

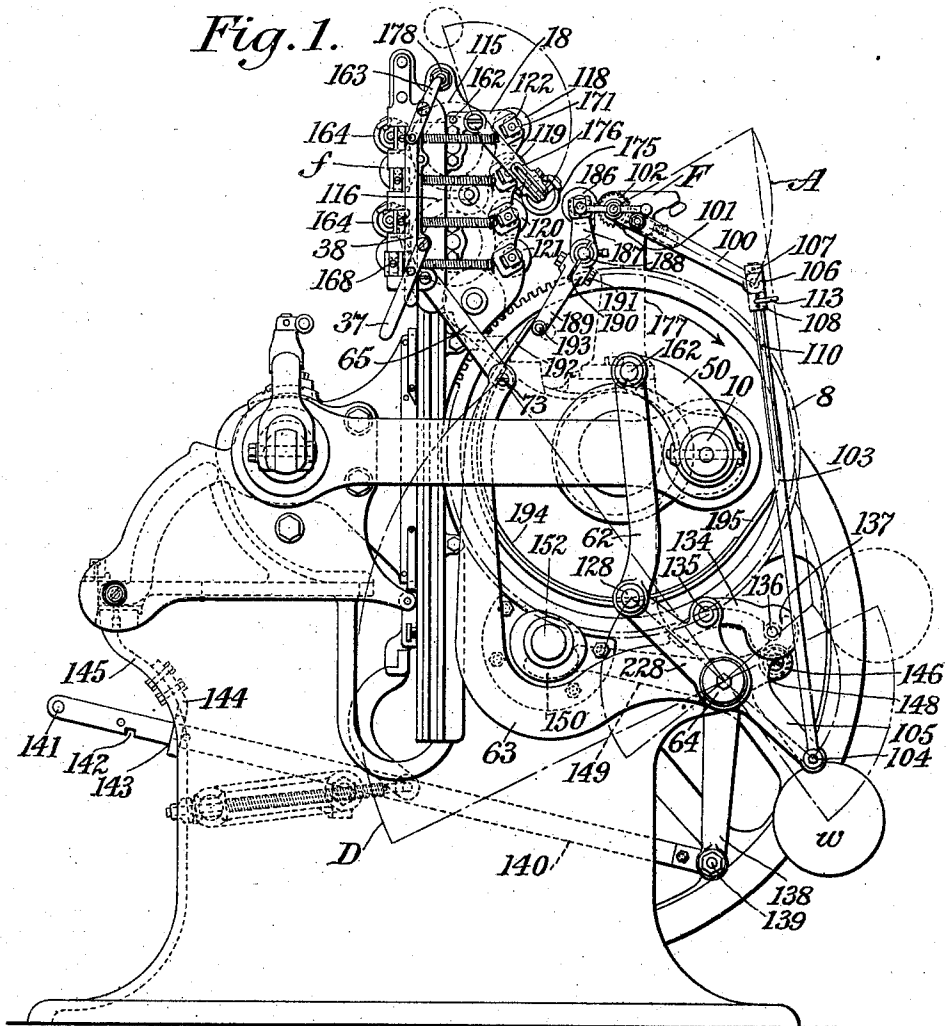
J. THOMSON.
PRESS.

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6 SHEETS-SHEET 1.



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6 SHEETS--SHEET 2.

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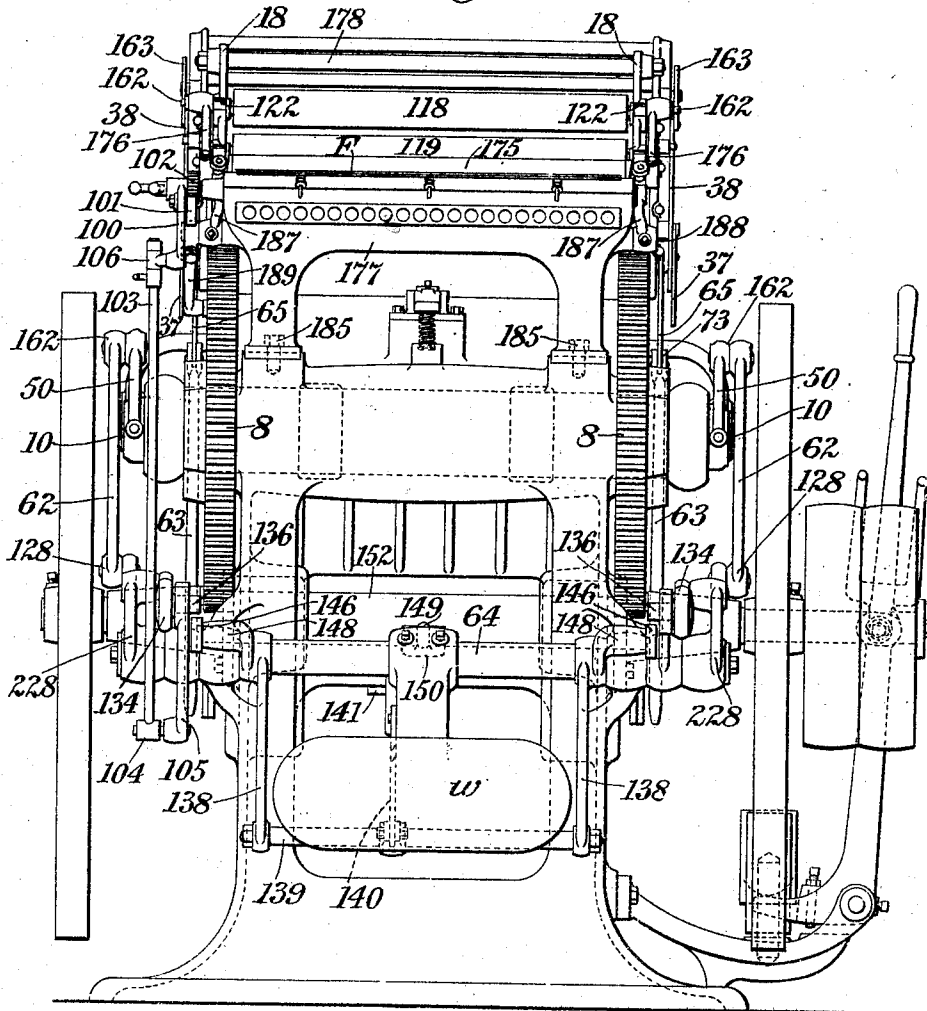
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6 SHEETS—SHEET 3.

Fig. 3.



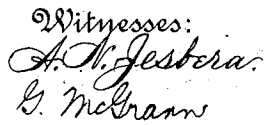
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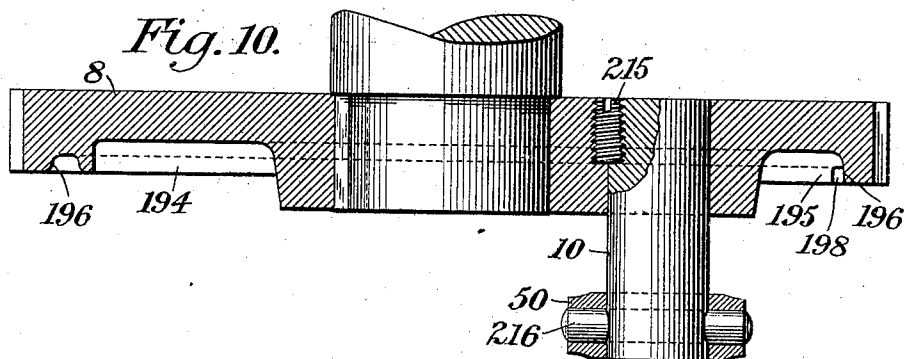
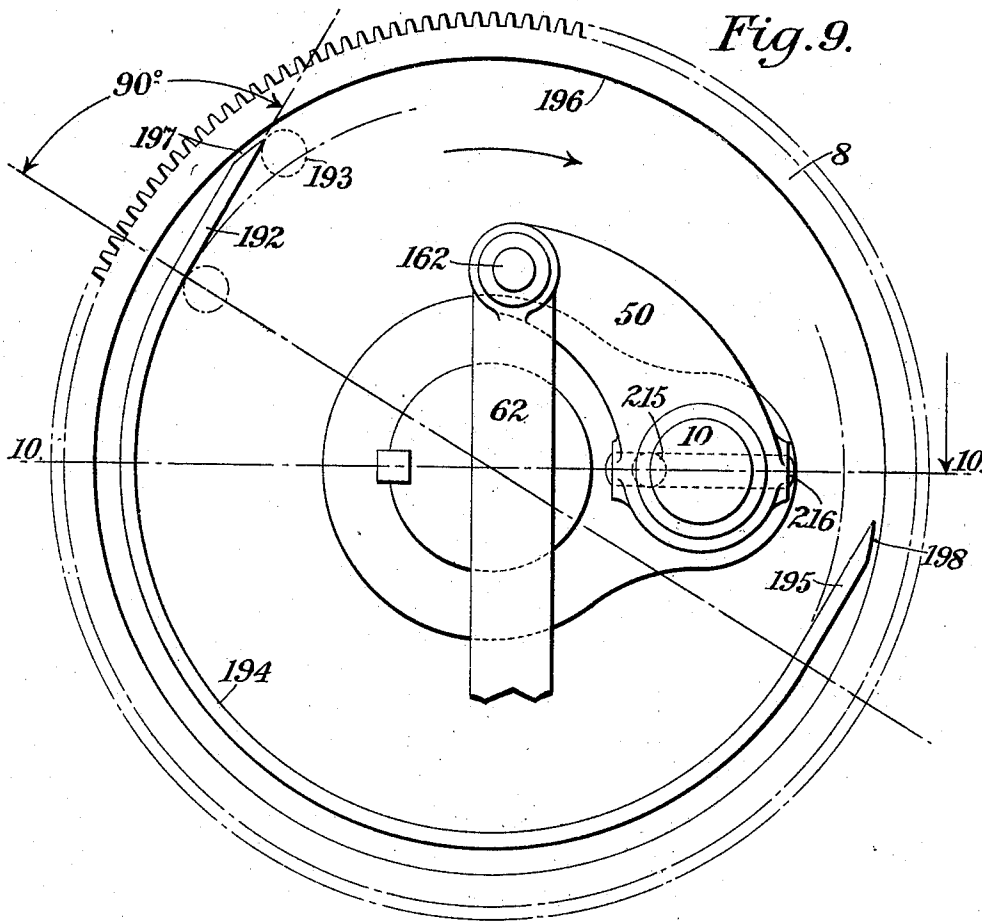
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6 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF NEW YORK, N. Y., ASSIGNOR TO JOHN THOMSON PRESS COMPANY,
OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PRESS.

980,456.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, and a resident of the borough of Manhattan of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Presses, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The invention relates more particularly to improvements in the inking mechanism of printing presses designed for high grade half-tone and three-color plate work, and especially of printing presses of the rocking platen type such as those commercially known by the trade name of "The Colts Armory".

Among the objects of the invention are to provide an inking mechanism and organize it into practical relation with a press of the type specified, for the production of the highest grade of half-tone and three-color work; to facilitate the change of colors; and, in general, to increase the speed and smoothness of operation, to promote the endurance of the various parts, and to create a simplicity of construction and handling.

In the drawings, which are reductions from a case in practice, Figure 1 is a side elevation of the assembled press, the platen being on the impression. Fig. 2 is also a side elevation, the platen being open, in position to feed, and the form rollers and their carriage disconnected to remain on the distributing cylinders. Fig. 3 is a rear elevation, and the preceding figures are taken from the left-hand side thereof except that, for clearness of illustration, the fly wheel on that side is removed. Fig. 4 is a partial front view, upon an enlarged scale, of the carriage and form inking rollers. Fig. 5 is an enlarged side view developed from Fig. 4. Fig. 6 is an enlarged top detail view of one of the form roller bearing boxes. Fig. 7 shows respectively, an enlarged side and rear view of one of the arms in which the distributing changer is mounted. Fig. 8 shows similarly detail side and sectional views of a distributor stock bearing box and its mounting in the carriage way. Fig. 9 is an enlarged front elevation of one of the main gear wheels. Fig. 10 is a central transverse section of said gear, on the line 10—10 of Fig. 9. Fig. 11 is an enlarged detail view

of a portion of the apparatus for actuating the ink fountain. Fig. 12 is a transverse section as on the line 12—12 of Fig. 11. Fig. 13 is a combined detail and diagram to illustrate the principles involved in the construction of the carriage actuating apparatus.

The basic ink distribution is produced upon two cylinders 115, 116 constantly revolved by suitable interposed gearing meshing with one of the main driving gear wheels, as 8, and, resting against each of these cylinders, are two composition distributing rollers 118, 119 and 120, 121 mounted in slots, as 122, of the carriage ways, as 18. It has hitherto been deemed essential that the carriage with its form inking rollers should make a definite stop or "dwell" upon the cylinder, or cylinders, in order to be adequately charged with fresh ink after each impression; and the usual means employed for such purpose has been cams or mutilated gearing. By such means, the movement of the carriage must thus, at best, be relatively suddenly arrested and started; and it has only been possible to obtain a satisfactory endurance by the employment of the utmost refinement in design, construction and material. It is also desirable, and through long use is now in fact a trade-requirement, that the carriage may be disconnected from the actuating mechanism and remain upon the cylinders while the platen of the press may be in motion.

In the apparatus now to be described, the carriage does not definitely stop upon the cylinders, but passes up to and away from them at so low a rate of speed, relative to the rate of revolution of the cylinders, that ample time is afforded the form inking rollers to be thoroughly charged with ink therefrom. This result is obtained by the following elements: To the main crank-pins, as 10, are fixed sub-crank arms, as 50, a link being journaled thereto, as at 162, and also freely connected, as at 128, to rocker-arms, as 228, mounted upon a rocker-shaft 64. Upon this same shaft two carriage-levers, as 63, are mounted, these being pivotally connected to the carriage, as at 66 and 73, by the link connection 65. The rocker-arms may be in turn locked to the carriage levers by the swinging links, as 134, pivoted at 135 in the rocker-arms and having friction rolls

mounted upon pins 136, which are adapted to engage slots, as 137, formed in the carriage levers, the assemblage being as shown in Fig. 1. In this wise the rocker-arms and the carriage levers are definitely locked together and act as if they were one part; hence, as the sub-crank arm revolves, the carriage levers will be reciprocally swung through the arc D thereby actuating the carriage. Journaled upon the rocker-shaft 64 are two arms, as 138, connected horizontally by a tie-rod 139 to which is attached a hand lever 140 passing forward to the front of the press and having a cross-handle, as 141. This lever has two notches 142, 143 adapted to engage a clip 144 secured to the cross-girth 145 of the frame. The arms 138 have bell-crank extensions 148, carrying friction rolls as 146. Now, the arrangement is such that when the notch 143 is in engagement with the clip, the links with their rolls are free to engage by gravity, with slots in the carriage levers; but when the hand lever is lifted and thrust forwardly to engage the notch 142, then the link-rollers are forced out of engagement by the impingement of the bell-crank rollers. If the press is now operated (see Fig. 2) the link-rollers will simply ride along the curved bearing 147 formed on the carriage levers without actuating the latter. But a very important contingent condition must here be provided for, as the counter-weight *w* fast to the rocker-shaft 64 must necessarily exert a sufficient excess of thrust to hold the carriage upon the cylinders. A most efficient and enduring means for sustaining the counter-weight in the exact position desired, and with it the carriage, consists in providing the said weight with a forwardly projecting arm 149 (Figs. 1 and 13) whose end is suitably curved as 150 to rest against the main driving pinion-shaft 152, that is where the latter is exposed in passing through the frame of the press between its bearings. As the bearing surface of the curved end 150 may be of any extent desired, and as the pressure is nominal, the action once set will endure indefinitely and will not require any means for adjustment.

The elemental principles of the design and construction of the carriage actuating apparatus are clearly shown in the diagram of Fig. 13, but these will not be here described in complete detail, as reference may be had to another application filed concurrent herewith. However, in the present utilization of this system there are two important deviations specifically essential to the type of press under consideration. Thus, the carriage is not caused to incline backwardly upon the cylinders but traverses up and down in a straight vertical path. The consequence of this is that the center 73 of the carriage-lever may be swung up-

wardly until it lies on the dead-center line, E between the carriage center 66 and the center of the rocker-shaft 64 or fulcrum of the carriage lever. This is shown by the thrust angle, 38° , to the carriage slides, which is well within good practice. As a matter of fact, the center 73 of the carriage-lever might be swung slightly beyond the dead-center without detrimental effect, as the slight motion thereby produced would be readily taken care of by the several bearings and the spring of the connections. Now, by so disposing the carriage levers that they shall swing through unequal arcs with respect to the horizontal center-line H, or as shown 30° below and 50° above it, and by also locating the centers 128, of the rocker-arms below the carriage lever center line E, or 12° as here shown, the following differences in the ratio of the carriage movement, at top and bottom, take place: For a crank-swing of 40° , shown, the carriage being at its up-most limit, the carriage lever will only be swung 6° and the carriage center 66 will be drawn down to the dotted position 166. Again, the carriage lever center being drawn down to its lowest position 273, it will, for a crank swing of 40° , be swung, as shown, 12° , and the carriage center, 266 will be moved to the dotted position 366, or in vertical traverse the carriage will move, as shown, about fifteen times more slowly at the top than at the bottom. The consequences of this condition are that ample opportunity is afforded to charge the rollers with fresh ink, adequate clearances are readily secured between the carriage and the platen, and the smoothness and endurance of the action are of the highest order.

As a convenience for removing and inserting the form rollers to or from the usual spring retracted boxes of the carriage and to prevent the rollers from flattening if the press is stopped, hand-levers, as 37, connected to a linked bar, as 38, are mounted thereon whereby when drawn outwardly, as in Fig. 2, all of the boxes are forced fully outward and the rollers are freely suspended; but in this type of press it is essential, if the boxes are not manually reset, that this should be done automatically and before the outwardly projecting rollers can interfere with the upper edge of the platen. To this end, the limiting stops for the upward movement of the said hand-levers are pins, as 162, located in the carriage-ways, the upper pivoted link, 163, of the bars extending rearward to engage the pins. The disposal and arrangement, shown, is such that the elevating bars cannot be drawn beyond the dead-centers of the links, owing to the impingement of the rear portion of the links, 163, upon the pins, until the carriage is at its up-most position; hence, if not manually

re-set, the boxes will be free to spring back immediately the carriage is started downwardly, thereby avoiding any possible damage.

5 In many classes of work, especially where half tones or tint-plates are combined with borders, rules and types, it is exceedingly difficult to obtain perfect inking thereof without streaking or "re-printing", as it is
10 termed; which is usually caused by slippage of the roller-trucks as the carriage reverses at the bottom of its stroke, thereby presenting some portion of a roller which has delivered its ink to a surface of the form already perfectly covered. Obviously, this has
15 the effect of depositing an ink film of variable thickness or intensity of color-tone. Ordinarily, when such results occur, the practice is to "double-roll", thereby reducing the out-put capacity by fifty per centum.
20 A complete remedy for such difficulties is best shown in Figs. 1, 2, 4 and 5 and consists in substituting for one or for two of the four composition form rollers, a metallic changer or changers as 164, which is driven by ink-friction. The rod, 165, upon which the
25 changer revolves and reciprocates, is mounted in two end pieces, as 160, which in turn are provided with pins, as 167, adapted to rest in the roller-boxes, as 168. The space between the centers of the changer rod and the
30 pins of the said end-pieces is to be such that the changer cannot come in contact with the form and will also be perfectly free to "ride", by gravity, upon the form-roller
35 next below, t denoting the roller trucks. The consequence of this is that the pressure between the two is a constant; that no additional means for adjustment or attachment
40 are required; that the covering capacity of the form roller is equal to that of its own circumference plus that of the changer and that the reciprocal or spreading action thereof is continuous. By this arrangement,
45 the changer may be most conveniently swung up, as shown by the dotted circle k , for cleaning and it also automatically adapts itself to the form roller when passing over an uneven form or when the boxes are forced out
50 for removal of the rollers.

In respect of the distributing rollers, 118 to 121, means is provided for quickly withholding them from contact with the cylinders, as when the press is stopped or for
55 cleaning them, and such means consists, as shown in Fig. 2 and a portion of Fig. 8, in forming notches, as 170, in the lower surface of the carriage-way slots and employing square bearing boxes, as 171, with sharp corners. Thus, by slightly withdrawing the
60 roller and tilting its boxes to engage the notches, shown in dotted lines, the rollers will remain freely suspended. Then, by simply re-tilting the boxes, the rollers will
65 slide into operative contact with the cylinders.

Another feature relating both to the form rollers and to the distributing rollers (see Figs. 4, 5, 6 and 8) consists in providing pivotal end-bearings for the stocks. Hitherto, the endwise thrusts on these rollers, due
70 to the reciprocating action of changers or cylinders, have been borne by collars of considerable diameter, resulting in excessive friction and wear both upon the collars and the boxes. This is overcome, in the instance
75 of the carriage rollers, by milling a slot along the central outer side of each, and inserting therein a piece of hardened steel, as 172, secured in place by a screw as shown; and, in the instance of the distributor roller
80 box, by forcing in a circular plug of hard metal, as 174. The closed ends afford an excellent retainer for lubricants and the result, as to diminution of friction and increase of
85 endurance, is all that can be desired.

The distributing changer acting against one or two of the distributing rollers, has hitherto been slid into slots formed in the carriage-ways or secured by means of bolts or
90 screws; hence when desiring to remove the rollers, or to clean the changer, it has been necessary to remove it. This is here avoided by mounting the changer 175 (Figs. 1, 2 and
95 7) in a pair of swinging arms, as 176, pivoted upon the carriage-ways, the arrangement and disposal being such that the changer will rest, by gravity, in its proper position. But when it is desirable to wash it, or to remove the rollers, it is simply required to be
100 swung upwardly, beyond the vertical center, where it rests securely against the projecting ends of the carriage-way tie-rod 178 (Fig. 2.) To provide convenient means for securing the changer in its arms, and also for adjusting it to the natural shrinkage of composition rollers, whereby it may make equal
105 contact upon two distributor rollers, the ends of the changer spindle 179 are flattened, as at 180, to be engaged by slots, as 181, the sides being sprung together by the bolt and nut, as 182. In this wise, too, the changer
110 may be readily removed without detaching the arms from the carriage-ways.

The final adjunct to the distributing and inking apparatus, as so far described, is the
115 ink-fountain and the means for passing the ink therefrom to the rollers and the cylinders, the importance of which, although ordinarily treated as secondary, is in fact equal to that of the main distributing system. Heretofore, in presses of this type, the doctor roller, its frame and actuating parts have been mounted in projections cast upon the upper portion of the bed, the fountain
120 and its operative mechanism being separately applied and adjusted in place. But in the present instance the fountain F, and all apparatus necessary to actuate it and to transmit its ink to the distributing rollers, are mounted in a distinct separate bracket
125 130

177 machined and assembled off the press, and then secured to the bed thereof, above the main shaft, as by the bolts 185. This considerably simplifies the molding and casting of the main frame, reduces the cost of construction and insures greater accuracy in the various alinements and in their endurance. The ductor roller 186 is mounted in bearing boxes similar to that shown in Fig. 8, these being inserted in the open slots of arms, as 187, fixed to a shaft 188 mounted in the aforesaid bracket. This shaft is to be provided, as will readily be understood without illustration, either with a spring, or springs, or with a counter-weight, the action of which shall be to hold the ductor roller in contact with the fountain cylinder, as shown in Fig. 1. Upon an end of shaft 188 an arm 189 is secured by friction, the slotted end 190 being clamped upon the shaft by the bolt and nut 191. The object of this is to provide for the natural shrinkage of the composition rollers, that is to be able to set this arm to suit variable diameters. The ductor roller is swung through a short arc until it impinges against the changer by a cam 192 (Figs. 1 and 9) formed on the outer surface of the main gear or crank disk and which acts upon the roller 193 fixed in the other end of the arm. The said roller will then run on the concentric wall 194 during half of one revolution of the gear, maintaining the ductor in contact with the changer until it reaches the run-off cam 195, when the springs or weight mentioned, will retract the ductor and bring it again into contact with the fountain cylinder. These cams are preferably formed, as shown, tangential to the maintaining circle of the concentric wall, and not only effects a very smooth action but makes the construction simple. A finishing cut 196 may also be taken, to remove the sharp edge on the machined face of the gear blank or crank disk, as the slight separations of the cam, as at 197, 198, do not sensibly affect the operation of the roller.

The fountain cylinder, the ductor roller being in contact therewith, is now partially revolved by the lever 100 which carries a pawl 101 acting upon a ratchet 102 secured to the end of the cylinder, and the said lever is vibrated by a rod 103. The lower end of this rod is pivotally connected, as at 104, to a projection, as 105, on one of the rocker arms; and its upper portion (see Figs. 11, 12) acts freely in a swivel 106 secured in the lever 100. To the extremity of the rod a sleeve 107 is secured, and below the swivel is an adjustable sleeve 108. The upper portion of the rod is provided with two V-grooves 109, 110 each opposite from the other and to one of these grooves a fixed pointed pin 112 and a pointed adjusting screw, preferably with an arm 113 of considerable relative length is situated opposite

from the fixed pin. The bore in the sleeve should be sensibly larger than the diameter of the rod so that when the sleeve is slid to a position and the adjusting screw is set the friction will be entirely upon the conical surfaces of the fixed pin and the screw. In this wise, the adhesion is very high and permanent and a shift can be made, practically in an instant of time, either to drive the fountain cylinder through the full arc A (Fig. 1) or any definite subdivision thereof, or to stop the feed entirely, the rod sliding idly through the swivel. It is to be noted that, as the action to revolve the cylinder is on the down movement of the rod, no counterbalance is required upon the ratchet lever. The particular advantages of these elements are that the ductor roller is swung into contact with the changer as the carriage leaves the cylinders and remains in contact therewith during half of the entire period of time between the impressions, so that the film of fresh ink is necessarily completely distributed over all of the surfaces of all the rollers and cylinders before the carriage returns. Again, ample time is afforded to actuate the fountain cylinder slowly and smoothly, and finally, when the rocker arms are disconnected from the carriage levers, the rod and ratchet lever automatically cease to operate. Therefore, the press may be temporarily operated with the form rollers latched up in contact with the cylinders, without being sur-charged with ink; hence, when the carriage is again put into operation it will deliver precisely the same tone of color as before.

It has been found in practice, to be exceedingly important that the sub-crank arms which actuate the carriage and its connections, should be attached with the utmost accuracy, rigidity, and permanency in that while the actual thrusts delivered from their pins is comparatively nominal these become of considerable moment at the main crank-pins because of the leverage thereat. A very satisfactory solution has been found and is shown in Figs. 9 and 10, wherein the main crank-pin is formed of uniform diameter, without shoulders, and is pressed into the blank from the outside. A hole is then drilled and tapped, on the inside, half in the pin and half in the material of the blank, into which is very snugly inserted a headless screw, as 215. This screw performs the two-fold function of acting as a key, to prevent the pin from turning, and also to prevent the pin from being drawn outwardly, as by the cramping action of the connecting rod eyes when the impression is very heavy. Then, with all the parts assembled, the carriage being forced up until the several centers reach the position shown in the diagram (Fig. 13), a hole is drilled and reamed entirely through the arm and

the main crank-pin and a key-pin 216 is driven therein.

I claim as my invention:

1. In a press, the combination with the form inking carriage, carriage ways and inking apparatus located at the top of said ways of operating connections for the carriage including a link connecting the carriage and a swinging lever and also including another link connecting the swinging lever and a sub-crank mounted upon the main crank, both centers of the link and the fulcrum of the swinging lever being substantially in line and the sub-crank and main crank being substantially on their dead-centers when the carriage reaches the limit of its up-movement.

2. In a press, the combination with the form inking-carriage and carriage ways vertical throughout, of operating connections for the carriage including a swinging lever, a link connecting said lever and carriage and another link connecting said lever to a sub-crank mounted upon the main crank, the several members being so related that when the carriage has reached the limit of its up-movement the fulcrum of the swinging lever and both centers of the link connecting it to the carriage will be substantially in line while the sub and main cranks will be substantially on their dead centers.

3. In a press, the combination with the form inking-carriage, carriage ways and inking apparatus at the top of said carriage ways of main and sub-cranks, a swinging lever, a link connecting the said sub-crank and lever, and another link connecting said lever to the carriage, the fulcrum of the lever and both of the carriage connection centers being substantially in a straight line or on dead center, and the sub and main cranks substantially on their upper and forward dead-centers when the carriage is at the limit of its up-movement.

4. In a press, the combination with a platen, form inking carriage, carriage ways and inking apparatus located adjacent the end of the travel of the carriage on the ways, of operating connections for the carriage, including a link connecting the carriage and a swinging lever also including another link connecting the swinging lever and a sub-crank operatively connected with the main crank which operates the platen, both centers of the link and fulcrum of the swinging lever being substantially in line and the sub-crank and main crank being substantially on their dead centers when the carriage reaches the limit of its movement and at the time the platen is in impressing position.

5. In a press, the combination with the form inking-carriage, vertical carriage-ways, inking apparatus at the top of said carriage-

ways, and a rocking platen, of a crank disk to operate said platen, a swinging lever also operated from the crank disk but from a different center, a link connecting said lever and carriage, the fulcrum of the lever and the lever and carriage centers being substantially in line when the carriage reaches the limit of its up-movement.

6. In a press, the combination of a platen and operating means for continuously reciprocating the same, a form roller carriage and ink fountain provided with a fountain cylinder, a reciprocating member for reciprocating the carriage operatively connected by a disengageable connection with the operating means and means extending between said reciprocating member and the fountain cylinder for causing angular movement to be imparted thereto by movement of the member.

7. In a platen press having an ink fountain, a form inking carriage and operating mechanism for the platen, the combination of a swinging lever with connections for operating the carriage and means for disconnecting the said lever from the operating mechanism for the platen to stop the carriage at its up-movement, of a connection between the swinging lever and the means for revolving the ink fountain cylinder, whereby both the carriage and the fountain are stopped or started in unison and the platen moved to and from impressing position.

8. In a press, the combination with the form inking-carriage, and the fountain cylinder, of a swinging lever, a link connecting the lever and carriage, a crank disk, a link connecting said disk and lever, a ratchet and pawl and pawl lever for actuating the fountain cylinder, a swiveled sleeve upon the end of the pawl lever, and a rod sliding in the said sleeve and connected with the swinging lever.

9. In a press, the combination with the inking apparatus, the form inking-carriage and actuating members therefor so arranged that the several members are substantially on dead centers when the carriage is at its up-movement, of the disconnectible carriage counterweight provided with a direct stop whose operation is independent of the carriage or its connections.

10. In a press, the combination with the inking apparatus, the form inking-carriage and actuating members therefor so arranged that the several members are substantially on dead-centers when at its up-movement, of a carriage counterweight provided with an arm adapted to engage with a stop member carried by the frame and acting as a direct limitation to the downward swing of the weight.

11. In a platen press having operating means for the platen comprising a pinion shaft, the combination with the inking appa-

ratus, the form inking-carriage, and actuating members therefor so arranged that the several members are substantially on dead-centers when at its up-movement, of a carriage counterweight provided with an arm adapted to engage with the pinion shaft and acting as a direct limitation to the downward swing of the weight.

12. In a press, the combination of an inking apparatus, a form inking carriage and actuating members therefor so arranged that the members are substantially on dead centers when the carriage is at the end of its upward movement and means which over-balance the carriage sufficient to maintain the same in elevated position and a stop for directly limiting the movement of said means at the time the members are on substantially dead centers in a direction tending to force the carriage upward, the actuating members being detachably connected to the source of power.

13. In a press, the combination with the form inking-carriage, the form inking rollers and the roller boxes in which the rollers are journaled, of a changer having mounting pins eccentric therewith and adapted to be inserted in any of the roller boxes, whereby any roller may be replaced by a changer.

14. In a press, the combination with the form inking-carriage, the form inking-roll-

ers, and the roller boxes in which the rollers are journaled, of a changer, a rod upon which the changer is mounted, end-pieces secured to the rod, and mounting pins secured to the end pieces and adapted to be inserted in any of the roller boxes, whereby any roller may be replaced by a changer.

15. In a press, the combination with the main inking cylinders, the carriage ways and the distributing rollers, of free journal boxes in which the spindles of the rollers are mounted, the said boxes being squared and adapted to rest in inclined slots formed in the carriage ways, the bottoms of said slots having notches whereby the boxes may be partially withdrawn and turned to engage the notches to suspend the rollers out of contact with the cylinders.

16. In a press, the combination of the carriage-ways, distributing rollers journaled therein, a pair of arms pivoted to the carriage-ways and having slots in their ends, and a distributing changer having a spindle with flattened ends adapted to fit in the slots.

This specification signed and witnessed this 7th day of January, A. D., 1910.

JOHN THOMSON.

Signed in the presence of—

G. McGRANN,

ALFRED W. KIDDLE.