W. M. CLARK.

PRINTING PRESS.

APPLICATION FILED JULY 7, 1910.

1,038,088.

Patented Sept. 10, 1912.

3 SHEETS—SHEET 1.

FIG 2

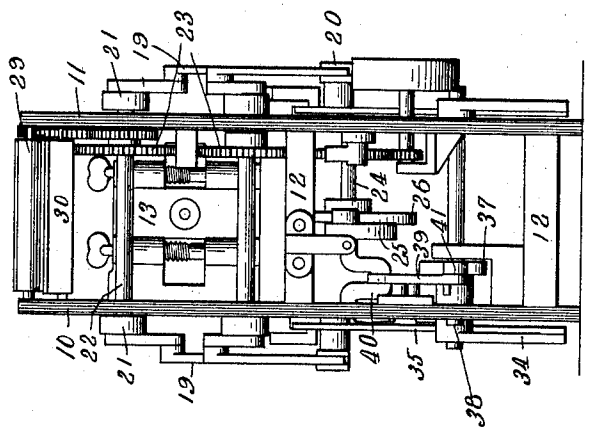
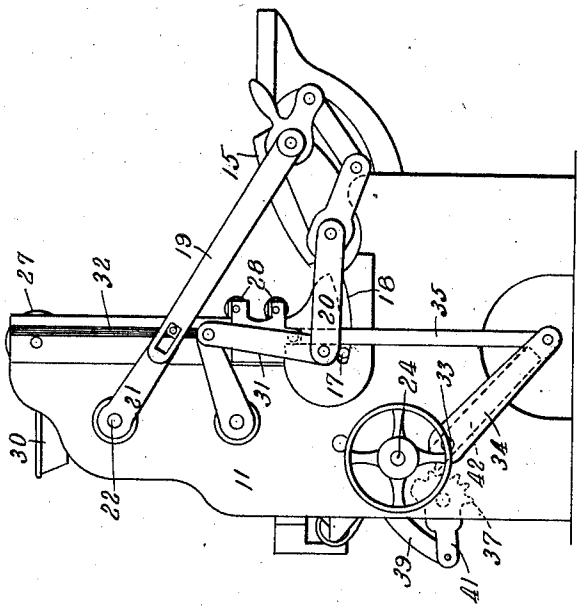


FIG 1



Witnesses

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3 SHEETS—SHEET 2.

Fig 4

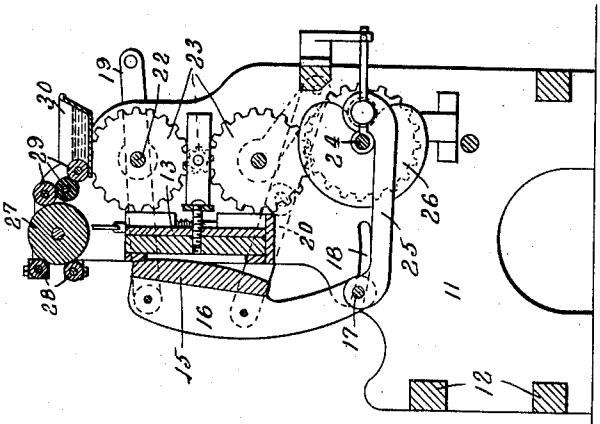
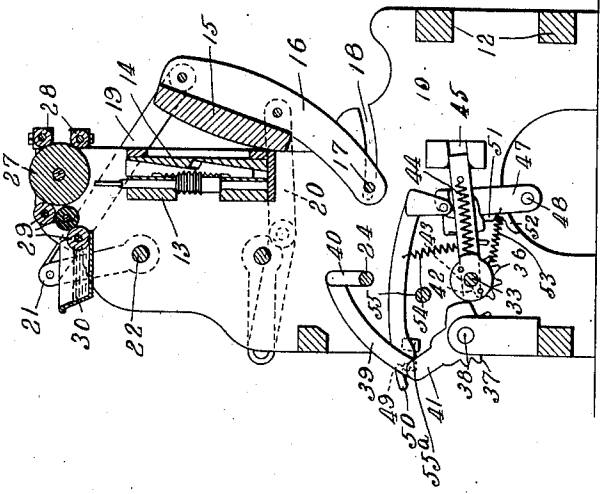


Fig 5



Witnesses

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3 SHEETS—SHEET 3.

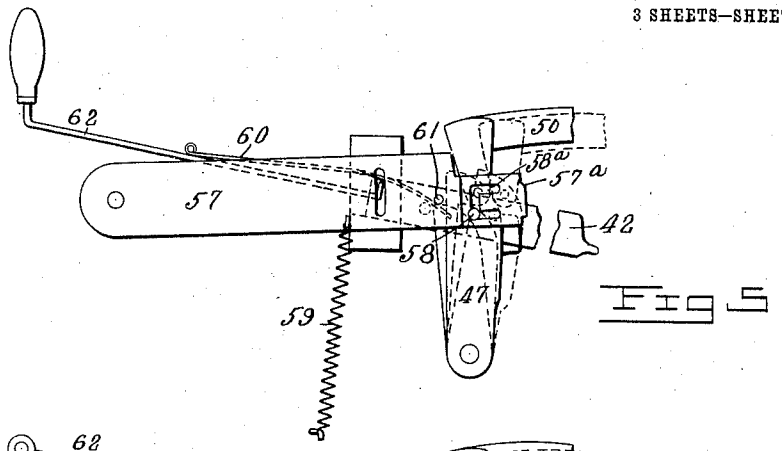


Fig 5

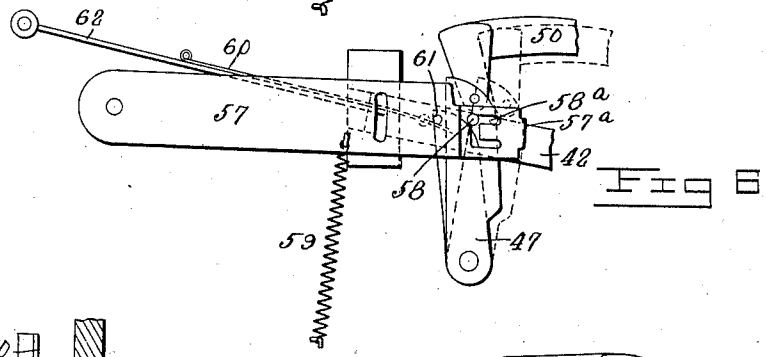


Fig 6

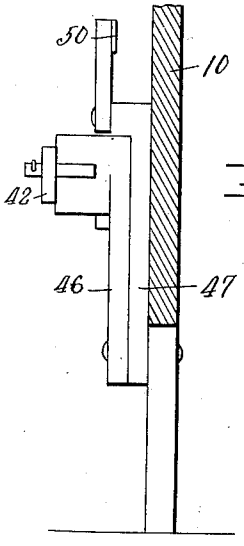


Fig 8

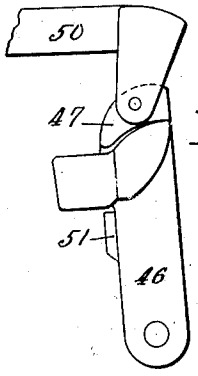
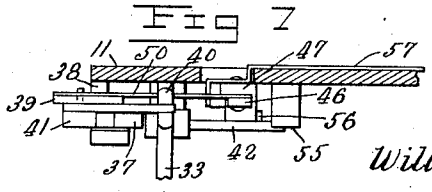


Fig 9

Fig 7



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UNITED STATES PATENT OFFICE.

WILLIAM M. CLARK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO CLARK PRINTING PRESS COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PRINTING-PRESS.

1,038,088. Specification of Letters Patent. Patented Sept. 10, 1912.

Original application filed March 11, 1910, Serial No. 548,661. Divided and this application filed July 7, 1910. Serial No. 570,880.

To all whom it may concern:

Be it known that I, WILLIAM M. CLARK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Printing-Presses, of which the following is a specification.

My invention consists of a new and improved printing press of the bed and platen type, and relates particularly to that type of bed and platen presses commonly known as job presses.

In my co-pending application, Serial No. 548,661 I have described and claimed a printing press in which I make use of a curved platen adapted to make a rolling contact with the form instead of delivering the impression at one stroke over the whole surface of the form as in the job presses now in use. I also make use of an improved form of inking mechanism, and this application is a divisional application filed for securing patent protection on that inking mechanism.

Half-tones, tint blocks and similar matter are now greatly in demand in job printing. Great pressure is necessary to produce this in processes of the old type, and my improved press in which I employ the curved platen is particularly designed to apply this pressure by a line contact so that the strain is distributed through an appreciable length of time during which the platen rolls over the form, thus avoiding the enormous momentary strain which must be applied in processes of the old form employing the plane platen. When we consider the fact that a minimum pressure of 300 pounds per square inch is required in producing modern illustrations in job work, the advantages of the line contact printing, over the plane platen press, should be evident, for the total strain of the parts in the line contact method may be made far less than that in the plane contact method. An equal factor in the producing of half-tones, tints and so forth in job presses is the quality of the ink applied to the form, and the manner of its application. This class of work requires a stiff and dense printers' ink to produce purity and depth of color of the printed sheet. When the sheet is impressed on the whole surface of the form at once by the plane platen method, it is very apt to adhere so fast, by reason of the extreme pressure necessarily applied to produce a proper imprint, that it cannot be easily delivered, and unless the paper is unusually tough it is liable to be mutilated in stripping it off. To remedy this the ink is sometimes thinned down, but in doing so, the depth and clearness of the impression so much desired are lost. Again the "squeeze" of the platen method being given all over the surface of the plate or form at once, seems to cause the ink to appear in excess in the middle tones, and on the more delicate portions to be pressed over the lines into the spaces as if the ink had "run." Very often the printed sheet is "picked," that is, small parts of the surface of the paper have pulled off and white specks show in the darker portions, while it not unusually occurs that a soft ink refuses to leave the form evenly and comes off on the sheet mottled in appearance. In the line contact impression or cylinder method, the sheet is separated while it is being printed and the numerous ink difficulties which so try the skill and patience of the printer, in the platen method, mostly disappear.

According to my invention I supplement the action of the curved platen in producing the improved impression, by an inking mechanism which supplies ink in the best quality and the best manner, and in the accomplishment of my invention associated with the platen mechanism of my press an improved inking mechanism for the form.

Instead of the usual table or disk from which the form rollers get their ink in most job presses, an inking roller is used mounted on the frame adjacent the form bed, and ink is supplied to this roller by a series of distributing rollers of metal and composition. This series of rollers acting one upon the other reduces the ink to great fineness and uniform consistency. Means are provided for carrying the form rollers into contact with the inking roller and holding them there in rolling contact for a certain period of time. The ink is thus well distributed on the form rollers in a very thin film of fine quality. Suitable mechanism is also provided for throwing the form rollers out of operation whenever desired and insuring the position of the form rollers

upon the inking roller when so thrown out of operation at a definite point opposite the inking roller, so that the ink distribution can be continued while the form rollers are out of operation.

Of the drawings: Figure 1 is an elevation of the left hand side of the press; Fig. 2 is a rear elevation of the same; Fig. 3 is a vertical section through the press; Fig. 4 is a section on line 3—3 of Fig. 2 looking in the direction of arrows 4—4 opposite to arrows 3—3; Fig. 5 is an enlarged elevation of the form roller operating mechanism from the right hand side of the press, showing the parts in operating position; Fig. 6 is a similar view showing the parts in off position; Fig. 7 is a plan view of the mechanism of Figs. 5 and 6; Fig. 8 is a detail section of the press showing the rock levers of the form roller operating mechanism; and Fig. 9 is a side elevation of these rock levers.

The general construction of the press of my invention as described in my co-pending application referred to is simple. It consists of a frame structure made up of right and left hand standards 10 and 11 interconnected by cross-bars 12 and the supporting bed 13 for the form 14.

15 is the curved platen supported upon the downwardly extending supporting arms 16 secured to a pivotal shaft 17 mounted in cycloidal ways 18 in the standards 10 and 11. The mechanism for moving this curved platen over the form comprises a pair of draw-bars 19 and 20 on each side of the press connected at their outer ends to the platen 15 and at their inner ends to cranks 21 carried upon the ends of a driven shaft 22 and a driving shaft 24, the latter being arranged beneath the driven shaft 22 and having operative connection therewith for movement in the same direction by gears 23. The sliding pivot 17, of the platen is made a positive one by a link connection to a cam-wheel 26 on the shaft 24, the cam acting in positive agreement with the draw-bars during the operation of the impression mechanism at the end of the rolling movement of face of the platen, producing the impression. The said cam holds the pivotal shaft 17, an instant in its forward position within the cycloidal ways 18 causing the separation of the platen face from the type-form. Then it quickly draws the pivotal shaft 17 to its rearward position in 18 and holds it there on its concentric face until the beginning of the next impression. This mechanism gives the improved results described in my application, Serial No. 548,661.

The improved inking mechanism of this embodiment comprises an inking roller 27, and means for supplying it with ink and a form roller 28 and mechanism for operating the form roller to take ink from the inking roller 27, and to ink the form. The inking roller 27 is supplied with ink through a series of metal and composition rollers 29, which roll in contact with each other, the first of these rollers taking ink from a fountain 30, and the last of these rollers rolling in contact with the inking roller 27 and delivering the ink to it. The plurality of rollers between the fountain and the inking roller reduce the ink of the fountain to great fineness of quality and deliver it to the inking roller in a thin film. The form roller 28 is mounted on carriages 31 (see Fig. 1) on opposite sides of the form bed and adapted to slide in ways 32 formed on the standards 10 and 11. These carriages are connected to an oscillating shaft 33 by cranks 34 secured to the shaft and links 35 connecting the carriage directly with cranks. The shaft 33 is oscillated by the engagement of a segmental gear 36 keyed on the shaft with a segmental gear 37 mounted on a short shaft 38 journaled just back of it and regularly oscillated by a link 39 connecting crank 40 on shaft 24 with crank arm 41 associated with shaft 38. (See Fig. 3 and Figs. 6 and 7). Gear 36 is provided with a disengageable tooth or clutch member 42 mounted in a slot 43 transversely of the gear and adapted to slide rearwardly to disengage the tooth from mesh with the gear 37. A spring 44 presses the tooth into engaging position. When in the position shown in dotted lines, the tooth bar 42 is opposite a socket 45 adapted to receive it and lock the shaft 33 and parts operated by it in position. Two rock levers 46 and 47 are journaled on a common pivot 48. One of these rock levers, the lever 47, is oscillated periodically by engagement of a pin or abutment 49, associated with link 39 from crank 41, with the hooked end of a link 50 pivoted to the rock lever. The link 50 is of such length and is so positioned that it is engaged by abutment 49 only when the crank 41 is adjacent the end of its upward stroke, the rock lever 47 having imparted to it therefore a periodic movement through a short distance. (See Fig. 3). An abutment 51 is provided on one side and at the forward edge of lever 47 which engages lever 46 to retract the same against the tension of spring 44, while an abutment 52 is provided on the frame for limiting the rearward movement of both of the rock levers. Both rock levers 46 and 47 are normally held forwardly by a spring connected to the rock lever 46 and to a fixed point. The link 50 is drawn downwardly by a spring 54, and is held in the proper position to be engaged by the abutment 49 by a stop 55 on the frame. A second stop 55[a] above the link 50 admits of the link being raised and sprung over the

stop and to be held thereby out of engagement with the abutment 49. To further this end and to prevent undue shocks or strain on the parts when the lever 50 is moved to operate the rock lever, this lever is preferably made of spring metal as clearly shown in Fig. 7. An abutment 56 projects from one side of the tooth or clutch member 42 into the path of movement of rock lever 46. By the engagement of the rock lever 46 with this abutment, the clutch member 42 is disengaged from the segmental gear 37 each time the gear 37 is operated. With this arrangement of the levers 46 and 47 and their adjacent elements, it will be seen that as the link 39 is oscillated it moves the pin 49 against the hooked end of the link 50 and retracts the lever 47. As the lever 47 is provided with the abutment 51, the latter strikes the forward edge of the lever 46 and carries the same back with the lever 47. As the tooth bar 42 is provided with a stud engaging the lever 46 when retracted, the tooth bar 42 is moved out of the path of the segmental gear 37 so as to disengage the shafts 33 and 38, and to move the member 42 into the locking slide 45 to hold the shaft 33 from rotation. As the member 42 registers with the slide 45 and with the stud on the lever 46, only at a predetermined position, such position being determined by the engagement of the form-roller 28 with the inking roller 27, the form-roller 28 is locked from downward movement over the form-bed. During this operation the normal position of the cam rod 62 is raised in order to yieldingly hold the latch lever 57 up and retain its inturned end 57[a] out of the path of the rock lever 46 so as to admit of the return of the lever 46 under the action of the spring 53. It will be readily seen that when it is desired to lock the tooth bar 42 in a retracted position so as to hold the gears 36 and 37 out of mesh with one another, the cam rod 62 is turned down to release the tension of the spring 60 from the latch lever 57 when the latter is drawn down by the spring 59. As the spring 59 exerts a yielding action upon the latch lever 57 the latch lever is moved down only when the pin 58 moves into the bridging portion of the U-shaped slot 58[a], at which time the latch 57 snaps into the position disclosed in full lines in Fig. 6, admitting of the movement of the pin 58 in the upper arm or branch of the slot 58[a]. In this position, disclosed in Fig. 6, the rock lever 46 is held from forward movement by the spring 53 by the inturned end 57[a] of the latch which is now disposed in the path of the forward projection of the lever 46. The lever 47, however, is permitted to oscillate under the action of the link 50 and pin 49 as the pin 58 is free to move in the slot 58[a], the stop 52 limiting the rearward movement of the same. When it is desired to release the inking mechanism, the cam rod 62 is again turned up to bow the spring 60 and increase its tension upon the latch 57. The latch 57 is not permitted to move up, however, until the pin 58 reaches the bridging portion of the slot 58[a], the bridging portion of the slot acting as a timing device to throw the inking mechanism into operative engagement with the moving portions of the machine only at the desired time. It will be further evident upon an inspection of Fig. 3 that the disengagement of the clutch member 42 takes place always when the crank 41 is at the upper end of its stroke, owing to the positioning of the link 50 and the abutment 49. At this time the clutch member 42 is opposite the slot 45, and is moved into it thus locking the shaft 33 and form rollers 28 in the positions which they occupy when the clutch member is disengaged. The cranks 34 are so connected to the shaft 33 that the form rollers are in contact with inking roller 27, when this disengagement takes place. When the downward movement of crank 41 takes place, the abutment 49 releases its pressure on the link 50 and the clutch member 42 is moved by its spring back into engaging position. The form rollers are thus moved downward over the form as the shaft 38 is oscillated to the lower position shown in Fig. 1 and then up again until they contact with the inking roller 27 and the clutch member is disengaged and locks them temporarily in position. The form rollers are thus allowed to remain in contact with the inking roller long enough to be supplied with a well distributed film of the ink. As the shaft 33 moves at the same speed as the shaft which moves the platen, this inking of the form rollers takes place once each impression.

It is often desired to allow the form rollers to remain in contact with the inking roller, or to stop inking the form while the press is still in operation. The form rollers must not rest, when thrown out of operation, in the path of the platen or otherwise the clash of parts will ensue and result in breakage of the press. I have therefore provided a latch for locking the clutch member 42 in its disengaged position, which latch is operative only when the clutch is in disengaged position and only when the form rollers are in contact with the inking roller 27.

57 is the latch which is pivoted to the side of the frame, and is provided with an inturned end 57[a] which projects into the path of oscillation of the lever 46, as clearly shown in Fig. 7. A pin 58 is provided on the side of rock lever 47, which oscillates regularly, periodically, adjacent to the latch. Opposite the pin the latch 57 has formed in

it a double branched slot 58ª with a cross-over between the branches. The branches of the slot are substantially parallel to the line of reciprocation of the pin 58, and the pin projects into the slot. More specifically speaking the free end of the latch is provided with a U-shaped slot into which the pin on the member 47 projects, the branches of the U being substantially parallel to the line of reciprocation of the pin. Two springs act on this latch, one 59 yieldingly holding the latch downwardly and the other 60 being a stronger spring than spring 59 and being adapted to press the latch upwardly. (See Fig. 6). This latter is a leaf spring, fixed at one end and engaging an inwardly projecting pin 61 on the latch at its other end. Intermediate its end it is engaged by the cam shaped end of an operating control or key shaft 62, which extends to the front of the press and is provided with an operating handle or wheel. When the key shaft 62 turns so that the cam bows the spring 60 upwardly intermediate its ends, as shown in Fig. 5, the leaf spring 60 overcomes the force of the spring 59 and moves the latch 57 upwardly. This is the normal operating position of the latch in which the rock lever 47 is free to reciprocate or rock and the inking rollers alternately rest in contact with the inking roller 27, and move up and down the face of the form bed. In this position the pin 58 moves back and forth in the lower branch of the slot 58ª as the rock lever 47 is periodically moved by the link 50 and pin 49. When, however the key shaft 62 is turned to its opposite position in which the pressure of the leaf spring 60 is relieved, the latch is moved downwardly by a greater pressure. As soon as the pin 58 is moved to the end of the lower branch of the slot 58ª opposite the cross-over, the latch is pulled downwardly so that the pin is free to enter the upper branch of the slot and reciprocate therein, as shown in Fig. 6. As the pin 58 is connected to the rock lever 47, this can occur only, when the form rollers are in contact with the inking roller, at which time, as heretofore stated, the clutch member 42 is disengaged and locks the shaft 33 and the form rollers in position. No matter at what time therefore the key shaft is thrown to disengage the form rollers, the disengagement does not take place until the form rollers have been moved into rolling contact with the inking roller, and have been locked in that position by the disengagement of the clutch member 42. The position at which the inking rollers stop when thrown out of operative position is therefore predetermined. The form rollers are always stopped in contact with the inking roller where the distribution in ink on them can be furthered, and out of the path of the platen as it moves to and from the form bed so that all clash between the platen and the form rollers, or all jamming of parts is positively avoided. It is of course evident that release of the form rollers also can take place only at a definite time with respect to the movement of the platen, and that this time is the time for the clutch member in its normal operation to engage the segmental gear 37 on the shaft 38. The time relation of the movements of the form rollers and the platen, by this mechanism, is effectually preserved as is the position of the form rollers in rolling contact with the inking roller when they are thrown out of operative relation.

While I have described the best form of my invention now known to me, I wish to have it understood that I desire to cover in the annexed claims all forms of my invention which can be given it without departing from its generic spirit.

What I claim is:—

1. In a printing press, a form bed, a form roller, a carriage for the roller slidable in ways running parallel with the bed, and means for operating said roller carriage comprising an oscillating shaft, connections between said shaft and said carriage, a second oscillating shaft, and segmental gears between the two oscillating shafts, one of said gears having a retractable tooth adapted for movement out of engagement with the opposite gear to release the gears from one another and lock said gear with said tooth from rotation.

2. In a printing press, a form bed, a form roller, a carriage for the roller slidable in ways running parallel with the bed, an oscillating shaft, connections between said shaft and said carriage, a second oscillating shaft for operating said first shaft, intermeshing gears upon the shafts, a retractable tooth carried on one of said gears for movement out of engagement with the opposite gear to release the gears from one another, and an abutment in the path of said retractable tooth for engagement with the same when retracted to hold the gear from rotation.

3. In a printing press, a form bed, a form roller, a carriage for the roller, an oscillating shaft, connections between said shaft and said carriage, an operating shaft, intermeshing gears carried on said shafts, a retractable tooth arranged on one of the gears for movement out of engagement with the opposite gear to release the gears, an abutment in the path of the retractable tooth to hold its supporting gear from rotation, and manually operable locking means associated with the retractable tooth for holding the same inoperative.

4. In a printing press, a form bed, a form roller, a carriage for the roller, a shaft connected to the carriage for retracting the

same, an operating shaft, intermeshing gears on said shaft, a retractable tooth on one of said gears for movement out of engagement with the opposite gear, said tooth being elongated to extend diametrically oppositely from the gear when retracted, an abutment for the reception of the extension of the tooth when retracted to hold the gear from rotation, and a manually operable locking device associated with the tooth for positively holding the same inactive at a predetermined period in the operation of the press.

5. In a printing press, a form bed, a form roller, and means for moving said roller comprising a movable shaft, operative connections from the shaft to the roller, and means for controlling the movement of said roller comprising a continously oscillating gear, a coöperating gear on said movable shaft, means for engaging and disengaging said gears at will, and means which determine the position of said form roller when said gears are unlocked.

6. In a printing press, a form roller, and means for moving said roller comprising a movable shaft, operative connections from the shaft to the roller, and means for controlling the movement of said roller comprising a continuously oscillating gear, a coöperating gear on said movable shaft, means for engaging and disengaging said gears at will, and means which holds said form roller in the position which it occupies when the gears are disengaged.

7. In a printing press, a form bed, a form roller which runs over the bed, means for moving said roller comprising a movable shaft, operative connections from said shaft to said roller, means for controlling the movement of said roller comprising a normally continuously oscillating gear, a cooperating gear on said movable shaft, and means for unlocking and locking said gears together automatically and periodically, and means for maintaining said gears unlocked at will.

8. In a printing press, a form bed, a form roller, means for operating the same at will, said means comprising a regularly moving element and gearing between said element and said roller, and means which insures said roller being always held in the same inoperative position, comprising a latch, and a pin and slot connection between said latch and said regularly moving element, said slot having two branches, and a cross-over between the branches whereby said latch can change position only when said pin reaches the cross-over.

9. In a printing press, a form bed, a form roller, means for operating the same at will, said means comprising a regularly moving element and gearing between said element and said roller, and means which insures said roller being always held in the same inoperative position, comprising a latch, and a pin and slot connection between said latch and said regularly moving element, said slot having two branches, a single cross-over between the branches, whereby said latch can change position only when said pin reaches the cross-over, and means biasing said latch laterally of the line of movement of said pin.

10. In a printing press, a form bed, a form roller, means for operating the same at will, said means comprising a regularly moving element and gearing between said element and said roller, and means which insures said roller being always held in the same inoperative position, comprising a latch, and a pin and slot connection between said latch and said regularly moving element, said slot having two branches, a single cross-over between the branches whereby said latch can change position only when said pin reaches the cross-over, and means biasing said latch laterally of the line of movement of said pin in either direction at will, said means comprising two springs which act on said latch in opposite directions, one of which springs may be placed at a greater tension than the other, and a key shaft acting on one of said springs to alter its tension.

11. In a printing press, a form-bed, a form roller movable over said form-bed, an inking device for engagement with the form-roller, gears operatively connected to the form-roller for moving the same from the inking device over the form-bed and back again, means for automatically disengaging said gears at the time of engagement of the roller with the inking device, and locking means for the gears for holding the roller against the inking device as long as desired.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM M. CLARK.

Witnesses:
RICHARD CRANKSHAW, Jr.,
NATHANIEL M. SWOPE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."