

M. A. DROITCOUR.
PRINTING PRESS.

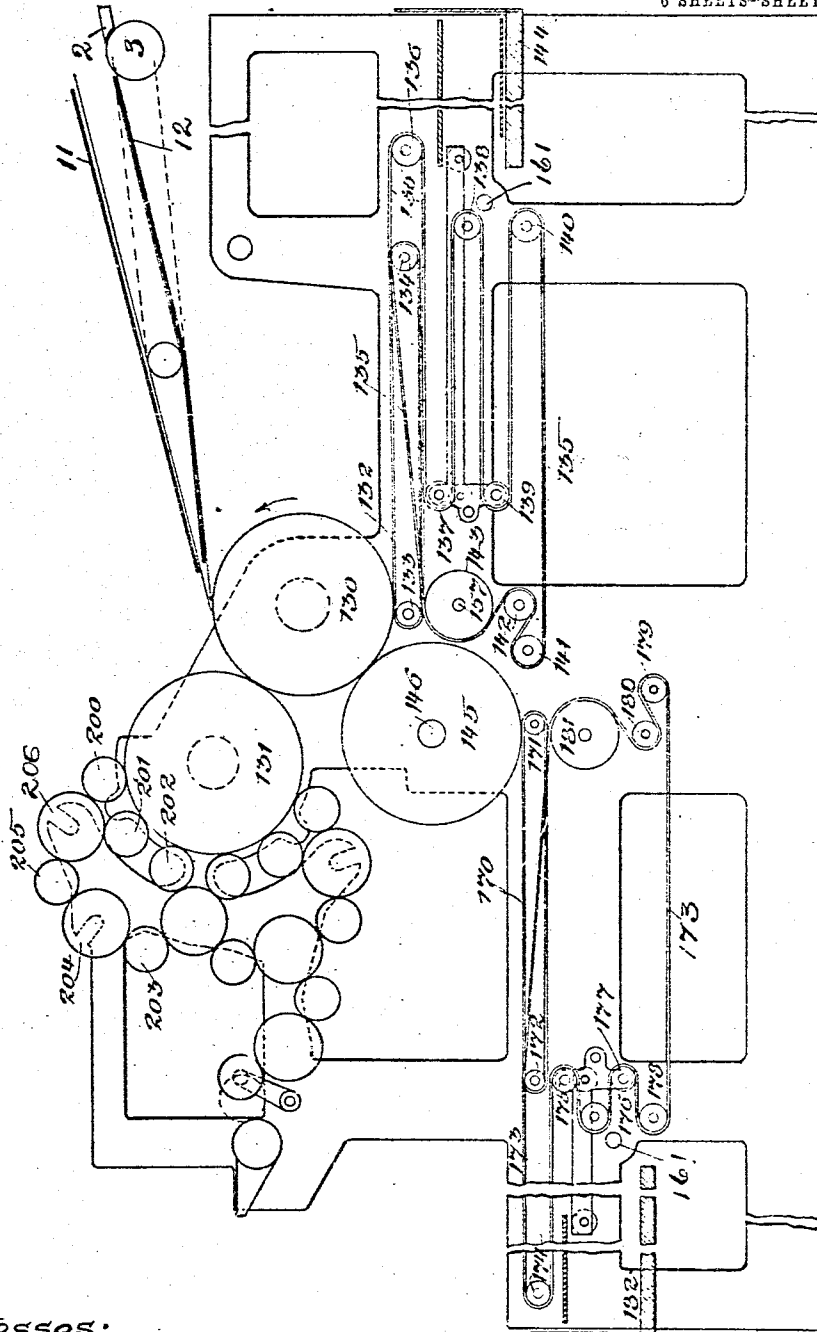
APPLICATION FILED JUNE 7, 1909. RENEWED JULY 1, 1910.

983,219.

Patented Jan. 31, 1911.

6 SHEETS-SHEET 1.

Fig. 1.



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6 SHEETS—SHEET 2.

Fig. 2.

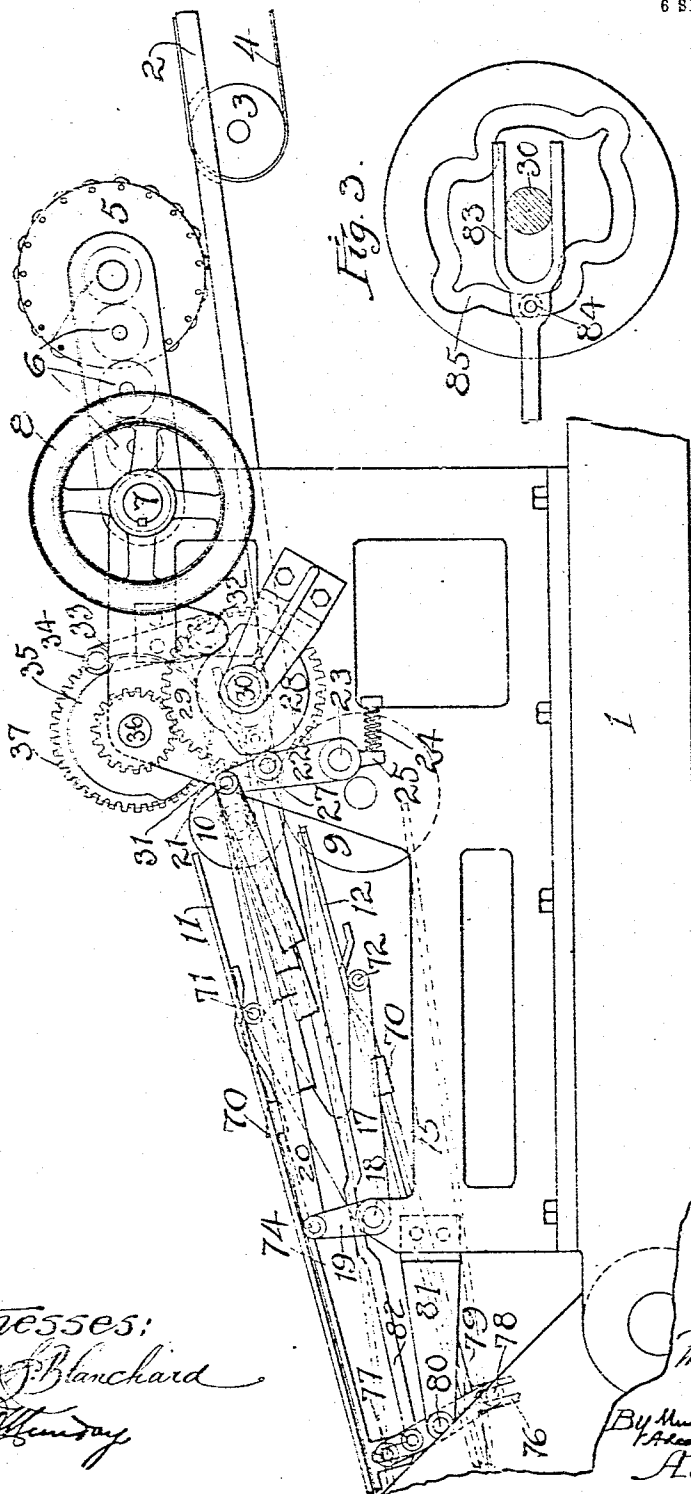


Fig. 3.

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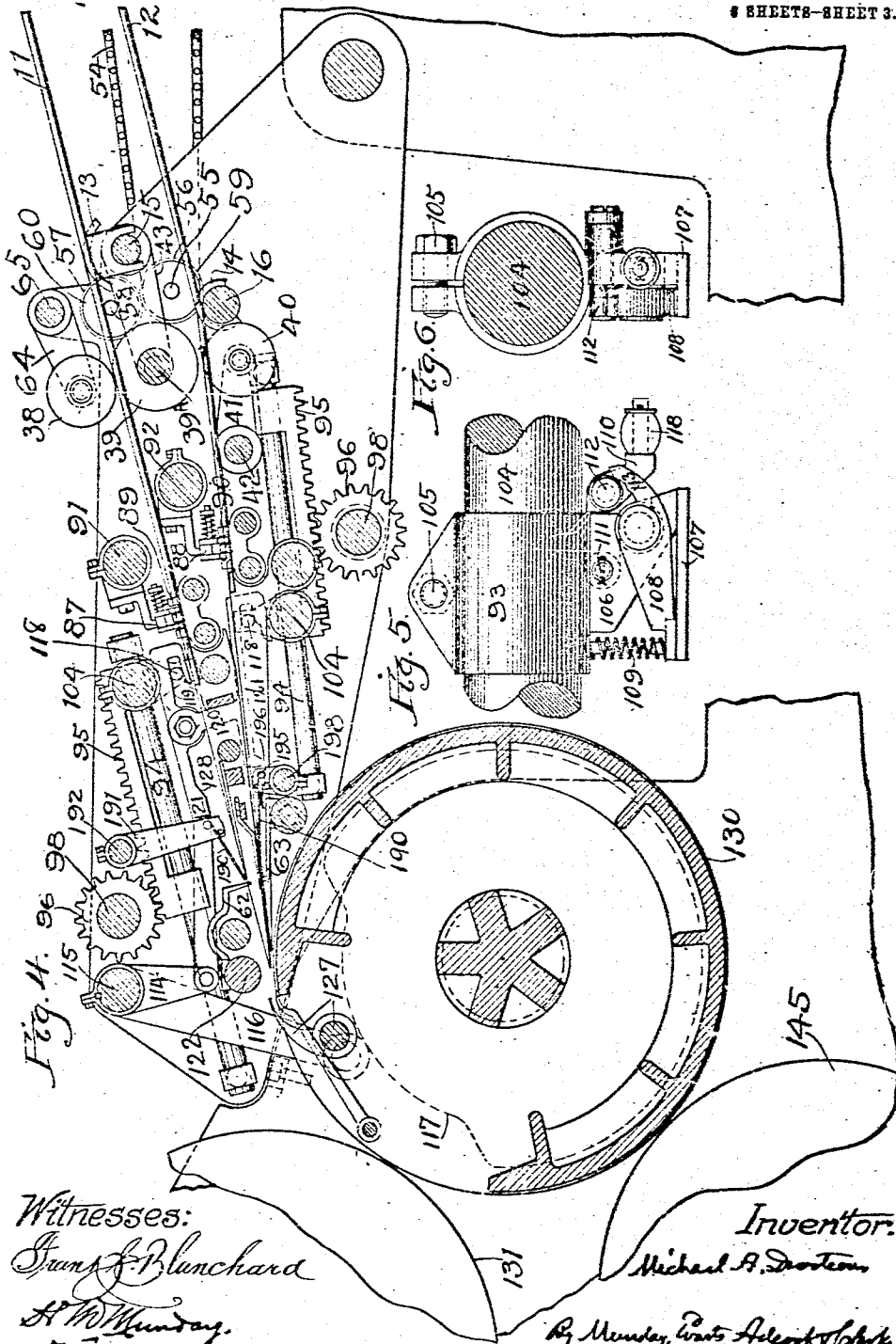
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8 SHEETS-SHEET 3.



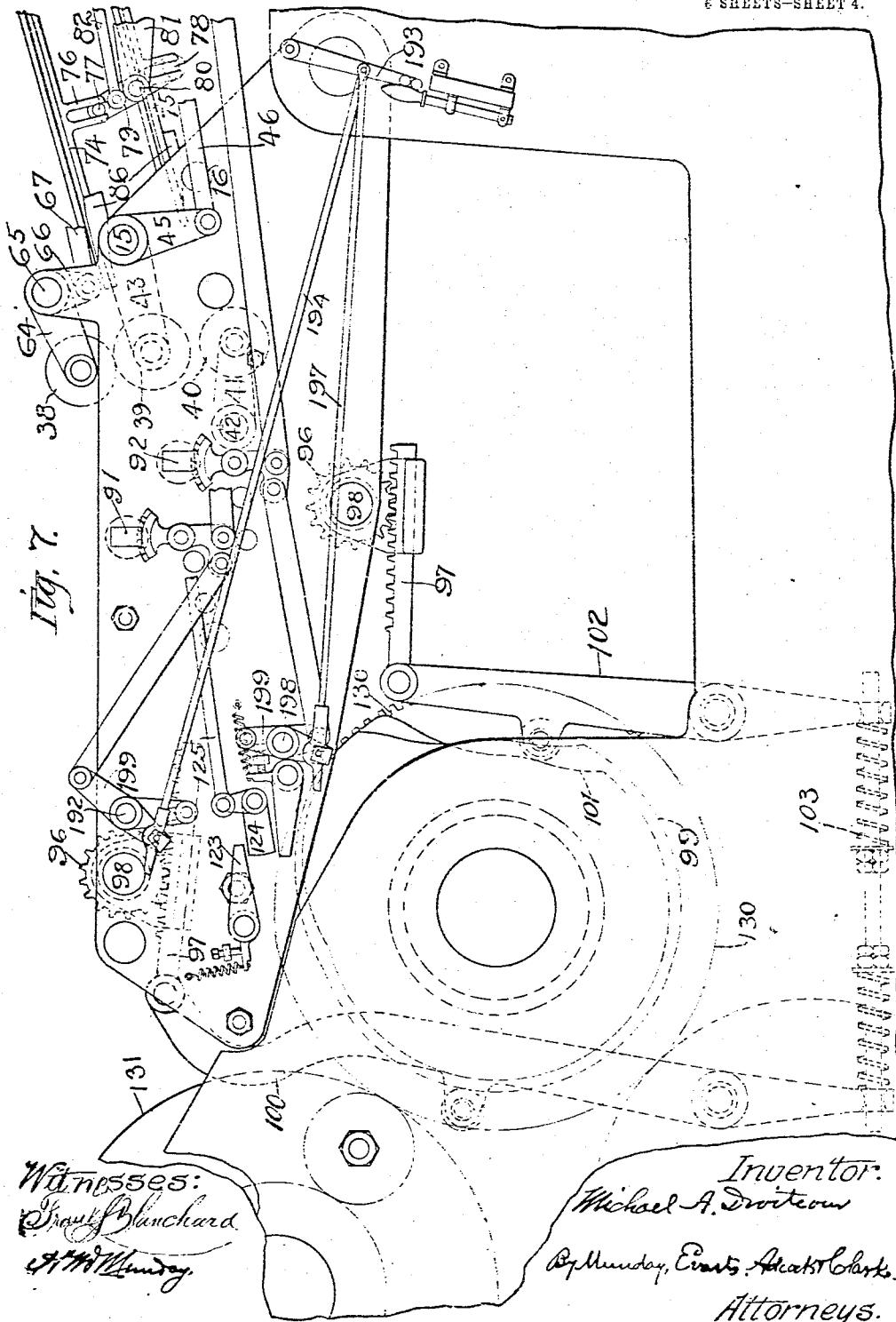
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6 SHEETS—SHEET 4.



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8 SHEETS-SHEET 5.

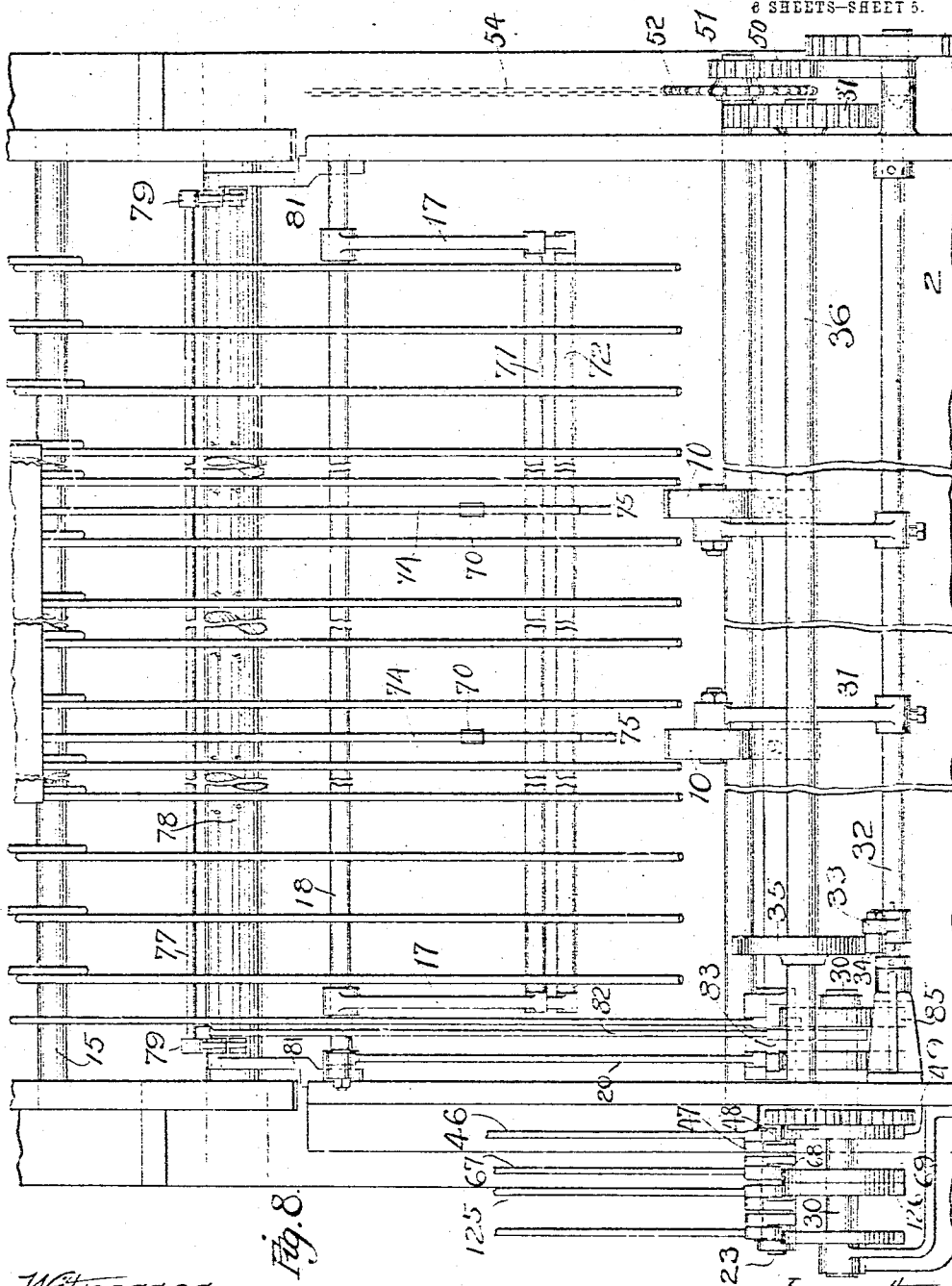


Fig. 8.

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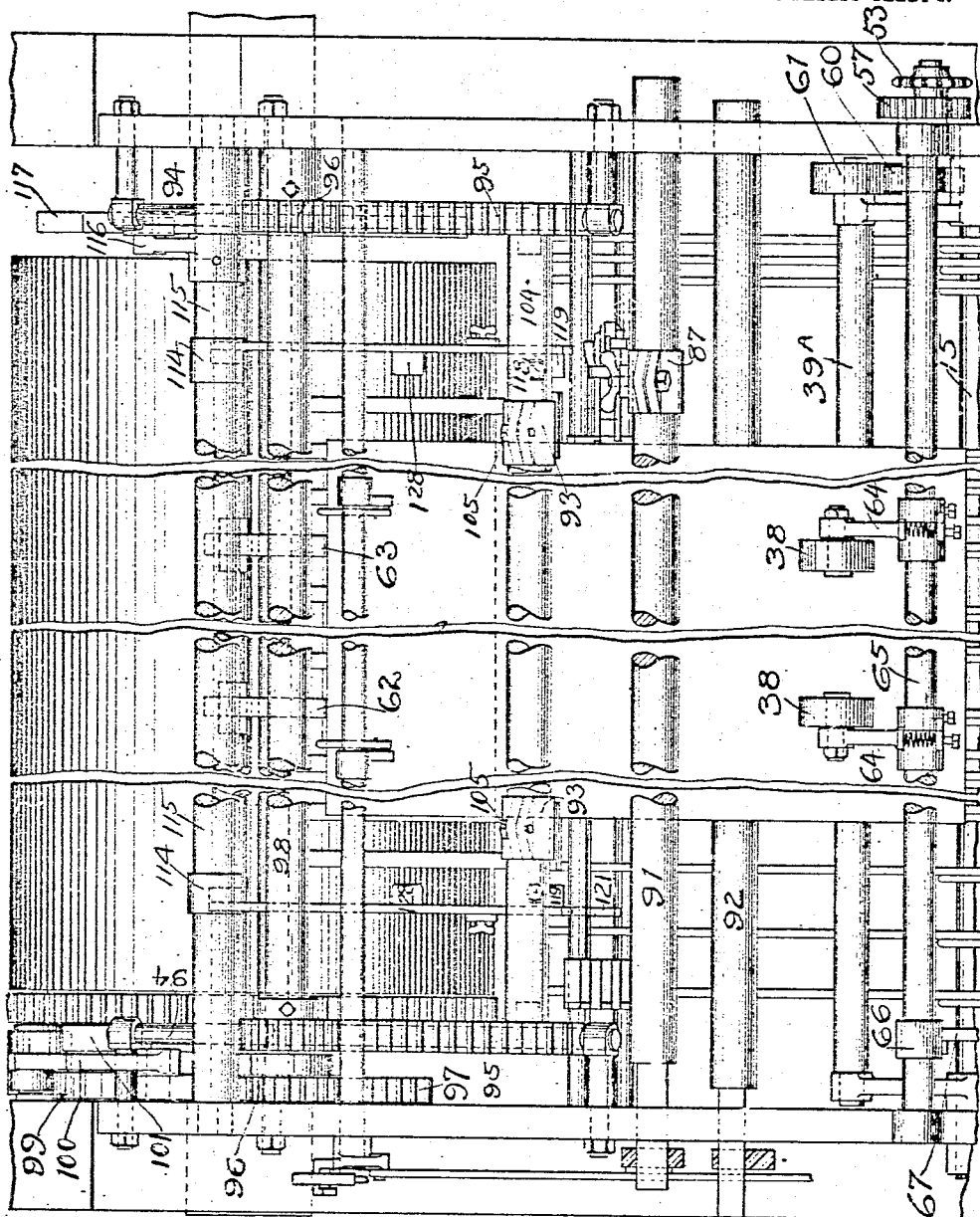
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6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

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PRINTING-PRESS.

983,219.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed June 7, 1909, Serial No. 500,672. Renewed July 1, 1910. Serial No. 570,012

To all whom it may concern:

Be it known that I, MICHAEL A. DROITCOUR, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Printing-Presses, of which the following is a 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.

In the feeding mechanism I have embodied the following features which I believe to be new and which are capable of feeding a largely increased number of sheets in a given time. Instead of a single feed table and feeding mechanism, I employ two feed tables, one directly over the other and adapted to deliver the sheets at the same point to the impression cylinder. Each of these feed tables is provided with its own automatic feeding mechanism and sheet positioning devices, and both arrest the sheets and register them just before they are delivered to the cylinder and the advantage of the two feed tables in point of time is that while one of them is positioning one sheet the other is feeding another sheet, so that the sheets can be fed very closely after each other and avoid any large gap on the cylinder. Another feature of the feeding mechanism is the provision in the two feed tables of swinging sections, the rising and falling of the free ends of which brings them alternately into registry with a main table upon which is an automatic sheet separating and feeding mechanism.

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 the main portions of the press. Fig. 2, is an enlarged side elevation of the feeding tables and mechanism, showing the parts not appearing in Fig. 1. Fig. 3, is a section showing the cam controlling the positioning devices. Fig. 4, is a section of sheet feeding mechanisms of the two feed tables. Fig. 5, is an enlarged elevation of the paper clamps by which the sheet after being arrested on the feed tables, is carried to the impression cylinder and Fig. 6, is a section at right angles to Fig. 5. Fig. 7, is an enlarged partial side elevation of the feed table mechanisms. Figs. 8 and 9 are plan views of different parts of the feeding mechanisms.

In the accompanying drawing, 1 represents the frame of the press and 2 is the initial main feed table upon which the sheets to be printed are first laid. This feed table is provided with any of the ordinary automatic feed devices and I have shown in combination therewith a roller 3 operating tapes 4, located below the table, a combing wheel 5 located above the table, the operating gears 6, 6, 6, 6 for driving said combing wheel from the shaft 7, and 8 is a hand wheel on said shaft adapted to be used in effecting adjustment. From the table these sheets are fed between rollers 9 and 10 on to the swinging sections 11 and 12 of the companion or registering feed tables hereinafter mentioned. These swinging sections are provided at their rear ends with semi-circular pieces 13 and 14 whereby the former is adapted to ride on the shaft 15 and the latter upon the shaft 16. At their forward ends they are supported upon the shafts 71 and 72 attached to the limbs of a rocking V-shaped piece 17 rigidly mounted on a pivot 18, having an upright arm 19, pivoted to the lever 20, attached at its forward end to a stud 21 carried on the arm 22, on shaft 23. A spring 24 acts on a projection 25 of the arm 22 projecting downwardly below the shaft 23 and retains said arm against the cam 28. The arm 22 has a roller 27 bearing on said cam 28 which is keyed to shaft 30, and this cam is adapted in one position, the one shown at Fig. 2, to operate the lever 20 and arm 19 so as to rock the table sections in such manner as to bring the lower section 12 into receiving position, and

when the roller 27 passes off the high portion of the cam to the lower portion thereof, the lever 20 and arm 19 are operated so as to rock the support 17 and allow the upper table section 11 to move into register with the table 2.

The sheets are caused to move onto the swinging table sections by the closing upon them of the rollers 9 and 10. For this purpose the roller 10 is mounted on an arm 31 rigidly attached to a shaft 32 operated by an arm 33 having a roller 34 contacting with a cam 35 on the shaft 36 carrying gear 37. This cam 35 is adapted to drop the roller 10 at proper times to seize the incoming sheets and feed them forward, and it is raised as soon as the sheets have passed. For the purpose of advancing the sheets after they have moved on to the movable table sections, I provide further mechanism, consisting of the rollers 38, 39 and 40. Of these, the roller 40 is stationarily located so far as vertical movement is concerned. It is supported upon arms 41 upon shaft 42. The roller 39 is supported upon arms 43 attached to rock shaft 15 and oscillates between rollers 38 and 40, acting first with one and then with the other, and is operated by arm 45 and lever 46 which is operated from shaft 30 by an arm 47 through a roller 48 in contact with a cam 49 on said shaft 30. This cam is adapted to lift and lower roller 39 at proper times, but as its rotary motion in one position should be the reverse of that in its other position I employ with it a rack 50 meshing with a gear 51 which drives chain sprocket wheel 52, thus giving motion to sprocket wheel 53 through chain 54. The sprocket wheel 53 is keyed to shaft 55 which has a gear 56 on it meshing with a gear 57 on shaft 58. The shafts 55 and 58 have friction pulleys 59 and 60 which alternately contact with friction roller 61 keyed to shaft 39. Through the action of the rollers 38, 39 and 40, the sheets are fed to the gages 62 and 63. The roller 38 is raised as the sheets near the gages 62 by the arm 64 on rock shaft 65 carrying a second arm 66 joined to a lever 67 connected to a roller 68 operated by cam 69 and attached to shaft 30.

I also provide the device with means whereby the sheets may be carried into perfect register with the gages. These devices in printing parlance are called kickers. These kickers, shown at 70 are adjustably mounted upon rods 74 and 75 having their forward ends supported upon shafts 71 and 72 and their rear ends upon shafts 15 and 16. Intermediate of such supports the rods are provided with depending projections or legs 76 arranged in pairs, and between which are shafts 77 and 78 passing through a link 79 pivoted at 80 to a stationary bracket 81. The link 79 is pivotally con-

nected to a lever 82 at the forward end of which is a fork 83, the limbs of which movably embrace the shaft 30, and a stud 84 attached to the lever close to the fork enters a box cam 85 keyed to shaft 30. This cam is adapted to impart both forward and back movements to the kickers necessary to bring the sheets to the proper register. The kickers are also adapted to move vertically with the table sections 11 and 12 and they also have independent vertical movement which is imparted to them by the shafts 71 and 72 and 15 and 16, the bars 74 and 75 being bent over the shafts 71 and 72 and having wedges 86 adapted to ride on the shafts 15 and 16. The kickers 70 through the action of the bars 74 and 75 come in contact with the rear end of the sheet pushing said sheet into register with the gages 62. The description we have given of the kickers applies equally to those provided for the upper table and to those for the lower table as well, the lower kickers being adapted to position the sheet against the gages 63, but it will be understood that they act alternately in point of time, one sheet being positioned by them while the other is moving off onto the impression cylinder.

The side clamps 87 and 88 bring the sheet into register with the side gages 89 and 90 through the endwise motion of shafts 91 and 92.

After the sheets have been positioned in register with the gages, I provide means for again starting it on its travel to the impression cylinder, these means being adapted to seize the sheet at opposite sides and to give it, while it is in their control, a greatly increased speed which at the time it reaches the gripping point will be equal to that of the cylinder, this mechanism being adapted to release the sheet as soon as it is seized by the grippers. These sheet starting devices may be variously constructed, but the construction I have adapted is that shown in the drawings and consists of clamps 93 at each side of the sheet and adapted to engage the margins thereof and traveling on rods 94 and attached to racks 95 meshing with gears 96, the gears 96 being actuated by pitman racks 97 through shafts 98, the upper pitman rack 97 being actuated by a cam 99 and a swinging lever 100, and the lower rack 97 being actuated by a cam 101 and a swinging lever 102, the expanding springs 103 holding the swinging levers 100 and 102 in contact with the cams 99 and 101.

The clamps 93 are clamped upon rods 104 by screws 105. They are pivoted to a stationary projection 106 with a base portion 107 and with a movable clamp 108 pivoted to the projection 106 and provided with a spring 109 pressing the clamp against the base. The sheet is clamped between the parts 107 and 108 and is released therefrom by a lever 130

110 pivoted at 111 and provided with a roller 112 adapted to engage a cam lever 113 on the clamp 108. The cam lever or projection 113 is notched on the side which receives the roller 112 and when said roller 112 is depressed it lifts the clamp from the paper and enters said notch and holds the clamp open. The releasing and closing device is operated by a cam lever 121 attached to a crank 114 mounted upon a rock shaft 115 receiving its motion from an arm 116 bearing upon a cam 117 mounted with the impression cylinder.

The roller 118 on the device 110 enters between the cam faces 119 and 120 of cam lever 121 and is partially lifted by the lower cam face 120 so as to carry the roller 112 above the notch in cam lever 113 without wholly closing the clamp upon the sheet. This partial closing of the clamp unlocks it and permits the clamp to thereafter close quietly on the sheet without throwing it out of registering position. The cam lever 121 has an extension indicated in dotted lines in Fig. 4 which acts upon the clamp 93 of the lower feed table 12 just as the parts shown in full lines in Fig. 4 act upon the clamp of the upper feed table 11.

The cam 99 operating through the lever 100 rocks the shaft 98 by the pitman rack 97, which moves the rack 95 part of its travel and at the proper time continues its travel to the starting point through the shaping of cam 99. In this continued movement it causes the tripping of clamps 93, partially closing them. The clamps 93 are fully closed upon the sheet by the movement it causes the tripping of clamps 93 114 through the shaft 115 and cam-lever 116 actuated by the cam 117. This causes a movement of the cam-lever 121 in a direction the reverse of the feed so that the rollers 118 of the clamps 93 move upward along the face of cam 119. This allows the clamp jaws 108 to close upon the sheet through the action of the springs 109. At this time the gages 62 lift away from the sheet through the action of the shaft 122 operated by lever 123 lifted by bell-crank 124 actuated by a connecting rod 125 which receives this motion through a cam 126 on shaft 30. The sheet being now clamped at both sides by clamps 93 and the gage being lifted out of the way, is in condition to be again started on its movement to the impression cylinder and that movement is now imparted to it through the cam 99, the lever 100, the pitman rack 97 rocking shaft 98 and through said shaft sliding rack 95 on rod 94, carrying with said rack the clamps 93 and moving the sheet forward until it reaches the gripping point of the cylinder. This movement is accelerated just before the paper reaches the gripping point, so that when it reaches that point, it

will be moving at the same speed as the cylinder when the grippers 127 close upon the sheet. In this starting movement of the sheet the clamps 93 are moved forward and the rollers 118 encounter cam-face 128 of lever 121 and are thereby caused to release the sheet so that the cylinder grippers can then take full control of it.

The lower feed table is provided with devices for registering and positioning the sheet and with devices for starting it after it has been registered, which are duplicates of those described in connection with the upper feed table and accomplish the same results, working, however, alternately in point of time with those of the upper feed table. With the double apparatus which I have described, I may employ any suitable sheet delivery, but I prefer to employ two separate deliveries, one of which will receive the sheets fed by the upper feed table, and the other will receive the sheets fed by the lower feed table. Because by thus connecting the two feeding mechanisms with separate deliveries, the sheets from one feed table will always be kept by themselves and are not mixed with those from the other table. The gages of the two feed tables are apt to vary from each other somewhat and consequently the sheets printed from one table will vary slightly from those printed from the other table. This becomes an immaterial matter, however, because the sheets from the upper table will be delivered by one delivery, while the sheets from the other table are delivered from the other delivery. The sheets from the upper table are passed over the impression cylinder 130 and are printed by the type cylinder 131 and passing off the impression cylinder on to the tapes 132 operated by the rolls 133 and 134. The tapes 132 are adapted to carry the sheet over on to the other tapes 135 passing over rolls 134, 136, 137, 138, 139, 140, 141, 142, and 143. Of these rolls, number 143 drives the tapes 135, and the rolls 136, 137 and 139 are moved from the positions given in Fig. 1 to the right, so as to extend the support by tapes 135. The tapes on their return are not traveling.

It will be noted that the tapes 132 receive the sheets from the top feed table from the bottom of the impression cylinder and that the tapes 170 receive the sheets from the lower table from the bottom of the delivery cylinder 145. By thus locating the receiving end of the tapes under the bottom of these cylinders, I am enabled to take advantage of the gravity of the sheets, which tends to deflect the sheet on to the tapes when passing these points.

At 190 upon the upper table is the usual guard for causing the stopping of the press when any sheet fails to reach the gages. It is mounted on a swinging arm 191 on

shaft 192 connected to the throw off lever 193 of the operating switch by the pitman 194. In the case of the lower table a similar guard 195 is employed, but this guard is located below the paper and works upward under impulse from spring 196 when any sheet fails to reach the gages. Guard 195 is connected to lever 193 by a pitman 197 and is supported by an arm not shown attached to shaft 198. Shafts 192 and 198 both carry arms 199, by which they are operated from the side gages in the usual manner.

Having thus described my invention I claim:

1. The combination in a printing press and with the printing mechanism thereof, of two feed tables delivering the sheets alternately to the printing mechanism at the same point and both provided with automatic feeding devices and with means for starting the sheet after it has been registered at the speed of the cylinder to which it is fed.

2. The combination in a printing press and with the printing mechanism thereof, of two feed tables delivering the sheets alternately to the printing mechanism at the same point and both provided with automatic feeding devices, and with means for moving the sheet from the registering devices to the printing mechanism, such means giving the sheet the speed of the printing mechanism.

3. The combination with the printing mechanism of two feed tables delivering the sheets at the same point, and embodying movable sections, and a single supply table from which the movable sections are alternately supplied with sheets.

4. The combination with the printing mechanism of two feed tables delivering the sheets at the same point and embodying movable sections, and mechanism for raising and lowering said movable sections, a single supply table from which the movable sections are alternately supplied with sheets, and means for feeding the sheets from the supply table to the movable sections.

5. The combination with the printing mechanism of a single paper supply table, two separate feed tables each embodying movable sections adapted to be moved into register with said supply table, means for moving said sections into register alternately, means for feeding the sheets from the supply table and means for feeding the sheets along the feed tables.

6. The combination with the printing mechanism, of a feed table and two registering tables adapted to receive the sheets alternately from the feed table and from which the sheets are alternately fed to the printing mechanism; and two sheet delivery mechanisms, one receiving the sheets fed

from one of the registering tables and the other receiving the alternate sheets fed from the other registering table.

7. The combination with a printing mechanism of two feed tables one above the other and adapted to deliver sheets alternately to the printing mechanism at the same point, means on each table for feeding the sheets to the printing mechanism, and mechanism for registering the sheets

8. The combination with a printing mechanism of two feed tables one above the other and adapted to deliver sheets alternately to the printing mechanism at the same point, means on each table for feeding the sheets to the printing mechanism, mechanism for registering the sheets; and two sheet delivery mechanisms one receiving the sheets fed by the upper table and the other receiving those fed by the lower table.

9. In a printing press the combination with printing mechanism, of two vibratory superposed tables adapted to alternately deliver sheets to be printed to the printing mechanism, sheet registering devices on each table, means for raising and lowering the tables, and means for moving the sheets after they have been registered to the printing mechanism.

10. In a printing press the combination with a cylinder, of two tables adapted to alternately deliver sheets to be printed to the cylinder at the same point, sheet registering devices on each table, means for raising and lowering the tables, and means for moving the sheets after being registered to the printing mechanism.

11. In a printing press the combination with a printing mechanism, of two superposed vibratory tables adapted to alternately deliver sheets to be printed to the same point, sheet registering devices on each table, automatic means for moving the sheets after they have been registered on to the printing mechanism, and means for raising and lowering the tables.

12. In a printing press the combination with an impression cylinder, of two superposed tables adapted to alternately deliver sheets to be printed to the cylinder at the same point, sheet registering devices on each table, automatic devices for feeding the sheets to the registering devices, means for raising and lowering the tables, and means for moving the sheets after being registered to the printing mechanism.

13. The combination with an impression cylinder, of a common feed table, two registering tables for supplying sheets from the feed table alternately to said cylinder at the same point, gages on each registering table for registering the sheets, and two sheet delivery mechanisms respectively receiving the sheets fed from the related feed tables.

14. The combination with the printing mechanism, of a single feed table and two parallel superposed registering tables adapted to receive the sheets alternately from said 5 feed tables, and deliver sheets alternately to the printing mechanism at the same point, substantially as described.

15. The combination with a printing mechanism, of a feed table and two adjacent 10 parallel superposed registering tables each provided with means for feeding and means for registering the sheets, and means for automatically shifting said tables so that they shall alternately deliver the sheets to 15 the printing mechanism, substantially as described.

16. The combination in a printing press, and with the printing mechanism thereof, of two parallel vibrating superposed feed tables 20 adapted to alternately feed sheets to be printed to the printing mechanism, and means for raising and lowering the delivery ends of the tables to alternately deliver the sheets to the printing mechanism.

17. The combination in a printing press and with the printing mechanism thereof, of two parallel superposed vibratory tables adapted to alternately feed the sheets to be 25 printed to the printing mechanism at the same point, automatic sheet feeding devices on each table, and means for raising and lowering the tables so that they shall alternately deliver the sheets to the printing mechanism.

18. The combination in a printing press of an impression cylinder, and a feed table; with 30 two parallel superposed vibrating registering tables adapted to deliver sheets to be printed to the cylinder, automatic feeding devices on each table, devices for positioning the sheets on each table in correct register, and means for shifting the tables so that they shall alternately deliver the sheets to the 35 same point of the impression cylinder.

19. The combination in a printing press of an impression cylinder, and two superposed parallel tables; with automatic feeding devices on each table, gages on each table 40 against which the sheets are positioned before delivery to the printing mechanism, and means for shifting the tables to cause them to alternately deliver sheets to the same point of the impression cylinder.

20. The combination with the printing mechanism, of two tables arranged one directly above and parallel with the other, 45 and each provided with means for registering the sheets, and means for delivering the

registered sheets alternately from said tables directly to the printing mechanism; with 60 two sheet delivery mechanisms, one receiving the sheets fed from one table, and the other receiving the sheets fed from the other table.

21. In combination with a continuously rotating impression cylinder, a plurality of 65 superposed devices for feeding sheets to be printed in alternation to said impression cylinder at the same point of its revolution, means for registering sheets on said devices prior to their delivery to the impression cylinder, and mechanism for removing the alternate 70 printed sheets from the cylinder at different points.

22. In combination with a continuously rotating cylinder, a plurality of feed tables 75 arranged one directly above and parallel with the other, devices thereon for registering the sheets, and means for alternately feeding the registered sheets from said tables to said impression cylinder at the same point in 80 its rotation; with a plurality of delivering mechanisms whereby the sheets from the different tables are delivered at different points.

23. In combination a continuously rotating impression cylinder, two tables arranged one directly above and parallel with the other, means for registering sheets thereon, 85 and devices for alternately feeding the registered sheets from said tables to said impression cylinder at the same point in its rotation; with two delivering mechanisms whereby the sheets from the said tables are separately delivered.

24. The combination with printing mechanism, of a feed table, gages for positioning the sheets on the table, and movable side clamps adapted to engage the margins of the sheets after being positioned, and deliver the sheets to the printing mechanism, and means 100 for opening and closing the clamps to take and release the sheets.

25. In a printing press the combination of printing mechanism, a feed table, a registering table, gages thereon adapted to arrest a 105 sheet, devices for feeding a sheet from the feed table to the registering gages, and movable side clamps adapted to engage the registered sheet and move it on to the printing mechanism, said clamps delivering the sheet 110 to the printing mechanism at the speed of such mechanism.

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