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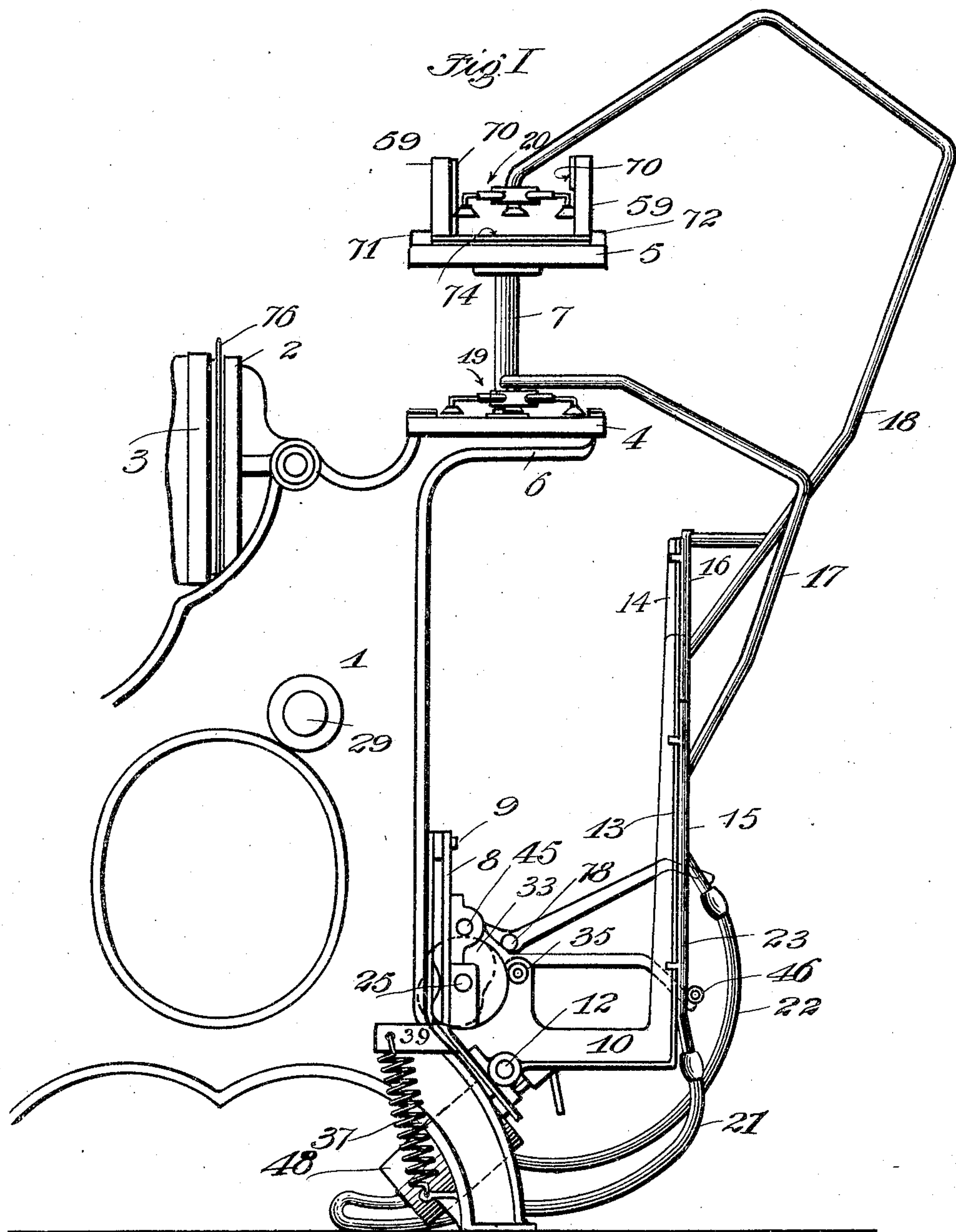
PATENTED MAY 16, 1905.

P. F. RICE.

PAPER FEEDING AND DELIVERY MECHANISM FOR PRINTING PRESSES.

APPLICATION FILED OCT. 7, 1903.

5 SHEETS—SHEET 1.



WITNESSES

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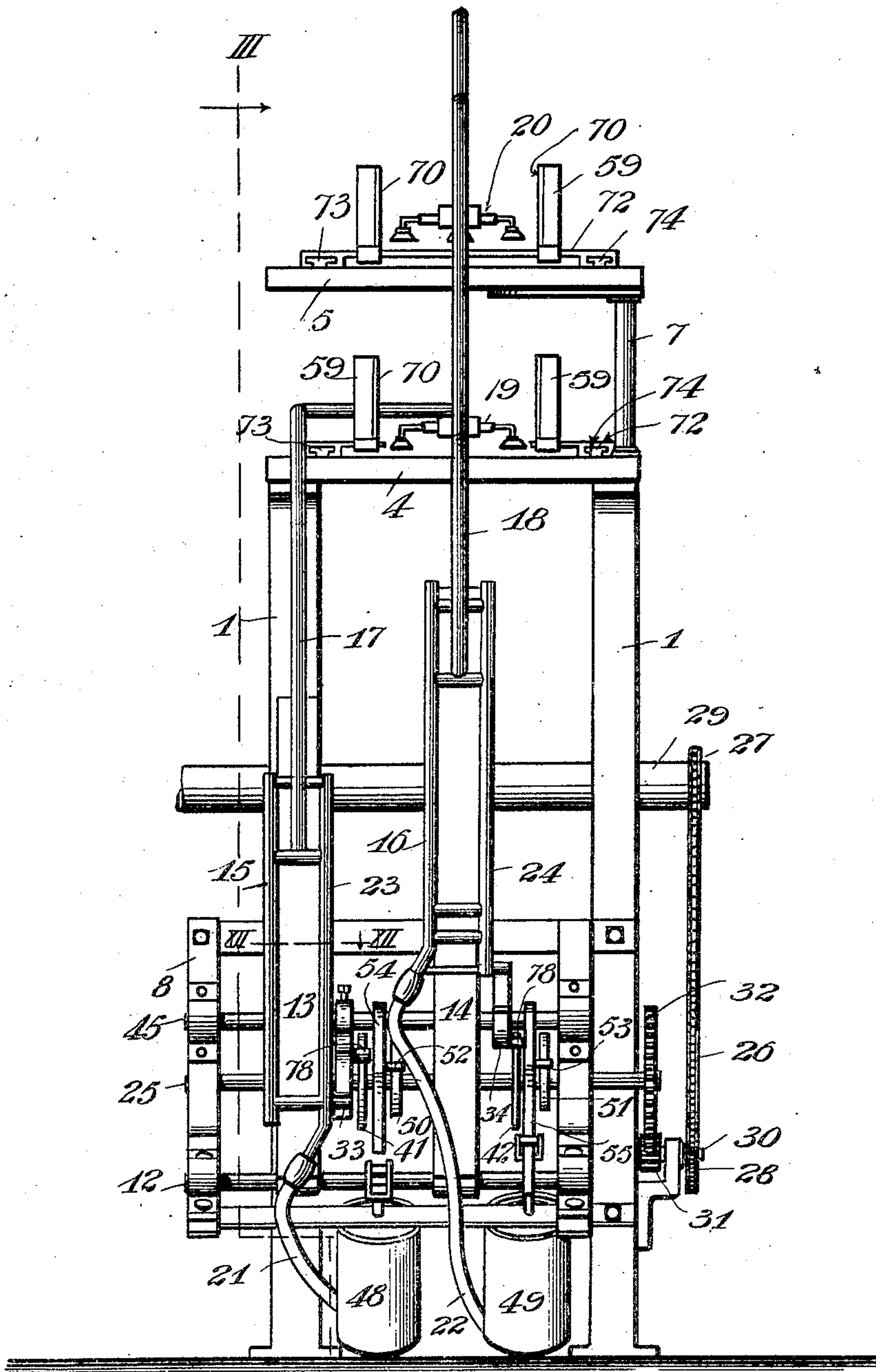
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Fig. II



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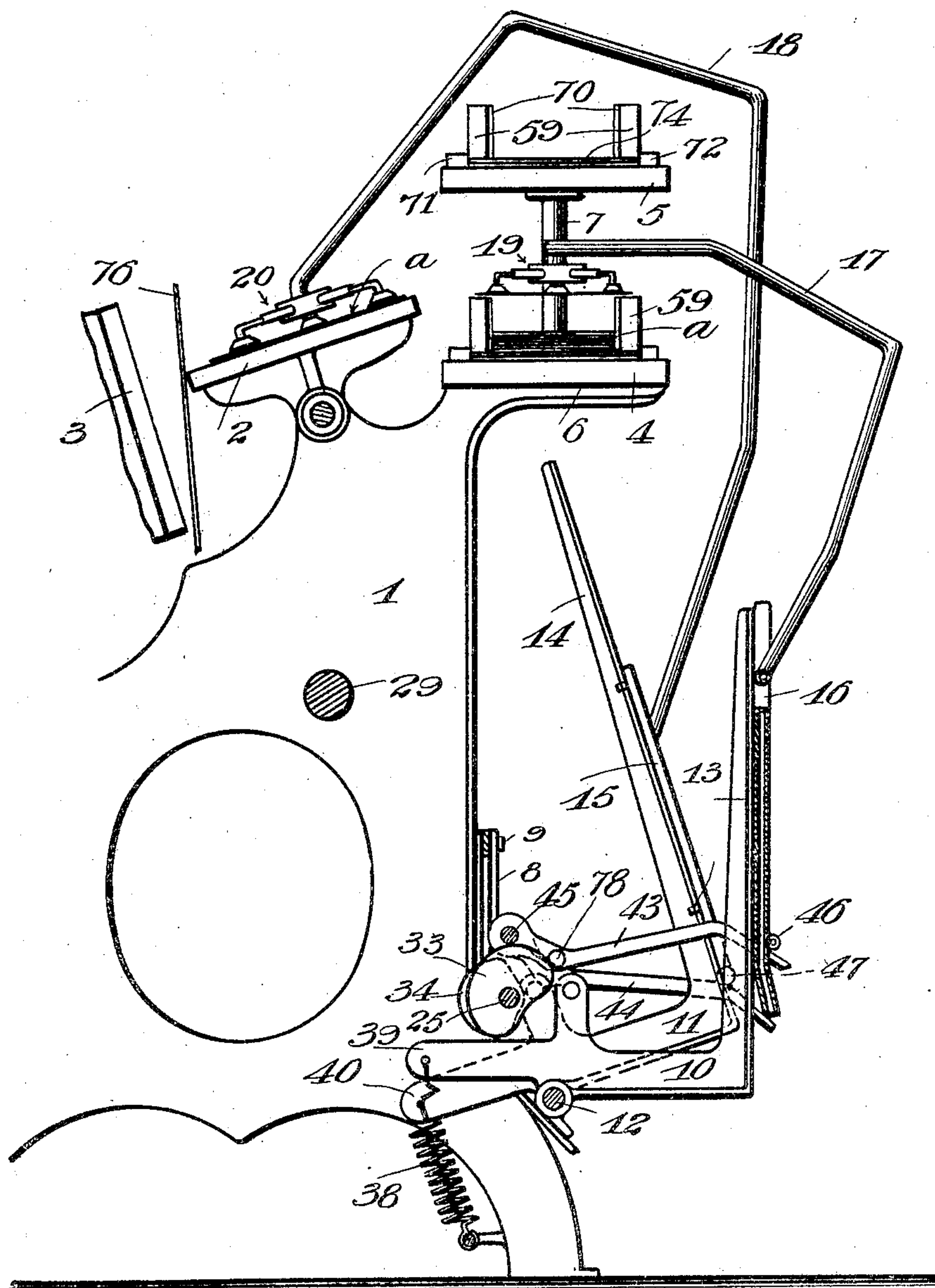
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Fig. III



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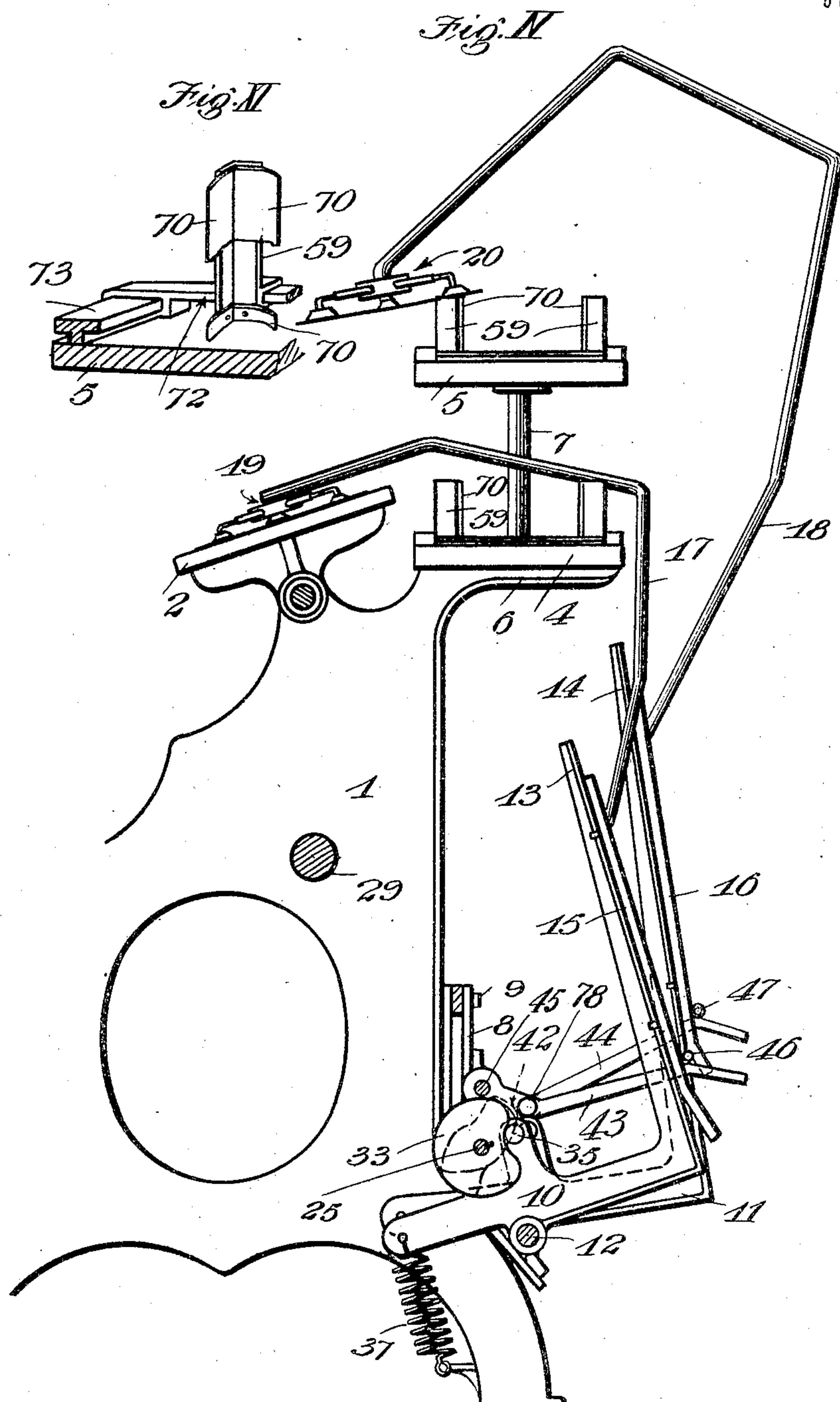
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5 SHEETS—SHEET 4.



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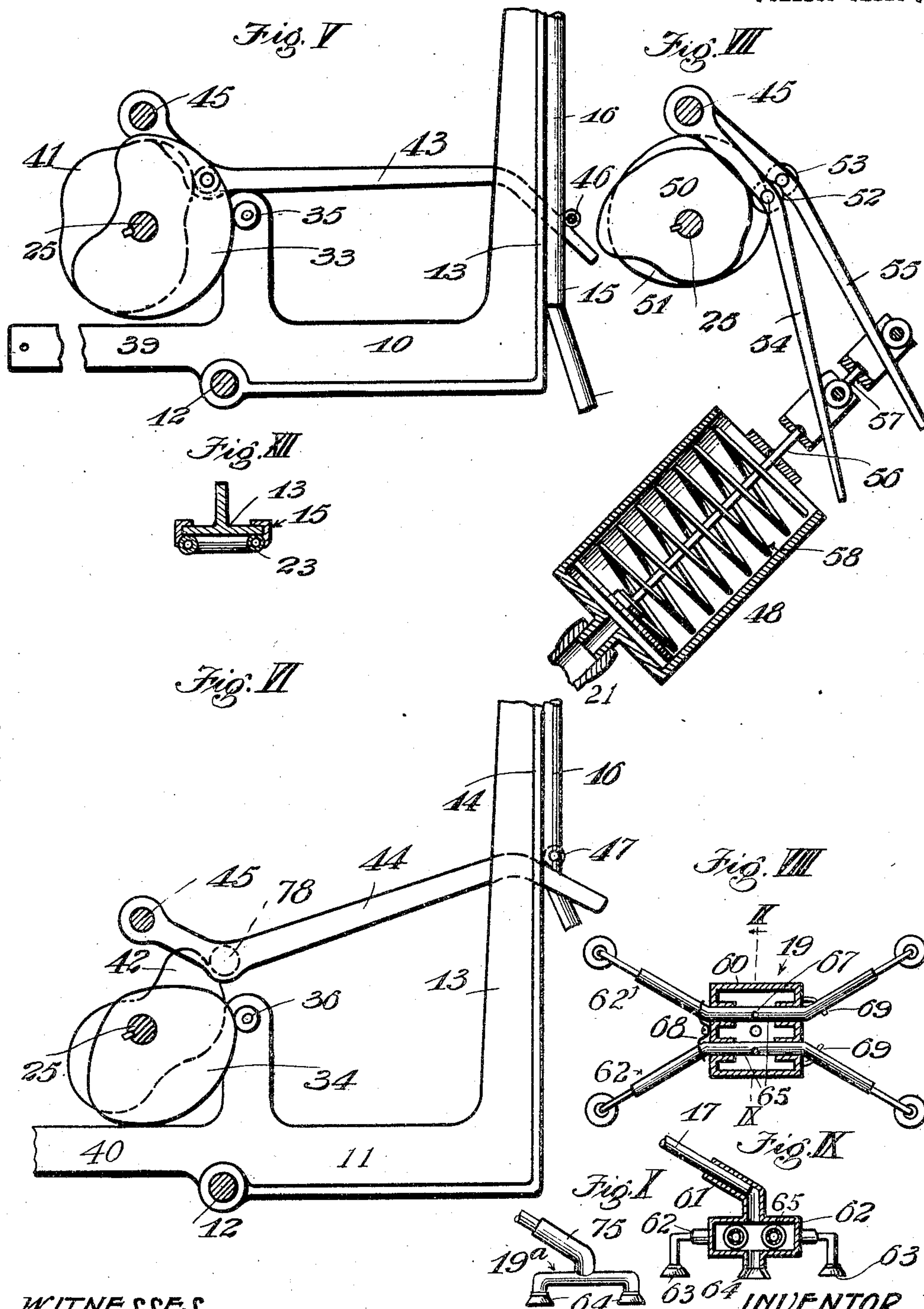
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5 SHEETS—SHEET 5.



WITNESSES

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PERCY F. RICE, OF TUSTIN, CALIFORNIA.

PAPER FEEDING AND DELIVERY MECHANISM FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 789,881, dated May 16, 1905.

Application filed October 7, 1903. Serial No. 176,051.

To all whom it may concern:

Be it known that I, PERCY F. RICE, a citizen of the United States, residing at Tustin, in the county of Orange and State of California, have
5 invented a new and useful Paper Feeding and Delivery Mechanism for Printing-Presses, of which the following is a specification.

This invention is particularly intended for use in connection with printing-presses hav-
10 ing an oscillating platen, although certain features of it are applicable in connection with other forms of presses.

The primary object of the invention is to provide a paper-sheet feeding and delivery
15 mechanism for printing-presses of this character which will operate with the extreme rapidity required for the successful operation of such presses and in a smooth easy man-
ner, avoiding damage to the paper, as well as
20 unnecessary noise, jar, and wear.

A further object of the invention is to provide a feeding and delivery device of this char-
acter which will operate in a manner similar to that of the human operator in feeding sheets
25 to and removing them from the platen.

Another object of the invention is to feed and withdraw the sheets in such manner that full utilization is made of the brief time at
30 which the platen is in its outermost or open position, thereby allowing the press to be run at maximum speed.

Another object of the invention is to arrange the feeding and delivery devices in such man-
ner that a minimum amount of space is re-
35 quired.

Other objects of the invention will appear in and from the accompanying description and the claims.

The accompanying drawings illustrate the
40 invention.

Figure I is an end elevation of a paper feed-
ing and delivery mechanism embodying my invention applied to an oscillating-platen
45 printing-press, only so much of the press being shown as is necessary for the understand-
ing of the invention and the mechanism being shown in normal position. Fig. II is a front
elevation. Fig. III is a vertical section on the
50 line III IV in Fig. II, showing the delivery device operating to remove the paper and the

feeding device starting to operate, the cam for rocking the latter being omitted to more clearly show the other cams. Fig. IV is a vertical section on the line III IV in Fig. II, showing the delivery device as about to com-
55 plete its movement and the feeding device operating to deposit the paper on the platen. Figs. V, VI, and VII are detail elevations of cam devices for the operation of the respec-
tive feeding, delivery, and suction members 60 of the mechanism. Fig. VIII is a horizontal section of one of the paper-carrier suction frames. Fig. IX is a vertical section of the same on the line IX IX in Fig. VIII. Fig. X is an elevation of a suction device adapted for
65 use with cards, &c. Fig. XI is a perspective view of a gage device for the paper. Fig. XII is a horizontal section on line XII XII in Fig. II, showing the construction of the guide for the paper-carrier.
70

1 designates the frame of the printing-press, 2 the platen, and 3 the chase, all of which may be of any usual or suitable construction and operation, it being understood that the platen oscillates toward and from the chase between
75 the position shown in Fig. I and that shown in Fig. III.

A feed-board or support 4 for the pile of blank paper and a receiving-table or support
80 5 for the printed sheets are located at the front of the machine, the feed-board being desirably somewhat below the level of the platen and the paper-receiving board 5 being located above the feed-board with sufficient space be-
tween them for operation therein of the paper-
85 feeding carrier. These paper-supports may be of any suitable shape and attached to the press in any suitable manner. As shown, the board 4 is attached to the press by brackets 6, and the board 5 is supported by a standard 7
90 from one of said brackets.

The paper feeding and delivery devices are desirably all supported on a supplementary frame 8, which is attached to the main frame 1 by bolts 9, so that it can be readily applied
95 to machines now in use. A rocking member 10 for supporting the paper-feeding-carrier means and a rocking member 11 for supporting the paper-delivering-carrier means are loosely pivoted on a shaft 12, fixed in the sup-
100

plementary frame 8 in such position as to be centrally located with respect to the paper-supports 4 and 5 and to the platen when it is in its outermost position. These rocking members 10 and 11 are respectively provided with guides or ways 13 14, extending vertically or transversely of the shaft or pivotal axis 12, and slides 15 16 engage and move vertically on these ways and have arms or brackets 17 18 projecting therefrom, constituting, respectively, the paper-feeding-carrier means and the paper-delivery-carrier means. The upper end of each of these carrier means is provided with a pneumatic suctional device or frame (indicated in a general way at 19 20) for taking hold of the paper sheet. Slides 15 16 and arms 17 18 are desirably formed of tubular metal for the sake of lightness and also to serve as means for connecting the suctional devices with suitable air-suction means. Thus rubber tubes or hose 21 22, leading to suction-pumps, hereinafter described, are connected, respectively, with tubular parts 23 24 of the slides 15 16, which parts communicate through the tubular arms 17 18 with the respective suctional devices 19 20.

A shaft 25, journaled in the supplementary frame 8, carries cams for operating the rocking members and slides aforesaid and is connected with the shafting or gearing of the press proper in any suitable manner—for example, by a sprocket-chain 26, engaging over sprocket-wheels 27 28, respectively, on a working shaft 29 of the printing-press and on a shaft 30, which is connected by gearing 31 32 with the shaft 25 aforesaid.

The rocking members 10 11 are operated by cams 33 34 on the shaft 25 engaging rollers 35 36 on said rocking members, springs 37 38 being connected to the frame of the machine and to rearwardly-extending arms 39 40 on the respective rocking members 10 11 to hold said members in position with their rollers bearing against said cams, said springs thus tending to move the upper ends of the rocking members and the carrier means aforesaid inwardly toward the platen.

To move the slides 15 16 and the carrier means aforesaid vertically upon the corresponding rocking members, two cams 41 42 are provided on shaft 25, engaging with pins or rollers 78 on arms 43 44, loosely mounted on a pivot rod or shaft 45, fixed on the supplementary frame 8, the outer ends of these arms or levers 43 44 engaging under rollers 46 47 on the respective slides 16 17 and the said slides with the carrier means attached thereto tending to fall by gravity, and thereby pressing the rollers 46 47 against the arms 43 44.

The suction-pumps 48 49, whose cylinders are connected to the rubber tubes 21 22, aforesaid, are operated by means of cams 50 51 on the shaft 25, said cams engaging with rollers 52 53 on arms 54 55, pivoted on shaft 45. These arms are pivotally connected to the

piston-rods 56 57 of the respective pumps, and suitable means, such as springs 58, are provided to press the springs inwardly and at the same time hold the rollers on the arms in engagement with the cams. The arm 54 is partly broken away in Fig. II to show more clearly the engaging part on the pump-piston. The cams 50 51 are so cut and so arranged as to act in alternation, each cam operating by lifting the corresponding arm 54 or 55 to draw up the corresponding piston and produce a suction in the pipe of the carrier means connected to the corresponding cylinder, so as to hold the sheet of paper against the sucker device and then on further movement to release the piston and the arm and allow the piston to be driven inward by its spring, thereby not only destroying the suction in the pipe and suction devices, but producing an actual expulsion effect to forcibly push the paper sheet from the sucker device. With such a construction no valves are required in the pneumatic connections.

The cutting and arrangement of the cams 33 34 41 42, operating the rocking members and the lifting-arms for the carrier means, are such that the carrier means are operated alternately, the respective carrier means being operated in separate paths one above the other, said paths intersecting in vicinity of the outermost position of the platen.

Guides, stops, or gages 59 are provided on the feed-board 4 and on the paper-receiving table 5 to hold and guide the paper in proper position.

The construction of the suctional device or frame 19 is shown in Figs. VIII and IX, the suctional device or frame 20 being similar thereto in every respect, said frame consisting of a central box or chamber 60, having a socket 61 fitting over the end of the tubular carrier-arm 17 sufficiently tight to be substantially air-tight and to retain the sucker-frame in place and tubular arms 62 radiating from said central box and communicating therewith and carrying suckers or mouth-pieces 63 at their outer ends. In order to provide for different sizes of sheets, these tubular arms are desirably made telescopic, as shown. The central box or suction-chamber 19 is also desirably provided with a sucker or mouthpiece 64, and I prefer to construct and arrange the parts in such manner that the suckers 63 have a limited movement relative to the sucker device 64. For this purpose the arms 62 are pivotally connected with the suction-chamber 19, tubular pivots 65 being journaled in cylindrical seats or bearings 66 in said chamber and having openings 67 communicating with the interior of said chamber and each of said tubular pivots carrying two of the arms 62. The weight of the sucker-arms 62 will serve to press them downward, and this action may be reinforced by springs 68, the downward movement being limited by stops 69. When the

sucker device above described descends upon the paper sheet, the outer sucker devices 63 will first make contact with the sheet and then yield sufficiently to allow the central sucker device 64 to contact with the sheet. As the carrier rises the central sucker will rise, first drawing up the center of the sheet, thereby buckling the paper and breaking the vacuum beneath the sheet. The outer suckers meanwhile turn downwardly on their pivots until they strike the stops 69, whereupon they will also be raised and the paper carried up bodily.

The guides or gages 59 are desirably provided with resilient frictional means, (see Figs. I and XI,) such as soft-rubber strips 70, engaging with the edges of the paper sheets to resist free movement thereof, so that when the top sheet of the stack is lifted by the sucker-frame the subjacent sheets will be retained in place and the feeding of more than one sheet at a time be prevented. Said guides or gages are also desirably made adjustable to receive different sizes of sheets, and any usual expedient may be adopted for this purpose. I have shown said guides as slidably supported on bars 71 72, extending at right angles to and adjustably sliding on bars 73 74, so as to be extended or contracted, according to the size of the sheet to be printed.

In case cards or similar articles are to be printed the sucker-frames 19 and 20 may be removed altogether and sucker-boxes, such as shown at 19^a in Fig. X, substituted, each of said boxes having one or more sucker-openings 64 in the bottom and a tubular socket 75 in the top communicating with the interior of the box and adapted to fit on the end of the tubular carrier means 17 or 18.

When a new form is to be placed in the machine or repairs are to be made, it is desirable to have the upper part of the press unobstructed by any of the feeding and delivery devices. The construction above described is especially desirable in this respect, as the feeding and delivery devices or paper-carrier means 17 18 may be freely slid upward on the ways 13 14 till the slides 15 16 are free of engagement with said ways, thereby enabling the paper-carrier means to be removed bodily from the machine.

The operation is as follows: A pile or stack of sheets *a* having been placed on the feed-board 4, the sucker device 19 being lifted to allow the insertion of the stack and then allowed to fall by its own weight until it rests on the top of the pile of paper sheets, the machine is set into operation and the feeding and delivery proceeds in the following manner: Cam 50 first starts to depress the piston of pump 48, establishing a condition of suction in the piping of the carrier means 17 and drawing the top sheet of pile *a* against the sucker device 19. Cam 41 now lifts the arm 54 and the carrier means 17 upward, carrying

the sheet so attached to the sucker-frame vertically upward clear of the side guides or gages 59. Then cam 33 comes into operation, rocking the member 10 inwardly, transversely, or laterally of the horizontal axis and of the paper-support to carry the sucker-frame 19 toward the platen, the parts being so constructed and arranged that shortly after the platen has reached its outermost position the sucker-frame 19 is projected inwardly over the platen, bringing the sheet of paper substantially in contact with the platen. At this moment the cam 50 allows the piston of the corresponding pump-cylinder to move inwardly, thus destroying the vacuum and expelling air through the sucker-frame, thereby forcibly pushing the sheet of paper from its position of attachment to the sucker-frame and forcing it against the platen. The cam 33 then immediately operates to rock member 10 backward, causing the carrier means 17 to return to the position over the feed-board, whereupon the cam 41 releases the lifting-arm 43 and allows the carrier means to drop until the sucker-frame rests on the top of the next sheet of paper in the stack. While this return movement is taking place the platen of the press is being operated to make the impression, the usual retainer or clips 76 serving to retain the paper sheet in position on the platen as it approaches the form and to strip the sheet from the form after the impression and cause it to follow the platen in its return movement. As the platen is returning with the printed sheet cam 42 operates to lift carrier means 18 and sucker-frame 20 vertically upward, and cam 34 then comes into operation, drawing the carrier means over and inwardly toward the platen and in position over the printed sheet. The cam 51 now operates to cause suction in the sucker-frame 20 to draw up and attach the printed sheet to the sucker-frame, and then cam 34 immediately causes member 11 to rock backward, carrying the printed sheet upwardly over the receiving-table 5. Just as this upward and backward movement of the delivery-carrier means is taking place the downward and forward stroke of the feeding-carrier means is being effected, so that the new sheet is fed in as the printed sheet is removed. As the platen is returned from the printing position both the carrier means are advanced toward the platen; but the delivery-carrier means is in advance of the feeding-carrier means, and as the platen reaches its extreme outward position the delivery means first advances into position over the platen and is immediately lifted up, with the attached printed sheet, to allow the feeding-carrier means to move in between it and the platen, a new sheet being thus deposited under the printed sheet. The two paper-transferring devices thus operate by easy steady movement, but with great swiftness, the action being similar to the "hand-over-

hand" movement of the human operator. The similarity of construction of the two paper-transferring devices not only simplifies and cheapens the apparatus, but conduces to the smoothness of the operation and to its similarity to hand operation.

The cam devices for operating the respective feeding and delivery devices are so constructed and arranged that the said feeding and delivery devices are each in continual movement, except in so far as the movement may be arrested by the piles of paper themselves—that is, assuming that only a few sheets of paper are on the tables the movement of the paper-carriers vertically from the table backward over the platen and then returning over and down to the tables and back again forms a continuous uninterrupted movement without any stopping or starting. Of course when there is a considerable pile of paper on either table the corresponding paper-carrier will be arrested thereby and its vertical movement will therefore cease during the time that the lifting-arm descends to the bottom of its stroke and ascends sufficiently to again strike the carrier-slide.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination with an oscillating-platen printing-press, of a paper-table mounted at the front of the press, a rocking member pivoted below the paper-table, a paper-carrier on said rocking member, extending rearwardly over said paper-table, and means for operating said rocking member to move said carrier rearwardly and forwardly over the outermost position of the platen.

2. The combination with an oscillating-platen printing-press, of a paper-table mounted at the front of the press, a rocking member pivoted below said table, a paper-carrier movably mounted on said rocking member and extending rearwardly over the paper-table, means for operating the rocking member to move the paper-carrier toward and away from the platen, and means for lifting the carrier, the carrier being adapted to fall toward the table and platen by its own weight.

3. The combination with an oscillating-platen printing-press, of two tables mounted one above the other at the front of the press, rocking members pivoted below said tables, paper-carriers on said rocking members extending rearwardly over the respective tables toward the platen, and means for operating said rocking members to move the paper-carriers alternately toward and from the platen.

4. The combination with an oscillating-platen printing-press, of two tables mounted one above the other at the front of the press, rocking members pivoted below said tables, paper-carriers on said rocking members extending rearwardly over the respective tables toward the platen, means for operating said rocking members to move the paper-carriers

alternately toward and from the platen, and means for lifting the paper-carriers, the said carriers being adapted to fall by gravity toward the tables and platen.

5. The combination with an oscillating-platen printing-press, a paper-feed board and a paper-receiving table, of paper feeding and delivery carriers, and means connected to be driven from the press for reciprocating the said carriers in paths extending respectively upwardly from the board and table and over and downward toward the platen, paper-holding-nozzle means on said carriers, pneumatic means operated by the press mechanism communicating with the paper-carrier-nozzle means to establish a condition of suction therein on movement upward and over from the feed-board, and a condition of pressure therein on reaching the platen, and pneumatic means operated by the press mechanism and communicating with the paper-delivery-nozzle means to establish a condition of suction therein on movement upward from the platen and over toward the paper-receiving table, and a condition of pressure therein on reaching the paper-receiving table.

6. In a paper feeding and delivery mechanism for printing-presses, a feed-board and a paper-receiving table located one above the other, a rocking member movable on a horizontal axis, a paper-carrier sliding on said rocking member transversely to said axle and thereby moving vertically over the feed-board, and a second rocking member pivoted on the horizontal axis, a delivery-carrier means slidably mounted on said second rocking member to move vertically over the paper-receiving table, and means engaging said rocking member and paper-carrier means to move the same vertically and laterally with regard to the feed-board and paper-receiving table.

7. The combination with a carrier member, of a pneumatic paper-holder comprising a suction-chamber connected to said carrier member, and having a suction device thereon, and suction devices pivotally connected to said suction-chamber to move vertically, and communicating with said suction-chamber, and means limiting the movement of the pivoted suction devices.

8. The combination with a printing-press, of a rocking member having a way formed thereon, and paper-carrier means slidable on said way and detachable endwise from said way.

9. The combination with an oscillating-platen printing-press, of a paper-table mounted at the front of the press, a rocking member, a paper-carrier on said rocking member, extending rearwardly over said paper-table, and means for operating said rocking member to move said carrier rearwardly and forwardly over the outermost position of the platen.

10. The combination with an oscillating-platen printing-press, of a paper-table mounted at the front of the press, a rocking member, a paper-carrier movably mounted on said
5 rocking member and extending rearwardly over the paper-table, means for operating the rocking member to move the paper-carrier toward and away from the platen, and means for lifting the carrier, the carrier being adapted
10 to fall toward the table and platen by its own weight.

11. The combination with an oscillating-platen printing-press, of two tables mounted one above the other at the front of the press,
15 rocking members, paper-carriers on said rocking members extending rearwardly over the respective tables toward the platen, and means for operating said rocking members to move the paper-carriers alternately toward and
20 from the platen.

12. The combination with an oscillating-

platen printing-press, of two tables mounted one above the other at the front of the press, rocking members, paper-carriers on said rocking members extending rearwardly over the
25 respective tables toward the platen, means for operating said rocking members to move the paper-carriers alternately toward and from the platen, and means for lifting the paper-carriers, the said carriers being adapted
30 to fall by gravity toward the tables and platen.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the
35 county of Los Angeles and State of California, this 21st day of September, 1903.

PERCY F. RICE.

Witnesses:

ARTHUR P. KNIGHT,
JULIA TOWNSEND.