(No Model.)

4 Sheets—Sheet 1.

G. P. FENNER

DELIVERY MECHANISM FOR PRINTING MACHINES.

No. 389,800. Patented Sept. 18, 1888.

Fig. 1.

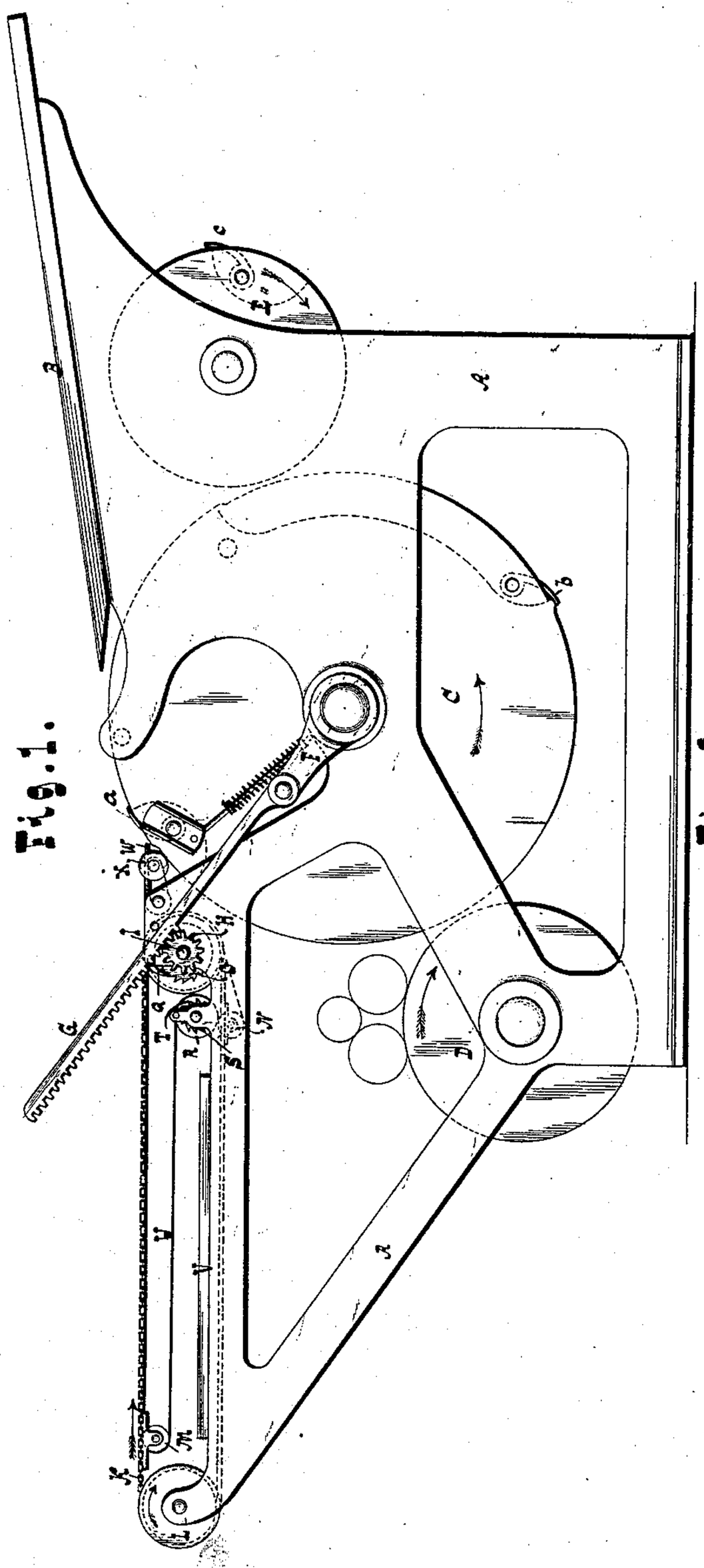
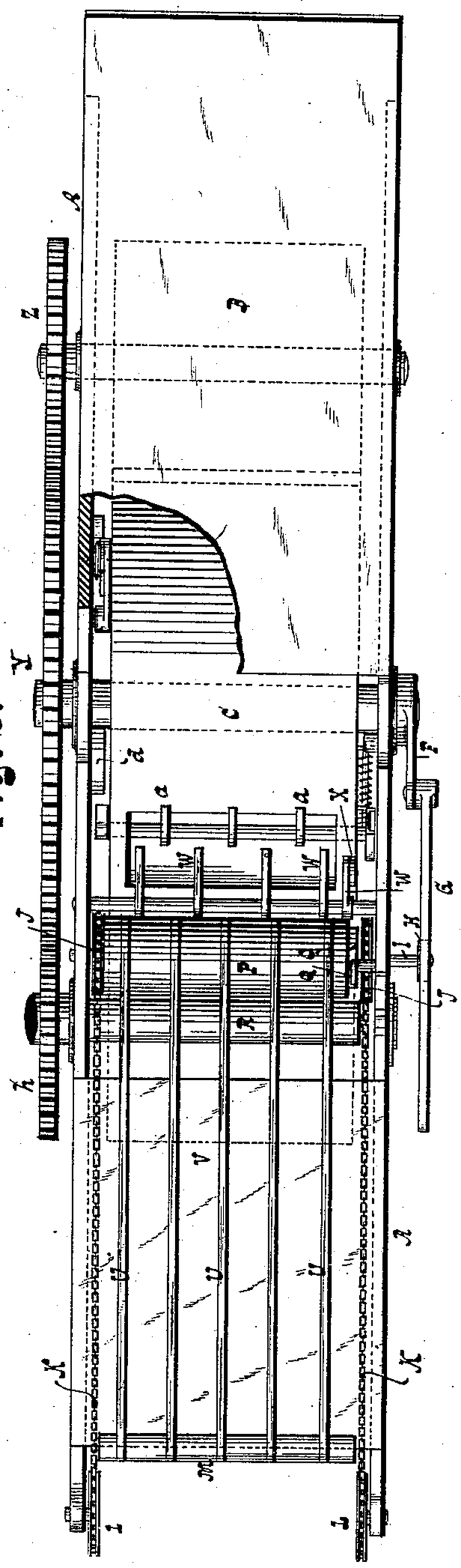


Fig. 2.



WITNESSES:

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INVENTOR:

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BY

Van Santvoord & Hauff

his ATTORNEYS.

(No Model.) 4 Sheets—Sheet 2.

G. P. FENNER

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Fig. 3.

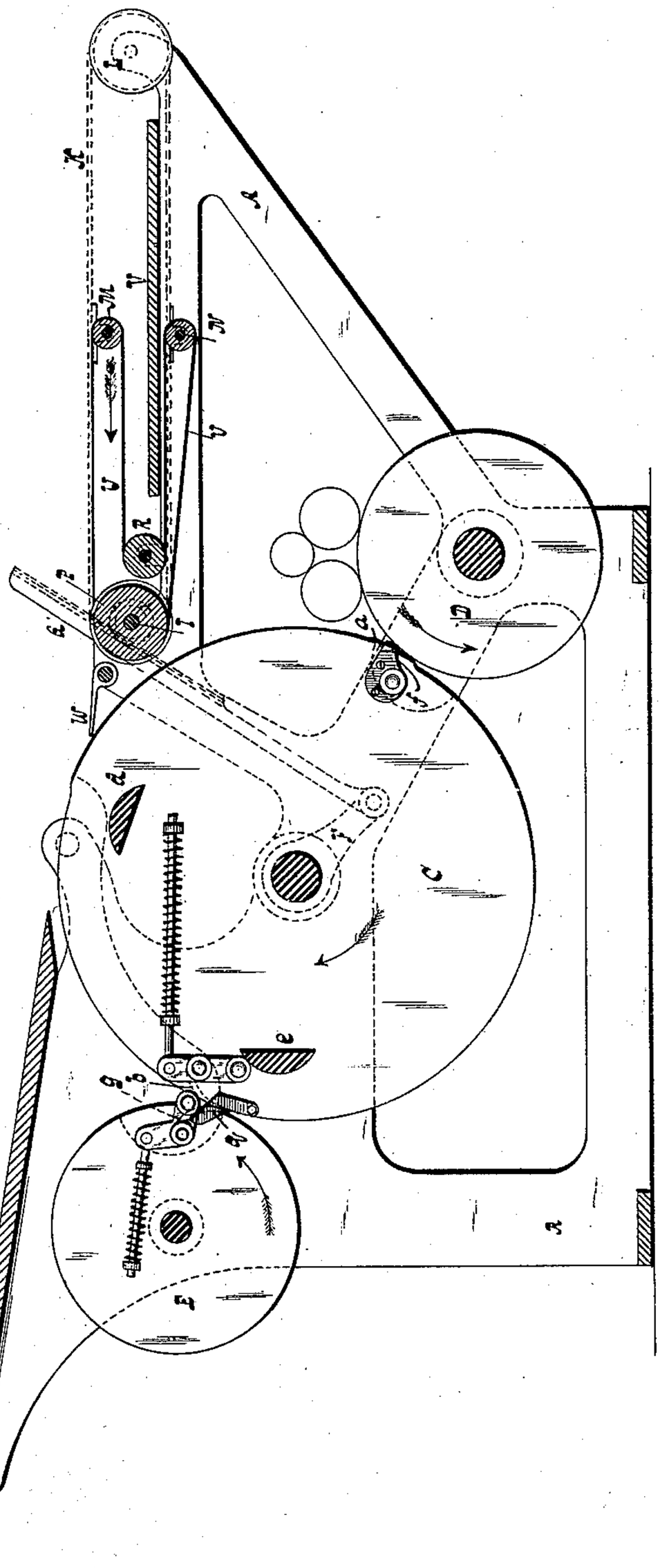
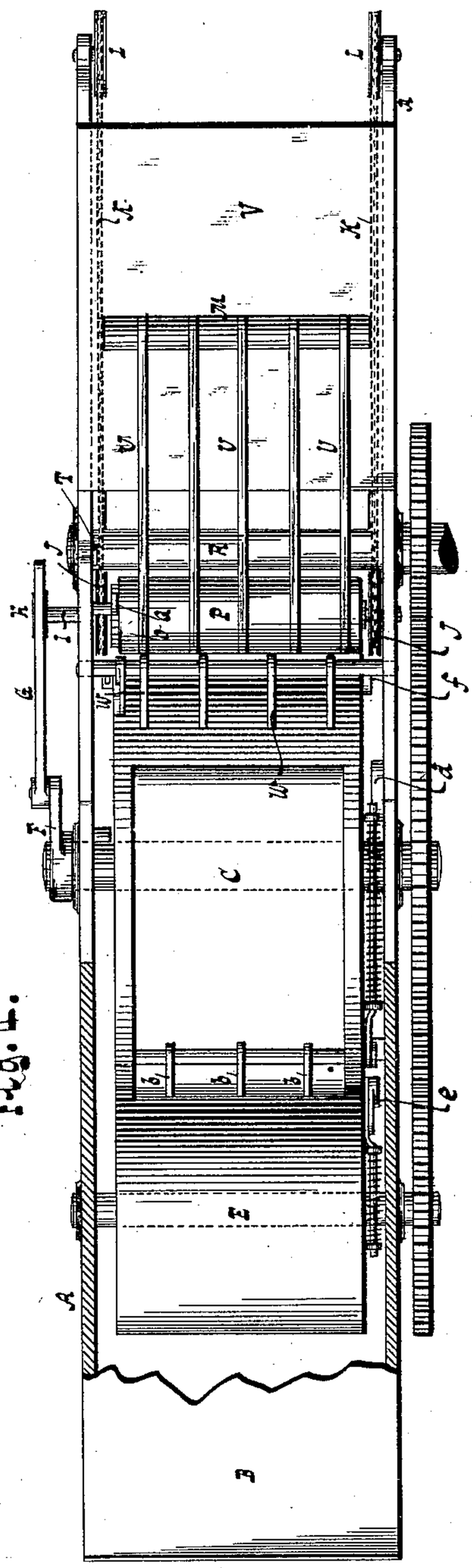


Fig. 4.



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(No Model.)

4 Sheets—Sheet 3.

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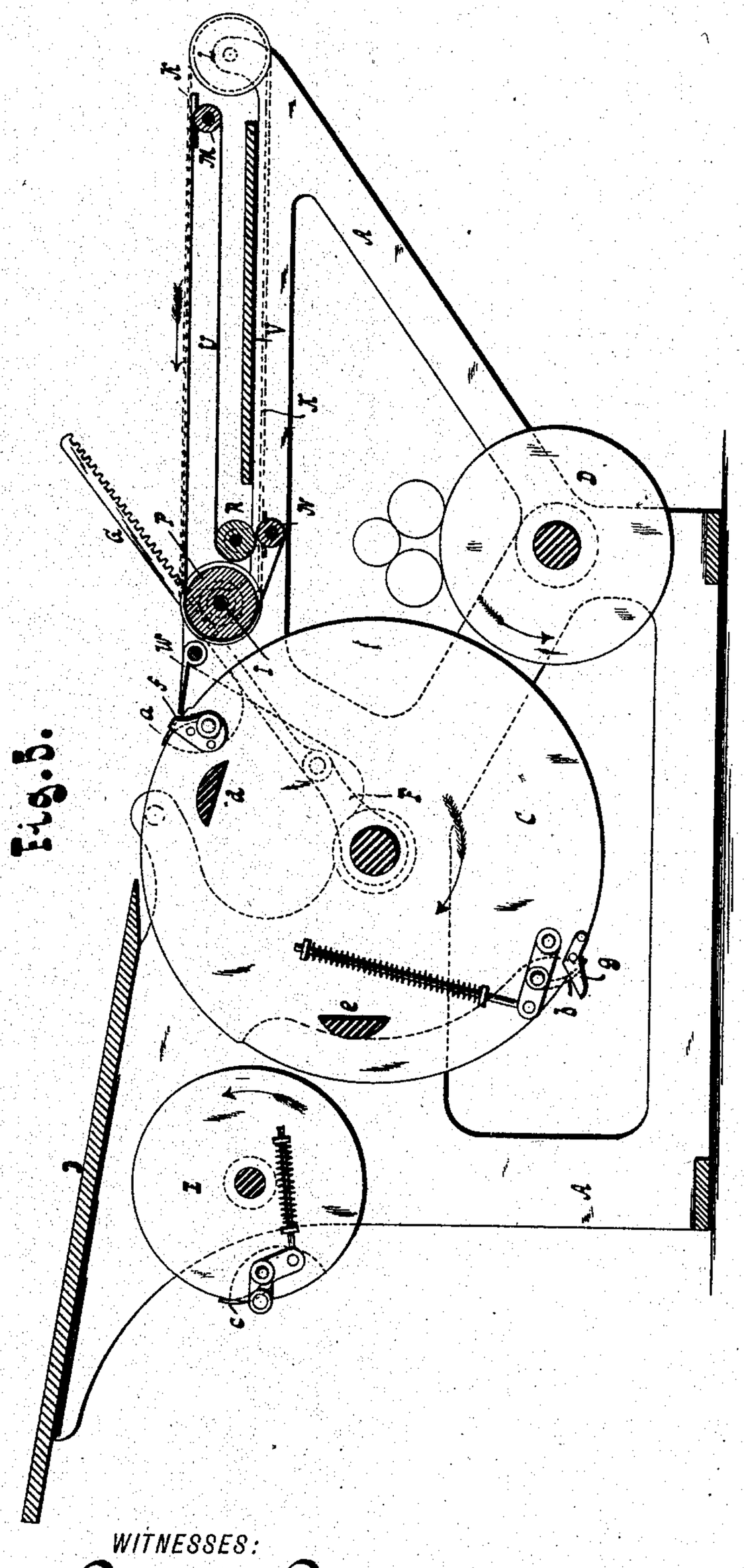

Fig. 5.

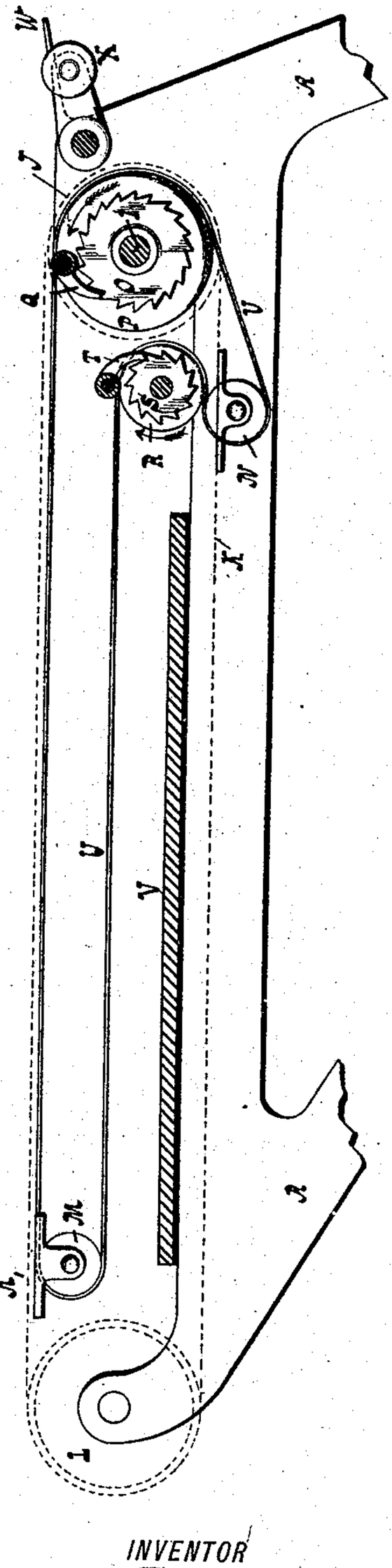

Fig. 6.

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4 Sheets—Sheet 4.

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DELIVERY MECHANISM FOR PRINTING MACHINES.

No. 389,800. Patented Sept. 18, 1888.

Fig. 7.

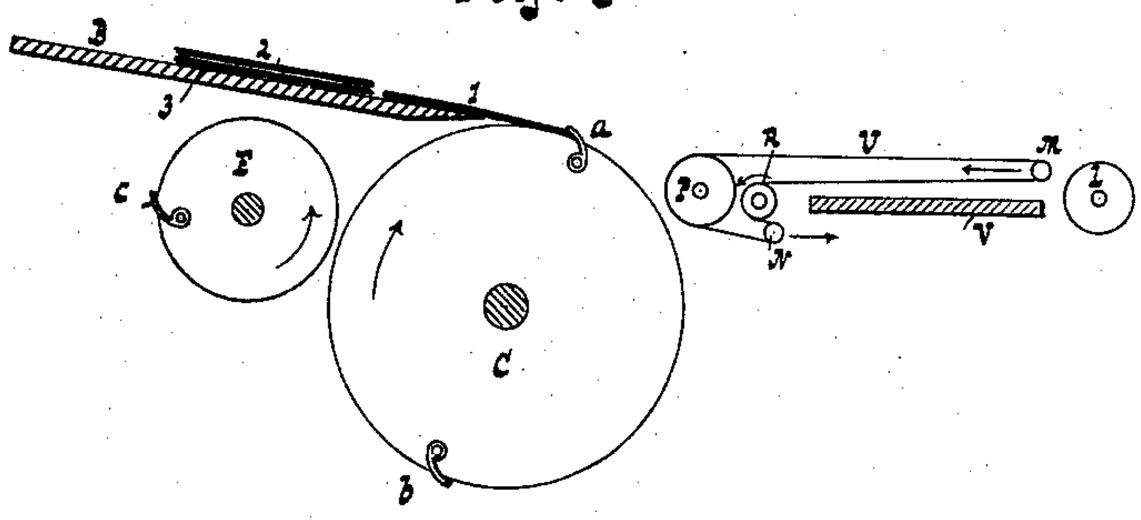


Fig. 8.

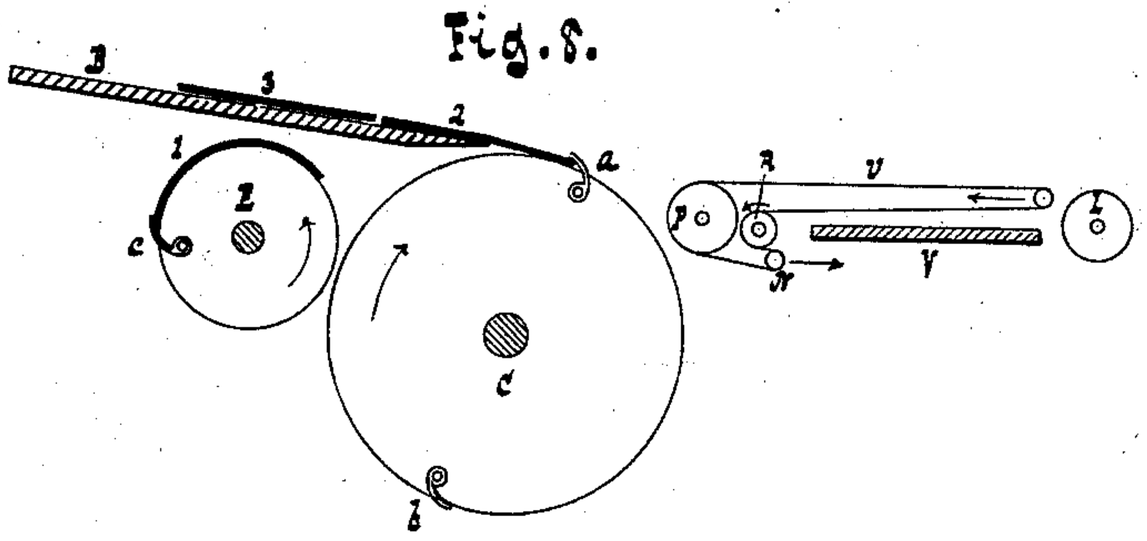


Fig. 9.

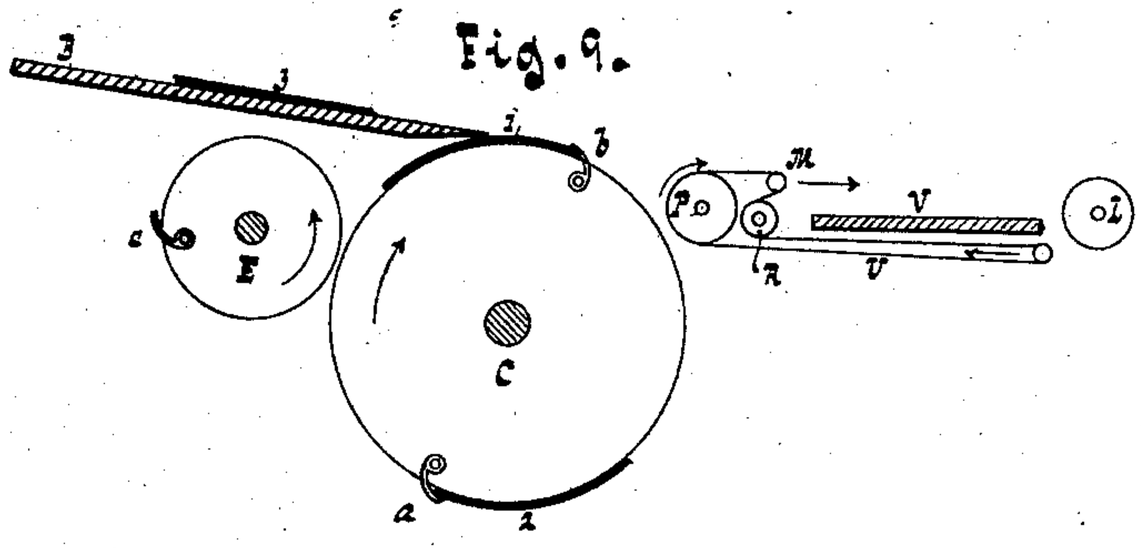


Fig. 10.

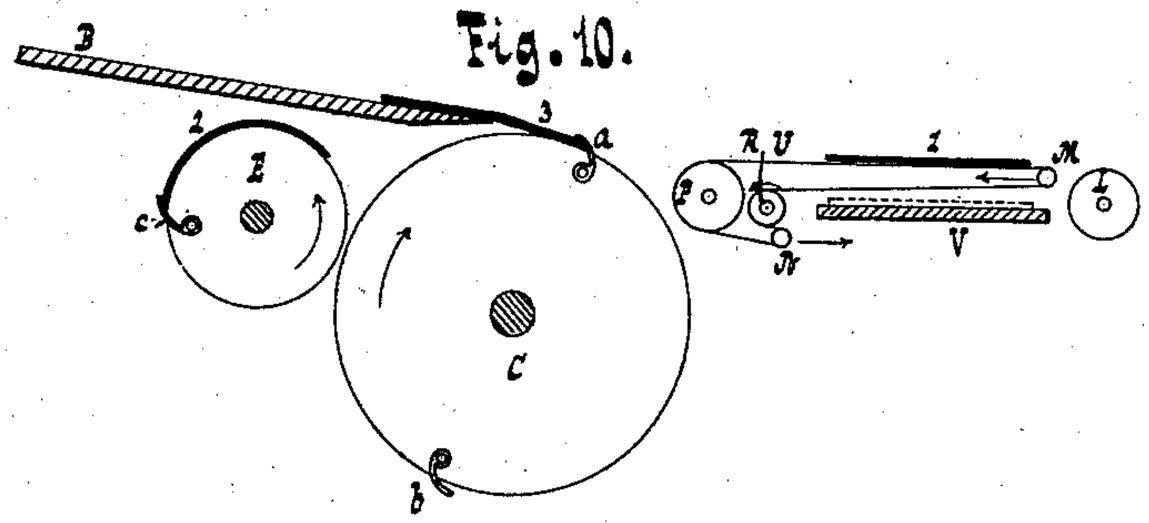
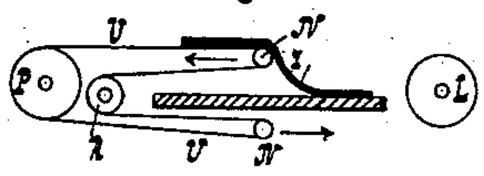


Fig. 11.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE P. FENNER, OF NEW LONDON, CONNECTICUT.

DELIVERY MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 389,800, dated September 18, 1888.

Application filed February 7, 1888. Serial No. 263,267. (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 Delivery Mechanism for Printing-Machines, of which the following is a specification.

This invention relates to certain improvements in delivery mechanism for printing-machines, the purpose thereof being to enable the impression-cylinder to have continuous rotation and to print at each revolution, as set forth in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a printing-press. Fig. 2 is a plan view of Fig. 1, partly broken away. Fig. 3 is a side elevation of a printing-press, viewed from the opposite side from that shown in Fig. 1 and with parts in somewhat different position from that shown in Fig. 1. Fig. 4 is a plan view of Fig. 3, partly broken away. Fig. 5 is a side elevation similar to Fig. 3 with parts in somewhat different position from that shown in Fig. 3. Fig. 6 is a detail side elevation, partly in section, of a delivery mechanism shown in the preceding figures and on a larger scale than in the preceding figures. Figs. 7 to 11, both inclusive, illustrate movements of various parts of the mechanism.

Similar letters indicate corresponding parts.

In the drawings, the letter A indicates a frame or support. B is a feed-table, and C is an impression-cylinder. The type-bed D is shown in the form of a cylinder. The direction of rotation of the impression-cylinder and the type-bed is indicated by arrows on said cylinder and type-bed. The impression-cylinder has two grippers or two sets of grippers, *a* and *b*.

A sheet, 1, Fig. 7, being fed off the feed-table is taken by the gripper *a* and carried past the type-bed, so as to receive an impression. From the type-bed the sheet is carried to the secondary cylinder E, and, being taken by the gripper *c* of the secondary cylinder, said sheet 1 is carried off the impression-cylinder about the secondary cylinder, as seen in Fig. 8, while the gripper *a* is left free to take sheet 2 off the feed-table B. From the secondary cylinder E the sheet 1 is delivered to the gripper *b*, as seen in Fig. 9, and thence said sheet 1 is passed to the delivery mechanism. The gripper *a* is thus free to take a sheet from the feed-table at each revolution of the cylinder, which sheet is printed on passing the type-bed D. As the rotation of the cylinder C may be continuous and without intermissions or stops, the process of printing can be continuously carried on.

Suitable lugs, *d e*, operate the grippers *a b* at proper times. The gripper *c* on the secondary cylinder E is operated by the impression-cylinder C. A lug, *f*, on the impression-cylinder actuates the gripper *c*, so as to cause said gripper *c* to take the sheet from the gripper *a*. The lug *g* on the impression-cylinder actuates the gripper *c*, so as to cause said gripper *c* to release the sheet, which is thereupon taken by the gripper *b*. From the gripper *b* the sheet is passed to the delivery mechanism. Said delivery mechanism operates as follows: A crank-arm, F, rotates with the impression-cylinder C and imparts an oscillating motion to the rack G and the gear-wheel H, which is keyed to the shaft I. The oscillations of the shaft I are imparted to the sprocket or chain wheels J and to the chains or cords K, which pass about said wheels J and about the wheels L. The chains K carry rollers M N, and the oscillations of the chains K cause the rollers M N to travel back and forth from the position shown in Fig. 7 to the position shown in Fig. 9, then back to the position shown in Fig. 7, and so on.

Mounted loosely on the shaft I is a roller, P. Said roller P has a ratchet-wheel, O, secured to it. A pawl, Q, located on the frame A, engages said ratchet-wheel O. When the rack G rotates the gear-wheel H and shaft I in the direction of the arrow on the roller P in Fig. 6, then the frictional contact between the shaft I and roller P will cause the roller P to rotate in the same direction. When said wheel H and shaft I rotate in the opposite direction, the pawl Q will lock the ratchet O and prevent rotation of the roller P in said opposite direction. The roller R has a ratchet, S, and the pawl T, located on the frame A, leaves the roller R free to rotate in the direction of the arrow shown on said roller R in Fig. 6; but said pawl locks said roller against rotat-

ing in the opposite direction. One or more tapes or belts, U, pass from the roller P to the roller M, thence to the roller R, thence to the roller N, and back to the roller P. W represents lifters or fingers, which are operated at suitable times in any well-known way, as by a cam-roller, X, engaging a suitable cam on the cylinder C. When the gripper *b* on the impression-cylinder has brought a sheet to the lifters W, said lifters strip the sheet from the impression-cylinder and cause said sheet to pass onto that portion of the belt U which extends from the roller P to the roller M, and which may be called the "delivery" portion of the belt. At the moment when the sheet begins to leave the cylinder C to pass to the belt U, said belt U is in the position shown in Fig. 9, with the roller M traveling away from the cylinder C and the roller P rotating in the direction of the arrow shown thereon in Fig. 9, and the roller R remaining stationary. As the sheet 1, Fig. 9, is passed off the cylinder C onto the delivery portion of the belt U, said delivery portion is extended until it is in the position shown in Fig. 10, bringing the sheet 1 over the delivery-table V. As the rollers M N are carried from the position shown in Fig. 10 back to the position shown in Fig. 9, so as to restore the belt U to position for another delivery, the roller P remains stationary and the roller R rotates in the direction of the arrow shown on said roller R in Fig. 10. The belt U is thus restored to position for another delivery by its actuating mechanism acting upon the under or idle portion of said belt, while the delivery portion of the belt, or that portion which extends from the roller P to the roller M, remains stationary during the restoration of said belt to position for another delivery. The belt U is thus drawn away from underneath the sheet 1, so that said sheet falls onto the delivery-table V, as indicated in Fig. 11. The traveling rollers M N and the alternately-rotating rollers P R keep the belt U stretched or extended, so that said belt is in condition to smoothly support a sheet.

The operation of the mechanism is illustrated in Figs. 7 to 11, both inclusive. The parts starting from the position shown in Fig. 7, the gripper *a* takes sheet 1 from the feed-table B and delivers said sheet 1 to the secondary cylinder E, Fig. 8, after which said gripper *a* is free to take sheet 2 off the table B. The sheet 1 is carried by the secondary cylinder E during part of the revolution of the impression-cylinder, and is then taken from said cylinder E by the gripper *b*, Fig. 9, and passed from the gripper *b* to the delivery mechanism, Fig. 10, whence said sheet 1 is passed to the delivery-table V, Fig. 11. The secondary cylinder-gripper *c* is made to approach first one and then the other of the impression-cylinder grippers, the secondary cylinder being constructed to make a complete revolution while the impression-cylinder makes part of a revolution or to revolve with different angular velocity than the impression-cylinder. Gears Y Z *h*, Fig. 2, are shown as uniting the cylinders C E and the type-bed D, so as to secure the proper relative motion of said parts. The secondary cylinder E having its axis placed in fixed relation to the axis of the impression-cylinder, said secondary cylinder is easily mounted and geared to the impression-cylinder.

As indicated in Fig. 6, each one of the alternately-rotating rollers P R is made to revolve in a direction opposed to the direction of rotation of the other of said rollers, one of said rollers acting during the delivery motion of the belt U, the other of said rollers acting during the return motion of said belt.

The secondary cylinder E may be regarded as a temporary carrier for shifting the position of the sheet on the impression cylinder.

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

1. The combination, with a delivery-belt, cords or chains K, and wheels J L, of traveling rollers and alternately-rotating rollers engaging said belt, substantially as set forth.

2. A delivery mechanism consisting of a belt and actuating mechanism for said belt, said actuating mechanism consisting of traveling rollers and fixed alternately-rotating rollers, and being constructed to extend the delivery portion of said belt for the delivery and to restore said belt to position for another delivery by acting upon the idle portion of said belt, substantially as described.

3. The combination, with a delivery-belt, cords or chains K, and wheels J L, of traveling rollers and alternately-rotating rollers engaging said belt, each of said rotating rollers being made to rotate in a direction opposed to the direction of rotation of the other roller, substantially as described.

4. The combination, with a delivery-belt, cords or chains K, and wheels J L, of traveling rollers and rotating rollers engaging said belt, one of said rotating rollers being made to act during the delivery motion of said belt and the other rotating roller being made to act during the return motion of said belt, substantially as described.

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

GEORGE P. FENNER. [L. S.]

Witnesses:

GEORGE COLFAX,

HIRAM W. HUBBARD.