(No Model.)

4 Sheets—Sheet 1.

G. P. FENNER.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 335,066. Patented Jan. 26, 1886.

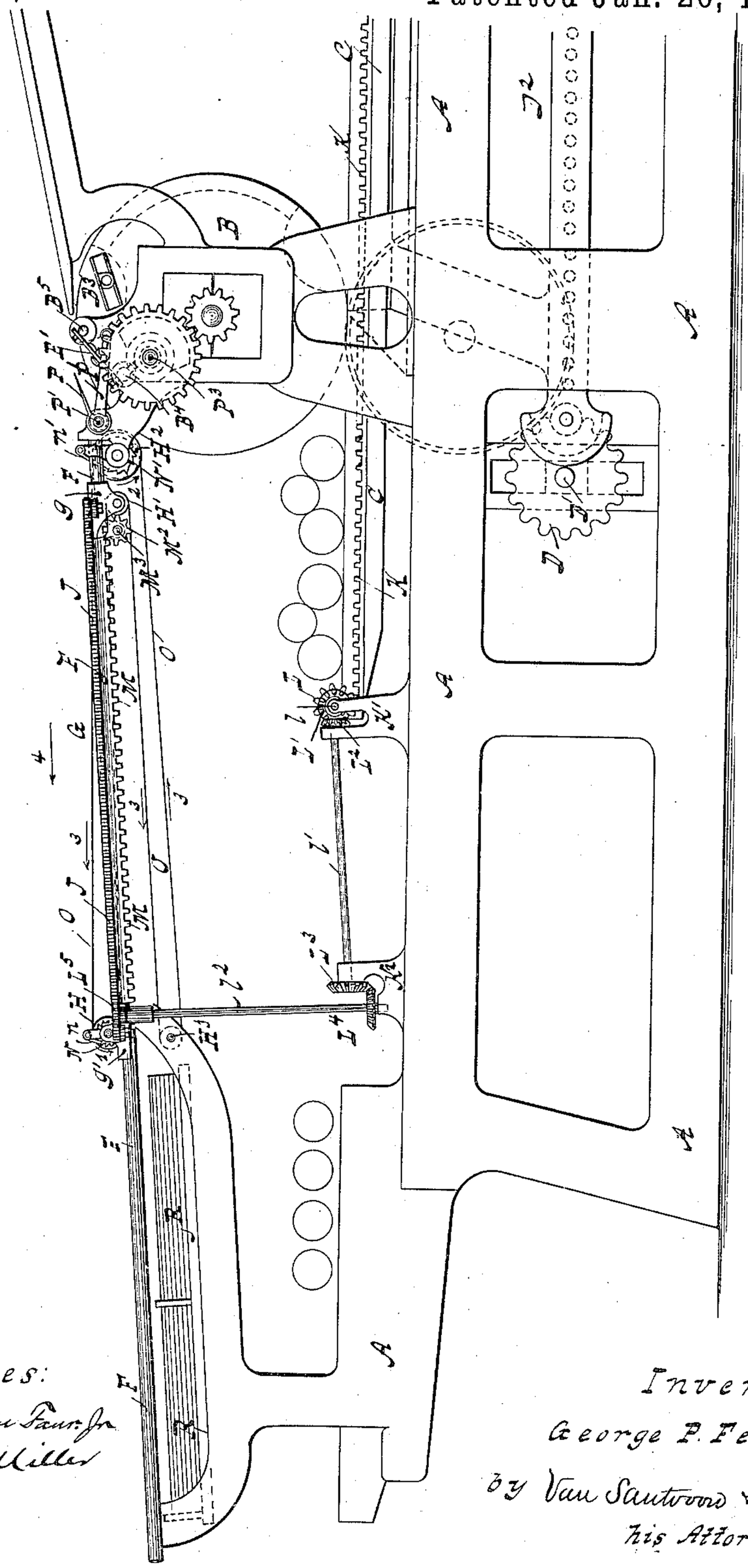

Fig. 1.

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William Miller

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

(No Model.) 4 Sheets—Sheet 2.

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SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

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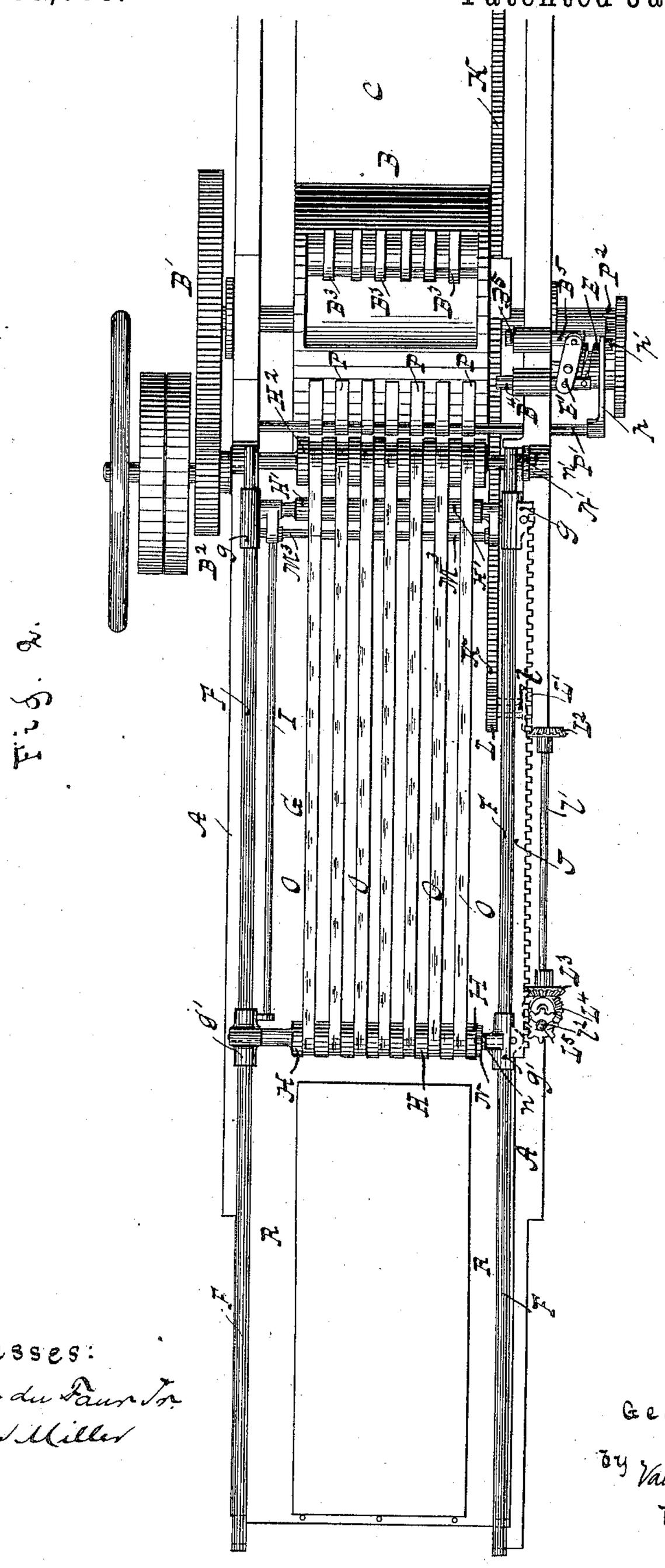

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

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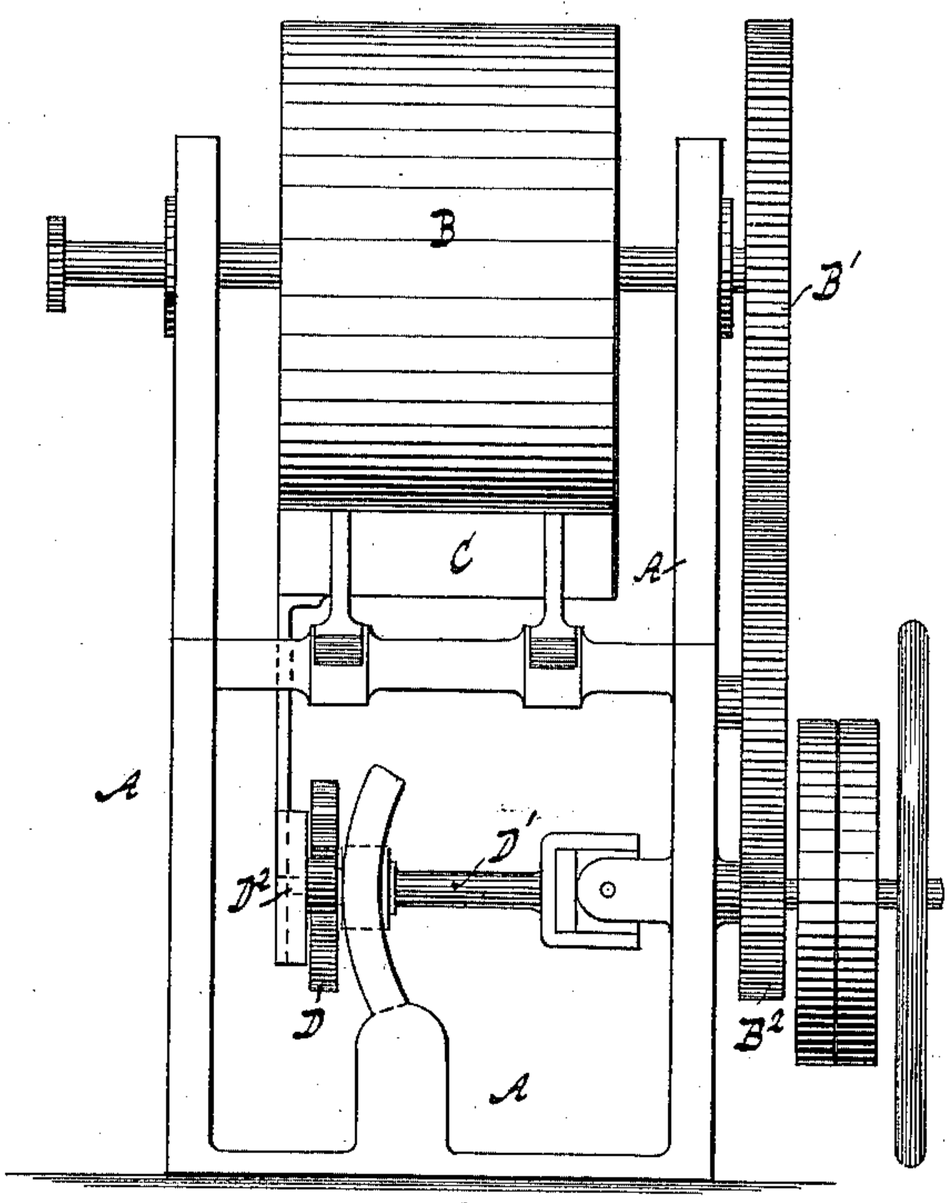
Fig. 3.



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(No Model.)

4 Sheets—Sheet 4.

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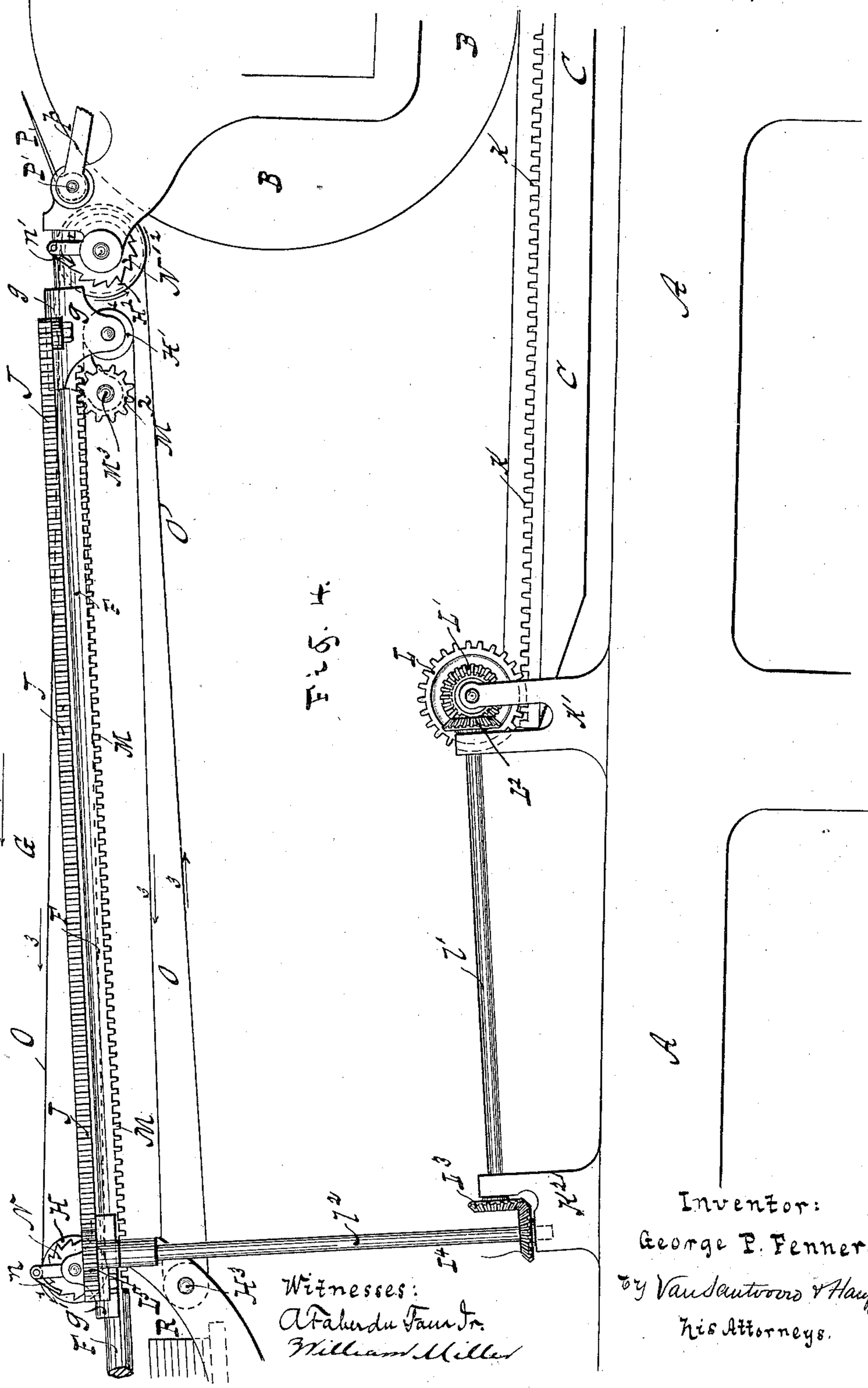
SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 335,066. Patented Jan. 26, 1886.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE P. FENNER, OF NEW LONDON, CONNECTICUT.

SHEET-DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 335,066, dated January 26, 1886.

Application filed August 13, 1885. Serial No. 174,294. (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 for Printing-Machines, of which the following is a specification.

My invention relates to improvements in sheet-delivery apparatus for printing-machines; and it consists, essentially, in certain novel features of construction, whereby the printed sheet is delivered to the receiving-table printed side up, and without having the said printed side brought into contact at any time with the said delivery apparatus.

The novel features of construction whereby the above-mentioned result is accomplished are fully pointed out in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of a two-revolution printing-press provided with my improved sheet-delivery apparatus. Fig. 2 is a plan or top view of the same with the feed-table removed. Fig. 3 is an end view thereof. Fig. 4 represents a side elevation of my improved sheet-delivery apparatus on a larger scale than the preceding figures.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the press-frame of a printing-press, which is constructed to support the rotating impression-cylinder B and the reciprocating type-bed C in the proper relation to each other. The reciprocating motion can be imparted to the type-bed C by means of an ordinary "rack-and-knuckle" shaft consisting of a spur-wheel, D, arranged on a shaft, D′, in a proper position to engage with a horizontal row of spurs or pins on a rack-bar, D^2, pendent from the type-bed C, Figs. 1 and 3; however, other known means may be employed for the specified purpose.

Upon the shaft of the impression-cylinder B is mounted a cog-wheel, B′, Figs. 2 and 3, which is properly connected by intermediate gears to a gear, B^2, arranged on the driving-shaft of the press, whereby the rotary motion is imparted to the said impression-cylinder B.

In a suitable cavity of the cylinder B are arranged the usual grippers, B^3, for holding the sheet to be printed upon the cylinder, these grippers being operated by trip-pins B^4 B^5, which are acted upon by a helical cam or worm, E, on the shaft P^3, into the thread of which cam the end of one of the pins, B^4, projects, while the other pin, B^5, is operated by its connection with the cam-lever E′, which is centrally fulcrumed to the press-frame and attached to the pins, as shown. The cylinder B makes two revolutions during a complete traverse of the bed in both directions, and the trip-pins are alternately thrown out of action by means of the cam and cam-lever before described, the whole constituting a two-revolution press of well-known construction.

To the upper part of the press-frame A, which is suitably formed for the purpose, are rigidly secured two slide-rods, F F, which extend forward to near the impression-cylinder to points at which the said slide-rod can be suitably secured to the press-frame.

G is a tape-carriage, constructed to reciprocate upon the slide-rods F F, having suitable sliding boxes, *g g′*, arranged at each of its ends for the purpose, and which boxes rest upon and partially embrace the said slide-rods. This carriage is provided with bearings for the tape-rollers H H′, which bearings, in the example shown in the drawings, are directly in the sliding boxes *g g′*. The tape-rollers H H′ reciprocate with the tape-carriage, and are held in their relative positions by a rod, I, Fig. 2, on one side of the press, which is secured to one of the boxes, *g′*, and to a suitable projection on one of the sliding boxes *g*, while on the other side of the press the said tape-rolls are held by a rack, J, secured to the boxes, the specific purpose of which rack will be hereinafter more fully described.

The reciprocating motion of the tape-carriage G can be imparted thereto from any of the moving parts of the press by the use of devices such as would suggest themselves to a skilled mechanic; but in the example shown in the drawings I have derived the said motion of the tape-carriage G from the type-bed C, as follows: On the surface of the type-bed C, Figs. 1, 2, and 4, is secured or formed a rack, K, and in a suitable position to engage therewith is a gear-wheel, L, secured to one end of a shaft, *l*, having bearings in a standard, K′, of the press-frame A, and upon the

other end of the shaft *l* is a bevel gear-wheel, L′, which in turn engages with a bevel-wheel, L^2, mounted upon a nearly-horizontal shaft, *l′*, having bearings in the standards K′ and K^2. This shaft carries on its other end a similar bevel-gear, L^3, which engages with a bevel-gear, L^4, suitably arranged at right angles thereto, which latter gear-wheel, L^4, is arranged on one end of a shaft, l^2, extending upward, and upon the upper end of this shaft l^2 is secured a spur-gear, L^5, which meshes into the rack J, previously mentioned. The shaft l^2 is journaled in the press-frame A near its upper end. It is now evident that if the type-bed is reciprocated its motion will be imparted to the sliding carriage G, and both move simultaneously in one and the same direction, and the carriage G, also, is caused to make a complete forward and return motion for each impression of the cylinder.

The above-described means for reciprocating the carriage would suffice to accomplish the said purpose; but in order to cause both sides of the carriage G to travel at the same time, and to effect this motion without cramping or binding on the slide-rods F F, I provide each of the slide-bars with rack-teeth, which form racks M M, Figs. 1 and 4, extending one-half of the length of the slide-rods, and these racks are engaged by spur-wheels M^2 M^2, secured to the ends of a shaft, M^3, having bearings in the slide-boxes *g g*, by which mechanism motion is imparted to the sliding carriage on both sides at the same time.

As before described, the sliding carriage G carries with it two tape-rolls, H H′, and I also provide a third tape-roll, H^2, which has suitable bearings in the press-frame A, and a fourth roll, H^3, also having bearings in the frame, which latter two rolls do not reciprocate with the carriage.

Upon the one end of each of the tape-rolls H and H^2 are secured ratchet-wheels N N′, which are engaged, respectively, by pawls *n* *n′*, one pivoted to the sliding box *g′* and the other to the frame, in order that the said tape-rolls can rotate only in one direction; and, as shown, the teeth of the ratchet-wheels are so placed that they can respectively rotate only in the direction of arrows 1 and 2, marked thereon in the drawings, Figs. 1 and 4. It is evident that the restriction of the rotation of rolls H H^2 can be accomplished by other means, such as would suggest themselves to a skilled mechanic. Around these tape-rolls H H′ H^2 H^3, Fig. 4, extend continuous bands of tape O, or the like, which run from roll H^2 around roll H back to roll H′, then around roll H^3, and from this roll back again to roll H^2. It will be observed that when the carriage reciprocates these tapes O can move only in one direction—that indicated by arrows 3 marked thereon, Fig. 1—since the ratchet-wheels N N′ on the rolls H^2 and H prevent these two rolls from turning in any other direction than that indicated by arrows 1 and 2, Fig. 1. When the carriage G moves from the position shown in the drawings toward the direction indicated by arrow 4, marked thereon in Fig. 1, the top tape O moves in the direction shown by arrows 3, marked thereon, since the roll H^2 can rotate while roll H remains fixed, owing to its ratchet-wheel, while, when the carriage moves back toward the impression-cylinder, this top tape remains stationary, since the roll H^2 is prevented from rotating by the pawl-and-ratchet wheel thereon, while the roll H can rotate. Thus when the carriage G moves outward, as indicated by the arrow 4, Fig. 1, that part of the tapes O between the rollers H and H′ is stationary with respect to said rollers, while on the return movement of the carriage the part of the tapes between the rollers H^2 and H^3 is stationary. During the outward motion of the carriage the part of the tapes O between the rollers H and H^2 at the start is carried forward, followed by a portion drawn from below; but on the return of the carriage the first-mentioned part of the tapes is drawn around roller H, while the said part which is drawn from below remains stationary.

In order to guide the sheets from the impression-cylinder B to the tape-roll H^2, I provide sheet-lifters P, which are arranged in a series on a rod, P′, having bearings in the press-frame which are so operated that when the sheet is in the proper position it is lifted upward and its edge deposited upon the said roll H^2. To operate these sheet-lifters, I provide a sheet-lifter cam, P^2, which is rigidly secured upon one end of the shaft P^3, and is adapted to engage with a lever, *p*, on one end of the rod P′, which lever can be provided at the proper end with a friction-roll, *p′*, which is engaged by the said cam, Fig. 2. When the sheet-lifter cam P^2 comes into contact with the lever *p*, the grippers are opened, Fig. 1, the edge of the sheet is caught by the sheet-lifters P, and the sheet is guided out away from the impression-cylinder upon the roll H^2, and from this upon the tapes.

In the position shown in the drawings the press has just finished printing a sheet, the type-bed is on its back center, the sliding carriage in its extreme backward position toward the cylinder, and the front edge of the printed sheet is under the grippers B^3 on the impression-cylinder.

The operation of the sheet-delivery apparatus is as follows: When the type-bed starts on its return toward the forward end of the press, the sliding carriage participates in its motion, and as the roll H cannot turn in a direction opposite to the arrow marked thereon the top tapes are carried forward with the carriage at the same speed as said carriage, thereby rotating the roll H^2 in the direction indicated by the arrow marked thereon. When the gripper-cam comes into contact with pin B^4, the grippers are opened, the edge of the printed sheet is caught by the sheet-lifters P,

(which are raised at the same time by the sheet-lifter cam P^2,) and the sheet is guided from the impression-cylinder to roll H^2, from which it passes upon the tapes, which are still moving. The sheet travels a short distance upon the tapes, when it stops with the tapes and remains stationary, while the sliding carriage is on its return motion toward the impression-cylinder, during which period the next sheet is being printed. As the next sheet is guided by the sheet-lifters, the first sheet is carried onward by the tapes to a position directly over the receiving-table R, and remains in that position while the carriage moves forward again from under the sheet, which then drops printed side upward upon the receiving-table R, whereby the operation is completed and the sheet delivered without having been touched upon its printed face during the delivery.

It is obvious that instead of employing devices for restricting the rotation of rolls H and H^3 to one direction, the result sought to be acplished thereby can be attained by restricting the rotation of rolls H' H^3 to one direction.

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

1. The combination, substantially as described, with the impression-cylinder and the type-bed, of the reciprocating tape-carriage, the tape-rolls H H' thereon, one of which is restricted to an intermittent rotation in one direction, the tape-rolls H^2 H^3, mounted in the frame, one of which is confined to rotate intermittently in one direction only, and means, substantially as described, for conducting the sheets from the cylinder to the tapes.

2. The combination, substantially as shown and described, with the impression-cylinder, the type-bed, the reciprocating tape-carriage, and the roll H' thereof, of the roll H, having bearings in the carriage and restricted to rotate intermittently in one direction, the rolls H^2 H^3, mounted in the frame, the roll H^2 being restricted to rotate intermittently in one direction, the sheet-delivery tapes passing around the rolls H H' H^2 H^3, the sheet-delivery fingers P, and means, substantially as shown and described, for operating the same.

3. The combination, substantially as shown and described, with the impression-cylinder, the type-bed, and the rack K thereon, of the tape-carriage G, the rack thereof geared to the type-bed rack, for reciprocating the carriage G, the roll H, mounted on the carriage, the ratchet-wheel N and its pawl *n*, roll H', the rolls H^2 H^3, mounted in the frame, the ratchet-wheel N' and pawl *n*, controlling roll H^2, the sheet-delivery tapes O, passing around the rolls, the sheet-lifters P, mounted on shaft P', the cam P^2, and lever *p* for controlling the sheet-lifter.

4. The combination of the reciprocating carriage G, the rolls H H' H^2 H^3, and the tapes O, passing round said rolls, the said tapes having imparted thereto an intermittent motion, substantially as shown and 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:
E. F. KASTENHUBER,
A. FABER DU FAUR, Jr.