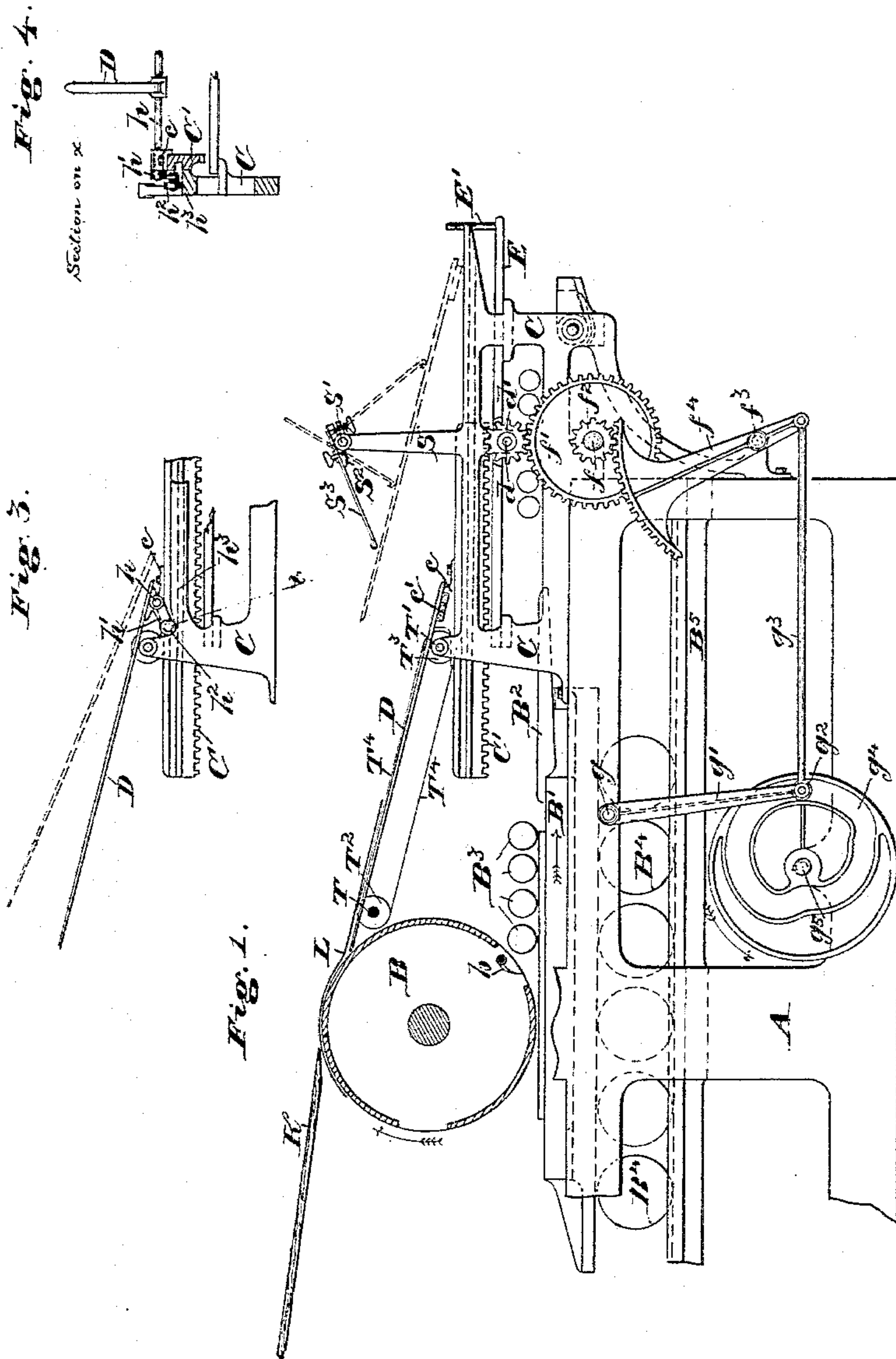


2 Sheets—Sheet 1.

SHEET DELIVERY APPARATUS FOR PRINTING PRESSES.

Patented July 28, 1885.



Witnesses:

Francis P. Reilly
James E. Keese

Inventor,
John T. Hawkins
by P. A. Voorhes
Attorney.

(No Model.)

2 Sheets—Sheet 2.

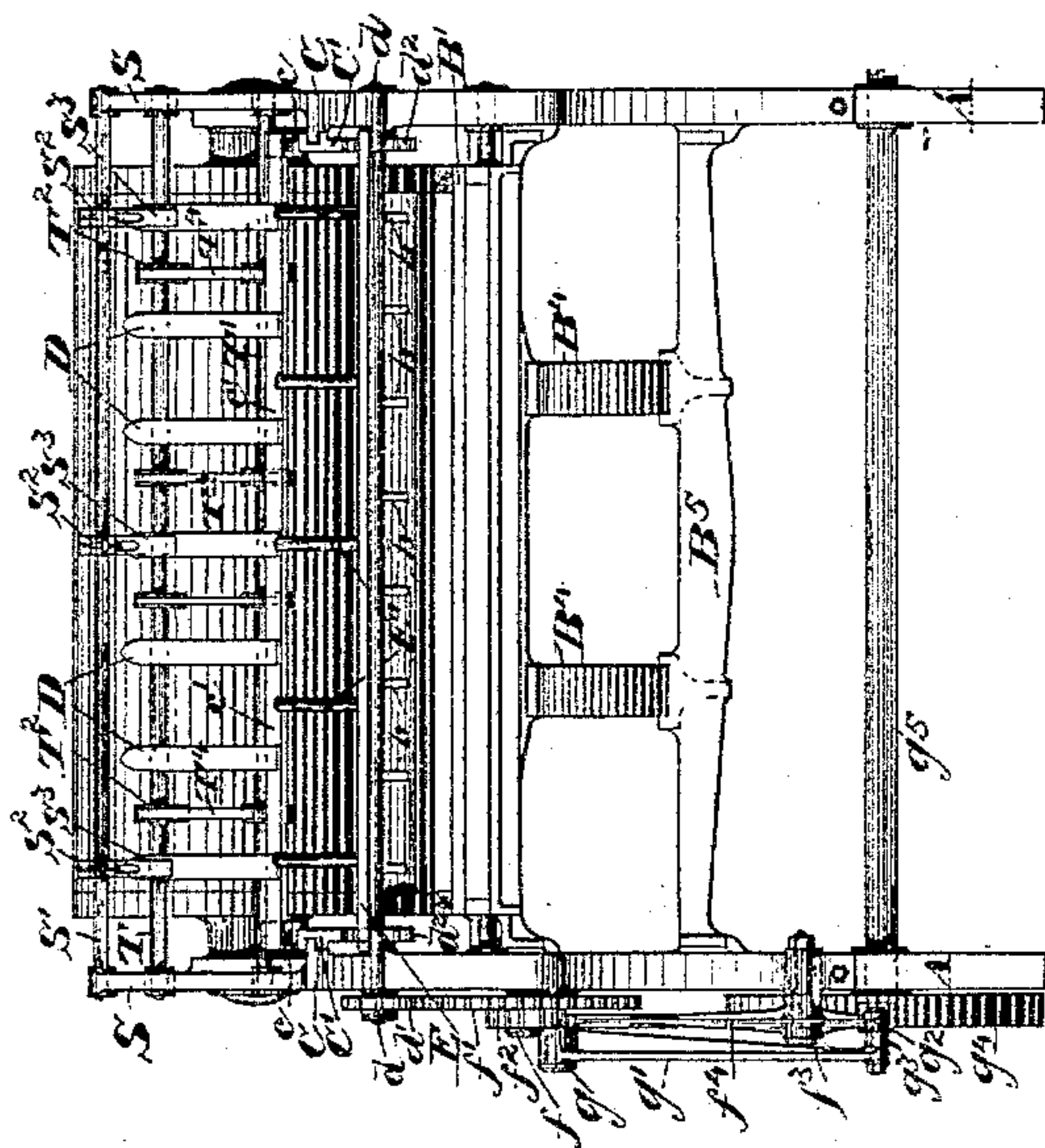
J. T. HAWKINS.

SHEET DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 323,331.

Patented July 28, 1885.

Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE

JOHN T. HAWKINS, OF TAUNTON, MASSACHUSETTS.

SHEET-DELIVERY APPARATUS FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 323,331, dated July 28, 1885.

Application filed February 11, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. HAWKINS, of Taunton, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Sheet-Delivery Apparatus for Printing-Presses, which invention or improvements are fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to deliver the sheets from the top and front of the cylinder of a cylinder printing-press directly to a delivery-board in an even pile, with the last printed side uppermost, without contact of the printed parts of said last printed side with any part of the mechanism.

Following is a brief general description of the means used to accomplish the object above mentioned. A series of stripper or receiving fingers are provided for stripping the sheet head first from the top of the impression-cylinder and receiving its entire length thereon, and thereafter moving the said stripper or receiving fingers horizontally, or practically so, away from the cylinder, said fingers being set at either a fixed angle or at varying angles to the horizontal sufficient to permit of the resistance of the air, keeping the sheet in contact with them until the sheet is allowed to drop clear of said fingers upon their return again to the position for receiving the succeeding sheet, the resistance of the air on the under side of the sheet preventing its return with said fingers.

In practice with this method it has been found that at high speeds the sheets have sufficient momentum to cause them to continue on in their direction of motion when the motion of the stripper or receiving fingers is arrested, and with thin paper it has been found impracticable to arrest the motion of a sheet by contact with anything like a stop against the sheet's leading edge, any such device causing the sheet to double up and preventing its deposition in an even flat pile. To prevent this, two or more stationary pressure-stops are used, adjusted to come in contact with the unprinted margins or some other unprinted spots on the upper or last printed side of the sheet just at the time the stripper or receiving fingers are brought to a stop at the ter-

mination of their outward stroke, these stops being adjustable, so as to press upon the sheet near to its tail or following end, thus arresting its motion by that end and allowing the sheet to quietly drop upon the pile by its own weight merely upon the return of the stripper or receiving fingers toward the cylinder.

The invention consists of the parts and combinations of parts hereinafter described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation of those parts of a two-revolution-cylinder printing-press necessary to illustrate the invention (shown as delivering the sheet) during its second or non-printing revolution from its top to and upon the stripper or receiving fingers. Fig. 2 is an end elevation of the machine. Fig. 3 is a side elevation of a modification providing for a change of the inclination of the stripper or receiving fingers during the first part of their movement from the cylinder in those cases where the proportions of the machine will not permit of the stripper-fingers having sufficient inclination as they lie against the cylinder, when receiving the sheet, to propel the sheet and keep it in contact with the stripper or receiving fingers during their outward motion. Fig. 4 is an end elevation of the parts shown in Fig. 3, partly in section.

In said figures the respective parts of the machine are indicated by letters, as follows:

A A' are parts of the main frames. B is the impression-cylinder; B', the type-bed; B², the ink-table; B³, the form-rollers, and b the cylinder-grippers; B⁴, the bed-rollers; B⁵, the bed-roller ways, and K the feed-board.

C C are a pair of brackets attached to the frames A A'. The upper horizontal members of these brackets form guides in which slide two toothed racks, C'. Secured to the racks C', Figs. 1 and 2, are two brackets, c, which carry a cross-bar, c', to which are secured the lower ends of the stripper or receiving fingers D.

E is the receiving-board, and E' a sheet-stop or series of stops against which the leading edge of each sheet slightly impinges as the sheets float downward in the inclined position in which each sheet is left by the recession of the stripper or receiving fingers.

T is a shaft journaled in the main frames (these parts of the frames being broken away in Fig. 1) just in front of the cylinder carrying a series of tape-pulleys, T^2 , and T' is a similar shaft journaled in the brackets C, carrying a similar series of pulleys, T^3 . Upon these two series of pulleys run a series of tapes, T^4 , the respective positions of said shafts being such as to bring the upper sides of the tapes slightly above the stripper-fingers when in position to receive the sheet from the cylinder. The shaft T and the tapes T^4 are driven by gearing with a suitable gear upon the cylinder B, (not shown,) so as to drive them in the proper direction to convey the sheet downward parallel with the stripper or receiving fingers.

A shaft, d , journaled in the brackets C, has secured to it at one end a pinion, d' , the pinion d' on the same shaft engaging the sliding racks C' . On a stud, f , secured in one of the brackets C, freely runs a gear-wheel, f' , which engages the pinion d' . Secured to the gear-wheel f' is a pinion, f^2 , also running freely on the stud f . Oscillating upon a stud, f^3 , secured in the lower part of one of the brackets C, is a sector-gear lever, f^4 . Upon a stud, g , secured in the frame A, oscillates a lever, g' , carrying upon its lower end a roller, g^2 . The lower ends of levers g' and f^4 are connected by a rod, g^3 , pivoted to each lever. The roller g^2 engages a suitably-formed groove in a cam, g^4 . The cam g^4 is carried on a shaft, g^5 , journaled in the frames A A', to which shaft motion is imparted from any suitably rotating part of the machine, (not shown,) so that said cam may make one revolution for each sheet printed.

Secured in two standards, S, projecting upward from the brackets C, is a rod, S' . Adjustably secured to this rod S' are one or more sockets S^2 . The sockets S^2 may be adjusted angularly or laterally upon the rod S' . Adjustably secured to each socket S^2 is a slotted rod or strip of metal S^3 . This rod or strip S^3 is so made and attached to its socket S^2 that it may be protruded from the socket any desired amount, so that this adjustment, together with the angular and lateral adjustment of the socket S^2 upon the rod S' , will permit of the free end of the rod S^3 being so placed as to meet any part of the sheet desired, or a sheet of any size. The free ends of the rods S^3 may be tipped with rubber or any substance suitable for offering a slight frictional resistance to the upper surface of the sheet. The rods S^3 are shown in Fig. 1, in one position in full lines and in two other positions in dotted lines. In Fig. 1 also the stripper or receiving fingers D are shown in dotted lines at the ends of their outward motion, illustrating the positions of the parts when rods S^3 impinge upon some unprinted spots on the upper side of the sheet, to prevent, by their frictional contact, the further progress of the sheet in the direction in which it was moving. The tapes T^4 are not essential to this invention; but may be used when the angle of the stripper-fingers with

the horizontal is so small as to prevent the running of the sheet freely down the stripper-fingers.

Referring now to the modification shown in Figs. 3 and 4, the stripper or receiving fingers D are secured to a rock-shaft, h , instead of to a bar, c' , (shown in Figs. 1 and 2,) said rock-shaft being journaled in the brackets c ; and on one end of the rock-shaft h is secured a lever, h' , carrying a roller, h^2 , which engages an incline, h^3 , formed upon one of the brackets C, so that in cases where the inclination of the stripper or receiving fingers D, when first receiving the sheet, is not sufficient, if thereafter moving without change of angle to cause the sheet to adhere to the stripper or receiving fingers by the resistance of the air, said fingers will, during a short first part of their motion, be carried to a greater angle sufficient to securely hold the sheet in contact with them, as shown in dotted lines, Fig. 3.

The operation in detail is as follows: The sheet is received from the top of the cylinder upon the stripper or receiving fingers D, as shown at L, Fig. 1, the stripper or receiving fingers D remaining at rest while the roller g^2 is passing through a concentric part of the groove in the cam g^4 until the sheet has passed entirely down and upon the stripper or receiving fingers D, at which time the cam g^4 will have arrived in such a position that its further rotation will carry the roller g^2 to the left, Fig. 1; and, through the instrumentality of the rod g^3 , sector-lever f^4 , intermediate multiplying-gears $f' f^2$, the pinion d' , the shaft d , the pinions d^2 , and the racks C' , the stripper-fingers will be carried to the right without change of angle, as in Fig. 1, or with altered inclination during the first part of their movement, and thereafter without further change of angle, as in Figs. 3 and 4, until they arrive in the position shown in dotted lines, Fig. 1, at the extreme right. Upon arriving at this position the rods S^3 will impinge upon some unprinted spots on the face of the sheet, holding it at rest at the same time. The further rotation of the cam g^4 , through the mechanism already described, returns the stripper or receiving fingers to their position against the cylinder preparatory to receiving a succeeding sheet, while the resistance of the air upon the under side of the sheet as the sheet passes between the stripper or receiving fingers prevents it from following the said fingers upon their return motion and allows it to drop gently down upon the pile on the receiving-board E, being thereon left by the stripper or receiving fingers D upon the commencement of their return motion in the same inclined position they themselves occupy. The tendency of the sheet, upon being released from the pressure between the ends of the rods S^3 and the stripper or receiving fingers D, will be to again have a slight motion to the right, Fig. 1, sailing down upon the air as upon an inclined plane. To insure an even pile of paper, therefore, the sheet-stops or series of stops E' are

provided to arrest this small residual motion of the sheet through the air, which motion, however, is never sufficient to cause buckling in the thinnest paper, while it provides effectual means of correcting any little variation in position of the respective sheets as received upon the stripper or receiving fingers and effectually secures an even pile upon the receiving-board E.

It is obvious that the inclines h^3 , Figs. 3 and 4, may be so formed as to be a continuous incline throughout the whole length of the motion of the fingers D, so that the angle of the fingers D may be gradually changing throughout the whole of their travel until they arrive at the termination of their outward movement at the desired angle, and also that the incline h^3 may be made adjustable so as to vary the maximum angle through which the fingers may move. It is also obvious that, by aid of the tapes T^4 , the fingers D may primarily occupy a horizontal position, or may, indeed, be inclined somewhat toward the cylinder while receiving the sheet, as may be best suited to meet special cases, depending upon the diameter of impression-cylinder.

I do not confine myself to the mechanism shown for imparting a reciprocating motion to the stripper or receiving fingers D, as this may be effected in various ways, as best suited to the various forms of cylinder press; but,

Having thus fully described my said improvements as of my invention, I claim—

1. In a sheet-delivery for cylinder printing-presses, a set of inclined stripper or receiving fingers, as D, in combination with mechanism for reciprocating said fingers in a horizontal plane, substantially as described, whereby a sheet deposited upon said fingers is held in contact therewith by the resistance of the air on the upper side of the sheet during the travel of said fingers in one direction, and the sheet released from contact therewith by the resistance of the air upon the under side of said sheet upon the return travel of said fingers in an opposite direction, substantially as and for the purposes set forth.

2. In a sheet-delivery for cylinder printing-presses, a set of stripper or receiving fingers, as D, in combination with mechanism for reciprocating said fingers in a horizontal plane, and varying the angle of inclination of said fingers from the horizontal during their reciprocation, substantially as described, whereby a sheet deposited upon said fingers is held in contact therewith by the resistance of the air against the upper side of the sheet during the travel of said fingers in one direction, and said sheet released from contact therewith by the resistance of the air upon the under side of the sheet upon the return travel of said fingers in an opposite direction, substantially as and for the purposes set forth.

3. In a sheet-delivery, delivering the sheet by means of a set of inclined reciprocating stripper or receiving fingers for the reception of the sheet on their upper side, in combina-

tion with said fingers, means for varying the angle of said stripper or receiving fingers, consisting of a rock-shaft, as h , to which the said fingers are secured, an arm, as h' , secured to said rock-shaft, carrying a roller, as h^2 , said roller engaging a suitable incline, as h^3 , substantially as and for the purposes set forth.

4. In a sheet-delivery for cylinder printing-presses, in combination with a set of inclined reciprocating stripper or receiving fingers, as D, a series of supporting-tapes, as T^4 , whereby the sheet is supported from contact with said inclined fingers while passing down or upon them, substantially as and for the purposes set forth.

5. In a sheet-delivery for cylinder printing-presses, delivering the sheet by means of a set of inclined reciprocating stripper or receiving fingers, as D, the combination, with said inclined reciprocating fingers, of a delivery or receiving board, as E, placed under said inclined reciprocating fingers when in their outward-assumed position, substantially as and for the purposes set forth.

6. In a sheet-delivery for cylinder printing-presses, delivering the sheet by means of a set of inclined reciprocating stripper or receiving fingers, as D, in combination with said fingers a series of adjustable frictional sheet-stops, as S^3 , whereby the upper surface of the sheet at the termination of the outward excursion of said inclined fingers is impinged upon by said stops, the sheet's momentum overcome and its motion arrested simultaneously with the arrival of the said fingers at the termination of their outward travel, substantially as and for the purposes set forth.

7. In a sheet-delivery for cylinder printing-presses delivering the sheet by means of a set of inclined reciprocating stripper or receiving fingers, as D, in combination with said fingers, an abutting sheet-stop or series of stops, as E' , whereby the residual motion of the sheets is arrested, substantially as and for the purposes set forth.

8. In a sheet-delivery for a cylinder printing-press delivering the sheet by means of a set of inclined reciprocating stripper or receiving fingers, as D, the combination, with said fingers, of a set of frictional adjustable sheet-stops, as S^3 , and an abutting sheet-stop or series of stops, as E' , whereby both the forward momentum and residual motion of the sheets is arrested, substantially as and for the purposes set forth.

9. In a sheet-delivery for cylinder printing-presses, in combination with an impression-cylinder, as B, delivering the sheet from the top of said cylinder, a series of reciprocating inclined stripper or receiving fingers, as D, for receiving and discharging the sheets from said cylinder, substantially as and for the purposes set forth.

10. In a sheet-delivery for cylinder printing-presses, in combination with an impression-cylinder, as B, delivering the sheet from its top, a series of inclined reciprocating stripper

or receiving fingers, as D, and a set of receiving-tapes, as T⁴, whereby the sheets are removed from said cylinder, substantially as and for the purposes set forth.

5 11. In a sheet-delivery for cylinder printing-presses, in combination with an impression-cylinder, as B, delivering the sheet from its top, a series of inclined reciprocating stripper or receiving fingers, as D, a set of supporting-
o tapes, as T⁴, and a series of frictional adjustable sheet-stops, as S³, whereby the sheets are removed from said cylinder and their momenta arrested, substantially as and for the purposes set forth.

15 12. In a sheet-delivery for cylinder printing-presses, in combination with an impression-cylinder, as B, delivering the sheet from its top, a series of inclined reciprocating stripper or receiving fingers, as D, a series of support-

ing-tapes, as T⁴, a series of adjustable frictional 20 sheet stops, as S³, and an abutting sheet-stop or series of stops, as E', all constructed and operating, substantially as and for the purposes set forth.

13. In a sheet-delivery for a cylinder print- 25 ing-press, in combination with an impression-cylinder, as B, delivering the sheet from its top, a series of inclined reciprocating stripper or receiving fingers, as D, a set of supporting tapes, as T⁴, a set of adjustable frictional sheet- 30 stops, as S³, and an abutting sheet-stop or series of stops, as E', and a receiving-board, as E, all arranged and operating, substantially as and for the purposes set forth.

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