

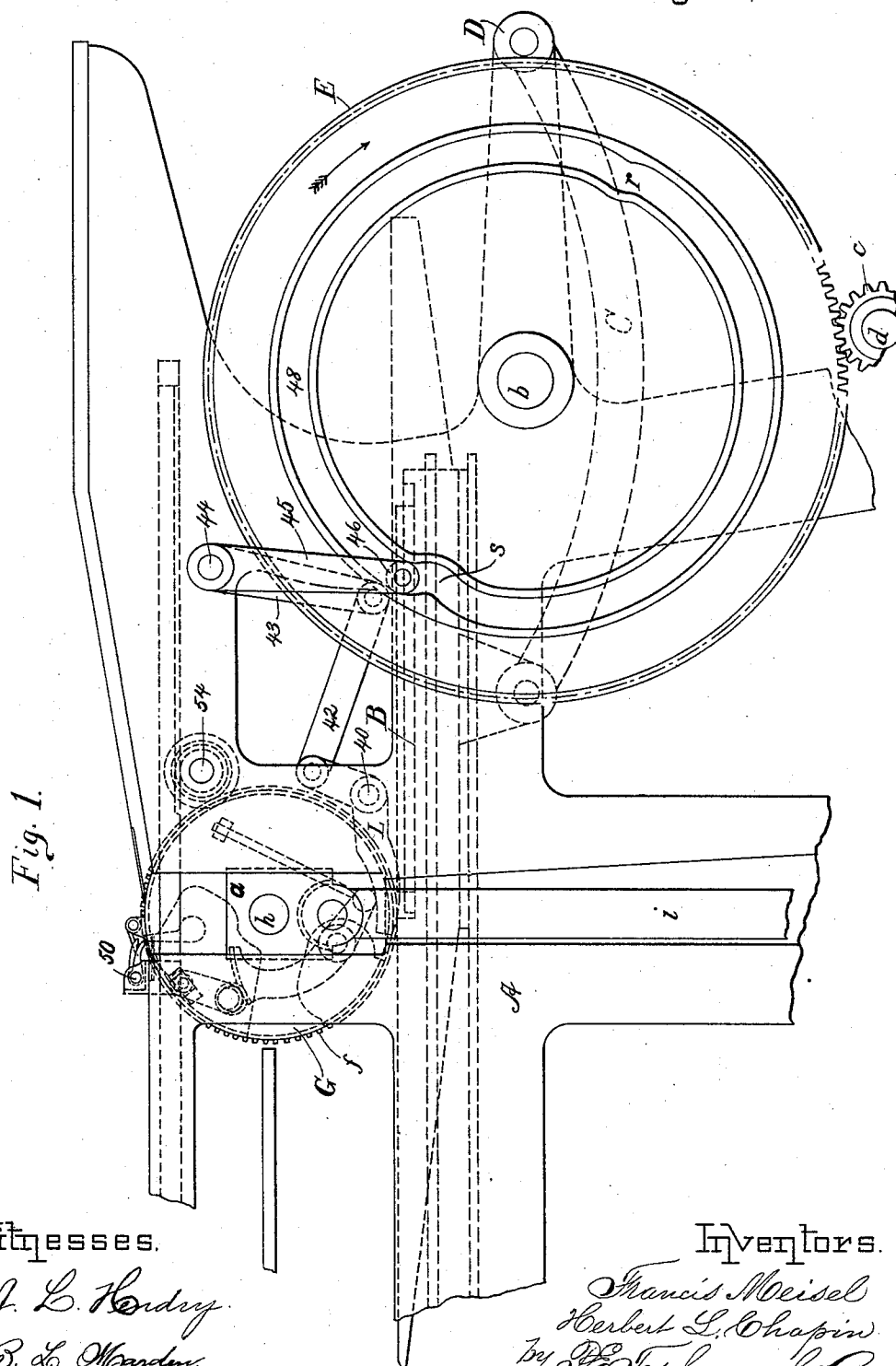
(No Model.)

4 Sheets—Sheet 1.

F. MEISEL & H. L. CHAPIN.
PRINTING MACHINE.

No. 588,284.

Patented Aug. 17, 1897.



Witnesses.

J. L. Hardy
B. L. Marden.

Inventors.

Francis Meisel
Herbert L. Chapin
by P. E. Teschemacher

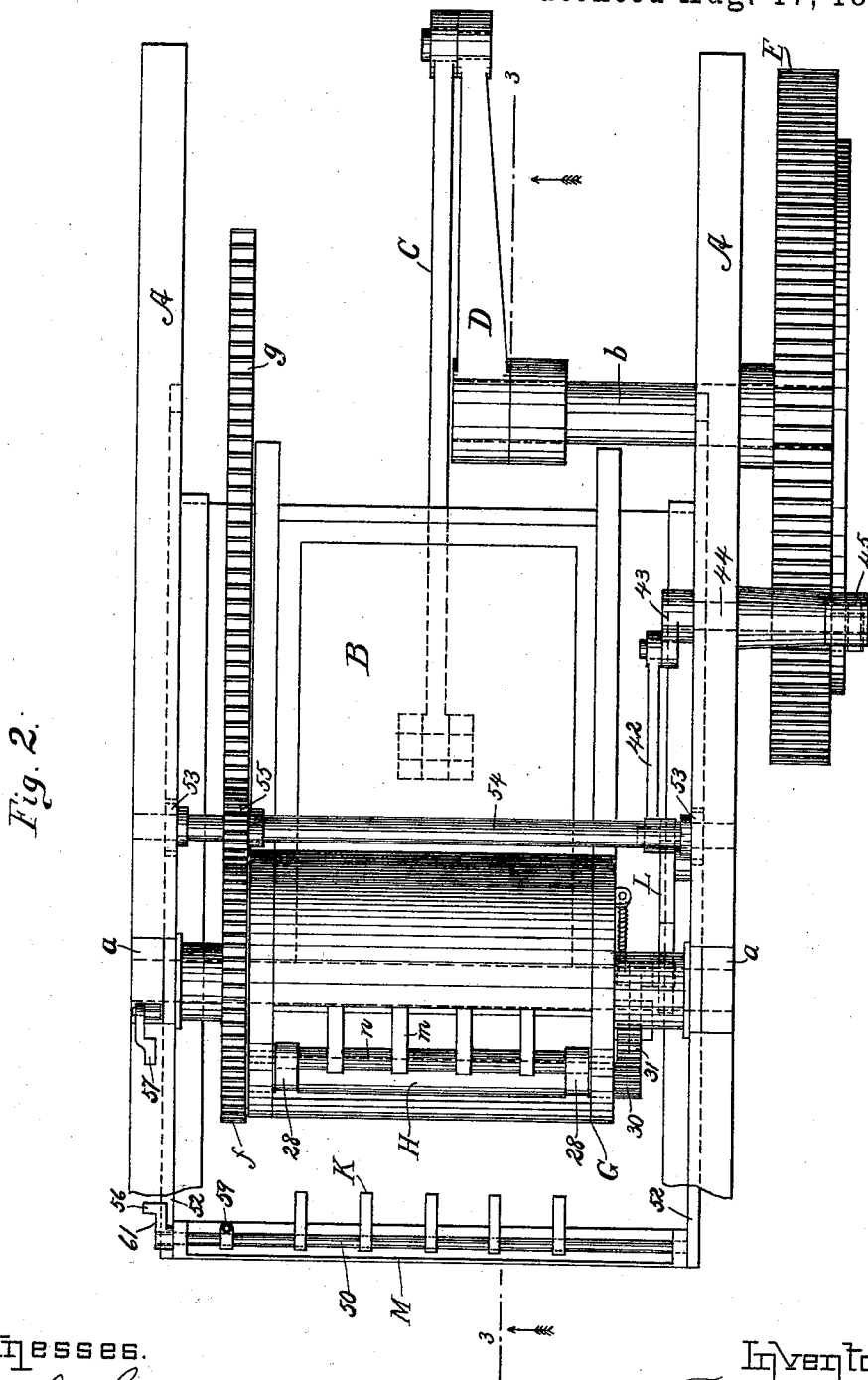
(No Model.)

4 Sheets—Sheet 2.

F. MEISEL & H. L. CHAPIN.
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Patented Aug. 17, 1897.



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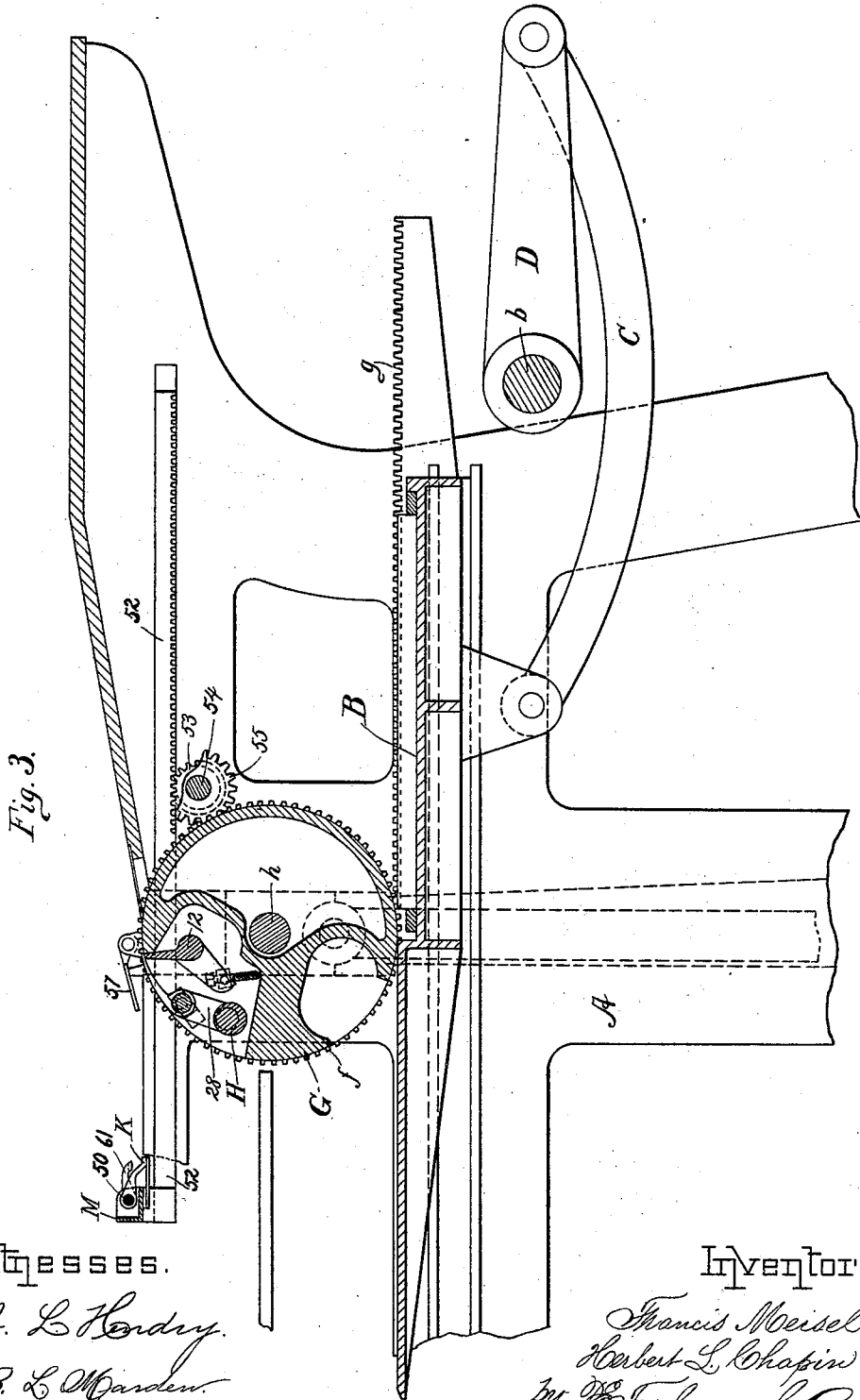
(No Model.)

4 Sheets—Sheet 3.

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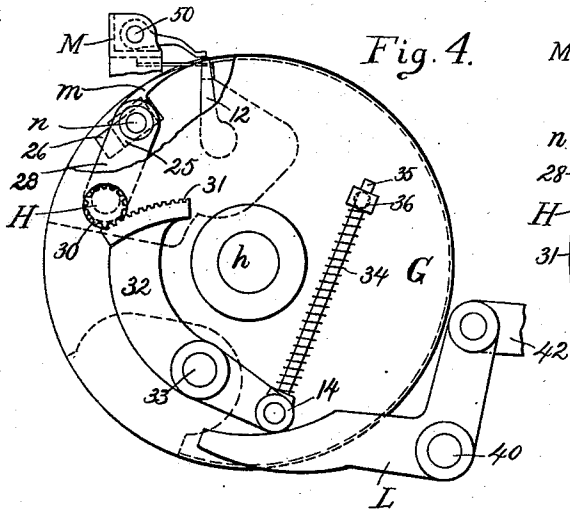


Fig. 4.

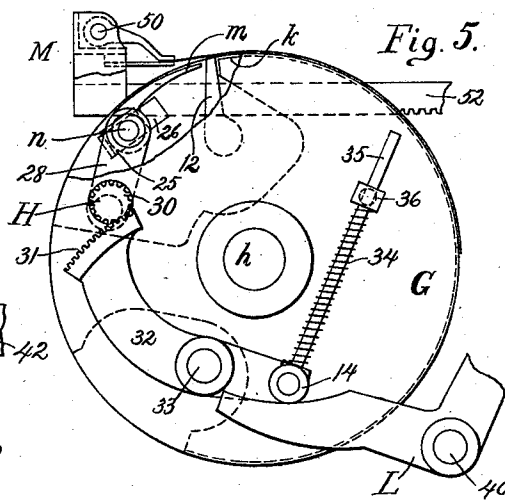


Fig. 5.

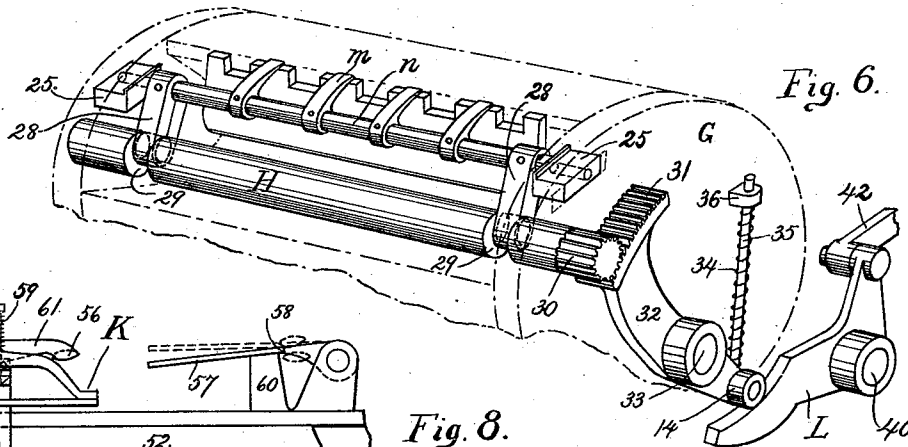


Fig. 6.

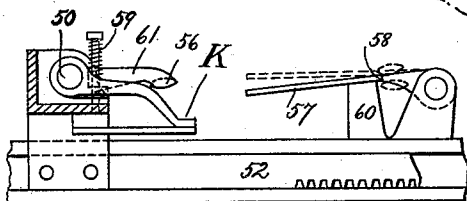


Fig. 8.

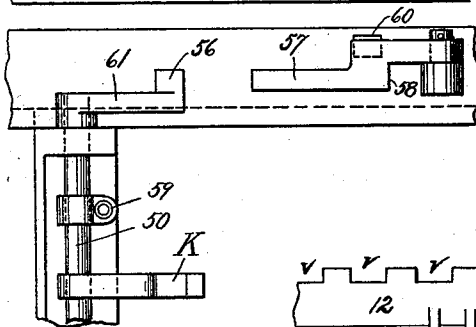


Fig. 9.

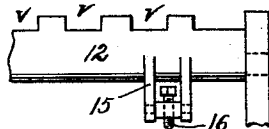


Fig. 10.

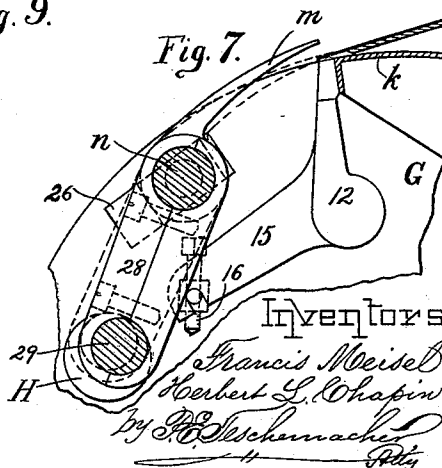


Fig. 7.

Witnesses.

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UNITED STATES PATENT OFFICE.

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PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 588,284, dated August 17, 1897.

Application filed June 19, 1896. Serial No. 596,182. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS MEISEL, of Boston, and HERBERT L. CHAPIN, of Chelsea, in the county of Suffolk, State of Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Flat-Bed Cylinder Printing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of a flat-bed cylinder printing-machine constructed in accordance with our invention. Fig. 2 is a plan of the same. Fig. 3 is a longitudinal vertical section on the line 3 3 of Fig. 2, looking in the direction of the arrows. Fig. 4 is an end view of the impression-cylinder, showing the mechanism for operating the cylinder-grippers, a portion of the end wall of the cylinder being broken away to show the parts behind the same. Fig. 5 is a similar end view of the impression-cylinder, showing the parts in a different position and the printed sheet being drawn off from the cylinder by the delivery-grippers. Fig. 6 is a perspective view of the cylinder-grippers and mechanism for operating the same, the outline of the impression-cylinder being indicated by dotted lines. Fig. 7 is a detail of the impression-cylinder, showing the cylinder-grippers raised from the gripper edge to receive a fresh sheet from the feed-board. Fig. 8 is a sectional detail of the delivery-grippers and mechanism for opening and closing the same. Fig. 9 is a plan of the parts shown in Fig. 8. Fig. 10 is a detail of the clamp for holding the cylinder-packing.

Our invention relates to flat-bed cylinder printing-machines, and particularly to the cylinder-grippers and delivery-grippers and the mechanism for operating the same; and our invention consists in the several novel features of construction and combinations of parts hereinafter fully set forth, and definitely pointed out in the claims.

In the said drawings, A represents the framework of the machine, and B the reciprocating type-bed, to the under side of which is pivoted the connecting-rod C, the opposite

end of which is pivoted to the crank D on the crank-shaft *b*, which carries at its outer end the large gear E, which is driven by a pinion *c* on the driving-shaft *d*. (Shown in Fig. 1.)

G is the impression-cylinder, which is provided at one end with a gear *f*, which meshes with a rack-bar *g* on the type-bed B, whereby the cylinder is rotated in the usual manner first in one direction and then in the opposite direction as the said type-bed is reciprocated. The shaft *h* of the cylinder G is supported in boxes *a*, placed within vertical slots in the framework A, said boxes being connected in a well-known manner by rods *i* with eccentrics, (not shown,) by means of which the cylinder is raised clear of the bed during the backward movement of the latter to "throw off" the impression, as is customary in printing-machines of this description.

k, Figs. 5 and 7, is the cylinder-packing, which is held in place by means of a longitudinal clamp 12, pivoted at its lower edge within the cavity of the cylinder G and provided with an arm 15, having a set-screw 16, Figs. 7 and 10, which bears against an adjacent portion of the cylinder and by means of which the upper end of the clamp is held tightly against the turned-in edge of the packing *k*, as shown in Figs. 5 and 7, the upper edge of said clamp forming what is known as the "gripper edge" of the cylinder, with which cooperate the cylinder-grippers *m*. These grippers are secured to a horizontal rock-shaft *n*, having its bearings in a pair of boxes 25, Figs. 4, 5, and 6, adapted to slide in slots 26 in the opposite ends of the cylinder G near its periphery. To the gripper-shaft *n* are fastened two arms 28, the lower ends of which are connected to two cranks or eccentrics 29, turned upon a rock-shaft H, having its bearings in the ends of the cylinder near its periphery. One end of the shaft H projects outside the cylinder and carries a pinion 30, which meshes with a toothed sector 31 at the upper end of a lever 32, fulcrumed on a stud 33, projecting from the end of the cylinder and carrying at its lower end an anti-friction-roll 14, which as the cylinder is revolved is brought into contact with a bell-crank lifting-lever L, which is then raised by

mechanism to be presently described, whereby the lever 32 is rocked against the resistance of a spring 34, which encircles a rod 35, pivoted to the end of the lever 32 and passing through a guide 36, secured to the end of the cylinder. This movement of the lever 32 in one direction by means of the lifting-lever L and in the opposite direction by the spring 34 causes the shaft H to be oscillated to produce the desired movements of the grippers, as will be hereinafter more fully explained. The lifting-lever L is fulcrumed on a stud 40, projecting from the framework A, and is connected by means of a rod 42, lever 43, and short shaft 44 with a lever 45, located on the outside of the framework and carrying a cam-roll 46, which works in a cam-groove 48 on the outside of the main gear E, said cam-groove having two inclines or depressions *r s*, one to produce a slight upward movement and the other a more extended upward movement of the lifting-lever L.

As the cylinder is revolved to bring the grippers *m* into position to take a fresh sheet the roll 14 of the lever 32 is brought into contact with the curved upper face of the lever L, at which time the roll 46 enters the portion *r* of the cam-groove 48 of the gear E, whereby the lever L is slightly raised, causing toothed sector-lever 32 to turn the crank-shaft H sufficiently to cause the grippers to be raised from the gripper edge to receive the sheet, as shown in Fig. 7, after which the lifting-lever L returns to its former position, when the grippers will be instantly closed by the spring 34, which brings them squarely down upon the paper, after which the movement of the cylinder is reversed, when the sheet will be carried around into contact with the "form" and printed in the usual manner. When the cylinder is in a position to take a fresh sheet, the cranks or eccentrics 29, during the first part of their movement from the position shown in Fig. 6 and dotted in Fig. 7, are traveling so nearly across the "dead-center" that the grippers are only lifted sufficiently to receive the sheet without having any appreciable backward movement, but when the grippers are to be opened to release the sheet they are first raised slightly to clear the paper by the same movement of the cranks 29 across the dead-center, as above described, the continuous movement of the crank-shaft H as the roll 46 passes through the portion *s* of the cam-groove 48 causing the gripper-shaft, with its boxes, to be drawn downward and thereby withdrawing the grippers in the direction of their length away from the gripper edge of the cylinder into the position shown in Fig. 5, the grippers after clearing the gripper edge being carried down below the level of the same and out of the way of the edge of the printed sheet by the rocking of the shaft *n*, which is produced by the movement of the cranks 29 as they approach the dead-center in their descent, the delivery-grippers K, to be presently described,

being in this manner enabled to seize the edge of the printed sheet and draw it off the cylinder without any liability whatever of its catching in or being obstructed by the cylinder-grippers, no auxiliary device of any description being required to push up the edge of the printed sheet or place it in a position to be seized by the delivery-grippers, and consequently the construction of the machine is materially simplified and its action rendered more reliable.

During the time that the cylinder-grippers are being withdrawn in the direction of their length and lowered, as described, the printed sheet has been seized and is being drawn out by the delivery-grippers, as shown in Fig. 5, said delivery-grippers having seized the edge of the printed sheet before the cylinder-grippers commenced to rise to release the sheet, and as the printed sheet is being drawn off by the delivery-grippers the lifting-lever L returns to its former position, thereby permitting the grippers to be returned to their normal position on the gripper edge by the action of the spring 34.

During the time the sheet is being printed the grippers *m* are held firmly and securely in their forward position over and upon the gripper edge by the action of the spring 34, as shown in Figs. 4 and 6, and the grippers are brought into contact with the paper and raised therefrom without any sliding movement, thereby preventing the tearing or marring of the edge of the sheet, the grippers remaining in this position until the cylinder has completed its backward revolution into the position to take a fresh sheet, when the grippers will be opened to receive it, as before described. It will be seen that the cam-groove 48 and the spring 34 produce all the required movements of the cylinder-gripper mechanism, the operation of the machine being thus simplified and the cost of construction reduced to a minimum.

The delivery-grippers K are mounted upon a shaft 50, supported in bearings in a carriage M, which extends transversely across the machine and is secured to rack-bars 52, fitted to slide in horizontal grooves or ways in the sides of the framework A. These rack-bars 52 are reciprocated by pinions 53 upon a transverse shaft 54, carrying a small gear 55, which meshes with the gear *f* on the cylinder G, as shown in Fig. 3, the motion of which is thus transmitted to the carriage M to reciprocate the same at the required times.

As the delivery-grippers K are brought up to the cylinder G they are opened to seize the printed sheet by means of a lever 61, secured to the end of the gripper-shaft 50, which arm is provided at its outer end with a small projection 56, which during the forward movement of the carriage M rides upon an inclined arm 57, pivoted upon a support projecting from the framework A, as shown in Figs. 8 and 9, thereby rocking the gripper-shaft 50 to open the grippers K, and just as the grip-

per-carriage stops on its forward movement the projection 56 drops off a shoulder or offset 58 on the pivoted arm 57, thereby permitting the gripper-shaft to be turned by a spring 59, Fig. 8, which closes the delivery-grippers K onto the end of the printed sheet. As the gripper-carriage M is drawn back the projection 56 passes under the arm 57, as shown by dotted lines in Fig. 8, raising said arm on its pivot until said projection passes out from under it, when the arm will drop by its own weight to its normal position upon a support 60 ready to act as before. At the termination of the backward movement of the carriage M the delivery-grippers are opened by a stop (not shown) in the usual manner.

The upper edge of the cylinder-packing clamp 12, which forms the gripper edge or lower jaw of the cylinder-grippers, is provided along its upper edge with a series of rectangular notches or openings *v* (shown in Fig. 10) for the reception of the lower jaws of the delivery-grippers K, which are thus permitted to get under the front edge of the printed sheet, as is necessary to insure the proper seizure of the same.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a flat-bed cylinder printing-machine, the combination with the impression-cylinder, of a shaft and grippers secured thereto, said shaft sliding in slots in the cylinder, whereby the grippers are made movable in the direction of their length away from and toward the gripper edge, a shaft provided with cranks or eccentrics connected with arms fast to the gripper-shaft, and mechanism for oscillating the crank-shaft, whereby the gripper-shaft is moved away from and toward the gripper edge and rocked to open and close the grippers and carry them below the level of the gripper edge as they are withdrawn therefrom, substantially as described.

2. In a flat-bed cylinder printing-machine, the combination with the impression-cylinder, of a gripper-shaft and grippers secured thereto, said shaft being supported in boxes sliding in slots in the cylinder, whereby the grippers are made movable in the direction of their length away from and toward the gripper edge, a shaft provided with cranks or eccentrics connected with arms fast to the gripper-shaft, and mechanism for oscillating the crank-shaft, a lifting-lever with which said mechanism is brought into contact as the cylinder is rotated, and means for actuating the lifting-lever after the crank-shaft-actuating mechanism has been brought into contact therewith by the rotation of the cylinder, substantially as set forth.

3. In a flat-bed cylinder printing-machine, the combination with the impression-cylinder, of a gripper-shaft and grippers secured thereto, said shaft being supported in boxes sliding in slots in the cylinder, whereby the grippers are made movable in the direction of their length away from and toward the gripper edge, a shaft provided with cranks or eccentrics connected with arms fast to the gripper-shaft, and provided at its outer end with a pinion, a toothed sector-lever meshing with said pinion and provided with a spring for actuating it in one direction, a lifting-lever, fulcrumed on a stationary support, with which said sector-lever is brought into contact as the cylinder is rotated, and cam-and-lever connections for actuating the lifting-lever when the sector-lever is in contact therewith, substantially as described.

Witness our hands this 15th day of June, 80
A. D. 1896.

FRANCIS MEISEL.
HERBERT L. CHAPIN.

In presence of—

P. E. TESCHEMACHER,
A. R. ELLINGWOOD.