(No Model.) 3 Sheets—Sheet 1.

C. B. COTTRELL.

DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 260,945. Patented July 11, 1882.

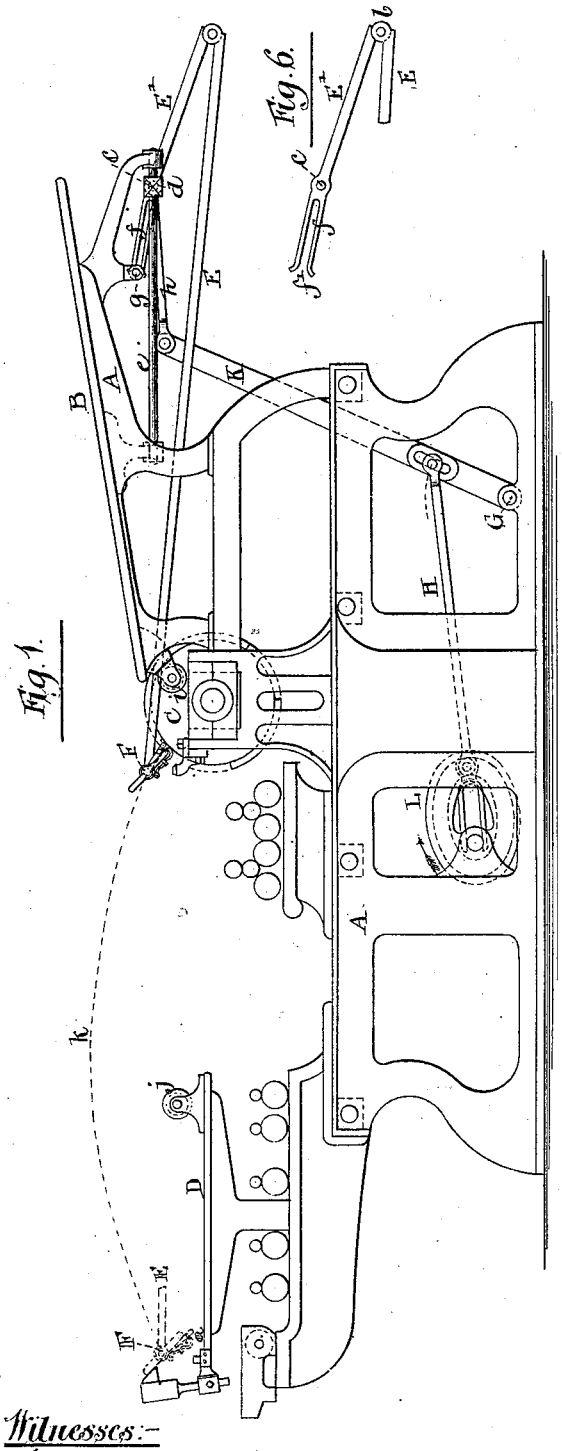

Fig. 1.

Fig. 6.

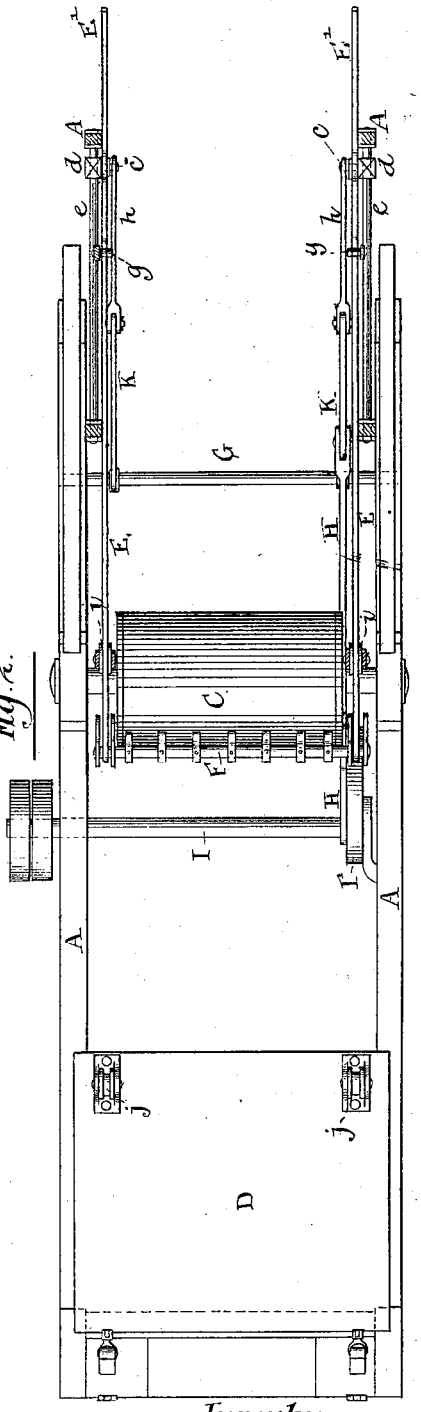

Fig. 2.

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by his Attorneys
Brown & Brown

(No Model.) 3 Sheets—Sheet 2.

C. B. COTTRELL.

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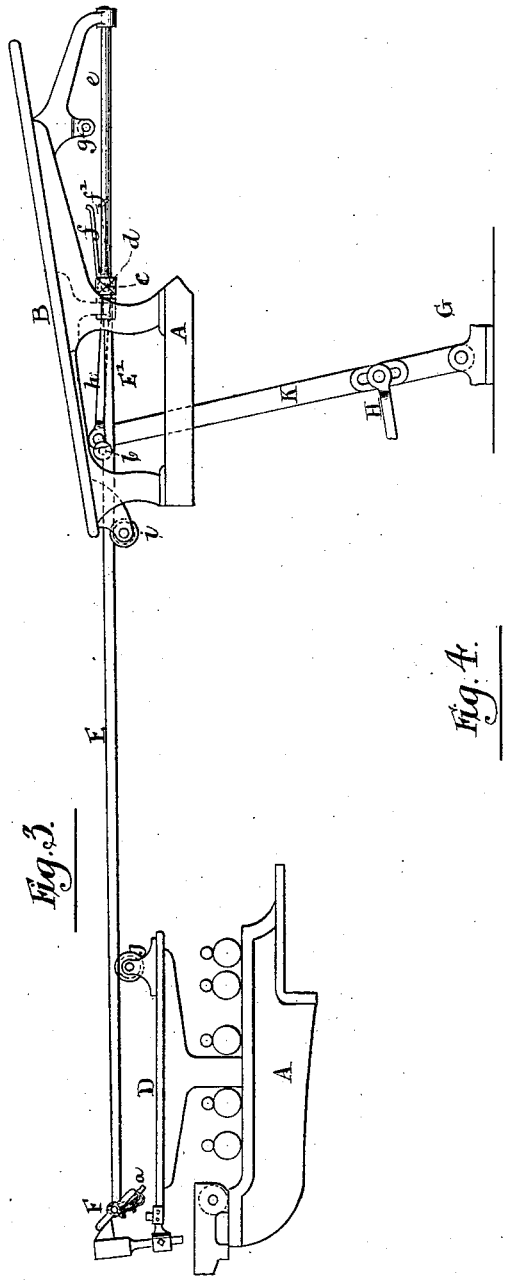

Fig. 3.

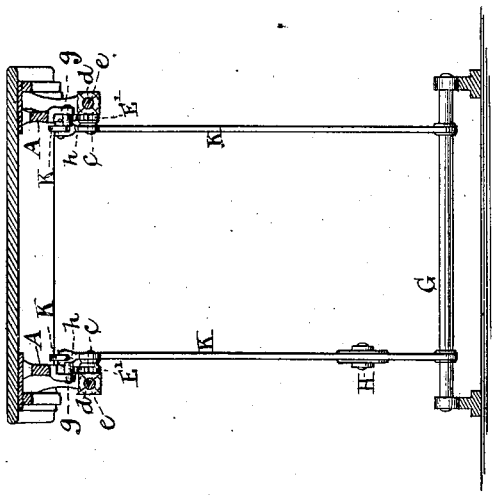

Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

C. B. COTTRELL.

DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 260,945. Patented July 11, 1882.

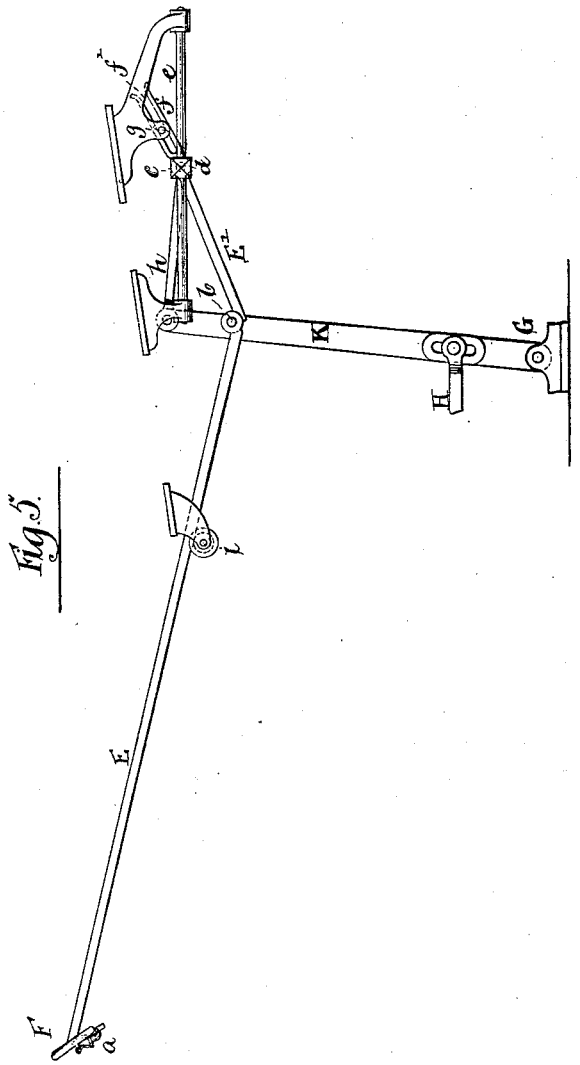

Fig. 5.

Witnesses:
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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF WESTERLY, RHODE ISLAND.

DELIVERY APPARATUS FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 260,945, dated July 11, 1882.

Application filed March 29, 1881. (No model.)

To all whom it may concern:

Be it known that I, CALVERT B. COTTRELL, of Westerly, in the county of Washington and State of Rhode Island, have invented certain new and useful Improvements in Sheet-Delivery Apparatus for Cylinder Printing-Presses, of which the following is a specification, reference being had to the accompanying drawings.

This invention, which is applicable either to two-revolution cylinder or stop-cylinder presses, relates to delivery apparatus in which grippers are employed to take the sheet from the impression-cylinder of the press and carry it to and deliver it upon a receiving-table with the printed side upward without the use of tapes.

The invention consists in the combination, with the impression-cylinder, of folding gripper-carrying rods of peculiar construction, whereby a greatly-accelerated movement of the grippers is obtained, and in certain details of mechanism in combination with such folding rods.

In the accompanying drawings, Figure 1 is a side elevation of such of the parts of a two-revolution cylinder printing-press as are necessary to illustrate my invention, showing the delivery-grippers in position for taking the sheet. Fig. 2 is a plan corresponding with Fig. 1, but having the feed-board omitted to expose to view those portions of the sheet-delivery apparatus which are under the feed-board. Fig. 3 is a side view, representing the principal parts visible in Fig. 1, but showing them with the delivery-grippers in position for depositing the sheet on the receiving-table. Fig. 4 is a back view, partly in section, corresponding with Fig. 3. Fig. 5 is a side view of the principal parts employed to move the delivery-grippers from the cylinder to the receiving-table, showing them in a position intermediate between the positions shown in Figs. 1 and 3. Fig. 6 is a detail view, which will be hereinafter explained.

A is the framing of the press; B, the feed-board; C, the impression-cylinder; D, the receiving-table at the opposite end of the press to the feed-board. The cylinder is to be fitted with grippers to take the sheet from the feed-board and hold it during the printing; but these grippers, being well understood, are not represented. The rotary motion of the cylinder and the reciprocating motion of the type-bed (which is not shown) may be produced by the usual or suitable means.

F is a shaft which carries the delivery-grippers *a*. This shaft, instead of being supported and carried in any of the well-known ways to and fro between the cylinder and a position over the receiving-board, is fitted to and entirely supported in bearings in the front ends of two long jointed carrying-rods, which are arranged outside of the cylinder on opposite sides of the press, and each of which is composed of two sections, E E′, connected by a rule-joint, *b*, which permits the two sections to fold or flex downward, but which, by reason of its stop-shoulders being on the under side, prevent it from folding upward or moving upward beyond or far above a right line drawn through the two sections of the rod. This may be understood by reference to Figs. 1, 3, and 5, Fig. 3 showing the rod straight with the stop-shoulders of its joint in contact, as it is when depositing the sheet on the receiving-board, Fig. 1 showing it as having the greatest degree of flexure, as it has when the grippers are in position to take the sheet from the cylinder, and Fig. 5 showing it with an intermediate flexure.

The rear sections, E′, of the gripper-shaft-carrying rods are of lever-like construction, as best shown in Fig. 6, which is a side view of one of these sections and part of the section E of one rod, and they are pivoted on pins *c*, which project from two slides, *d*, which are fitted to slide on two fixed horizontal guide-rods, *e*, secured one to each side of the press-framing, near the rear end thereof. The end portions of the rear sections, E′, which project beyond their fulcrums, are forked or slotted lengthwise, as shown at *f*, to enable them to move lengthwise as well as oscillate on fixed fulcrum pins or studs *g*, which are firmly secured to each side of the press-frame a little above the guide-rods *e*. The open extremities of the forks or slots *f* are shown at *f′* as

widened in flaring form to enable them to pass easily onto the fulcrum pins or studs *g* on their return to the said pins or studs after having left them. The sliding boxes *d* are connected by rods *h* with two levers, K, which are secured to a rock-shaft, G, which works in bearings in the lower part of the framing, and which constitutes the fulcrum of said levers, and one of the said levers is connected with a rod, H, which derives a reciprocating motion from a cam, L, on the main shaft I of the press.

On each side of the cylinder, under or just in front of the feed-board, there is attached to the framing of the press a support, *i*, for one of the two gripper-carrying rods E E′. This support preferably consists of a roller flanged on each side, so that the rods, which always bear on the said rollers, are, by working between the flanges thereof, kept from lateral displacement. There are also two supports, *j*, represented as consisting of flanged rollers, like *i*, one for each carrying-rod, secured to the receiving-board or some adjacent part of the press-frame to support the said rods when they have moved forward with the delivery-grippers to the position over the receiving-board in which they deliver the sheet.

The delivery-grippers *a a*, attached to the shaft F, fitted to oscillate in bearings in the front ends of the front sections, E, of the carrying-rods E E′, may be of any suitable construction, and may have their closing and opening movements, by which they are caused to take hold of the sheet on the cylinder and let go of it after having placed it over the receiving-board, produced by any suitable mechanism. It will suffice, however, for explanation of the present invention to say that the said grippers and their appurtenances, except that their shaft F is fitted to oscillate in bearings in the rods E E′ instead of in bearings in carriages sliding on fixed ways, may be in all respects like those described and claimed in my application for Letters Patent filed January 25, 1881.

The operation of the gripper-carrying mechanism is as follows: At the time the delivery-grippers are taking the sheet from the cylinder by its front edge, with the last-printed face upward, the two sections E E′ of the gripper-shaft-carrying rods are folded and nearly doubled up, as shown in Fig. 1, their joints *b* being thrown far back from the pins *c*, which form the connections between the rear section, E′, and the sliding boxes *d* and rods *h*. After the sheet has been taken the cam L, by its action on the rod H, draws forward the levers K, which, by means of the rods *h*, draw forward the slides *d* along the guide-rods *e*, and with them the flexed carrying-rods E E′, which are connected with the pins *c*. The said rods then move bodily forward over the stationary supporting-rollers *i*, carrying the delivery-grippers toward the receiving-board. As the said rods thus move forward the slotted portions of their rear sections, E, slide longitudinally on the pins or studs *g*, and the said sections then operate as levers of the third order, of which the said pins or studs *g* are the fulcrums, and the consequence is that the lower ends of the said sections, which are jointed at *b* to the front sections, E, move forward with a much greater velocity than the levers K and their connecting-rods *h*. During this movement, which carries the sheet flying from the cylinder to the receiving-board, the lever-like sections E′ of the carrying-rods turn almost completely over, as will be understood by reference to Figs. 5 and 3, and a little before the delivery-grippers arrive in the position shown in Fig. 3 for dropping the sheet on the receiving-board the shoulders of the rule-joint *b* come in contact with each other, and the rods are straight and practically rigid, and the last portion of their movement is directly longitudinal. Besides the lever-like action involved in the movement of the sections E′, there is also a lever-like action of the sections E of the carrying-rods upon the rollers or supports *i*, which serve as fulcrums for this action, and by this last-mentioned action the ends of the rods which carry the gripper-shaft F are caused to describe an arc-shaped path, as indicated by the dotted line *k* in Fig. 1, in which they rise from the cylinder, so that as they take the sheet therefrom they do so with an upward motion, which causes its rear end to fly well above the ink-rollers. After the rods E E′ have become rigid, as above described, they come onto the supporting-rollers *j*, which take the weight of the forward ends and of the grippers, and so steady the latter during the completion of their forward movement. As the carrying-rods E E′ move back after depositing the sheet, the first portion of their movement is directly longitudinal; but the forks *f* of the lever-like sections E′, which may have left their fulcrum-pins *g* in the forward movement, soon again pass onto the said pins, and during the continued backward movement the joints *b* of the said rods are flexed by the lever-like action of the said sections and the grippers are caused to be drawn back to the cylinder with an accelerated motion relatively to the upper ends of the levers K.

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

1. In a cylinder printing-press, the combination, with the impression-cylinder, receiving-table, and delivery-grippers, of gripper-carrying rods, each composed of two jointed sections and capable of folding or flexure, slides connected with the rear sections of the said rods, guides for the said slides, and supports on which the forward sections of said rods move longitudinally and operate as levers, substantially as herein described.

2. In a cylinder printing-press, the combination, with the impression-cylinder, receiving-table, and delivery-grippers, of gripper-carrying rods, each made of two sections

which are jointed so as to be capable of folding or flexure, and the rear one of which consists of a slotted or forked lever, supports for the front sections of the said rods, guides for the rear sections thereof, and fixed fulcrums on which the lever-like rear sections slide, substantially as herein described.

3. The combination of the jointed folding delivery-gripper-carrying rods E E′, having their rear sections of lever form, with slides *d*, guides *e*, fulcrums *g*, supports *i*, levers K, and connecting-rods *h*, substantially as herein described.

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Witnesses:
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A. C. WEBB.