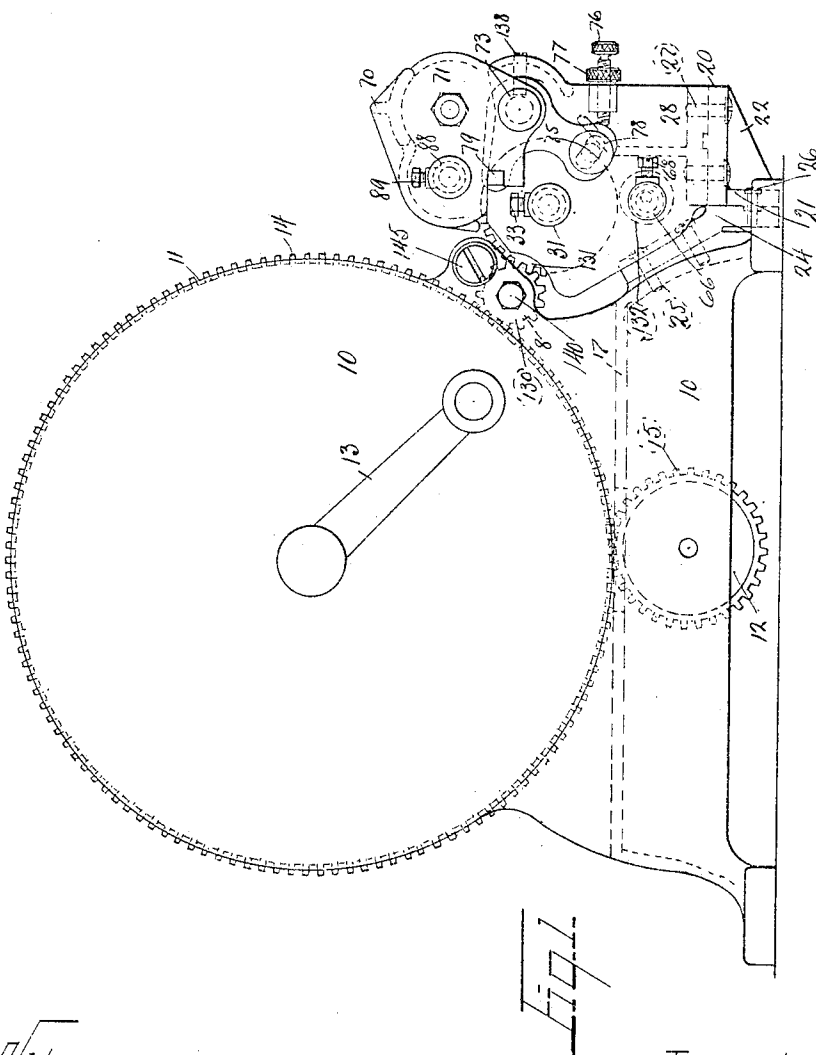


W. R. ALLEN.
PRINTING MECHANISM.
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1,117,751.

Patented Nov. 17, 1914.

4 SHEETS—SHEET 1.



Witnesses:

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1,117,751.

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4 SHEETS—SHEET 2.

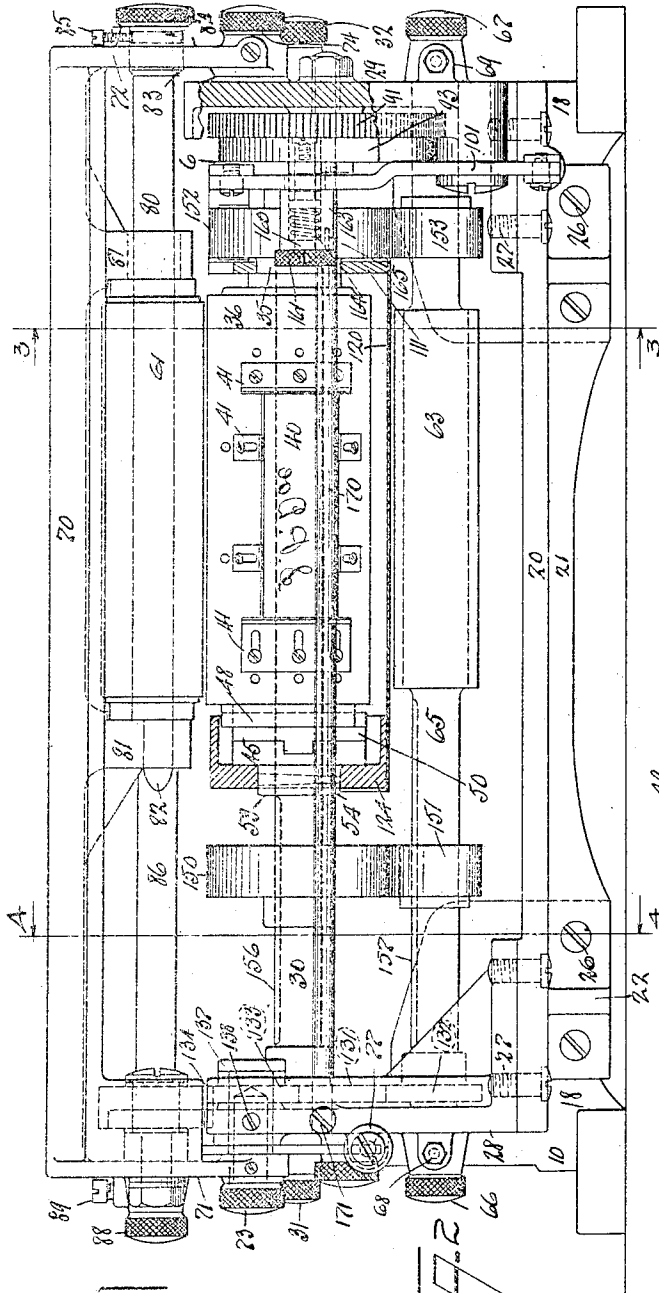


Fig. 2

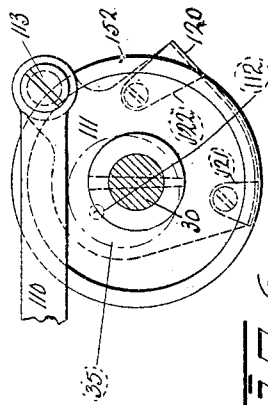


Fig. 6

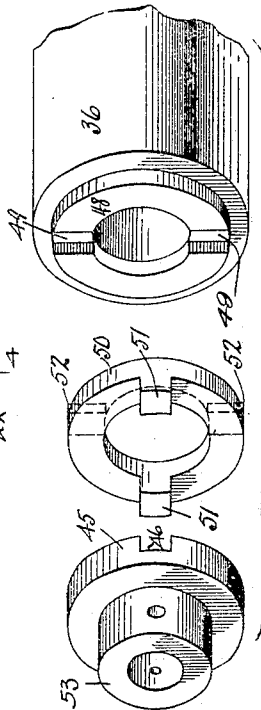


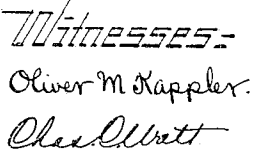
Fig. 5

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1,117,751.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

WILLIAM R. ALLEN, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN MULTIGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

PRINTING MECHANISM.

1,117,751.

Specification of Letters Patent.

Patented Nov. 17, 1914.

Application filed October 16, 1911. Serial No. 655,042

To all whom it may concern:

Be it known that I, WILLIAM R. ALLEN, citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Printing Mechanisms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 This invention relates generically to rotary printing devices, one object being to provide for an effective automatic inking of the rotary printing form. This I accomplish by automatically causing the form cylinder to engage at one time the ink device and at another time the platen roller, and I provide a suitable movable guard to prevent the form cylinder, when not impressing, from inadvertently smudging the paper traveling between the form cylinder and platen. To this end I may mount the form cylinder between the platen and an inking roll, and, by the turning of an eccentric, cause coaction alternately between the form cylinder and platen and between the form cylinder and inking roll, and I may connect the guard with the eccentric so that it is automatically withdrawn as the form cylinder and platen are coming into coaction. This is one feature of my invention.

My invention is well adapted to operate in conjunction with another printing mechanism to produce therewith properly registering impressions on the same sheet. When the present mechanism is so correlated I provide (in addition to the means for inking the form and the means for guarding the sheet) means for regulating the position of the impression made by the present printing device out of action, when desired; and means for giving the proper adjustments to the various parts. These features, as well as the generic characteristics, are all comprehended within my invention.

45 An approved embodiment of my invention as a signature printing attachment for a press is illustrated in the drawings hereof and is hereinafter more fully described, and serves as an illustration of the various characteristics of the invention. These characteristics are summarized in the claims.

50 In the drawings, Figure 1 is a side elevation of my signature printing device attached to and cooperating with a rotary printer similar to the multigraph; Fig. 2 is

an enlarged rear elevation, partly sectional, of the signature printing mechanism; Fig. 3 is a vertical cross section of the signature printing mechanism substantially on the line 3—3 of Fig. 2 looking toward the right; Fig. 4 is a vertical cross section of the signature printing mechanism substantially on the line 4—4 of Fig. 2 looking toward the left; Fig. 5 is a perspective view of three parts of a shifting coupling connecting the form cylinder or signature roller with its driving shaft; Fig. 6 is a detail, being substantially a vertical section, as indicated by line 6 in Fig. 2 looking toward the left; Fig. 7 is a substantially horizontal section distorted from a true horizontal plane so as to pass through the axes of other shafts, as indicated by the broken lines 7—7 in Figs. 3 and 4; Fig. 8 is a detail of the adjustable connection between the signature printer and the cooperating printing press, being an enlarged section on the line 8—8 of Figs. 1 and 4; Fig. 9 is a perspective view of the cam controlling the signature impression.

As shown in Fig. 1, 10 represents one of the vertical end plates of an office printing press, similar to the multigraph, and having a rotary printing drum 11 carrying the form and a rotary platen 12 cooperating therewith. A suitable crank 13 connected with the drum is shown as providing means for rotating it. On the drum is a gear 14 which meshes with a gear 15 connected with the platen.

Fig. 4 shows the drum 11 as provided with a series of parallel overhanging longitudinal rails 16 which are adapted to loosely carry between them parallel rows of individual type grooved on their opposite sides. This much of the construction is the usual one in the printing portion of the multigraph.

In such machine as described the paper is fed from the front or from the left, in Fig. 1, between the drum and platen, by a suitable feeding device not shown, and the printed sheet passes to the rear along a horizontal frame plate 17 for delivery.

In the present invention I mount at the rear of the printing machine the signature printing device in position to cooperate with the delivery rolls and arranged to receive and act on the sheet passing rearwardly and horizontally from the printing drum and platen. That construction will now be described.

Suitably secured to the frame of the printing machine is a horizontal cross plate 20 which forms the base of the signature attachment. This cross plate is provided with a vertical flange 21 braced by webs 22. The vertical flange is secured to the vertical portion of the plates 24, which are secured to the frame of the multigraph. As shown, the plates 24 are secured to a flange 18 of the base portion of that frame by screws 25, Fig. 1. The flanges 21 are secured to the plates 24 by screws 26. Secured to the upper face of the plate 20 by screws 27 are a pair of vertical end plates 28 and 29, which carry the various parts of the signature printer. These end plates, together with the plate 20, constitute, in effect, the frame of the signature printer.

Extending horizontally and journaled in the plates 28 and 29 is the main shaft 30 of the signature printing device. This shaft is journaled at its ends on short studs 31 and 32 clamped in the vertical plates by set screws, indicated by 33, Fig. 1. These studs have pins on their ends extending into sockets in the ends of the shaft. Loosely surrounding the shaft 30 in an eccentric sleeve 35 and journaled on this sleeve is the signature roller or form cylinder 36.

The form roller 36 carries a suitable electrotype or other printing form, shown in Figs. 2 and 3 at 40. This curved electrotype is shown as mounted on the periphery of the roller 36 and held at its edges by overhanging clamping plate 41. Several of these clamps are shown as dotted and they are secured to the roller by screw screwing into radial holes in the roller. There are preferably a number of such holes in the wall of the roller to enable various sized plates to be accommodated. The interior of the roller is recessed at 37 to form an oil receptacle, lined with a felt sleeve 38 to prevent escape of oil through the holes in the roller. Radial oil openings are provided on the eccentric 36 which may be fed through radial openings in the roller normally plugged by screws 39, Fig. 7.

The roller 36 is rotated by the shaft 30 irrespective of the position of the eccentric sleeve 35 within the roller by a shiftable coupling, which is shown in Figs. 2, 5 and 7. That coupling consists of three parts, namely, a head 45 rigid on the shaft 30 and having a pair of diametrically opposite grooves 46; a boss 48 on the end of the roller 36 having a pair of diametrically opposite grooves 49 at right angles to the grooves 46; and an intermediate ring 50 having on one side a pair of ribs 51 occupying the grooves 46 and on the other side, at right angles to the ribs 51, a pair of ribs 52 seating in the grooves 49. The securement of the head 45 to the shaft 30 may be conveniently accomplished by providing this head with a hub

53 and having a pin 54 pass through such hub and through the shaft.

With the construction described, the head 45 must rotate with the shaft and the ring 50 must rotate with the head but can shift thereon diametrically, and the form roller 36 must rotate with the ring but may shift thereon diametrically at right angles to the shifting of the ring. This double shifting allows the roller to shift in any direction with reference to the head while it must rotate therewith. This shifting of the roller is provided by the turning of the eccentric, and operates to carry the signature roller, alternately into contact with the inking roller and into contact with the platen. This operation will be described presently.

Above the signature roller is an inking roller 60 coacting with another roller 61. The roller 60 is preferably of rubber and the roller 61 of felt, so that the roller 61 may conveniently be a fountain roller and the roller 60 a distributor therefrom to the form. Mounted below the signature roller is the platen roller 63. It will be seen from Fig. 3 the signature roller cannot contact at the same time with both the roller 60 and the roller 63, but the shifting of the eccentric 35 may bring it into cooperation with either roller, so that the type form 40 may be inked by contact with the roller 60 and then by the depression of the form roller may cooperate with the platen roller 63. Fig. 3 shows the parts in position for the form 40 to engage the ink roller.

The platen 63 is shown as consisting of an elastic sleeve of rubber on a shaft 65. This shaft is journaled at its ends on pins (see Fig. 1) projecting eccentrically from a pair of studs 66 and 67, these studs being mounted in the end members 28 and 29 and clamped by set screws 68 and 69. The loosening of these set screws allows the knurled heads on the studs to turn them to change the position of the shaft 65, thus adjusting the approach of the platen to the form roller and regulating the impression.

The two inking rollers are mounted in a yoke-like frame consisting of a cross bar 70 which has downwardly extending end plates 71 and 72 pivoted to the plates 28 and 29 by studs 73 and 74. A plate 75 pivoted concentrically of the studs 73 forms in operation a downward extension of the yoke plate 71. This extension abuts a set screw 76 locked by a jam nut 77, and it is clamped in adjusted position by the clamping screw 78 screwing into the frame through a slot in the plate 75. This enables accurate adjustment of the yoke frame to cause the proper contact between the roller 60 and the form 40. For convenience of removal of the inking rollers, I make the yoke 70 separable from the extension 75. This I accomplish by making this extension in the form

of the flat bell crank shown, with a stud 79 which is adapted to occupy a notch in the rear edge of the yoke, and I make the pivot studs 73 and 74 removable and lock them by set screws. The removal of these set screws allows the studs 73 and 74 to be drawn out, thereby freeing the connection between the yoke 70 and the plate 75 and allowing the yoke and its rollers to be removed intact.

The fountain roller 61 is loosely mounted on a shaft 80 between a pair of ears 81 and 87 on the yoke 70. This shaft has an eccentric extension 82 journaled in the ear 81 and another eccentric portion 83 journaled in the end plate 72 of the yoke, and immediately passes through an enlarged opening in the ear 87. The outer end of the shaft 80 is provided with a knurled head 84 by which it may be rotated, and it is locked in adjusted position by a set screw 85. This arrangement enables the fountain roller to bear on the transfer roller with proper adjusted pressure to transfer the proper amount of ink. Moreover the loosening of the set screw 85 allows the shaft to be drawn out and the roller 61 removed entirely for cleaning or replacement. This enables the ink to be changed whenever desired.

The transfer roller 60 is mounted on a shaft 86 which is journaled at its ends by means of short studs carried by the end plates 71 and 72 of the yoke. A stud mounted in the end 71 is shown in Figs. 1 and 2 as provided with a knurled head 88 and as clamped by a set screw 89. The pin in the end of this stud occupies a socket in the shaft 86 corresponding to the engagement of the stud 31 with the shaft 30 shown in Fig. 7. The stud carrying the other end of the shaft 86 is similar, except that the pin is eccentric of the stud after the manner of the pin on the platen studs 66 and 67. This enables adjustment of the shaft 86 to preserve proper alinement with the type form.

From the construction described it will be seen that the fountain roller may be adjusted toward and from the distributing roller, the distributing roller adjusted into proper alinement with reference to the fountain roller, and the whole frame carrying both the fountain roller and distributing roller adjusted about an axis to cause the distributing roller to bear on the form with the proper force when the form is raised to receive the ink.

To enable the desired shifting of the form roller back and forth between the platen roller and the distributing roller, I provide the following mechanism: Mounted on the shaft 30 is a pinion 90, Fig. 7, which meshes with a gear 91 journaled in a stud 97 mounted in the frame plate 29. In the embodiment shown, the diameter of the gear 91 is four times the diameter of the pinion

90. Formed by ribs 93 and 94 on the side of this gear is a peculiar internal and external cam. The internal face of this cam, provided by the concave edge of the rib 93, is indicated by 92. This concave edge is concentric for something over a quarter of a circumference and then flares outwardly until it merges with the outside surface of the rib 93. This takes up somewhat more than half of the circumference. On the opposite side of the axis from the rib 93 is the rib 94, the convex outer surface of which constitutes a concentric cam. This surface is preferably somewhat less than a quadrant in length and is spaced at each end from the points of the rib 93. A pawl 95 is pivoted at one end of the rib 94 and bears at its nose against the hub 98 by which the gear is journaled. A spring 96 seated in a recess on the face of the gear holds the pawl in normal position.

Pivoted to the frame by a stud 100 is a lever 101 carrying a roller 102 adapted to coact with the cam. The lower end of this lever is connected by a pin and slot with a plunger 103 which extends into a socket in the base frame and has a head 104 bearing against a spring 105 in the base of the socket. Surrounding the shank of the rod 103 in front of the head is a spring 106. This spring is compressed between the head and a bushing 107 screwing into the base frame. Accordingly, the two springs tend to center the lever but allow it to swing in either direction. The upper end of the lever is connected by a link 110 with the plate 111, which is rigidly connected to the end of the eccentric sleeve 35. As shown, the plate surrounds a projecting end of the eccentric sleeve and is prevented from rotating independently of the sleeve by a locking pin 112. This plate is connected to the lever 110 by a stud 113 extending from the plate.

Now, with the construction described, when the shaft 30 is rotated, the gear 91 is correspondingly rotated in the right hand direction (Figs. 3 and 9) at one-fourth speed, and the roller 102 travels in the internal cam groove between the hub 98 and the surface 92 and then outwardly along the convex face of the pawl 95, beyond the surface 92 and around the outer face of the rib 94 and then it passes off of the rib 94 and the compressed spring 105 forces it inwardly into coaction with the internal cam.

Now, when the roller 102 is on the inside cam 92, as shown in Fig. 3, the eccentric holds the signature roller elevated so that the plate 40 thereon may contact with the inking roller 60 to obtain ink. This position of the signature roller is maintained for two of its rotations, or for substantially a half rotation of the gear 91. Then, as the roller 102 passes out of the inside cam, the rocking of the eccentric caused thereby de-

presses the signature roller into coaction with the platen roller. This movement takes about one-eighth rotation of the gear 91 or about one-half rotation of the signature roller. Then the roller 102 comes onto the external surface of the rib 94 and this being concentric, holds the signature roller down in printing coöperation with the platen during a complete rotation of the signature roller, which is substantially for one-fourth turn of the gear 91. During the remaining half rotation of the signature roller, or one-eighth rotation of the gear, the roller 102 passes inwardly through the opening between the ribs into the internal groove, ready for a repetition of the operation.

In the operation above described, the double acting spring 105, 107 allows the roller to operate on the inside and outside cam surfaces and keeps it in proper contact with each surface, as required. The pawl 95 acts as a stationary surface during proper rotation of the parts, but if they be rotated in a backward direction for any reason, the roller, on striking the concave face of the pawl, simply shoves it idly away and continues its position, so that the signature roller is not shifted. The two rotations of the signature roller past the distributing roller insure proper and effective inking of the type form on the signature roller. To prevent the sheet of paper from being inadvertently inked as it passes between the separated form cylinder and platen roller, I provide a guard plate normally standing beneath the form cylinder and above the platen, the paper passing beneath the guard. When the form cylinder is lowered this guard is automatically swung to inactive position.

As shown, the guard is a curved plate designated 120. At one end it is secured to a collar 124, which is loosely journaled on the hub 53 of the coupling head 45. This collar being hollow also serves the purpose of covering the coupling between the shaft and signature roller. At the other end the guard is provided with ears 121 and 122 (Fig. 6) secured to the plate 111 by which the eccentric sleeve is rocked. The guard being thus rigidly connected with the eccentric sleeve 35 on the side of the axis opposite the greatest eccentricity, it follows that whenever the eccentric is turned to lower the form roller into active position the guard is thereby swung upwardly out of the way. When the eccentric is turned in the other direction to raise the form roller, the guard is returned to normal position, as shown in Fig. 3.

The power for driving the various rollers is preferably obtained from the main gear 14 of the printing drum with which the signature device cooperates. As shown in Figs.

1, 4 and 7, this main gear meshes with an idler 130. The idler is adapted to mesh with a gear 131 rigid on the shaft 30 of the signature roller. This gear meshes with the gear 132 rigid on the shaft 65 of the platen roller. The gear 131 also meshes with an idler 133 which is mounted concentrically of the pivot 73 of the rocking yoke 70. The gear 133 is shown as journaled on a stud 137 held in the frame plate 28 by a set screw 138. The portion of this stud beyond the frame plate forms the bearing for the plate 75, and the stud has a socket in its outer end to receive the stud 73 pivoting the yoke carrying the ink rollers. The idler 133 meshes with another idler 134 which meshes with a gear 135 on the shaft 86 of the distributing roller. The fountain roller is rotated by its frictional contact with the distributing roller. As heretofore explained, on the shaft 30 is a pinion 90 meshing with the gear 91 on the cam.

It will be seen that the gearing described causes the signature roller and platen roller to roll in the proper direction to advance the sheet printer and discharging rearwardly by the main drum and platen of the multi-graph. The gearing to the cam 91 causes the periodic transportation of the signature roller from the inking device to its own platen, which movement is in prearranged relation to the matter on the printing drum. The gearing to the inking rollers rotates them properly, irrespective of the actual position into which they may be adjusted.

To adjust the position of the signature impression on the sheet with reference to the printing drum, it is simply necessary to change the relation of the gearing between the drum and the main gear 131 of the attachment. I provide for this by making the idler 130 shiftable out of mesh with the gear 131 or the gear 14. I prefer to disconnect it from the gear 131. As shown, I accomplish the disconnection mentioned by mounting this idler rotatably and slidably on a short stud 140 which is rigidly mounted in an ear on the frame plate 10. Slidably mounted in this ear is a plunger 142 which carries a yoke 141 occupying a peripheral groove in the hub of the idler. A spring 144 surrounding this plunger 142 tends to keep the parts in engagement. Whenever it is desired to change the adjustment this plunger is forced inwardly by the operator pressing on its head 145, thus disconnecting the idler from one of its gears. Then the printing drum is rotated in one direction or the other a proper distance and the idler returned into mesh so as to properly correlate the signature printer with the main drum. The main gear 14 is naturally of greater width than the gear 131, so that the inward movement of the plunger 142 may disconnect the idler 130 from the gear 131 while leaving it con-

5 nected with the gear 14. This adjustable idler and its operating plunger enable the signature printer to be quickly and accurately set with reference to the matter on the drum so that the signature may be printed in exactly the proper place on the sheet. If a finer adjustment is desired than that provided by a change of one tooth in the gear, it may be accomplished by shifting the printing plate 40 on the signature roller, though in ordinary operation such finer adjustment is unnecessary.

10 The product of the main printing drum and platen is delivered between the signature roller and its platen. To assist in this delivery I mount delivery rolls on the shafts 30 and 65. These rolls are best shown in Fig. 2. They are designated 150, 151, 152 and 153. The rolls 152 and 153 are preferably immovable and keyed to their respective shafts. The rolls 150 and 151 are slidable on their shafts but compelled to rotate therewith by means of feathers carried by the rolls occupying keyways 156 and 157 in their respective shafts. This enables adjustment of the rolls for different widths of paper.

30 When it is desired to render the signature printer idle, simply delivering the paper between the shield 120 and the platen 63, this could be accomplished by simply removing the printing plate 40 from the printing roller. However, to enable the signature printer to be idle without requiring the removal of the plate, I provide a special throw-out device. This consists of adjustable means carrying the roller 102 and serving to withdraw it, when desired, from the range of the cams on the gear 91. As shown, 40 the roller 102 is mounted on a plunger 160 having a head 161 slidably mounted in a boss 163 on the lever 101. A spring 164 tends to maintain this pin in its innermost position with the roller active. The pin, however, may be pulled lengthwise by means of the knurled head 161 to withdraw the roller out of range with the cam and hence to inactive position, and the parts may be maintained in this position by then turning the head, which causes a pin 165 50 carried thereby (normally occupying an opening in the barrel 163) to stand on the end of the barrel and hold the parts in inactive position. Accordingly, whenever it is desired to throw out the signature printer, it is simply necessary to take hold of the head 161 and draw it to the left in Fig. 2 and give a slight turn. When this is done the signature roller is maintained in idle position. The guard 120 then continues to occupy its normal position and the sheet printed by the main drum and platen is delivered between the guard and platen 63 by the delivery rollers without a signature imprint. To insure against the printed

sheet clinging in any case to the signature roller, or accidentally coming in contact with the fountain roller, I provide a stationary protecting rod 170 at the rear of the signature roller and extending lengthwise 70 of the attachment. This rod is shown as mounted at one end in a socket in the stud 97 and at the other in the frame plate 28, where it is held by the set screw 171. If desired, this rod may carry some suitable 75 guide or receiving device for the printed sheets.

Having thus described my invention, what I claim is:

1. The combination, with a main rotary 80 printing member and platen, of a supplemental rotary printing member and platen geared therewith, the supplemental printing member making a plurality of rotations for each rotation of the main member, and means for holding the supplemental printing member and platen out of mutual engagement during the major portion of the rotation of the main member while the paper passes idly between such supplemental 90 printing member and platen; but bodily shifting the axis of one of them to bring it into coaction with the other to print on such paper once during each rotation of the main member. 95

2. The combination, with a main rotary printing member and platen, of a supplemental rotary printing member and platen geared therewith, the supplemental printing member making a plurality of rotations for each rotation of the main member, means for holding the supplemental printing member and platen out of mutual engagement during the major portion of the rotation of the main member but bodily shifting the axis of one of them to bring it into coaction with the other once during each rotation of the main member, paper advancing rolls for the supplemental printing member rotatable continuously while the printing member is shifting, and an inking device with which the supplemental printing member coacts when out of engagement with the supplemental platen. 110

3. The combination, with a main rotary 115 printing member and platen, of a supplemental rotary printing member and platen geared therewith, the supplemental printing member making a plurality of rotations for each rotation of the main member, and means for holding the supplemental printing member and platen out of mutual engagement during the major portion of the rotation of the main member but bodily shifting the axis of one of them to bring it into coaction with the other once during each rotation of the main member, and a guard plate normally standing between the supplemental printing member and its platen but automatically moved to idle po- 130

sition when such printing member and platen coact.

4. The combination, with a printing couple, of a supplemental couple adapted to receive the product discharged by the first couple, said supplemental couple including a printing member and platen, one of which is shiftable into and out of coaction with the other, and a guard for the paper extending between the members of the supplemental couple when they are out of coaction and automatically moved from such position when they come into coaction.

5. In a device of the character described, the combination of a platen roller, an inking roller, a shaft carrying an eccentric, a rotary printing form mounted on the eccentric, means for rotating the form, the platen roller and the inking roller, means for turning the eccentric to shift the form first in one direction and then in the other, a printing couple, and an adjustable connection between the same and the last mentioned means whereby the latter may be turned according to the matter on the couple.

6. The combination, with an inking device, of a rotary printing couple, the printing member of which is located between its platen and said inking device, means for shifting such member of the couple into and out of coaction with the platen and inking device alternately, a driving shaft, and a shiftable coupling between the same and the shiftable member of the couple.

7. The combination of a platen and inking device, a driving shaft, an eccentric thereon, a rotary type form mounted on the eccentric, means for turning the eccentric to shift the form between the inking device and platen, and a shiftable coupling between the form and shaft whereby the form may be rotated by the shaft irrespective of the position of the form.

8. The combination, with a platen and inking device, of a shaft, an eccentric loosely mounted thereon, a rotary type form mounted on the eccentric, a shiftable coupling between the type form and shaft consisting of a head on the shaft, an intermediate ring between it and the rotary form, a diametric sliding connection between the ring and the head, and a diametric sliding connection at right angles to the connection first mentioned between the ring and the rotary form.

9. The combination of a rotatable platen roller, a rotatable inking roller, a rotatable shaft, an eccentric loosely mounted on the shaft, a rotary type form mounted on the eccentric and standing between the platen roller and inking roller, mechanism for continuously rotating the shaft, a shiftable coupling between the shaft and the type form, and mechanism for periodically turning the eccentric to shift the type form.

10. The combination, with a platen and an inking device, of an eccentric, a type form rotatably mounted on the eccentric, a cam, a connection between the same and the eccentric to turn the eccentric to shift the type form between the inking device and platen, a driving member and a shiftable coupling for continuously rotating the type form, a printing couple, and adjustable gearing between one member thereof and the cam.

11. The combination of a platen, an inking device, a rotary printing member, means for continuously rotating the same, and means for causing the printing member to coact with the inking device on a plurality of successive rotations and to coact on one rotation with the platen, and a guard active when the printing member coacts with the inking device and inactive when it coacts with the platen.

12. The combination of a rotary printing couple comprising a printing member and platen, an inking device, means for changing the mutual relation of the printing member and the axis of the platen to cause the printing member to coact at one time with the inking device and at another with the platen, a guard moved concurrently with such change into active position when the printing member is coacting with the inking device and into inactive position when the printing member is coacting with the platen, and means for concurrently rotating the printing member and platen.

13. The combination of a platen, an inking roller, a rotary printing member, means for continuously rotating it, an eccentric on which the member is mounted, a cam and connections therefrom to the eccentric adapted to hold the rotary printing member in coaction with the inking roller for two successive engagements with the inking roller and thereafter shifting it and holding it in coaction with the platen for one engagement therewith, and a guard for the printing member automatically movable to idle position when said member becomes active and vice versa.

14. The combination, with a roller platen and an inking device, of a shiftable printing roller adapted to have rolling coaction with either, and a guard adapted to protect the paper from inadvertent contact with the printing roller when it is out of contact with the platen.

15. The combination, with a platen and inking device, of a rotary printing member the axis of which is shiftable to coact alternately with them, mechanism for advancing paper between the printing member and platen, a guard adapted to protect the paper from contact with the printing member when the latter is coacting with

the inking device and out of contact with the platen, and means for moving said guard to idle position when the printing member is coacting with the platen.

16. The combination, with a platen and inking device, of a printing member, mechanism for continuously rotating it, mechanism for bodily shifting it to coact with the inking device and thereafter with the platen, a shiftable guard preventing contact of the paper with the printing member when the latter is contacting with the inking device, and means for automatically moving said guard to idle position when the printing member is moved to active position.

17. In a device of the character described, the combination of a platen and a printing member which coact to print by rolling contact, coacting rollers for advancing paper between the printing member and platen, a guard adapted to stand between them and prevent the printing member inadvertently inking the paper, and means for automatically moving said guard to idle position when the printing member comes into active position.

18. The combination, with a rotary platen, of a bodily shiftable rotary printing member adapted to coact therewith, a guard adapted to extend between the printing member and the platen when they are out of coaction, and means for automatically and concurrently shifting the printing member into active position and the guard out of active position.

19. The combination of a rotary platen, a rotary printing member, means for continuously rotating it, means for bodily shifting it to coact or be out of coaction with the platen, a guard, means for holding the same between the printing member and platen when the two are out of coaction, and means for holding the same in idle position when the printing member and platen come into coaction.

20. The combination of a platen, an eccentrically mounted rotary printing member, means for turning the eccentric to shift the printing member into and out of coaction with the platen, and a guard for the paper connected with the eccentric and shifted by the movement thereof.

21. The combination of a rotary platen, a rotary shaft parallel therewith, an eccentric on said shaft, a form cylinder on the eccentric, a driving connection between the form cylinder and shaft, a guard for paper connected with the eccentric, and means for turning the eccentric to shift the form cylinder and guard.

22. The combination of a roller platen, an inking roller, a shaft, an eccentric thereon, a form roller on the eccentric, driving connection between the form roller and shaft

a guard adapted to stand between the form roller and platen when they are out of coaction, said guard being connected with the eccentric, and a cam and connections for turning the eccentric into a position where the form coöperates with the roller and the guard is between the form and platen and thereafter into another position where the form coöperates with the platen and the guard is in front of the form roller.

23. In a device of the character described, the combination of a rotary platen, a shaft parallel therewith, an eccentric loose on the shaft, a form roller rotatably mounted on the eccentric, a coupling at one end of the form roller connecting it with the shaft, a guard for the coupling, a member for shifting the eccentric, and a guard for the paper secured at one end to said member and at the other end to the coupling guard.

24. The combination, with a platen and an inking device, of a form cylinder, an eccentric, on which the same is mounted and which is adapted to shift the cylinder from coaction with the inking device into coaction with the platen, an inside and outside cam, mechanism connecting the same with the eccentric, and means for rotating the form cylinder and concurrently rotating the cam at a slower speed.

25. The combination, with a platen and an inking device, of a rotary printing member, mechanism for rotating the member in one direction or the other, and mechanism for automatically shifting the member from normal position where it engages the inking device to the platen for rotations in one direction and for holding it in normal position for rotations in the opposite direction.

26. The combination, with an inking device and platen, of a printing member, an inside and outside cam, means for rotating the member and for rotating the cam at a lower speed connecting mechanism for shifting the form cylinder relative to the inking device and platen, and a pawl carried by the cam for insuring the passage of the co-operating member from the inside to the outside of the cam in one direction only of rotation of the cam.

27. The combination, with an inking device and platen, of a rotary printing member, mechanism for causing the printing member on one rotation to coact with the inking device and on another rotation to coact with the platen, said mechanism including a cam, a coöperating roller, a lever carrying the roller, said roller being mounted on a spring pressed plunger adapted to withdraw it from coaction with the cam, an eccentric on which the member is mounted, and a connection between the eccentric and said lever.

28. The combination, with a rotary printing device, of a printing roller and platen

geared with the printing device for concurrent continuous rotation, mechanism for causing relative shifting between the axes of said roller and its platen to cause the roller to print at a certain position on the sheet, and continuously rotary paper-advancing rolls associated with both the printing device and said printing roller.

29. In a device of the character described, the combination of a platen, a rotary form cylinder, an eccentric on which the same is mounted, means for turning the eccentric to shift the form cylinder bodily to coact with the platen, and paper advancing rolls at opposite ends of the eccentric and rotatable independently of such shifting.

30. The combination of a platen roller, a form roller, a pivoted frame, a fountain roller and a distributing roller mounted in the frame, mechanism for shifting the form roller between the distributing roller and platen roller, a train of gearing for driving the form roller and distributing roller concurrently, said train including an idler mounted concentrically with the pivot of said frame.

31. The combination of a platen roller, a shaft parallel therewith, a rotary printing member mounted on said shaft, gearing connecting said shaft with the platen, a pivoted frame, a fountain roller and distributing roller carried by said frame, a gearing connecting the distributing roller with the said shaft, said gearing including an idler pivoted concentrically with the pivot of said frame, and mechanism for shifting the printing member on the shaft to bring it into coaction with either the distributing roller or the platen.

32. The combination with a printing couple, of an independent signature printing roller and platen geared with the printing couple for concurrent continuous rotation, continuously rotary paper advancing rolls, and mechanism for causing relative shifting between the axes of the signature roller and its platen to cause the signature roller to print at a certain position on the sheet being advanced by said rolls.

33. The combination, with a rotary printing machine adapted to automatically deliver a printed sheet, of a supplemental printing device geared therewith and including an additional platen and a bodily shiftable form roller, continuously rotary paper-advancing rolls, and means for automatically shifting the form roller into and out of contact with the platen.

34. The combination, with a rotary printing device adapted to deliver a printed sheet, a supplemental and independent rotary printing device in position to have such sheet automatically pass between the two members of its couple, a guard to prevent inking the sheets so passing and means for

automatically shifting one of such members to effect the printing.

35. The combination, with a rotary printing device adapted to deliver a printed sheet, a supplemental rotary printing device in position to have such sheet automatically pass between the two members of its couple, means for automatically shifting one of such members to prevent the printing, and a guard automatically positioned between the printed sheet and the supplemental printing member consequent upon such shifting.

36. The combination, with a rotary printing device adapted to deliver a printed sheet and a supplemental and independent rotary printing couple geared with the printing device and including a roller platen and a bodily shiftable printing roller, an inking device, means for shifting the printing roller alternately into coaction with the inking device and the platen for said roller, and a guard for the paper active when said printing roller is in contact with the inking device.

37. The combination, with a rotary printing couple having a gear, a supplemental rotary printing couple having a gear, a shiftable idler normally connecting said gears and movable to interrupt the connection, said supplemental couple being positioned to receive the sheet discharged from the first couple, the printing member of the supplemental couple being bodily shiftable, an inking device for the supplemental couple, and mechanism for periodically shifting the printing member of the supplemental couple to cooperate alternately with its inking device and platen.

38. The combination of a printing couple having a gear, a supplemental printing couple having a gear, said couples being in position whereby the supplemental couple receives the sheet discharged from the first mentioned couple, an idler adapted to connect with both gears, a spring tending to hold said idler in such engagement, and a plunger adapted to shift the idler out of engagement with one of its cooperating gears.

39. The combination of a rotary printing device adapted to deliver a printed sheet, delivery rolls at the rear thereof adapted to act on such printed sheet, a signature printing roller mounted between two of said delivery rolls, a platen with which the signature roller cooperates whereby a supplemental printing couple is provided, and means for shifting the signature roller with reference to its platen and said delivery rolls automatically and periodically.

40. The combination of a rotary printing couple, delivery rolls at the rear thereof, a signature printing roller between two of such delivery rolls, a cooperating platen

roller, an eccentric on which the signature roller is mounted, and means for turning said eccentric to bodily shift the signature roller without shifting the delivery rolls.

5 41. The combination of a platen, a shaft parallel therewith, a pair of delivery rolls mounted on said shaft an eccentric on the shaft between the delivery rolls, a rotary printing device on the eccentric adapted to
10 cooperate with the platen, and means for turning said eccentric to shift the printing device into and out of such cooperation without shifting the delivery rolls, and means for rotating the shaft and printing
15 device.

42. The combination of a pair of parallel shafts, two pairs of coacting delivery rolls mounted on the two shafts, a platen on one shaft between the two delivery rolls there-
20 on, an eccentric on the other shaft between the delivery rolls on it, and a printing roller mounted on said eccentric and adapted to coact with the platen or be shifted by the eccentric out of such coaction.

25 43. The combination, with a platen and an inking device, of a rotary form cylinder, an eccentric, means for turning the eccentric, mechanism whereby such turning causes coaction at one time between the ink-
30 ing device and form and at another time between the platen and form, and a guard controlled by such turning.

44. In a device of the character described, the combination of a shaft, means for con-
35 tinuously rotating it, an eccentric loosely mounted on the shaft, a form cylinder mounted on the eccentric, a driving connection between the shaft and the form cylinder, a platen, an inking device, and means
40 for turning the eccentric to shift the form cylinder between the platen and inking device while the form cylinder is being driven by the shaft.

45. In a device of the character described, the combination of a shaft, means for con-
tinuously rotating it, an eccentric loosely mounted on the shaft, a form cylinder mounted on the eccentric, a driving connection between the shaft and form cylinder,
50 a platen, an inking roller, means for turning the eccentric to shift the form cylinder between the platen and inking roller while the form cylinder is being driven by the shaft, and means for continuously rotating
55 the shaft, platen and inking roller.

46. The combination of a platen roller, an inking roller, a rotary printing form mounted between them, means for continuously rotating said form and bodily shifting
60 means to cause the form to coact at one time with the inking roller and at another with the platen roller, and a guard for the paper moving concurrently with and reversely of the form.

65 47. The combination of an eccentric, a ro-

tary type form mounted on the eccentric, a shiftable coupling for driving the type form consisting of a rotary head, an intermediate ring between it and the rotary form, a diametric sliding connection between the ring and the head, and a diametric sliding connection at right angles to the connection first mentioned between the ring and rotary form.

48. The combination of a platen, an inking device, a rotary printing member, means for continuously rotating the same, means for causing the printing member to coact with the inking device on a plurality of successive rotations and to coact on one ro-
80 tation with the platen, and a guard for the paper automatically moved to the position when the printing member coacts with the platen.

49. The combination, with a roller platen and an inking device, of a rotary printing member adapted to print by rolling contact, means for causing alternate coaction between it and the platen and inking device and a guard adapted to protect the paper
90 from inadvertent contact with the printing member when the latter is out of coaction with the platen.

50. The combination, with a platen and inking device, of a rotary printing member, means for causing it to coact alternately with the platen and inking device, means for continuously rotating the printing member whereby it may print by rolling contact when in coaction with the platen, a guard
100 adapted to protect the paper from contact with the printing member when the latter is coacting with the inking device, and means for holding the guard in idle position when the printing member is coacting with the
105 platen.

51. The combination, with a rotary platen, of a rotary printing member adapted to coact therewith, a guard adapted to extend between the printing member and the platen
110 when they are out of coaction, and means for automatically and concurrently causing the printing member to be active and the guard to be inactive.

52. The combination of a platen, a rotary printing member, an eccentric, means for turning the eccentric to cause the platen and printing member to be in or out of coaction, and a guard for the paper connected with the eccentric and shifted by the move-
120 ment thereof.

53. The combination of a rotary printing couple, two pairs of delivery rolls at the rear thereof, a signature printing roller between two of such delivery rolls, a co-
125 operating platen roller between the other two delivery rolls, an eccentric on which one of said rollers is mounted, and means for turning said eccentric without shifting the delivery rolls.

54. The combination of a continuously rotary main printing member and platen adapted to print on paper for each revolution of the main printing member, an auxiliary printing member and a platen therefor normally out of contact with each other and positioned to have the same paper pass between them, means adapted to move the auxiliary printing member at the same peripheral speed as the main member, and means for automatically and periodically causing the auxiliary printing member and platen to impress each other at a predetermined position on said paper.
55. The combination of a printing device, paper-advancing rolls, an auxiliary printing roller mounted between said rolls, a platen with which the auxiliary roller cooperates, and means for shifting the auxiliary roller with reference to its platen and said rolls.
56. The combination of a printing device, paper-advancing rolls, an auxiliary printing device mounted between said rolls and movable independently thereof, a platen with which the auxiliary device coacts, and means for changing the relation of the auxiliary device and platen with reference to each other.
57. The combination of a rotary printing couple, paper-advancing rolls therefor, a printing roller mounted between two of such rolls, a cooperating platen roller, an eccentric on which said printing roller is mounted, and means for turning said eccentric to bodily shift said printing roller without shifting the advancing rolls.
58. The combination of a platen, a shaft parallel therewith, a pair of rolls mounted on said shaft, an eccentric on the shaft between the rolls, a rotary printing device on the eccentric adapted to cooperate with the platen, means for turning said eccentric to shift the printing device into and out of such cooperation without shifting the rolls, and means for rotating the shaft and printing device.
59. The combination of a rotary printing couple, two pairs of paper advancing rolls, a printing roller between two of such rolls, a cooperating platen roller between the other two rolls, an eccentric on which one of said rollers is mounted, and means for turning said eccentric without shifting the rolls.
60. The combination, with a main rotary printing couple adapted to print on each rotation of the printing member, of an auxiliary printing couple having rolling coaction and geared with the main couple for concurrent movement at the same peripheral speed, and mechanism for automatically causing the members of the auxiliary couple to approach each other.
61. The combination, with a main rotary printing couple adapted to print on each rotation of the printing member, of an auxiliary printing couple having rolling coaction and geared with the main couple for concurrent movement at the same peripheral speed, mechanism for automatically causing the members of the auxiliary couple to approach each other, and means for adjusting the gearing between the couples to regulate the position of such approach with reference to the sheet.
62. The combination of a main rotary printing couple, an auxiliary printing couple including a rotary platen and a printing member mounted to have rolling coaction therewith, means for continuously rotating the members of the main couple and the platen of the auxiliary couple, means for periodically causing the members of the auxiliary couple to come into coaction, and means for adjusting the time of such coaction.
63. The combination of a main rotary printing couple, an auxiliary printing couple including a rotary platen and a printing member mounted to have rolling coaction therewith, means for continuously rotating the members of the main couple and the platen of the auxiliary couple at the same peripheral speed, means for periodically causing the members of the auxiliary couple to come into coaction, means for controlling the time of such coaction, and means for advancing paper direct from one to the other.
64. The combination of a rotary printing couple, an auxiliary printing couple, an eccentric mounting for one member of the auxiliary couple, means for turning said eccentric to cause the members of the auxiliary couple to coact, means for moving such members when in coaction at the same peripheral speed as that of the said rotary couple, and means for varying the time of turning such eccentric without varying said rotary couple.
65. The combination of a main printing couple having rolling coaction, an auxiliary printing couple having rolling coaction, one couple being adapted to deliver its product directly to the other couple, an eccentric mounting for one member of the auxiliary couple, means for automatically turning said eccentric periodically in the operation of the main couple to enable the auxiliary couple to print at a definite position, means for adjusting the time of such turning relative to the action of the main couple, and means for moving the members of the auxiliary couple at the same peripheral speed as the members of the main couple.
66. The combination of a rotary printing couple, an adjacent auxiliary printing couple adapted to receive a sheet discharged from the main couple while a portion of such sheet is between the members of the main couple,

an eccentric mounting for one of the members of the auxiliary couple, and means for automatically turning such eccentric mounting while the sheet is between the members of the auxiliary couple.

67. The combination of a main printing couple, an auxiliary printing couple adapted to receive a sheet discharged by the main couple while it is being printed by the main couple, an inked fabric for inking the main couple, means for directly inking the auxiliary couple, an eccentric mounting for one member of the auxiliary couple, and delivery rolls in two pairs spaced apart to clear the matter printed by direct inking.

68. The combination of a rotary printing drum, a rotary under-running cooperating platen, a signature printing device behind the couple just described and in position to receive the product of that couple without intermediate rolls, and comprising a rotary platen and a member coacting therewith and adapted to be turned about an axis, an eccentric mounting for the last mentioned member, means for turning said eccentric to bring the member down to printing position, means for adjusting the time of such turning relatively to the said drum, and means for moving the members of the signature printing device when in coaction at the same peripheral speed as the first-mentioned drum and platen.

69. The combination of a rotary printing drum, a rotary cooperating impression

platen, a signature printing device comprising a rotary platen and a member coacting therewith and adapted to be turned on an axis, an eccentric mounting for the last mentioned member, a cam for turning such eccentric to bring the member down to printing position, gearing between the cam and printing drum, and means for throwing one member of such gearing into and out of action, whereby the action of the eccentric may be adjusted according to the matter on the drum.

70. The combination of a rotary printing drum having a gear, a rotary platen, a gear for the platen meshing with the drum gear, a signature printing device beyond the couple just described in position to receive the product thereof and comprising a rotary platen and a member coacting therewith and adapted to be turned on an axis while coacting, an eccentric mounting for the last mentioned member, a cam for turning such eccentric, gearing connecting said cam with the gear on the drum, means for moving one member of such gearing into and out of action, and gearing connecting the platen of the signature printer with the gear on the drum.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

WILLIAM R. ALLEN.

Witnesses:

GEO. T. TRUNDLE, Jr.,
ALBERT H. BATES.