

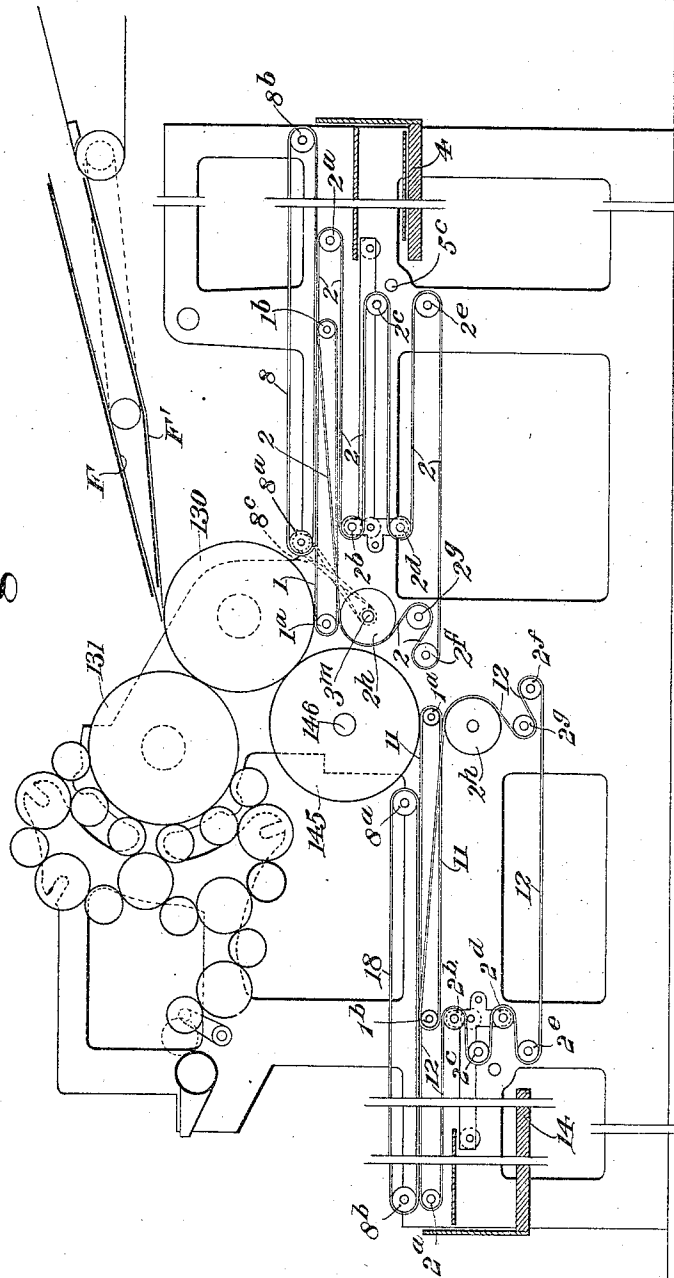
M. A. DROITCOUR.
SHEET DELIVERY MECHANISM FOR PRINTING PRESSES.
APPLICATION FILED AUG. 10, 1908.

960,007.

Patented May 31, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



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Witnesses

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James B. Mansfield

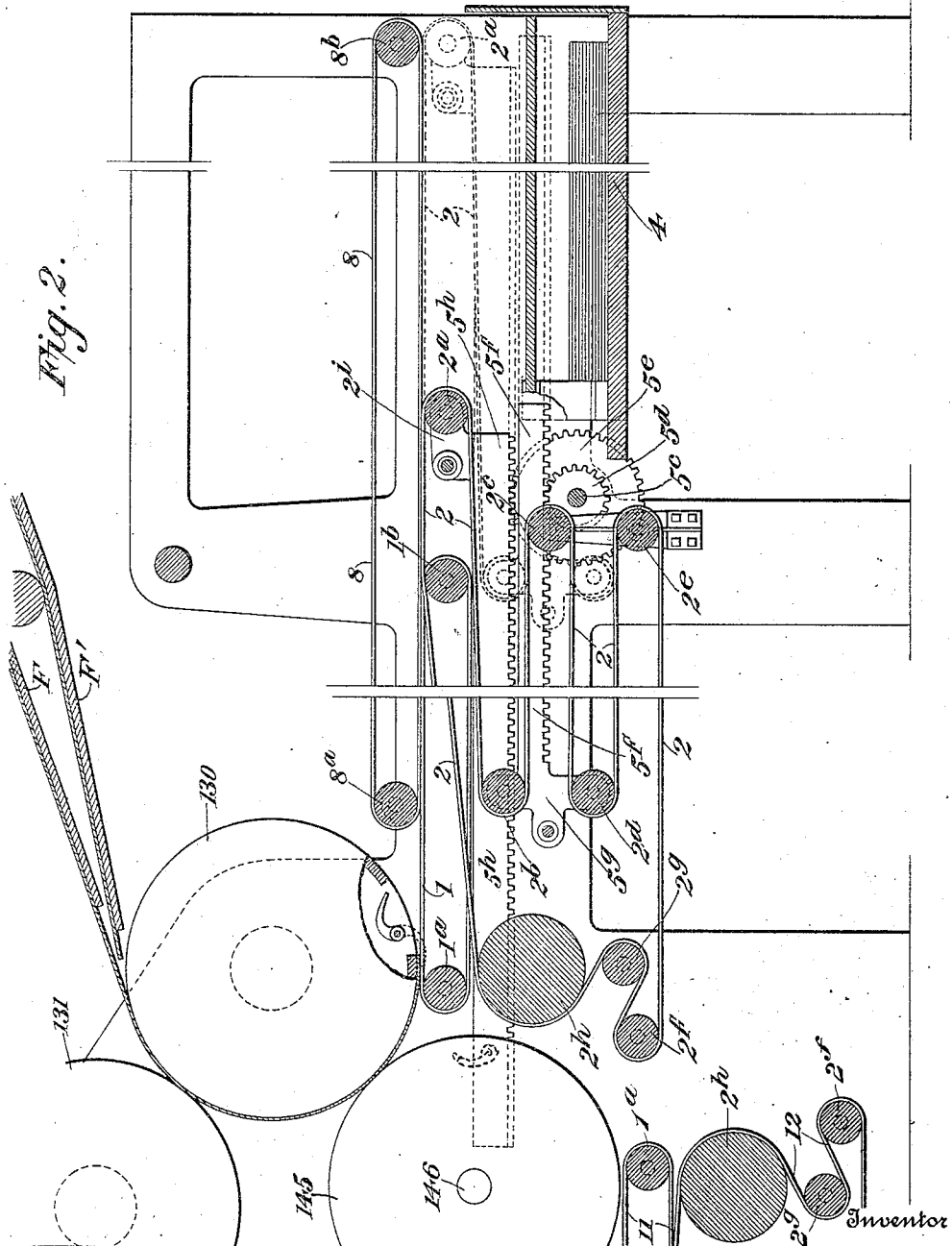
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4 SHEETS—SHEET 2.



Witnesses

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4 SHEETS—SHEET 3.

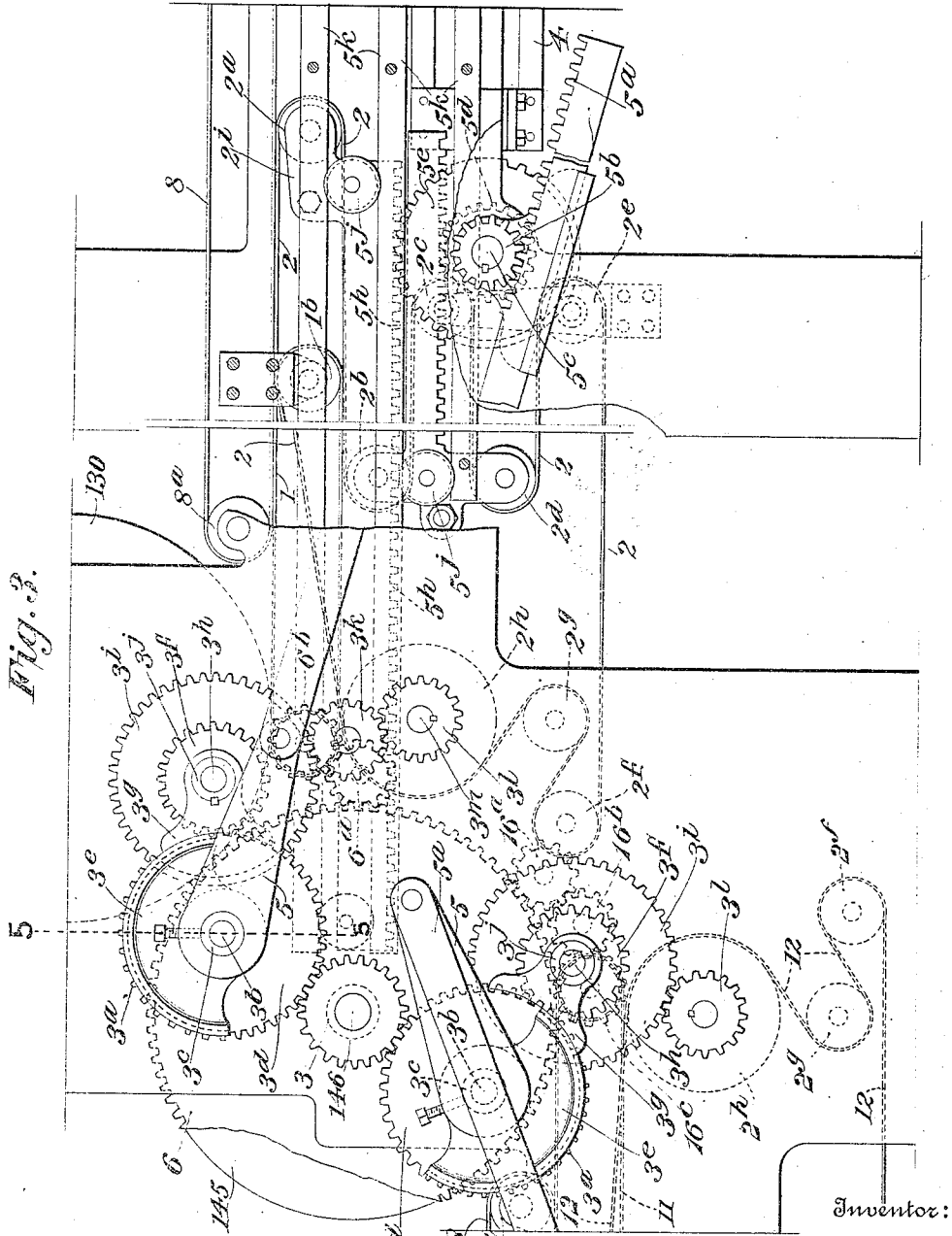


Fig. 2.

Witnesses

James P. Mansfield

Michael A. Droitcour

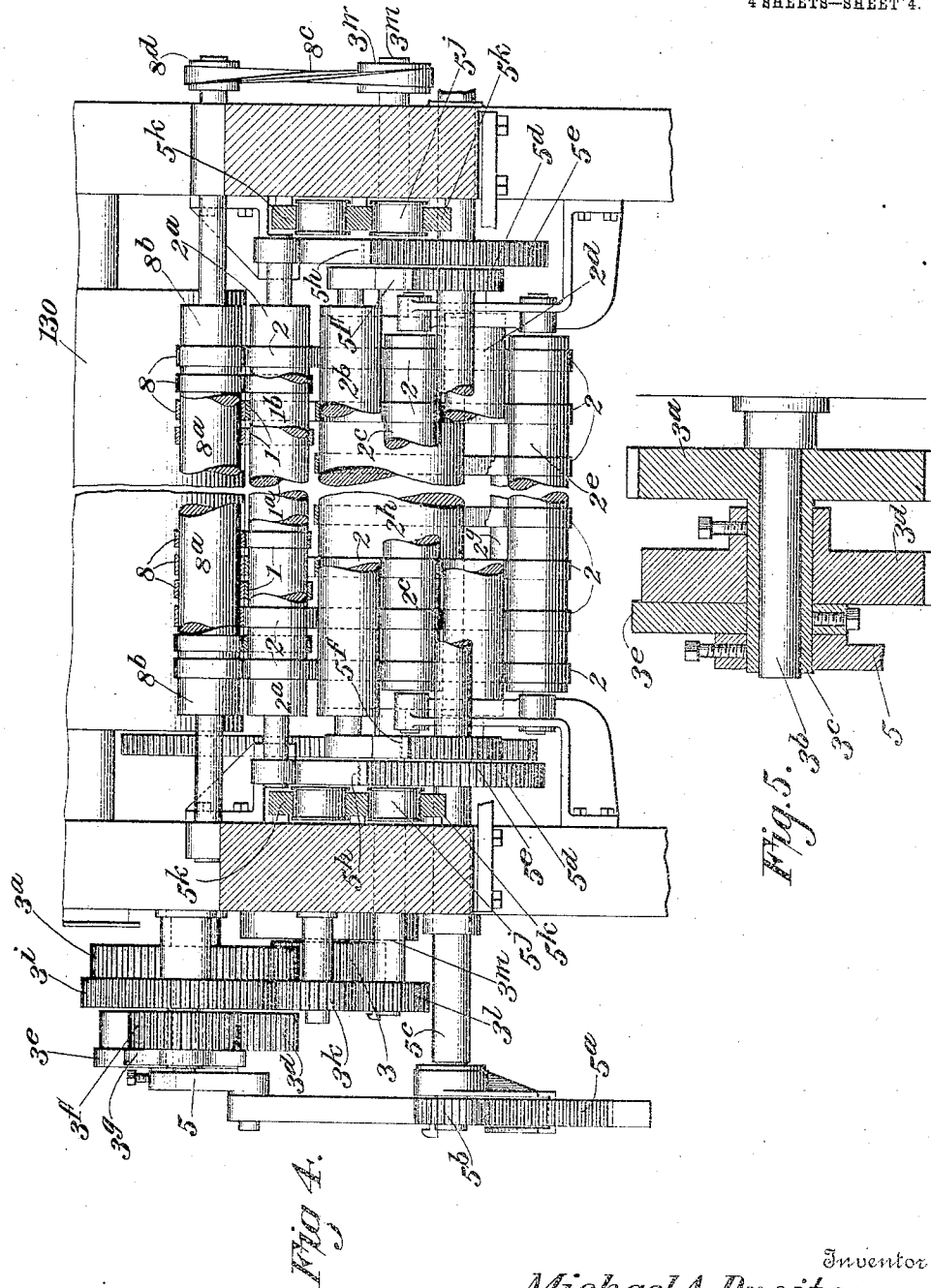
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4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

MICHAEL A. DROITCOUR, OF CHICAGO, ILLINOIS, ASSIGNOR TO MIEHLE PRINTING PRESS AND MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-DELIVERY MECHANISM FOR PRINTING-PRESSES.

960,007.

Specification of Letters Patent.

Patented May 31, 1910.

Original application filed June 7, 1909, Serial No. 500,672. Divided and this application filed August 10, 1909. Serial No. 512,216.

To all whom it may concern:

Be it known that I, MICHAEL A. DROITCOUR, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Delivery Mechanism for Printing-Presses; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

It is a well-known fact that the printing mechanism of printing presses is capable of printing sheets at a greater speed than the sheets can be fed to and taken from the mechanism and my endeavor in this invention has been to devise means for feeding the sheets to and for taking them from the printing mechanism which shall be capable of greater speed than any mechanism heretofore employed for the purpose.

The preferred means for feeding the sheets to the cylinder is shown in my companion application filed June 7, 1909, Serial No. 500,672 of which the present application is a division.

The present invention relates particularly to the means for delivering the sheets; and the principal object of the invention is to enable sheets to be delivered at alternate points and the delivery devices to be operated at approximately the same speed as that of the periphery of the plate and impression cylinders so that sheets will not be dragged off these cylinders nor over the tapes and thereby smutting of the freshly printed sheets would be obviated. In order to successfully accomplish this it is essential that the alternate sheets shall be delivered at alternate points and by separate devices so that each of the delivery mechanisms may have ample time to operate and deliver its sheets smoothly and uniformly to the tables, and in practice each delivery has twice the time of the impression to operate in.

In delivering the sheets, I provide two different deliveries, depositing the sheets on different tables, one taking all the sheets which have been fed by the upper feed table and the other taking all the sheets which have been fed by the lower feed table. All these features, as well as the details of the

construction of the press, are set forth in the description given below, and they are also illustrated in the accompanying drawings in which—

Figure 1 is a diagrammatic sectional elevation of a complete press showing the location of the two sheet deliveries. Fig. 2 is an enlarged longitudinal section through one of the plate deliveries and the co-acting device in sheet receiving position in full lines, and in sheet delivery position in dotted lines. Fig. 3 is a detail side elevation of the delivery mechanism showing the actuating gearing. Fig. 4 is a transverse vertical section through the sheet delivery mechanism. Fig. 5 is a detail sectional view on line 5—5, of Fig. 3.

In the drawings 131 is a plate cylinder, 130 the impression cylinder provided with grippers adapted to receive sheets successively from the alternate feed boards F, F'; 145 is a delivery cylinder. I provide one sheet delivery mechanism adapted to receive sheets directly from the cylinder 130 and deliver same to the right-hand end of the machine; and I provide a second similar delivery mechanism adapted to receive sheets from the delivery cylinder 145 and deliver them to another receiving table. The feeding, printing, and inking mechanisms, form no part of the present invention and may be of any suitable construction and require no detailed explanation herein, as the present invention has particular reference to the delivery mechanisms of the press; but it is an essential feature of the press that the two deliveries act in alternation, or receive alternate sheets printed between the plate and impression cylinders; and in order that this may be most conveniently done one delivery mechanism is adapted to receive sheets directly from the impression cylinder, while the other delivery mechanism is adapted to receive sheets from the delivery or transfer cylinder 145 which takes alternate sheets from the impression cylinder 130 and delivers them to its relative delivery mechanism.

In the preferred form of press for which the invention is designed one delivery mechanism is adapted to receive sheets fed from

the board F' and the other to receive sheets fed from the board F. By employing two separate deliveries, one to receive the sheets fed by the upper feed table and the other to receive the sheets fed by the lower feed table, the sheets from each feed table will be kept to themselves, and not mixed with those from the other table, which is quite desirable; the gages of the two feed tables are apt to differ somewhat from each other and consequently the impressions printed on sheets fed from one table will vary slightly in position from those printed on sheets fed from the other table.

The sheets from the upper table F are passed over the impression cylinder 130 and are printed by the type cylinder 131 and pass from said impression cylinder on to the tapes 1 operated by the rolls 1^a and 1^b. The tapes 1 are adapted to carry the sheet over on to other tapes 2 passing over rolls 1^b, 2^a, 2^b, 2^c, 2^d, 2^e, 2^f, 2^g and 2^h. Of these rolls 2^h drives the tapes 2, and the rolls 2^a, 2^b and 2^d are movable from the positions shown in full lines in Fig. 2 to the right, as shown in dotted lines, so as to extend and contract the line of tapes 2 between the rolls 1^b and 2^a. The tapes 2 are traveled as they are extended by the outward movement of roll 2^a but are stopped as they are retracted or contracted by the inward movement of roll 2^a, as hereinafter explained.

The tapes 2 are operated as follows: On the shaft 146 of the delivery cylinder 145 is keyed a pinion 3 which drives a gear 3^a loosely mounted on a stud 3^b having a sleeve 3^c on which is mounted a segment 3^d which is adapted to mesh with a pinion 3^f loosely mounted on a stud 3^h. Beside segment 3^d is a segmental delay face 3^e keyed to sleeve 3^c of gear 3^a and adapted to engage a delivery segment 3^g keyed to the hub of gear 3^f. The segment gear 3^d and delay segments 3^e, 3^g, impart intermittent motion to gear 3^f in one direction only. When segment 3^d is in mesh with pinion 3^f the tapes are traveled, but when delay segment 3^e comes into engagement with the delay segment 3^g the tapes are stopped.

A gear 3ⁱ keyed to the sleeve 3^f of gear 3^f imparts this motion to an intermediate gear 3^k which meshes with a gear 3^l keyed on a shaft 3^m, which shaft drives tape roll 2^h.

By the means described the tapes 2 are traveled intermittently but always in the same direction, their movements being so timed that they will receive the sheets from the tapes 1 and carry them to and over the right-hand delivery table 4.

The roll 2^a is moved so as to extend and retract tapes 2 at the proper times as follows: A crank 5 keyed to sleeve 3^c of gear 3^a operates a pitman rack 5^a and said rack operates a pinion 5^b on a shaft 5^c on

which are gears 5^d and 5^e. Gear 5^d meshes with a rack 5^f upon a frame 5^g carrying rolls 2^b and 2^d and reciprocates said frame to carry rolls 2^b and 2^d to the right, and return, as shown in Fig. 2.

Gear 5^e meshes with a rack 5^h on the frame 2ⁱ which carries roll 2^a and reciprocates the latter at a speed double that given to the frame 5^g carrying rolls 2^b and 2^d so as to extend the tapes 2 when the roll 2^a is moved to the right and over the delivery table 4; the rolls 2^b and 2^d also moving to the right to keep the tapes 2 tight but yielding up enough from the loops in the tapes to permit the travel of the roll 2^a.

The gears 5^d and 5^e are preferably duplicated at opposite sides of the press, and racks 5^f and 5^h are furnished with duplicate supporting rolls 5^j traveling along slotted ways 5^k, formed and adapted to prevent vertical play of the rolls 5^j as shown.

While the sheet is being delivered upon the tapes 2 said tapes are moved at a speed equaling the peripheral speed of the impression cylinder 130; and when the sheet has been brought properly over the table 4, the intermittent gearing (by engagement of the delay segments 3^e and 3^g) stops the movement of the tapes 2 and the crank 5 operates the racks and causes the frames carrying the rolls 2^a, 2^b and 2^d, to move so that the tapes 2 are withdrawn from beneath the sheet by the retraction of rolls 2^a, 2^b and 2^d, without giving the tapes 2 any longitudinal travel as a whole. In this retracting movement the tape rolls 2^a, 2^b and 2^d are operated by the crank actuated pitman 5^a so that at the start their movement is slow, and is then accelerated and then again slowed, thus permitting the sheet to drop gently on the table without imprisoning any air.

The sheets from the upper feed table F are delivered as described to tapes 1 and 2. The alternate sheets which come from the lower feed table F' are taken from the impression cylinder 130 by the delivery cylinder 145, and by it are delivered to the left-hand set of tapes 11, which are arranged and operated like tapes 1, and deliver the sheets in turn to extensible and contractible tapes 12 which are arranged and operated like tapes 2, and in turn deliver the sheets to the left-hand table 14. The left-hand delivery is similar in all respects to the right-hand delivery, except that the respective sets of tapes move in reverse directions and tapes 12 are extended in the opposite direction from that described with reference to tapes 2.

The operating mechanism for tapes 11 and 12 is almost identical with that used for the tapes 1 and 2 and similar parts are similarly lettered in the drawings so that detailed explanation thereof is unnecessary.

It will be noted that the tapes 1 receive the sheets from the top feed table F from the bottom of the impression cylinder 130, and that the tapes 11 receive the sheets from the lower table F from the bottom of the delivery cylinder 145. By thus locating the receiving ends of the tapes under the bottoms of the cylinders, I am enabled to take advantage of the gravity of the sheets and centrifugal force, which tends to deflect the sheet on to the tapes when passing these points.

It will be observed that the receiving ends of the tapes 1 and 11 are located beyond the center line of the cylinders from which they respectively receive the sheets; this enables the cylinder grippers to be opened between the tapes and clear of the innermost rolls 1^a over which the tapes are led, see Fig. 2. As the tapes are traveling at the same speed as the periphery of the cylinders from which they receive the sheets, the sheets will pass on to the tapes naturally, and by gravity, and are transferred from the cylinders to the tapes in the easiest possible manner and without any sudden stoppage or acceleration of their movement, and thus are not liable to be displaced on the tapes; nor to be snuffed thereby.

The shoe-flies in the cylinder by which the sheets are directed on to the tapes when the grippers release them also act in the direction of the gravity of the sheet, and in the most natural manner to separate the sheets from the cylinders; and the usual tendency of the sheet to curl back on itself, as it is stripped from the cylinder, only causes it to lay more closely upon the receiving delivery tapes.

The sheets may be kept in position on the tapes 1 while they are being moved out to the tables, by means of rider tapes 8 and 18 arranged above the upper runs of the tapes 1 and 2 and 11 and 12 respectively as indicated in Figs. 2, 3, 4, and extending from a point near the cylinder to the upper end of the table. These rider tapes run over rollers 8^a, 8^b and may be driven by any suitable means at the same speed as the carrying tapes, and are shown as operated intermittently by means of a crossed belt 8^c running over a pulley 8^a on the end of the shaft of roll 8^a and over a pulley 3^a on the intermittently driven shaft 3^m. By this arrangement the rider tapes can be driven intermittently and at the same speed as the carrying tapes, and they are started and stopped in unison with tapes 2 and 12 being stationary when said tapes begin to retreat from beneath the sheets to permit them to drop on to the tables.

The crank 5 moves continuously so as to cause reciprocation of the movable rollers over which the sets of tapes 2 and 12 run.

The gears 3^r are rotated intermittently so that the sets of tapes 2 and 12 are traveled intermittently, and only when the related movable looping rollers are moving outward, and carry the sheet into position over the tables. The sets of tapes 1 and 11 may however be driven continuously as while they are traveling idly there are no sheets thereon nor in contact therewith.

The tapes 1 may be driven in the desired direction from a gear 6 on shaft 146 of the delivery cylinder 145 which operates an intermediate 6^a meshing with a pinion 6^b fast on the shaft of roll 1^a, see Fig. 3. The tapes 11 may be also driven from gear 6 by trains of gears 16^a, 16^b meshing with pinion 16^c on the shaft of roll 1^a driving tapes 11, see Fig. 3. As the tapes 12 are driven in an opposite direction from tapes 2 the intermediate pinion 3^a between the gears 3^r and 3ⁱ is omitted, see Fig. 3.

Having described my invention what I claim as new and desire to secure by Letters Patent thereon is:

1. In combination, a cylinder, tapes adapted to receive sheets from said cylinder and running at the peripheral speed of the cylinder, extensible tapes for transferring sheets from the first set of tapes, and rider tapes co-acting with the tapes; with means for intermittently traveling the rider and extensible tapes while the sheets are being carried to the point of delivery, and for stopping said tapes during the contraction thereof.

2. In combination, an impression cylinder, means for feeding sheets thereto, a delivery cylinder adapted to take alternate sheets from said impression cylinder, a tape delivery for delivering the alternate sheets from the impression cylinder, and a second tape delivery for taking the sheets from said delivery cylinder, each of said tape deliveries comprising a set of endless tapes receiving sheets from its related cylinder, and a set of extensible tapes for receiving sheets from the first set of tapes.

3. In combination, an impression cylinder, means for feeding sheets thereto, a delivery cylinder adapted to take sheets from said impression cylinder, a tape delivery operable at the peripheral speed of the impression cylinder for delivering the alternate sheets from the impression cylinder, and a second tape delivery mechanism operable at the speed of the delivery cylinder for taking the sheets from said delivery cylinder, each of said tape deliveries comprising a set of endless tapes receiving sheets from its related cylinder, and a set of extensible intermittently traveled tapes for receiving sheets from the first tapes.

4. In combination, an impression cylinder, means for feeding sheets thereto, a de-

live cylinder adapted to take alternate sheets from said impression cylinder, a tape delivery mechanism for delivering the alternate sheets from the impression cylinder, and a second tape delivery mechanism for delivering the sheets from said delivery cylinder, and sets of rider tapes co-acting with the sheet carrying portions of the delivery tapes.

5. In combination, an impression cylinder, means for feeding sheets thereto, a delivery cylinder adapted to take sheets from said impression cylinder, a tape delivery for delivering sheets from the impression cylinder, and a second tape delivery for taking the sheets from said delivery cylinder, each of said tape deliveries comprising a set of endless tapes receiving sheets from its related cylinder, a set of extensible intermittently traveled tapes for receiving sheets from the first tapes; means for driving the first set of tapes continually, and means for intermittently traveling the extensible tapes.

6. In combination, an impression cylinder, means for feeding sheets thereto, a delivery cylinder adapted to take alternate sheets from said impression cylinder, a tape delivery operable at the peripheral speed of the cylinder for delivering the alternate sheets from the impression cylinder, and tape delivery mechanism operable at the speed of the delivery cylinder for taking the sheets from said delivery cylinder, each of said tape deliveries comprising a set of endless tapes receiving sheets from its related cylinder, a set of extensible intermittently traveled tapes for receiving sheets from the first tapes; means for driving the first set of tapes continually, and means for intermittently traveling the extensible tapes.

7. In a delivery mechanism, the combination of extensible sheet carrying tapes, means for extending and retracting such tapes, segmental gearing for traveling such tapes during the extension thereof, and delay segments for stopping the travel of the tapes during the contraction thereof.

8. In a delivery mechanism, the combination of a cylinder, a set of delivery tapes receiving sheets from said cylinder, and means for traveling said tapes at the peripheral speed of the cylinder; with a set of extensible sheet carrying tapes receiving the sheets from the first set, crank-actuated means for extending and retracting such tapes, segmental and delay face gearing for traveling such extensible tapes during the extension thereof, and for stopping their travel during the contraction thereof.

9. In a delivery mechanism, the combination of a cylinder, a set of delivery tapes receiving sheets from said cylinder, and means for traveling said tapes at the peripheral speed of the cylinder; with a set of exten-

sible sheet carrying tapes receiving the sheets from the first set, a crank-actuated means for extending and retracting such extensible tapes, segmental gearing for traveling such tapes during the extension thereof by the crank mechanism, and delay cam faces for stopping the travel of the tapes during the contraction thereof.

10. In a sheet delivery mechanism, the combination of an endless set of tapes, a set of relatively fixed rollers over which the tapes are guided, a laterally movable guide roller for the tapes, a pair of movable rollers for looping the tapes, and crank-actuated rack and gear mechanism for moving said pair of rollers at half the speed of the said guide roller so as to take up and give out the tapes in accordance with the movement of the latter roller.

11. In a sheet delivery mechanism, the combination of an endless set of tapes, a set of relatively fixed rollers over which the tapes are guided, a reciprocating guide roller for the tapes, crank-actuated rack and gearing for reciprocating said roller, a looping roller for said tapes, and means for moving said looping roller so as to give out or take up slack in the tapes in accordance with the movement of the reciprocating guide roller; with delay gearing whereby the said tapes are traveled during the outward movement of the said guide roller, and are stopped during the return movement thereof.

12. In a short delivery mechanism, the combination of an endless set of tapes, a set of relatively fixed rollers over which the tapes are guided, a reciprocating guide roller for the tapes, crank-actuated rack and gearing for moving said roller, a pair of looping rollers for looping the tapes, and crank-actuated rack and gear mechanism for moving said pair of rollers at half the speed of the first reciprocating roller; with delay gearing whereby the said tapes are traveled during the outward movement of the reciprocating roller, and are stopped during the return movement thereof.

13. In combination, a gripper cylinder, tapes adapted to receive sheets from said cylinder and running at the peripheral speed of the cylinder, and extensible tapes for transferring sheets from the first set of tapes; with means for intermittently traveling the extensible tapes at the peripheral speed of the cylinder while the sheets are being carried thereby to the delivery point, and for stopping said extensible tapes during the contraction thereof.

14. In combination, an impression cylinder, a set of tapes co-acting therewith, and traveling at the peripheral speed of the cylinder, a set of extensible and contractible tapes adapted to carry sheets from the first tapes to the point of delivery, means for ex-

tending and contracting said extensible tapes; delay gearing for intermittently traveling the extensible tapes at the peripheral speed of the cylinder carrying the sheet, and means for stopping the travel of said extensible tapes while they are being retracted.

15 15. The combination with the impression cylinder, of a delivery cylinder adapted to take every other successive printed sheet from the impression cylinder; and two sheet delivery mechanisms one taking the alternate printed sheets directly from the impression cylinder, and the other taking printed sheets from the delivery cylinder.

20 16. The combination with the impression cylinder, of a delivery cylinder adapted to take every other successive printed sheet from the impression cylinder; and two sheet delivery mechanisms one taking the alternate printed sheets from the bottom of the impression cylinder, and the other taking the

sheets from the bottom of the delivery cylinder.

17. In combination, an impression cylinder, means for feeding sheets thereto, a delivery cylinder adapted to take every other successive printed sheet from said impression cylinder, a tape delivery operable at the peripheral speed of the cylinder receiving the other sheets from the impression cylinder, and a second tape delivery mechanism operable at the speed of the delivery cylinder and receiving the sheets from said delivery cylinder.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

MICHAEL A. DROITCOUR.

Witnesses:

JAMES R. MANSFIELD,
L. E. WITHAM.