No. 763,672. PATENTED JUNE 28, 1904.

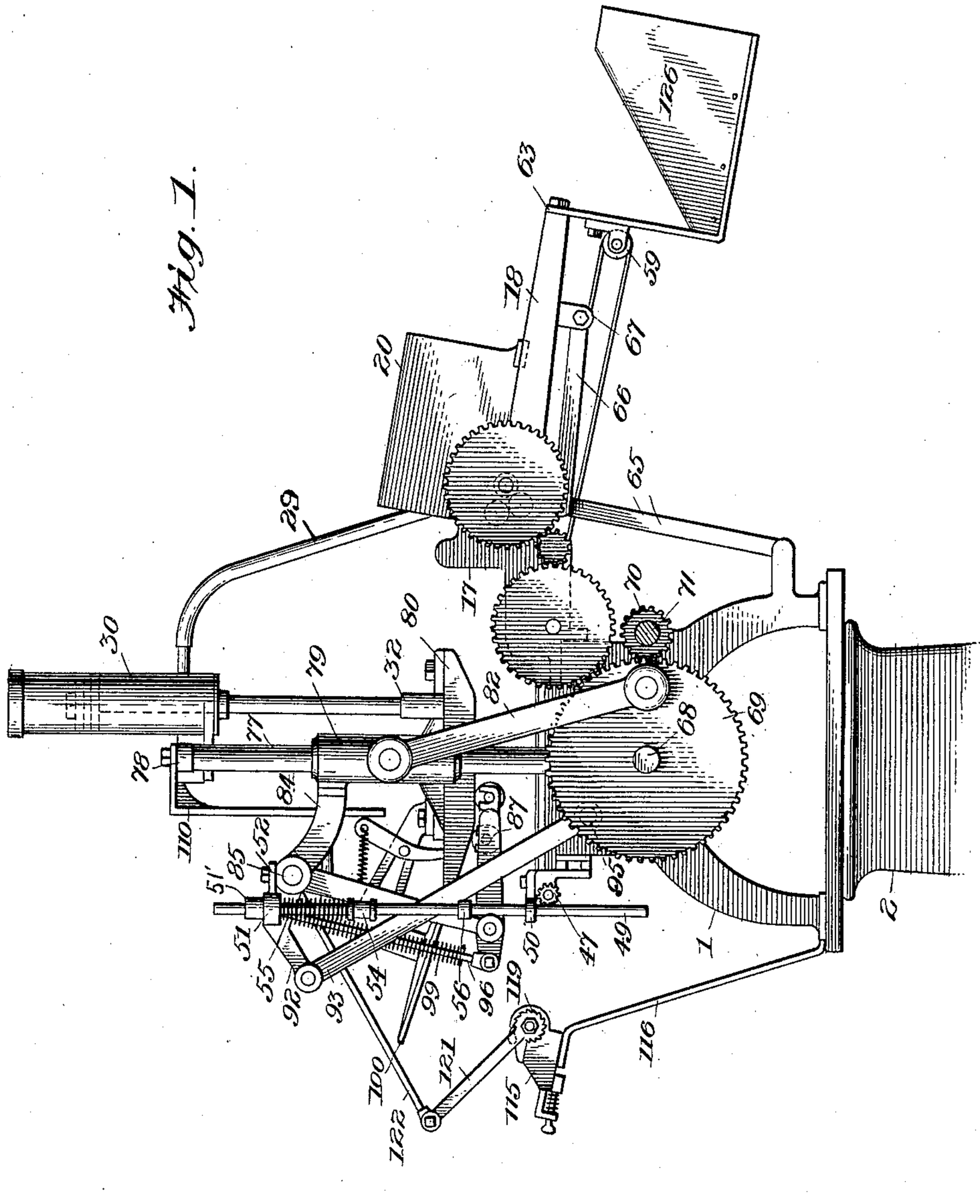
W. G. JOHNSTON.

PRINTING PRESS.

APPLICATION FILED JUNE 10, 1902.

NO MODEL. 5 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Jno. T. Cross.

Edw. W. Vaile Jr.

INVENTOR:

William G. Johnston,

by Horace Pettit

ATTORNEY:

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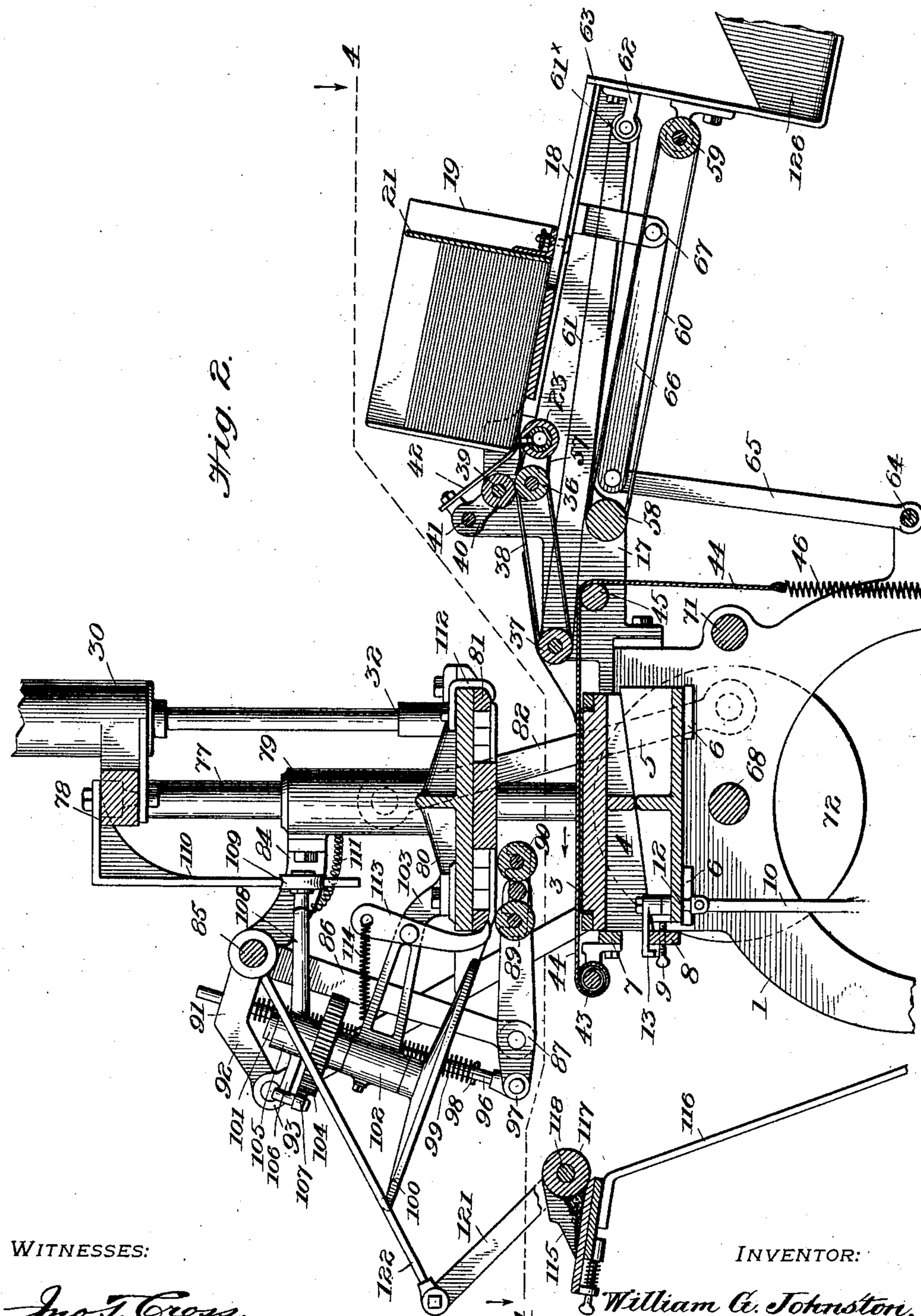
NO MODEL. 5 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 5 SHEETS—SHEET 3.

Fig. 3.

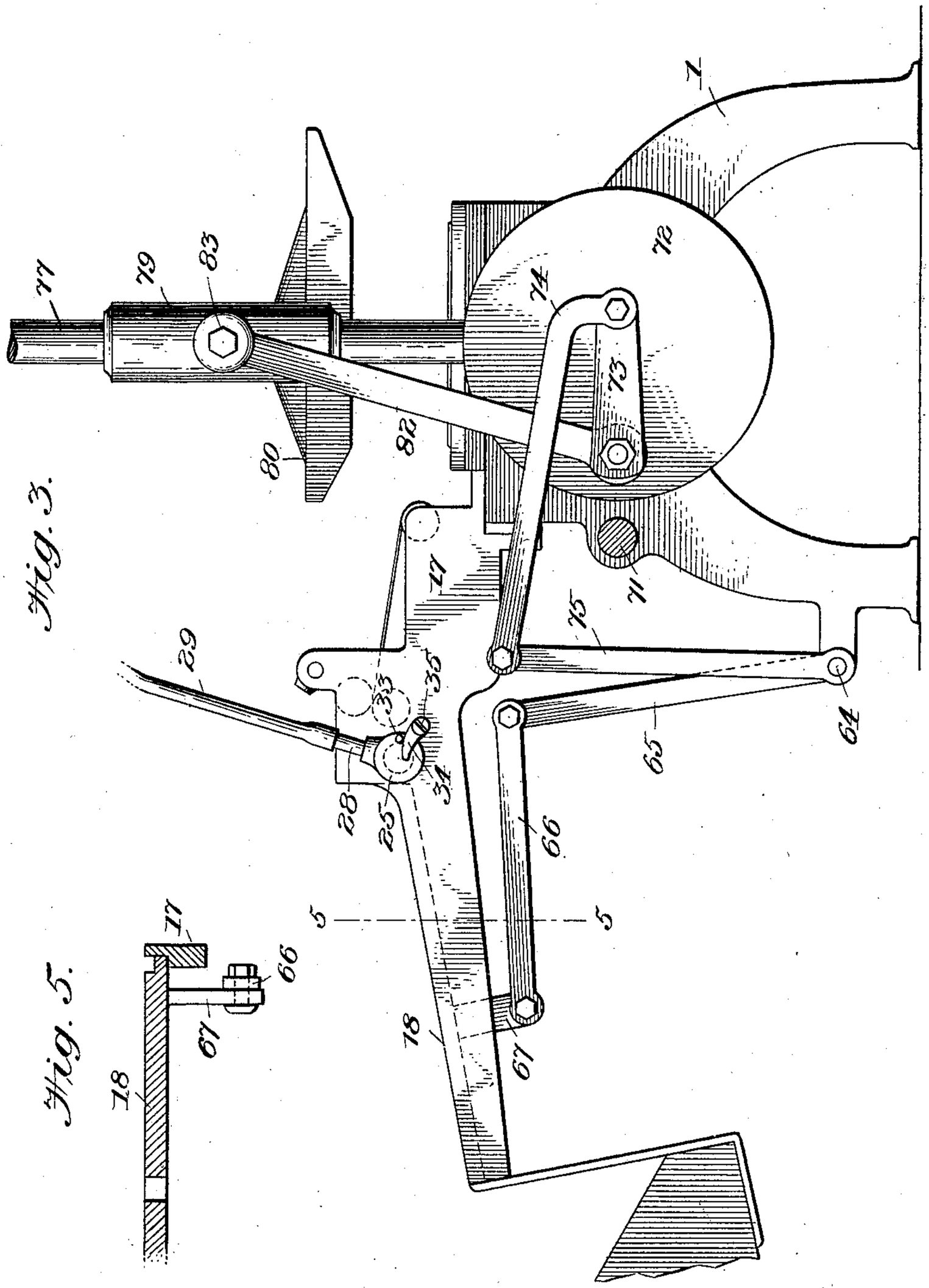

Fig. 5.

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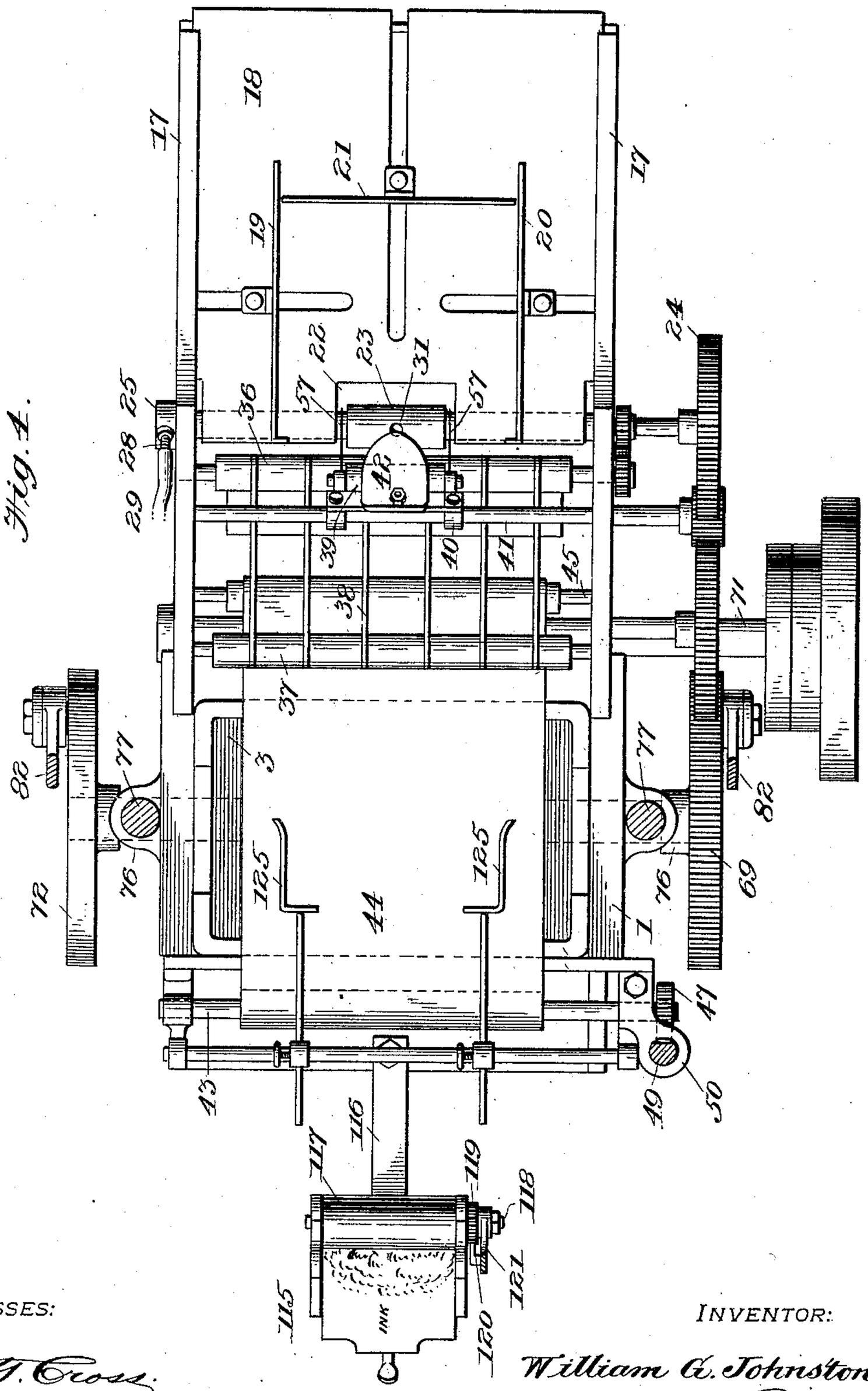
NO MODEL. 5 SHEETS—SHEET 4.

Fig. 4.



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NO MODEL. 5 SHEETS—SHEET 5.

Fig. 6.

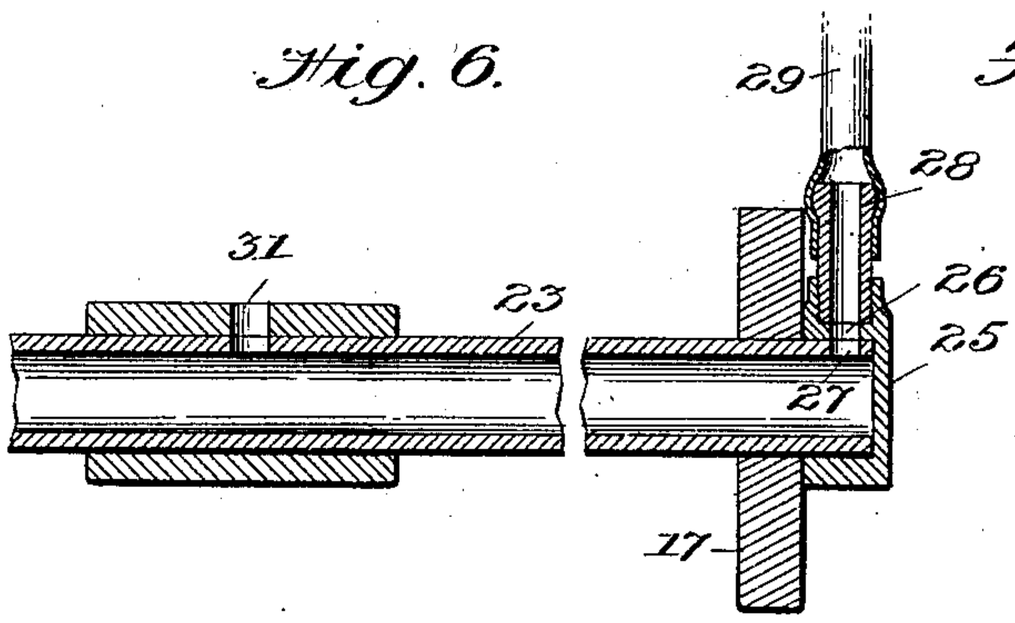


Fig. 7.

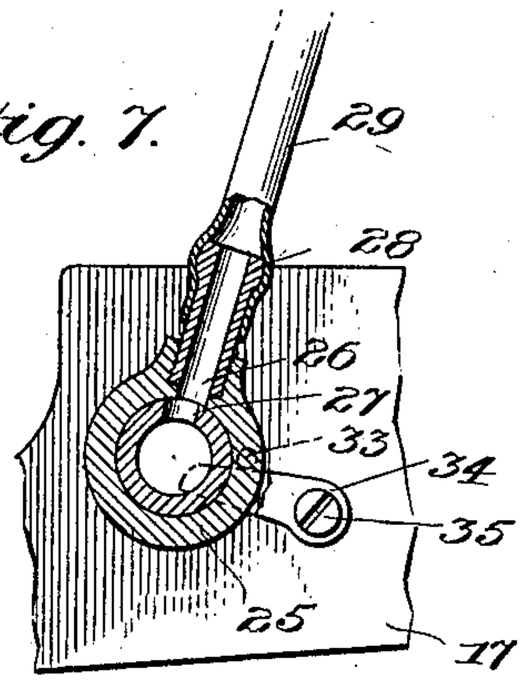


Fig. 8.

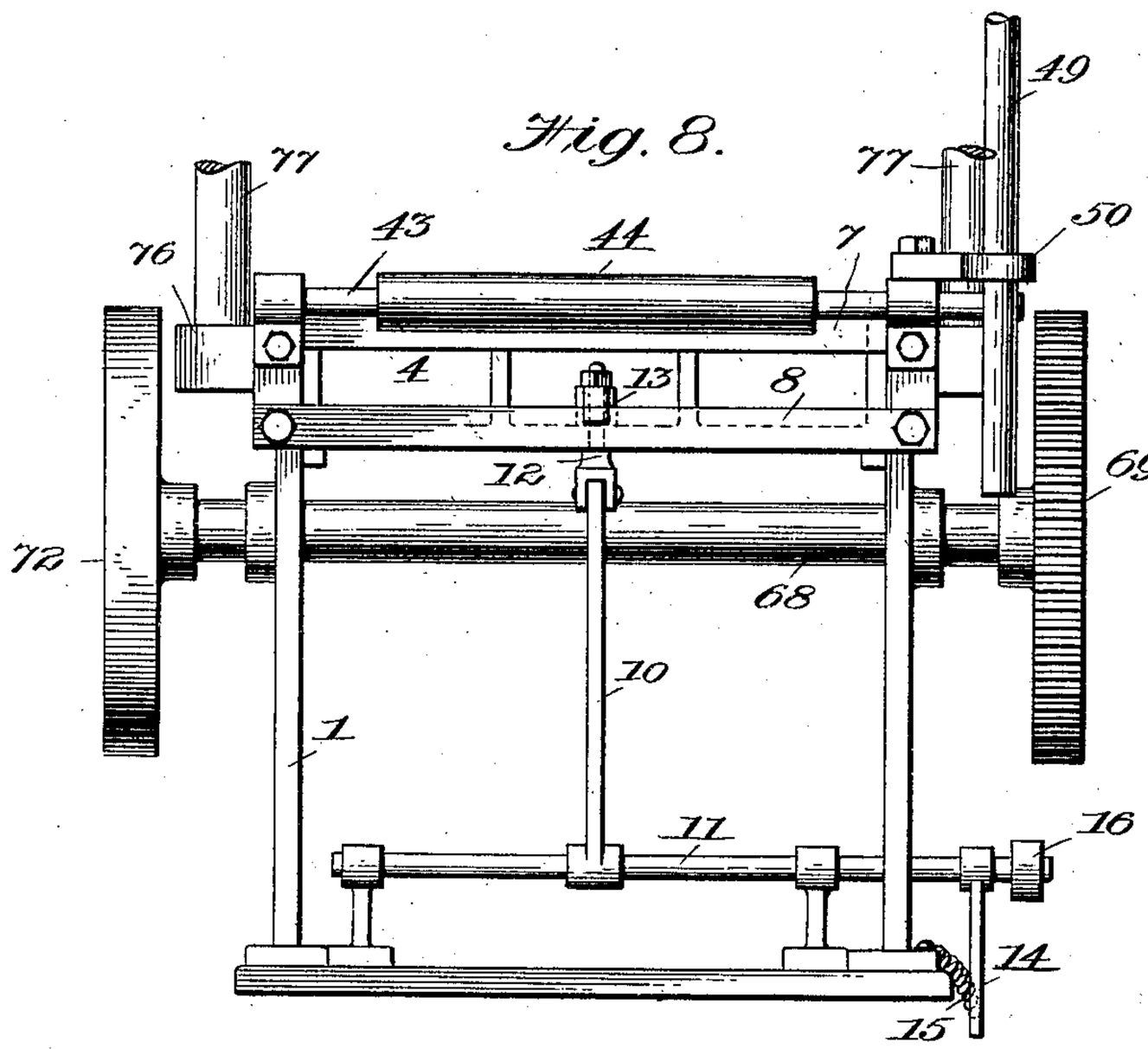
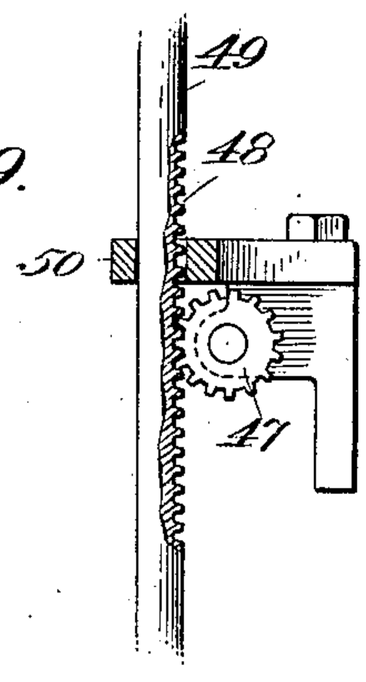


Fig. 9.



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ATTORNEY:

No. 763,672. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM G. JOHNSTON, OF WOODBURY, NEW JERSEY.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 763,672, dated June 28, 1904.

Application filed June 10, 1902. Serial No. 110,955. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. JOHNSTON, a citizen of the United States, and a resident of Woodbury, in the county of Gloucester, State of New Jersey, have invented certain new and useful Improvements in Sheet-Feed Mechanism for Printing-Presses, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to certain improvements in sheet-feed mechanism for printing-presses, and particularly to that class known to the trade as "job-presses," which are usually adapted to small work.

The principal object of my invention is to generally improve and simplify the construction of machines of this character and to provide a machine which is entirely automatic in its operation both as to its feeding mechanism and as to its printing and delivering mechanism.

With this and other objects in view my invention consists in the combination and arrangement of the various mechanisms, such as will be hereinafter fully described and the novelty of which will be particularly pointed out in the claims made hereto.

Referring to the accompanying drawings, in which similar reference-numerals are used to indicate similar parts, Figure 1 is a side elevation of a machine constructed in accordance with my invention, the lower portion of the supporting-frame being broken away. Fig. 2 is a longitudinal sectional elevation of the machine, shown on an enlarged scale for the purpose of more fully illustrating the construction and operation of the various parts. Fig. 3 is a side elevation having portions of the printing mechanism broken away or omitted and illustrating the opposite side of the machine to that shown in Fig. 1. Fig. 4 is a sectional elevation taken about on the line 4 4 of Fig. 2, showing the platen and feeding mechanism of the machine in plan view. Fig. 5 is a detail section through the feed-table, taken about on the line 5 5 of Fig. 3. Fig. 6 is a detail sectional view, on an enlarged scale, illustrating the vacuum-roller and its valve mechanism located at one end thereof. Fig. 7 is an end elevation, partially in section, of the valve mechanism and adjusting device. Fig. 8 is a detail end elevation from the rear of the machine, illustrating the mechanism for lowering the platen, parts of the frame and printing mechanism being broken away or omitted for convenience. Fig. 9 is a detail view of the rack and pinion which actuates the reciprocating apron feed.

In carrying out my invention I provide a suitable frame, as 1, which is supported on a suitable base 2 to give it the proper height. The platen 3 is constructed in two sections, as 4 and 5, having inclined supporting-ledges disposed at an angle opposite each other, as illustrated in Fig. 2, the lower section 5 being supported on projecting pads 6, which extend from the inner face of each of the side frames 1. Cross-bars 7 and 8 connect the two side frames 1 and also hold the platen in its proper position. A set-screw 9 is threaded through an aperture in the lower cross-bar 8 and bears against one of the webs of the lower section 5 of the platen, so that by adjusting the position of this screw the lower section of the platen may be moved longitudinally and the upper section 4 thereby raised or lowered, as may be desired. If it should be desired to prevent an impression being made during the operation of the machine, the platen can be lowered by a lever mechanism which may be quickly operated by the attendant and which may be described as follows: A lever 10, rigidly secured at its lower end to a rock-shaft 11, is pivotally connected at its upper end to a knuckle-joint carried by a screw 12, which is secured to the lower section 5 of the platen. An arm 13 is attached to the upper end of this screw, having a projection on its outer end which extends over the lower cross-bar 8 and is for the purpose of limiting the movement of the platen-section 5 in the manner hereinafter described. The rock-shaft 11 is mounted in suitable bearings, and one of its ends projects beyond the side frame of the machine and carries thereon a depending arm 14, which is connected, by means of a coiled spring 15, to the frame of the machine. A handle-lever 16 is also secured on this end of the rock-shaft

11, so that the operator will by turning or depressing the handle-lever rock the shaft 11, and through the connection of this shaft with the section 5 of the platen the said section will be moved forwardly, and by reason of the inclined supporting-ledges of the two sections the upper section will be caused to drop, and thereby remove the platen or impression-plate out of the way of the form-holder. As soon as the lever 14 is released by the operator the spring 15 will return the rock-shaft, and consequently the lower section of the platen, to normal position.

Secured to the side frame 1 are the supplemental frames 17, which support the feeding mechanism now to be described.

A slightly-inclined table, as 18, mounted so as to slide in suitable ledges formed on the supplemental frames 17 is provided, which carries the pile of sheets or other matter to be printed. These sheets are arranged on the table and held in position by suitable side guides, as 19 and 20, which are adjustable laterally on the table 18, and an end guide 21, which is also adjustable longitudinally on the said table. A portion of the table, as shown at 22, is cut away, so that the bottom sheet of the pile of paper is free to be acted upon by the suction-roller 23. This roller 23 comprises a hollow tube mounted in suitable bearings provided in the side frames and is driven by means of the gear 24, which is geared to the driving-shaft of the machine. The opposite end of the tube 23 extends through the frame and has mounted on its projecting end a cap or casing 25, which is provided with a passage 26, which communicates at intervals with an aperture 27, formed in the tube adjacent the end thereof. The casing 25 is provided with a projecting nipple 28, over which is fitted the rubber tube 29, which is connected to the vacuum-pump 30. (Shown in Fig. 1.) An aperture 31 is provided in the central portion of the tube 23, which is located directly under the center of the pile of papers. The piston-rod of the vacuum-pump 30 is connected at its lower end to the form-holder of the press, as shown at 32, so that the said pump is operated by the reciprocating action of the form-holder. As the tube 23 is revolved by means of the gearing heretofore described, the aperture 27, provided in said tube, will register with the passage 26, provided in the casing 25 at intervals only, so that the suction in the tube will be only created at intervals, and therefore will be much stronger than if the tube were connected with the vacuum-pump directly at all times. The two apertures 27 and 31 are on the same axial line, so that when the opening 31 is under the paper on the feed-table a strong suction is created which pulls the bottom sheet of the pile away from the others very readily. The suction may be decreased or increased by regulating the incline of the valve-casing 25, so as to increase or diminish the area of the opening 27 when it registers with the passage 26. This can be accomplished by means of the arm 34, which is secured to the machine-frame to one side of the valve-casing 25 and projects in front of said casing, as shown in Figs. 3 and 7. A pin 33 projects from the said casing 25 and rests against the top edge of the arm 34. By loosening the set-screw 35 the angle of the arm 34 may be adjusted, and thus change the angle of the passage-way 26, thereby increasing or diminishing the passage between the interior of the tube 23 and the tube 29.

A short distance in the rear of the suction-tube 23 is a feed-roller 36, mounted in suitable bearings provided in the side frames and which is connected, by means of a series of elastic bands, with a roller 37, located a short distance in the rear of the roller 36 and slightly below the same, so that the bands 38 will be inclined toward the platen of the machine. Over the roller 36 is a short roller 39, journaled in bearings 40, supported by a cross-bar 41, which roller bears against the roller 36, as shown in Fig. 2 of the drawings. Rigidly secured to the bearings of the roller 39, carried by the shaft 41, is a downwardly-inclined knife 42, having a rounded lower end which terminates at a point directly above the aperture 31 in the suction-tube 23. This knife is made of spring-steel or of any other suitable material and is thin enough to be slightly elastic at its lower end.

Journaled to the cross-bar 7 or to suitable bearings carried by the said cross-bar is a roller 43, which has secured to it a flexible apron 44, which extends across the platen of the machine and passes over a roller 45, journaled in the supplemental frame 17, where it then passes in a substantially vertical position and has its end connected to a spiral spring 46, which is secured to the base-plate of the machine. The roller 43 has secured on its outer end a pinion 47, which meshes with a rack 48, formed on a vertical rod 49, which is supported in a bearing 50 near its lower end and at its upper end in a bearing 51 in the form of a short sleeve carried by the arm 52, which is bolted to the sleeves 79 of the form-holding frame. A collar 51′, fixed to the rod 49, causes the latter to move upward with the bearing 51. On the rod 49 a suitable distance below the bearing 51 is secured a collar 54, and confined between this collar and the lower portion of the bearing is a coiled spring 55. A suitable distance above the bearing 50 is another collar 56, rigidly secured on the rod 49, so that it will be seen that as the form-holder reciprocates a vertical reciprocating motion is imparted to the rod 49 between limits determined by the collars 51′ and 56, which causes the roller 43 to revolve first in one direction and then in the opposite direction. The flexible apron 44, which is connected to

the roller 43, will thus be caused to wind around the roller 43 and travel rearwardly upon the downward stroke of the form-holder and then travel in an opposite direction upon the upward stroke of the form-holder, the spring 46 serving to take up the slack in the apron as the roller 43 is revolved in the opposite direction to that first described. As the form-holder descends the rod 49 will also descend until the collar 56 strikes against the top of the bearing 50, when the said rod will stop, thus stopping the revolution of the roller 43 and stopping the movement of the traveling apron 44, while the form-holder will continue to descend and make the impression on the sheet carried by the traveling apron while the said apron is at rest. The coiled spring 55 will be compressed immediately after the rod 49 stops during the descent of the form-holding frame.

A pair of cords 57 connect the two rollers 36 and 23, as shown in Fig. 2, and serve to guide the lower sheet of paper between the roller 36 and the roller 39 after it has been drawn down by the suction created by the vacuum in the tube 23 and separated from the pile of sheets by the knife 42. In front of the roller 45 is a roller 58, journaled in suitable bearings, which is connected to a roller 59, located at the front end of the machine by means of the series of bands 60. A cord 61 passes around the roller 37 and around the roller $61^{\times}$, secured to the bearings 62, carried by the cross-bar 63 on the front end of the machine. The object of the cord 61 is to guide the printed sheets over the feed-roller 58 and to prevent said sheets from lifting up while traveling on the band-carriers 60.

The feed-table 18 is, as before stated, mounted on suitable ledges provided in the side frame 17 and is adapted to reciprocate during the operation of the machine. This reciprocating motion is imparted to the table 18 by the following mechanism: A rock-shaft 64 is journaled in bearings provided on the main frame of the machine, on which is rigidly mounted a lever 65, which has pivoted to its upper end a lever 66, which is pivoted to a projection 67, formed on the under side of the table 18. A transversely-disposed shaft 68 is journaled in the side frames of the machine, having a large gear 69 secured on one end, which meshes with the gear 70, provided on the main driving-shaft 71. On the other end of the shaft 68 is a disk 72, corresponding in size to the gear 69, and pivoted eccentrically on the disk 72 is a link 73, which has pivoted to its free end a lever 74, which is pivotally connected to a lever 75, rigidly secured to the rock-shaft 64, so that on the revolution of the disk 72 the shaft 64 is caused to rock, which oscillates to the lever 65 and through the medium of its connection with the table 18 imparts a reciprocating motion to said table.

On each of the side frames 1 is provided a lug or projection 76, in which is rigidly secured the vertically-disposed rods 77, which are connected at their upper ends by cross-heads 78. On each of the rods 77 is a loosely-fitted sleeve 79, and these sleeves are connected at their lower ends by a cross-head or casting 80, which carries on its under surface the chase or form-holder 81. A pitman 82 is pivoted at 83 to the outside of each of the sleeves 79 and has its lower end eccentrically pivoted in one instance to the gear 69, carried by the shaft 68, and on the opposite side of the machine to the disk 72, carried by said shaft 68, so that upon the revolution of the shaft 68 a vertically-reciprocating motion will be imparted to the said sleeves 79 and the form-holding frame.

Extending rearwardly from the upper ends of the sleeves 79 are the bracket-arms 84, having journaled in their ends a transverse shaft 85, on which are loosely mounted the levers 86, which are pivoted at their lower ends to the levers 87, which carry the inking-rollers 89 and 90. Extending rearwardly from the shaft 85 are the short arms 91, which have angularly-disposed ends 92, to which are pivoted the levers 93, which levers are pivotally connected at their lower ends to a boss 95, formed on each of the side frames 1. The rods 96 are pivoted at their lower ends to the rear ends 97 of the roller-carrying arms 87 in rear of their pivotal connections to the arm 86. The upper ends of the rods 96 extend through apertures provided in the short arm 91, which is pivotally mounted on the transverse shaft 85. A pin 98 passes through the rod 96 a short distance above its lower end, and interposed between this pin and the under side of the arm 91 is a coiled spring 99, the object of which is to exert pressure on the rear ends of the roller-carrying frame 87, and thus keep the said rollers 89 and 90 in contact with the form and ink-distributing platen 100.

The ink-distributing platen 100 is mounted on a stub-shaft 101, which is supported by the sleeve 102, carried by the bracket-arm 103, which is bolted at the front end to cross-head or form-holder 80, and which consequently moves with the said form-holder. On the spindle 101, directly above the sleeve 102, is a ratchet-wheel 104, which is rigidly secured to said spindle. Directly above the ratchet-wheel is a sleeve 105, having an arm 106 formed thereon, and extending rearwardly from the said sleeve and pivoted in the end of this arm is a pawl 107, which engages the teeth of the ratchet-wheel 104. Extending from the forward portion of the sleeve 105 is an arm 108, which carries on its free end a loosely-mounted wheel 109. This wheel 109 bears against a stationary cam-arm 110, which is disposed in about the center of the machine and is secured at its upper end to the stationary cross-head 78, carried by the guide-rods 77, so that as the reciprocating form-holder frame moves down-

wardly the cam-lever 110 will cause the arm 108 to swing laterally on the shaft 101, upon which said lever is mounted, thereby imparting movement to the arm 106, which carries the pawl 107, which is in engagement with the ratchet-wheel 104, thus imparting a revolving movement to the spindle 101, and consequently to the ink-platen 100. The spring 111, which is connected at one end to the arm 108 and at its other end to the cross-head or some portion of the form-holding frame, serves to keep the wheel 109 always in contact with the cam-arm 110.

The chase 81, in which the form or type are locked, is held in position on the form-holding frame by means of a stationary dog 112, located at the front end of the form-holder, and a pivoted dog 113, located at the rear end of the form-holder. This pivoted dog is pivoted to the bracket-arm 103 and has connected to its upper end a spring 114, which is secured at its other end to the sleeve of the bracket-arm, so as to hold the engaging end of the dog firmly against the chase. If it should be desired to remove the chase, the pivoted dog 113 can be released by pushing its upper end toward the chase, and as soon as the pressure on this end is released the spring 114 will immediately return it to its locking position.

An inking-fountain 115 is supported on the bracket 116, which is suitably secured to the base-plate of the machine. A feeding-roller 117 is journaled on a shaft 118, and on its outer end is a ratchet-wheel 119, which is engaged by a pawl 120, carried by the lever 121. This lever 121 is pivotally connected at its upper end to a rod 122, which rod is pivoted at its upper end to the shaft 85, carried by the cross-head brackets 84, so that during the operation of the machine an oscillating movement is imparted to the lever 121, which through the medium of the pawl and ratchet-wheel on the inking-roller shaft 118 causes said inking-roller to be slowly revolved. As the inking-rollers 89 and 90 are caused to reciprocate or travel rearwardly on the distributing-platen 100 and upon the downward movement of the form-holding frame, the rear roller 89 will come in contact with the fountain-roller 117, and thus receive ink from the fountain and transfer it to the platen 100.

The entire operation of the machine is automatic, and after the pile of paper has been placed upon the table 18 and adjusted thereon by means of the guides 19, 20, and 21 and power is applied to the machine the said table will reciprocate, which carries the pile of papers over the suction-roller 23, and when the aperture 31 reaches the proper position under the pile of papers the vacuum within said roller 23 will pull down the front edge of the lower sheet, and as the papers move forward the stationary knife 42 will pass between the sheet pulled down and the pile of sheets while the lowermost sheet is being delivered between the two feed-rollers 36 and 39. The feed-table at this point starts to move in an opposite direction, while the carrying-belts 38 deliver the sheet fed thereon over the roller 37 down onto the reciprocating apron-feed 44. This apron 44 is now traveling rearwardly in the direction of the arrow shown in Fig. 2 and carries the sheet to be printed with it until it is stopped in a proper position to be printed by means of the guides 125. In the meantime the form-holder is descending, and just before the impression is made the rack 49 stops, which causes the apron 44 to also stop, thus holding the paper under the form-holder in a stationary position while the impression is being made. Upon the ascent of the form-holder the rack 49 also moves upwardly, which causes the roller 43 and its apron 44 to move in an opposite direction to that before described toward the front of the machine, thus carrying the sheet which has been printed forwardly and delivering it to the carrying-belt 60, from whence it is delivered to a receiver 126. As soon as the form-holder reaches the limit of its upward stroke it immediately descends, and the traveling apron 44 immediately reverses its direction of travel and carries another sheet under the form-holder in position to be printed.

I have found the above-described construction to feed very rapidly and accurately, and the movements are simple, and all classes and weights of paper can be fed with equal speed and efficiency at the rate of about eight thousand impressions per hour, or even faster, if found necessary.

While I have described my preferred form of mechanism, it is evident that various changes might be made in the details of the various working parts, and I do not wish to be limited to the exact construction herein set forth; but

What I do claim, and desire to secure by Letters Patent, is—

1. In a sheet-feed mechanism, a flexible apron adapted to reciprocate over the platen of a printing-press or similar machine, means for moving said apron inwardly, means for holding the same stationary while under pressure and means for retracting the same, automatic means for delivering sheets to the apron during its inward movement and means for withdrawing the sheets from the apron during its outward movement.

2. In a sheet-feed mechanism, a flexible apron adapted to reciprocate over the platen of a printing-press or similar machine, means for positively reciprocating said apron intermittently, automatic means located above said apron for delivering sheets to the apron during its inward movement, and means located in line with the movement of said apron for withdrawing the sheets therefrom.

3. In a sheet-feed mechanism, a flexible apron adapted to reciprocate over the horizon-

tal platen of a printing-press or similar machine, means for intermittently reciprocating said apron, automatic means located above said apron for delivering sheets thereto during its inward movement, and means located in line with the movement of said apron for withdrawing the sheets therefrom during its outward movement.

4. In a sheet-feed mechanism, a flexible apron adapted to reciprocate over the horizontal platen of a printing-press or similar machine, means for reciprocating said apron intermittently, automatic means located above said apron for delivering sheets to the apron during its inward movement, a roller over which said apron is deflected, and means located adjacent said roller for withdrawing the sheets from the apron.

5. In a sheet-feed mechanism, a flexible apron adapted to be arranged over the horizontal platen of a printing-press or similar machine, means for delivering paper to said apron during its inward movement, a roller having one end of the apron secured thereto, a spring attached to the other end of said apron, and mechanism for winding and unwinding said apron, substantially as described.

6. In a sheet-feed mechanism, a flexible apron adapted to be arranged over the horizontal platen of a printing-press or similar machine, a roller having one end of the apron secured thereto, a spring connected to the other end of said apron adapted to keep the apron taut, and mechanism actuated by the continuous operation of the form-holder, or similar part for winding and unwinding said apron, substantially as described.

7. In a sheet-feed mechanism, a flexible apron adapted to be arranged over the platen of a printing-press or similar machine, a roller having one end of the apron secured thereto, a spring connected with the other end of said apron adapted to keep the apron taut, a pinion carried by the said roller, a rack-bar normally carried by a moving part of the machine and engaging said pinion, and means for preventing the reciprocation of said rack-bar during the time of impression, substantially as described.

8. In a sheet-feed mechanism, a flexible apron adapted to be arranged over the platen of a printing-press or similar machine, a roller having one end of the apron secured thereto, a spring connected to the other end of said apron adapted to keep the apron taut, a support carried by a reciprocating part of the machine in which said rack-bar is loosely mounted, a spring interposed between said support and a projection carried by the rack-bar, a bearing through which the lower end of the rack-bar passes and a projection carried by said rack-bar adapted to strike against the said bearing and stop the movement of the bar, substantially as described.

9. In a sheet-feed mechanism, a reciprocating form-holder, a transversely-disposed shaft having disks on each end, a pitman connection between the said disk and the form-holding frame, a paper-supporting table loosely mounted on the machine-frame, a rock-shaft carried by said frame, link connections between the rock-shaft and the paper-supporting table, and means connected with the driving mechanism for imparting movement to said transverse shaft and causing the paper-supporting table to reciprocate, substantially as described.

10. In a sheet-feed mechanism, a vertically-reciprocating form-holder, an apron-carrier adapted to reciprocate above the platen of a printing-press or similar machine, means actuated by the operation of the form-holder for imparting an intermittent reciprocating movement to the apron, means for separating and advancing the sheets to be printed, a series of feed-rollers adapted to feed the lower sheet to the reciprocating apron-carrier, and a series of endless carriers adapted to receive the printed sheets from the reciprocating apron, substantially as described.

11. In a sheet-feed mechanism, a flexible apron arranged over the platen of a printing-press, means for reciprocating said apron, means for delivering paper to said apron during its inward movement, and means for withdrawing paper from said apron during its outward movement in the opposite direction.

12. In a sheet-feed mechanism, a flexible apron arranged over the platen of a printing-press, means for reciprocating said apron, means for delivering paper to said apron during its inward movement, and means located beneath said delivering means, for withdrawing paper from said apron during its outward movement.

13. In a sheet-feed mechanism, a flexible horizontal apron arranged over the platen of a printing-press, means for reciprocating said apron, means for delivering paper to said apron during its inward movement, and means located at the same side of the apron as said delivering means for withdrawing paper from said apron.

In witness whereof I have hereunto set my hand this 14th day of May, A. D. 1902.

WILLIAM G. JOHNSTON.

Witnesses:
H. B. GREEN,
M. J. O'ROURKE.