

June 11, 1935.

J. F. SHEPPARD

2,004,801

PRINTING PRESS

Filed May 12, 1933

3 Sheets-Sheet 1

Fig. 1

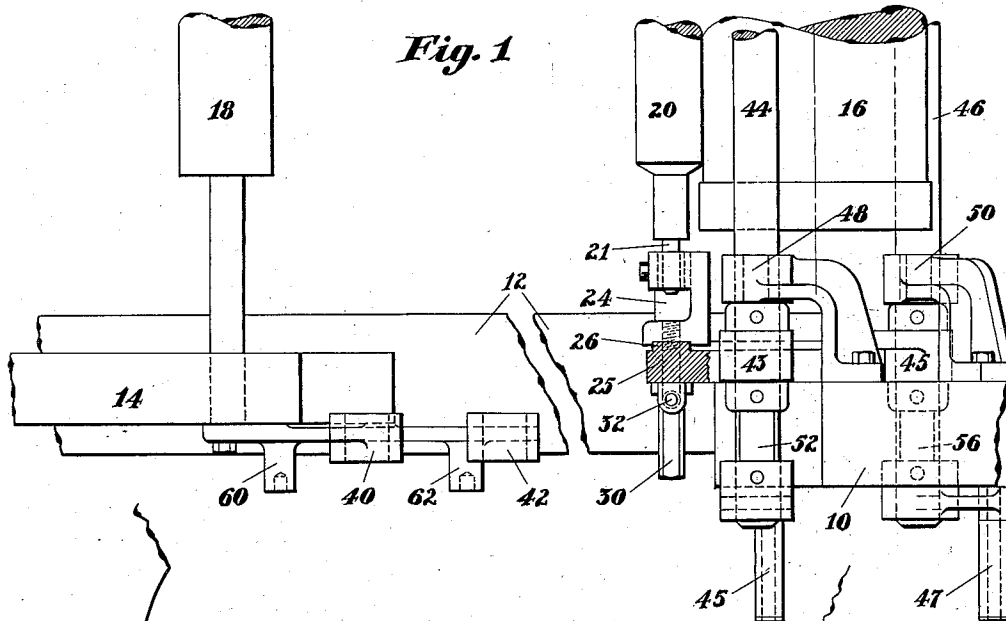
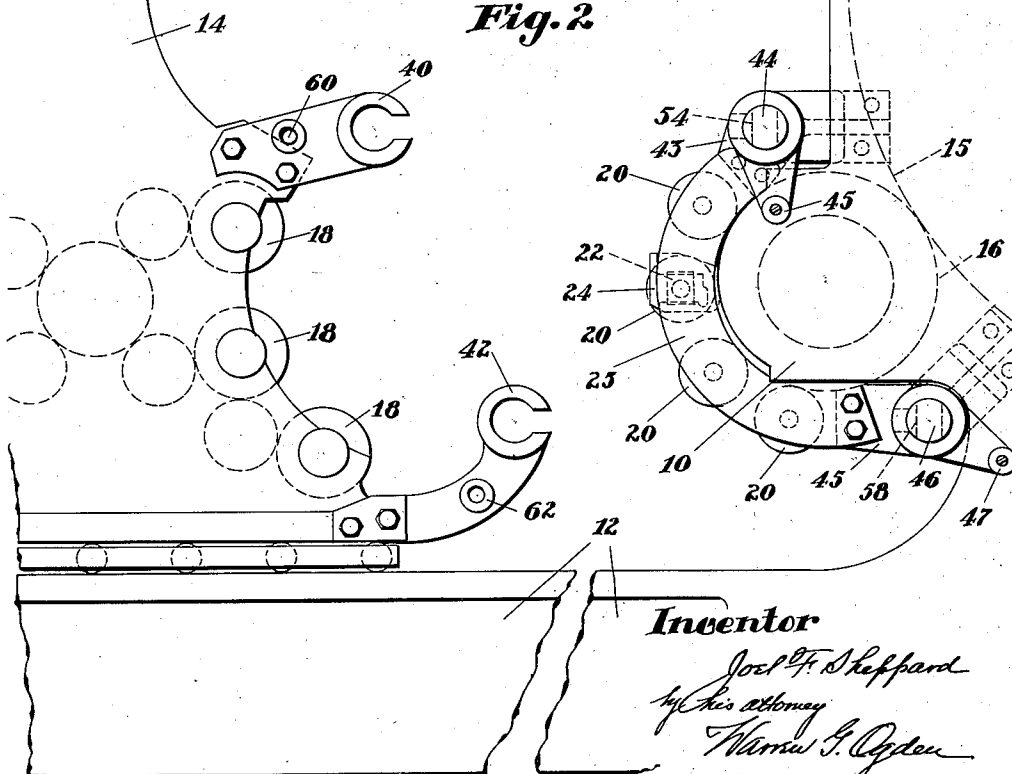


Fig. 2



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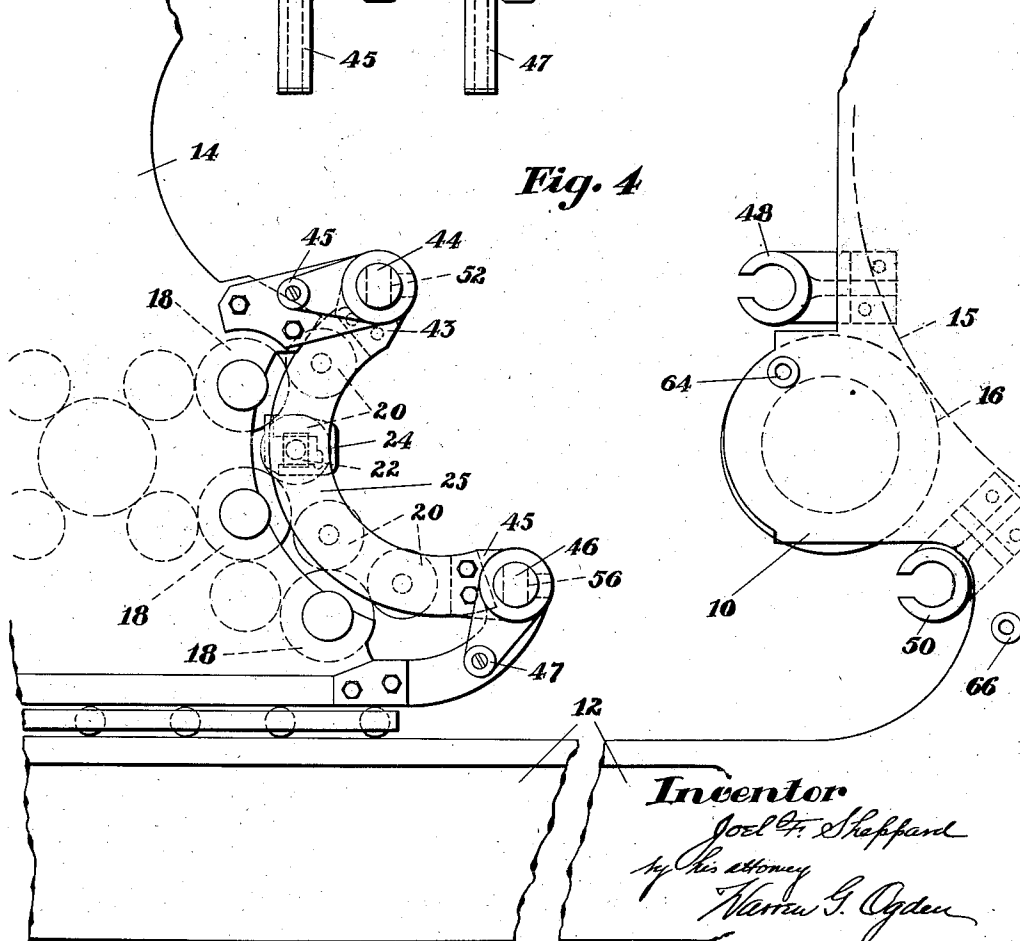
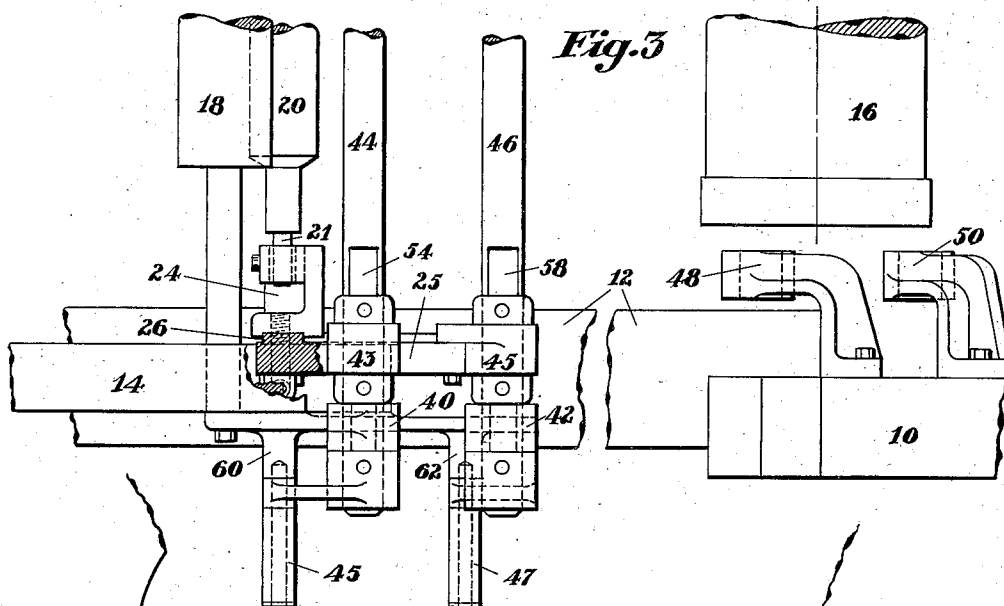
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

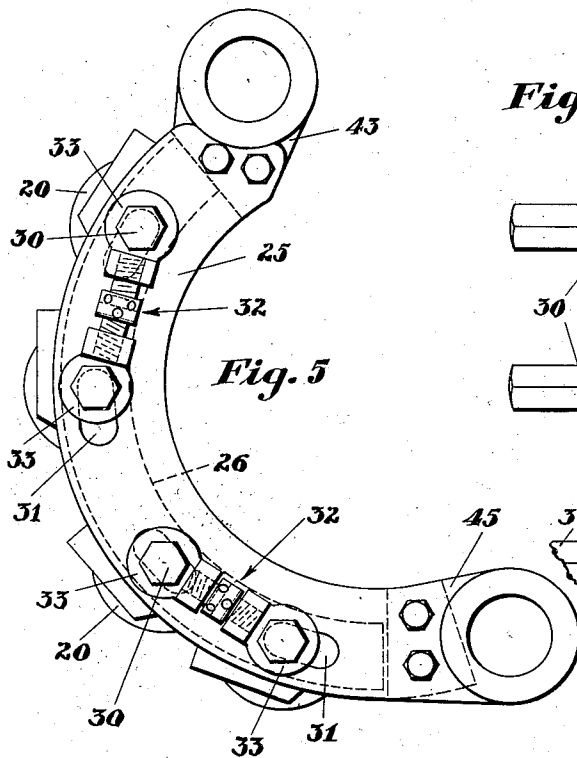


Fig. 6

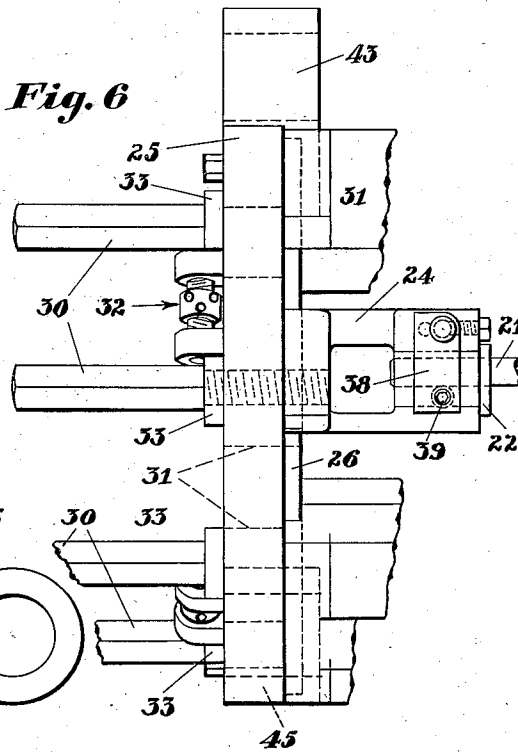


Fig. 7

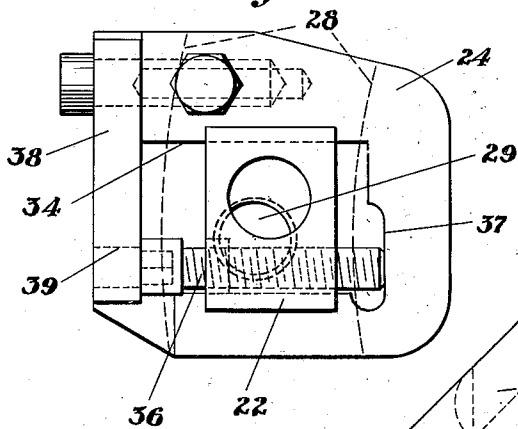
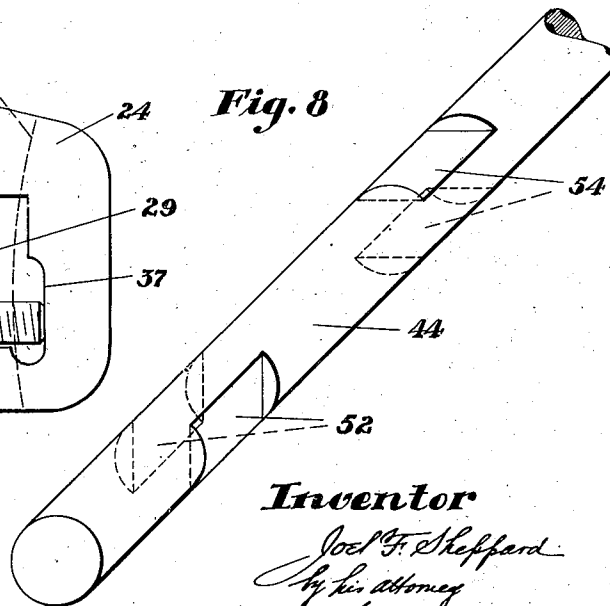


Fig. 8



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UNITED STATES PATENT OFFICE

2,004,801

PRINTING PRESS

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Application May 12, 1933, Serial No. 670,682

20 Claims. (Cl. 101—352)

This invention relates to printing presses and more particularly to improved means for enabling an accurate setting or adjustment of the form rollers of the ink distribution train for a proper inking of the plates on the plate cylinder.

Heretofore printing presses have been so designed that the inking frame may be racked back from the printing section to provide space in front of the plate cylinder where the operator may work to set or change the printing plates. Thereafter the inking frame is racked forward again or run up in contact with the printing section to a positive position and permanent lock during operation. The form rollers of the inking train which contact the printing plates must be very nicely and delicately set to the plates for the best results. Also these form rollers must be set accurately to the metallic vibrators of the inking train which cut up the ink and spread it to a film on the form rollers before it is transferred to the printing plates. The form rollers are made from printer's composition and generally speaking are soft rollers which, with use or with weather conditions get smaller and continually need some adjustment if good work is to be procured. Under the present practice these necessary adjustments of the form rollers to the printing plates must be made while the inking frame is in printing position, or made on a closed press. Obviously it is difficult to look into a closed press or to use feelers or gauges in an endeavor to adjust the form rollers radially to or circumferentially of the plate cylinder with a view to set them with proper pressure or contact to the printing plates or to the vibrator rolls of the inking train.

The main object of this invention is to overcome the present difficulties in making form roller adjustments for the proper and adequate inking of the printing plates. Accordingly the inking frame is so designed that, in the preferred form of the invention, an auxiliary form roller supporting frame is transferable from the inking frame to the printing section and provision is made for locking this auxiliary frame with the form rollers about the plate cylinder permitting the remainder of the inking train to be racked back and leave a space for the operator to work, in front of the then combined unit of plate cylinder, printing plates and form rollers, while making the required form roller adjustments to the printing plates. Thereafter the remainder of the inking train may be racked up again, the auxiliary form roller frame locked thereto, and

the whole again racked back to a position where the operator has room to work and make the required individual adjustments of the form rollers around the arc on which their centers are located to place them in proper inking contact with the ink vibrators. Thus accurate adjustments, impossible under prior conditions, are easily and quickly made by the use of mechanisms and by practising methods embodying the teaching of this invention.

To the accomplishment of this object and such others as may hereinafter appear, as will readily be understood by those skilled in the art, the invention comprises the features and combinations of parts and the method of adjusting the form rollers hereinafter described and then particularly pointed out in the appended claims.

While one important use of the invention is for adjustments of form rollers to the various color plate cylinders of multi-color printing presses its use is not limited thereto and for simplicity the accompanying drawings, to which reference may be had for a better understanding of the nature and scope of the invention, are skeletonized or simplified views indicating a single plate cylinder, which may be the sole such cylinder or one of several in the press, with the improvements hereinafter described combined therewith.

In the embodiment of the invention illustrated in the drawings,

Figure 1 is a view, in plan, showing a plate cylinder at the right having the novel auxiliary form roller frame locked in operative position therewith, and showing, at the left, the inking frame carrying the remainder of the ink distribution mechanism, withdrawn from the plate cylinder and from the form rollers;

Fig. 2 is a view, in side elevation, of the parts as shown in Fig. 1, although this figure shows four form rollers carried by the auxiliary frame and four vibrator rolls in the inking frame, while Fig. 1, to avoid confusion of lines, shows only one form roller and one vibrator roll and also shows an auxiliary frame segment partly broken away to illustrate the adjustable connection thereto of a form roller housing;

Fig. 3 is a view, in plan, similar to Fig. 1 but with the auxiliary form roller frame locked to the inking frame;

Fig. 4 is a view, in side elevation, of the parts as shown in Fig. 3; (Those skilled in the art will understand that the other side of the machine, not shown in Figs. 1 and 3, is a duplicate of what is

shown in so far as the mechanism of this invention is concerned.)

Fig. 5 is a detail, in side elevation, of one of the two end segments of the auxiliary or transferable form roller frame, showing also one manner of effecting circumferential adjustment of the form rollers supported thereon;

Fig. 6 is a view, in front elevation, of the auxiliary frame segment as shown in Fig. 5, one form roller housing being shown in detail and the position of the other three being merely indicated;

Fig. 7 is a view, in end elevation, of a form roller housing and shaft box showing the means for adjusting the bearing box within the housing and radially of the plate cylinder; and

Fig. 8 is a view, in perspective, of one end of one of the rotatable lock rods, both of which are alike, for securing the auxiliary form roller frame either to the printing section or to the inking frame.

The illustrations show only enough of the printing press to make it clear to those skilled in the art how the improvements of this invention may be applied. The printing section frame is indicated by 10 and the long track 12 on which the inking frame 14 is racked back and forth is shown as broken. An impression cylinder 15 is indicated by dotted lines on Figs. 2 and 4 with one plate cylinder 16 in contact therewith. The position of the axis of the plate cylinder 16 relatively to the novel features of this invention is shown in Figs. 1 and 3 by a dot and dash line, its mounting in the frame being conventional and omitted herein to avoid confusion on the drawings. The inking train also is conventional and apart from the ink vibrators 18, the remainder of the rolls forming the train are indicated by dotted circles in Figs. 2 and 4.

It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation and it is not intended to limit the invention beyond the terms of the several claims hereto appended as considered in view of the prior art and the requirements thereof.

The form rollers 20 have projecting shafts 21 supported at each end in a bearing box 22 carried by a form roller housing 24 shown in detail by Figs. 6 and 7. The form rollers are supported by connecting their housings to two end segments 25 curved to fit or to be concentric to the plate cylinder and each having a circular tongue 26 (Fig. 5) on its inner face. To this end each housing is provided with a co-operating circular end groove 28 (dotted lines Fig. 7) having a sliding fit on the tongue 26. Each housing 24 is secured to the segment 25 by a locking screw 30 passed through an elongated slot 31 in the segment and passed into a threaded hole 29 (Fig. 7) through the outer wall of the housing (see Figs. 5 and 6). The form rollers are adjusted on the tongue 26 to bring them into operating contact with the metal vibrator rolls 18 by means of turnbuckles, indicated generally on Fig. 5 by 32, connecting each pair of lock screws. Each lock screw of a pair passes through one of the two adjusting eyes 33 of the turnbuckle so that by backing off one of the pair of locking screws connected by a turnbuckle that screw may be shifted in its slot 31 and thus shift the connected form roller 20 circumferentially of the segment toward or from a co-operating vibrator roll. The form rollers are also adjustable in their housings toward and from the printing plates for exact inking engagement therewith. To this end the bearing box 22 is slidable in a guideway 34 of the

housing (Fig. 7) the axis of which is on a radius of the plate cylinder in any adjusted position of a form roller along the segment tongue 26 due to the fact that the center of curvature of both the tongue 26 and the housing slot 28 is at the center of the plate cylinder when the segments 25 are locked to the printing section (see dotted lines Fig. 2). Adjustment of the bearing box 22 radially of the plate cylinder to secure proper inking contact of the form rollers with the printing plates is obtained by threading a Bristo screw 36 through the box, said screw being held from axial movement by its toe bearing on a wall 37 of the housing and its head bearing on the inner face of a pivoted, spring-held cover plate 38 on the housing. By inserting a Bristo set screw wrench through a hole 39 in the cover plate and into the socketed head of the Bristo screw the bearing box may be slid along its guideway radially of the plate cylinder.

The special devices for adjusting the form rollers radially to the plate cylinder and circumferentially of the segments to the vibrator rolls have not been described in great detail because they are not new and will not be claimed herein except as these adjustments form a part of the novel form roller transfer mechanism now to be described.

In the embodiment of the invention illustrated in the drawings the form roller frame, which includes the pair of end segments 25, is so mounted on the inking frame that it can be separated therefrom and provision is made for locking this auxiliary frame to the inking frame or to the printing section as may be desired.

Referring first to Figs. 1 and 2 the inking frame 14 is provided at each side with pairs of upper and lower brackets terminating in C-heads 40 and 42 respectively, their open mouths facing toward the printing section and their entrance tracks being horizontal or parallel to the lower track 12. Each segment 25, as shown best in Fig. 5, is provided with upper and lower bearing heads 43 and 45 respectively. These heads are each bored for receiving upper and lower lock rods 44 and 46 respectively. The lock rods are held from axial movement by fixed collars abutting the bearing heads as shown in Figs. 1 and 3. At one end of the upper lock rod is a collar carrying a handle lever 45 for rotating the rod within its bearings. Similarly the lower lock rod is provided with a handle lever 47.

The frame 10 of the printing section also is provided at each side with pairs of upper and lower brackets terminating in C-heads 48 and 50 respectively (see Figs. 3 and 4), their open mouths facing toward the inking frame and their entrance tracks being horizontal like the inking frame C-heads 40 and 42. The lateral spacing of the inking frame C-heads is such that they are outside of the segments 25 while the lateral spacing of the printing section C-heads places them inside of the segments 25. The upper lock rod 44 (see Fig. 8) is flattened as at 52 near each end. This pair of flats 52 has an axial spacing to match the spacing between the inking frame C-heads 40. The thickness of metal constituting a flat 52 is such that when the flat is horizontal the lock rod may be passed through the mouth of a C-head 40. The upper lock-rod 44 is also flattened as at 54, Fig. 8, the flat being cut in the rod at a 90° angle to the flat 52. The pair of flats 54 are inside the flats 52 and have an axial spacing to match the spacing between the printing section C-heads 48. When the flats 54 are

horizontal they may pass through the mouths of the C-heads 48. The lower lock-rod 46 is provided with pairs of flats 56 and 58 (see Figs. 3 and 1); in all respects similar to the pairs of flats 52 and 54 just described, designed for passing into the mouths of the lower C-heads 42 and 50 respectively.

In order to describe how the auxiliary or transferable form roller frame, comprising the pair of segments 25 tied by the pair of lock rods 44 and 46, is used in practice it will be assumed that the parts of the press are first in open position, as shown in Fig. 4, with the plate cylinder exposed so that an operator may put on the plates. As shown in Fig. 4 the inking frame pairs of C-heads 40 and 42 have received the flats 52 on the upper and 56 on the lower lock rods and the handle levers 45 and 47 have then been turned to rotate each lock rod 90° in a clockwise direction, viewing Fig. 4, which turns the outer flats 52 and 56 to a vertical position (see dotted lines) thus locking the auxiliary frame to the inking frame. The handle levers have spring pins (see Fig. 3) which take into fixed latching sockets 60 and 62 on the frame 14 (Fig. 2) each of which serves as an index to bring the flats to a vertical or locking position. It will be observed that when the outer flats 52 and 56 are vertical the inner flats 54 and 58 are horizontal (see Fig. 3) and vice versa. The plates having been mounted on the plate cylinder the entire inking frame is racked over to the printing section and the horizontal inner flats 54 and 58 slip into the mouths of the pairs of C-heads 48 and 50 whereupon the handle levers are released from the sockets 60 and 62 and are turned to rotate the lock rods 90° in a contra-clockwise direction, viewing Fig. 2, which turns the inner flats 54 and 58 to a vertical position (see dotted lines) and simultaneously turns the outer flats 52 and 56 to a horizontal position (see Fig. 1). The handle levers are indexed by fixed sockets 64 and 66 on the frame 16 (Fig. 4) and their spring pins are latched therein.

The inking frame is then racked back again but this movement slips the C-heads 40 and 42 from the then horizontal outer flats 52 and 56 of the lock rods and although the inking train including the vibrator rolls 18 is moved away, the form rollers 20 are left in position around the plate cylinder 16. If new form rollers are to be mounted the empty auxiliary frame would be locked to the printing section and after racking back the inking frame the form rollers would be put into their respective housings 24. With the inking frame racked back ample space is provided for an operator to adjust each form roller to the plates on the plate cylinder, with just the nicety of contact that is desired, by means of the Bristow screws 36 hereinbefore described, it being remembered that the bearing block guide 34 of said form roller housing 24 is held radially to the plate cylinder by the co-operating curved housing groove 28 and segment tongue 26.

The inking frame is then racked up again, the lock rods are rotated to transfer the auxiliary frame from a locked position on the printing section to a like position on the inking frame and these connected parts are again racked back as shown in Fig. 4. Now the operator may again step into the press and make such adjustments of the turnbuckles 32 as may be necessary properly to set the form rollers 20 to the vibrator rolls 18. This does not disturb the radial adjustments to the printing plates previously made because

the form rollers are moved on the segment tongue 26 which is concentric to the plate cylinder 16.

All of the required adjustments having been made, both expeditiously and with a complete view of the parts being worked upon, the auxiliary form roller frame is left locked to the inking frame, as in Fig. 4, and the printing may proceed as with the prior printing presses not fitted with the improvement of this invention.

Many changes in design may be made by those skilled in the art and still remain within the scope of the invention which, in its broader aspects, comprises the separability of the form rollers from the inking train, in combination with means to hold them in position around the plate cylinder subject to adjustment. Another broad view of the invention comprises the provision of ample space for the operator to work in while making the delicate radial adjustment of the form rollers to the printing plates with ability to inspect the work as it progresses. The means by which these objects are attained is simple, inexpensive to install and foolproof with respect to its operation and, in the preferred form specifically described, to the setting of the lock rods to lock the auxiliary form roller frame either to the inking frame or to the printing section.

It will be clear to those skilled in the art of printing and with the general objects of the present invention in view that the described and illustrated embodiment of the invention, while illustrating a good practical form, is intended as an exploitation of its underlying essentials, the features whereof are definitely stated in their true scope in the claims herewith.

That which is claimed as new, is:—

1. A printing press having, in combination, a printing section, an ink distribution section, means to move one of said sections relatively to the other to produce an open or closed press, a form roller frame, means on said frame and on each of said sections for supporting the frame on a section, and mechanism for transferring the frame from one section to the other.

2. A printing press having, in combination, a printing section, an inking frame, an independent frame supporting form rollers detachably mounted on the inking frame, and mechanism operable to detach said form roller frame from the inking frame and attach it to the printing section.

3. In a printing press of the type having a plate cylinder, ink distribution mechanism including vibrator rolls movable toward and from the plate cylinder, an auxiliary frame intermediate said vibrator rolls and plate cylinder and bodily separable from each for supporting the form rollers of the inking train, and means to mount said separable auxiliary form roller frame either in inking relation to said vibrator rolls or in printing relation to said plate cylinder, at the will of the operator.

4. A printing press comprising a printing section and an inking frame movable to open or closed position relative to said printing section, an auxiliary frame supporting a set of form rollers, and means operable when the inking frame is closed on the printing section to transfer said auxiliary frame bodily from the printing section to the inking frame or vice versa at the will of the operator.

5. A printing press having a fixed frame carrying a plate cylinder, a movable frame carrying an ink distribution train, a third frame separa-

ble from the other two for carrying form rollers for the inking frame, means on said movable frame for supporting said form roller frame with its form rollers in inking relation to said ink distribution train, and means independent of the ink distribution frame for supporting said form roller frame in position around said plate cylinder.

6. A printing press having an inking frame including a separable auxiliary frame carrying form rollers, a printing section carrying a plate cylinder, means to move the inking frame toward and from the printing section, and a single mechanism for disconnecting said auxiliary frame from the inking frame and for connecting it to the printing section.

7. A printing press having a printing section including a plate cylinder, an inking frame movable toward and from said printing section, an auxiliary form roller frame, means on the inking frame and on the printing section for supporting said auxiliary frame in co-operative relation to the remainder of the ink distribution mechanism of the inking frame or the plates on the plate cylinder, and means for transferring said auxiliary frame from one to the other of said supporting means.

8. A printing press according to claim 7 in which said transfer means comprises mechanism to lock said auxiliary frame to the inking frame or to the printing section as the case may be.

9. A printing press according to claim 7 in which said transfer mechanism includes a locking and unlocking mechanism operating to lock said auxiliary frame to the inking frame while unlocking it from the printing section and vice versa.

10. A printing press of the type having an inking frame movable relatively to the printing section to form an open or closed press, a separable form roller frame supported between the remainder of the ink distribution mechanism and the printing plates when the press is closed, and means operable when the press is closed for locking said form roller frame to the printing section whereby the inking frame may be withdrawn from the form rollers to open press position.

11. A printing press of the type having an inking frame movable relatively to the printing section to form an open or closed press, a separable form roller frame supported between the remainder of the ink distribution mechanism and the printing plates when the press is closed, and locking means for said form roller frame operable to connect it to or disconnect it from the inking frame whereby said inking frame may be withdrawn to form an open press either with or without the form rollers.

12. A printing press of the type having an inking frame movable relatively to the printing section to form an open or closed press, means for mounting a frame carrying the form rollers alone of the ink distribution mechanism in printing relation to the printing plates to facilitate adjustment of said form rollers while the press is open, and means for mounting said form rollers on the inking frame for movement therewith, after said adjustment.

13. A printing press according to claim 12 in which said means for mounting the form rollers comprise C-head shaft bearings on the printing section and on the inking frame, and a transverse shaft on the form roller frame having flats to match said C-heads and to enter the open mouths thereof.

14. A printing press according to claim 12 in which said means for mounting the form rollers comprise C-head shaft bearings on the printing section and on the inking frame, and a transverse shaft on the form roller frame having flats to match said C-heads and to enter the open mouths thereof, said shaft being rotatable within said C-heads to turn its flats to a position preventing withdrawal through said mouths.

15. A printing press according to claim 12 in which said means for mounting the form rollers comprise C-head shaft bearings on the printing section and on the inking frame, a transverse shaft on the form roller frame having flats to match said C-heads and to enter the open mouths thereof, said shaft being rotatable within said C-heads to turn its flats to a position preventing withdrawal through said mouths, a latching lever for rotating said shaft, and means for indexing said lever to a locked or unlocked position of said flats within said C-head bearings.

16. The method of preparing a printing press for making individual radial adjustment of the form rollers of its movable ink distribution mechanism to the plates on its plate cylinder which comprises advancing the inking frame including said form rollers to a closed press position, disconnecting said form rollers from the inking frame and locking them in printing relation about the printing plates, then withdrawing the remainder of the ink distribution train to leave space in front of the form rollers for an operator to work while making said radial adjustments.

17. The method of adjusting the form rollers of the ink distribution mechanism of a printing press of the type having an inking frame movable relative to the printing section to form an open or closed press which comprises connecting the form rollers alone of said ink distribution mechanism in printing relation to the printing plates, making individual radial adjustment of the form rollers to the printing plates while the press is open, then transferring the radially adjusted form rollers to the inking frame, and finally, while preserving the said radial adjustments, making individual circumferential adjustment of the form rollers to the vibrator rolls of the inking frame while the press is open.

18. The method of adjusting the form rollers, of a press of the type in which said form rollers are normally carried by an inking frame that is movable toward and from the printing section, into inking relation to the vibrator rolls of the inking train or into inking relation to the printing plates which comprises separating said form rollers from the inking frame and mounting them in printing relation about the printing plates, then adjusting each form roller radially to said plates with the inking frame moved back, separating said radially adjusted form rollers from the printing section and mounting them in inking relation to the vibrator rolls, then, while preserving its said radial adjustment, adjusting each form roller circumferentially to its co-operating vibrator roll with the inking frame moved back.

19. A printing press having, in combination, a printing section, an ink distribution section, means to move one of said sections relatively to the other to produce an open or closed press, a set of form rollers, means on each of said sections for supporting the form rollers of said set in either printing relation to the printing plates on the plate cylinder of the printing section or in inking relation to the vibrator rolls of the ink distribution section, and means for securing

the said form rollers in either of said relations at the will of the operator.

the plate cylinder of the printing section or in inking relation to the vibrator rolls of the ink distribution section, and means carried by the said form rollers for alternately coacting with one and then the other of said supporting means for maintaining said form rollers in said relations while making successive adjustments thereof to said plates and to said vibrator rolls.

20. A printing press having, in combination, a printing section, an ink distribution section, means to move one of said sections relatively to the other to produce an open or closed press, a set of form rollers, means on each of said sections for supporting the form rollers of said set in either printing relation to the printing plates on

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