

No. 648,066.

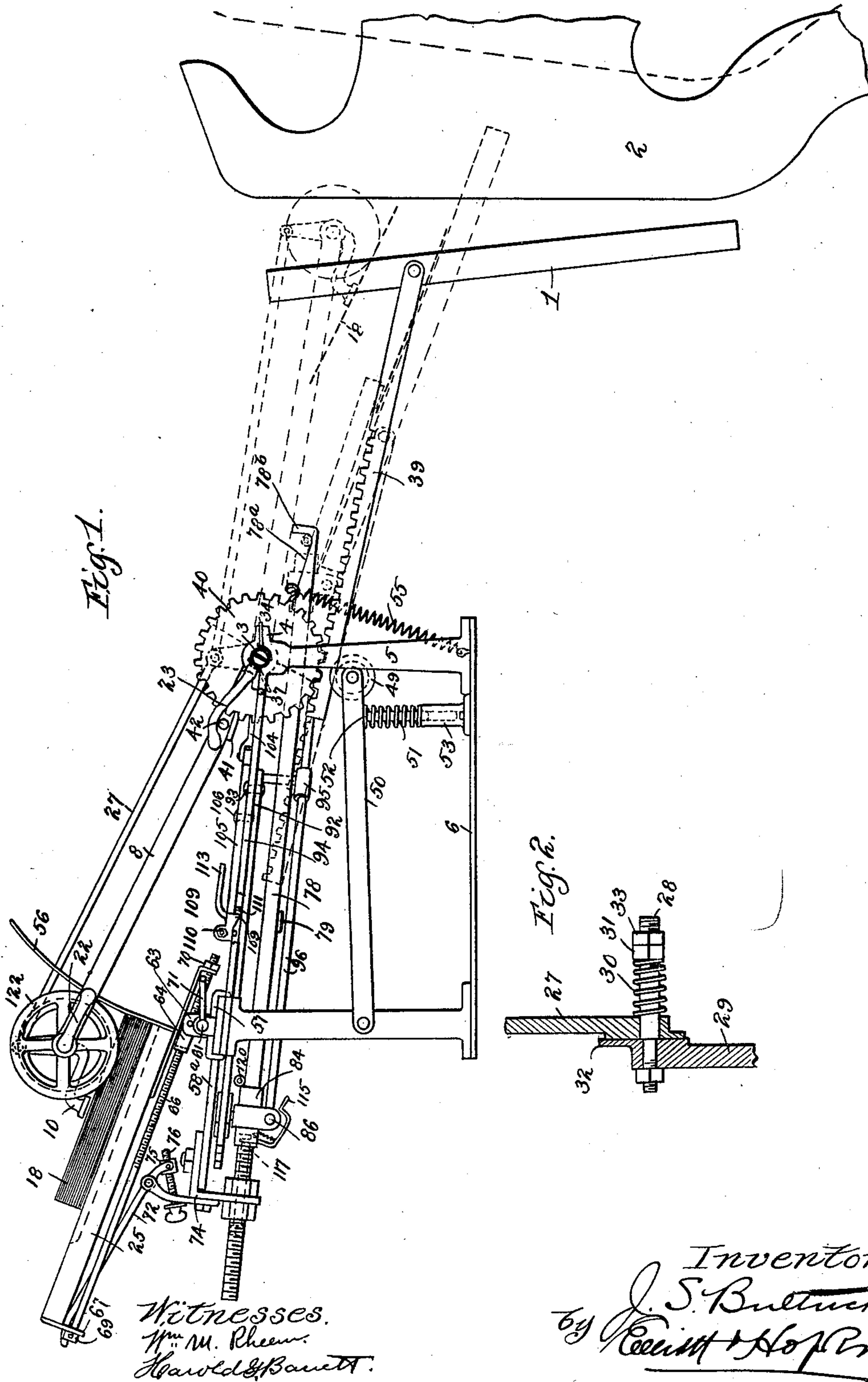
Patented Apr. 24, 1900.

J. S. BULLUCK.
FEEDER FOR PRINTING PRESSES.

(Application filed Mar. 29, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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4 Sheets—Sheet 4.

Fig. 6.

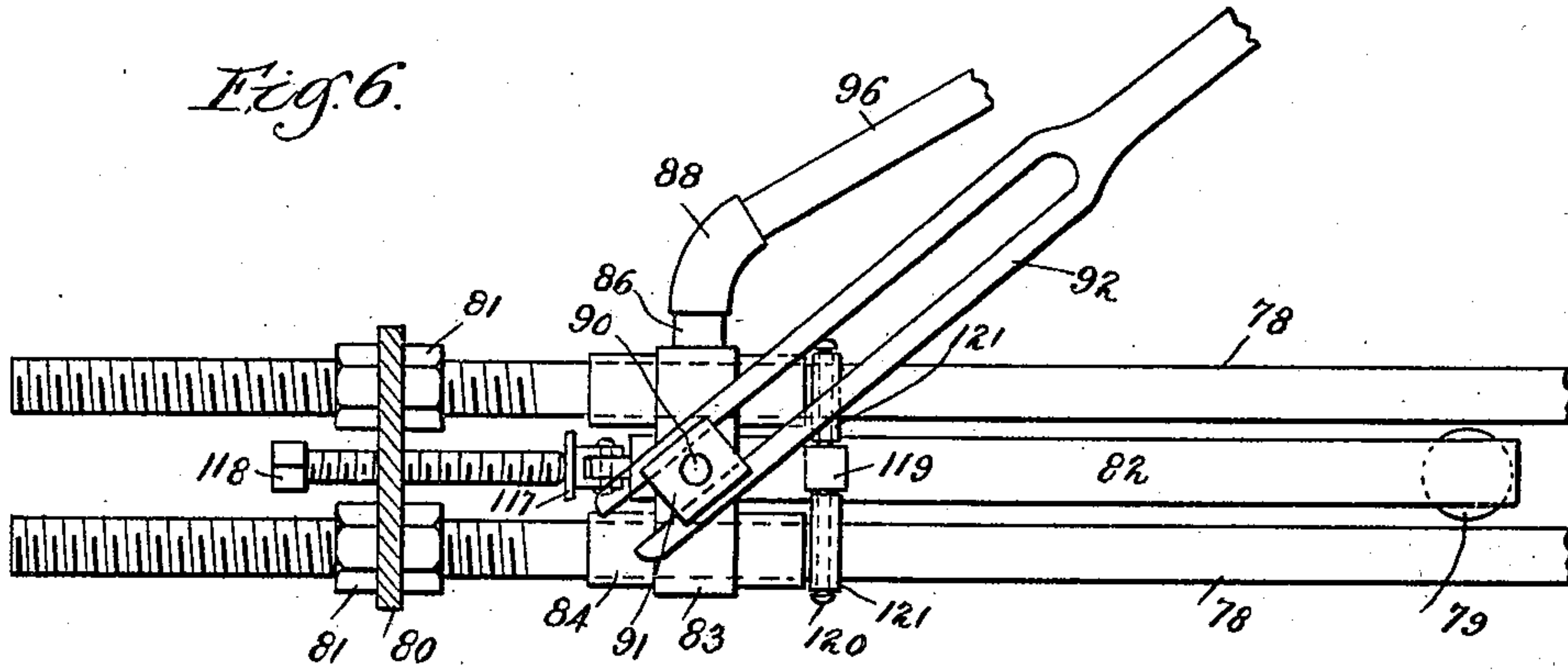


Fig. 7.

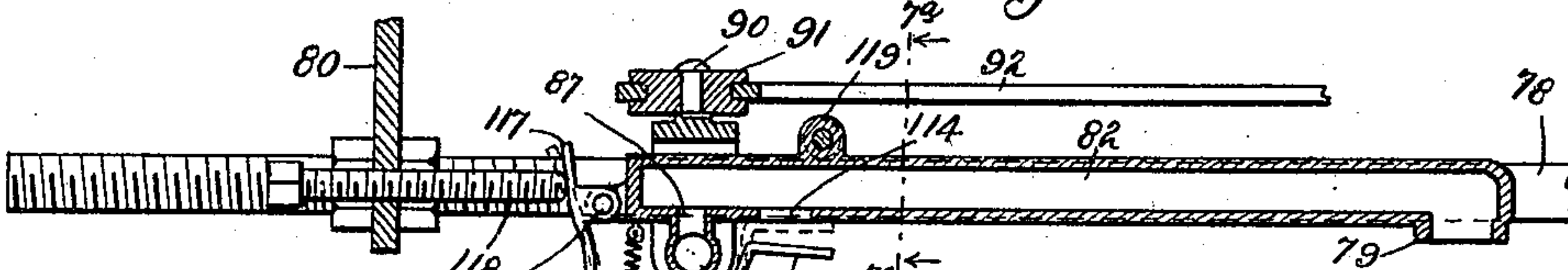


Fig. 7a.

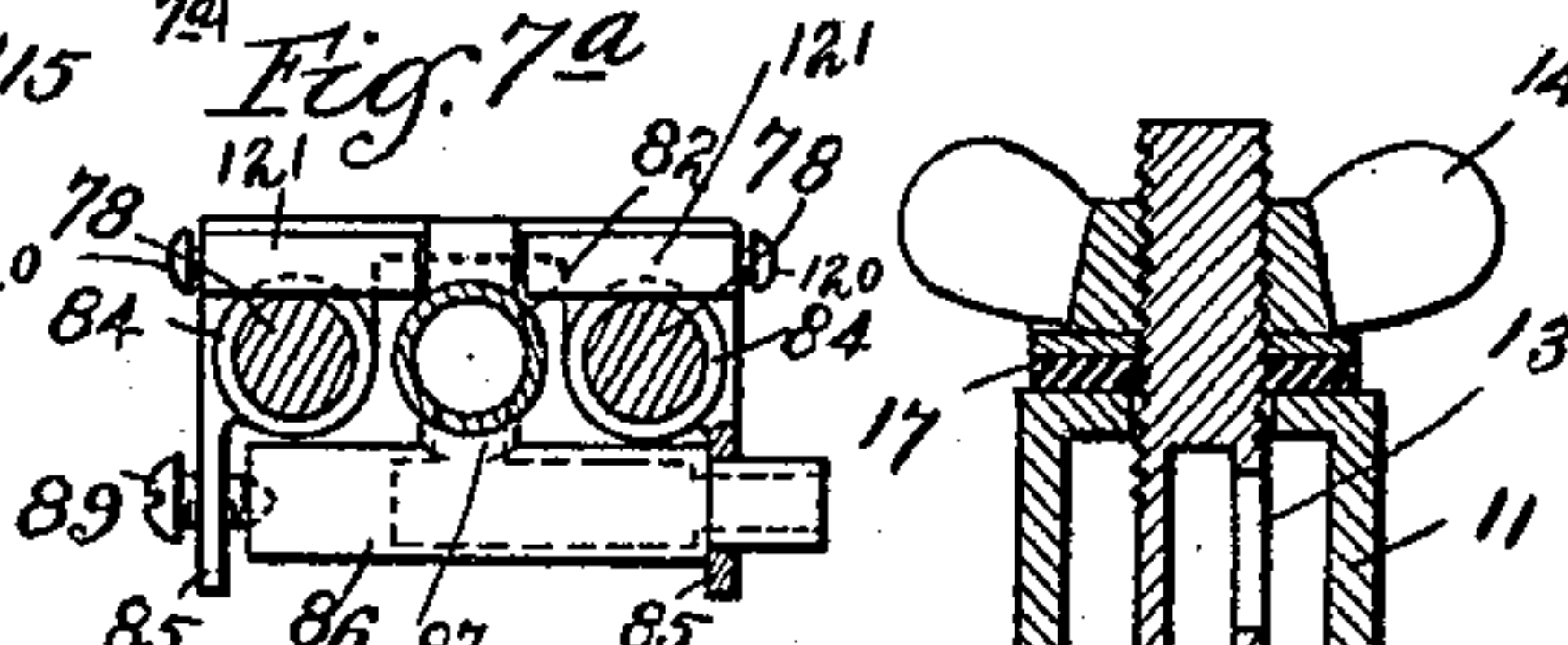


Fig. 10.

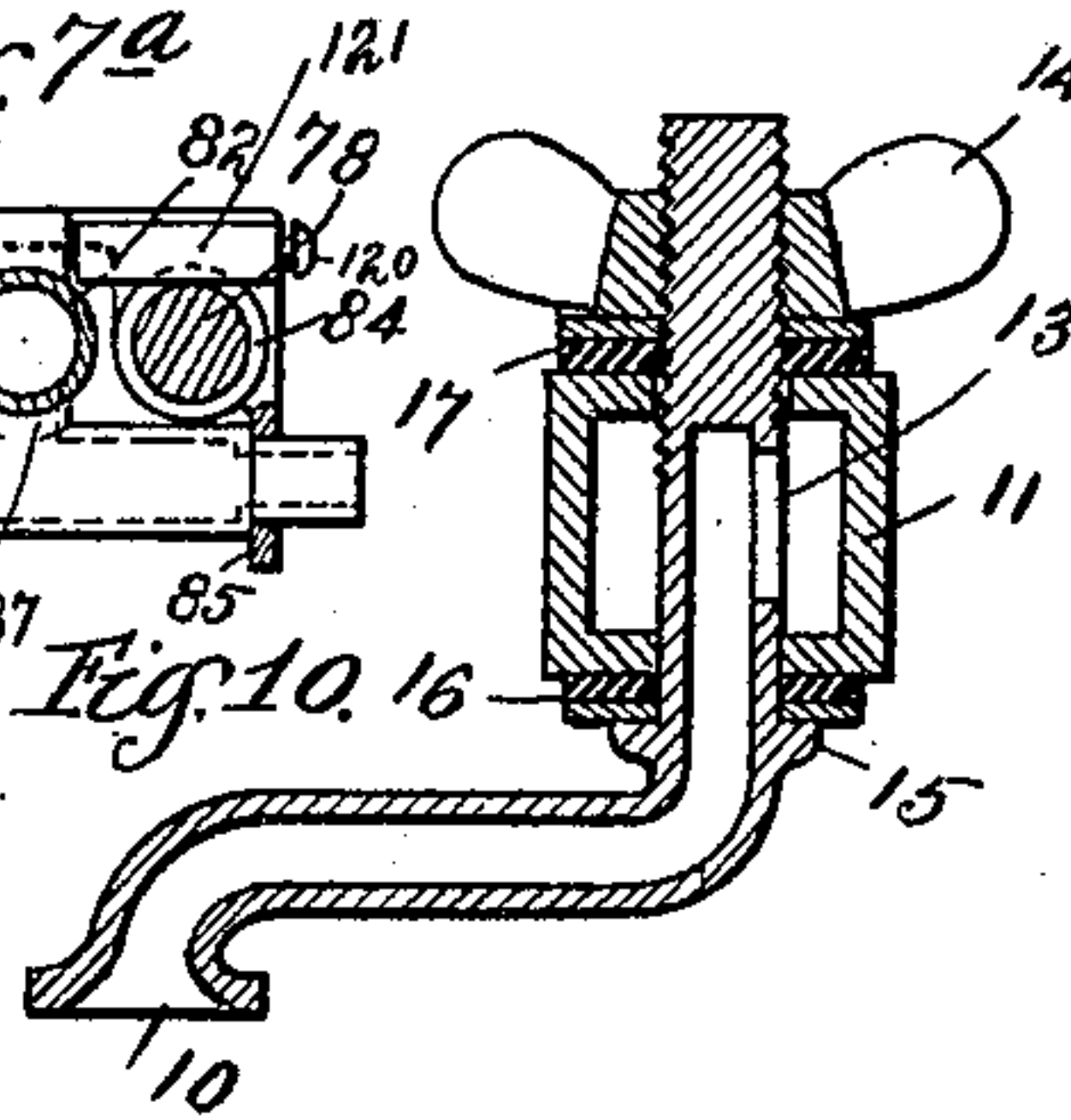


Fig. 8.

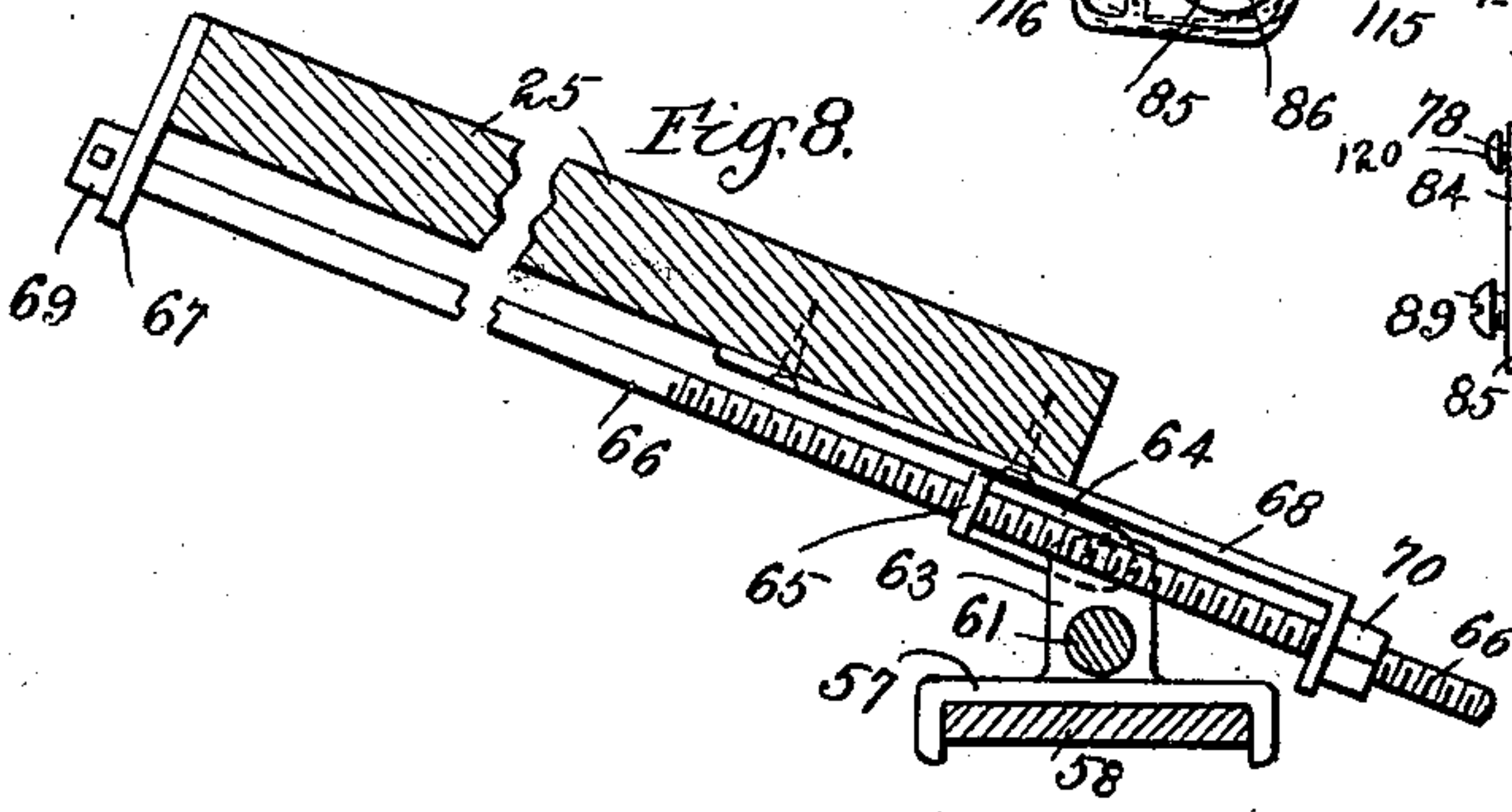


Fig. 9.

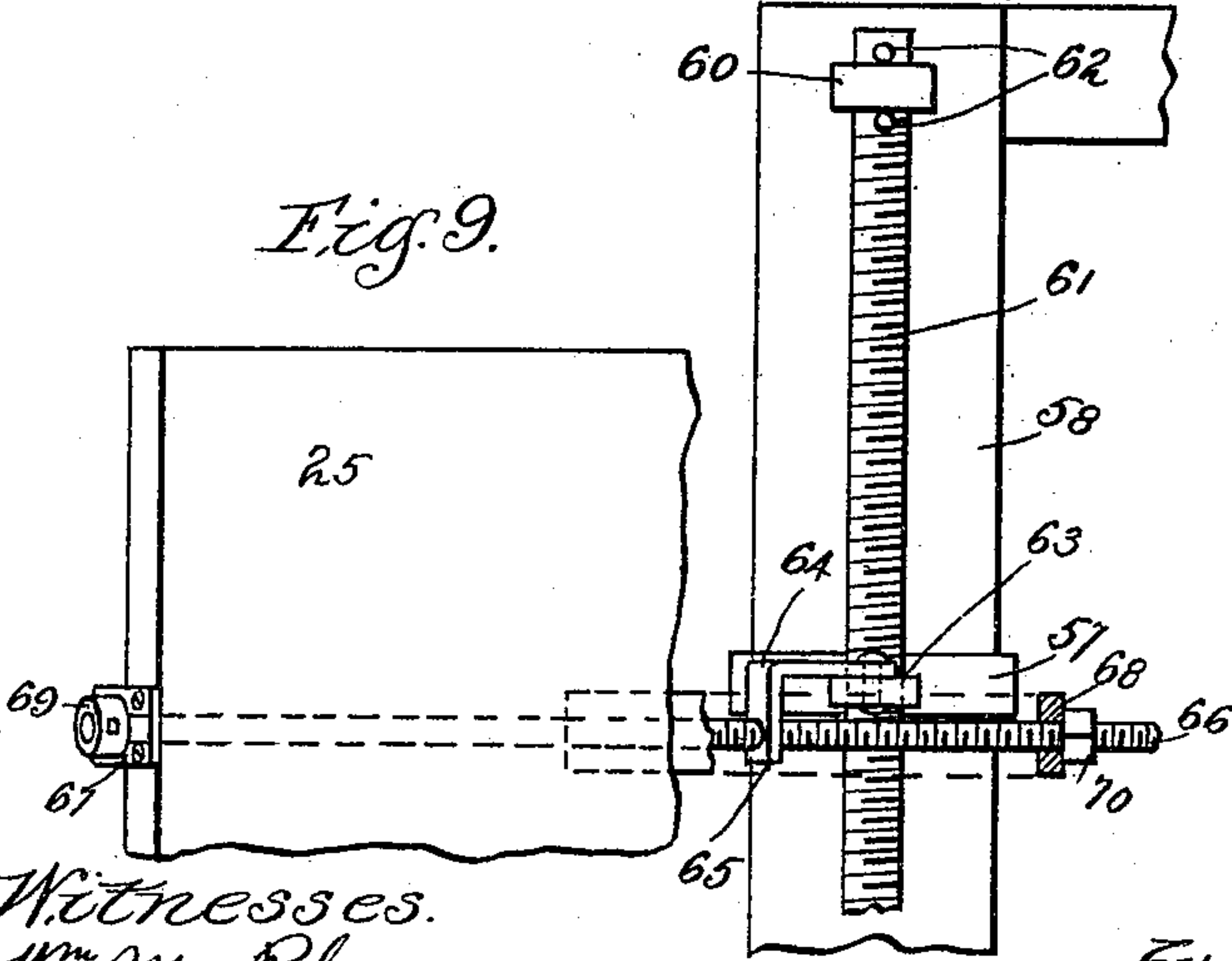
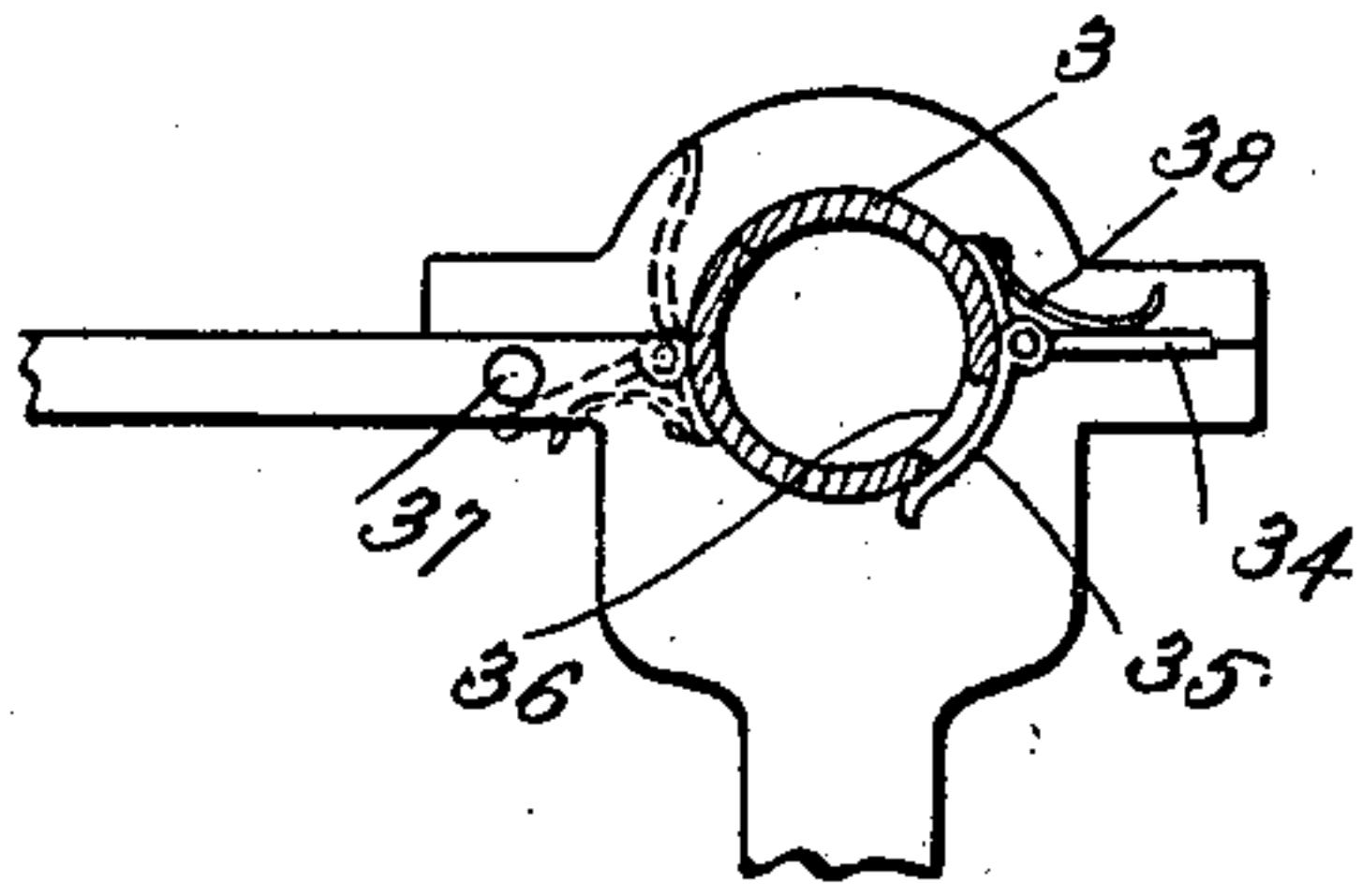


Fig. 11.



Witnesses.
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Inventor
J. S. Bulluck
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att'y's.

UNITED STATES PATENT OFFICE.

JOHN S. BULLUCK, OF RACINE, WISCONSIN, ASSIGNOR OF ONE-HALF TO
J. M. FALVEY, OF SAME PLACE.

FEEDER FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 648,066, dated April 24, 1900.

Application filed March 29, 1899. Serial No. 710,861. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. BULLUCK, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Feeders for Printing-Presses, of which the following is a full, clear, and exact specification.

My invention relates to pneumatic feeders for printing-presses, and more particularly to feeders for flat-platen presses as contradistinguished from cylinder-presses, yet it might be used for depositing a single sheet at a time on the feed-board of the latter form within reach of the grippers.

My invention also relates to a sheet-delivery mechanism combined and operating with the feeding mechanism and being especially designed for delivering or removing from the platen the freshly-printed sheet to a suitable piling-table.

My invention has for its primary object to provide a simple and efficient pneumatic feeder especially adapted for flat-platen presses.

Another object of my invention is to provide improved and simple means for removing or delivering the freshly-printed sheet directly from the platen.

A further object of my invention is to so combine and operate the feeder and delivery that the sheet being fed and the one being delivered may pass each other in transit and thus save time in effecting the complete operation.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a side elevation of my combined feeder and delivery, showing it in connection with a part of a platen printing-press. Fig. 2 is a detail view, on an enlarged scale, of a friction-hold hereinafter described, the same being shown in section. Fig. 3 is a plan view of the apparatus as

shown in Fig. 1. Fig. 4 is a view similar to Fig. 1, but looking from the opposite side of the machine and showing the sheet-carrier in the act of depositing a sheet in full lines and in dotted lines at an intermediate point of its movement. Fig. 5 is an enlarged detail view of the mechanism for tripping the sheet-delivery device hereinafter explained. Fig. 6 is an enlarged plan view, partly broken away, of the sheet-delivery. Fig. 7 is a vertical longitudinal sectional view thereof. Fig. 7^a is a section on the line 7^a 7^a, Fig. 7. Fig. 8 is a cross-section of the feed-board. Fig. 9 is a plan view thereof and of a part of the supporting-frame, showing the longitudinal and transverse adjusting-screws. Fig. 10 is an enlarged detail vertical sectional view of the pneumatic sucker of the sheet-feeder; and Fig. 11 is a transverse sectional view of the hollow shaft and the inlet-valve guarding the inlet-aperture thereof for admitting air to the sucker of the feeder, as will be hereinafter explained.

In illustrating my invention I have shown it in connection with a form of printing-press having a flat oscillating platen as an example of the form to which it is best adapted.

1 represents the platen, and 2 the back legs. The platen in this form of press when at the extremity of its outward movement assumes the position at a wide angle to the back legs or the chase, as shown in dotted lines in Fig. 1; but the invention is applicable to any other form of platen-press.

3 represents a shaft journaled in the upper ends of standards 4 5, which are mounted upon a frame 6, supported on any suitable part of the press—such, for instance, as the usual feed-board, (not shown,)—or, if desired, upon any special support, and mounted loosely upon this shaft 3 is a pair of arms 7 8, whose upper or outer ends are connected together by a cross-shaft 9. The latter shaft is hollow at least from one end to the point where the pneumatic sucker 10 for picking up and holding the sheet is situated. The connection between the sucker 10 and the shaft 9 is established by means of a box 11, into which the ends of the sections of the shaft 9 are hermetically secured, while the sucker 10 is in the

form of a crank, as better shown in Fig. 10, the stem 12 of which passes upwardly through the box 11 and is provided with an air-port 13 in one side within the box, and its upper extremity is screw-threaded above the box and has secured thereon a thumb-nut 14, by means of which a shoulder 15 under the box 11 may be crowded upwardly toward the box, forcing the washer and gasket 16 firmly against the latter and compressing the same around the stem of the sucker, while a gasket 17 is similarly compressed around the stem where it emerges from the upper side of the box. By thus attaching and constructing the sucker it will be seen that I am enabled to adjust it with relation to the surface of the sheet 18, and thereby cause it to contact with either the margin or a more central point on the surface of the sheet, as the nature of the work may require.

Mounted upon the shaft 9, preferably on each side of the sucker 10, is a stop 19, which for convenience and efficiency is in the form of a wheel with an elastic tire 20 and which rests upon the surface of the pile of sheets 18 and prevents the surface or face of the sucker 10 from coming directly in contact with the sheet as it rests over the pile, thus compelling the sheet to float upwardly under the influence of the suction, and thereby admit air between it and the next sheet below and avoid picking up more than one sheet at a time. As shown in Fig. 1, the point of contact between the pile and the stops or wheels 19 and that over which the face of the sucker 10 lies is considerably removed with reference to the height of the sheet, so that while the stops 19 may be holding the sheet down at its lower edge the upper edge of the sheet will be free to rise against the sucker. These stops 19 are adjustable by means of adjusting-collars 21, so as to adapt themselves to sheets of various widths.

The outer extremity of the shaft 9 at one end is connected in any suitable manner to the interior of the arm 8, which is also hollow, the connection being effected, as shown in the drawings, by a section of tubing 22, and the hollow arm 8 is connected by tube 23 to the outer end of the shaft 3, which is also hollow, and the latter is connected at its opposite end by tube 24 to any suitable pump or suction device. (Not shown.)

The shaft 3 is so mounted that the arms 7 and 8 will oscillate or vibrate back and forth between the feed-board 25, which supports the pile of sheets 18, and the platen 1, thus at one time reaching over the feed-board to pick up a sheet and at another extending over the platen, as shown in dotted lines in Fig. 1 and in full lines in Fig. 4, to deposit it in position to be printed. Thus it will be seen that as the arms 7 8 are caused to oscillate back and forth while suction is produced in the shaft 3 the sheets will be lifted by the sucker 10 from the feed-board 25 and will be carried

aloof and then downwardly over and deposited upon the platen, as shown in dotted lines in Fig. 1 and in full lines in Fig. 4. In order, however, that the proper position of the sheet may be maintained throughout its transit, I provide means for holding the sucker against rotation with the balance of the oscillating sheet-carrier thus constituted, so that while the arms 7 8 may make a relative rotary movement around the shaft 9 the latter will maintain its position with reference to the horizontal. This may be best accomplished by providing one end of the shaft 9 with a crank 26, to which is connected one end of a rod 27, whose other end is fixed at a point eccentric to the center of oscillation of the arms 7 8, or, in other words, eccentric to the shaft 3, so that as the arms 7 8 rotate around their center of oscillation, carrying the sucker 10 upwardly and then downwardly with them, the rotation of the shaft 9 will be continually resisted by the crank 26 and rod 27. The lower end of the rod 27 may be pivoted on a pin 28, secured in a standard 29 and having sleeved thereon a coiled spring 30, against which bears an adjusting-nut 31 for regulating the friction of the rod 27 against a friction-face 32, formed on the standard 29, a lock-nut 33 being provided for holding the nut 31 from unscrewing. By means of this friction-hold for retarding the oscillation of the rod 27 it will be seen that when the arms 7 8 reach their perpendicular position, as shown in dotted lines in Fig. 4, the tendency of the rod 27 to lag behind will pull the crank 26 backwardly over the dead-center, and thereby prevent the pull of the rod 27 against the crank 26 from turning the sucker 10 upwardly as the arms 7 8 descend toward the platen. In making the return movement from the position shown in Fig. 5 to the position shown in full lines in Fig. 1 the retarding action of the friction-hold 30 31 will have a similar effect in pushing the crank 26 past the dead-center or over onto the side next the press, so that the crank 26 will at all times be in substantially an upright position.

When the arms 7 8 have descended sufficiently close to the surface of the platen to make it safe to release the sheet 18 from the sucker, a crank-arm 34, secured to and controlling an air-admission valve 35, guarding a port 36 in the shaft 3, comes in contact with a trip-lug 37, secured to the frame of the machine, and thus admits air to the shaft 3 and destroys the suction against the sheet, which is thereby allowed to drop onto the platen. When the arms 7 8 make a return movement, the valve 35 is automatically closed by a spring 38.

The arms 7 8 receive their oscillatory movement from some moving part of the press, preferably the platen 1, to which is pivoted one end of a rack-bar 39, whose other end engages under a pinion or cog-wheel 40, secured rigidly to the shaft 3, but having a lug 41,

which engages with a pin 42 on the arm 8. This pinion 40 is shown complete or circular, but as a matter of fact only a segment thereof, the lower half on which the lug 41 is not situated, is utilized in the rotation of the shaft 3. On the other end of the shaft 3 is secured a disk 43, having a similar lug 44, engaging with a pin 45 on the arm 7. The motion of the shaft 3, derived from the pinion 40 and rack-bar 39, is communicated to the arms 7 8 through the intermediary of an elastic or yielding medium, such as two coil-springs 46, coiled one on each end of the shaft and each being secured by lug 47 at one end to the shaft and at its other end by lug 48 to the hubs of the arms 7 8, respectively, which, as before explained, are loose on the shaft. The springs 46 are so wound as to produce a normal tendency to force the lugs 41 44 upwardly against the under sides of the pins 42 45, so that if need be the lugs 41 44 may turn downwardly away from the pins should the shaft 3 continue to rotate after the stop-wheels 19 come to rest on the pile of paper. This yielding action is important, because it is readily seen that since the height of the pile is continually varying, requiring a greater movement or throw of the arms 7 8 at one time than at another, while the reciprocating movement of the rack-bar 39 and the consequent rotary movement of the shaft 3 remain the same at all times, the pinion 40 must be capable of carrying the sucker 10 downwardly to the surface of a pile of the minimum height, while at the same time it must be capable of continuing its rotation after the sucker 10 has come to rest on a pile of the maximum height. Therefore when the stop-wheels 19 come against a high pile the lugs 41 44 turn downwardly away from their pins 42 45, while the stop-wheels are held in firm contact with the surface of the pile by the motion of the shaft 3, communicated to the arms 7 8 through the intermediary of the springs 46, and they are held down in firm contact until the lugs 41 44 again rise into engagement with their respective pins on the arms 7 8.

In order that the rack-bar 39 may maintain its engagement with the pinion 40 and at the same time follow the irregular motion of the platen 1, it is supported by a grooved roller 49 on the end of an arm 50, which is in turn supported by spring 51, coiled around a stem 52, projecting downwardly from the arm 50 and entering a standard 53, which constitutes an abutment for the lower end of the spring.

The arms 7 8 are counterbalanced by means of weights 54, secured to the under sides of their hubs, and their movement as they near the surface of the pile is also retarded by springs 55, which prevent the stop-wheels 19 from coming into too violent engagement with the paper, and they also serve to relieve the shock when the sheet-carrier comes to rest on the platen, the upper ends of the springs being attached to the lower sides of the

weights 54 at a point diametrically opposite the arms 7 8, so as to resist the movement of the arms from both sides of the perpendicular.

The sheets 18 are supported upon any suitable feed-board, such as the board 25 already referred to, whose lower or forward edge may be provided with upwardly-extending arms 56, against which the paper is piled, and these arms may be curved concentrically with the arc described by the arms 7 8, so as to avoid colliding with the edge of the sheet as it rises with the sucker 10. It is important that this board 25 be adjustable both as to its inclination and its position with reference to the arms 7 8 both longitudinally and transversely. To this end I pivot the board upon a longitudinal axis and make its pivotal supports adjustable transversely of the arms 7 8.

57 represents slides which are mounted upon a member 58 of the frame, which is supported by standards 59, rising from the base-frame 6, and journaled in suitable bearings 60 on the member 58 is a shaft 61, which is screw-threaded, but held against longitudinal movement by stop-pins 62, and this shaft passes through a nut 63, rising from each of the slides 57, and pivoted to each of the nuts 63 is an arm 64, carrying or having formed thereon a nut 65, through which passes a threaded shaft 66, arranged under and transversely of the board 25, the shaft 66 being supported in suitable hangers 67 68, secured to the board 25. The upper end of each of the shafts 66 is provided with a turning-head 69, while the lower end is provided with a nut 70 for holding the shaft against endwise movement. Thus it will be seen that by rotating the shaft 61, which may be provided at one end with a crank 71 for the purpose, the board 25 may be shifted from side to side without altering its inclination, or by rotating the shafts 66 the board may be shifted from front to rear—that is, upwardly or downwardly in its own plane—without changing its inclination.

In order that the inclination of the board may be readily altered without otherwise changing its position, I support the rear or upper side thereof by means of an arm or lever 72, upon the upper end of which the board loosely rests. This lever is pivoted in a standard 73, which is secured to a rearwardly-projecting portion 58^a of the frame member 58 by means of a bracket 74. The lower end of the lever 72 has pivotally secured to it a nut 75, through which passes an adjusting-screw 76, which also passes through the standard 73 and whose head takes a bearing against the rear side thereof. Thus by rotating the screw 76 the upper end of the lever 72 may be raised or lowered and the inclination of the board 25 accordingly varied.

77 is an ordinary gage-plate secured to the face of the board 25.

Having explained the means for depositing a single sheet at a time on the platen of the

press with readiness to be printed, I will now describe the delivery or means for picking the sheet from the platen and conveying it to the piling-table, while the feeder, having conveyed a sheet to the platen, is about to deposit the same thereon.

Arranged under the shaft 3 and projecting forwardly and downwardly a sufficient distance to be slightly over the upper edge of the platen when the latter is at the extremity of its upward and outward movement is a pair of guide-rods 78, constituting a way upon which the sucker 79 of the sheet-delivery slides. These guide-rods 78 are preferably supported at their rear ends only by means of a bracket 80, which projects downwardly from the portion 58^a of the frame member 58, the upper ends of the rods 78 being screw-threaded and firmly bound to the bracket 80 by means of nuts 81. The sucker 79, which is best shown in Figs. 6 and 7, consists of a mouth portion formed on the lower side of the forward end of a tube 82, which is located between the rods 78 and is pivotally supported on a sliding carriage 83, having sleeves 84, embracing and sliding on the rods 78, respectively. The lower side of the carriage 83 is provided with depending ears 85, through which passes a cross-tube 86, which communicates through neck 87 with the interior of the tube 82. This tube 86, being closed at one end and open at the other, constitutes at once a pivot for the tube 82 and a means of connection with a flexible tube 88, through which the air is exhausted from the tube 82 and the sucker 79 rendered effective. The end of the cross-tube 86 opposite that to which the tube 88 is secured may be closed by screw 89, which also serves to hold the tube 86 in place. The upper side of the carriage 83 is provided with a pivot-pin 90, upon which is pivoted a stud 91, having its edges grooved and receiving the two members of a bifurcated arm 92, which is pivoted at 93 to the under side of a member 94 of the frame. The under side of the arm 92 is also provided with an eye or bracket 95, through which slides a pipe 96, having one end coupled to the pipe 86 by the flexible tube 88, above referred to, and its other end attached to any suitable tube 97, leading off to an exhauster. (Not shown.) By this means it will be seen that as the arm 92 oscillates back and forth, causing the carriage 83 to reciprocate on its ways 78, the tube 96 will be carried back and forth with it and the connection with the exhauster continually maintained. The arm 92 is given its return movement or movement away from the platen by means acting independently of the power which actuates the sheet-carrier, preferably by means of an ordinary coil-spring 99, whose rear end is attached to a rearwardly-extending bracket 100, secured to the frame member 58, while its forward end is hooked to the arm 92. The forward movement of the arm 92 is effected by means op-

erating in unison with the mechanism which actuates the sheet-carrier arms 7 8. This is accomplished by providing the shaft 3 with a crank-arm 101, carrying a ball-wrist 102, which enters a socket 103, pivotally connected by rod 104 to one end of a lever 105, which in turn is pivoted to the upper side of the frame member 94, as shown at 106, the pivotal connection between the lever 105 and the rod 104 being effected by means of a collar 107, mounted on a pivot-pin 108, extending longitudinally of the lever 105. Thus it will be seen that a universal-joint connection between the lever 105 and crank 101 is established and the parts are allowed free movement in any position they may assume. As shown in Fig. 4, the connecting-rod 104 is curved downwardly under the end of the shaft 3 to permit the crank 101 to make a half-turn with the shaft 3. The other end of the lever 105 is provided with a latch or dog 109, which is secured to the lever 105 by pivot 110, so as to be capable of vertical deflection, and this dog 109 engages with a pin or lug 111, projecting from the upper side of the arm 92, the rear side of the dog being beveled, as shown in Fig. 1, so as to enable it to slide over the pin 111 when the lever 105 makes its return or rearward movement. By this means it will be seen that, assuming the parts to be in the position shown in full lines in Figs. 1 and 3, a half-turn, approximately speaking, of the shaft 3 will cause the sheet-carrier, with the sucker 10 and sheet adhering thereto, to rise from the pile of paper and descend upon the platen, while the lever 105 will force the carriage 83 downwardly along the guide-rods 78 and project the sucker 79 over the sheet 18 as it rests upon the platen in readiness to pick up the sheet and convey it to the rear, as shown in dotted lines in Figs. 1 and 3 and in full lines in Fig. 4. After the sucker 79 has gained possession of the sheet on the platen the dog 109 is tripped by the further downward movement of the sheet-carrier, which is conveying a new sheet to the platen. This may be accomplished by means of a trip-pin 112, secured to the hub of the arm 7 in such a position as to engage with a tailpiece 113, projecting from the dog 109, as better shown in Fig. 5, thus lifting the dog out of engagement with the lug 111 and permitting the arm 92 to be quickly withdrawn by the spring 99, thereby forcing the sheet-delivery back into the position shown in full lines in Figs. 1 and 3. When the delivery arrives at the rear end of its movement, it is compelled to release the sheet adhering to the sucker 79 and to drop the same upon any suitable piling-table (not shown) arranged under the frame 6 and which may be the ordinary feed-board of the press by automatic means for admitting air to the sucker 79 and destroying the partial vacuum or suction created therein. This may be accomplished by providing the under side of the tube 82 with an air-ad-

mission port 114, which is normally closed by valve 115, pivoted at 116 to the rear end of the tube 82 and having a lever 117, which is adapted to come against an abutment 118, composed of a screw adjustably secured in the bracket 80, so that when the carriage 83 arrives at the rear end of its movement the sheet will be automatically released from the sucker 79.

10 In order that the sucker 79 may conform or adapt itself to the surface of the platen and rest gently upon the sheet thereon, the tube 82 on which it is formed is allowed to drop freely at its forward end when it reaches the
15 extremity of its forward movement. The rear end of the tube 82 being pivotally supported from the carriage 83, as before explained, I provide the upper side thereof with a rest or support upon the rod 78. This support consists of an ear 119, through which
20 passes a pin 120, carrying antifriction-rollers 121, which run along the bars 78, and when they arrive at the forward ends of the bar 78 they drop into notches or inclines 78^a,
25 formed thereon, as clearly shown in Fig. 1, thus permitting the sucker 79 to drop freely and loosely upon the sheet as it rests on the platen. The extreme ends of the bars 78 may be formed with stops 78^b for guarding
30 against the dislodgment of the supporting-rollers 121.

The parts are so proportioned and timed that the sheet-delivery moves forwardly or toward the platen in unison with the sheet-
35 carrier for conveying a sheet to the platen and the sucker 79 of the sheet-delivery comes into contact with the printed sheet on the platen just before the sheet carried by the sheet-carrier is deposited, and in order that
40 neither the sucker 10 of the sheet-carrier nor the stop-wheels 19 thereof may bear upon the printed sheet I provide the transverse shaft 9 with additional rubber-tired stop-wheels 122, arranged at a wide distance apart, so as
45 to bear against the outer margins of the platen, and thus support the parts, as before described, without interfering with the removal of the sheet by the sheet-delivery. When the sheet-carrier returns to its normal position over the feed-board 25, the larger stops
50 122 are received in grooves 123, formed in the surface of the board, so as to permit the smaller stops 19 to descend into contact with the surface of a pile of minimum height.

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

1. The combination with a printing-press of an oscillating sheet-carrier provided with
60 a pneumatic sucker for picking up the sheet, and stops adapted to rest against the sheet for holding the sucker aloof therefrom, substantially as set forth.

2. The combination with a printing-press
65 of an oscillating carrier provided with a sucker for picking up the sheet and a stop having a

bearing independently of or extraneously to the sheet on the platen for holding said sucker aloof from the sheet while on the platen, substantially as set forth. 70

3. The combination with a printing-press of an oscillating sheet-carrier provided with a sucker for picking up the sheet, a stop for holding the sucker aloof from the sheet on the pile and a second stop for holding said first
75 stop and sucker aloof from the sheet on the platen, substantially as set forth.

4. The combination with a printing-press having a feed-board, of an oscillating sheet-carrier vibrating between the feed-board and
80 place of delivery of the sheet to be fed, and an operative connection between the press and the carrier having a spring through the medium of which it oscillates said carrier, whereby said connection may have a limited
85 movement independently of the carrier, substantially as set forth.

5. The combination with a printing-press of an oscillating sheet-carrier vibrating between the feed-board and platen, a shaft on
90 which said carrier is loosely mounted and to which the carrier is attached through an elastic medium, a pinion on said shaft and a rack connected with the press and engaging said pinion for rocking said shaft, substantially
95 as set forth.

6. The combination with a printing-press of an oscillating sheet-carrier vibrating between the board and platen, a shaft on which the carrier is loosely mounted and to which
100 the carrier is attached through an elastic medium, the pinion on the shaft, a rack connected with the press and engaging said pinion, a lug having a fixed relation to said pinion and moving therewith, and a pin projecting from the
105 carrier into the path of said lug, substantially as set forth.

7. The combination with a printing-press of an oscillating carrier having a rotary shaft, a sucker mounted on said shaft, a crank on
110 said shaft, a rod having one end attached to said crank and its other end fixed at a point eccentric to the center of oscillation of said carrier, and means for retarding the oscillation of said rod, substantially as set forth. 115

8. The combination with a printing-press and a feed-board of a sheet-carrier having a pivoted sucker for picking up the sheet, adjustable in an arc around its pivot, and in a plane parallel with the face of the feed-board,
120 substantially as set forth.

9. The combination with a printing-press of a sheet-carrier having stops adapted to rest upon the pile of paper and a sucker for picking up the sheet arranged at a point between
125 the edge of the sheet and said stops whereby the edge of the sheet will be free to rise, substantially as set forth.

10. The combination with a printing-press of a sheet-carrier having a rotary shaft, circular stops mounted on said shaft and adapted to rest upon the pile of paper and a sucker
130

located between and held aloof by said stops for picking up the sheet, substantially as set forth.

11. The combination with a printing-press of a hollow shaft 3, arms loosely mounted upon said shaft and one of which is hollow, a hollow cross-shaft 9 mounted in said arms, a sucker carried by said cross-shaft and communicating therewith, a connection between said cross-shaft and hollow arm and between said hollow arm and shaft 3, a suction-tube connected with said hollow shaft 3, a valve for admitting air to said shaft 3, a trip for automatically opening said valve, a yielding connection between shaft 3 and said arms and means for rocking said shaft 3, substantially as set forth.

12. In a feeder for printing-presses the combination of a carrier for conveying the sheet to the platen and a feed-board adjustable independently transversely and vertically and being rotatable on a longitudinal axis whereby its inclination may be varied, substantially as set forth.

13. In a feeder for printing-presses the combination of a carrier for conveying the sheet to the platen, a feed-board, a threaded shaft, nuts on said shaft and to which nuts said board is pivotally connected, a second set of nuts connected with said first nuts respectively, threaded rods passing through said second nuts and upon which said board is supported, said rods and shaft being arranged transversely, substantially as set forth.

14. In a feeder for printing-presses the combination of a carrier for conveying the sheet to the platen, a feed-board pivoted on a longitudinal axis, means for shifting said board longitudinally and transversely and a vertically-movable support upon which the rear or upper edge of said board rests, substantially as set forth.

15. In a feeder for printing-presses the combination of a carrier for conveying the sheet to the platen, a feed-board pivoted on a longitudinal axis, a standard, a lever pivoted in said standard and supporting the rear side of said board, a nut carried by said lever and an adjusting-screw passing through said standard and nut, for adjusting the inclination of said board, substantially as set forth.

16. The combination with a printing-press having a platen and a feed-board, of a sheet-feeder extending back and forth alternately over the feed-board and platen and a sheet-delivery moving in a plane below said feeder and having a sucker for picking up the sheet on the platen, said feeder and delivery approaching the platen simultaneously, substantially as set forth.

17. The combination with a printing-press having a platen and a feed-board, of a sheet-feeder extending back and forth alternately over the feed-board and platen and a sheet-delivery movable toward the platen in unison with the sheet-feeder and movable from the

platen independently of said feeder, substantially as set forth.

18. The combination with a printing-press having a platen, of a sheet-feeder and sheet-delivery both approaching the platen simultaneously and the delivery in advance of the feeder and means for returning the delivery before the feeder reaches the platen, substantially as set forth.

19. The combination with a printing-press having a platen, of a sheet-feeder oscillating to and from the platen in a vertical plane and a reciprocating sheet-delivery approaching the platen in unison with but in advance of the said feeder, substantially as set forth.

20. The combination with a printing-press having a platen and a feed-board, of a sheet-carrier for conveying the sheet to the platen, a sheet-delivery having means for picking the sheet from the platen, movable toward the platen in unison with the carrier, independent means for moving the delivery from the platen and a trip actuated by the movement of the carrier for releasing the delivery and permitting it to return with the sheet, substantially as set forth.

21. The combination with a printing-press having a platen of a way or track projecting toward the platen, a carriage mounted on said track, a sucker carried by said carriage and adapted to be projected over the platen for picking up the sheet thereon, a pivoted arm having operative connection with said carriage and means for oscillating said arm, substantially as set forth.

22. The combination with a printing-press having a platen, of a track or way extending toward said platen, a sliding sheet-delivery mounted thereon and having a sucker adapted to pick up the sheet on the platen, a pivoted arm having operative connection with said sliding delivery, a lever, a detachable connection between said arm and lever, for forcing said arm in one direction, independent means for pulling said arm in the other direction, means for oscillating said lever and a trip for releasing said lever from its connection with said arm, substantially as set forth.

23. The combination with a printing-press having a platen of a way extending toward said platen, a sliding sheet-delivery mounted on said way and having a sucker for picking up the sheet, a pivoted arm connected to said sliding sheet-delivery, a rock-shaft 3, a crank on said shaft, a pivoted lever having detachable connection with said arm at one end and a universal-joint connection with said crank at the other end, and an operative connection between said rock-shaft and the printing-press, substantially as set forth.

24. The combination with a printing-press having a platen, of guide-bars constituting a way extending toward said platen and having their forward ends downwardly inclined, a carriage mounted on said guide-bars, a

sucker-tube pivoted at one end to said carriage, a support for said sucker-tube resting upon said guide-bars, means for connecting said tube with an exhausting device and
5 means for reciprocating said carriage, substantially as set forth.

25. The combination with a printing-press, of a sheet-feeder, a pinion by means of which said sheet-feeder is operated, a rack-bar con-

nected to the printing-press and engaging to said pinion, the idler 49 supporting said rack-bar and a spring or cushion supporting said idler, substantially as set forth.

JOHN S. BULLUCK.

Witnesses:

PETER BERING NELSON,
LARA DAVIES.