the natural tendency thereof is to run in a circular path, thus obviating the undesirable tendency of the roll to leave the face upon

85 which it is required to bear, and consequently avoiding the friction otherwise existing between the roll and its cam. The opposite end of the cylinder-spindle is rotatably connected to one end of a rocking lever 275 by a link

90 276, forked at each end to straddle the end of said rocking lever, and a sleeve 277, to each of which it is pivotally connected, the sleeve being in turn rotatively connected to the adjacent end of the cylinder-spindle by a screw

95 278 taking through the sleeve into a tapped boring in the cylinder-spindle. The rocking lever is fulcrumed in the forked end 279 of a horizontal rigid arm 280, projecting from the fountain-frame, and a link 281, forked at both

100 ends, is connected at one end to the opposite end of the rocking lever and at its opposite end to a sleeve 283, through which a screw

284 takes loosely into a cap 285, which fits over the adjacent end of the intermediate reciprocating roll 239 and is connected rigidly

105 thereto by a set-screw 286.

The form-inking roll 290 is mounted in adjustable bearing-blocks 291, carried in slots 292 of greater width than said blocks, in a pair of blocks 293, constituting the end pieces

110 of a vertically - reciprocating cross - head formed by the blocks 293 and a connecting-bar 294, said blocks being vertically bored to take upon a pair of rigid vertical rods 287, secured at their lower ends by being set in

115 sockets in a pair of brackets 288, secured to the table, and at their upper ends by taking into a pair of rigid sleeves 289, secured to sides of the fountain-frame. A screw 295 takes through the bar 204 and bears upon

120 the adjustable block 291, while a pair of bow-shaped levers 296 are fulcrumed to each end of the cross-head and are caused to bear yieldingly upon the bearing-blocks 291 and the

125 latter in turn upon the adjusting-screws 295 by retractile helical springs 297. This manner of mounting the form-roll enables it to be adjusted toward or from the form to counteract the variations in the diameter of said roll

130 due to shrinkage and other natural causes.

This form-roll cross-head is vertically reciprocated by a cam 300, mounted upon the main cam-shaft 1, and a lever 301, carrying a trundle-roll 302 and having a retractile helical spring 303, connected at one end thereto and at its other end to a forward part of the frame, the spring keeping the trundle-roll constantly in yielding contact with the cam. A fork 304 straddles and is pivotally connected to the upper end of this lever, and the crotch thereof is bored to receive the screw-threaded end of a link adjustably connected thereto by a pair of nuts 305, located one on each side of said crotch. The opposite end of this link is perforated to take over and be pivotally connected to a stud 306, adjustably secured by a nut 307 to the slotted end of the short arm 308 of a bell-crank lever fulcrumed to a pair of brackets 309, bolted to the top of the table. This bell-crank lever consists of said short arm 308, a spindle 310, bearing in said brackets and having said short arm 308 rigidly connected thereto, and a pair of curved arms 311, rigidly connected at one end to said spindle near each end thereof and at their other ends pivotally to the lower ends of a pair of vertical links 312, the upper ends whereof are pivotally connected by studs 313 to the inside faces of the end pieces 293 of the said form-roll cross-head. In order that the form-roll may be caused to rotate independently of its frictional contact with the form, a pair of T-brackets 315, formed with planed outer faces 316, are bolted, as at 317, to the inside faces of the fountain-frame, with said planed faces 316 located on each side of the chase, when it is in its position to receive the pressure of the platen, said faces constituting rails upon which the ends of the form-roll will run as it reciprocates with its cross-head.

The envelopes after having been printed and simultaneously with the inking of the form are displaced from the retaining-frame by a pair of elongated fingers 318, each secured at one end to the top of the form-roll cross-head bar 294 and extended upwardly and bent and extended downwardly, with its other end 320, which is of V form, in a line with the inside face of the side 150 of the retaining-frame, which is grooved, as at 321, to allow the passage of said V-shaped ends. The length of the upward extension of said fingers is such as to accommodate the upper edge of the said side 150 of the retaining-frame when the form-roll cross-head is at its lowest point.

The operative connection between the chase-actuating pawl 208 and the lever-arm 193 that moves it is effected by the envelop when being carried into the retaining-frame by the cross-head. The ends of the envelop bear upon the before-mentioned flattened ends 50 of the rods 51, which are secured rigidly at their outer ends to a vertical sleeve 325, rigidly secured by set-screws 326 upon the upper ends of a pair of vertical spindles 327, one at

each side of the machine in a pair of bearings 328, one upon the outer side of each capping-plate 57, and a second pair of bearings 329, one upon the outside of each of the side frames 52 and directly beneath the bearings 328. A sleeve 330 is secured upon each of these vertical spindles, near the lower ends thereof, by set-screws 331, and a pair of arms 332 are rigidly connected at their outer ends to said sleeves and have their inner ends forked, as at 332^a, to straddle and be pivotally connected to a pair of exteriorly-squared and interiorly-screw-threaded sleeves 333. A pair of rods 334, screw-threaded at their ends, take at their forward ends into said sleeves 333 and at their other ends into similar sleeves 335, pivotally connected to the forked ends of a pair of arms 336, rigid upon a spindle 337, mounted in a pair of bearing-brackets 338, rigidly secured upon the table beneath the end of the pawl 208 when it is in its lowermost position. A pair of oval cams 339 are secured rigidly upon this spindle 337 sufficiently apart to accommodate the pawl and the lip 206 of the lever-arm 193 between them, and the pawl has a pin 340, carried rigidly thereby and of sufficient length to have its ends project over and rest upon the tops of the cams 339. The movement of the rods 51 by the envelop will turn the cams in the direction indicated in Fig. 11 and allow the pawl to fall upon the lip 206 before the lever-arm 193 is caused to act. The cams will be raised to again support the pawl by a pair of depending fingers 340^a rigidly upon the rear ends of a pair of sliding rods 341, mounted in bearings 342 integral with the before-mentioned angular bearing-brackets 343, secured by screws 344 to the inside of the sides 52 of the drying-chain frame. The horizontal portions of these brackets are longitudinally slotted, as at 345, to accommodate the downwardly-projecting keys 346 of a pair of sleeves 347, secured rigidly upon said sliding rods 341 by set-screws 348 and having upwardly-projecting rigid lugs 349. A pair of retractile helical springs 350 are connected at one end of each to said set-screws 348 and at their other ends to a pair of screws each taking into the under side of said brackets 343, and a pair of depending rigid lugs 351 are formed upon the under side of the cross-head to at times engage the lugs 349 and through the intermediate gear raise the pawl 208 out of engaging position with relation to the operating end of the lever 193. The function of the keys 346 is, in conjunction with the sides of the slots 345, to guide the rods 341 and prevent them turning.

When no envelop has been raised to the platen by the lifting-hooks, the chase is not moved into position to receive the pressure of the platen, and neither does the inking-roll in the form nor the fountain-roll rotate, their operating means being caused to fail in the performance of their functions for the reason

that the rods 51 will not be moved, and consequently the cams 339 will support the end of the pawl, and the operating end 207 of the lever-arm 193 will pass thereunder without engaging it.

The envelop, printed and falling, is guided into its proper space in the drying-chain by a pair of wires, each having a looped attaching portion 355 to take beneath the heads of a pair of screws 356 and bent to extend downwardly below the lower edges of the envelops in the chain and horizontally, as at 357, toward the envelops and vertically, as at 358, to bear at its ends upon the spindle 112. The envelops are prevented from falling from the drying-chain after they have been printed and while they are being conveyed back to the envelop-making machine by a pair of heavy wire lengths 360, extending beneath the drying-chain to the end thereof, supported by my machine, around the lower portion of which end they are extended a short distance above the level of the chain-shaft. These guard-wires are secured in place by clamping devices consisting of bars 361, secured to the under side of the table by screws 362 and having one end split and notched, as at 363, to partially encircle said wires, which they are caused to grip by clamping-screws 364.

An alarm is given if an envelop gets folded in the retaining-frame or if two or more get bunched therein by an electric bell 370, the terminals whereof are carried, respectively, by a rigid arm 373, secured by screws 374 to the end of the cross-bar 54 and the other to the free end of a resilient strip 375, secured at its inner end by screws 376 to the front side of the cross-piece 54 of the machine. Each of the terminals is in the form of a tubular pin 377, having a flat head 378, perforated in line with the opening through the sleeve, and the terminal wires 379 and 380, respectively, are rigidly set in these sleeves, while the sleeves themselves are located in and insulated from the split ends of said rigid arm and resilient strip, respectively, and secured therein by clamping-screws 381. It is obvious that upon an abnormal movement of the retaining-frame, due to, say, the presence of two envelops or a folded one between it and the cross-head, one of the upper sleeves of the yoke will bear upon the resilient strip and bring the terminals into contact, thereby closing the bell-circuit and giving an alarm.

The forward movement of the chase is limited by a strap 383, bolted to the table and against which the chase-arm impinges, while the platen is prevented from slipping upon the form during the impression by a tongue 384 taking into a cavity 385 in the upper end of the chase, and the ends of the dowel-pins 66 are accommodated by holes 386 in the lower portion of the chase.

The operation of my envelop-printing ma-

chine is, briefly, as follows: An envelop is lifted from the drying-chain into position to allow the carrying-pins 66 of the cross-head to be projected thereunder. In the meantime the cross-head will have commenced to advance on its stroke, and immediately it arrives at the point in its stroke with its pins beneath the envelop the lifting-hooks will be lowered. The cross-head continuing to advance causes the envelop to bear upon the projecting ends 50 of the rods 51, thereby through the intermediate gear lowering the cams 339, and with them the pawl 208, and simultaneously with the dropping of the pawl the lever commences to swing forward and engages the pawl and moves the chase, and with it the form, into position to receive the impression. In the meantime the cross-head will have continued in its advance and carried the envelop into the retaining-frame, and while this is taking place the yielding fingers 120 upon the oscillating spindle 112 will hold the envelop upon the platen and the top of the envelop will have raised the spring-latch 183, and the cross-head in the continuation of its stroke presses the envelop upon the form, thereby printing it. The cross-head then begins to recede. As it recedes the envelop and its retaining-frame will move to the position over the space to receive the envelop in the drying-chain and remain there while the cross-head continues to recede. As the cross-head leaves the retaining-frame the fingers 114 and 116 (which will have been yieldingly held in contact with the under side of the cross-head) will rise in the notches in the under side of the cross-head and project upward between the envelop and the platen, thereby preventing the envelop being drawn by the cross-head away from the retaining-frame. Immediately the retaining-frame stops the form-roll cross-head will descend, the envelop will be knocked from the retaining-frame, and the form inked. During this operation and immediately the envelop is lifted from the drying-chain the latter will be moved ahead one link.

From the foregoing it is obvious that my improved printing-machine will work in conjunction with an envelop-making machine and take the completed envelops from the drying-chain, print them at any point throughout the area of the opening in the retaining-frame, and return them again to the drying-chain without interfering with or delaying the movement of said chain as it relieves the envelop-making machine of the envelops.

I do not herein claim specifically the inking mechanism, alarm, nor the conical trundle-roll.

What I claim is as follows:

1. The combination with the carrier for completed envelops of an envelop-making machine, of means for intermittently moving said envelop-carriers; and means actuated by said envelop-making machine for removing

one of the envelops from said carrier, printing said envelop and returning said envelop to the carrier during each period of intermission.

2. The combination with the carrier for completed envelops of an envelop-making machine; means for intermittently moving said envelop-carrier; means actuated by said envelop-making machine for printing one of the envelops carried by said carrier during each period of intermission, and means under the control of a completed envelop being fed for causing the operation of said printing means.

3. The combination of the envelop-carrier of an envelop-making machine; an envelop-printer located above said carrier; means for automatically lifting the envelop from the carrier to the printer, and means for returning the printed envelop from the printer to the carrier.

4. The combination of the envelop-carrier of an envelop-making machine; an envelop-printer located above said carrier; means for automatically lifting the envelop from the carrier to the printer, means for returning the printed envelop to the carrier, and means for causing the envelop to start the envelop-printer, for the purpose set forth.

5. The combination with the carrier for completed envelops of an envelop-making machine, an envelop-printing machine to work in unison with said envelop-making machine, and comprising a form; means for carrying the form; a platen; means for carrying the platen; form-inking mechanism; means for feeding the envelops made by said envelop-making machine after they are completed one at a time to a position between said platen and the form; means for causing said platen and form to come into contact with one another with the completed envelop between them; and means for receiving the printed envelop from the printer and conducting them back to the counting-table of the envelop-making machine, substantially as described.

6. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for carrying the form; a platen; means for carrying the platen; form-inking mechanism; means for feeding the envelops made by said envelop-making machine after they are completed one at a time to a position between said platen and the form; means for causing said platen and form to come into contact with one another with the completed envelop between them; means for receiving the printed envelop; and means under the control of an envelop being fed for causing the said form and form-inking mechanism to act, substantially as described.

7. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for carrying the form;

a platen; means for carrying the platen; form-inking mechanism; means for feeding the envelops made by said envelop-making machine after they are completed one at a time to a position between said platen and the form; means for causing said platen and form to come into contact with one another with the envelop between them; means for receiving the printed envelop and means under the influence of the fed envelop for causing the said form and form-inking mechanism to print, substantially as described.

8. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for supporting said form in a perpendicular position; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; means for feeding the envelops one at a time from said envelop-making machine to a position between said form and cross-head; means for retaining said envelop upon said cross-head during a portion of the stroke of the cross-head; and means for displacing the envelop from between said form and cross-head, substantially as described.

9. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for moving said form to and supporting same in a perpendicular position; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; means for feeding the envelops one at a time from said envelop-making machine to a position between said form and cross-head; means for retaining said envelop upon said cross-head during a portion of the stroke of the cross-head; and means for displacing the envelop from between said form and cross-head, substantially as described.

10. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for supporting said form in a perpendicular position; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means for feeding the envelops one at a time to a position between said cross-head and retaining-frame; means for supporting said envelop upon said cross-head; means for retaining the envelop in said retaining-frame; means for displacing the envelop from said retaining-frame; and means for receiving said envelop, substantially as described.

11. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for moving said form to and supporting same in a perpendicular position; means for inking said form; a cross-head; means for reciprocating said cross-head

toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means for feeding the envelopes one at a time
5 to a position between said cross-head and retaining-frame; means for supporting said envelop upon said cross-head; means for retaining the envelop in said retaining-frame; means for displacing the envelop from said retaining-
10 frame; and means for receiving said envelop, substantially as described.

12. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for supporting said
15 form in a perpendicular position; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the
20 path of said cross-head; means for feeding the envelopes one at a time to a position between said cross-head and retaining-frame; means for supporting said envelop upon said cross-head; means for retaining the envelop in said
25 retaining-frame; means for displacing the envelop from said retaining-frame; means for receiving said envelop, and means under the control of an envelop being fed for causing said form-moving means to move the form and
30 form-making mechanism to ink the form.

13. An envelop-printing machine to work in unison with an envelop-making machine, comprising a form; means for moving said form to and supporting same in a perpendicular po-
35 sition; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means
40 for feeding the envelopes one at a time to a position between said cross-head and retaining-frame; means for supporting said envelop upon said cross-head; means for retaining the envelop in said retaining-frame; means for
45 displacing the envelop from said retaining-frame; means for receiving said envelop, and means under the control of an envelop being fed for causing said form-moving means to move the form and form-inking mechanism
50 to ink the form, substantially as described and for the purpose set forth.

14. The combination of the envelop-carrier of an envelop-making machine; means for intermittently moving said envelop-carrier; an
55 envelop-printer located out of the path of said carrier; and means for feeding an envelop from the carrier to the printer, means for causing the printer to print said envelop, and means for returning said envelop to said
60 carrier all during each period of intermission.

15. The combination of the envelop-carrier of an envelop-making machine; means for intermittently moving said envelop-carrier; an envelop-printer located out of the path of said
65 carrier; and means for feeding an envelop

from the carrier to the printer, means for causing the printer to print said envelop, and means for returning said envelop to said carrier all during each period of intermission; and means under the control of an envelop
70 being fed for causing said printer to print, for the purpose set forth.

16. The combination of the drying-chain of an envelop-making machine; means for intermittently moving said drying-chain; an en-
75 velop-printer located out of the path of said drying-chain; and means for feeding an envelop from the drying-chain to the printer, means for causing the printer to print said envelop, and means for returning said envelop
80 to said drying-chain all during each period of intermission, substantially as described.

17. The combination of the drying-chain of an envelop-making machine; means for intermittently moving said drying-chain; an en-
85 velop-printer located out of the path of said drying-chain; and means for feeding an envelop from the drying-chain to the printer, means for causing the printer to print said envelop, and means for returning said en-
90 velop to said drying-chain all during each period of intermission; and means under the control of an envelop being fed for causing said printer to print, substantially as described, and for the purpose set forth. 95

18. The combination of the drying-chain of an envelop-making machine; means for intermittently moving said drying-chain consisting of a shaft, a sprocket toothed roll upon said
100 shaft and over which the adjacent loop of said drying-chain takes, a ratchet-wheel mounted rigidly upon said shaft, a lever, a cam actuating said lever, a lever fulcrumed upon said shaft, and a pawl pivotally carried by said last-mentioned lever and engaging the teeth of
105 said ratchet-wheel; a brake for retarding the rotation of said shaft; an envelop-printer located out of the path of said drying-chain; and means for feeding an envelop from the drying-chain to the printer, means for causing
110 the printer to print said envelop, and means for returning said envelop to said drying-chain all during each period of intermission, substantially as described.

19. The combination of the drying-chain of
115 an envelop-making machine; means for intermittently moving said drying-chain consisting of a shaft a sprocket toothed roll upon said shaft and over which the adjacent loop of said drying-chain takes, a ratchet-wheel mounted
120 rigidly upon said shaft, a lever, a cam actuating said lever, a lever fulcrumed upon said shaft and a pawl pivotally carried by said last-mentioned lever and engaging the teeth of said ratchet-wheel; a brake for retarding
125 the rotation of said shaft; an envelop-printer located out of the path of said drying-chain; and means for feeding an envelop from the drying-chain to the printer, means for causing the printer to print said envelop, means for
130

returning said envelop to said drying-chain all during each period of intermission; and means under the control of an envelop being fed for causing said printer to print, substantially as described and for the purpose set forth.

20. The combination of the drying-chain of an envelop-making machine; means for intermittently moving said drying-chain; an envelop-printer located above said drying-chain; means for lifting an envelop from the drying-chain consisting of a pair of fingers normally located beneath the level at which the envelops are supported by the drying-chain, means for lifting said fingers, means for conveying the envelop from said fingers when lifted to the printer, means for causing the printer to print said envelop, and means for returning said envelop to said drying-chain, substantially as described.

21. The combination of the drying-chain of an envelop-making machine; means for intermittently moving said drying-chain; means for lifting an envelop from the drying-chain consisting of a pair of fingers normally located beneath the level at which the envelops are supported by the drying-chain, means for lifting said fingers, means for conveying the envelop from said fingers when lifted to the printer, means for causing the printer to print said envelop, and means for returning said envelop to said drying-chain; and means under control of an envelop being fed for causing the printer to print, substantially as described, and for the purpose set forth.

22. The combination of the drying-chain of an envelop-making machine; means for intermittently moving said drying-chain; an envelop-printer located above said drying-chain; means for lifting an envelop from the drying-chain consisting of a pair of fingers normally located beneath the level at which the envelops are supported by the drying-chain, a lever, a cam for actuating said lever, a pair of vertical guides located one on each side of and extending above said drying-chain, a pair of sliding blocks carried in said guides and having said fingers rigidly connected thereto, means for operatively connecting said lever to said sliding blocks; means for conveying said envelop from the fingers when lifted to the printer; means for causing the printer to print the envelop and means for returning said envelop to the drying-chain, substantially as described.

23. The combination of the drying-chain of an envelop-making machine; means for intermittently moving said drying-chain; an envelop-printer located above said drying-chain; means for lifting an envelop from the drying-chain consisting of a pair of fingers normally located beneath the level at which the envelops are supported by the drying-chain, a lever, a cam for actuating said lever, a pair of vertical guides located one on each side of

and extending above said drying-chain, a pair of sliding blocks carried in said guides and having said fingers rigidly connected thereto, means for operatively connecting said lever to said sliding blocks; means for conveying said envelop from the fingers when lifted to the printer; means for causing the printer to print the envelop and means for returning said envelop to the drying-chain, and means under the control of an envelop being printed for causing said printer to print, substantially as described, and for the purpose set forth.

24. The combination with the frame of an envelop-printing machine, of an envelop-lifter comprising a pair of outwardly-facing vertical guides secured to said frame; a pair of blocks sliding in said guides; a pair of fingers secured rigidly to said blocks and bent around said guides to the insides thereof; a lever fulcrumed at its upper end to the frame of the machine; a cam for actuating said lever; an oscillatory counter-shaft mounted intermediate said lever and guide; an arm mounted rigidly at its upper end upon said counter-shaft; a link connected at one end pivotally to the lower end of said first-mentioned lever and at its other end pivotally to the lower end of said arm; a pair of arms rigidly secured at one end to said counter-shaft and projecting toward said guides; and a pair of links pivotally connected at one end to said pair of arms and at their other ends to said blocks, substantially as described.

25. The combination with the frame of an envelop-printing machine, of an envelop-lifter comprising a pair of outwardly-facing vertical guides secured to said frame; a pair of blocks sliding in said guides; a pair of fingers secured rigidly to said blocks and bent around said guides to the insides thereof and having the upper sides of their inner ends notched; a lever fulcrumed at its upper end to the frame of the machine; a cam for actuating said lever; an oscillatory counter-shaft mounted intermediate said lever and guides; an arm mounted rigidly at its upper end upon said counter-shaft; a link connected at one end pivotally to the lower end of said first-mentioned lever and at its other end pivotally to the lower end of said arm; a pair of arms rigidly secured at one end to said counter-shaft and projecting toward said guides; and a pair of links pivotally connected at one end to said pair of arms and at their other ends to said blocks, substantially as described.

26. The combination with the frame of an envelop-printing machine, of an envelop-lifter comprising a pair of outwardly-facing vertical guides secured to said frame; a pair of blocks sliding in said guides; a pair of fingers secured rigidly to said blocks and bent around said guides to the insides thereof and having the upper sides of their inner ends notched; an upwardly-projecting rigid pin upon each finger adjacent to said notches; a lever ful-

crumed at its upper end to the frame of the machine; a cam for actuating said lever; an oscillatory counter-shaft mounted intermediate said lever and guides; an arm mounted
 5 rigidly at its upper end upon said counter-shaft; a link connected at one end pivotally to the lower end of said first-mentioned lever and at its other end pivotally to the lower end of said arm; a pair of arms rigidly secured at
 10 one end to said counter-shaft and projecting toward said guides; a pair of links pivotally connected at one end to said pair of arms and at their other ends to said blocks, substantially as described.

15 27. The combination with the frame of an envelop-printing machine, of an envelop-lifter comprising a pair of outwardly-facing vertical guides secured to said frame; a pair of blocks sliding in said guides; a pair of fingers
 20 secured rigidly to said blocks and bent around said guides to the insides thereof; a lever fulcrumed at its upper end to the frame of the machine; a cam for actuating said lever; an oscillatory counter-shaft mounted intermediate
 25 said lever and guides; an arm mounted rigidly at its upper end upon said counter-shaft; a link connected at one end pivotally to the lower end of said first-mentioned lever and at its other end pivotally to the lower end
 30 of said arm; a pair of arms rigidly secured at one end to said counter-shaft and projecting toward said guides; a pair of links pivotally connected at one end to said pair of arms and at their other ends to said blocks; and means
 35 for guiding the envelop while being lifted, substantially as described.

28. In an envelop-printing machine to work in unison with an envelop-making machine the
 40 combination with the drying-chain of said envelop-making machine of a form; means for supporting said form in a perpendicular position above said drying-chain; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said
 45 form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means for lifting the envelops one at a time from said drying-chain to a position between said cross-head and retaining-frame; means for guiding the envelops as they are lifted; means for supporting the lifted envelops upon said cross-head; means for retaining the envelops in the retaining-frame; means for displacing the envelops
 50 from the retaining-frame, and means for guiding the falling envelops to the drying-chain, substantially as described, and for the purpose set forth.

29. In an envelop-printing machine to work
 60 in unison with an envelop-making machine the combination with the drying-chain of said envelop-making machine, of a form; means for moving said form to and supporting same in a perpendicular position above said drying-chain, means for inking said form; means un-

der the control of an envelops being fed for causing said form-moving means to move the form and the inking mechanism to ink; a cross-head; means for reciprocating said cross-head toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means for lifting the envelop one at a time from said drying-chain to a position between said cross-head and retaining-frame; means
 70 for guiding the envelops as they are lifted; means for supporting the lifted envelops upon said cross-head; means for retaining the envelops in the retaining-frame; means for displacing the envelops from the retaining-frame, and means for guiding the falling envelops to the drying-chain, substantially as described, and for the purpose set forth.

30. In an envelop-printing machine to work in unison with an envelop-making machine the
 85 combination with the drying-chain of said envelop-making machine of a form; means for moving said form to and supporting same in a perpendicular position above said drying-chain; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means
 90 for shifting the envelops one at a time from said drying-chain to a position between said cross-head and retaining-frame; means for guiding the envelops as they are lifted; means for supporting the lifted envelops upon said cross-head; means under the control of the
 95 supported envelop for causing the said form-moving means to move the form, and form-inking means to ink the form; means for retaining the envelops in the retaining-frame, means for displacing the envelops from the retaining-frame, and means for guiding the falling envelops to the drying-chain, substantially as described and for the purpose set forth.

31. In an envelop-printing machine to work
 110 in unison with an envelop-making machine the combination with the drying-chain of said envelop-making machine of a form; means for supporting said form in a perpendicular position above said drying-chain; means for
 115 inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means for lifting the
 120 envelops one at a time from said drying-chain to a position between said cross-head and retaining-frame; means for guiding the envelops as they are lifted; means for supporting the lifted envelops upon said cross-head; means for retaining the envelops upon said cross-head, means for retaining the envelops in the retaining-frame; means for displacing the envelops from the retaining-frame, and means for guiding the falling envelops to the
 130

drying-chain, substantially as described, and for the purpose set forth.

32. In an envelop-printing machine to work in unison with an envelop-making machine the combination with the drying-chain of said envelop-making machine of a form; means for moving said form to and supporting same in a perpendicular position above said drying-chain; means for inking said form; a cross-head; means for reciprocating said cross-head toward and from said form; a retaining-frame; means for yieldingly supporting said retaining-frame in the path of said cross-head; means for lifting the envelops one at a time from said drying-chain to a position between said cross-head and retaining-frame; means for guiding the envelops as they are lifted; means for supporting the lifted envelops upon said cross-head; means for retaining the envelop upon said cross-head; means under the control of the supported envelop for causing the said form-moving means to move the form, and form-inking means to ink the form; means for retaining the envelop in the retaining-frame; means for displacing the envelops from the retaining-frame, and means for guiding the falling envelops to the drying-chain, substantially as described and for the purpose set forth.

33. The combination of the envelop-carrier of an envelop-making machine; an envelop-printer located above said carrier and consisting of a form, means for inking said form, a platen, and means for causing said form and platen to press one upon the other; means for lifting the envelops individually from said carrier to a position between said platen and form; means for guiding said envelops while being lifted consisting of a pair of vertical plates into contact with which said carrier feeds the envelops to be lifted; a pair of envelop-guides located above said vertical plates; means for moving said envelop-tilting guides to and from a position between said platen and form; means for supporting the envelop in its tilted position upon the removal of said guides; and means for returning the envelop to the carrier, substantially as described and for the purpose set forth.

34. The combination of the envelop-carrier of an envelop-making machine; an envelop-printer located above said carrier and consisting of a form, means for inking said form, a platen, and means for causing said form and platen to press one upon the other; means for lifting the envelops individually from said carrier to a position between said platen and form; means for guiding said envelop while being lifted consisting of a pair of vertical plates into contact with which said carrier feeds the envelops to be lifted; a pair of envelop-tilting guides located above said vertical plates; means for moving said envelop-tilting guides to and from a position between said platen and form; means for supporting

the envelop in its tilted position upon the removal of said guides consisting of a yielding part projecting between said form and platen; means for causing the printer to print, and means for returning the envelop to the carrier, substantially as described and for the purpose set forth.

35. In an envelop-printing machine comprising a perpendicular form, and a cross-head reciprocating toward and from said form, the combination with said cross-head of a pair of horizontal levers fulcrumed about midway of their length and extending parallel to and outside of the path of said cross-head and each having one end offset to be engaged by said cross-head; pair of plates carried by the opposite ends of said levers and having their adjacent sides formed with diagonal flanges; and a spring for causing said offset ends to be yieldingly held toward one another, substantially as described and for the purpose set forth.

36. In an envelop-printing machine, a reciprocating platen and means for carrying it consisting of a cross-head; a platen upon said cross-head; a tympan upon said platen; a pair of screws taking through said cross-head and platen into said tympan; a pair of dowel-pins projecting at right angles to said platen from the cross-head, substantially as described and for the purpose set forth.

37. The combination with the frame of a printing-machine having a pair of cross-head guides, of a cross-head consisting of a pair of slides taking into said guides, a vertical portion, a web connecting said vertical portion to said slides, a platen and a tympan carried by said cross-head, a pair of dowel-pins carried by said cross-head at right angles to said platen, said cross-head having a pair of laterally-projecting portions a pair of levers fulcrumed at their lower ends to the frame of the machine, a pair of cams actuating said levers, and a pair of links connecting the upper ends of said levers to said diminished portions of the cross-head, substantially as described and for the purpose set forth.

38. The combination with the frame of a printing-machine, and a cross-head, of a yielding retainer-frame consisting of a pair of angular plates a wing of each whereof coincides with a wing of the other, said coinciding wings extending across the face of said cross-head from opposite sides and having the middle of their adjacent portions cut away, the other wings of said angular plates receiving the cross-head between them and extending from said first-mentioned wings toward said cross-head, guiding-sleeves integral with the frame of the machine, sliding rods taking through said sleeves, means for limiting the movement of said rods in both directions, said rods being connected to and supporting said angular plates, and means for yieldingly retaining said angular plates in a predetermined position,

substantially as described, and for the purpose set forth.

39. The combination with the frame of a printing-machine, and a cross-head, of a yielding retainer-frame consisting of a pair of angular plates a wing of each whereof coincides with a wing of the other, said coinciding wings extending across the face of said cross-head from opposite sides and having the middle of their adjacent portions cut away, the other wings of said angular plates receiving the cross-head between them and extending at an obtuse angle from said first-mentioned wings toward said cross-head, a flat spring on the inside of each of said last-mentioned wings, guiding-sleeves integral with the frame of the machine, sliding rods taking through said sleeves, means for limiting the movement of said rods in both directions, said rods being connected to and supporting said angular plates, and means for yieldingly retaining said angular plates in a predetermined position, substantially as described, and for the purpose set forth.

40. The combination with the frame of a printing-machine and a cross-head guided in said frame, of a yielding retainer-frame consisting of a pair of angular plates a wing of each whereof coincides with a wing of the other, said coinciding wings extending across the face of said cross-head from opposite sides and having the middle of their adjacent portions cut away, the other wings of said angular plates receiving the cross-head between them, a series of guiding-sleeves integral with said frame, a series of rods secured at one end to said angular plates and guided in said sleeves, a series of stops rigidly upon said rods, a coiled spring encircling each of said rods and bearing at one end upon the frame and at their other ends upon said stops, substantially as described and for the purpose set forth.

41. The combination with a moving part of an envelop-printing machine and an envelop-carrier, of means for replacing in the carrier endwise-displaced envelops, consisting of a pair of levers fulcrumed between their ends and normally having one arm of each extending across the path of said movable part and the other arm extending parallel to said envelop-carrier, a pair of curved strips located adjacent to the ends of said envelops and extending parallel to said envelop-carrier, a pair of rods connecting said curved strips to said last-mentioned arms of the levers, a retractile helical spring yieldingly connecting said lever-arms to one another, and stops for limiting the movement of said levers under the influence of said spring, substantially as described and for the purpose set forth.

42. The combination with a moving part of an envelop-printing machine and an envelop-carrier, of means for replacing in the carrier sidewise-displaced envelops, consisting of a

lever fulcrumed between its ends and normally having one arm extending across the path of said movable part and the other arm being in the form of a curved strip and extending parallel and in close proximity to the sides of the envelops carried by said envelop-carrier, a retractile helical spring yieldingly retaining said curved strip away from said envelops, and a stop for limiting the movement of said lever under the influence of said spring, substantially as described and for the purpose set forth.

43. The combination with a machine-frame and a yielding retainer-frame of a pair of spring-latches carried by said machine-frame adjacent to said retainer-frame, substantially as described and for the purpose set forth.

44. The combination with a machine-frame, an envelop-lifting device and a yielding retainer-frame normally located a short distance from said lifting device, of a pair of rigid arms extending from said machine-frame in the transverse plane of said lifting device to said retainer-frame in its normal position; and a pair of spring-latches carried by and projecting below said rigid arms adjacent to said retainer-frame, substantially as described and for the purpose set forth.

45. The combination with a machine-frame comprising a bridge-piece, and a yielding retainer-frame normally located a short distance from said bridge-piece, of a pair of rigid arms extending from said bridge-piece to within a short distance of the top of said retainer-frame and having slots near the ends thereof adjacent to said retainer-frame, a flat spring secured to the top of each of said arms and bent to form a latch which protrudes downwardly through the opening in each arm, substantially as described and for the purpose set forth.

46. In an envelop-printing machine the combination with a cross-head, means for reciprocating said cross-head, and means for feeding an envelop to said cross-head of a series of fingers, adapted to bear upon said envelop during a portion of the travel of said cross-head, and means for yieldingly retaining said fingers in a position to be engaged by said cross-head, substantially as described and for the purpose set forth.

47. In an envelop-printing machine the combination with a cross-head, means for reciprocating said cross-head, and means for feeding an envelop to said cross-head of a series of fingers adapted to bear upon said envelop during a portion of the travel of said cross-head, means for yieldingly retaining said fingers in a position to be engaged by said cross-head, and means for automatically dipping said fingers upon the approach of the cross-head, substantially as described and for the purpose set forth.

48. In an envelop-printing machine the combination with a cross-head, means for reciprocating said cross-head, and means for feeding an envelop to said cross-head of a series of fingers adapted to bear upon said envelop during a portion of the travel of said cross-head, means for yieldingly retaining said fingers in a position to be engaged by said cross-head, and means for automatically dipping said fingers upon the approach of the cross-head, substantially as described and for the purpose set forth.

cating said cross-head, and means for feeding an envelop to said cross-head, of an oscillatory spindle extending transversely of and beneath said cross-head; a series of upwardly-projecting fingers mounted rigidly upon said spindle and adapted to bear upon said envelop during a portion of the travel of said cross-head; means for yieldingly retaining said spindle against oscillation, substantially as described and for the purpose set forth.

49. In an envelop-printing machine the combination with a cross-head, means for reciprocating said cross-head, and means for feeding envelops to said cross-head, of an oscillatory spindle extending transversely of and beneath said cross-head; a series of upwardly-projecting fingers mounted rigidly upon said spindle, and adapted to bear upon said envelops during a portion of the travel of said cross-head; means for yieldingly retaining said spindle against oscillation, and means for oscillating said spindle upon the approach of the cross-head, substantially as described and for the purpose set forth.

50. In an envelop-printing machine the combination with a cross-head, of an oscillatory spindle extending transversely of and beneath said cross-head; a series of upwardly-projecting fingers mounted rigidly upon said spindle; a downwardly-projecting finger mounted rigidly upon said spindle; a retractile helical spring connected at one end to said downwardly-projecting finger and at its other end to the frame of the machine, and means for oscillating said spindle upon the approach of the cross-head, substantially as described and for the purpose set forth.

51. In an envelop-printing machine the combination with a cross-head, of an oscillatory spindle extending transversely of and beneath said cross-head; a series of upwardly-projecting fingers mounted rigidly upon said spindle; means for yieldingly retaining said spindle against oscillation, and means for oscillating said spindle upon the approach of the cross-head causing a downwardly-projecting arm rigidly mounted upon said spindle and having a lateral pin projection, a vertical lever fulcrumed adjacent to the said upper end thereof engaging said lateral pin projection, a reciprocating rod connected to the lower arm of said lever, a cam intermittently reciprocating said rod, and a spring maintaining said rod in engagement with said cam, substantially as described and for the purpose set forth.

52. In an envelop-printing machine the combination with a cross-head, of an oscillatory spindle extending transversely of and beneath said cross-head; a series of upwardly-projecting fingers mounted rotatably upon said spindle; a series of stops for limiting the movement of said fingers around said spindle, a series of bow-springs between said stops and fingers; means for yieldingly retaining said

spindle against oscillation, substantially as described and for the purpose set forth.

53. The combination with an oscillatory spindle of a finger mounted rotatably upon said spindle, a finger mounted rigidly upon said spindle in line with said rotatable finger, a bow-spring between said fingers and yieldingly maintaining same apart and a stop for limiting the movement of said rotatable finger away from said rigid finger, substantially as described.

54. The combination with an oscillatory spindle of a finger mounted rotatably upon said spindle, a finger mounted rigidly upon said spindle in line with and curved at its end toward said rigid finger, a bow-spring between said fingers yieldingly maintaining same apart and a stop limiting the movement of said rotatable finger away from said rigid finger, substantially as described.

55. In a printing-machine the combination with a chase, means for moving said chase to and from a printing position; means for automatically disconnecting said chase-moving means from the chase after each movement thereof; and means for at times effecting the operative connection of said chase-moving means and chase, for the purpose set forth.

56. In a printing-machine the combination with a chase, of a lever fulcrumed at its lower end and carrying said chase at its upper end, a cam for moving said lever and chase to a printing position; a spring for returning said lever and chase from said printing position, an intermediary for connecting said cam to said lever; means for automatically breaking the operative connection between said intermediary and cam after each cycle of rotation of the cam; and means for at times effecting the operative connection of said intermediary and cam, for the purpose set forth.

57. In an envelop-printing machine the combination with a chase, of a lever-arm fulcrumed at its lower end and carrying said chase at its upper end; a lever fulcrumed at its lower end at the same point as said lever-arm; a cam for actuating said lever; an intermediary carried by said lever-arm for connecting the upper end thereof to said lever; means for automatically breaking the operative connection between said intermediary and lever after each cycle of rotation of the cam; and means for at times automatically effecting the operative connections between said intermediary and lever, substantially as described and for the purpose set forth.

58. In an envelop-printing machine the combination with a chase, of a lever-arm fulcrumed at its lower end and carrying said chase at its upper end; a lever fulcrumed at its lower end at the same point as said lever-arm and having a lateral tongue projecting a short distance from its upper end; a cam for actuating said lever; a pawl pivoted to the

upper end of said lever-arm and adapted to rest upon said tongue and receive the impact of said lever; movable means for automatically temporarily retaining said pawl out of operative connection with said lever; and means whereby the operative connections between said pawl and lever can at times be automatically effected, substantially as described and for the purpose set forth.

59. The combination with a form-carrying device, a lever for moving said device, and a pawl pivoted to said device and adapted to rest upon and receive the impact of said lever, of a cam for supporting said pawl out of engaging position relatively to said lever; and means whereby said cam can at times be moved and the pawl be allowed to assume an engaging position relatively to said lever, substantially as described.

60. In an envelop-printing machine, the combination with a form-carrying device, a lever for moving said device, and a pawl pivoted to said device, and adapted to rest upon and receive the impact of said lever, means for carrying the envelop to be printed to the form carried by said device; a horizontal spindle; a cam mounted rigidly upon said spindle in a position to support said pawl out of engaging position relatively to said lever; an arm rigidly upon said spindle; a vertical spindle, an arm rigidly mounted upon said vertical spindle; a link connecting said last-mentioned arm to the arm upon the horizontal spindle; a second arm upon said vertical spindle and intersecting the path of said envelop as it is carried to be printed; and means for returning said cam to its normal position, substantially as described.

61. In an envelop-printing machine, the combination with a form-carrying device, a lever for moving said device, and a pawl pivoted to said device, and adapted to rest upon and receive the impact of said lever, means for carrying the envelop to be printed to the form carried by said device; a horizontal spindle; a cam mounted rigidly upon said spindle in a position to support said pawl out of engaging position relatively to said lever; an arm rigidly upon said spindle; a vertical spindle, an arm rigidly mounted upon said vertical spindle; a link connecting said last-mentioned arm to the arm upon the horizontal spindle; a second arm upon said vertical spindle and intersecting the path of said envelop as it is carried to be printed; and means actuated by said envelop-carrying means for returning said cam to its normal position, substantially as described.

62. In an envelop-printing machine, the combination with a form-carrying device, a lever for moving said device, and a pawl pivoted to said device, and adapted to rest upon and receive the impact of said lever, means for carrying the envelop to be printed to the form carried by said device; a horizontal spindle;

a cam for supporting said pawl out of engaging position relatively to said lever; means actuated by the envelop carried by said envelop-carrying means for moving said cam away from said pawl; and means actuated by said envelop-carrying means for returning said cam to its normal position, substantially as described.

63. In an envelop-printing machine, the combination with a form-carrying device, a lever for moving said device, and a pawl pivoted to said device, and adapted to rest upon and receive the impact of said lever, means for carrying the envelop to be printed to the form carried by said device; a horizontal spindle; a cam for supporting said pawl out of engaging position relatively to said lever; means actuated by the envelop carried by said envelop-carrying means for moving said cam away from said pawl; a sliding rod mounted in the frame of the machine; a laterally-projecting finger upon said rod in a position to engage said cam-moving means when the cam is moved; a laterally-projecting adjustable dog upon said rod in a position to be engaged by said envelop-carrying means; and a spring for causing said rod to follow said envelop-carrying means for a limited distance, substantially as described, and for the purpose set forth.

64. The combination with an envelop-retaining frame and a vertically-reciprocating device of a pair of vertically-arranged curved rods secured rigidly at one end to said reciprocating device and having their other ends of inverted-V form and in line with the inside of the adjacent face of said retaining-frame, substantially as described, and for the purpose set forth.

65. In an envelop-printing machine the combination with printing means, means having a separate place for each envelop for carrying the envelops from the envelop-making machine to the printing means, means for raising the envelops to be printed and means for dropping the printed envelops, of means for guiding the dropping envelop to its proper space in the carrying means.

66. In an envelop-printing machine the combination with printing means, means for carrying the envelops from the envelop-making machine to the printing-machine, means for raising the envelops to be printed and means for dropping the printed envelops, of a pair of envelop-guiding wires secured to the frame of the machine and projecting between the dropping envelop and the envelop being raised, substantially as described, and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHNSTON ALEXANDER THOMSON.

Witnesses:

WILLIAM P. McFEAT,
FRED. J. SEARS.