

Feb. 20, 1951

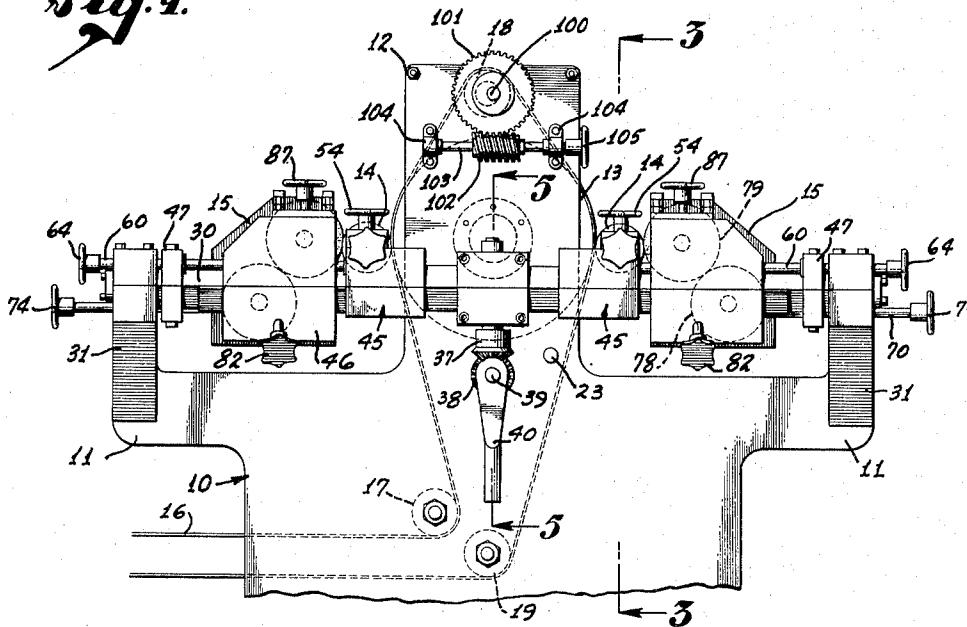
A. M. BOJANOWER ET AL  
 PLATE CYLINDER AND INK ROLL MOUNTING  
 FOR PRINTING PRESSES

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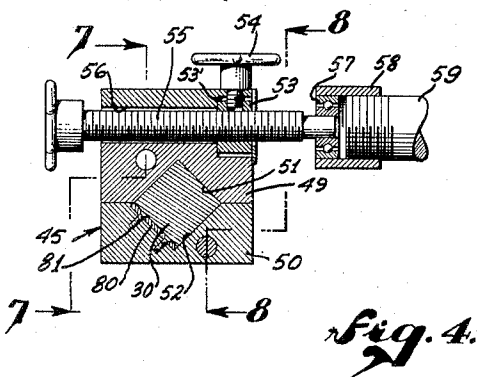
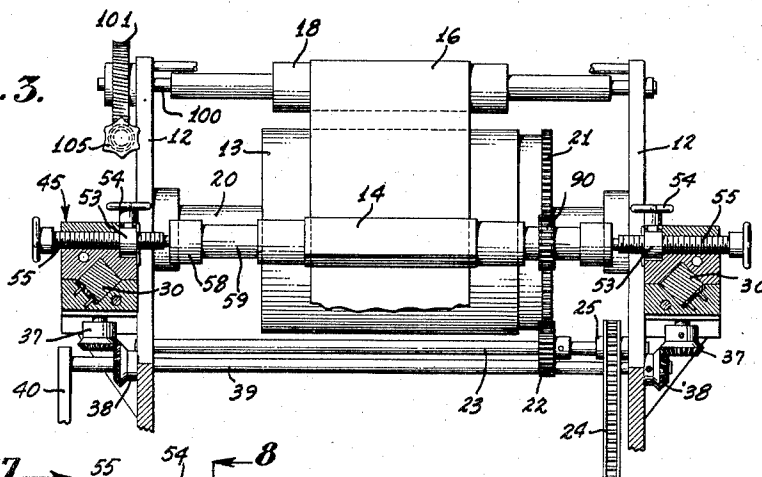
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*Fig. 1.*



*Fig. 3.*



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Fig. 2.

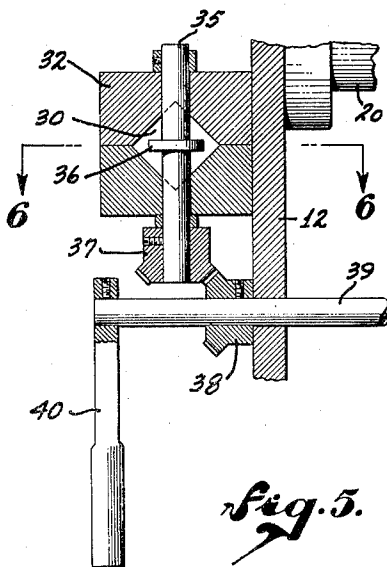
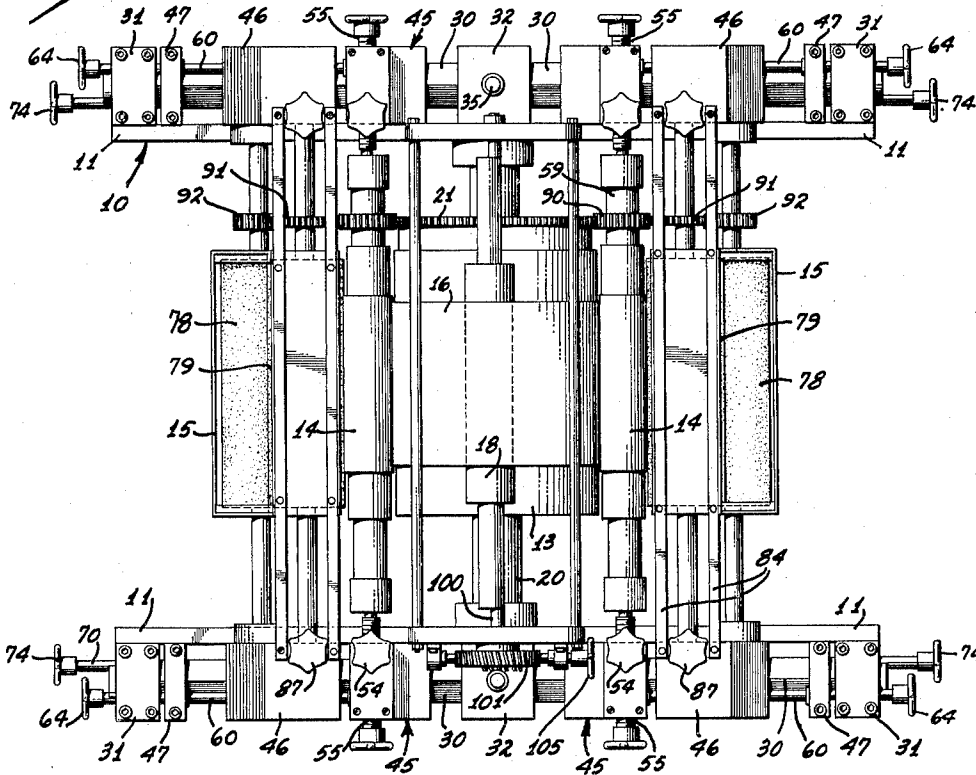
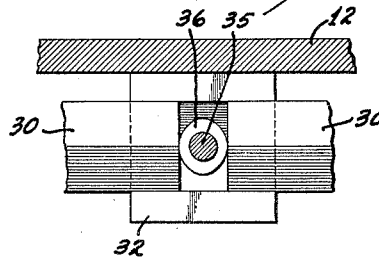


Fig. 5.

Fig. 6.



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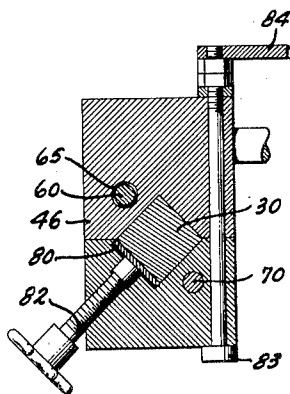
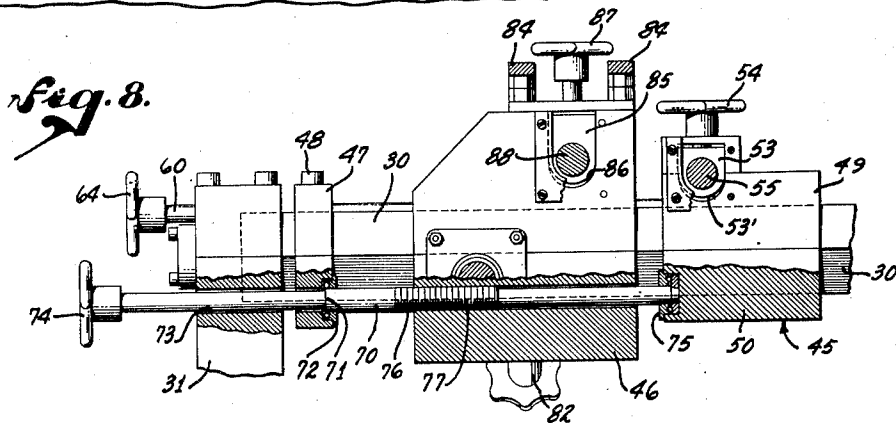
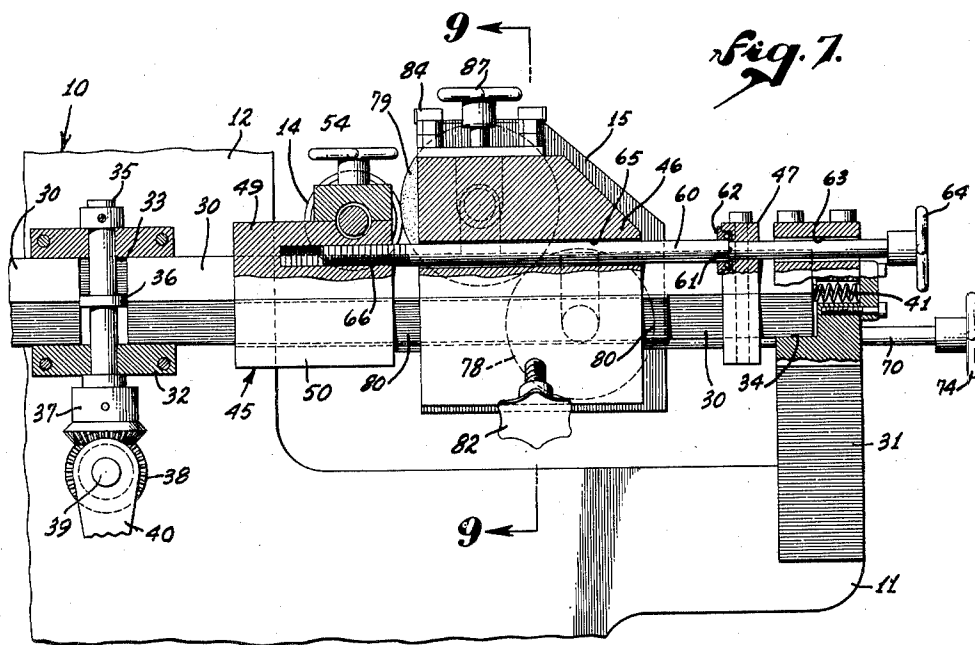
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## UNITED STATES PATENT OFFICE

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PLATE CYLINDER AND INK ROLL MOUNTING  
FOR PRINTING PRESSESAlbert M. Bojanower and Richard D. Spearman,  
Downey, Calif.

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3 Claims. (Cl. 101—182)

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The application relates to printing presses and has particular reference to printing presses which are set up to print a pattern of two or more colors which must register properly one with another. The press is moreover a type customarily designated as a continuous press, that is to say, the pattern of color is printed upon a strip of paper taken from a roll which after printing is re-rolled upon another roll.

Presses for printing patterns of color on sheets of paper have been built in a variety of different designs. The object in all of them is to reproduce upon the strip of paper color patterns which bear a relationship to each other and contribute to a composite design or pattern effect featuring two colors, and in some instances more than two colors. In order that the pattern effect may present a proper appearance the successive patterns of different colors must be in precise register. This means that the register must be right in lineal direction along the strip or sheet and must also be correct in a lateral direction transverse to the sheet. To satisfy this requirement various means have been developed for adjusting the pattern in proper register.

Plate cylinders upon which are formed the color patterns have been mounted in various ways, frequently on pedestals, in a manner permitting them to be shifted toward one side or the other in order that the pattern printed by one plate cylinder may be brought into register with the pattern printed by the other plate cylinder.

Various means have likewise been provided for changing the register of the patterns in lineal direction by altering the travel of the strip or sheet of paper from the point at which one pattern is applied to the point at which a successive pattern is applied. The expedients resorted to in the past, while resulting in a measure of adjustment capable of producing a composite pattern of desired effect, have been cumbersome, prone to get out of adjustment and have otherwise been unsatisfactory from an operating standpoint. Inefficient means for making the necessary adjustment has resulted in the production of a great many printings of inferior grade and have also resulted in a considerable waste of paper.

It is therefore among the objects of the invention to provide a new and improved plate cylinder and ink roll mounting for printing presses which is simple in its adjustment, quicker to operate and which is of a construction sufficiently rigid to be capable of maintaining its ad-

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justment through a complete run of the printing process.

Another object of the invention is to provide a new and improved plate cylinder adjustment for a printing press which is so designed that one or more plate cylinders may be quickly and simultaneously released from contact with an impression cylinder and reapplied with equal celerity whenever desired.

Still another object of the invention is to provide in a printing press a new and improved support of special design and of particularly rugged construction so that the application of ink to the plate cylinder and the reapplication of ink from the plate cylinder to paper on the impression roll remains steady and free from the harmful effects of vibration and the possibility of a disturbance in the register of the patterns.

Still another object of the invention is to provide in a multiple color printing press of the type herein referred to an efficient and sensitive adjustment for the positioning of the plate cylinders so that each end of each cylinder may be adjusted in order to bring the plate cylinder in precise registration with substantially a minimum of effort.

Still further among the objects of the invention is to provide in a multiple color printing press a means of mounting and adjusting the ink rolls relative to the plate cylinders in such a manner that the ink roll adjustment remains fixed even though a plate cylinder may be shifted back and forth into and out of contact with the impression cylinder; the design, location and manner of adjustment of the plate cylinders and ink rolls being such as to permit use of an impression roll of considerably larger size than has heretofore been possible.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

Figure 1 is a longitudinal, elevational view of the upper portion of a multiple color printing press in which the novel features of the invention have been incorporated.

Figure 2 is a plan view of the printing press shown in Figure 1.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a fragmentary cross sectional view

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showing the plate cylinder support drawn to a larger scale.

Figure 5 is a fragmentary, cross sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a sectional view taken on the line 6—6 of Figure 5.

Figure 7 is a side view partially in section taken generally along the line 7—7 of Figure 4.

Figure 8 is an elevational view partially in section taken generally along the line 8—8 of Figure 4.

Figure 9 is a fragmentary cross sectional view taken on the line 9—9 of Figure 7.

In the design and construction of a printing press incorporating the features of the invention described herein conventional press construction has been followed to the extent of providing the usual frame, impression roll, plate cylinders and inking rolls but the parts have been so mounted and arranged upon the frame as to make possible adjustments of the movable parts in a manner departing in a material way from practice heretofore employed.

In an embodiment chosen for the purpose of illustration there is shown a multiple color printing press comprising in general a frame 10 having two lateral extensions 11 on each end and a vertical extension 12 on each side. An impression roll 13 is carried rotatably upon the vertical extensions 12. Plate cylinders 14, two in number in the embodiment illustrated, are located on opposite sides of the impression roll. The plate cylinders are inked by sets of rolls fed from fountains 15. A strip or sheet 16 of paper is fed from a roll (not shown) over an idler 17, around one side of the impression roll, over a paper supporting roller 18, thence around the other side of the impression roll and downwardly to an idler roll 19. The paper is finally wound upon a windup roll (not shown). The impression roll 13 to which all of the other working parts of the press must be related is shown mounted upon a shaft 20 which is, in turn, carried by the vertical extensions 12. For driving the plate cylinder the cylinder is provided with a large gear 21 which is adapted to mesh with a gear 22 in turn carried by a drive shaft 23, likewise mounted upon the frame. In this embodiment the drive shaft is driven by means of a chain 24 engaging sprocket 25 on the drive shaft. All of the power applied to the machine is derived from the chain drive 24.

Inasmuch as supports for the plate cylinders and ink rolls are substantially identical in principle the details of only one need be described. Furthermore, since plate cylinder and ink roll assemblies on opposite sides of the impression roll are duplicates of each other a description of one only will likewise suffice to convey a complete picture of the press assembly.

Square shafts 30, four in number, are used for supporting the ends of the plate cylinders and sets of ink rolls. As illustrated in Figure 1 and in greater detail in Figure 7 each of the square shafts is supported at its outer end by a stationary block or vertical support 31 mounted upon the outer end of the lateral extension 11 and at its other end in a casing 32 located substantially at the center line of the vertical extension 12. The casing 32 is provided with an aperture 33 within which one end of the square shaft is slidably positioned. A similarly shaped aperture 34 is provided in the stationary block 31 and the shaft is therefore adapted to be shifted from right to left and left to right while

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being supported in the respective apertures. The shafts 30 are directed primarily to the purpose of providing adjustable supports for the plate cylinders and ink rolls and also serving as means along which the plate cylinders and ink rolls may be adjusted relative to each other and also relative to the impression roll. The shaft 30 in each instance thereby serves a multiple purpose.

For shifting each of the square shafts 30 in a lengthwise direction there is provided in the casing 32 a vertical aligned pin 35 provided with a cam 36 located between the juxtaposed ends of adjacent shafts 30. The shape of the cam is best viewed in Figure 6 and its relative position with respect to the casing and the shafts is readily discernible in Figure 5 wherein the parts are drawn to a larger scale. The cam 36 is adapted to be rotated and for this purpose the pin 35 has attached at the bottom end a bevel gear 37 which is adapted to mesh with a second bevel gear 38 in turn carried by a rod 39 which is rotatably supported upon the frame. It should be noted in this connection that the rod 39 extends across the frame from one side to the other and that it carries on its opposite end another bevel gear 39 which is effective upon a similar cam 36 on the opposite side of the frame, devoted to the same purpose.

For rotating the bevel gear 38 there is provided a crank 40. By rotating the crank in either direction the cam 36 is rotated from the position shown in Figure 6 to a position more or less 90° therefrom in which it presses its high sides against the ends of the adjacent square shafts 30. Rotation of the cam thereby moves the shafts 30 in an endwise direction with the result that everything carried by the shafts is moved in the same direction and throughout the same distance as the shafts are moved. A coiled spring 41 in each case bearing against the end of the shaft remote from the cam and mounted in the stationary block 31 tends to return the shaft to the initial position shown in Figure 6 whenever the crank is returned to initial position. It will be apparent that all of the shafts and whatever may be mounted thereon are moved simultaneously by rotation of the single crank 40.

Each end of each plate cylinder is carried by a composite block 45 which rides upon the upper edge of the square shaft 30 and thereby supports the plate cylinder upon the shaft. The set of ink rolls is likewise carried at each end thereof by a somewhat similar block 46, slidably disposed also upon the square shaft 30. Disposed upon the square shaft is still another part comprising a positioning block 47. Adjustments of the blocks 45 and 46 are made with relation to the location of the positioned block 47, the adjustment of the block 45 being made and altered with respect to the positioning block and the adjustment of the block 46 being made and altered with respect only to the location of the block 45. The positioning block 47 is adapted to be anchored in place upon the square shaft by means of screws 48. It will be apparent, however, that the positioned block may be shifted a slight distance toward the left or toward the right upon the square shaft to whatever particular location is necessary in order to properly accommodate the blocks 45 and 46.

Specifically, each composite block 45 consists of an upper portion 49 and a lower portion 50 bound together by some suitable means (not shown). Within the upper and lower portions

are V-shaped apertures 51 and 52 together adapted to slidably accommodate one of the square shafts 30. It is further apparent that the best arrangement for positioning the square shaft is on edge, this orientation being more advantageous for the manipulation of the blocks 45 and 46 in precise position slidably along the shaft.

In the upper portion 49 there is provided an auxiliary fitting or block 53 slidably located within a recess 53' so that the auxiliary fitting is free to move up and down within the recess. An adjusting screw 54 extending through the upper portion of the block into threaded engagement with the auxiliary fitting is adapted to adjust the fitting upwardly and downwardly as may be desired.

A second horizontal adjusting screw 55 has a horizontal threaded engagement with the same auxiliary fitting 53, the screw 55 being loosely accommodated within a bore 56 in the upper portion of the block 45. At its inside end the screw has mounted thereon a bearing 57 located within a sleeve 58 which provides a threaded engagement for a shaft 59 upon which the plate cylinder 14 is mounted. Details of the support for the plate cylinder are readily apparent in Figures 3 and 4. By provision of the adjusting screws just described it will be evident that the plate cylinder can be readily adjusted at each end upwardly and downwardly and can also be adjusted in a lateral direction by cooperable manipulation of adjusting screws 55 at opposite ends of the plate cylinder shaft.

The block 45 and accessories attached thereto may be shifted in location along the square shaft 30 so that precisely the correct amount of pressure may be established between the plate cylinder 14 and the impression roll 13. The adjustment last described is accomplished by means of an adjusting rod 60, the arrangement of which and mounting for are best illustrated in Figure 7. As there shown the adjusting rod has a shoulder 61 stepped in a bearing 62 which in turn is carried by the positioning block 47. It will be apparent that the adjusting rod is free to rotate with respect to the block 47 but is prevented from moving endwise with respect thereto. For convenience the righthand end of the adjusting rod 60, as viewed in Figure 7, extends through a large bore 63 in the stationary block 31 and is provided with a hand wheel 64 at its outside end. A similarly dimensioned large bore 65 is provided in the block 46 through and beyond which the adjusting rod 60 extends so that a threaded end 66 of the adjusting rod threadedly engages the block 45. By rotating the hand wheel 64 the adjusting rod 60 threads its way into or out of the block 45 while the rod remains stationary with respect to the positioning block 47, thereby shifting the location of the block 45 likewise on the square shaft 30 with respect to the location of the positioning block. A careful adjustment of the location of the plate cylinder with relation to the impression roll can thus be made.

Since the inking rolls must be adjusted with respect to the plate cylinder independently of what location of the plate cylinder may occupy, means need be provided for fixing the location of the inking rolls with respect to the plate cylinder in a manner which permits the last named adjustment to remain permanent regardless of whether or not the plate cylinder may be advanced or retracted from contact with the impression roll by movement of the vertical shaft

30. Since, however, the adjustment of inking rolls with respect to the plate cylinder depends upon location of the plate cylinder 64 upon the square shaft 30, the plate cylinder must be first adjusted in its proper location upon the shaft and the inking rolls then adjusted only to the location of the plate cylinder.

The last described adjustment is accomplished by providing for relative movement between the blocks 45 and 46. The structural elements making this relative movement possible are best shown in Figure 8.

In Figure 8 there is shown a second horizontal adjusting rod 70 provided with a shoulder 71 stepped in bearing 72 in the positioning block 47. The adjusting rod 70 is likewise freely accommodated within a loose-fitting bore 73 in the stationary block 31 and terminates in a handwheel 74. The right hand end of the adjusting rod 70 is retained in a thrust bearing 75 in the block 45 so that rotation of the adjusting rod 70 has no tendency to alter the position of the block 45 with respect to the positioning block 47. In order, however, to shift the location of the block 46 with respect to the block 45 the adjusting rod has a threaded portion 76 engaging a threaded bore 77 in the block 46. By this device rotation of the adjusting rod in one direction or another moves the block 46 with respect to the block 45.

By properly adjusting block 46 with respect to block 45 inking rolls 78 and 79, both more or less set with relation to each other and adapted to dip ink from the fountain 15, may be shifted laterally with respect to the plate cylinder 14 so that the inking roll 79 presses against the plate cylinder with the correct amount of pressure.

Once having set the block 46 with respect to the block 45 it is desirable to secure the blocks in their respectively adjusted relationship. This is accomplished by the provision of a flat strip 80 anchored within the aperture 52 by means of screws 81, the strip being of sufficient length and breadth so that it coincides with one side of the square shaft 30 throughout a portion of its length and extends from the block 45 into the block 46 and an enlargement of the recess provided therein for the square shaft. It will be noted, moreover, that the strip is not anchored to the block 46 but that the block 46 is free to slide with relation to both the strip 80 and the square shaft as the adjusting rod 70 is manipulated.

Upon completion of manipulation of the adjusting rod 70 a tightening screw 82 in the block 46 is operated and by exerting pressure against the strip 80 firmly anchors the block 46 with relation to the strip 80 and consequently with relation to the block 45. Bolts 83 hold upper and lower portions of the block 46 together and ties 84 hold the blocks 46 on opposite sides of the frame firmly in proper relationship.

By reason of the fact that the plate cylinder 14 is so adjusted that it can be moved up and down, similar adjustments must be provided for the inking roll 49 so that it can follow the location of the plate cylinder and be maintained in proper inking contact. Accordingly, there is provided auxiliary fitting 85 vertically adjustable within a recess 86 on the inside face of the block 46. The fitting is provided with an adjusting screw 87 for moving it up and down. A shaft 88 carrying the ink roll 79 is journaled in the fitting 85. No endwise adjustment is needed for either of the ink rolls inasmuch as they have ample width to cover the plate cylinder within its range

of adjustment. It may be further noted in this connection with respect to the various gears used for driving the machine that the gears are cut with teeth deeper than ordinarily required by from .020 to .030 inch to make certain that throughout the range of adjustment of the various rotating parts of the device the gears will remain properly in mesh. Among the gears referred to are a gear 90 on the plate cylinder shaft 59 adapted to mesh and be driven by the gear 21 on the impression roll, and gears 91 and 92 respectively on the shafts of ink rolls 79 and 78 which are, in turn, driven from the gear 90 on the plate cylinder shaft.

As has been previously indicated the strip or sheet 16 of paper is adapted to pass over the horizontal paper supporting roll 18 at a location intermediate lines of contact of the paper with the impression roll on opposite sides thereof. The paper supporting roll 18 as illustrated particularly in Figures 1, 2 and 3 is carried by a shaft 100 which, in turn, is rotatably supported adjacent the tops of the vertical extensions 12. One end of the shaft 100 is provided with a worm gear 101, the gear being shown in side elevation in Figure 1.

Meshing with the worm gear 101 is a worm wheel 102 rotatably mounted on its shaft 103, by means of brackets 104 and provided with a handwheel 105 by means of which the worm wheel is manipulated and adjusted. Of particular significance is the fact that the paper supporting roll 18 is eccentrically disposed relative to the shaft 100, the eccentric relationship being readily apparent by a showing of dotted lines in Figure 1. It is clear therefore that by rotation of the handwheel 105 the paper supporting roll 18 may be rotated so that the high side of the roll can be moved up or down elevating or lowering the loop of paper extending over it as the case may be.

Adjustment of the paper supporting roll is thus adapted to vary by small amounts the length of paper between the line of contact of the plate cylinder on one side of the impression roll and the line of contact of the other plate cylinder on the opposite side of the roll. Register of the respective plate cylinders in a lineal direction upon the strip or sheet of paper can thus be varied.

In operation of the press the strip 16 of paper is first threaded around the idler roll 17, thence over the impression roll on the left side as viewed in Figure 1, over the paper supporting roll 18, next against the impression roll on the right side of the machine and finally around the idler roll 19.

The plate cylinders are adjusted in position first on one side and then on the other in order that the plate cylinders contact the impression roll with the proper amount of pressure and at the proper elevation. These adjustments are accomplished in part by manipulating the adjusting rod 60 at each of the ends of the plate cylinder. The adjustments are completed by further manipulation of the adjusting screws 54. By operation of the latter screws the plate cylinder may be properly levelled.

After the plate cylinder has been properly located so that the impression is capable of being correctly transferred to the paper the ink rolls, and particularly the ink roll 79 on each side is adjusted. This is accomplished first by manipulating the adjusting screw 87 together with the adjusting rod 70. The adjusting screw 87 elevates or lowers the ink roll 79 to a proper line

of adjustment whereas the adjusting rod 70 shifts the entire block 46 and the ink rolls carried thereby to proper locations transverse to the axes in order that the ink may be spread properly upon the respective plate cylinders. Once the ink rolls are properly adjusted the block 46 may be tightened in place with respect to the block 45 carrying the plate cylinder by use of the tightening screw 82.

When the press is started after these adjustments have been made the successive patterns printed upon the sheet of paper may be examined. If the patterns are out of register laterally one with the other one, or if need be both, of the plate cylinders may be shifted a slight amount lengthwise with respect to their axes until the patterns are in register laterally.

If the patterns are out of register in a lineal direction, that is to say, lengthwise of a strip or sheet of paper, they may be brought into register by rotation of the handwheel 105 which causes the eccentric mountings of the paper supporting roll 18 to rotate as previously described. The degree of eccentricity is made sufficiently great with relation to the patterns that for a characteristic setup the patterns may be brought into register no matter how greatly they may diverge at initiation of the operation.

When, after the press has continued in operation, there is occasion to release the plate cylinders from their positions of contact with the impression roll both plate cylinders may be simultaneously released by rotation of the crank 40 as previously described. Rotation of the crank by aid of the cam 36 immediately extends all of the square shafts 30 in directions away from the impression cylinder. As the square shafts 30 move the blocks 45, 46 and 47 mounted thereon are removed with the shaft without their mutual relationship being disturbed. When the time comes to reapply the plate cylinders to the impression roll they may be reapplied by a reverse rotation of the crank 40 and the plate cylinders will again be brought into their previously adjusted contact with the impression roll by operation of the coiled springs 41.

In the device described herein there has been provided adjustable mountings for both plate cylinders and ink rolls extremely versatile in their manner of adjustment. All parts have been made simple and have been designed in a manner permitting a rugged and steady construction which assures holding the adjusted positions throughout the entire run of a given composite pattern. If for any reason the parts of the composite pattern should become slightly disarranged they can be quickly and accurately returned to register by manipulation of one or the other of the various adjusting screws without disturbing the setup of the press.

While we have herein shown and described our invention in what we have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of our invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A printing press comprising a frame, a horizontal impression roll thereon, a plate cylinder rotatably mounted on the frame parallel to the impression roll, an inking roll mounted adjacent the plate cylinder, a plate cylinder and ink roll

mounting on each side of the frame, said mounting comprising reciprocally supported shafts on each side of the frame, a cam mounted in the casing adjacent an end of each shaft adapted upon rotation to shift said respective shaft endwise and a return for said shafts, a plate cylinder carrier on said mounting and adjusting means for the plate cylinder, and an ink roll carrier on said mounting and individual adjusting means adapted to adjust each end of the inking roll relative to the adjacent end of the plate cylinder.

2. A printing press for multiple color printing comprising a frame, a horizontal impression roll thereon, plate cylinders rotatably mounted on the frame parallel to the impression roll, an inking roll mounted adjacent each plate cylinder, a plate cylinder and ink roll mounting on each side of the frame adapted to support the plate cylinders and inking rolls in position relative to the impression roll, said mounting comprising a pair of shafts on each side of the frame in endwise relationship, outwardly directed ends of said shafts being reciprocally supported on the frame, the other ends of the shafts being supported in juxtaposed position on the frame, a cam mounted between said juxtaposed ends adapted upon rotation to shift said shafts endwise and a return for said shafts, an adjustable plate cylinder carrier on said mounting, and an adjustable ink roll carrier on said mounting and individual adjusting means adapted to adjust the ends of the inking rolls relative to the adjacent ends of the plate cylinders.

3. A printing press for multiple color printing comprising a frame, a horizontal impression roll thereon, plate cylinders rotatably mounted on the frame parallel to the impression roll, a set of ink-

ing rolls mounted adjacent each plate cylinder, plate cylinder and ink roll mounting on each side of the frame adapted to support the plate cylinders and sets of inking rolls in releasable position relative to the impression roll, said mounting comprising a pair of edgewise positioned square shafts on each side of the frame, stationary blocks on the frame for outwardly directed ends of the shafts, stationary apertured casings on the frame for juxtaposed ends of the shafts, a cam mounted in each casing between said juxtaposed ends adapted upon rotation to shift said shaft endwise and spring returns for said shafts, a plate cylinder carrier block support on said mounting and individual adjusting means for each end of each plate cylinder, an ink roll carrier block on said mounting and individual adjusting means adapted to adjust each end of the set of inking rolls relative to the adjacent end of the plate cylinder.

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