

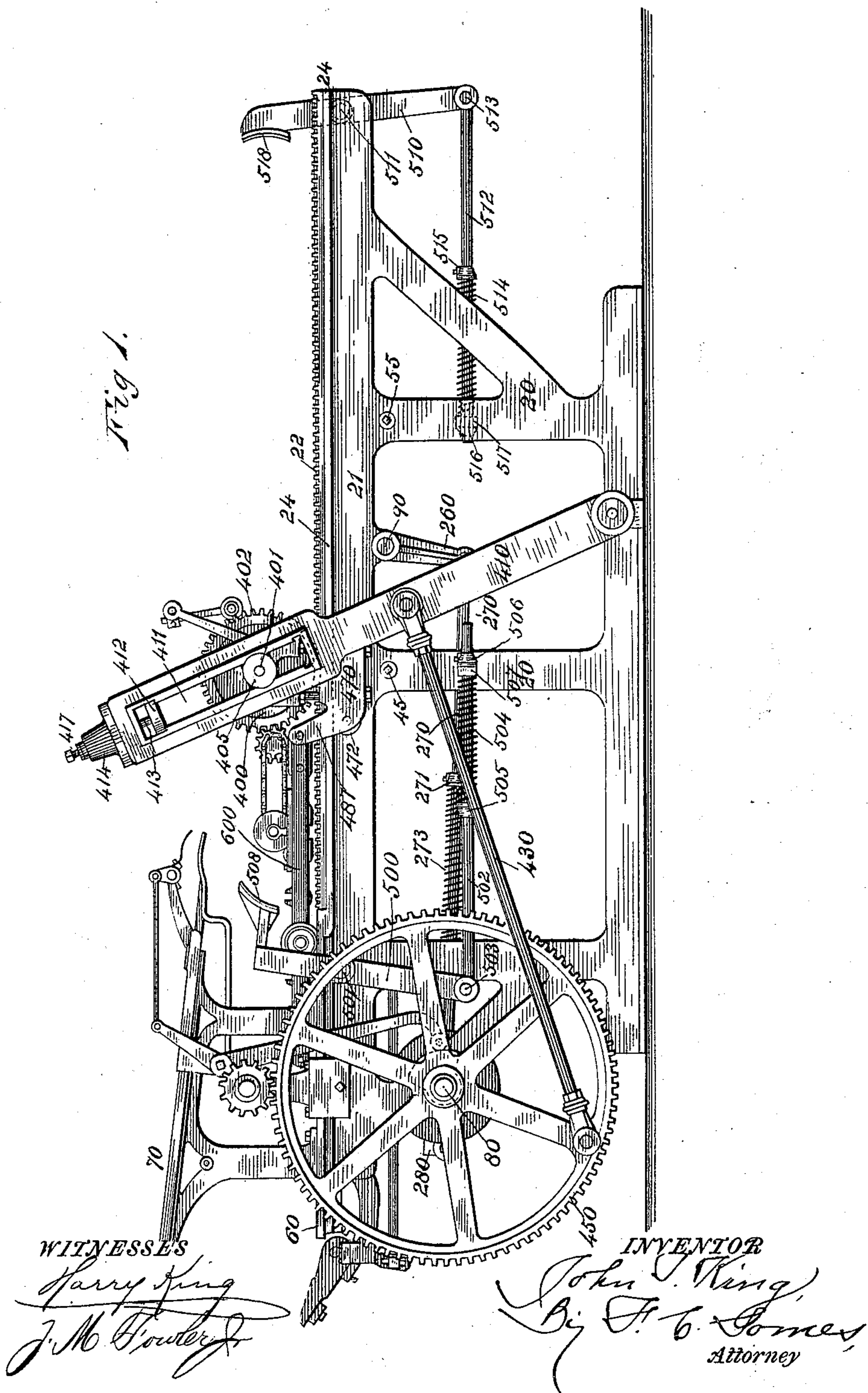
(No Model.)

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J. T. KING.  
PRINTING PRESS.

No. 599,102.

Patented Feb. 15, 1898.



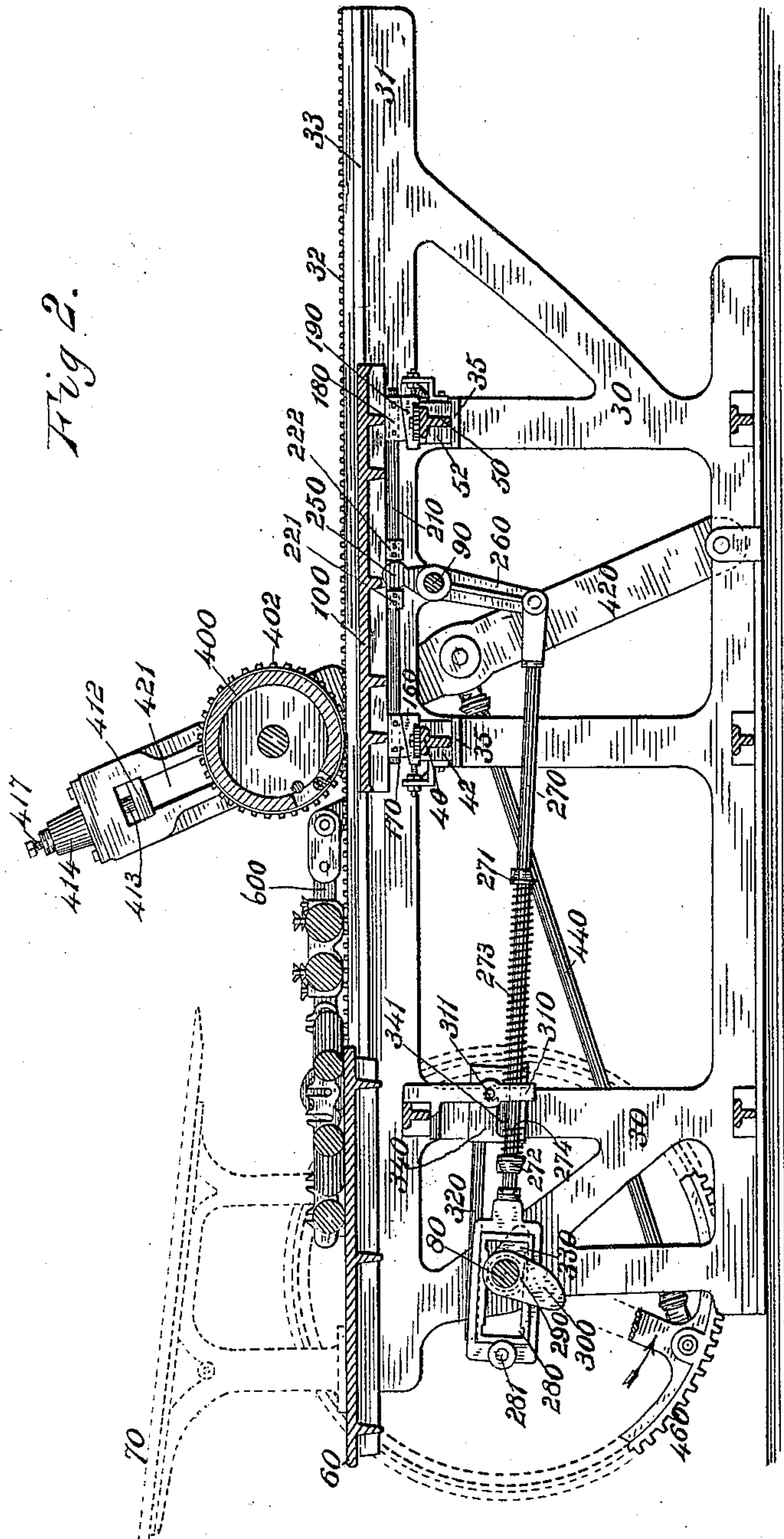
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6 Sheets—Sheet 2.

J. T. KING.  
PRINTING PRESS.

No. 599,102.

Patented Feb. 15, 1898.



WITNESSES

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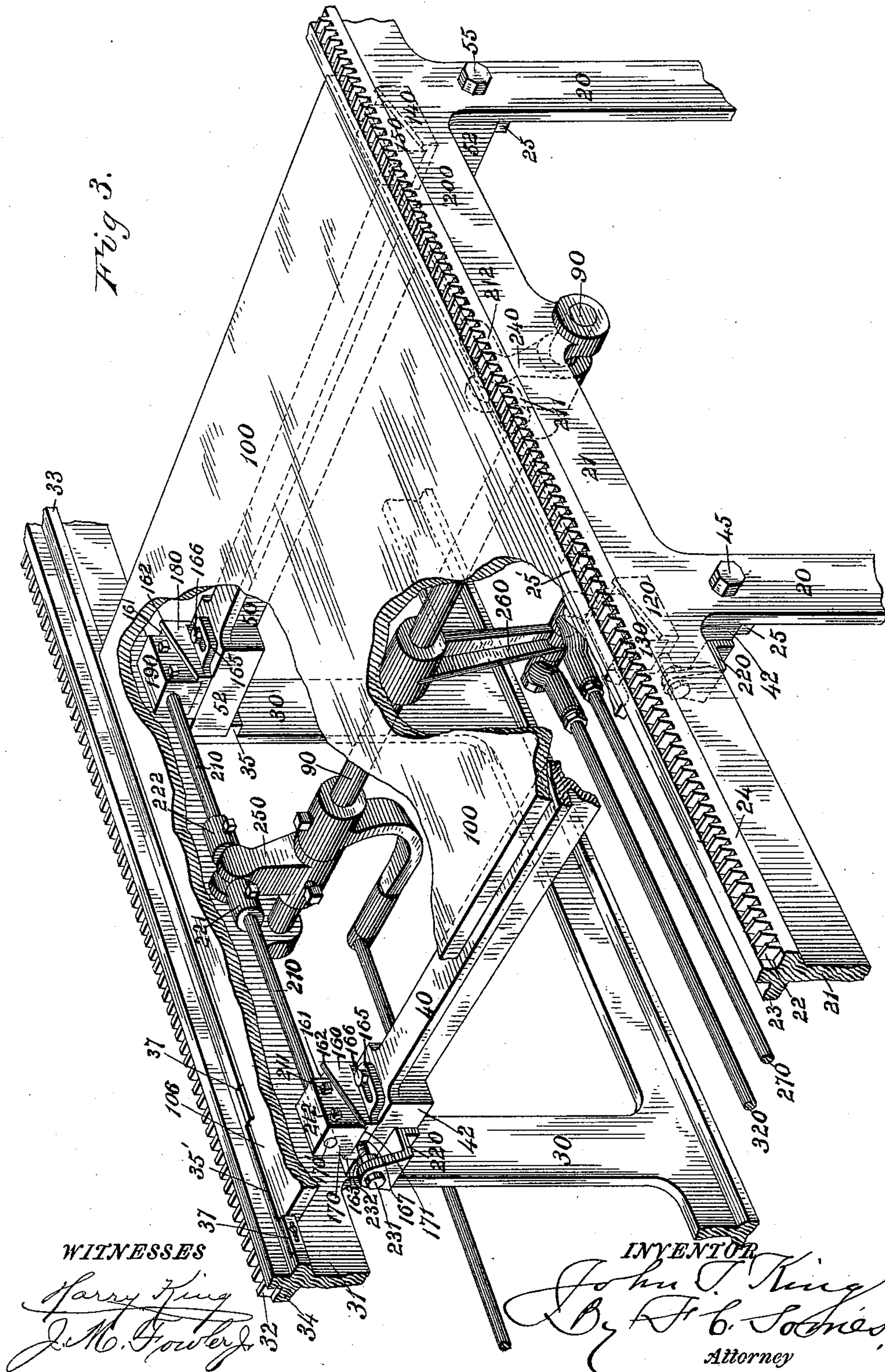
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J. T. KING.  
PRINTING PRESS.

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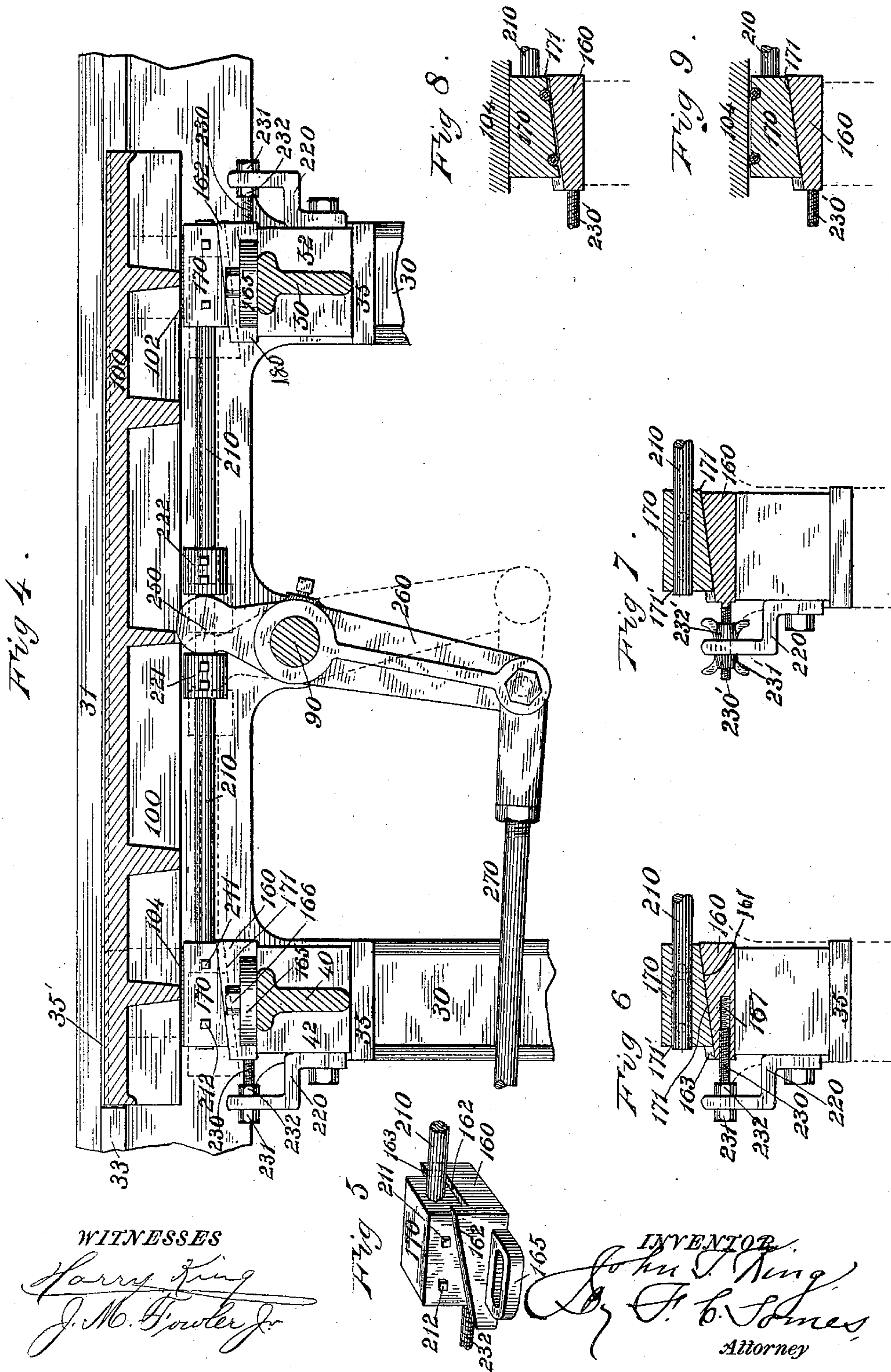




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No. 599,102.

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(No Model.)

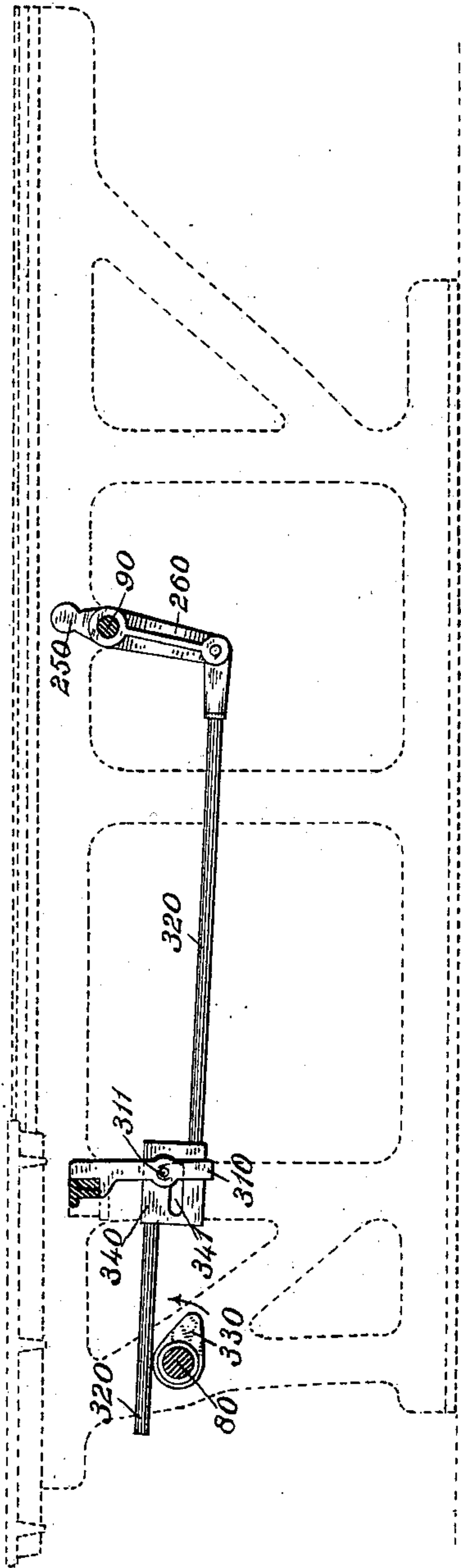
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PRINTING PRESS.

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Fig 10.



WITNESSES  
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Fig 12.

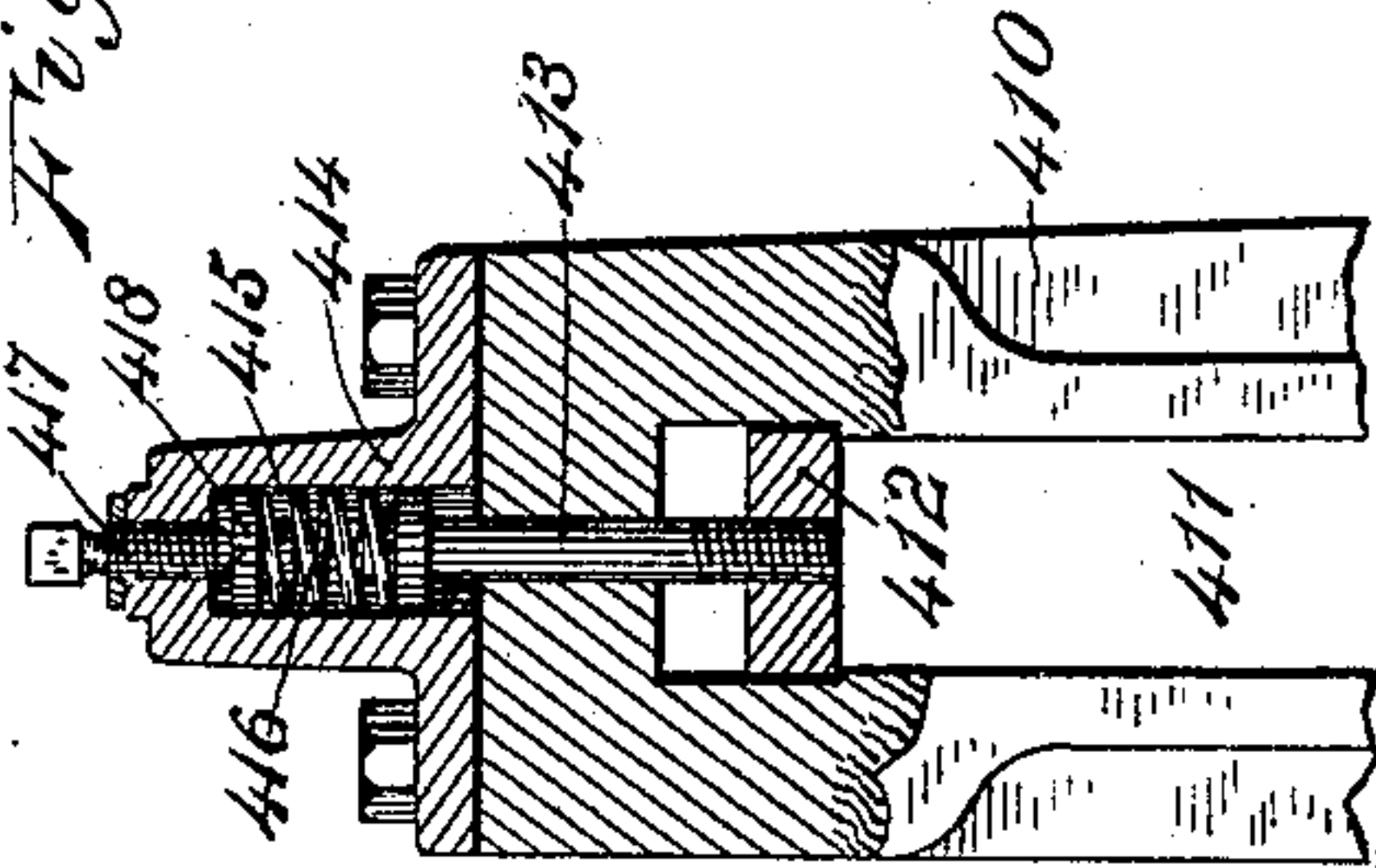
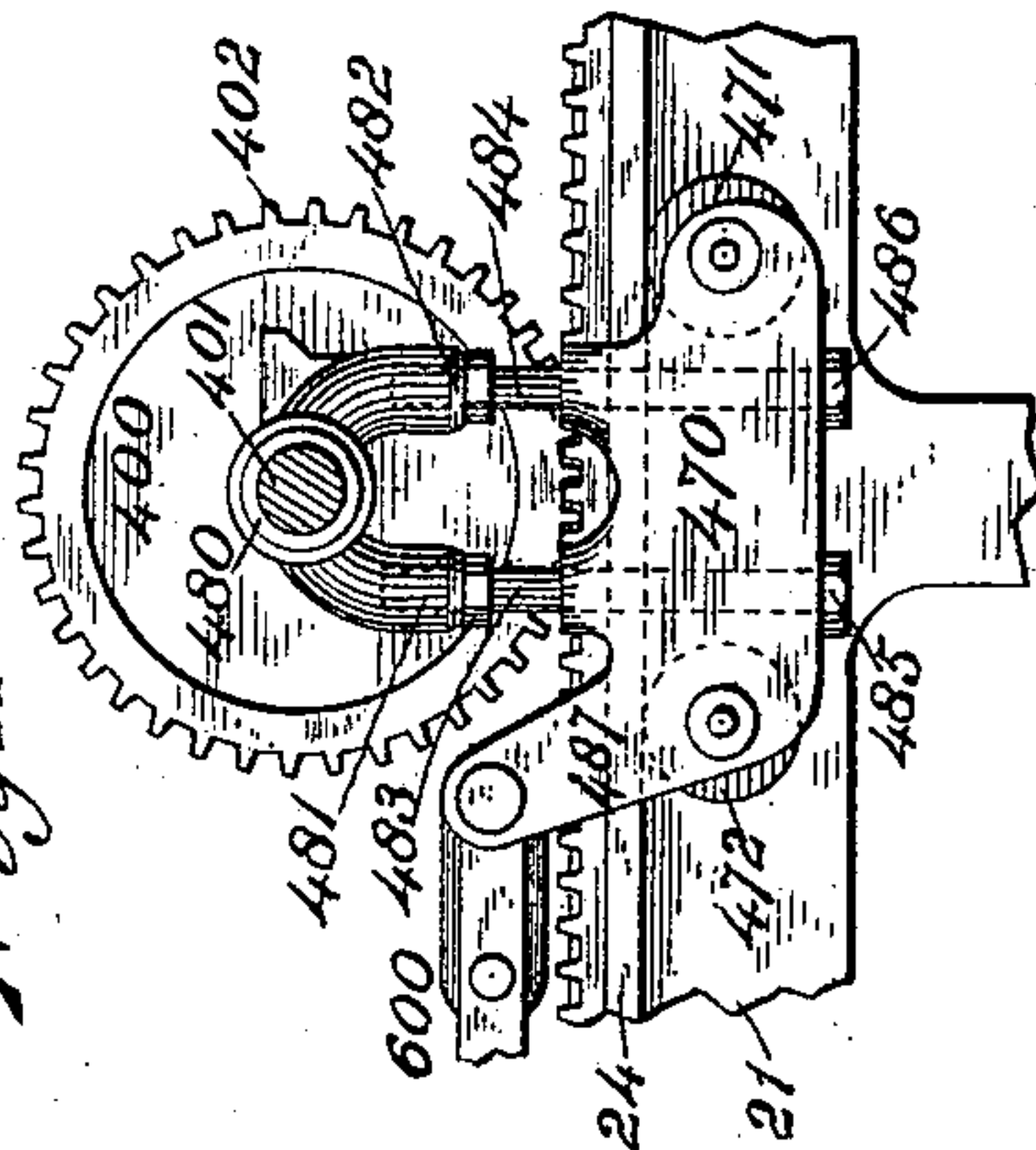


Fig 11.



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(No Model.)

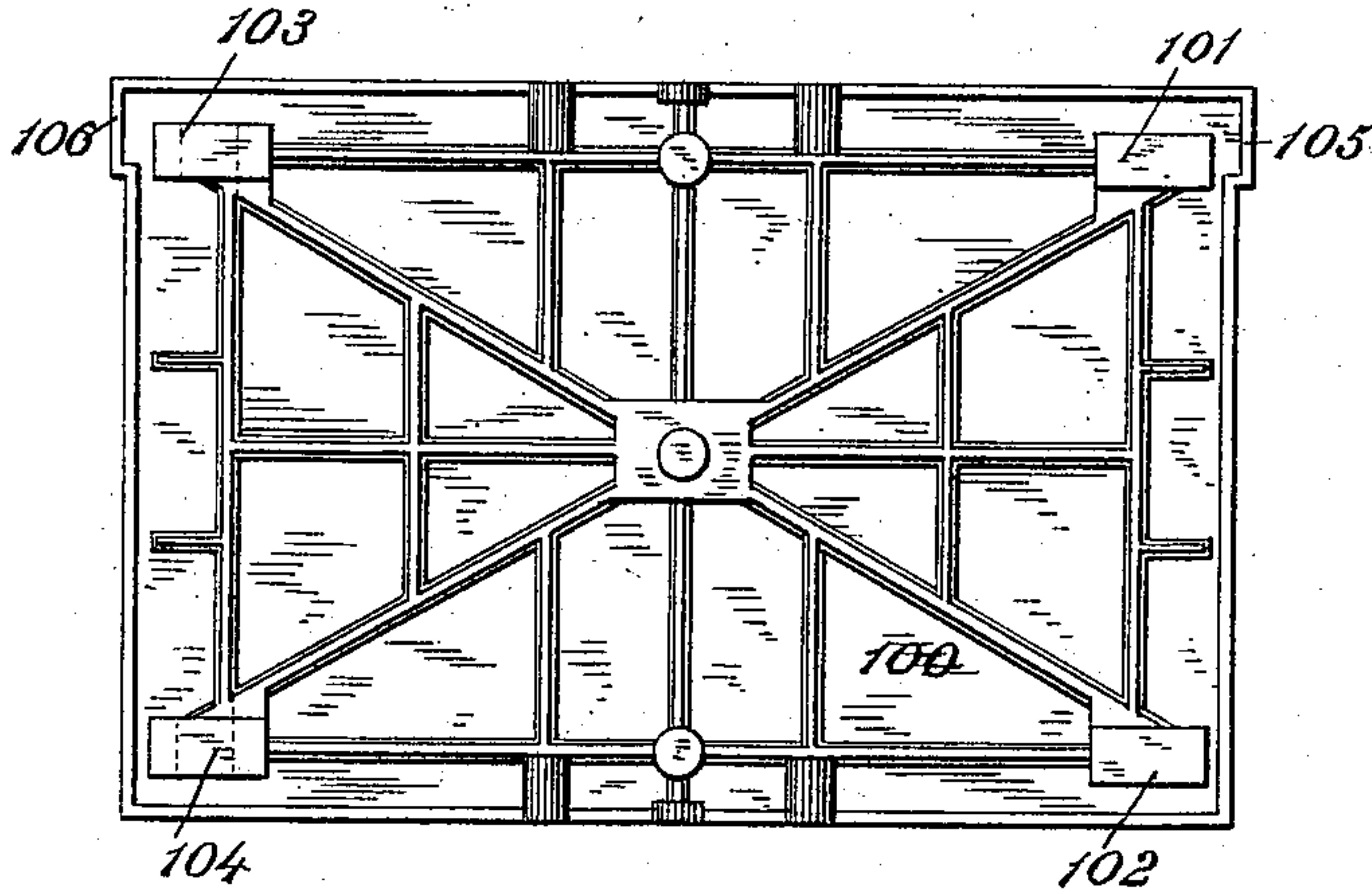
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J. T. KING.  
PRINTING PRESS.

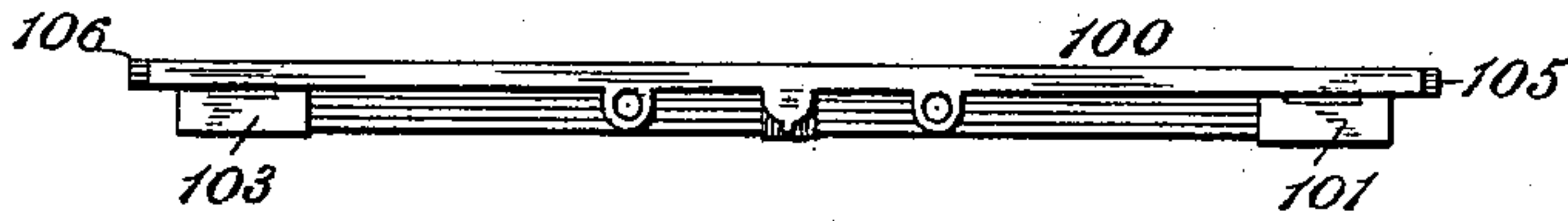
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Patented Feb. 15, 1898.

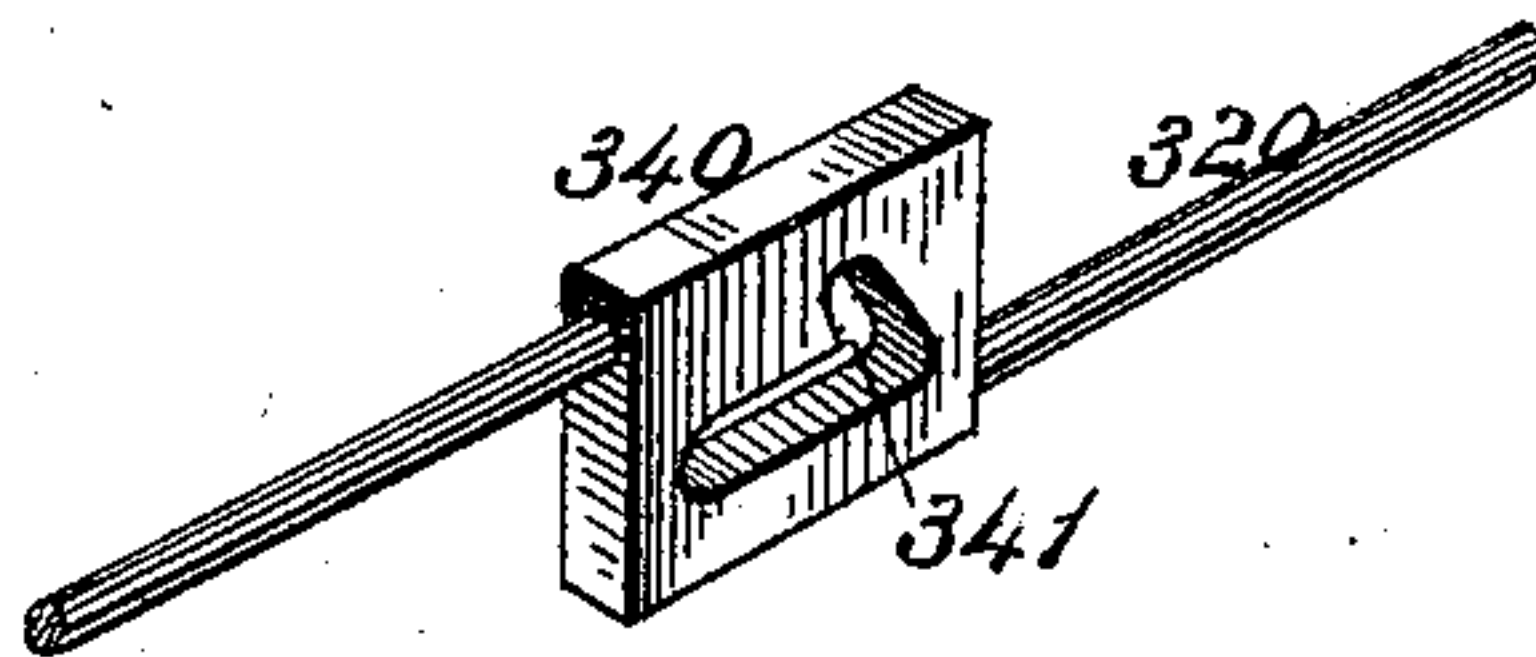
*Fig 13.*



*Fig 14.*



*Fig 15.*



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# UNITED STATES PATENT OFFICE.

JOHN T. KING, OF MADISON, WISCONSIN.

## PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 599,102, dated February 15, 1898.

Application filed August 9, 1897. Serial No. 647,609. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. KING, a citizen of the United States of America, residing at Madison, in the county of Dane, in the State of Wisconsin, have invented certain new and useful Improvements in Printing-Presses, of which the following is a specification.

This invention relates to that kind of printing-press which embodies a vertically-movable type-bed for holding the type and a traveling impression-cylinder for carrying the sheet to be printed into contact with the type on said bed in taking the impression, the type-bed being raised before each forward stroke or movement of the cylinder into position to make the impression and slightly lowered before each backward stroke of the cylinder in order to escape contact therewith. In various machines of this character heretofore in use it has been found difficult to hold the bed rigidly in its operative position.

The principal object of this invention is to produce a simple mechanism which will permit adjustment of the bed into and out of operative position and afford an absolutely firm support therefor during the printing operation.

Another object of the invention is to provide improved means for supporting and imparting motion to the traveling cylinder.

Figure 1 of the accompanying drawings represents a side elevation of a printing-machine embodying this invention. Fig. 2 represents a longitudinal vertical section thereof. Fig. 3 represents a perspective view of a portion thereof, parts of the type-bed being broken out. Fig. 4 represents, on an enlarged scale, a vertical longitudinal section taken through the type-bed, showing in elevation the means on one side for supporting, elevating, and lowering said bed. Fig. 5 represents, on a larger scale, a perspective view of one set of the wedge-blocks for supporting the type-bed. Fig. 6 represents a vertical longitudinal section thereof. Fig. 7 also represents a vertical longitudinal section thereof, showing thumb-nuts for adjusting the bed wedge-block. Fig. 8 represents a vertical longitudinal section of one set of the wedge-blocks in which the inclined face of the upper movable wedge-block is provided with antifriction-rollers for contact with the

inclined face of the bed wedge-block, this form being designed for type-beds of large size. Fig. 9 represents a longitudinal section of one set of wedge-blocks in which the movable wedge-block is provided with antifriction-rolls on its upper face between it and the type-bed. Fig. 10 represents in dotted lines one side of the frame and in full lines the mechanism for locking the type-bed in elevated position. Fig. 11 represents a side elevation of a fragment of the frame and one end of the traveling impression-cylinder and its guide mechanism. Fig. 12 represents, partly in elevation and partly in section, the upper end of one of the slotted arms for operating the traveling cylinder. Fig. 13 represents a plan of the under side of a type-bed adapted for use in this machine. Fig. 14 represents a side elevation thereof. Fig. 15 represents a perspective view of the lock for the wedge-blocks.

The same reference-numbers indicate the same parts in all the figures.

These improvements may be embodied in any printing-press in which they may be useful. They are herein illustrated as applied to a printing-press of the same general character as that shown in my United States Patents Nos. 361,423 and 377,432.

This frame may be composed of two side frames 20 and 30, connected by cross-bars and bolt-rods in such a manner as to form a rigid support for the moving parts. These side frames have top rails 21 and 31, respectively, which constitute a track on which the impression-cylinder travels, said rails being provided with racks 22 and 32, engaged by the toothed wheels on said cylinder. They are also provided with inward longitudinal flanges 23 and 33 and outward flanges 24 and 34. The two cross-bars 40 and 50 serve as supports for the type-bed.

An inking-table 60 is shown at the left-hand end of the frame and an elevated feed-table 70 above said inking-table. A transverse driving-shaft 80 and a rock-shaft 90 are journaled in the frame.

A movable type-bed 100 of any suitable construction is supported through intermediate mechanism on the two cross-bars 40 and 50. These cross-bars are preferably T-shaped in cross-section throughout the greater por-



tion of their lengths, and are provided with box-shaped ends, as 42 and 52, which rest on rigid flanges, as 34 and 35, on the side frames, and are secured by bolts, as 45 and 55, passing through said frames.

The intermediate mechanism for supporting the type-bed comprises several sets of wedge-blocks disposed in pairs on said cross-bars under the four corners of the type-bed. These several sets of wedge-blocks are similar in construction and comprise, respectively, a stationary and a sliding wedge-block, disposed one on the other, the stationary wedge-block being preferably the bottom or bed block and the sliding wedge-block the top block. The upper face of the top wedge-block and the lower face of the bottom wedge-block are preferably parallel and horizontal, and their meeting or contact faces are inclined to form the wedge shape, so that the sliding of one on the other will cause a slight rising or falling of the top block. The stationary wedge-blocks are preferably adjustable. The construction shown comprises stationary bed wedge-blocks 120, 140, 160, and 180 and sliding wedge-blocks 130, 150, 170, and 190, disposed, respectively, on the bed wedge-blocks and supporting the four corners of the type-bed. The two sliding wedge-blocks 130 and 150 at the front side of the machine are connected to move in unison by an actuating-rod 200, and the rear sliding wedge-blocks 170 and 190 are connected to move in unison by means of the actuating-rod 210. A detailed description of one set of these wedge-blocks will now be given. The bed wedge-block 160 rests on a box-shaped end of the cross-bar 40 or other suitable support and is held in position thereon by any suitable means. The means shown comprise a slotted attaching-ear 165 and a bolt 166 passing through said slotted ear into the cross-beam 40. This block has an inclined upper face 161, provided with side flanges 162 and 163.

The sliding wedge-block 170 is disposed between the bed wedge-block 160 and the type-bed and has an inclined lower face 171, which is adapted to slide on the inclined upper face 161 of said bed wedge-block 160 between the side flanges 162 and 163, which serve as a guideway for it. This wedge-block has a longitudinal hole 170' for receiving one end of the actuating-rod 210 and lateral holes for clamping-screws 211 and 212. These clamping-screws operate to lock the wedge-block 170 on the rod 210 and also permit of its adjustment on said rod to bring it into proper position relative to the connected movable block 190.

The bed wedge-blocks are preferably adjustable on their supports to regulate the position of each relatively to the others and also to regulate and determine the height of adjustment of the type-bed 100. Any suitable means may be employed for effecting this adjustment. In the construction shown the several bed wedge-blocks are similar to

the block 160, which is provided at one end with a hole 167. A bracket 220 is attached to the cross-bar 40, and an adjusting-screw 230 extends through said bracket into said tap-hole, said screw being provided with a head 231 on the outer face and with a nut 232 on the inner face of said bracket. This screw turns freely in the bracket, and when rotated in one direction operates to move the bed-block 160 forward and when rotated in the other direction to move said block in backward direction. The fastening-screw 166 and the clamping-nut 232 are loosened to permit this adjustment and are then tightened to hold said block in adjusted position. By these means applied to the several sets of blocks the impression is made equal throughout all parts of the type-bed. Instead of the head 231 and clamp-nut 232, two thumb-nuts 231' and 232' may be used on a screw-rod 230', as shown in Fig. 7, said screw being fixed to the wedge-block.

The type-bed is provided with suitable bosses 101, 102, 103, and 104 on its under side at its four corners, which bosses rest upon the flat surfaces of the upper wedge-blocks. The wedge-blocks and the bosses are amply large and are all planed and fitted, so that the contact-surfaces are absolutely in contact and there is no tendency to spring or yield. Hence the type-bed cannot yield as the impression-cylinder passes over it.

The type-bed is provided at opposite ends with projecting guide-lugs 105 and 106, which play in recesses 25' and 35' in the side rails 21 and 31, respectively, as the type-bed rises and falls, said lugs fitting the recesses as closely as may be and permit free motion. The side rails are provided with cheek-pieces, as 37, which may be moved to take up any wear which may occur at this point.

The mechanism for moving the sliding wedge-blocks to raise and lower the type-bed may be of any suitable character. That shown herein comprises two forked crank-arms 240 and 250, fixed on the rock-shaft 90, which is journaled underneath the type-bed. These forked crank-arms embrace, respectively, the connecting-rods 200 and 210. The rod 200 is provided with adjustable collars 211 and 212 on opposite sides of the crank-arm 240, and the rod 220 is provided with adjustable collars 221 and 222 on opposite sides of crank-arm 250, the crank-arms pushing against these collars to move the rods in either direction. A larger crank 260 is disposed centrally of the rock-shaft 90, and a connecting-rod 270 is connected at one end to said crank and provided at the other end with a slotted head 280, which slides on an antifriction roller or pin 290, loose on the driving-shaft 80. The slotted head 280 is provided with a contact-stud 281, preferably covered by an antifriction-roll, which is engaged by a cam 300 on said driving-shaft to pull the rod 270 toward the left. The rod 270 is provided with two collars 271 and 272. A spring 273



is disposed on said rod between the collar 271 and a fixed abutment 310, which may be in the form of a dependent arm attached to the frame. This spring serves to thrust the rod in the opposite direction when released. A short spring 274 is attached at one end to the collar 272 and is free at its other end. The cam 300 engages the contact-stud 281 and pulls the rod 270 backward toward the left, as seen in Figs. 1 and 2, against the tension of the spring 273. This motion of the rod moves the crank-arm 260 and turns the rock-shaft 90 toward the right, whereby the connecting-rods 200 and 210 are thrust forward and the sliding wedge-blocks are moved upward on the rising inclines of the bed wedge-blocks, and the type-bed 100 is thereby lifted into position to deliver an impression onto the traveling cylinder.

Any suitable means are provided for locking the type-bed 100 in elevated position during the taking of the impression—such, for instance, as the means shown in my Patent No. 377,432. The means shown herein differ slightly from those in the patent and comprise a locking-rod 320, connected at one end with the crank 260 and resting at the other end on a cam 330 on the driving-shaft 80. This locking-rod carries a locking-block 340, having an angular slot 341, which is engaged by a fixed stud 311 on the dependent arm 310. The rod 320 moves in unison with the rod 270, and when the latter is thrust forward to raise the type-bed the rod 320 is drawn forward a sufficient distance to bring the vertical portion of the slot 341 opposite the stud 311, and the block and rod fall and let the stud 311 into the vertical portion of said slot. The locking-rod is thus held in position and the type-bed locked. To release the bed, the high part of the cam 330 lifts the rod 320 and its slotted block 340 until the horizontal portion of the slot 341 is opposite the stud 311, and then the spring 273 comes into action and shifts the rods 270 and 320 and the sliding wedge-blocks in opposite directions, lowering the type-bed. The spring 274 comes in contact with the arm 310 and serves as a cushion at the close of this return movement of the parts.

The traveling impression-cylinder and its actuating mechanism will now be described. This traveling cylinder 400 may be of any suitable construction known in this class of machines. It is provided at its opposite ends with axial studs, as 401, and on its periphery, at its opposite ends, with gears, as 402, which engage the racks 22 and 32 on the side rails 21 and 31 for the purpose of preventing the cylinder from slipping in operation, as is usual in this class of presses. Oscillating levers 410 and 420 are pivoted to the opposite sides of the frame near the lower portion thereof and provided at their upper ends with elongated longitudinal slots 411 and 421, respectively, through which the axial studs of the impression-rolls extend. These studs are pro-

vided, preferably, with antifriction-rolls, as 405. A rod 430 connects the oscillating lever 410 on one side with the wheel 450 on the shaft 80, and the rod 440 connects the oscillating arm 420 with a similar wheel 460 on the opposite side of the machine. As the driving-shaft 80 rotates the oscillating arms 410 and 420 are swung back and forth and cause the impression-cylinder to travel on the track over the type-bed 100. The connecting-rods 430 and 440 are pivoted to the oscillating levers between their slotted ends and their pivots. Each oscillating lever is provided with a cushion at its outer end for contact of the impression-roll to prevent jar on the reverse motion and secure an absolute register. This cushion may be any suitable yielding device having, preferably, an adjustable tension. The device shown comprises a contact-plate 412, which plays in an enlargement of the slot 411. This plate is attached to a sliding bolt 413, which extends through the outer end of the oscillating lever. A cap 414, provided with a chamber 415, is attached to the outer end of said lever, and a spring 416 is disposed in said chamber and presses on the head of said bolt. An adjusting-screw 417 extends through said cap into said chamber and comes in contact with a disk 418, against which the upper end of the spring rests. The tension of the spring may be regulated by this adjusting-screw. By this means when the traveling cylinder reaches the outer end of its stroke its axial studs come in contact with the yielding plates on the sliding bolts and said bolts yield against the tension of the springs, preventing jar on the reverse motion.

The means for holding the impression-cylinder 400 down to its work comprise, as usual, two guide-heads, as 470, hung from the axial studs of said cylinder and provided with trucks 471 and 472, which engage the under sides of the outer flanges of the side rails of the frame. Each guide-head is usually suspended by a single central spindle; but in this case a hanger 480 is swiveled on the axial stud between the end of the cylinder and the oscillating arm, and this hanger is provided with sockets 481 and 482, disposed in vertical planes passing on opposite sides of the axis of the cylinder. Dependent spindles 483 and 484 engage these sockets and extend through holes in the guide-head, being provided with heads at their lower ends and adjusting-nuts 485 and 486, which serve for adjusting the guide-head at a proper height. When one spindle was used, as heretofore, a heavy impression sometimes caused a cramping between the guide-head and rail and a bending of the spindle. By having two spindles on each side of the vertical line crossing the axis of the cylinder bending and cramping are avoided. The dependent guide-heads are provided with arms, as 487, to which the frame 600, carrying the inking-rolls, is connected, as usual.

Yielding stop mechanism is disposed at op-



posite ends of the path of the impression-cylinder. This mechanism is herein shown as embodied in the form of cushioned levers, as 500 and 510, fulcrumed on pivot-studs 501 and 511 on one side of the frame, similar levers being likewise pivoted on the back side thereof. These levers are respectively provided at their upper ends with stop-shoes 508 and 518, curved to fit the periphery of the cylinder and arranged to engage said cylinder near its ends. Sliding rods 502 and 512 are movable in guide-eyes 507 and 517 and connected to the stop-levers 500 and 510. The rod 502 is provided with adjustable collars 505 and 506 on opposite sides of the guide-eye 507, and a spring 504 is disposed on the rod between the collar 505 and eye 507 and serves to cushion the levers 500. The collar 506 serves as a stop-collar. The rod 512 is provided with corresponding collars and a spring.

The operation of this printing-press as respects the features herein described will now be given.

In Figs. 1, 2, and 10 the type-bed 100 is shown as locked in elevated operative position, and the impression-cylinder 400, which carries the sheet to be printed in the ordinary manner into contact with the form on said type-bed, is shown as having just begun its outward travel over the type-bed for the purpose of making the impression. The driving-shaft 80 and crank-wheels 450 and 460 thereon rotate in the direction of the arrows, and the oscillating side levers 410 and 420 from the position illustrated in said figures continue to swing toward the right. The impression-cylinder 400 is thereby driven over the type-bed and the impression imparted from the form on said bed to the sheet carried by the cylinder. After the impression-cylinder passes the outer end of the type-bed the cam 330 on the driving-shaft 80 engages the locking-rod 320 and releases the locking mechanism. Then the spring 273 on the rod 270, which is thus permitted to act, pushes the rod 270 toward the right and causes a rocking of the rock-shaft 90 toward the left, whereby the sliding wedge-blocks 130, 150, 170, and 190 are moved toward the left, sliding down on their inclined beds and slightly lowering the type-bed and taking it out of the path of the impression-cylinder. When the impression-cylinder approaches the end of its outward stroke, it engages the contact-shoe 518 on the lever 510 and the corresponding shoe on the opposite side of the frame, and its momentum is thereby cushioned and retarded. The cylinder is also cushioned by its axial studs coming in contact with the cushioning devices at the outer ends of the oscillating side levers 410 and 420 and completing its stroke while compressing the cushioning devices. These cushioning devices insure an absolute register and an ease of movement on the reverse motion. After reaching the end of the outward stroke the levers 410 and 420

swing back toward the left and the impression-cylinder 400 is made to travel backward on the track, but without contact with the form, the type-bed having been lowered. After the impression-roll 400 has passed back beyond the type-bed 100 the cam 300 on the driving-shaft 80 engages the stud 281 on the slotted head 280 and causes the sliding wedge-blocks to move toward the right, whereby the type-bed is raised into position for forming the impression. When the type-bed reaches the proper position, the stud 311 comes opposite the vertical portion of the slot 341 in the locking-block 340 and the locking-rod 320 falls and the parts are locked by said block in operative position. When the impression-roller approaches the end of its backward stroke, it is cushioned by contact with the stop-levers, as 500, and again by the cushioning devices at the upper ends of the side levers. The construction and arrangement of the wedge-blocks may obviously be changed without departing from the scope of this invention.

I claim as my invention—

1. In a printing-machine, the combination of a stationary rigid frame, superposed stationary and sliding wedge-blocks disposed on said frame, a type-bed wholly supported on said wedge-blocks, and means for moving said sliding wedge-blocks to raise or lower said type-bed at regular intervals.
2. In a printing-machine, the combination of a stationary rigid frame, superposed stationary and sliding wedge-blocks disposed on said frame, a type-bed wholly supported on said wedge-blocks, means for moving said sliding wedge-blocks to raise or lower said type-bed at regular intervals, and vertical guideways on said frame for said bed.
3. In a printing-machine, the combination of a stationary rigid frame, stationary wedge-blocks adjustable on said frames, sliding wedge-blocks on said stationary wedge-blocks, a type-bed wholly supported on said sliding wedge-blocks, rods connecting said sliding wedge-blocks in pairs, and means for actuating said rods.
4. In a printing-machine, the combination of superposed stationary and sliding wedge-blocks, means for supporting said wedge-blocks, a type-bed wholly supported on said wedge-blocks, rods connecting the sliding wedge-blocks in pairs in line with the movement thereof, and means for adjusting said sliding wedge-blocks relatively to each other on said rods.
5. In a printing-machine, the combination of a stationary rigid frame, superposed stationary and sliding wedge-blocks disposed on said frame, one set being provided with guide-flanges for the other set, a type-bed wholly supported on said wedge-blocks, means for moving said sliding wedge-blocks to raise or lower said type-bed at regular intervals, and vertical guideways on said frame for said bed.



6. In a printing-machine, the combination of a stationary rigid frame, superposed stationary and sliding wedge-blocks disposed on said frame, a movable type-bed wholly supported on said wedge-blocks, and provided with flat bosses under its four corners resting thereon, and means for moving the sliding wedge-blocks, to raise or lower the type-bed.

7. In a printing-machine, the combination of a stationary rigid frame, superposed stationary and sliding wedge-blocks interposed between said frame and the bosses of said type-bed, a movable type-bed wholly supported on said wedge-blocks and provided with flat bosses under its four corners, means for moving said sliding wedge-blocks, and vertical guideways on said frame.

8. The combination of a movable type-bed, bed wedge-blocks, sliding wedge-blocks disposed on said bed wedge-blocks for supporting said bed, rods connecting said sliding wedge-blocks in sets, a rock-shaft, and crank-heads on said rock-shaft engaging said rods.

9. The combination of a movable type-bed, bed wedge-blocks, sliding wedge-blocks disposed on said bed wedge-blocks for supporting said bed, rods connecting said sliding wedge-blocks in sets, a rock-shaft, crank-heads on said rock-shaft engaging said rods, an actuating-crank on said rock-shaft, an actuating-rod for actuating said crank in one direction, and a spring for actuating it in the other direction.

10. The combination of a movable type-bed, bed wedge-blocks, sliding wedge-blocks disposed on said bed wedge-blocks for supporting said bed, rods connecting said sliding wedge-blocks in sets, a rock-shaft, crank-heads on said rock-shaft engaging said rods, an actuating-crank on said rock-shaft, an actuating-rod for actuating said crank in one direction, a spring for actuating it in the other direction, and a cushioning-spring also on said rod cushioning the action of said actuating-spring.

11. In a printing-press, the combination of a type-bed, a traveling impression-cylinder provided with axial studs at its opposite ends, slotted levers engaging said studs, cushioning devices at the ends of the slotted levers and engaged by the axial studs of said cylinder, and means for regulating the tension of said cushioning devices.

12. In a printing-machine, the combination of a type-bed, a traveling impression-cylinder adapted to reciprocate back and forth over said type-bed, said cylinder being provided with axial studs at its opposite ends, oscillating levers provided with slots in which said studs play, cushioning devices disposed at the outer ends of said slots and engaged by

the axial studs of said cylinder, and means for oscillating said levers.

13. In a printing-machine, the combination of a type-bed, a traveling impression-cylinder adapted to move back and forth over said bed, said cylinder being provided with axial studs, pivoted oscillating levers provided with slots engaging the studs of said cylinder, cushioning devices disposed at the outer ends of said levers and engaged by the axial studs of the cylinder, and supplemental cushioning devices disposed on the frame and at opposite ends of the travel of the cylinder.

14. In a printing-machine, the combination of a type-bed, a traveling impression-cylinder adapted to reciprocate back and forth over said type-bed, said cylinder being provided with axial studs at its opposite ends, oscillating levers provided with slots in which said studs play, and having spring-cushioned buffer-plates adapted to slide in said slots, and means for oscillating said levers.

15. In a printing-machine, the combination of a type-bed, a traveling impression-cylinder adapted to reciprocate back and forth over said type-bed, said cylinder being provided with axial studs at its opposite ends, oscillating levers provided with slots in which said studs play, buffer-plates adapted to slide in said slots and having sliding bolts extending through the outer ends of said levers, detachable caps on the ends of said levers, springs in said caps operating on said bolts, and means for oscillating said levers.

16. In a printing-machine, the combination of a type-bed, a traveling impression-cylinder adapted to reciprocate back and forth over said type-bed, said cylinder being provided with axial studs at its opposite ends, oscillating levers provided with slots in which said studs play, buffer-plates adapted to slide in said slots and having sliding bolts extending through the outer ends of said levers, detachable caps on the ends of said levers, means for oscillating said levers, and means for regulating the tension of said springs.

17. In a printing-machine, the combination of a type-bed, a track, a traveling impression-cylinder reciprocating to and fro on said track over said type-bed, guide-heads suspended from the axis of said cylinder and engaging the under side of the track, each guide-head being supported by two spindles on opposite sides of the axis of the cylinder whereby cramping is prevented, and means for reciprocating said cylinder independently of said guide-heads.

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Witnesses:

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