

June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 1

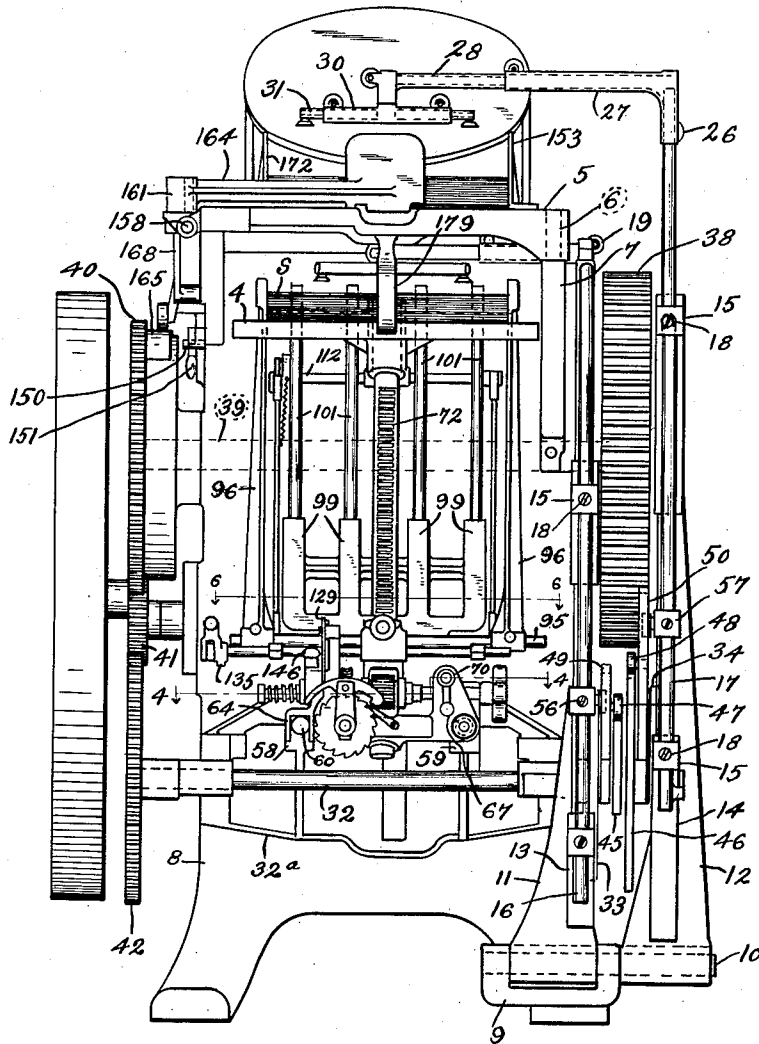


Fig. 1

INVENTOR.

Charles F. Root

BY

Jay, O'Brien & Jay
ATTORNEYS.

June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 2

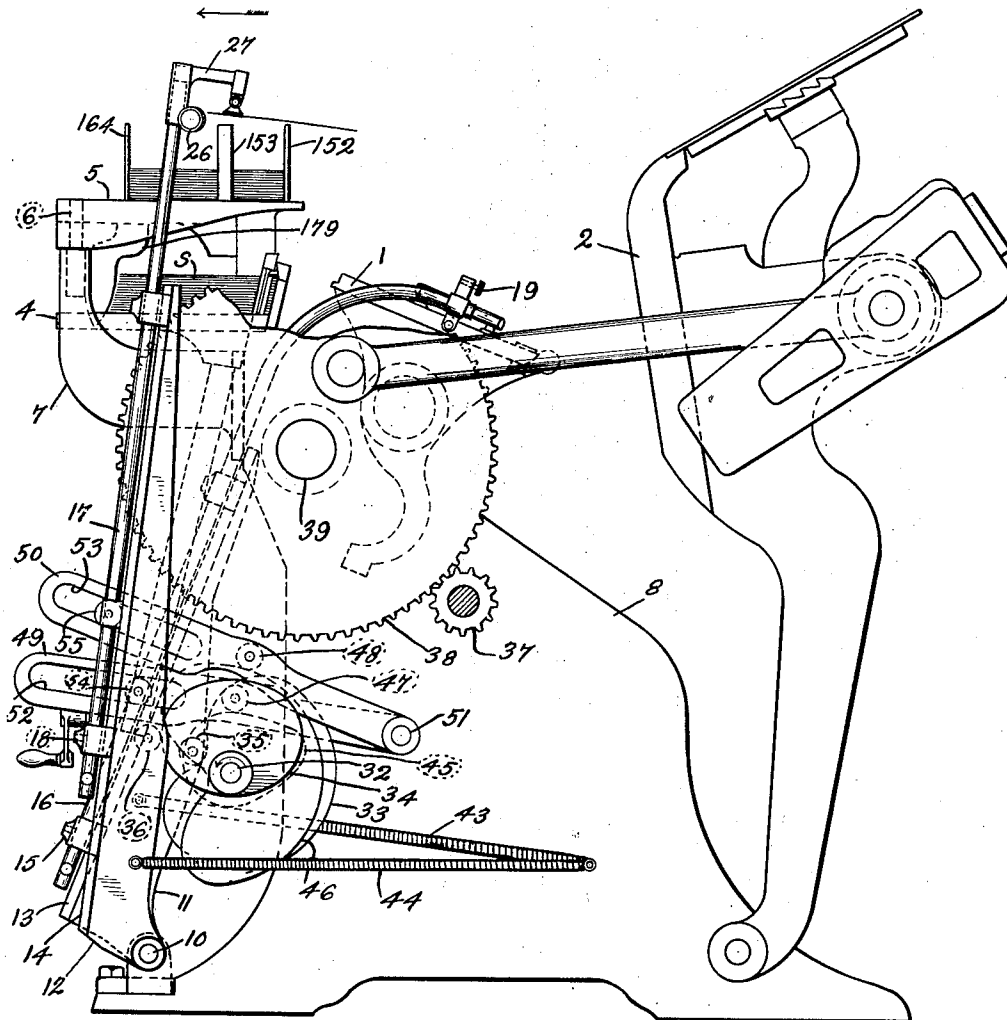


Fig. 2

INVENTOR.

Charles F. Root

BY

Day, O'Brien & Day
ATTORNEYS

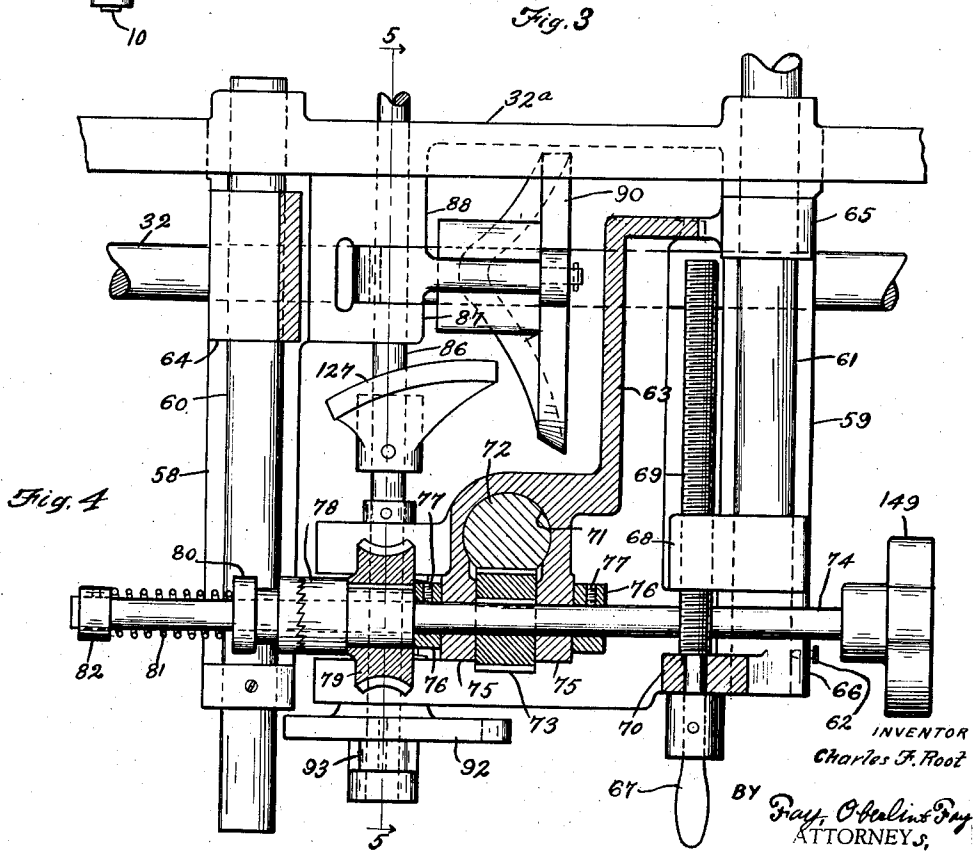
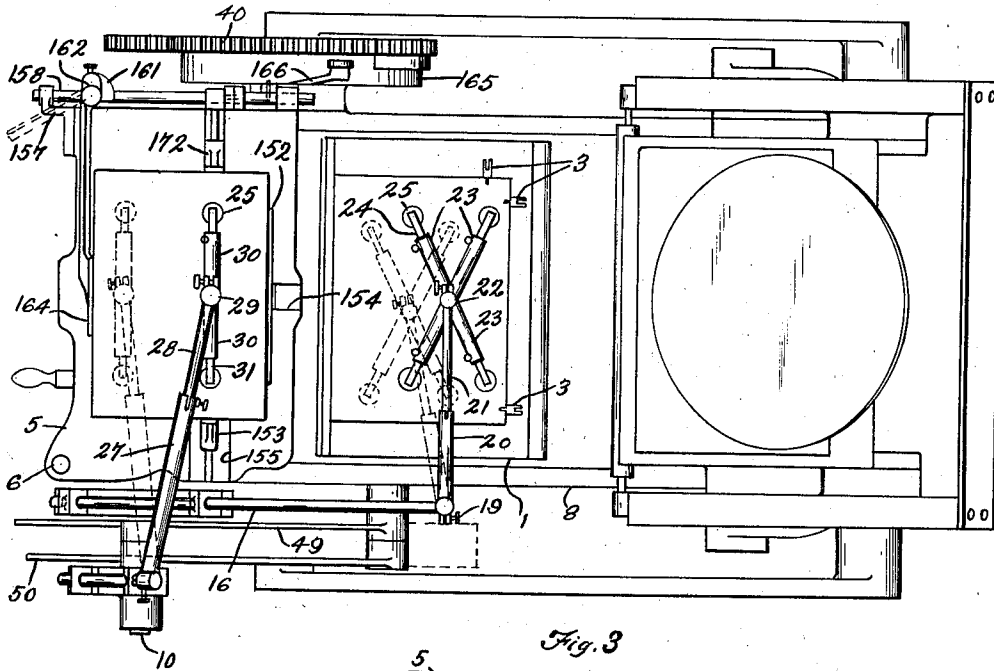
June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 3



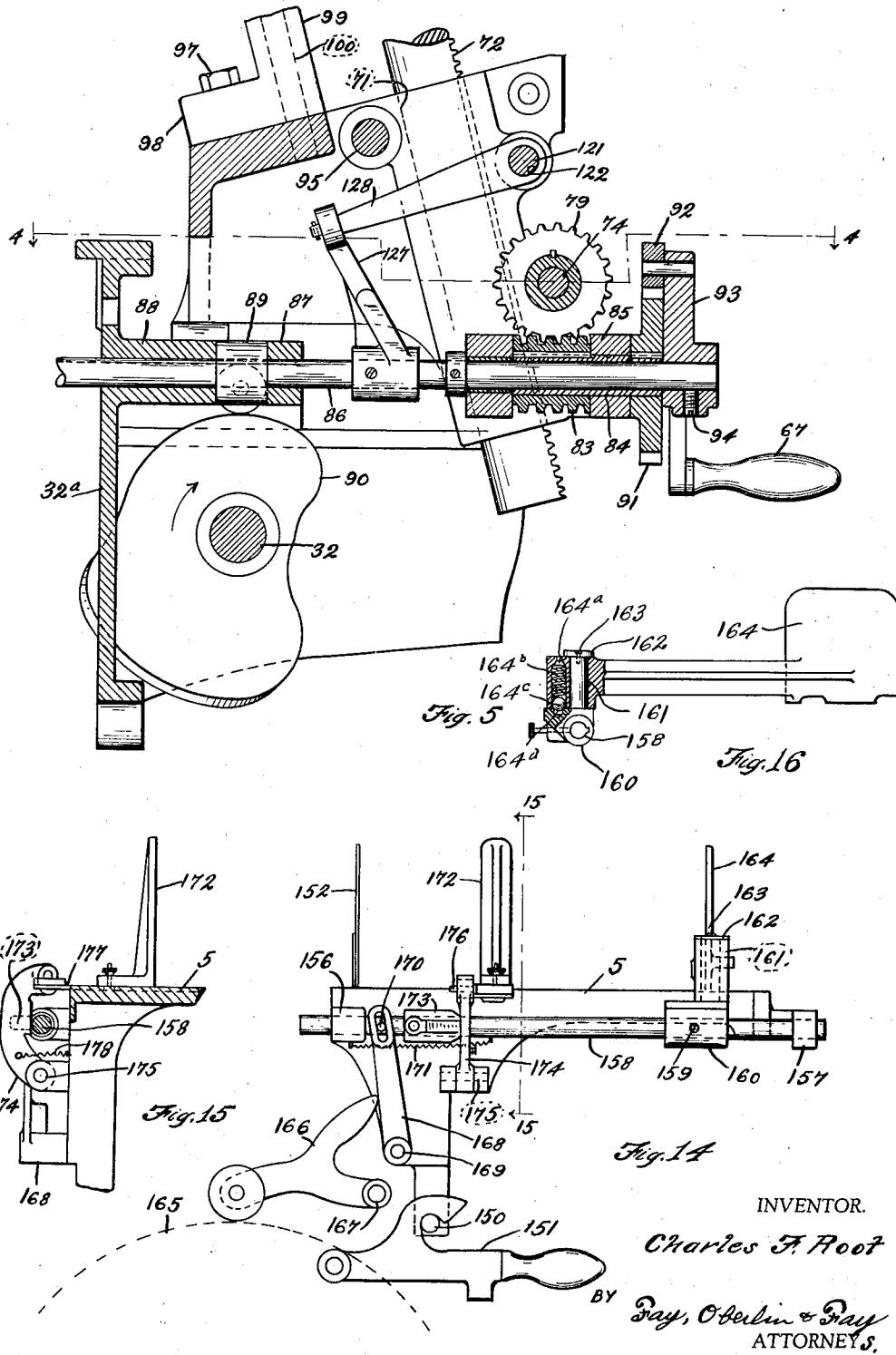
June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 4



June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 5

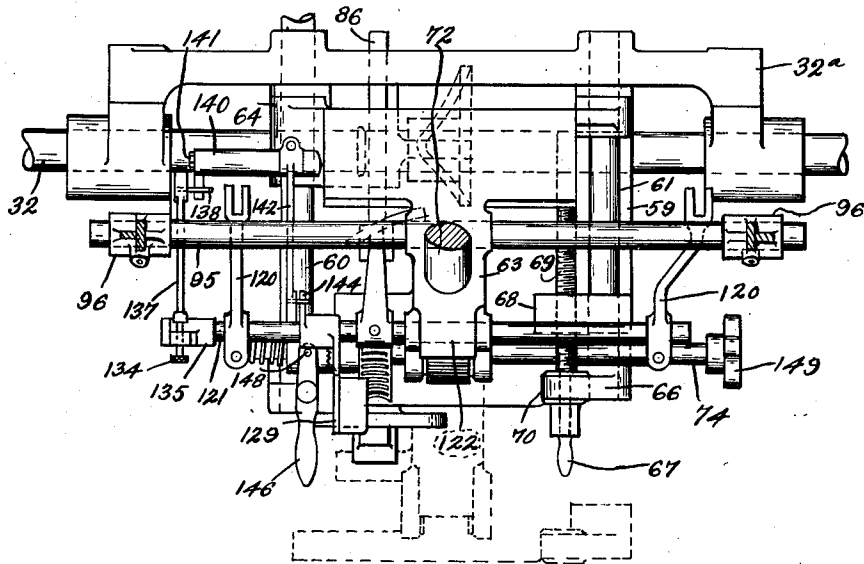


Fig. 6

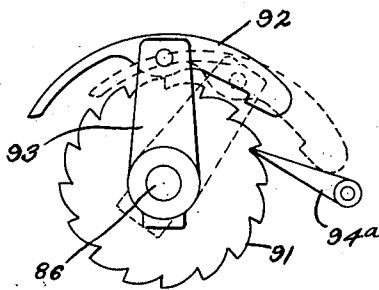


Fig. 13

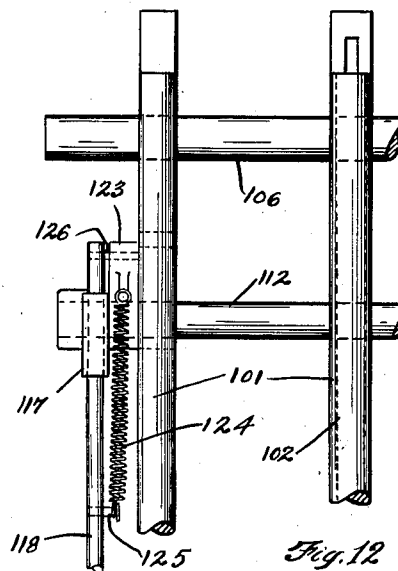


Fig. 12

INVENTOR.

Charles F. Root

BY

Ray, O'Brien & Ray
ATTORNEYS.

June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 6

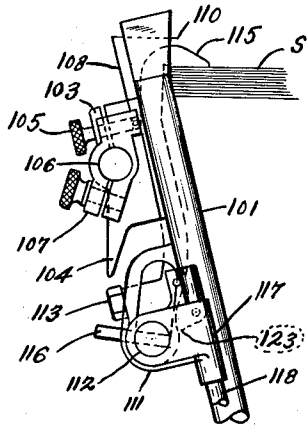


Fig. 10

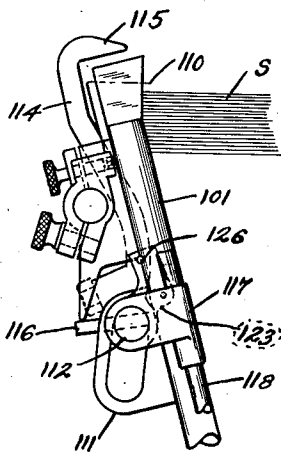


Fig. 9

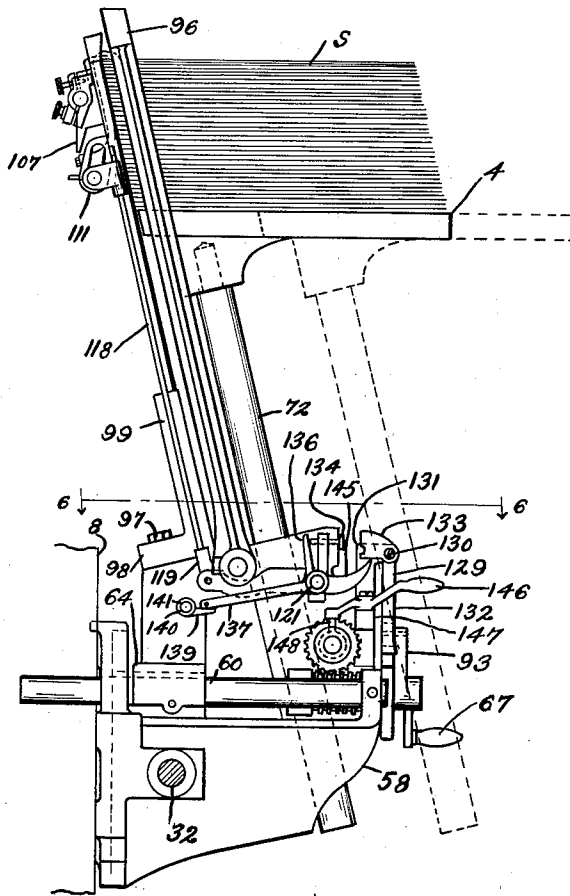


Fig. 7

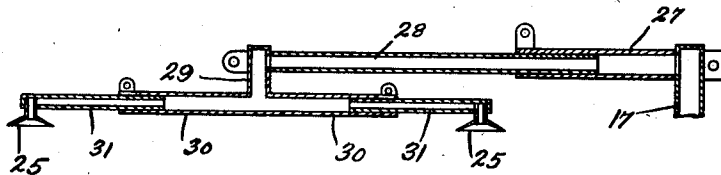


Fig. 17

INVENTOR.

Charles F. Root

BY

Fay, O'Brien & Fay
ATTORNEYS

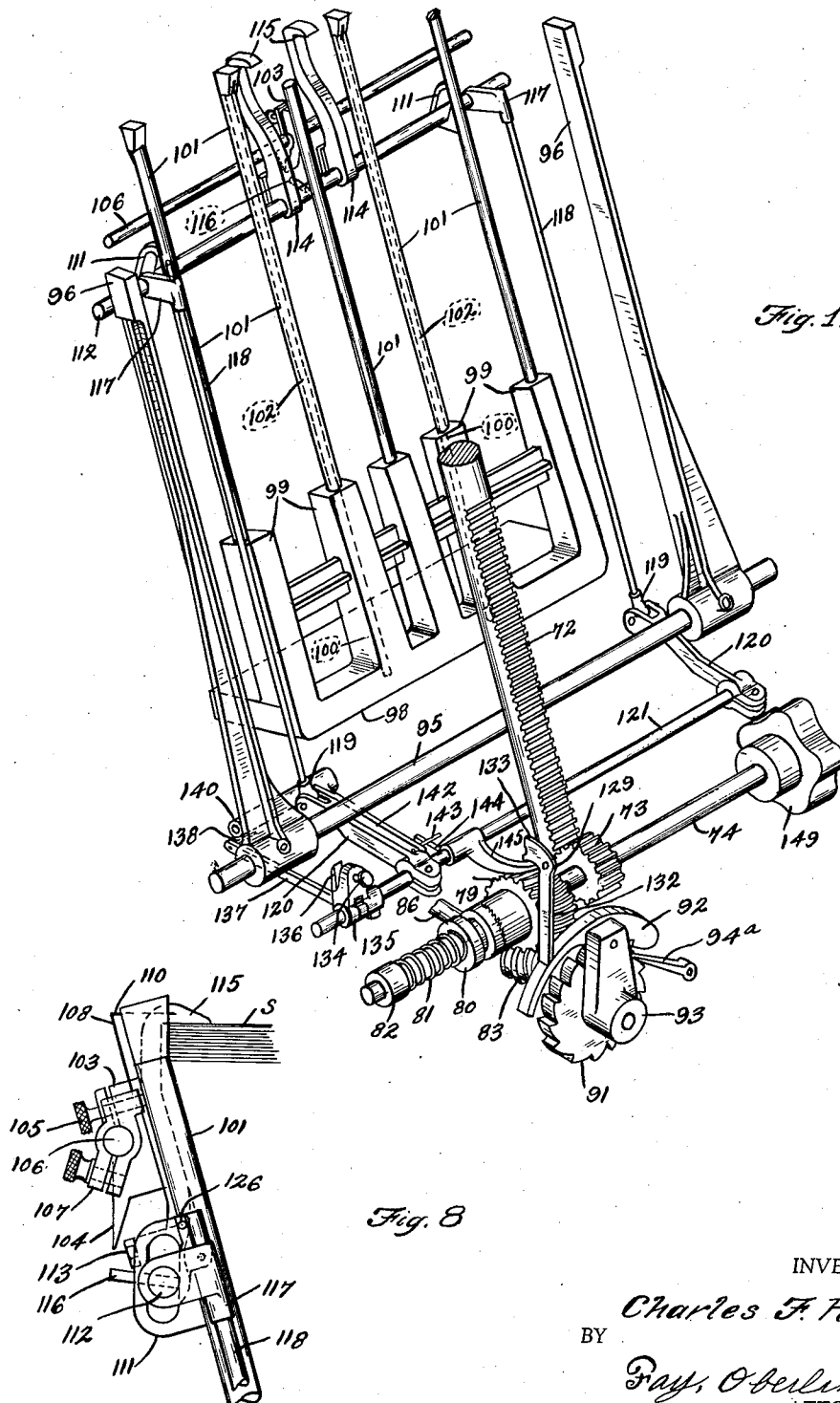
June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 7



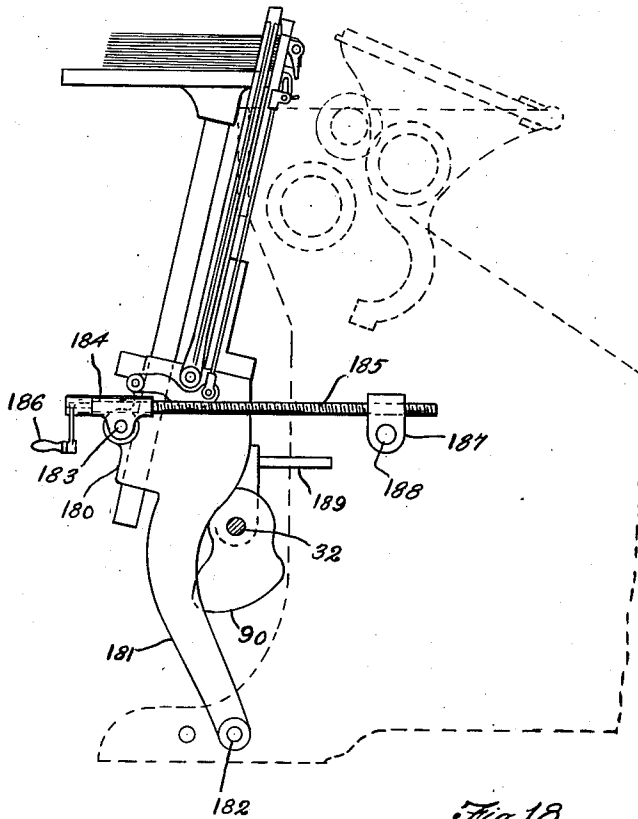
June 1, 1937.

C. F. ROOT

2,081,958

SHEET TRANSFERRING MECHANISM FOR PRINTING PRESSES

Original Filed Sept. 26, 1932 8 Sheets-Sheet 8



UNITED STATES PATENT OFFICE

2,081,958

SHEET TRANSFERRING MECHANISM FOR
PRINTING PRESSESCharles F. Root, Cleveland, Ohio, assignor to The
Chandler & Price Company, Cleveland, Ohio,
a corporation of OhioApplication September 26, 1932, Serial No. 634,875
Renewed July 3, 1936

28 Claims. (Cl. 271—62)

This invention relates, as indicated, to sheet transferring mechanism for printing presses, but has reference more particularly to sheet feeding and delivery mechanism for printing presses in which the printing couple consists of an oscillating platen and bed.

In the so-called "Rice" feeder, which is described in U. S. Patent No. 789,881, granted May 16, 1905, to Percy F. Rice, the paper-feeding-carrier means, as well as the paper-delivery-carrier means, each includes a vertically extending tubular arm which is disposed in front of the press and provided at its upper end with a pneumatic suction device. These arms are suitably mounted so as to permit of simultaneous vertical reciprocation and oscillation toward and from the press so as to enable the corresponding suction devices to feed blank sheets from a suitably located feed table to the platen and deliver the printed sheets to a delivery table located above such feed table. These arms are secured to slides, which are removably mounted on cam-operated rocking members, so that they may be removed from the machine when access to the platen and other parts of the press is desired.

While provision in the form of telescopic sucker tips is made in the pneumatic suction devices of the Rice mechanism for feeding different sizes of sheets, it will be noted that the stroke or length of the path of movement of the sheet-feeding arm is not adjustable, so that the sheets are necessarily always carried through approximately the same length of path or distance from the feed table onto the platen, and likewise from the latter to the delivery table. Since the feed table in Rice is integral with the frame of the press, and its position with respect thereto is not adjustable, it is necessary, in cases where sheets of various sizes are to be fed to the platen or where sheets are to be fed to different positions on the platen, to adjust the position of the guides or gauges 59 on the feed table to correspond with any changes which are made under these conditions.

The Rice mechanism, as described in the aforesaid patent furthermore included no provision for raising the pile of blank sheets as it was depleted, and the sucker device of the paper-feeding-carrier means accordingly was required to descend to a gradually lowered level as the pile of sheets was depleted, resulting in a corresponding amount of lost motion in the movement of the paper-feeding-carrier arm and requiring more or less frequent replenishing of the stock of blank sheets. In any case, there resulted a

loss of time, which materially reduced the capacity of the press.

The present invention has as its primary object the provision of sheet feeding and delivery mechanism for printing presses of the character described, which, while embodying certain features of the Rice feeder, is designed to increase the capacity and otherwise improve the advantages of such a feeder. Thus one of the objects of the invention is to provide increased flexibility of movement and adjustability of the sheet feeding and delivery assemblies with respect to the feed table and platen, and the arrangement of the arms which support these assemblies laterally of the table, whereby access to the platen and other parts of the press is at all times provided. Another object is to provide a floating feed table which may be bodily moved toward and away from the platen so that the position of the feed table with pile of sheets may be readily varied in accordance with the position of the feeder assembly and the position on the platen to which it is desired to deliver the sheets. Another object is to provide improved means for automatically elevating the feed table, regardless of its adjusted position as the stack of sheets thereon is depleted, so that the uppermost sheets in the stack are always presented to the sucker tips at substantially the same level and lost motion of the feeder supporting arm avoided. A further object of the invention is to provide an improved jogger mechanism for the delivery table whereby the printed sheets will be properly stacked as they are delivered to said table.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a front elevation of a printing press embodying the novel sheet transferring mechanism; Fig. 2 is a side elevation of the printing press; Fig. 3 is a plan view of the printing press; Fig. 4 is a view partly in elevation and partly in transverse section, taken on a plane substantially indicated by the line 4—4 of Figs. 1 and 5; Fig. 5 is a view, partly in elevation and partly in vertical section, taken on a plane substantially indicated

by the line 5—5 of Fig. 4; Fig. 6 is a view, partly in elevation and partly in transverse section, taken on a plane substantially indicated by the line 6—6 of Figs. 1 and 7, with certain parts omitted for clearness of illustration; Fig. 7 is a side elevation of the feeler and feed table elevating mechanism; Fig. 8 is a view, on an enlarged scale, of certain parts of the mechanism of Fig. 7, the feelers being shown in the position which they occupy prior to the removal of a sheet from the feed table; Fig. 9 is a view, similar to Fig. 8, but showing the feelers moved up and outwardly to permit removal of a sheet from the feed table; Fig. 10 is a view, similar to Fig. 8, but showing the approximate position of the feeler shaft when initiating automatic elevation of the feed table; Fig. 11 is a perspective view of the feeler and feed table elevating mechanism, with certain parts omitted for clearness of illustration; Figs. 12 and 13 are fragmentary details of portions of the mechanism shown in Fig. 11; Fig. 14 is a view in side elevation of the delivery table jogger mechanism; Fig. 15 is a cross-sectional view of the jogger mechanism, taken on a plane substantially indicated by the line 15—15 of Fig. 14; Fig. 16 is a detail view, partly in cross-section, showing the manner in which the back jogger is mounted; Fig. 17 is a detail cross sectional view of the sheet delivery assembly; Fig. 18 is a view similar to Fig. 2, but showing a modification of the feed table mounting; and Fig. 19 is a view similar to Fig. 5, but showing the feed table mounting of Fig. 18.

The press, as illustrated in the drawings, is of the familiar platen or Gordon type, and includes a platen 1, on which the sheet to be printed is positioned, and a bed 2 which supports the chase (not shown) in which the form is carried, the platen and bed being conjointly oscillated in a well-known manner to cause the sheet to be printed. The platen is provided with the usual gauge pins 3 for properly positioning the sheet on the platen, the position of the gauge pins being varied in accordance with the size of the sheet or the selected part of the platen to which it is desired to feed the sheet.

The stack of sheets S to be printed is supported on a feed table 4, and the printed sheets are delivered to a table 5 positioned above the feed table and mounted on a swivel post 6 seated in a bracket 7, which is bolted or otherwise secured to the frame 8 of the press. This swivel mounting for the delivery table permits the table to be swung laterally of the frame when access to the platen is desired.

For the purpose of feeding the sheets from the feed table to the platen and delivering them from the platen to the delivery table, suitable sheet transferring mechanism is provided, which may be briefly described as follows:

Secured to one of the front supporting legs of the frame 8 of the machine is a U-shaped bracket 9, the arms of which support a short shaft 10 on which are loosely pivoted oscillatable members 11 and 12. Members 11 and 12 are respectively provided with portions 13 and 14 which serve as guides for slide members 15, in which hollow tubular members 16 and 17 are adjustably secured, as by means of set screws 18. The upper portion of the member 16 is curved inwardly, the curved portion lying in a plane parallel with the side of the press, and has removably secured thereto, as by means of a clamp screw 19, an angularly adjustable hollow suction feeder assembly which, as most clearly shown in Fig. 3,

comprises a socket 20, a feed bar 21 telescopically mounted in and adjustable longitudinally of the socket, a frame having a central post 22 adapted to be clamped in any desired angular position, to the feed bar and provided with tubular arms 23 radiating from the central post and arms 24 telescopically mounted in and adjustable longitudinally of the arms 23 and provided at their outer ends with the usual sucker tips 25. By assembling the various parts of the suction feeder in the aforesaid manner, a high degree of adjustability is secured, whereby sheets of various sizes may be handled in the press and transferred to any desired position on the platen. One adjustment of the feeder assembly is indicated by the dotted lines in Fig. 3.

As most clearly shown in Figs. 3 and 17, the member 17 likewise has removably secured thereto, as by means of a clamp screw 26, an angularly adjustable hollow suction delivery assembly, which comprises a socket 27, a delivery bar 28 telescopically mounted in and adjustable longitudinally of the socket, a frame having a central post 29 adapted to be clamped in any desired angular position to the delivery bar and provided with tubular arms 30 radiating from the central post, and arms 31 telescopically mounted in and adjustable longitudinally of the arms 30 and provided at their outer ends with the usual sucker tips 25. This assembly, like that of the suction feeder affords a high degree of adjustability, one adjustment of the delivery assembly and the frame being indicated by the dotted lines in Fig. 3.

In order to move the sheet feeding and delivery suction devices in the arcuate paths which they follow in feeding the sheets from the stack S to the platen and returning the printed sheets to the delivery table, mechanism is provided for oscillating the members 11 and 12, and simultaneously imparting reciprocal movement to the members 16 and 17 along the members 11 and 12. Such mechanism includes a shaft 32, which is journaled in suitable bearing portions of a bracket 32a, which is secured to the front face of the frame 8 of the press, and has secured thereto adjacent one end cams 33 and 34 which respectively operate against rollers 35 and 36 mounted on the respective members 11 and 12 to rock these members to their outermost position, when the cam shaft is rotated in a counterclockwise direction as viewed in Fig. 2. Rotation of the shaft 32 is effected by the driving motor (not shown) of the press through the intermediary of pinion 37, large gear 38, main drive shaft 39, gear 40, idler gear 41, and gear 42, which is secured to the shaft 32. Extension springs 43 and 44, secured to the frame 8 of the press act to maintain the members 11 and 12 in engagement with the surfaces of the cams 33 and 34.

The shaft 32 is also provided with cams 45 and 46 which respectively operate against rollers 47 and 48 secured to levers 49 and 50, which are pivotally mounted on a pin 51 extending laterally from the frame 8. These levers are respectively provided with slots 52 and 53, which form guide-ways for rollers 54 and 55. These rollers are respectively journaled on collars 56 and 57 adjustably secured to the members 16 and 17, so that when the levers 49 and 50 are oscillated by the cams 45 and 46, the members 16 and 17 will be reciprocated, as well as oscillated, and thereby move the sheet feeding and delivery devices, as stated.

It will be noted that the major portion of the

sheet feeding and delivery mechanism is positioned laterally of the press. This arrangement permits access to the platen and other parts of the press at all times and permits the printing operations to be observed more clearly from the front of the press than would be the case if the members 16 and 17 were positioned directly in front of the press.

As previously stated, the position of the sheet feeder assembly may be varied with respect to the platen, and since the stroke or length of the path of movement of the feeder assembly is fixed, it becomes necessary to adjust the position of the feed table with respect to the platen so as to coordinate such position with any adjustment of the feeder assembly. For this purpose, the mechanism which is now to be described is provided.

The bracket 32a, on which is journaled the cam shaft 32, is provided with transversely spaced brackets 58 and 59. Rigidly secured to the bracket 58 is a smooth rod 60, which constitutes a guide for the feed table supporting frame 63, the bifurcated leg 64 of which straddles the rod. The feed table supporting frame 63 is provided with spaced collars 65 and 66, to the latter of which is rigidly secured, as by means of a set screw 62, a smooth rod 61, which extends through the rear portion of the bracket 32a and an aperture in an extension 68 integral with the bracket 59.

Secured to an extension 70 of the collar 66, as by means of a crank 67, is a screw 69, which is in threaded engagement with the extension 68, whereby rotation of the screw by the crank will cause the frame 63 to be bodily moved towards or away from the frame 8 of the press. The extent of outward movement of the frame 63 is indicated by the dotted lines in Fig. 7.

As the stack of sheets S on the feed table becomes depleted, it is desirable to elevate the feed table so as to bring the level of the uppermost sheets in the stack to a position in which they can be readily lifted by suction applied through the sucker tips 25. For this purpose, the following mechanism is employed.

Extending in an inclined position through an aperture 71 (see Figs. 4 and 5) in the frame 63 is a rack 72, upon the upper end of which is supported the feed table 4. This rack is in mesh with a pinion 73 which is keyed to a shaft 74 mounted in spaced bearing portions 75 of the frame 63, whereby rotation of said shaft serves to raise or lower the rack. The shaft 74 is locked against axial movement by means of collars 76 which are fixed to the shaft by set screws 77 and are in abutment with the outer faces of the bearing portions 75 of the frame 63. Loosely sleeved on the shaft 74 adjacent one of the collars 76 is a ratchet 78, to which is keyed a worm gear 79. Keyed to the shaft 74, but slidable longitudinally thereof, is a ratchet 80, the teeth of which are normally maintained in engagement with the teeth of the ratchet 78 by means of a compression spring 81, which is sleeved on the shaft 74 between the ratchet 80 and a collar 82 secured to one end of the shaft.

Worm gear 79 is in mesh with a worm 83 which is keyed to a sleeve 84 which extends through and beyond a bearing portion 85 of the frame 63 and is loosely mounted on a shaft 86 extending transversely of the shaft 74. The rear portion of shaft 86 extends through spaced bearing portions 87 and 88 of the bracket 32a and has keyed thereto between said bearing portions a lever 89, one end of which bears against the face of a cam 90,

which is suitably clamped to the cam shaft 32. While the lever 89 is keyed to the shaft 86, the keyway in the shaft is sufficiently long to permit the shaft to move coincidentally with the back and forth adjustment of the frame 63. Keyed to the portion of the sleeve 84 which projects beyond the bearing portion 85 of the frame 63 is a ratchet wheel 91, the teeth of which are adapted to be engaged by a pawl 92 loosely pivoted on a carrier 93 which is secured, as by a set screw 94 to the outer end of the shaft 86.

At such intervals when the pawl 92 is in engagement with the teeth of ratchet wheel 91, the cam 90, upon each revolution thereof, which corresponds to the removal of one sheet from the feed table 4, will rock the lever 89 towards the observer, as the lever is viewed in Fig. 4, thereby causing the pawl to rotate the ratchet wheel, and, through the medium of the worm 83, worm wheel 79, shaft 74 and pinion 73, raise the feed table 4 a short distance. With each rocking movement of the lever 89, the ratchet wheel 91 will normally be rotated by the pawl through an arc corresponding to a number of successive teeth on the wheel. In some cases, however, it is desirable to reduce the extent of movement of the feed table, and for this purpose, an additional pawl 94a is provided, which, as shown in Fig. 13, is pivotally mounted on the frame 63 and may be thrown over into engagement with the ratchet wheel 91. When so engaged with the ratchet wheel 91, the pawl 92, during its sliding movement over the teeth of the ratchet wheel and after it has moved through an arc smaller than its usual arc of movement, will slide outwardly on the upper surface of the pawl 94a, as indicated by the dotted line position in Fig. 13, and remain in such position until the next rocking movement of the lever 89, whereupon it will again engage the ratchet wheel, but rotate such wheel through the aforesaid smaller arc. This feature is of advantage in the printing of very thin sheets, where the stack of sheets on the feed table is depleted more slowly than in the case of thicker sheets.

Means are also provided for normally holding the pawl 92 out of engagement with the ratchet wheel 91, but before proceeding with the description of such means, certain other elements which are associated with the feed table unit, will be described.

Extending through a transverse aperture in the frame 63 is a shaft 95, the ends of which project from the sides of the frame and carry side guide fingers 96, which are adjustable along the shaft to conform with the width of the stack of sheets on the feed table 4.

Secured to the upper surface of the frame 63, as by means of cap screws 97, is a front stop 98, having posts 99 extending upwardly therefrom in an inclined direction substantially parallel with the rack 72. As shown in Fig. 11, five such posts are provided, those intermediate the end and middle posts having longitudinally extending apertures 100 for the passage of an air blast therethrough for a purpose to be presently described.

Extending upwardly from the posts 99 are front guide fingers 101 which serve as an abutment for the front edge of the stack of sheets on the feed table. The intermediate guide fingers are provided with axially extending apertures 102, which are in alignment with the apertures 100 in the posts 99, and which are directed outwardly at their upper ends against the edges of the up-

permost sheets in the stack so that a blast of air may be directed through such apertures at intervals coinciding with the removal of a sheet from the stack, whereby the uppermost sheets in the stack will be caused to flutter, overcoming cohesion between the sheets and facilitating removal of only one sheet at a time.

As previously stated, means are provided for normally holding the pawl 92 out of engagement with the ratchet wheel 91, and for permitting engagement of the pawl therewith at intervals when the stack of sheets on the feed table has been partially depleted. Such means constituting the so-called feeler mechanism will now be described, with attention directed more particularly to Figs. 6 to 12, inclusive.

The central guide finger 101 terminates short of the other guide fingers and has secured thereto adjacent its upper end, as by brazing or other means, a clip 103 having a downwardly and outwardly extending trip finger 104. Clamped in clip 103, as by means of a clamp screw 105 is a shaft or rod 106, which supports at spaced points thereon two or more holders 107 in which wires 108 of flexible spring-like metal are clamped. As clearly shown in Figs. 8, 9 and 10, each of these wires has a rebent portion 110 which overlies the uppermost sheet in the stack and acts as a stripper finger for the sheets, that is to say, it flexes to permit removal of the uppermost sheet, but immediately springs back into position to prevent removal of underlying sheets, which might otherwise be lifted with the uppermost sheet, as the result of the temporary vacuum created by the removal of the uppermost sheet.

The outermost guide fingers 101 have secured thereto, as by brazing or other means, slotted clips 111 which serve as guides for a feeler shaft 112. Clamped to this feeler shaft at points adjacent its center, as by means of clamp screws 113, are feelers 114, having hook-like ends 115, which normally rest on the stack of sheets, as shown in Fig. 8, but are adapted to be moved upwardly and outwardly, as shown in Fig. 9, to permit the removal of sheets from the stack. Extending rearwardly from the center of the feeler shaft is a pin 116.

The feeler shaft 112 is journaled in brackets 117 which are secured to the upper ends of rods 118, which, in turn, are secured at their lower ends to sockets 119. Sockets 119 are pivotally connected to the bifurcated ends of levers 120, which are clamped to a shaft 121 which extends through an aperture 122 in the frame 63. As more clearly shown in Fig. 12, a collar 123 is clamped to shaft 112 at a point adjacent one of the brackets 117, and has secured thereto one end of an extension spring 124, the other end of which is secured to a pin 125 extending laterally from one of the rods 118. This spring tends to rock the feeler shaft in a clockwise direction to the position shown in Fig. 8, wherein the hook-like ends 115 of the feelers 114 overlie the stack of sheets on the feed table 4. A pin 126 extending laterally from the collar 123 is adapted to strike the upper end of the rod 118 and thereby limits the extent of clockwise movement of the feeler shaft.

Coincidentally with the removal of a sheet from the stack, the feelers 114 must be moved upwardly and outwardly from the stack to the position shown in Fig. 9, and for this purpose, the feeler shaft must be rocked in a counter-clock-

wise direction. This is accomplished in the following manner.

As shown in Figs. 4 and 5, shaft 86 has keyed thereto intermediate its ends a fan cam 127, which, upon each rocking movement of the shaft, rocks a lever 128 which is rigidly secured to shaft 121, and rotates the latter in a clockwise direction, as viewed in Fig. 5, this movement resulting in an elevation of the feeler shaft 112. As feeler shaft 112 approaches the upper ends of the slots in clips 111, the pin 116 of the feeler shaft strikes the trip finger 104, thereby rocking the shaft in a counter-clockwise direction against the tension of spring 124, and causing the feelers 114 to move outwardly to the position shown in Fig. 9, wherein they will not interfere with the removal of the sheet from the stack.

As previously stated, the pawl 92 is normally held out of engagement with ratchet wheel 91, so that the feed table 4 will not be elevated. For this purpose, a lever 129 is provided, which is pivoted, as at 130, to a post 131, which is secured to and extends upwardly from the bearing portion 85 of frame 63. As clearly shown in Figs. 7 and 11, lever 129 has a long arm 132 and a short arm 133, the short arm being sufficiently weighted to cause the long arm to normally hang vertically, in which position it rests on the rearwardly extending portion of pawl 92 and holds the pawl out of engagement with the teeth of the ratchet wheel 91.

As the stack of sheets on the feed table is depleted, it is necessary at frequent intervals, to elevate the feed table so as to bring the level of the uppermost sheets in the stack to a position in which they may be readily lifted by suction applied through the suction tips 25.

This is accomplished by tripping the lever 129 sufficiently to permit the pawl 92 to drop, by gravity, into engagement with the teeth of the ratchet wheel 91. For the purpose of so tripping the lever, the following mechanism is employed.

As the stack of sheets is depleted, the feelers 114 will follow the receding stack and permit the feeler shaft 112 to move downwardly in the slots in clips 111. As the shaft 112 approaches the lower end of these slots, see Fig. 10, the extent of counter-clockwise rotation of shaft 121 will be sufficient to cause a screw 134 secured in a collar 135 which is clamped to shaft 121 to strike arm 136 of a lever 137. Lever 137 is loosely mounted on shaft 121 and has a laterally extending pin 138 which depresses an arm 139 of a lever 140 which is loosely journaled on a stud 141 extending laterally from the frame 63. Depression of arm 139 causes lever 140 to rock and depress a lever arm 142 which is clamped to the opposite end of lever 140, thereby causing a pin 143 extending laterally from the free end of arm 142 to depress rearwardly extending arm 144 of a trigger 145, which is loosely sleeved on shaft 121. As trigger 145 rises, it trips the lever 129 and permits the pawl 92 to drop by gravity into engagement with the teeth of the ratchet wheel 91, thereby permitting elevation of the feed table to the desired level. When the feed table reaches the desired level, the feelers 114 have risen sufficiently to break the contact of screw 134 with arm 136, and trigger 145 will drop by gravity, thereby permitting the arm 132 of lever 129 to assume its vertical position wherein it holds the pawl 92 out of engagement with the teeth of ratchet wheel 91. By adjusting the position of screw 134, the proximity of the sucker

tips to the uppermost sheet in the stack can be varied, it being desirable in the case of thick sheets to have the sucker tips in closer proximity to the sheets than in the feeding of thin sheets, which are lifted more easily than thick sheets.

Mechanism is also provided to permit the feed table to be rapidly lowered when desired or to be raised more quickly than by means of the automatically operating mechanism. This mechanism includes a handle 146 which is pivotally mounted on a laterally extending arm 147 of post 131, and which is provided with a downwardly extending pin 148. Upon suitable rotation of handle 146 about its pivotal mounting, pin 148 thereof engages ratchet 89 and forces it out of engagement with ratchet 78. By holding the ratchet 80 disengaged in this manner the shaft 74 may be manually rotated to raise or lower the feed table 4, as by means of a knob 149 secured to one end of the shaft.

Referring now to the delivery table and the mechanism associated therewith, it will be seen, upon reference to Fig. 1, that the delivery table 5 is positioned above the feed table 4 and is mounted on a swivel post 6 seated in a bracket 7, which is bolted or otherwise secured to the frame 8 of the press. This swivel mounting permits the table to be swung laterally of the frame when access to the platen is desired. Upon swinging the table to its operative position, however, a pin 150 extending laterally therefrom engages a latch lever 151 which is pivotally connected to the frame of the press and is held in latched engagement by said lever, as shown in Fig. 14.

Mounted on the delivery table 5 is a front jogger 152 and a side jogger 153, these joggers constituting abutments for the front and one side respectively of the stack of sheets which is delivered to the table. These respective joggers are adjustably slidable in slots 154 and 155 provided therefor in the upper surface of the delivery table.

Mounted in a bearing portion 156 of the table and in a bracket 157 secured to the table is a slide rod 158, which has secured thereto adjacent one end thereof, as by means of a set screw 159, a collar 160 having a post 161 extending upwardly therefrom. Secured to this post, as by a washer 162 and screw 163 is a back jogger 164. This jogger is adapted to be reciprocated by reciprocation of rod 158, which is accomplished by a cam 165 secured to gear 40. With each revolution of cam 165, a cam lever 166, which is pivotally mounted, as at 167, on the frame of the press, is rocked in a clockwise direction, as viewed in Fig. 14, thereby similarly rocking a lever 168 which is pivoted to the delivery table, as at 169. This lever is slotted at its free end to receive a stud 170. Return movement of rod 158 is obtained by means of an extension spring 171 which is secured to the bearing portion 155 and to the rod 158. The mounting boss of the back jogger 164 has formed therein a recess 164a in which is disposed a compression coil spring 164b, which bears against a ball 164c. This ball normally rests in a seat 164d in the collar 160, but may be pushed upwardly by the upper surface of the collar and against the tension of the spring 164b to permit the back jogger to be swung outwardly into parallelism with the side joggers when it is desired to remove a stack of printed sheets from the delivery table.

Upon each rearward movement of the rod 158, a side jogger 172 is adapted to be simultaneously moved laterally of the delivery table. Such move-

ment is obtained through the medium of a cam 173 which is rigidly sleeved on the rod 158, and which is adapted to rock a lever 174, which is pivoted to the delivery table, as at 175. This lever has a slotted free end, in which is received a pin 176, which is secured to the lower end of a slide plate 177 which carries the jogger 172. Return movement of lever 174 is obtained by means of an extension spring 178 which is secured to the lever and to the side of the delivery table.

The reciprocal movement of joggers 164 and 172 serves to square the printed sheets as they are transferred to the delivery table and insures proper stacking of such sheets.

Extending downwardly from the delivery table is a longitudinally adjustable member 179 which serves as a back support for the stack of sheets on the feed table so as to maintain the stack in engagement with the front guide fingers 101.

In Figs. 18 and 19 is shown a modification of the feed table mounting, wherein the feed table supporting frame is pivotally mounted and the movement of the feed table towards and away from the main frame is accomplished by oscillation of the supporting frame about its pivotal mounting.

The feed table supporting frame 180 is provided with legs 181 which are pivotally secured as at 182 to the feet of the main frame of the press. Pivotally mounted on a shaft 183, which corresponds with the shaft 74 in the hereinbefore described form of the invention, is a sleeve 184 through which passes the reduced end of a screw 185, the screw being rotatable in the sleeve by means of a crank 186. The rear end of the screw 185 is in threaded engagement with a sleeve 187, which is pivotally mounted on the rocker lock shaft 188 of the press. By suitable rotation of the crank 186, the feed table supporting frame may be oscillated about its pivotal mounting and the feed table moved towards and away from the main frame of the press.

In order to permit free movement of the various parts of the feed table supporting frame and its associated mechanism, the shaft 189, which corresponds with the shaft 86 (see Fig. 5) is made in two parts which are interconnected by a knuckle joint 190, and the rear portion of this shaft is keyed to a bifurcated support 191, which is pivotally mounted on the cam shaft 32 of the feeder.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, the combination with the main supporting frame of a press, of an elevator table adapted to support sheets to be printed, means for movably supporting said table, and means for moving said table supporting means relatively to said frame and about a horizontal axis to occupy different sheet feeding positions.

2. In mechanism of the character described, the combination with the main supporting frame of a press, of an auxiliary frame movably mounted on the front of said main frame and adapted to support an elevator sheet-feeding table, and means for moving said auxiliary frame towards or away from said main frame and about

a horizontal axis to occupy different sheet feeding positions.

3. In mechanism of the character described, the combination with the main supporting frame of a press, of an auxiliary frame adapted to support an elevator sheet-feeding table and mounted for pivotal movement about a horizontal axis and means for moving said auxiliary frame relatively to said main frame to occupy different sheet feeding positions.

4. In mechanism of the character described, the combination with the main supporting frame of a press, of an auxiliary frame adapted to support an elevator sheet-feeding table and mounted on the front of said main frame for pivotal movement about a horizontal axis and means for moving said auxiliary frame towards or away from said main frame to occupy different sheet feeding positions.

5. In a printing press of the character described, the combination of a table for supporting sheets to be printed, means for transferring sheets from said table to the platen of said press, a shaft having cams thereon for actuating said sheet transferring means, and another cam on said shaft for elevating said table.

6. In a printing press of the character described, the combination of a table for supporting sheets to be printed, means for transferring sheets from said table to the platen of said press, a shaft having cams thereon for actuating said sheet transferring means, and another cam on said shaft for intermittently elevating said table.

7. In a printing press of the character described, the combination of a table adapted to support the sheets to be printed, a table disposed above said first table and adapted to receive the printed sheets, pivotal mounting means for said sheet-receiving table adapted to permit swinging of the table laterally of the press, and latching means for maintaining the table in sheet-receiving position.

8. In a printing press of the character described, the combination of a table adapted to receive the printed sheets, pivotal mounting means for said table adapted to permit swinging of the table laterally of the press, guides mounted on said table, and means for automatically jogging said guides when the table is in sheet receiving position.

9. In a printing press of the character described, the combination of a table adapted to receive the printed sheets, pivotal mounting means for said table adapted to permit swinging of the table laterally of the press, latching means for maintaining the table in sheet-receiving position, guides mounted on said table, and means for automatically jogging said guides when the table is in sheet-receiving position.

10. In a printing press of the character described, the combination with the main supporting frame of the press, of independent means for respectively feeding sheets to and delivering them from the platen of said press, and arms for supporting said means, said arms being oscillatable in planes spaced laterally of said frame.

11. In a printing press of the character described, a frame, a platen and sheet transfer means, said means comprising an arm oscillatable in a plane spaced laterally of said frame, a member secured to said arm and angularly adjustable with respect to the plane of oscillation of said arm, and a suction feeder device mounted on the free end of said member and angularly adjustable with respect to said member.

12. In mechanism of the character described, the combination with the main frame of a press, of a member mounted on said frame and provided with spaced bracket portions, a guide rod rigidly mounted on one of said bracket portions, a threaded extension on the other bracket portion, an auxiliary frame adapted to support a sheet-feeding table, a screw secured to said auxiliary frame and in engagement with said threaded extension, and means for rotating said screw to move said auxiliary frame along said guide rod to occupy different sheet feeding positions.

13. In mechanism of the character described, the combination with the main frame of a press, of a member mounted on said frame and provided with spaced bracket portions, a guide rod rigidly mounted on one of said bracket portions, a threaded extension on the other bracket portion, an auxiliary frame adapted to support a sheet feeding table, said auxiliary frame having a portion straddling said guide rod and provided with a rod guided in said extension, a screw secured to said auxiliary frame and in engagement with said threaded extension, and manually operable means for rotating said screw whereby to move said auxiliary frame with respect to said main frame so as to occupy different sheet-feeding positions.

14. In mechanism of the character described, the combination with the main frame of a press, of an auxiliary frame adapted to support a sheet-feeding table and mounted on said main frame for pivotal movement in a vertical plane, and means for imparting such movement to said auxiliary frame whereby to cause it to occupy different sheet-feeding positions.

15. In mechanism of the character described, the combination with the main frame of a press, of an auxiliary frame adapted to support a sheet-feeding table and mounted on said main frame for pivotal movement in a vertical plane, and a manually operable screw for imparting such movement to said auxiliary frame whereby to cause it to occupy different sheet-feeding positions.

16. In mechanism of the character described, the combination with the main frame of a press, of an auxiliary frame, means for moving said auxiliary frame towards and away from said main frame, a rack mounted on said auxiliary frame, a table mounted on said rack, a shaft journaled in said auxiliary frame and having a pinion in engagement with said rack, and means for intermittently rotating said shaft to elevate the table irrespective of the position of said auxiliary frame with respect to said main frame.

17. In mechanism of the character described, the combination with the main frame of a press, of an auxiliary frame, means for moving said auxiliary frame towards and away from said main frame, a rack mounted on said auxiliary frame, a table mounted on said rack, a shaft journaled on said auxiliary frame and provided with a knob and a pinion in engagement with the rack, a ratchet loosely sleeved on said shaft, a ratchet keyed to said shaft but slidable longitudinally thereof, means for normally maintaining the slidable ratchet in engagement with said loosely mounted ratchet, means for intermittently rotating said shaft through the medium of said loosely mounted ratchet, and means for holding said slidable ratchet out of engagement with the other ratchet so as to permit manual rotation of said shaft by means of said knob.

18. In a printing press of the character de-

scribed, the combination with a table adapted to support a stack of sheets to be printed, a guide rod abutting the front edges of said stack, a second rod supported by said first rod and extending at right angles thereto, spaced holders secured to said last-named rod, and flexible wires clamped in said holders and having portions overlying said stack.

19. In a printing press of the character described, the combination of a table adapted to support the sheets to be printed, a table disposed above said first table and adapted to receive the printed sheets, said sheet-receiving table being pivotally mounted on the press frame at one corner so that it may be swung laterally of the press, and a gravity latch operable, when the sheet-receiving table is swung to operative position, to secure the table in such position.

20. In a printing press of the character described, the combination of a delivery table, guides for the edges of the sheets delivered thereto, a rod slidably mounted on said table, means for securing one of said guides to said rod, means for moving said rod axially whereby to move said guide away from the edges of the sheets, and spring means for returning said rod to its initial position.

21. In a printing press of the character described, the combination of a delivery table, a pair of angularly related guides for the edges of the sheets delivered thereto, a rod slidably mounted on said table, means for securing one of said guides to said rod, means for moving said rod axially whereby to move the guide thereon away from the edges of the sheets, cam means on said rod for moving the other guide away from the edges of the sheets, spring means for returning said rod to its initial position, and spring means for returning the last-named guide to its initial position when freed from the action of said cam.

22. In a printing press of the character described, the combination of a table adapted to receive the printed sheets, a guide mounted on said table and adapted to be swung into alignment with the side of the edge of the table, and a spring-pressed ball for maintaining said guide in its normal position.

23. In a printing press of the character described, a platen and sheet transfer means, said means comprising an oscillatable arm, a member mounted on the upper end of said arm and an-

gularly adjustable in a plane at right angles to the plane of oscillation thereof, and a suction feeder device mounted on the free end of said member and angularly adjustable with respect thereto.

24. In a printing press of the character described, a platen and sheet transfer means, said means comprising an oscillatable arm, a socket member mounted on the upper end of said arm and angularly adjustable in a plane at right angles to the plane of oscillation thereof, a hollow tubular member telescopically mounted in and adjustable longitudinally of the socket member, and a sucker tip supporting frame clamped to the end of said tubular member and angularly adjustable with respect thereto.

25. In a printing press of the character described, means for transferring sheets comprising an angularly adjustable socket member, a hollow tubular member telescopically mounted in and adjustable longitudinally of the socket member, and a sucker tip supporting frame clamped to the end of said tubular member and angularly adjustable with respect thereto.

26. In a printing press of the character described, the combination of a table for supporting sheets to be printed, means for transferring sheets from said table to the platen of said press, a shaft disposed adjacent the front of said press and extending transversely thereof, cams for actuating said sheet-transferring means mounted on said shaft adjacent one end thereof and a cam for elevating said table mounted on said shaft intermediate its ends.

27. In a printing press of the character described, including a platen and a sheet support; means for transferring sheets from one to the other, said means comprising an oscillatable arm, a member secured to said arm and angularly adjustable in a plane at right angles to the plane of oscillation of said arm, and a suction feeder device secured to the free end of said member.

28. In a printing press of the character described, including a platen and a sheet support; means for transferring sheets from one to the other, said means comprising an oscillatable arm, a member secured to said arm and angularly adjustable in a plane at right angles to the plane of oscillation of said arm, and a suction feeder device secured to said member and adjustable with respect to said member.

CHARLES F. ROOT.