

W. L. HAMILTON.

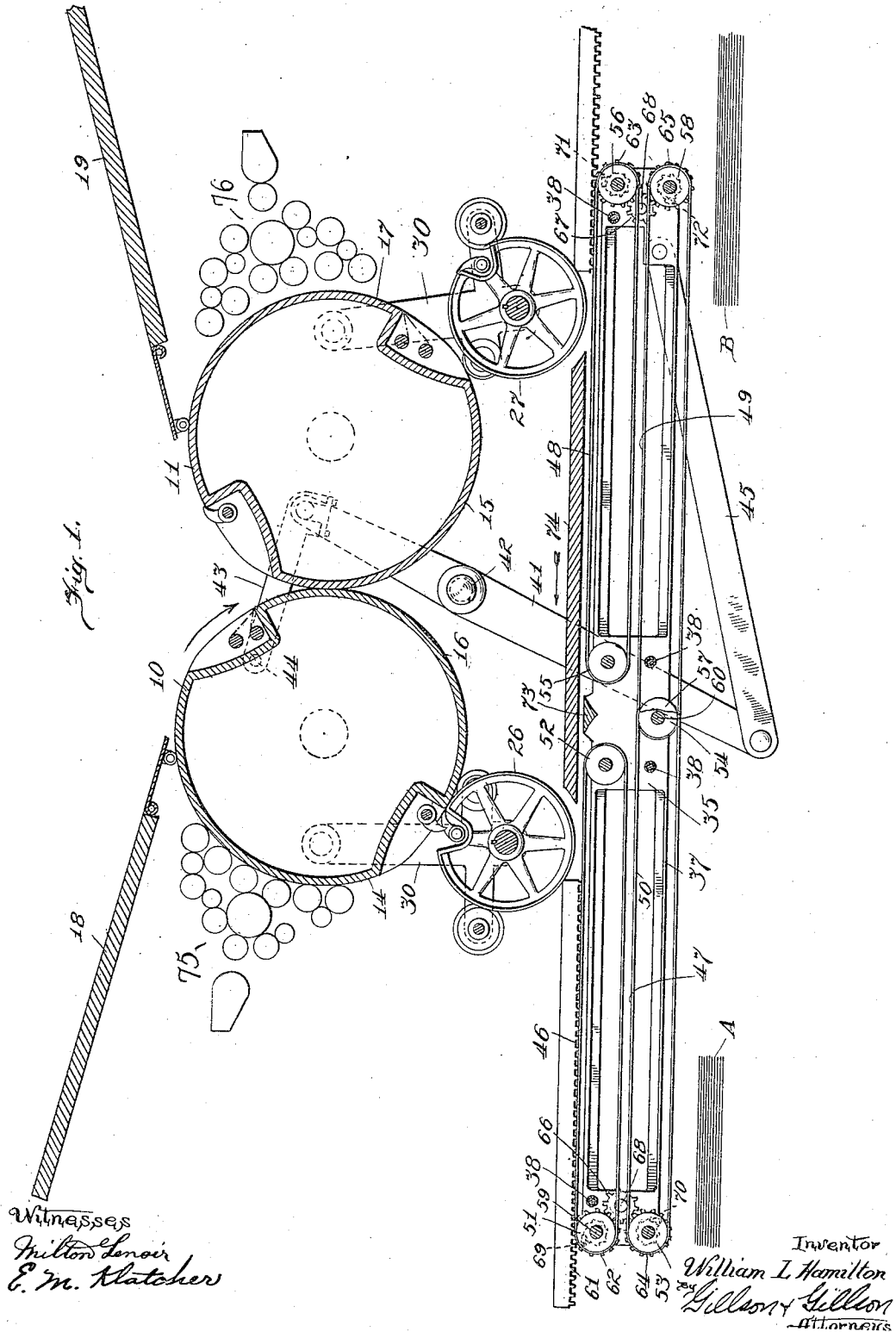
SHEET DELIVERY MECHANISM FOR PRINTING PRESSES AND THE LIKE.

APPLICATION FILED MAR. 23, 1911. RENEWED FEB. 18, 1913.

1,060,450.

Patented Apr. 29, 1913.

3 SHEETS—SHEET 1.



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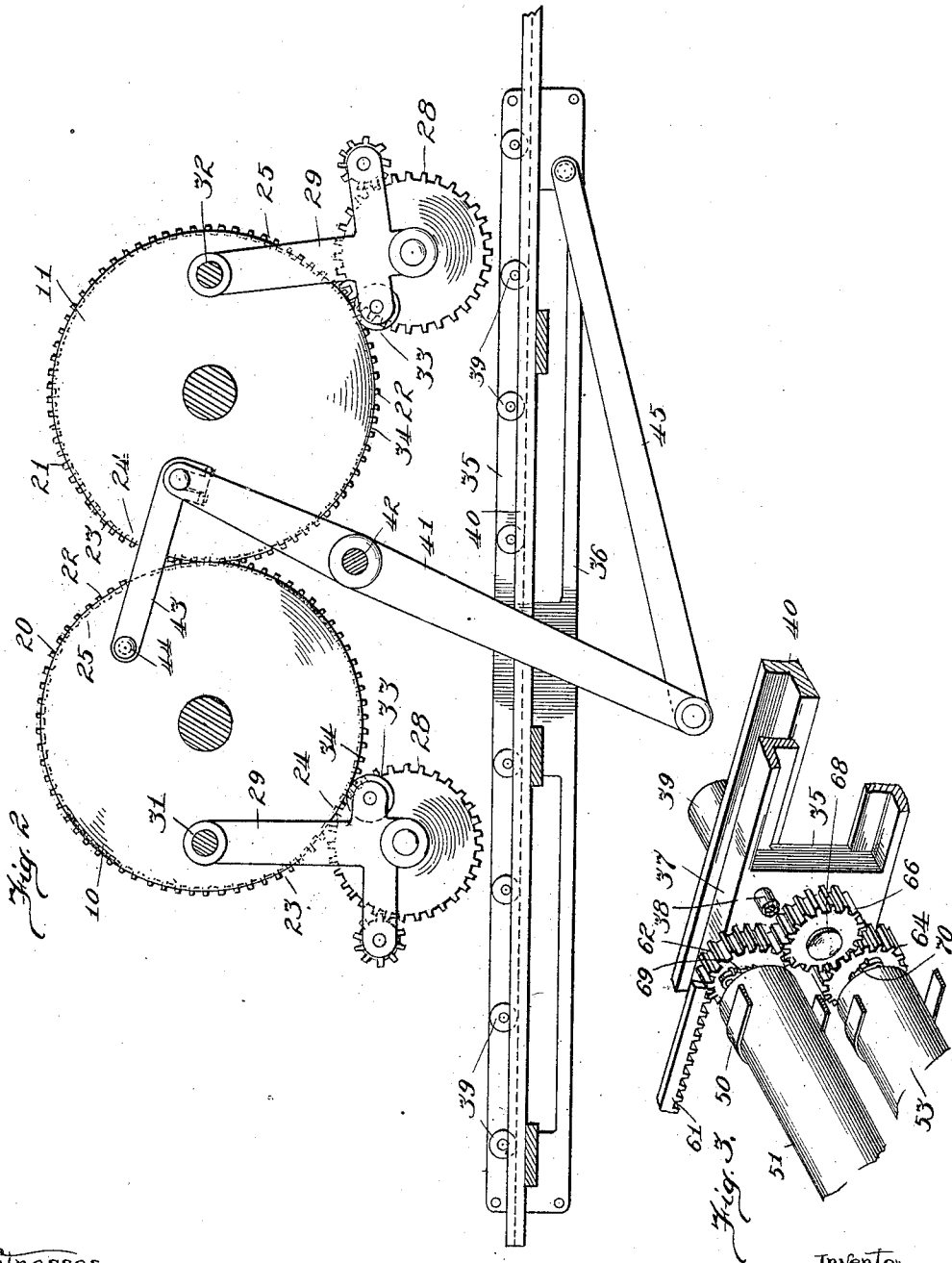
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Witnesses
Milton Lenoir
E. M. Klatcher

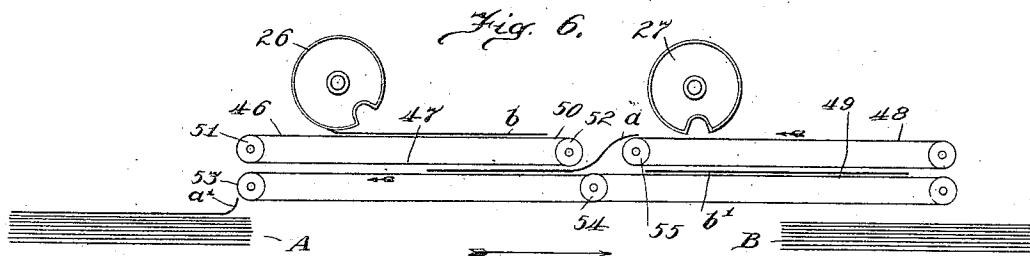
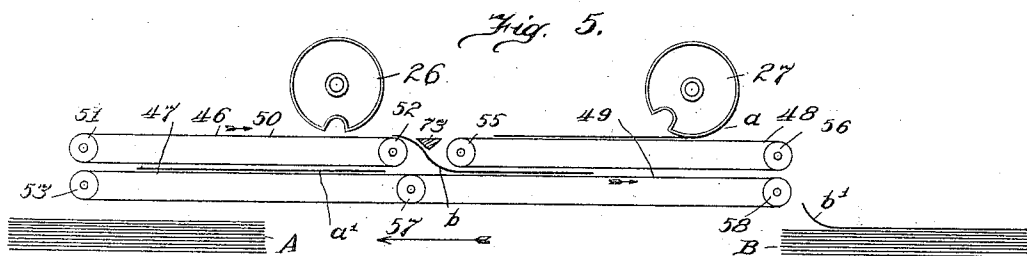
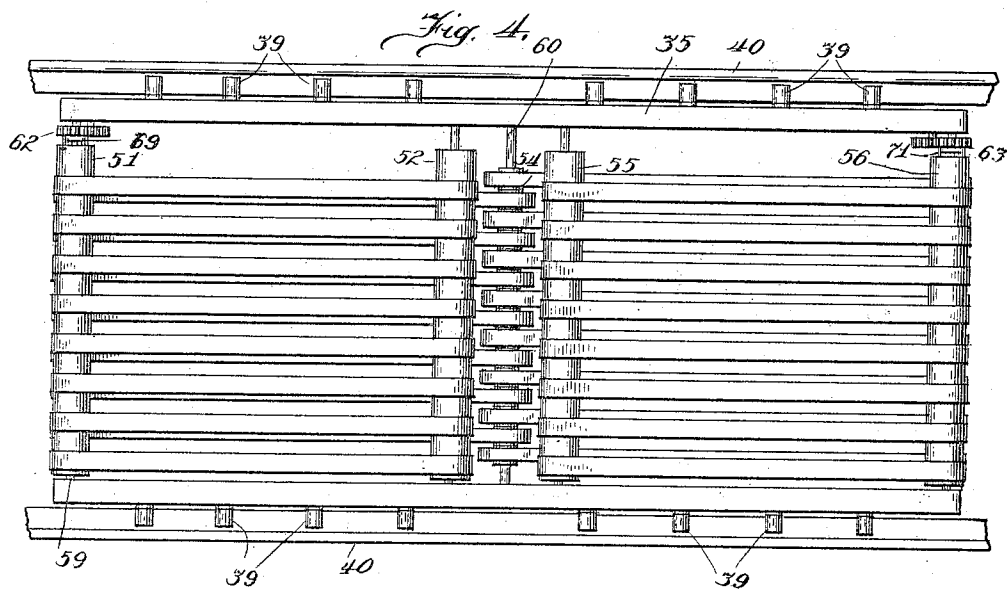
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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SHEET-DELIVERY MECHANISM FOR PRINTING-PRESSES AND THE LIKE.

1,060,450.

Specification of Letters Patent. Patented Apr. 29, 1913.

Application filed March 23, 1911, Serial No. 616,525. Renewed February 18, 1913. Serial No. 749,274.

To all whom it may concern:

Be it known that I, WILLIAM L. HAMILTON, a citizen of the United States, and resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Sheet-Delivery Mechanism for Printing-Presses and the Like, of which the following is a specification, and which is illustrated in the accompanying drawings, forming a part thereof.

The invention relates to mechanism for moving sheets of paper and the principal object of the invention is to provide improved means for effecting the discharge of printed sheets from a printing press.

In the accompanying drawings Figure 1 is a vertical longitudinal sectional view of a rotary printing press having a sheet delivery mechanism embodying the invention associated with it, the supporting frame being omitted; Fig. 2 is a side elevation of the same, some of the parts being shown in section, and other parts being omitted; Fig. 3 is a perspective view illustrating a detail of one end of the sheet delivery mechanism; Fig. 4 is a plan view of the sheet delivery mechanism, some of the parts being broken away; and Figs. 5, and 6, are diagrammatic views illustrating the operation of the sheet delivery mechanism.

Sheet delivery mechanism of a form provided by the invention is illustrated in the drawings as being associated with a rotary printing press made the subject of Letters Patent on rotary printing presses, No. 1,003,737, issued to me September 19, 1911. This rotary printing press comprises a pair of oppositely turning cooperating cylinders 10, 11, each provided with a printing or plate surface as 14, 15, and with an impression or tympan surface as 16, 17. The two cylinders 10, 11, are shown as being of like construction and of the same size. The printing and impression surfaces as 14, 16, and 15, 17, of each cylinder are circular, but of different radii, the radius of the printing surface as 14, 15, being the greater in each case, but the printing and impression surfaces of each cylinder are of the same length measured upon the circumference of the cylinder.

The printing press is equipped with two feed boards as 18, 19, and in the operation

of the press sheets are delivered from the feed boards 18, 19, to the impression surfaces 16, 17, of the cylinders 10, 11, respectively, in alternation, the sheets from the feed board 18 thereby receiving an impression from the printing surface 15 of the cylinder 11, and the sheets delivered from the feed board 19 receiving an impression from the plate surface 14 of the cylinder 10.

For effecting the relative turning of the two cylinders 10, 11, required for their co-operation in the manner just described, the two cylinders are equipped with intermeshing cam gears as 20, 21, Fig. 2. Each of these cam gears has circular portions 22, 23, equal in circumferential extent and having the same radius, respectively, as the printing and impression surfaces 14, 15, and 16, 17, of the corresponding cylinder. The adjacent ends of the two circular gear portions 22, 23, of each of the cam gears 20, 21, are connected by oblique gear portions, as 24, 25. If, therefore, one of the cylinders as 10 be continuously rotated at a uniform speed in the direction indicated by the arrow on Fig. 1, the other cylinder, as 11, will turn in the opposite direction at a variable angular speed such that the surface speed of the impression surface 17 of the cylinder 11 will be uniform with that of the printing surface 14 of the cylinder 10 during that part of each revolution when the surfaces 14, 17, cooperate, and the surface speed of the printing surface 15 of the cylinder 11 will be uniform with that of the impression surface 16 of the cylinder 10, while these surfaces are cooperating.

For removing the printed sheets from the impression surfaces 16, 17, of the cylinders 10, 11, a pair of delivery cylinders 26, 27, may be employed. As shown, one of these delivery cylinders cooperates with each of the cylinders 10, 11, and is rotated continuously with such cylinder, but in the opposite direction, as by the engagement of a gear 28 mounted upon the spindle of the delivery cylinder with the corresponding cam gear 20 or 21. To provide for the movement of the delivery cylinders 26, 27, necessary for the engagement of the gears 28 with the several parts of the corresponding cam gear as 20, 21, each is journaled at its opposite ends in links as 29, 30, which are pivotally

hung from a fixed support as at 31, 32. For swinging the links 29, 30, each carries a cam roller 33, which rides upon a cam bearing surface 34, conforming in shape with the cylinders 10, 11, and gears 20, 21, and formed upon the rim of the corresponding cylinder 10, 11, in accordance with the usual manner of providing the cylinders of printing presses with so-called "bearers."

In carrying out the invention a reciprocable carriage 35 is provided for receiving the printed sheets discharged by the delivery cylinders 26, 27. This carriage receives the sheets printed side up and retains them in that condition during the several movements of the sheets upon the tables, hereafter described, and upon their discharge from the tables onto piles, as A and B, Fig. 1. The sheets which have received an impression from the printing surface 14 of the cylinder 10, are deposited printed side up at A, and those that have received an impression from the printing surface 15 of the cylinder 11 are deposited printed side up at B.

As shown, the reciprocable carriage 35 has longitudinal side frame members 36, 37, which are connected at intervals by a plurality of tie-rods 38. The side frame members 36, 37, each carry anti-friction rollers 39 and these rollers run upon suitable rails 40 fixed in the frame (not shown) of the printing press. The carriage 35 is preferably given a complete movement in both directions during each revolution of the cylinders 10, 11. Any convenient mechanism may be employed for reciprocating the carriage. There is shown for this purpose a lever 41 which is pivoted intermediate its ends upon a fixed support, as at 42, and has its opposite ends connected, respectively, to a crank pin 44 turning with the cylinder 10, and to one of the side frame members, as 36, of the carriage 35, by links 43 and 45.

Two sets of superimposed tape tables 46, 47, and 48, 49, are mounted in the carriage 35. Each of these tape tables is composed of a plurality of continuous tapes 50, which turn over rolls located at the opposite ends of the table, the end rolls of the table 46 being designated 51, 52; those of the table 47 being designated 53, 54; and those of the tables 48 and 49 being designated, respectively, 55, 56, and 57, 58. Each of these rolls turns loosely upon a shaft, as 59, 60, which extends between the side frame members 36, 37, of the carriage 35. The tape tables 46, 47, 48 and 49, are thus longitudinally arranged in the carriage 35. The upper tables as 46, 48, and the lower tables as 47, 49, of the two sets, are preferably mounted at the same level and in longitudinal alinement. The adjacent or inner end rolls of the upper tables 46, 48, are spaced apart a sufficient distance to permit the passage of

a sheet downwardly between them, whereas the tapes 50 of the two lower tables 47, 49, have a relative staggered arrangement, as is most clearly shown in Fig. 4 of the drawings, and the inner end rolls 54, 57 of these two last mentioned tape tables are mounted upon a common shaft 60.

Provision is made for driving the tapes 50 of the two upper tables 46, 48, and of the two lower tables, 47, 49, alternately, the tapes of each lower table as 47, 49, being driven simultaneously and in the same direction with the tapes of the upper table as 48, 46, adjacent the other end of the carriage. As shown, the tapes 50 of one of the upper tables as 46, 47, and the tapes 50 of the carriage as 49, 47, adjacent the opposite end of the carriage, are driven during the movement of the carriage 35 in each direction, the tapes of the other tables then remaining stationary. Preferably the tapes of the upper table as 46, 48, adjacent the advance end of the carriage as it moves in each direction, are driven, and these tapes are so moved that the upper turns of the tapes travel backwardly in the carriage.

For driving the tapes 50 a stationary gear rack 61 extends along one side of the machine preferably adjacent the corresponding supporting rail 40 and a gear pinion as 62, 63, is coaxially mounted with one of the end rolls, as 51, 56, of each of the tape tables 46 and 48. The gear pinions 62 and 63 turn loosely upon the shafts 59 and they mesh continuously with the gear rack 61 whereby they are reversely rotated during the reciprocation of the carriage. A gear pinion, as 64, 65, is also coaxially mounted with one of the end rolls as 53, 58, of each of the tape tables 47 and 49. These last mentioned gear pinions are preferably turned with the gear pinions 62, 63, and in the same direction. As shown, this is effected through the medium of two gear pinions 66, 67, each of which is mounted upon a stub shaft 68 secured to the side frame member 37 of the carriage 35, and meshes with one of the gear pinions 62, 63, and one of the gear pinions 64, 65.

The gear pinions 62 and 65 turn the rolls 51 and 58, respectively, during the movement of the carriage 35 in one direction, and the gear pinions 63 and 64 turn the rolls 56 and 53, respectively, during the movement of the carriage 35 in the other direction. For this purpose each of the gears 62, 63, 64 and 65, and rolls 51, 56, 53 and 58, respectively, have cooperating ratchet wheels and pawls, as 69, 70, and 71, 72. A pawl 70 is mounted upon the inside face of each of the gears 62 and 65, and an oppositely facing pawl 72 is similarly mounted upon each of the gears 63 and 64. The ratchet wheels 69 and 71 are also oppositely formed. One of the ratchet wheels 69 is

mounted upon an end of each of the rolls 51 and 58 for cooperating with the pawl 70 mounted upon the adjacent gear 62 or 65, and one of the ratchet wheels 71 is mounted upon an end of each of the rolls 56 and 53 for cooperating with the pawl 72 mounted upon the adjacent gear 63 or 64.

In the use of the sheet delivery mechanism the reciprocation of the carriage 35 is so timed with reference to the operation of the cylinders 10, 11, that a sheet as *b* or *b'* Fig. 6 is deposited upon the tape table 46 by the delivery cylinder 26 during each movement of the carriage 35 to the right, as viewed in Figs. 1 and 2, and a sheet as *a* or *a'* Fig. 5 is deposited on the tape table 48 by the delivery cylinder 27 during each movement of the carriage 35 to the left. The movement of the tape 50 of the tables is such that a sheet as *b* Fig. 6 will be passed from the table 46 downwardly through the space between the end rolls 52, 55, onto the tape table 49 during each movement of the carriage 35, to the left, and a sheet as *a* Fig. 5 will be passed from the upper table downwardly through the space between the rolls 52, 55, onto the lower table 47; during each movement of the carriage to the right. Similarly a sheet as *a'* Fig. 5 will be passed from the table 47 to the pile A during each movement of the carriage to the right, and a sheet as *b'* Fig. 6 will be passed from the table 49 onto the pile B during each movement of the carriage to the left. Each sheet delivered to one of the lower tape tables as 47, 49, during the movement of the carriage 35 in one direction remains at rest with its printed side up upon such table during the movement of the carriage 35 in the other direction and is not deposited upon the corresponding pile A or B until the carriage again moves in the first mentioned direction. The delivery mechanism described thus provides time for the ink upon a printed sheet to set before it is disturbed by the deposit of another sheet upon it.

To insure the downward travel of the sheets through the space between the rolls 52, 55, a V-shaped deflector 73, having curved sides, extends between the side frame members 36, 37, of the carriage 35 at about mid-position between the rolls 52, 55. To prevent the sheets resting upon the tape tables 46, 48, from being disturbed by air currents during the reciprocation of the carriage 35 a stationary guard plate 74 extends over the carriage between the delivery cylinders 26, 27.

Form rollers 75, 76 of usual construction are provided for inking the plate surfaces 14 and 15, respectively. The sheets which are printed with ink supplied from the form rollers, 75, are delivered upon pile A. The sheets printed with ink supplied from the form rollers 76 are delivered upon pile B.

I claim as my invention—

1. In a sheet delivery mechanism, for printing presses and the like in combination, a reciprocable carriage, a pair of receiving tape tables longitudinally mounted in the carriage in horizontal alinement, their adjacent ends being separated, a delivery tape table mounted in the carriage below each of the receiving tape tables, means for intermittently driving the tapes of the several tables, the tapes of the receiving tables moving inwardly and the tapes of the delivery tables moving outwardly, the movement of the tapes being so timed that as the carriage moves in either direction the tapes of the receiving table adjacent its advance end and the tapes of the delivery table adjacent its rearward end are actuated and the tapes of the other tables are at rest.

2. In a sheet delivery mechanism for printing presses and the like in combination, a pair of oppositely rotating sheet delivery cylinders operating in alternation, a reciprocable carriage, a tape table for cooperating with each of the said delivery cylinders mounted in the carriage, the two tables being arranged in longitudinal alinement in the carriage and having their inner ends separated, means for intermittently driving the tapes of the two tables, the tapes of each table moving inwardly and the movement of the tapes being so timed that as the carriage travels in either direction the tapes of the table adjacent its advance end are actuated, the tapes of the other table being at rest.

3. In a sheet delivery mechanism for printing presses and the like, in combination, a reciprocable carriage, two tape tables mounted in the carriage at different elevations, the lower table being extended in rear of the upper table, means for driving the tapes of both tables backwardly during the advance of the carriage, the tapes being at rest during the rearward movement of the carriage and means for depositing a sheet upon the upper table during the rearward movement of the carriage.

4. In a sheet delivery mechanism for printing presses and the like, in combination, two sets of superimposed parallel tape tables arranged in longitudinal alinement, the upper table of each set being at a greater elevation than the lower table of the other set, and the inner ends of the upper tables of the two sets being separated, means acting in alternation for moving the tapes of the upper tables of the two sets inwardly and means for moving the tapes of the lower table of each set simultaneously and in the same direction with the movement of the tapes of the upper table of the other set.

5. In combination, two sets of superimposed parallel tables arranged in longitudinal alinement, the upper table of each set

being at a greater elevation than the lower table of the other set and the inner ends of the upper tables of the two sets being separated, means acting in alternation for depositing sheets of paper upon the upper
 5 tables of the two sets, means for moving the sheet inwardly upon the said upper table of each of the two sets to pass the sheet off of the inner end of such table, said sheet
 10 moving means being operable in alternation and means for moving the sheet outwardly upon the lower table of each of the two sets to pass the sheet off of the outer end of such table.

15 6. In combination, a reciprocable carriage, two sets of superimposed tables arranged in longitudinal alinement in the carriage, the upper table of each set being at a greater elevation than the lower table of
 20 the other set, and the inner ends of the upper tables of the two sets being separated, means acting in alternation for depositing sheets of paper upon the upper table of each of the two sets, means acting in alternation
 25 for moving sheets of paper inwardly upon each of said upper tables to pass the sheets off of the inner end of such table, and means acting in alternation for moving sheets of paper outwardly upon the lower table of
 30 each of the two sets to pass the sheets off of the said sheet depositing and sheet moving means being so timed that as the carriage moves in either direction, a sheet is deposited upon the upper table of the set
 35 located adjacent the rearward end of the carriage, a sheet is moved off of the upper table of the set located adjacent the advance end of the carriage and a sheet is moved
 40 off of the lower table of the set located adjacent the rearward end of the carriage.

7. In combination, a reciprocable carriage, two tables mounted in the carriage at different elevations, the lower table being
 45 extended in rear of the upper table, means acting during the rearward movement of the carriage for depositing a sheet of paper upon the upper table, and means acting during the advance of the carriage
 50 for moving a sheet rearwardly upon each of the tables to pass the said sheets off of the rear ends of the respective tables.

8. In combination, a reciprocable carriage, a pair of tables mounted in the carriage, the said tables being arranged in
 55 longitudinal alinement and having their inner ends separated, means acting in alternation for depositing sheets of paper upon each of the said tables and means acting
 60 in alternation for moving sheets inwardly upon each of the tables to pass said sheets off of the inner ends of the tables, the operation of the said sheet depositing and sheet moving means being so timed that
 65 as the carriage moves in either direction a

sheet will be deposited upon the table located adjacent the rearward end of the carriage and a sheet will be moved off of the table located adjacent the advance end of the carriage.

9. In a sheet delivery mechanism for
 70 printing presses and the like, in combination, a reciprocable carriage, a pair of tape tables mounted in the carriage, the said tables being in longitudinal alinement and
 75 having their inner ends separated, means for intermittently driving the tapes of the two tables, the tapes of each table moving inwardly and the movement of the tapes
 80 being so timed that as the carriage moves in either direction the tapes of the table located adjacent its advance end are actuated, the tapes of the other table being at rest.

10. In a sheet delivery mechanism, the
 85 combination of printing mechanism and a pair of sheet receiving tables below such mechanism; with a single reciprocating delivery carriage moving below the printing
 90 mechanism and between said tables and adapted to deliver sheets alternately over its opposite ends to the respective tables.

11. In combination, printing mechanism, adjacent sheet receiving tables below the
 95 printing mechanism, and a single sheet delivery carriage moving below the printing mechanism and between and over said tables, and two sets of carrying tapes adapted to alternately deliver sheets from opposite
 100 ends of the carriage to the respective tables.

12. In combination, a rotary printing mechanism, a pair of adjacent sheet receiving
 105 tables, a delivery carriage moving below the printing mechanism and to and over said tables, sets of endless tapes mounted on said carriage, and means for causing the sets of tapes to alternately deliver sheets from opposite ends of the carriage to the adjacent table.

13. In combination, printing mechanism, a pair of adjacent sheet receiving tables
 110 below the printing mechanism, of a delivery mechanism moving below the printing mechanism between and over said tables and sets of tapes on the carriage alternately receiving sheets from said printing mechanism, and delivering such sheets alternately from the ends of the carriage to the respective tables.

14. In combination, rotary printing mechanism, a pair of sheet receiving tables, a
 120 reciprocating delivery carriage below the printing mechanism, means for moving the delivery carriage alternately between and over the tables, tape rollers on the ends of the carriage, sets of endless tapes at opposite ends of the carriage and moving over the carriage rollers, said tapes alternately receiving sheets from the printing mechanism
 130

nism and respectively delivering the sheets over the opposite ends of the carriage to the related tables.

15. In combination, rotary printing and impression cylinders, and two sets of delivery tapes located at the same level below said cylinders, said sets of tapes acting in opposite directions and each set receiving each alternate sheet printed by the said cylinders.

16. In combination, rotary printing and impression cylinders, a pair of oppositely acting sheet delivery mechanisms located at the same level below said cylinders, and means for transferring the sheets printed by said cylinders alternately to the said delivery mechanisms.

17. In combination, rotary printing and impression cylinders, a pair of sheet delivery mechanisms, and a pair of transfer reels, said reels acting to transfer the sheets printed by said cylinders alternately to said delivery mechanisms.

18. In combination with a sheet fed rotary printing press comprising a pair of cylinders and inking apparatus for each cylinder, the inking apparatus for the two cylinders being located adjacent opposite ends of the press, of sheet delivery mechanism acting to deliver sheets at the two ends of the press, all sheets printed by each cylinder of the press being delivered at that end of the press at which the inking apparatus for the same cylinder is located.

19. In combination with sheet fed rotary printing mechanism printing one side of the sheets and comprising a pair of cylinders and inking apparatus for each cylinder, the inking apparatus for the two cylinders being located adjacent opposite ends of the press, of sheet delivery mechanism acting to deliver sheets at the two ends of

the press, the sheets printed by each cylinder of the press being delivered printed side up at that end of the press at which the inking apparatus for the same cylinder is located.

20. In a sheet delivery mechanism, the combination of sheet fed printing mechanism printing one side of the sheets and a pair of sheet receiving tables below such mechanism, with a single reciprocating delivery carriage moving below the printing mechanism and between said tables and adapted to deliver sheets alternately over its opposite ends to the respective tables with the printed sides of all sheets turned in the same way.

21. In combination, sheet fed rotary printing mechanism comprising a pair of cylinders printing one side of the sheets and a pair of oppositely acting sets of sheet delivery tapes, each set of delivery tapes receiving sheets from between the cylinders and the two sets of delivery tapes both delivering the sheets which they respectively receive with the printed sides of the sheets turned in the same way.

22. In a sheet delivery mechanism, the combination of sheet fed rotary printing mechanism comprising a pair of cylinders printing one side of the sheets and a pair of sheet receiving tables, with a single reciprocating delivery carriage moving between said tables and adapted to receive sheets from between the cylinders and to deliver said sheets alternately over its opposite ends to the respective tables with the printed sides of all sheets turned in the same way.

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