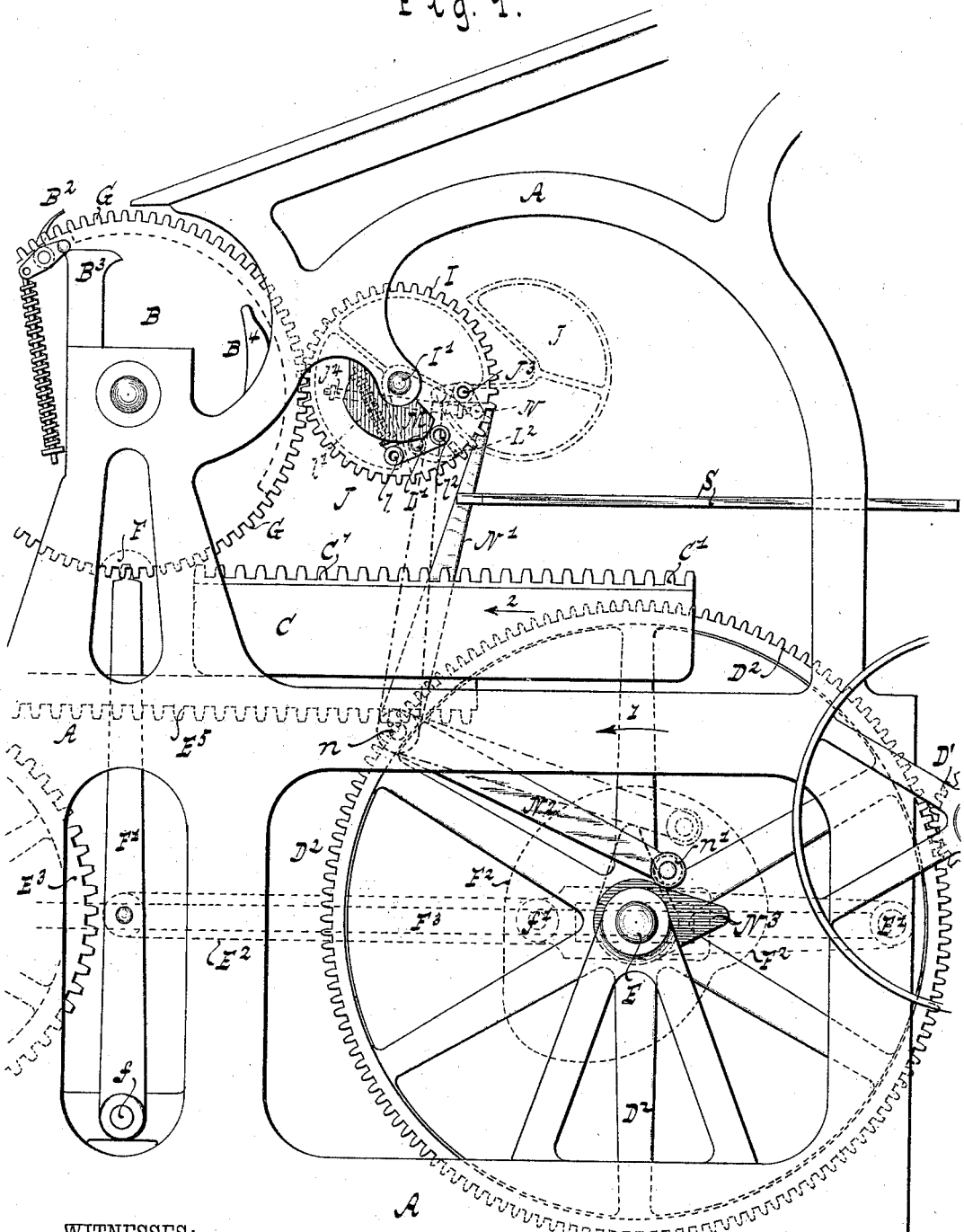
(No Model.) 3 Sheets—Sheet 1.

G. P. FENNER.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 344,731. Patented June 29, 1886.

Fig. 1.



WITNESSES:

A. Faber du Faur.

William Miller

INVENTOR

George P. Fenner.

BY

Van Santvoord & Hauff

his ATTORNEYS

(No Model.) 3 Sheets—Sheet 2.

G. P. FENNER.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

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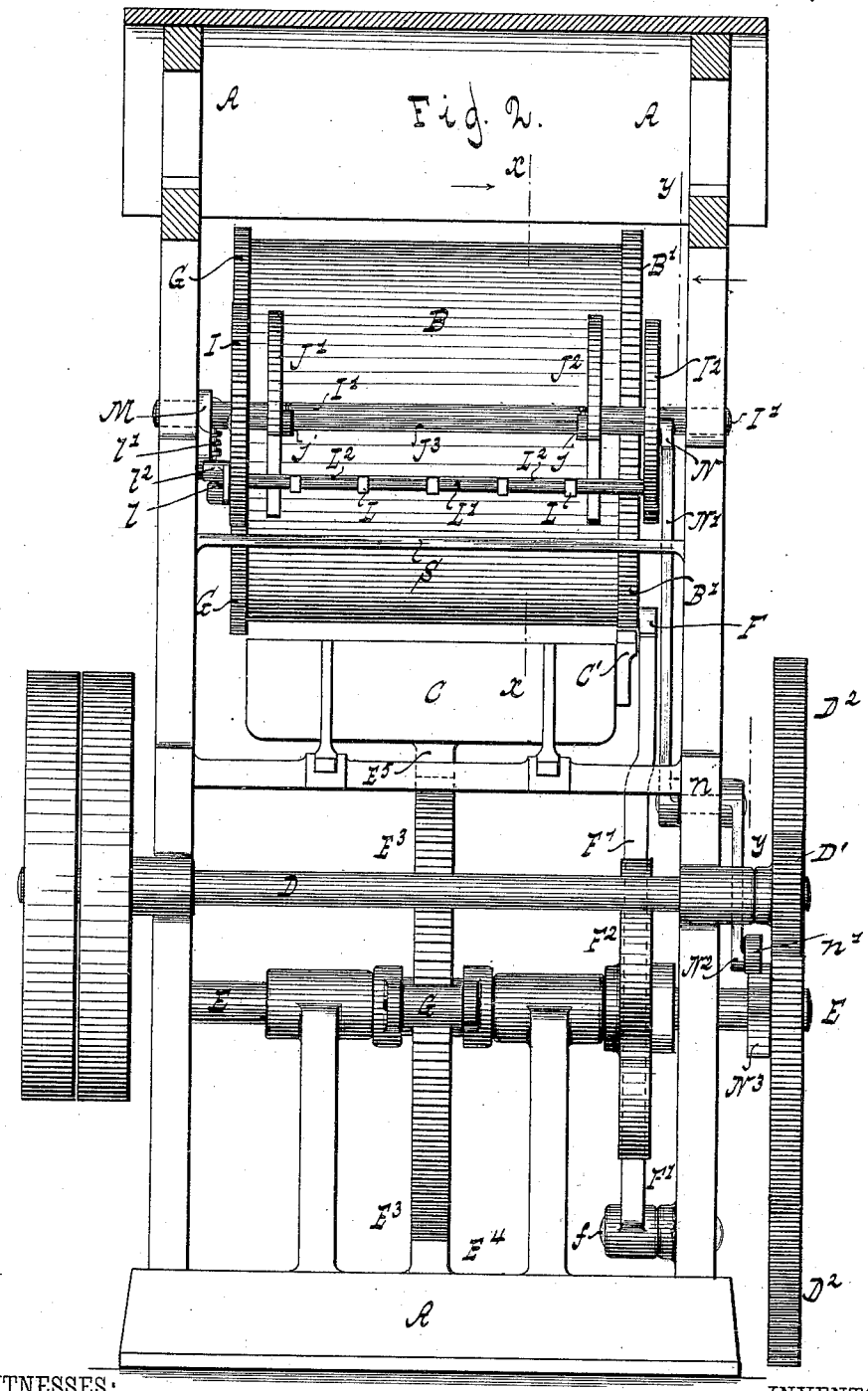


WITNESSES:

A. Faberdu Faur Jr.

William Miller

INVENTOR

George P. Fenner.

BY

Van Santvoord & Hauff

his ATTORNEYS

(No Model.) 3 Sheets—Sheet 3.

G. P. FENNER.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 344,731. Patented June 29, 1886.

Fig. 3.

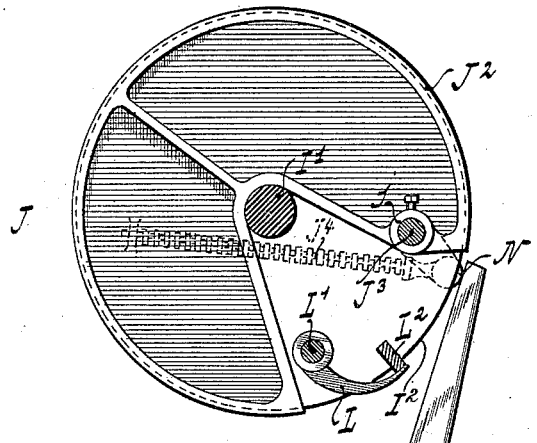
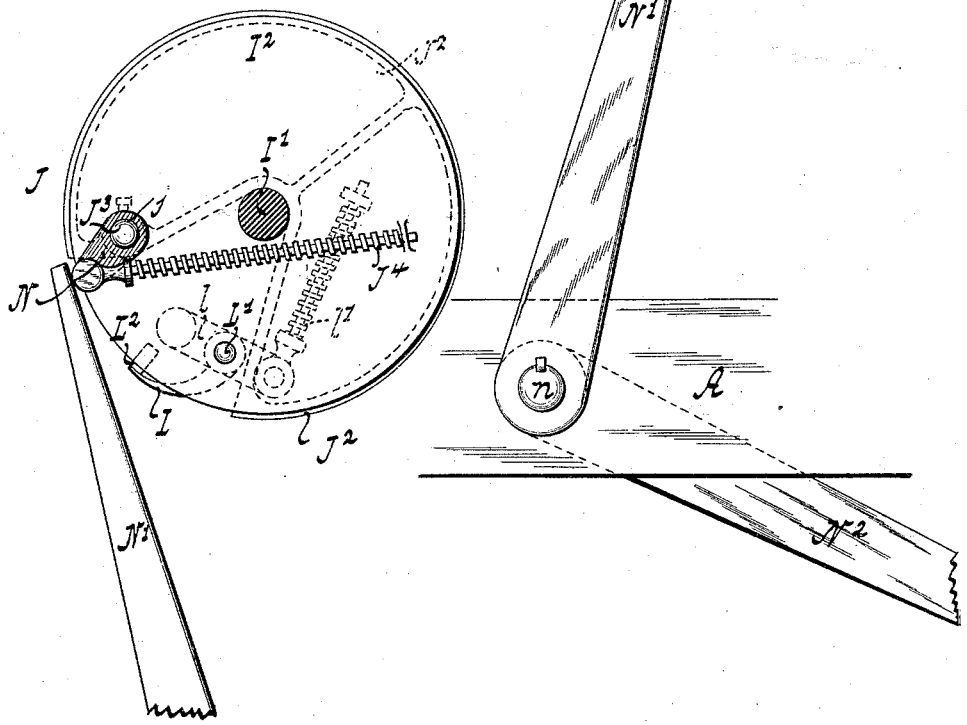


Fig. 4.



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BY

Van Santvoord & Hauff

his ATTORNEYS

UNITED STATES PATENT OFFICE.

GEORGE P. FENNER, OF NEW LONDON, CONNECTICUT.

SHEET-DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 344,731, dated June 29, 1886.

Application filed March 25, 1886. Serial No. 196,559. (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-presses, and especially for stop-cylinder presses; and it consists, essentially, in an eccentric carrier-reel, which is adapted to receive the printed sheet directly from the impression-cylinder and deliver the same, when thrown about its bearings, upon a receiving-table located in the press-frame. The carrier-reel is actuated to deliver the sheet at proper intervals by levers in connection with a cam on the main shaft of the press.

The specific construction of my sheet-delivery apparatus is more 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 stop-cylinder press provided with my improved sheet-delivery apparatus. Fig. 2 is an end elevation, partly in section. Fig. 3 is a vertical section in the plane *x x*, Fig. 2, of the carrier-reel and its carriage, said figure being drawn to a larger scale than the preceding figures. Fig. 4 is a similar section in the plane *y y*, Fig. 2.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the press-frame constructed to support the impression-cylinder B and the 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′ D² to the main shaft E of the press, from which motion is in turn transmitted by the usual crank, E′, and connecting-rod F³, Fig. 1, to the traveling cog-wheel E³, which meshes into a stationary rack, E⁴, on the base of the press, and also engages a suitable rack, E⁵, pendent from the type-bed C, whereby a reciprocating motion is imparted to the type-bed. The impression cylinder B receives its motion from the type-bed C through a second rack, C′, thereon, which is suitably arranged upon the latter to engage with the cog-wheel B′, Fig. 2, of the impression-cylinder. 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 the space in the cog-wheel B′ the impression-cylinder carries a toothed sector or catch, F, which is engaged by a catch-lever, F′, that 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, F², which has a suitable way therein, and a slotted rod, E², that is connected at one end to the catch-lever, and on its other end is a roller-stud, *f′*, which engages with the way in the cam.

The impression-cylinder is provided with grippers B², Fig. 1, for grasping, holding, and releasing the sheet. These grippers are opened by trip cams B³ and B⁴, arranged upon the press-frame in the proper relative positions, and they are closed by a spring, as usual, the whole constituting the main features of a stop-revolution press of well-known construction. To adapt my sheet-delivery apparatus to such a press, the impression-cylinder B is provided with an additional gear-wheel, G, which imparts motion to a gear-wheel, I, that is tightly mounted upon a shaft, I′, the latter having suitable stationary bearings in the press-frame. Upon the shaft is mounted a circular disk or wheel, I², Figs. 2, 3, and 4, for a purpose to be hereinafter described.

The shaft I′, the gear-wheel I, and the disk I² serve to support an eccentric reel, J, and are hereinafter collectively designated the "reel-support."

The carrier-reel J, which delivers the sheets to a table, S, consists of two sectoral disks, J′ J², which are eccentrically mounted at *j j* to a shaft, J³, having bearings at one end in the gear-wheel I, while its other end is supported in the disk I². The apices of the triangular open spaces formed in the disks J′ J² are rounded to form a center which fits the diameter of the shaft I′ of the reel-support, so that

when in their normal position, Figs. 1, 3, and 4, said disks rest with their centers upon the shaft of the reel-support and participate in the rotation of said reel-support.

To grasp the printed sheet as it is delivered to the carrier-reel from the impression-cylinder, to retain the same, and to release it when the carrier-reel is to be carried to its delivering position, I make use of grippers L, which are arranged on a horizontal gripper-shaft, L′, that extends between and has its bearing in the gear-wheel I and disk I^2 of the reel-support. The free ends of the grippers impinge upon a base, L^2, that extends between and is secured to the gear-wheel I and disks I^2, and the edge of the sheet is held between said base and the grippers. The end of the gripper-shaft L′ extends through the gear-wheel I, and a lever, *l*, is secured thereto, one arm of which is subjected to the action of a spring, *l′*, while the other arm carries a pin, l^2, that is brought in position at the proper intervals to be engaged by the face of a trip-cam, M, secured to the press-frame. The action of the spring *l′* tends to close the grippers upon the sheet after the lever *l* is released.

To trip the sectoral disks J′ J^2, constituting the eccentric carrier-reel, the shaft J^3 on which these disks are mounted is provided with an arm, N, which is acted on by a suitable lever actuated from the main shaft E of the press. In the example shown in the drawings I use a bell-crank lever, N′ N^2, which is pivoted at *n* to the press frame. One arm of this lever is in contact with the arm N of the rock-shaft J^3, and its other arm, N^2, is in contact with a cam, N^3, Figs. 1 and 2, on the main shaft E of the press. This latter arm of the lever carries a roller-stud, *n′*, which bears on the cam, thereby lessening the friction. A spring, J^4, is connected with the arm of the rock-shaft J^3, which spring returns the reel-carriage to the position shown by full lines in Fig. 1—that is to say, its receiving position—whenever the same is thrown about its bearings by the lever N′ N^2.

As before described, the eccentric carrier-reel J is connected with the reel-support by the shaft J^3, and consequently when the reel is in its receiving position it rotates with the reel-support to receive the sheet. Owing to this connection it is necessary that the carrier-reel should be actuated to deliver the sheet at those intervals in which the cylinder is at rest, and consequently the reel-support is not rotating. This is done by the proper contour and throw of the cam N^3. The lever N′ N^2 is so arranged that it will not interfere with the rotation of the carrier-reel when the latter is receiving the sheet.

The operation of the delivery apparatus is as follows: In the drawings the working parts of the press are shown (by full lines) in the position they will be in when the press has finished printing a sheet, in which position the impression-cylinder is in such a position that the grippers thereof are ready to grasp the next sheet as it is fed forward from the delivery-table and a sheet is under the grippers of the reel-support. As the main shaft E now continues its motion in the direction indicated by arrow 1, Fig. 1, the type-bed C moves toward the impression-cylinder B in the direction of arrow 2, marked thereon in Fig. 1, but does not rotate the impression-cylinder, since the latter has not yet been shifted by the catch-lever F′, so as to bring its teeth in the proper position to be engaged by the rack C′ on the type-bed, and the impression-cylinder is not rotated until the bed returns from its extreme position on the opposite side of the impression-cylinder. During this first half of the semi-revolution of the main shaft E and the corresponding traverse of the bed the cam N^3, moving in the direction of arrow 1, Fig. 1, engages the arm N^2 of the lever N′ N^2, and the eccentric carrier-reel is thrown about its bearings to its delivering position, as shown by dotted lines in Fig. 1, and during the remainder of the semi-revolution of the shaft E the lever returns to its original position and the carrier-reel is drawn to its receiving position by the spring thereof. Just before the carrier-reel moves from its receiving position to its delivering position above the receiving-table the gripper-lever *l* comes into contact with the face of the trip-cam M and opens the grippers L of the carrier-reel, but the sheet clings closely to the disks of said reel until it is in its proper position over the receiving-table, at which point the sheet releases itself and falls, printed side up, on the table. During the remaining semi-revolution of the main shaft E the carrier-reel J remains in its receiving position and rotates with the reel-support, which is now set in motion by the impression-cylinder, as the latter is now engaged by the type-bed which is moving toward its original position. As before stated, the carrier-reel is now rotating and the grippers L are held open by the cam M until the lever *l* clears the cam, when they are closed; but at the same time the edge of the printed sheet is brought under the grippers L, and same is wound on the disks J′ J^2. As the sheet is grasped by the grippers L, it is released by the grippers B′ of the impression-cylinder, said release being effected by the action of the cam B^4.

Since the sheet is delivered to the carrier-wheel J with its printed side facing toward the center of the reel, it is necessary to use disks J′ J^2, as shown, so that only the edge of the paper is brought into contact. The disks are made adjustable on the shaft J^3, in order to adapt them for varying sizes of sheets.

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

1. The combination, with the impression-cylinder, of the eccentric carrier-reel J, constructed to receive the printed sheet from the impression-cylinder, substantially as shown and described.

2. The combination, with the impression-cylinder and the receiving-table S, of the ec-

centric carrier-reel J, constructed to receive the printed sheet from the impression-cylinder and to deliver the same to the receiving-table, substantially as shown and described.

3. The combination, with the impression-cylinder, of the eccentrically-mounted carrier-reel J and a rotary shaft, I′, said carrier-reel being constructed to rotate concentrically with the shaft to receive the printed sheet from the impression-cylinder and to swing eccentrically to deliver the same, substantially as shown and described.

4. The combination, with the impression-cylinder, of the eccentric carrier-reel J and a reel-support, substantially as shown and described.

5. The combination, with the impression-cylinder, of the rotary reel-support mounted in stationary bearings and geared to the impression-cylinder, and a carrier-reel mounted eccentrically in said carrier-reel and constructed to rotate concentric with the same to receive the sheet from the impression-cylinder and to swing eccentrically to deliver the same, substantially as shown and described.

6. The combination, with the impression-cylinder, of the shaft I′, the gear I thereon engaging a gear on the impression-cylinder, the disk I^2, the grippers L and base, the cam for operating the grippers, the eccentric shaft J^3, the disks J′ J^2, mounted thereon and centered to the shaft I′, substantially as shown and described.

7. The combination, with the impression-cylinder, of the eccentric carrier-reel J, the reel-support geared to the impression-cylinder, the cam N^3, and the lever $N' N^2$, connected with the cam and the eccentric carrier-reel, substantially as shown and described.

8. The combination, with the impression-cylinder, its grippers, trip-cams for the same, and the receiving-table S, of the reel-support geared to the impression-cylinder, the shaft J^3, the carrier-reel eccentrically mounted on the shaft J^3 and constructed to rotate concentrically with the reel-support to receive the sheet, and mechanism, as described, for throwing the carrier-reel about its shaft J^3 to deliver the sheet to the receiving-table, substantially as shown and described.

9. The combination, with the impression-cylinder, its grippers, the trip-cam for the same, and the receiving-table S, of the shaft I′, the gear I thereon engaging a gear on the impression-cylinder, the disk I^2, the rock-shaft J^3, eccentrically mounted in the gear and disk, the sectoral disks J′ J^2, eccentrically mounted on said shaft J^3 and centered to the shaft I′, the grippers L and base L′, the spring-pressed lever and the cam for operating the same, and the spring J^4, connected to the disk I^2 and rock-shaft, substantially as shown and described.

10. The carrier-reel J, consisting of sectoral disks J′ J^2, eccentrically mounted on a shaft, said disks being adapted to receive the edges of the sheet, substantially as shown and described.

11. The carrier-reel J, consisting of two sectoral disks, J′ J^2, eccentrically mounted on a rock-shaft and adjustable thereon, and each of which is provided with an open center, substantially as shown and described.

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

GEO. P. FENNER. [L. S.]

Witnesses:

EDWARD T. BROWN,

H. W. HUBBARD.