(No Model.) 3 Sheets—Sheet 1.

C. B. COTTRELL.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 451,168. Patented Apr. 28, 1891.

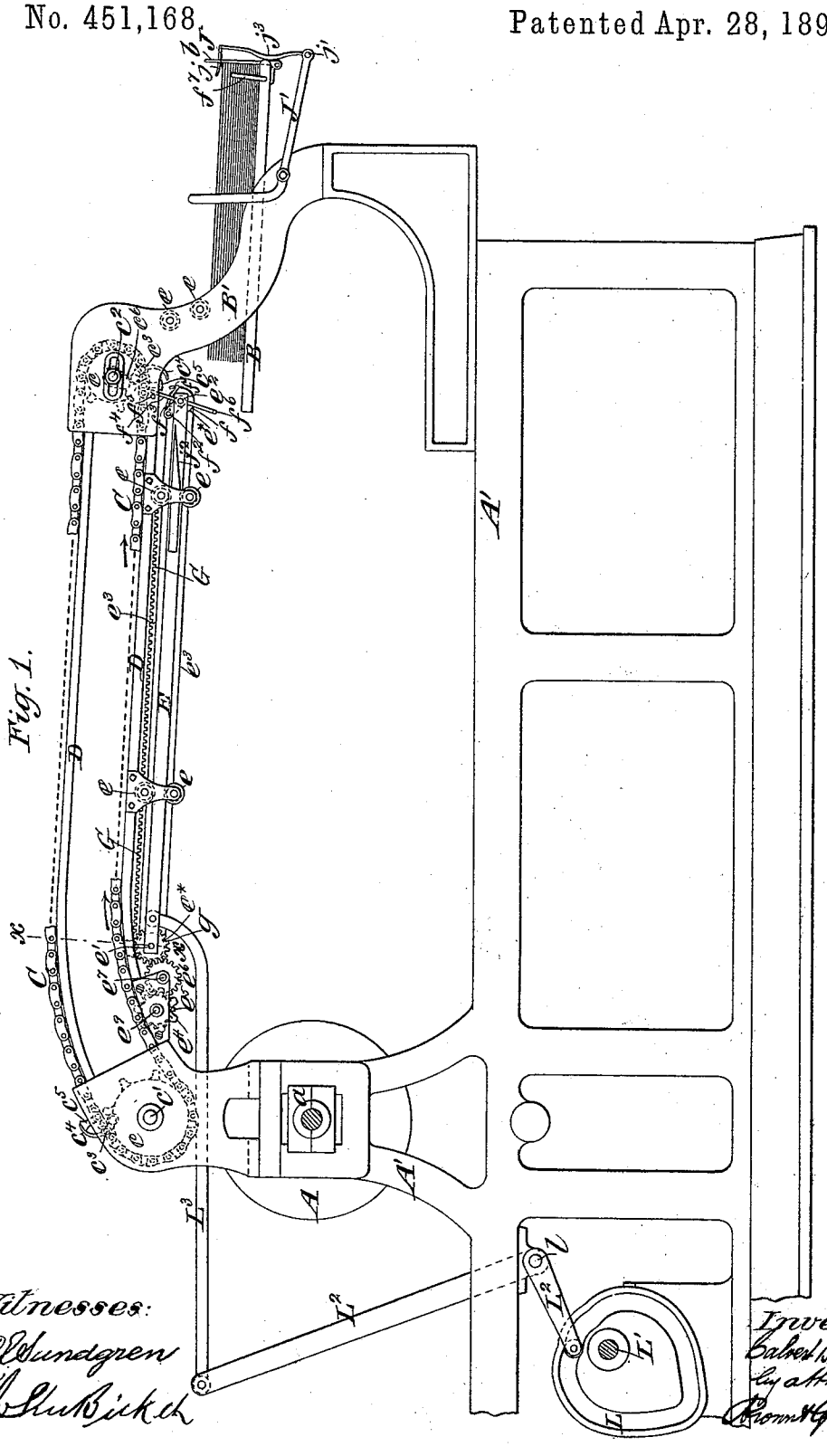


Fig. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

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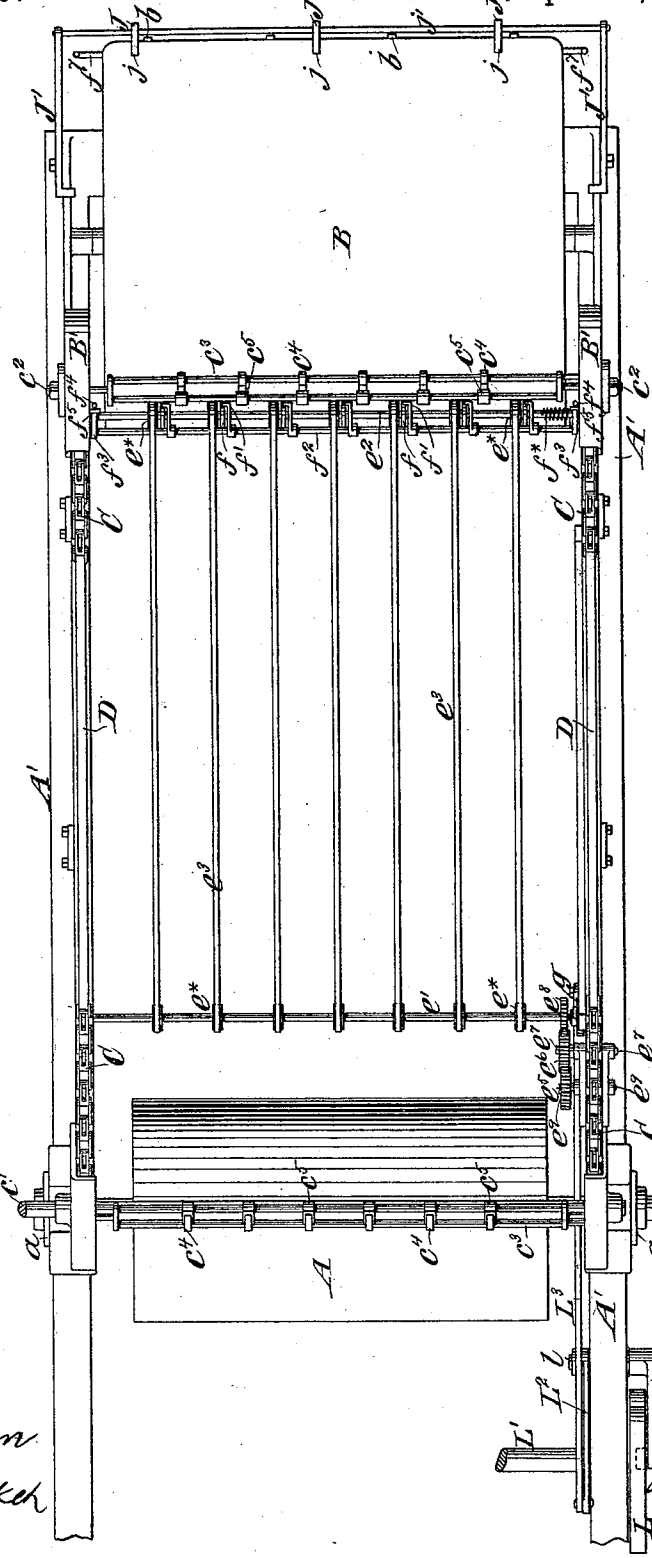


Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

C. B. COTTRELL.

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Fig. 3.

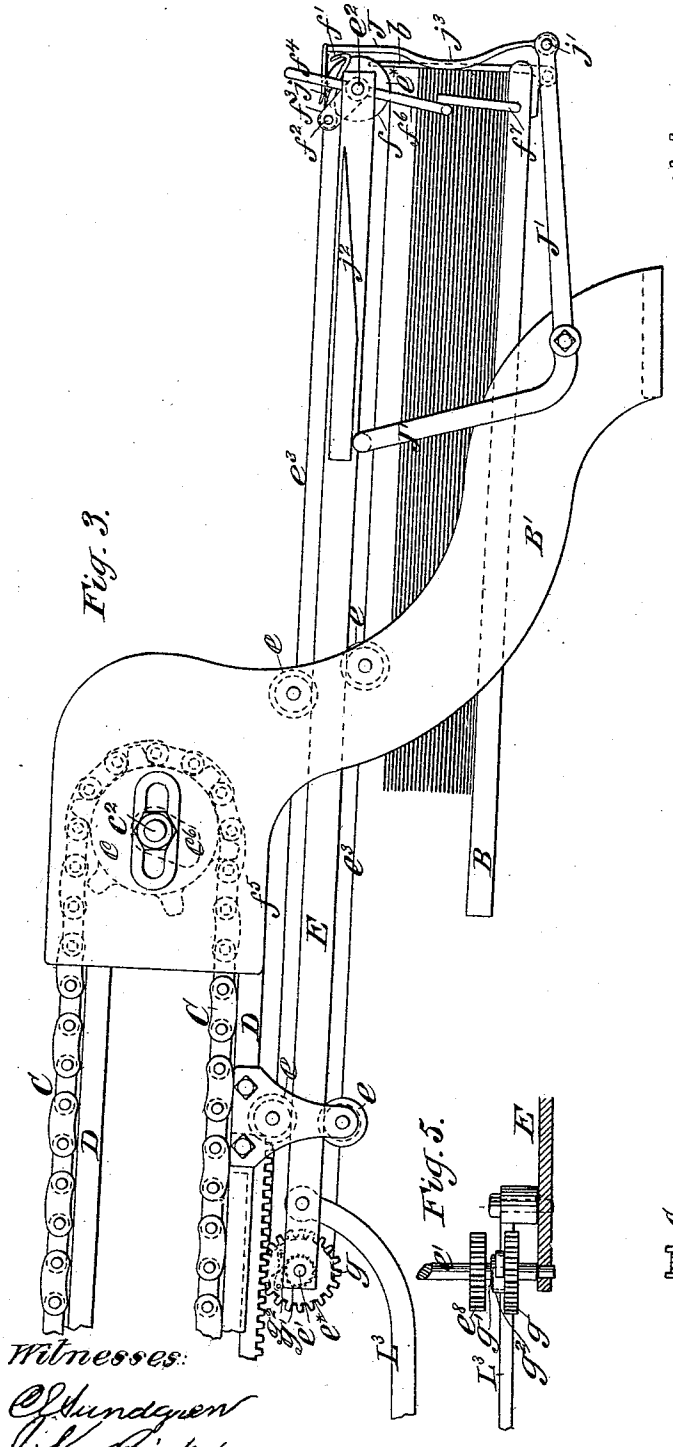


Fig. 4.

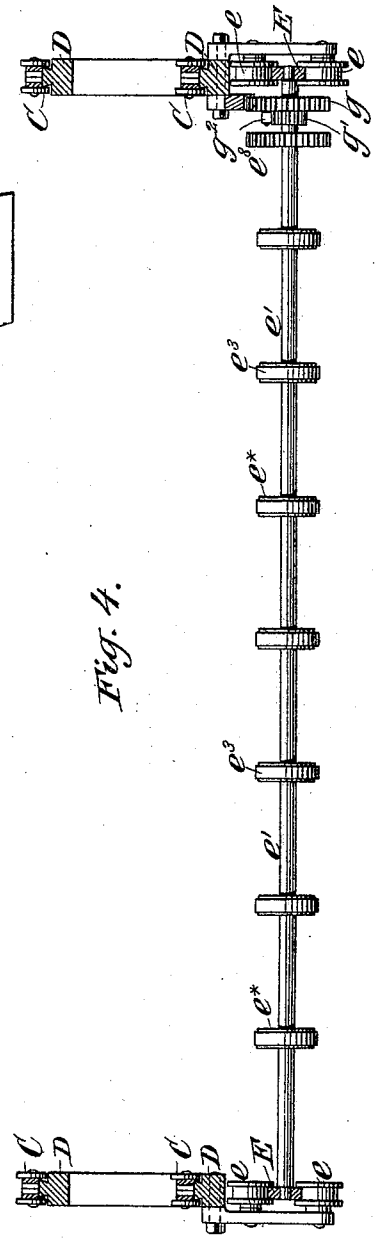


Fig. 5.

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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF WESTERLY, RHODE ISLAND.

SHEET-DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 451,168, dated April 28, 1891.

Application filed July 13, 1889. Serial No. 317,372. (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 a new and useful Improvement in Sheet-Delivery Apparatus for Printing-Machines, of which the following is a specification, reference being had to the accompanying drawings.

I will first proceed to describe my invention fully and in detail with reference to the accompanying drawings, and afterward point out its novelty in claims.

Figure 1 is a side view of such parts of a cylinder printing-machine as are necessary to illustrate my invention. Fig. 2 is a plan corresponding with Fig. 1. Fig. 3 is an elevation of the receiving-table and a portion of the delivery apparatus on a larger scale than Figs. 1 and 2. Fig. 4 represents a transverse vertical section on the same scale as Fig. 3, taken in the dotted line x x, Fig. 1. Fig. 5 is a plan, partly in section, corresponding with Fig. 3, of details which will be hereinafter described.

Similar letters of reference designate corresponding parts in all the figures.

A designates the impression-cylinder, supported in journal-boxes a a in the framing A′ of the machine.

B designates the receiving-table, supported between standards B′, erected upon the framing A′ at the front end of the machine—that is to say, the end farthest from the cylinder. Between the cylinder A and the table B, and at some distance above them, is the delivery apparatus, which, as here represented, is substantially similar to that shown and described in my Letters Patent No. 387,768, dated August 14, 1888. This delivery apparatus consists of two endless chains C and delivery-grippers c^3 c^4 c^5, carried by the said chains. Two sets of these grippers are shown on the chains arranged equidistant from each other, each set consisting of a gripper-bar c^3, having fingers or grippers c^4, and a rest bar c^5. The said chains are supported by chain-wheels c on two shafts c' c^2, journaled, respectively, in upward extensions of the cylinder-frames A′ and receiving-table standards B′, and between the said chain-wheels they are supported by stationary tracks or ways D.

E designates a reciprocating carriage arranged under the delivery apparatus, where it is guided by pairs of rolls or wheels e, some of which are journaled in brackets depending from the tracks or ways D, and others are journaled in the upward extension of the receiving-table standards B′. In the ends of this carriage are shafts e' e^2, which have wheels e^* upon them for the purpose of carrying a traveler consisting of a series of endless tapes or bands e^3, said tapes being wholly supported and operated by the said wheels. The wheels e^* on the shaft e' are fast on said shaft, to be turned by it, but the shaft e^2 is fixed in the carriage and its wheels e^* turn loosely upon it.

The carriage E has imparted to it a longitudinal reciprocating motion by means of a cam L on a shaft L′, which may be driven in any suitable manner to make one revolution for every revolution of the cylinder, the said cam transmitting a positive motion to the said carriage through an elbow-lever L^2, having a fixed fulcrum at l, supported in the framing, and a connecting-rod L^3 between the said lever and the carriage. The cam L is so constructed as to move the carriage E back and forth and to retain it at rest in its inner or backward position (shown in Fig. 1) while the printed sheet is being carried forward by the grippers c^3 c^4 c^5 to be deposited upon the traveler or tapes e^3 of the carriage. The traveler or tapes e^3, while the sheet is being carried forward over them by the delivery-grippers c^3 c^4 c^5, as just described, the carriage E being at that time stationary, have a progressive movement in the same direction as the lower portions of the chains and at the same speed as the said chains, in order to prevent the sheet from dragging upon the tapes and so blurring the impression. Then after the sheet has been deposited upon the tapes, and while the carriage moves forward to the position shown in Fig. 3, in which it lets go of the sheet to permit it to be deposited upon the receiving-table, the tapes remain stationary within the carriage, but during the return movement of the carriage the tapes have again a progressive movement in the same direction as the lower parts of the chains and at a speed corresponding with the backward movement of the carriage.

The carriage E and the traveler e^3 and their

movements, as above described, resemble what are described in my Letters Patent No. 387,768, hereinbefore referred to, but according to that patent the backward movement of the carriage is produced by a spring, while according to the present improvement the backward as well as the forward movement of the carriage is produced positively by means of the cam L.

The carriage E is provided at its front end with grippers for taking the front edge of the sheet after it has been deposited on the traveler or tapes. These grippers are represented as like those in my aforesaid Letters Patent, consisting of hooked gripper-fingers f', carried by a bar f^2, which is supported by arms f^3, hung loosely on the front tape-carrying shaft e^2, the said fingers holding the sheet against the edges of paper-supporting wheels f on the said shaft e^2. These grippers are closed automatically by a spring f^*, one end of which is secured to the shaft e^2 and the other end to one of the arms f^3; but they are held open while the carriage is in its rearward position to receive the sheet shown in Fig. 1 by arms f^4, attached to the hubs of the arms f^3, being pressed into contact with fixed stop-pins f^5, secured to the standards B'. The said grippers remain open while the carriage is stationary and the sheet is being carried forward upon the said carriage, and are allowed to close as the carriage starts forward and while it moves forward, and they are opened at the proper time to let go the sheet as the carriage completes its forward movement, as shown in Fig. 3, by arms f^6, which project downward from the said arms f^3, coming in contact with fixed stops f^7 on the sides of the receiving-table.

The receiving-table is provided at its front end with sheet-eveners b and with grippers J, having elastic forks or jaws j for the purpose of taking a slight hold of the sheet, which is brought between them by the forward movement of the carriage. These nippers project upward from a bar j', which is hung in levers J', one at each side of the machine, and on the carriage E at each side is an inclined cam j^2. As the carriage comes forward the action of the cams j^2 on the levers J' raises the nippers J to the level of the sheet, and as the front edge of the sheet passes into the jaws or forks of the nippers the downward-depending arms f^6 on the arms f^3 of the carriage come against stops f^7 on each side of the table B, and thereby raise the arms f^3 and bar f^2, thus moving the hooked fingers or grippers f' out of engagement with the edge of the sheet. As the carriage E moves rearward the cams j^2 leave the levers J' and the nippers J fall to the position shown in Fig. 1 from the position shown in Fig. 3. The nippers J are bowed, as shown at j^3, and as they descend such projections j^3 bear on the edge of the table and draw the nippers forward and away from the edge of the sheet, which is arrested by the sheet-eveners b and drops squarely upon the pile on the table B.

The operation of the carriage and its traveler or tapes and grippers is similar to that described in my aforesaid Letters Patent, but I will briefly here describe it. The carriage E, having been stationary with its tapes moving forward while the sheet was taken from the cylinder by the delivery-grippers c^3 c^4 c^5, commences its forward movement toward and over the receiving-table just as the said grippers are about to open to let go of the sheet. Immediately on the commencement of the said forward movement the delivery-grippers are opened by the cam c^6, provided on the framing for the purpose, and instantly afterward the carriage-grippers f', which have been open while the carriage was stationary, close and take the front end of the sheet released by the delivery-grippers. The sheet lies upon the tapes during the forward movement of the carriage, the tapes then having no movement independently of the carriage. As the carriage reaches the end of its forward movement and carries the front edge of the sheet in between the elastic jaws j of the nippers the carriage-grippers are opened, and as the carriage returns the progressive movement of the tapes within it in the opposite direction to its own movement causes the sheet to be pushed or eased off the tapes and left in the nippers J, which are afterward depressed to bring the sheet down upon the receiving-table or upon the pile of printed sheets previously deposited thereon.

The means of giving motion to the traveler or tapes in the carriage are the same as those described in my aforesaid Letters Patent, but may here be briefly mentioned. On the tape-wheel shaft e' is fast a small ratchet-wheel g', (see Figs. 3 and 5,) and on the same shaft is rigidly mounted a gear e^8 and a loose spur-gear g, which carries a pawl engaging with said ratchet-wheel. The said pawl and ratchet-wheel form such a clutch connection between the spur-gear g and the tape-wheel shaft e' as will only permit the said gear to turn the shaft in one direction. Two other spur-gears e^5 e^6, corresponding in size and pitch with e^8, are mounted, as shown in Figs. 1 and 2, on axles e^9 e^7, supported in a hanger dependent from one of the stationary ways D, and fast to the said gear e^5 is a gear e^4, which gears with one of the chains C of the delivery apparatus. When the carriage is in its backward position (shown in Fig. 1) to receive the printed sheet, the gear e^8 is in gear with e^6 and the tape-shaft e' and tapes are driven by the chain C, gears e^4, e^5, e^6, and e^8, the spring-pressed pawl g^2, and ratchet-wheel g'. When the carriage runs forward, the gear g runs in a stationary rack G, secured under one of the stationary ways D and is turned by it, but it does not turn the tape-shaft e' or move the tapes because the pawl g^2 moves over the teeth of the ratchet-wheel;

but when the carriage moves back and the said gear g is turned by the rack the pawl engages with the ratchet-wheel and turns it and the shaft e' and gives the tapes the necessary movement.

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

1. The combination, with an impression-cylinder, a delivery apparatus, and a receiving-table, of a reciprocating carriage located under and moving independently of the delivery apparatus for the reception of the printed sheet from the delivery apparatus, and mechanism, substantially as herein described, for positively moving said carriage in both directions between the delivery apparatus and the said table, substantially as herein set forth.

2. The combination, with an impression-cylinder, a delivery apparatus, and a receiving-table, of a reciprocating carriage located under and moving independently of the delivery apparatus for the reception of the printed sheet from the delivery apparatus, and a cam or its equivalent for actuating said carriage, constructed and arranged to allow said carriage to remain at rest while a sheet is deposited upon it, substantially as herein described.

3. The combination, with an impression-cylinder, a delivery apparatus, and a receiving-table, of a reciprocating carriage provided with a traveler or tapes for the reception of the printed sheet from the delivery apparatus, a rack, gears, and clutch connection for imparting to the traveler or tapes a progressive movement during the return movement of the carriage, and cam mechanism, substantially as herein described, for moving the carriage in both directions, substantially as herein set forth.

4. The combination, with an impression-cylinder, a delivery apparatus, and a receiving-table, of a reciprocating carriage provided with a traveler or tapes for the reception of the printed sheet from the delivery apparatus, said traveler or tapes having a progressive movement during the return movement of the carriage, but being motionless during the forward movement of the latter, a stationary rack, a gear-wheel on the carriage gearing with said rack, a clutch for engaging said gear-wheel with said traveler or tapes, and a cam mechanism, substantially as herein described, for positively moving the carriage in both directions, substantially as set forth.

5. The combination, with an impression-cylinder, a delivery apparatus, and a receiving-table, of a reciprocating carriage and tapes on said carriage for the reception of the printed sheet from the delivery apparatus, having a progressive movement during the return movement of the carriage toward the cylinder, whereby their upper sheet-supporting portions are moved toward the table, and mechanism, substantially as herein described, for positively moving the said carriage in both directions and for giving motion to said tapes on said carriage, substantially as herein set forth.

6. The combination, with an impression-cylinder, a delivery apparatus, and a receiving-table provided with a traveler or tapes for the reception of the printed sheet from the delivery apparatus, said traveler or tapes having a progressive movement toward said table while receiving the sheet upon them and a corresponding movement while the carriage makes its return movement toward the cylinder, but being motionless on their rollers during the forward movement of the carriage toward said table, and mechanism, substantially as herein described, for producing the positive movement of the carriage in both directions and for giving motion to said traveler or tapes, substantially as herein set forth.

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