

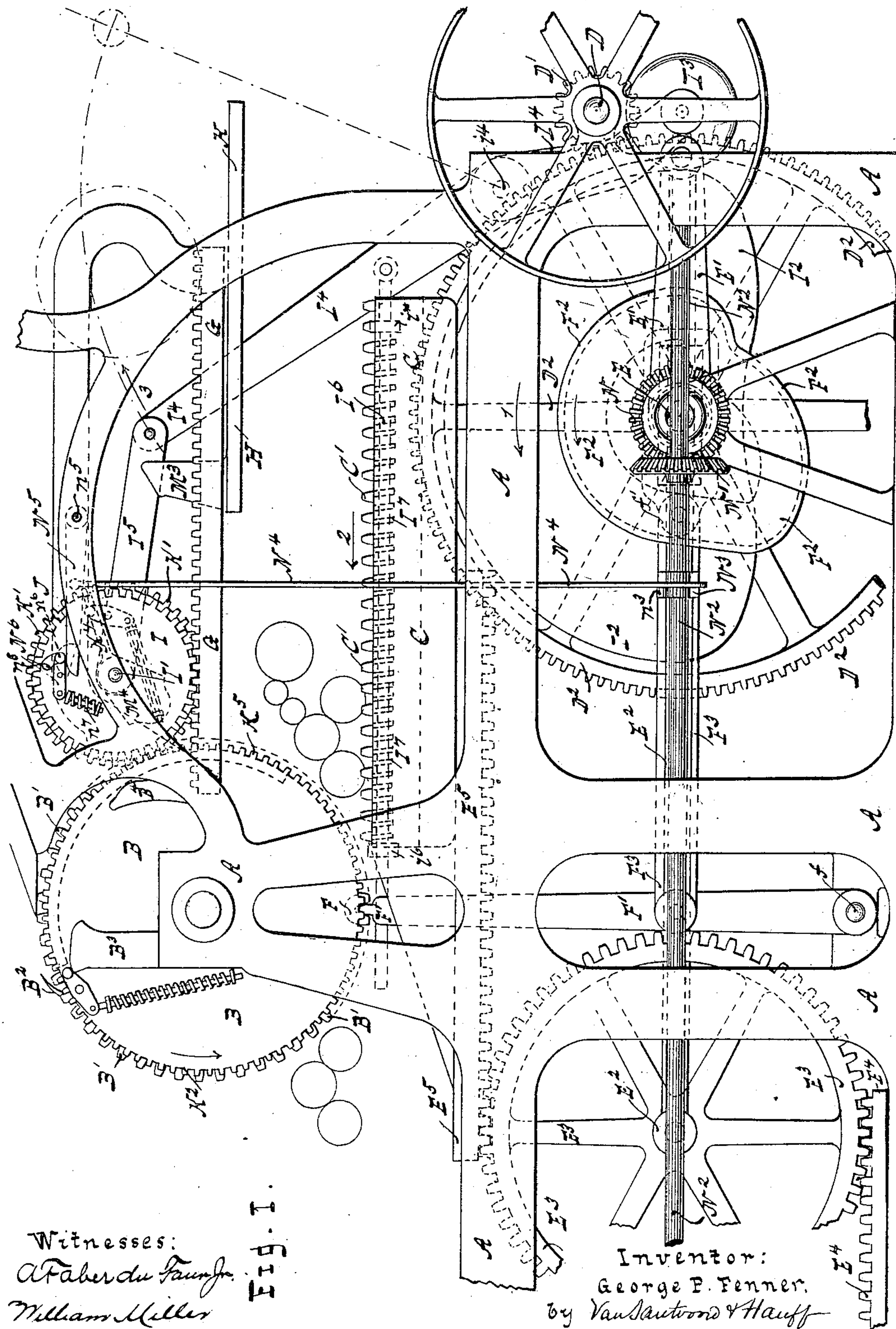
(No Model.)

2 Sheets—Sheet 1.

G. P. FENNER.  
SHEET DELIVERY APPARATUS.

No. 345,222.

Patented July 6, 1886.



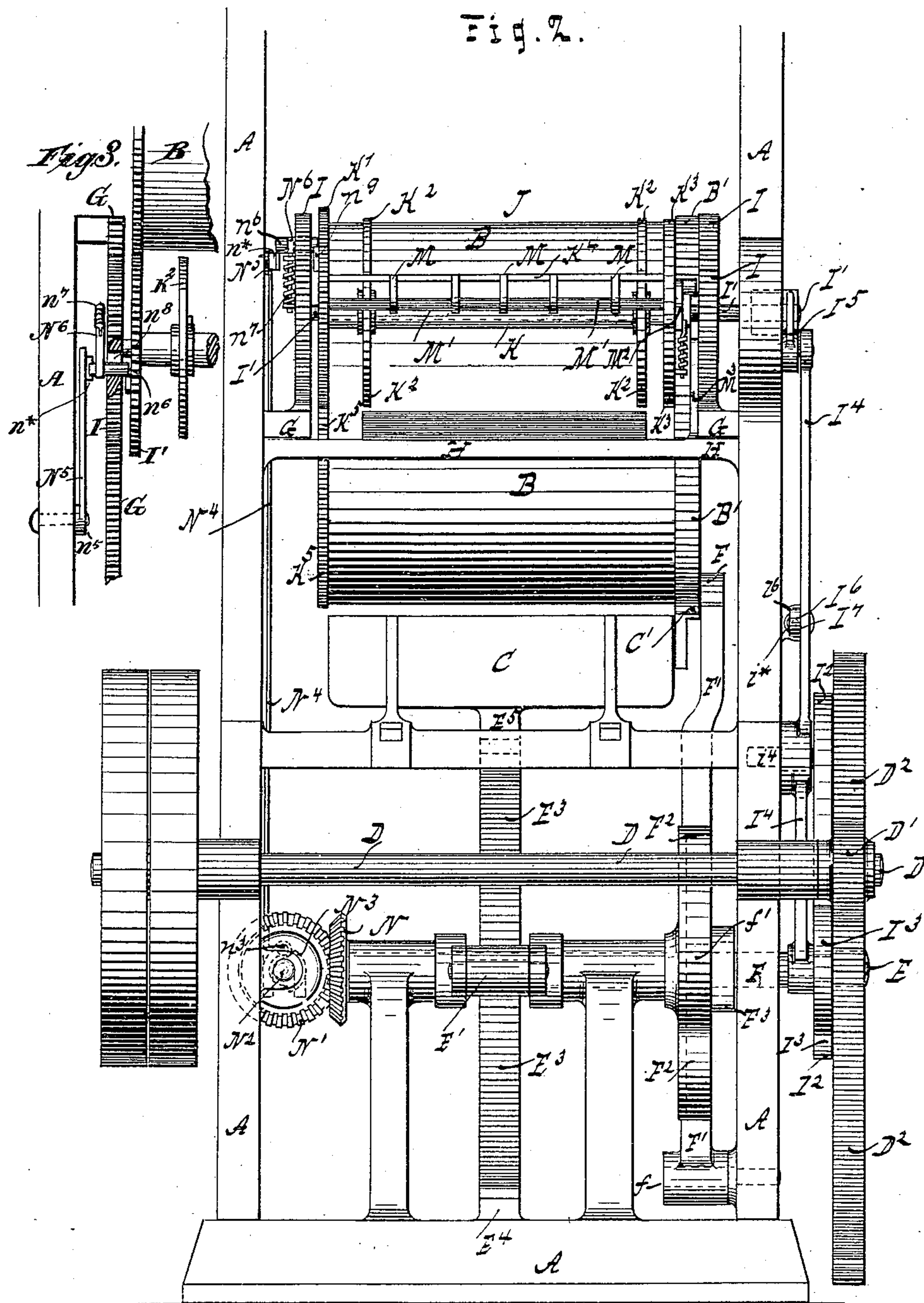
Witnesses:  
Attest du Faugfr.  
William Miller

Inventor:  
George P. Fenner.  
by Van Santvoord & Hauff  
his Attorneys.

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# UNITED STATES PATENT OFFICE.

GEORGE P. FENNER, OF NEW LONDON, CONNECTICUT.

## SHEET-DELIVERY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 345,222, dated July 6, 1886.

Application filed September 3, 1885. Serial No. 176,084. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE P. FENNER, a citizen of the United States, residing at New London, in the county of New London and State of Connecticut, have invented new and useful Improvements in Sheet-Delivery Apparatus, of which the following is a specification.

My invention relates to improvements in sheet-delivery apparatus for printing-presses, which improvements are especially adapted to stop-cylinder presses; and it consists, essentially, in a carrier-reel adapted to directly receive the printed sheet from the impression-cylinder and deliver the said sheet upon a receiving-table properly located to receive the same. The carrier-reel is operated by suitable levers and cams, which connect the same with the main shaft of the press.

The specific construction of the carrier-reel and the other operating parts is more fully pointed out in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a printing-press provided with my improved sheet-delivery apparatus. Fig. 2 is an end elevation of the same. Fig. 3 is a plan or top view of the mechanism for locking the carrier-reel and carriage.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the press-frame, constructed to support the impression-cylinder B and type-bed C in the proper relation to each other. At one end of the press-frame are bearings for the driving-shaft D, from which motion is transmitted by gear-wheels D' D<sup>2</sup> to the main shaft E of the press, and from which shaft E motion is in turn transmitted by the usual crank, E', and connecting-rod E<sup>2</sup>, Fig. 1, to the traveling rack-wheel E<sup>3</sup>, which meshes into a stationary rack, E<sup>4</sup>, on the base of the press, and also engages a suitable rack, E<sup>5</sup>, which is pendent from the type-bed C, whereby a reciprocating motion is imparted to the said type-bed. The impression-cylinder B receives its motion from the type-bed C through a second rack, C', which is suitably arranged upon the said type-bed C to engage with the cog-wheel B' of the impression-cylinder in the usual manner. A portion of this cog-wheel B' is cut away, so as to permit the type-bed C to travel while the

cylinder is at rest during stated intervals. At a point back of this space in the wheel B the impression-cylinder carries a catch, F, which is adapted to be engaged by a catch-lever, F', which operates to check, hold, and start the impression-cylinder under the impulse of adjusting mechanism of well-known construction. In the example shown in the drawings this catch-lever is pivoted at f to the press-frame, and is vibrated by means of a cam, F<sup>2</sup>, which has a suitable way therein, and a rod, F<sup>3</sup>, connected at one end to the lever, which has on its other end a roller-stud, f', which engages with the way in the cam F<sup>2</sup>. The end of the rod F<sup>3</sup>, which carries the roller-stud f', is slotted or bifurcated, so as to clear the main shaft E, and in order to support the former a block is neatly fitted into the slotted portion, through which block the shaft passes, the whole being arranged to allow the uninterrupted motion of the connecting-rod F<sup>3</sup>. The impression-cylinder is provided with suitable grippers, B<sup>2</sup>, for holding the sheet to be printed upon the cylinder, these grippers B<sup>2</sup> being opened by stationary trip cams or posts B<sup>3</sup> B<sup>4</sup>, arranged on the press-frame in their proper relative position, and closed by suitable springs, as usual, the whole constituting the main features of a stop-revolution press of well-known construction.

G G are a pair of racks, secured to the press-frame A in a proper alignment with the impression-cylinder, which racks are arranged directly over the receiving-table H, which is also properly secured to the frame, and these racks G G are engaged by gear-wheels I I, which gears I I and their shaft I' support a carrier-reel, J, which is constructed to receive the printed sheet from the impression-cylinder B, and transfer the same to the receiving-table H, previously mentioned. The gears I I and their shaft, I shall hereinafter call the "reel-carriage." The gear-wheels I I, as before stated, are mounted upon a shaft, I', which extends through a hollow spindle, K, Fig. 2, which spindle can rotate about the shaft I', and carries upon one end a gear-wheel, K', which is constructed to engage at the proper time with a corresponding gear-wheel, K<sup>2</sup>, upon the impression-cylinder B, so that a rotary motion is imparted to the spindle K, while the inner shaft, I', and the gear-wheels I I upon



the said inner shaft remain stationary in the position shown by full lines in Fig. 1 until acted upon by mechanism which will be hereinafter described.

5 To receive the paper from the impression-cylinder, two disks,  $K^2$   $K^2$ , Fig. 2, are arranged upon the hollow spindle  $K$ , which disks can be adjusted toward or from each other and secured in such a position by suitable thumb-  
10 screws or the like. The adjustment of the disks is rendered necessary to adapt the sheet-delivery apparatus for varying widths of sheets. A third disk,  $K^3$ , is arranged and permanently secured to the spindle  $K$ , the said  
15 disk  $K^3$ , however, only acting as a base for the sheet-grippers, which will be hereinafter more fully described.

It will be observed that, in order to properly deliver the sheet from the impression-cylinder  
20  $B$  to the receiving-table  $H$ , the said operation must be accomplished while the cylinder is at a stop, and that the carrier-reel  $J$  must be returned to its original position in time to receive the next printed sheet. This motion at  
25 the proper interval is imparted to the carrier-reel, as follows: To the main shaft  $E$  of the press is secured a heart-cam,  $I^2$ , which rotates with the said shaft, and engages with a roller-stud,  $I^3$ , having bearings on the lower arm of  
30 a lever,  $I^4$ , which is fulcrumed to the frame at  $i^4$ . This lever extends upward toward carrier-reel  $J$ , and its upper arm is connected with a link,  $I^5$ , which extends to and is in connection with the shaft  $I'$ , carrying the gears  $I$   $I$ . To  
35 continually keep the roller-stud  $I^3$  on the lower arm of lever  $I^4$  in close contact with the cam  $I^2$ , I employ a rod,  $I^6$ , which is connected to the other arm of the lever  $I^4$ , and extends through a socket,  $i^6$ , on the frame of the press,  
40 and which rod  $I^6$  has a collar,  $i^*$ , thereon, which is subjected to the action of a spring,  $I^7$ , coiled around the rod  $I^6$ , and abutting, respectively, against the socket  $i^6$  and collar  $i^*$ , the action of the spring being in the proper  
45 direction to produce the desired result. However, other means which would suggest themselves to a skilled mechanic could be employed to effect the same result.

The means for removing the printed sheet  
50 from the impression-cylinder  $B$ , retaining the same on the carrier-reel  $J$ , and releasing the said sheet at the proper moment from the carrier, consists of a set of grippers,  $M$ , Fig. 2, mounted upon a gripper-shaft,  $M'$ , the said  
55 shaft having bearings in the gear-wheel  $K'$  and disk  $K^3$ , which are mounted on the said shaft. These grippers  $M$  are operated by a lever,  $M^2$ , fulcrumed to the disk  $K^3$ , which is subjected to the action of a suitable spring in the ordinary manner, and is adapted to be engaged by  
60 a trip-cam,  $M^3$ , secured to the receiving-table  $H$ , and also by a suitable cam,  $M^4$ , and the ends of these grippers impinge upon the edge of a radial web,  $K^4$ , extending from the spindle and across the reel, so as to clamp the edge  
65 of the paper between the grippers and the

web  $K^4$ . To allow the use of such an arm or partition, the disks must necessarily be slotted. As before stated, the disks  $K^2$   $K^2$  and disk  $K'$  can rotate independently of the shaft  
70  $I'$  and the gears  $I$   $I$  thereon. In other words, the carrier-reel  $J$  can rotate independently of the carriage; but when the printed sheet is ready for delivery to the receiving-table, and during the linear motion of the reel, it is necessary  
75 that the carrier-reel should not rotate independently, but participate in the rotation of the gears  $I$   $I$ . For this purpose some locking device must be employed, and in the example shown in the drawings I have made  
80 use of the following: Upon the main shaft  $E$  of the press is secured a bevel-gear,  $N$ , which meshes into a similar gear,  $N'$ , situated upon a counter-shaft,  $N^2$ , aligned at right angles to the former shaft,  $E$ , and which shaft has suitable  
85 bearings in the press-frame. This counter-shaft  $N^2$  has thereon a cam,  $N^3$ , which engages a roller-stud,  $n^3$ , secured to one end of a rod,  $N^4$ , which rod is suitably bifurcated to straddle the shaft at this point, and the upper  
90 end of this rod  $N^4$  is connected to a lever,  $N^5$ , which is fulcrumed at  $n^5$  to the press-frame, while its other end is provided with an inwardly-extending projection,  $n^*$ , which engages with a pin,  $n^6$ , upon one arm of a lever,  
95  $N^6$ , pivoted at or near its center to the gear-wheel  $I$ . The lever  $N^3$  is provided with this inwardly-extending projection  $n^*$  in order that when the reel-carriage moves forward in its linear motion toward the receiving-carriage  
100  $H$  the said lever  $N^5$  will not interfere with its motion. As the carrier-reel is thus drawn forward by the link  $I^5$ , the pin  $n^6$  clears the projection  $n^*$  of the lever  $N^5$ . The lever  $N^6$  is subjected to the action of a spring,  $n^7$ , which  
105 constantly tends to keep the same in contact with the lever  $N^5$  when opposite thereto. The pin  $n^6$  extends through a slot,  $n^8$ , Figs. 1 and 3, in the gear-wheel  $I$ , to allow the lever to swing about its fulcrum, and engages at the  
110 proper intervals with a catch,  $n^9$ , on the gear-wheel  $K'$ , thereby automatically locking the two gears, and producing the desired result. When the roller-stud  $n^3$  on the rod  $N^4$  is not engaged by the cam, the gears and the reel are  
115 locked; but when the said rod is so engaged by the cam  $N^3$  the lever  $N^6$  is raised, and the pin  $n^6$  is thrown clear of the catch  $n^9$ , whereby the same is released from the cam, and the designated parts can again rotate independently  
120 of each other.

The operation of the press is now as follows: In the drawings the working parts of the press are shown in the position they will be in when the press has finished printing the sheets and the  
125 impression-cylinder is in such a position that the grippers  $B^2$  thereof are ready to grasp the next sheet and a sheet is under the grippers of the paper-carrier reel. When the main shaft  $E$  now continues its motion in the direction of  
130 arrow 1, the type-bed  $C$  moves toward the impression cylinder  $B$  in the direction of arrow



2 marked thereon, but does not rotate the impression-cylinder, since the latter is not rotated by the catch-lever F so as to bring its teeth in contact with the rack C' until the shaft E has made one-half of a complete revolution, which fact is due to the contour of the cam F<sup>2</sup>, and consequently the cylinder remains stationary until the bed has reached its extreme position on the opposite side of the impression-cylinder. During the semi-revolution of the main shaft and the traverse of the bed the hollow portion of the heart-cam I<sup>2</sup> is brought toward the roller-stud I<sup>3</sup>, on the lever I<sup>4</sup>, and, owing to the action of the spring I<sup>7</sup>, the upper arm of the lever I<sup>4</sup> is pushed outward in the direction indicated by arrow 3, carrying with it the carrier-reel J, the gears I I of which engage and travel along the racks G G. Just before the carrier-reel starts in its linear motion, the pin n<sup>3</sup> of the lever N<sup>4</sup> is released from the cam N<sup>3</sup> on the shaft N<sup>2</sup>, whereby the gears and the gear and disks of the carrier-reel are locked. The lever I<sup>4</sup>, being moved outward from the impression-cylinder, carries the carrier-reel therewith, the disks now rotating with the gear-wheels I I until both have reached the position indicated by dotted lines in Fig. 1. During this traverse the grippers M on the shaft M' are opened by the lever M<sup>2</sup> coming into contact with the spur or cam M<sup>3</sup> on the receiving-table, so that the end of the sheet is released, the sheet then falling printed face upward upon the delivery-table. On the remaining semi-revolution of the main shaft E the carrier-reel J is returned to remains in its normal position in contact with the impression-cylinder. The carrier-reel and the reel-carriage gears I I are again unlocked, in order to allow the reel to rotate with the said impression-cylinder, and the type-bed moves toward its original position, as shown in the drawings, but in so doing it engages with the cog-wheel B' of the impression-cylinder, which has been previously sufficiently turned by the action of the lever F<sup>2</sup>, and when in the position shown in the drawings the grippers B<sup>2</sup> are again in position to grasp the sheet delivered thereto from the feed-table. Since the carrier-reel J participates in the rotation of the impression-cylinder, the forward edge of the sheet printed during the preceding operation is grasped by the grippers M of the carrier-reel J, which draw the same upon the carrier-reel, whence it is delivered, as before described. Since only two disks, K' K<sup>2</sup>, are used in the construction of the sheet-carrier, only the edges of the paper come in contact with the said reel, and consequently the printed face is delivered unsoiled from the said reel to the receiving-table. As before stated, the sheet is held to the carrier-reel only along one of its edges, the lower edge of the sheet being free; but the entire sheet holds itself closely around the disks of the said carrier-reel during the operation of delivering the sheet to the receiving-table, and the free end of the

sheet does not release itself from the carrier-reel until it arrives at the proper position to fall upon the table.

I do not claim the combination, with an impression-cylinder, of a carrier-reel and a reciprocating carriage supporting the carrier-reel.

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

1. The combination, with the impression-cylinder, of the reel-carriage having an intermittent motion toward and from the cylinder, a carrier-reel supported by said reel-carriage and adapted to be rotated by the impression-cylinder to receive the sheet, substantially as shown and described.

2. The combination, with the impression-cylinder, the receiving-table H, and the trip-cam M<sup>3</sup> thereof, of the reciprocating carrier-reel and the grippers M and web K<sup>4</sup> thereof, for retaining and releasing the paper, substantially as shown and described.

3. The combination, with the impression-cylinder and the receiving-table H, of the carrier-reel J, the supporting-carriage, the rotary cam I<sup>2</sup>, and the lever-connections of the carriage, with the cam for imparting to the carriage a reciprocating motion, substantially as shown and described.

4. The combination, with the impression-cylinder, the receiving-table H, the racks G G, and the carrier-reel J, of the gears I I and shaft I', forming the reciprocating carriage, and means, as described, for locking the carrier-reel and carriage, substantially as shown and described.

5. The combination, with the carrier-reel J, of the shaft I' and gears I I thereon supporting the said carrier-reel, the rotary cam N<sup>2</sup>, the rod N<sup>4</sup>, engaging the cam-lever N<sup>5</sup>, and the lever N<sup>6</sup> on the gear I, adapted to engage with a catch, n<sup>9</sup>, on the reel, substantially as shown and described.

6. The combination, with the impression-cylinder, the carrier-reel J, rotary cam I<sup>2</sup>, and carriage, of the racks G G, gears I I, engaging the racks, gear K', engaging the impression-cylinder, and spring-pressed lever I<sup>4</sup>, connected with the carrier and engaging the cam, substantially as shown and described.

7. The combination, with the reel-carriage, of the disks K<sup>2</sup> K<sup>2</sup>, adapted to receive the edges of the sheet and adjustable on a spindle encompassing the shaft of the reel-carriage, and the grippers for retaining and releasing the sheet, substantially as shown and described.

8. The combination, with the reel-carriage, of the disks K<sup>2</sup> K<sup>2</sup>, adjustable on a spindle encompassing the shaft of the reel-carriage, the grippers M on shaft M', and web K<sup>4</sup>, for retaining and releasing the edge of the sheet, and a gear, K', and disk K<sup>3</sup>, having bearings for the gripper-shaft, substantially as shown and described.

9. The combination, with the impression-



cylinder and the gear K<sup>5</sup> thereof, of the reciprocating carrier-reel J, having a gear, K', adapted to engage with the gear on the impression-cylinder, substantially as shown and  
5 described.

10. The carrier-reel J, mounted in a reciprocating carriage and constructed to rotate independently of the carriage, and means for locking the carrier-reel to the carriage, substantially as set forth.  
10

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

GEORGE P. FENNER. [L. S.]

Witnesses:

HIRAM W. HUBBARD,  
GEORGE COLFAX.