

[72] Inventor **Carl E. Bohman**
Chicago, Illinois
 [21] Appl. No. **700,171**
 [22] Filed **Jan. 24, 1968**
 [45] Patented **Nov. 10, 1970**
 [73] Assignee **Miehle-Goss-Dexter Incorporated**
Chicago, Illinois
a corporation of Delaware

[56] **References Cited**
UNITED STATES PATENTS
 970,000 9/1910 Waite 101/352
 2,635,539 4/1953 Peyrebrune 101/352
 3,186,338 6/1965 Peyrebrune et al. 101/352
 3,323,452 6/1967 Pasquinelli 101/352

Primary Examiner—Robert E. Pulfrey
Assistant Examiner—J. Reed Fisher
Attorney—Hume, Clement, Hume & Lee

[54] **OSCILLATOR INK ROLLER MOUNTING AND CONTROL MEANS**
9 Claims, 5 Drawing Figs.

[52] U.S. Cl. **101/352**
 [51] Int. Cl. **B41f 31/34**
 [50] Field of Search. 101/349—
 352, 206, 207, 209, 247, 358, 362, 139, 140,
 143, 144, 145, 148, 185

ABSTRACT: A self-oscillating roller which is adapted to coact with two form rollers mounted for pivoting motion about respective spaced axes, has its journals mounted in sockets which are supported by rigid links pivotally connected to the respective form roller brackets and to said sockets. Adjustable eccentrics provide adjustability for establishing and thereafter maintaining the desired contact relation between the oscillator roller and the respective coacting form rollers.

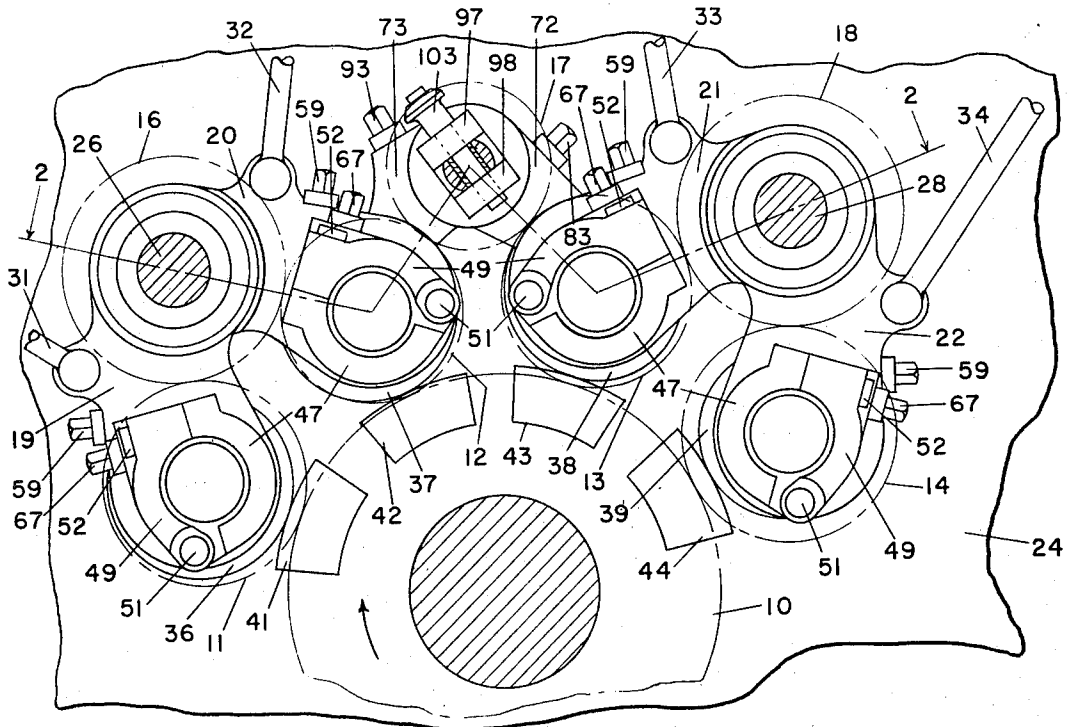


FIG. 1

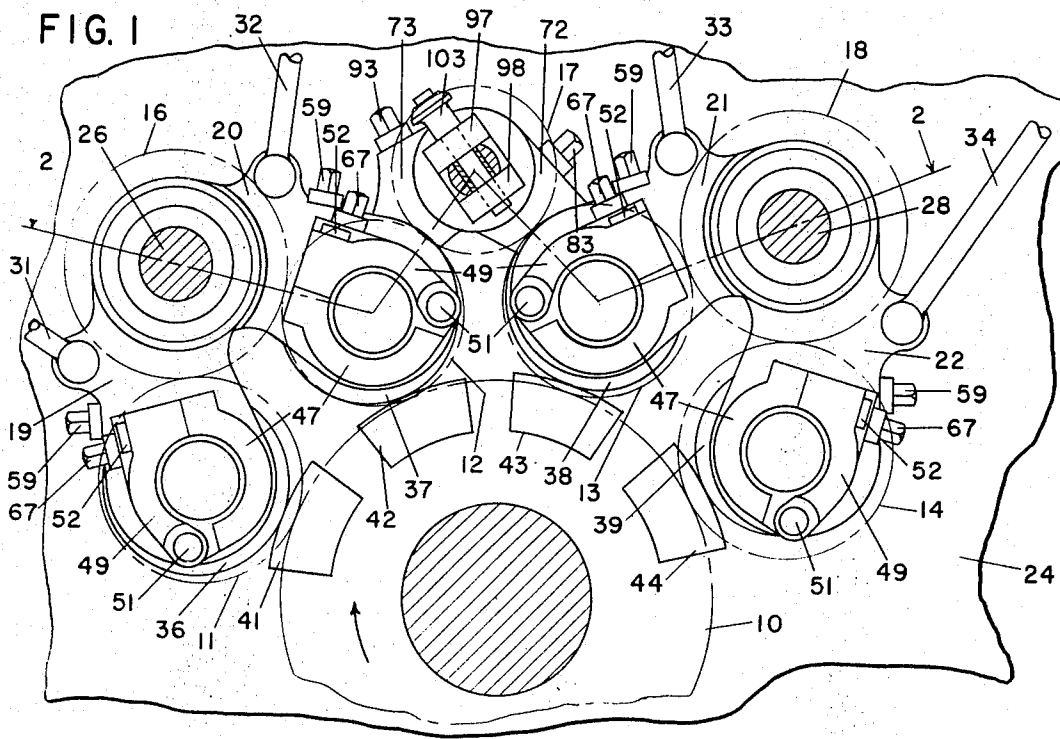
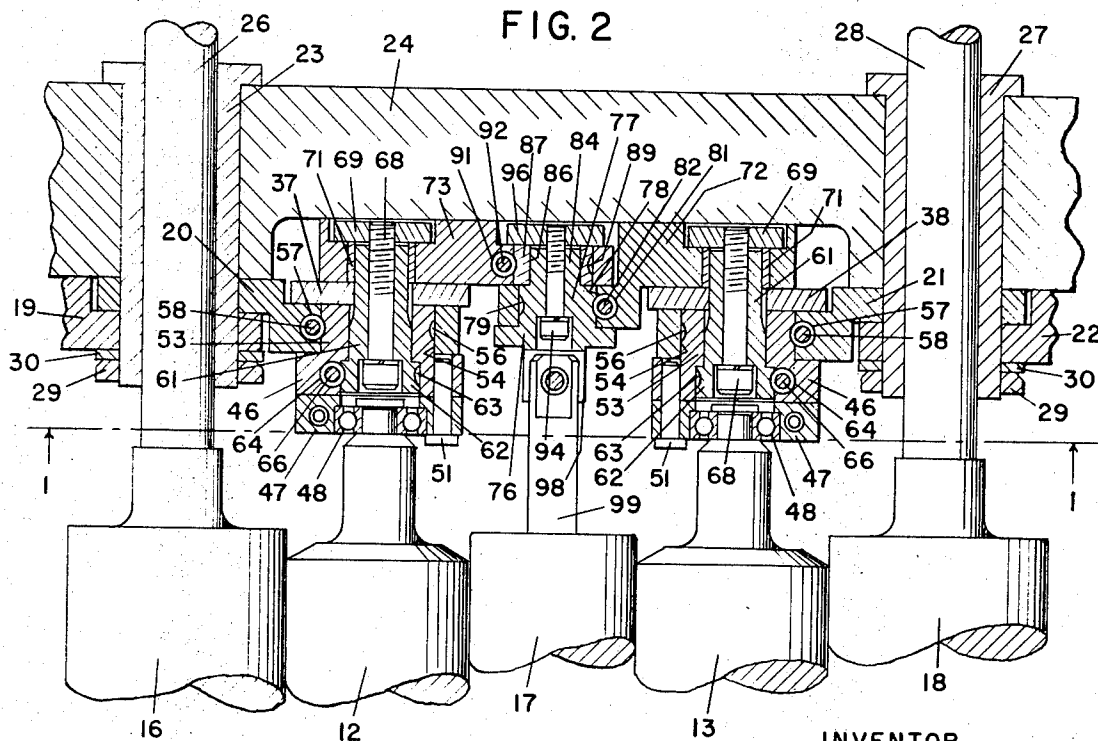


FIG. 2



INVENTOR

CARL E. BOHMAN

BY

Hume Clement Hume & Lee
ATTORNEYS

FIG. 5

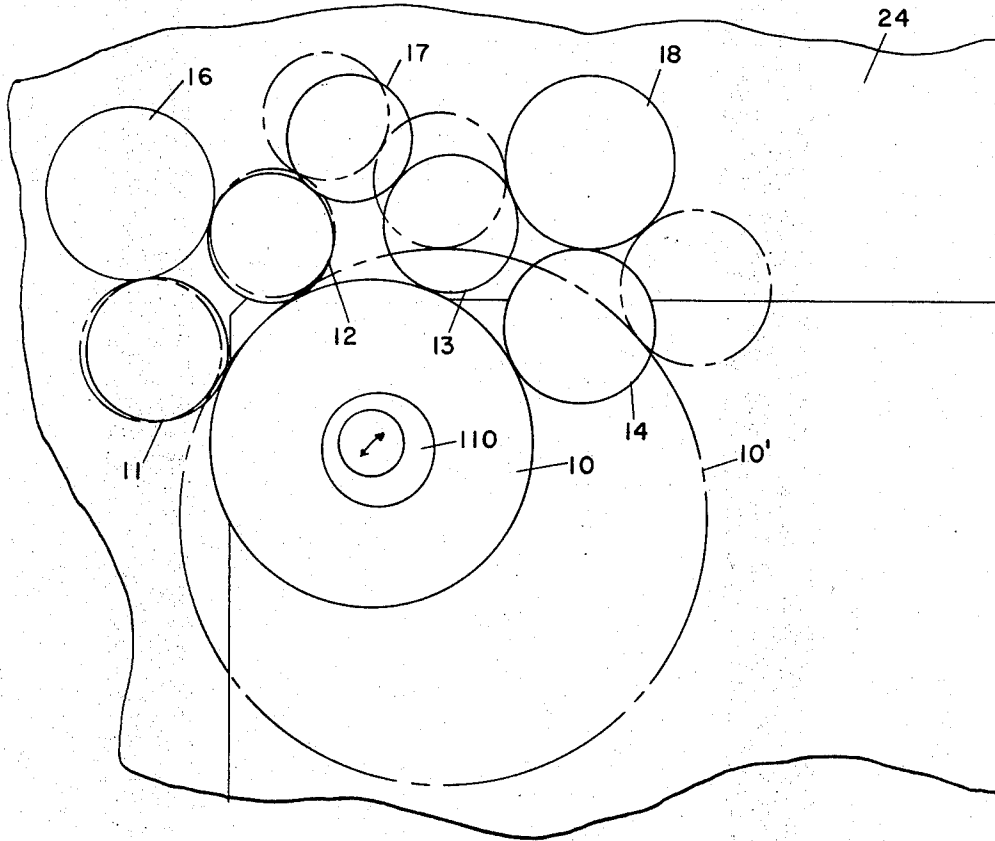


FIG. 4

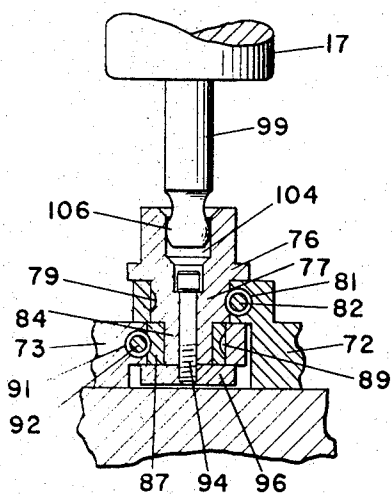
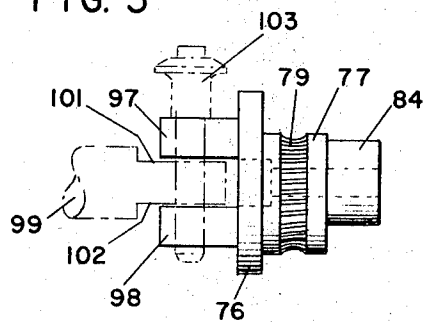


FIG. 3



INVENTOR
CARL E. BOHMAN

BY
Hume Clement Hume & Lee
ATTORNEYS

OSCILLATOR INK ROLLER MOUNTING AND CONTROL MEANS

The invention pertains to inking mechanisms for printing presses. More specifically, it is directed to an improved mounting arrangement for an oscillator roller in the inking mechanism of a variable cutoff web press.

In conventional web or sheet fed printing presses the inking mechanisms generally include a plurality of form inking rollers to effect final transfer of the ink to the plate carried by the plate cylinder. Usually four form inking rollers are employed and these are arranged in pairs with each pair being mounted for pivoting motion about the axis of a respective coacting vibrator roller so that they can be adjusted and tripped on and off relative to the plate cylinder.

It is also common practice to employ an oscillator roller which is located intermediate and is adapted to run in contact with the adjacent rollers of the respective pairs of form rollers to thereby improve the distribution of the ink and to maintain a balanced condition as regards the amount of ink carried on the surfaces of the respective form rollers. To facilitate the insertion and removal as well as the adjustment and tripping motions of the form rollers it has been the practice to mount the journals of the oscillator roller in simple guideways or the like on the press side frames so that it can readily be removed and which provide clearance for the oscillator roller to shift with the form rollers when the latter are tripped. Merely the force of gravity or in some instances, resilient springs are employed to maintain the oscillator roller in contact with the respective coacting form rollers.

This mounting arrangement for the oscillator roller has been relatively satisfactory for conventional presses having a fixed diameter plate cylinder which is mounted for rotation about a fixed axis. Under these circumstances, the positions of the form rollers are relatively fixed and the oscillator roller can be mounted so that its axis will remain parallel and in substantially perpendicular alignment with the axis of the plate cylinder. Consequently, gravity and/or simple spring means will maintain the contact relation between the oscillator roller and the respective form rollers substantially equal and since the oscillator roller is required to move only a limited distance when the form rollers trip, the simple guideways afford adequate flexibility.

The conventional mounting means are completely inadequate for a variable cutoff web press, however, because they do not provide the flexibility of motion for the oscillator roller which is necessary to accommodate the rather substantial displacement of the form rollers when plate cylinders of different diameters are interchanged. Moreover, once the oscillator roller is shifted from its balanced position in alignment with the plate cylinder, simple spring means and/or the force of gravity alone cannot be relied upon to maintain the desired contact relation between the oscillator roller and the two form rollers.

Modern web presses also generally incorporate means for skewing or inclining the axis of the plate cylinder relative to the coacting blanket or impression cylinder for register purposes, and this requires a corresponding shift in the positions of the form and oscillator rollers in order to assure uniform ink distribution. While means have been developed for shifting the form rollers together with the plate cylinder when the latter is skewed, the known oscillator roller mounting means are incapable of this function and therefore the distribution of ink is adversely affected when such plate cylinder adjustments are made.

The present invention obviates the shortcomings of the known devices by providing improved mounting means for an oscillator roller which positively maintains the center distance between the oscillator roller and the respective coacting form rollers in all positions and during any movement of said form rollers. This is accomplished by employing improved socket means for the journals of the oscillator roller which are supported by rigid members pivotally connected to the respective form roller brackets so that the oscillator roller will move in

precise unison with either one or both of the form rollers. The socket means also includes adjustable members for adjusting the center distance between the oscillator roller and the respective form rollers to obtain the desired squeeze therebetween and the arrangement is such that these settings are not affected by any change in the positions of the form rollers.

It is a primary object of this invention, therefore, to provide mounting structure for an oscillator roller which is capable of establishing and thereafter maintaining a predetermined setting of the oscillator roller relative to coacting form rollers.

Another object is to provide mounting structure such as described for an oscillator roller and which is capable of moving the oscillator roller bodily in unison with the form rollers while maintaining constant the center distance between said rollers.

A further object is to provide mounting means which include adjustable members for establishing and thereafter positively maintaining a predetermined contact relation between the oscillator roller and the respective coacting form rollers.

A still further object is to provide mounting structure which will incorporate quick release socket means to facilitate rapid insertion and removal of the oscillator roller.

Other objects and advantages will become apparent from the following description and accompanying drawings which disclose a preferred embodiment of the invention and wherein:

FIG. 1 is a side elevational view taken substantially along the line 1-1 of FIG. 2 and illustrating that portion of an inking mechanism to which the invention pertains;

FIG. 2 is a sectional view taken substantially along line 2-2 of FIG. 1;

FIG. 3 is a sectional view illustrating the oscillator roller socket at the drive side of the press;

FIG. 4 is an enlarged view of the socket means at the feed side of the press; and

FIG. 5 is a schematic view illustrating the extent to which the form inking and oscillator rollers are displaced for the purpose of accommodating minimum and maximum size plate cylinders.

With reference now to the drawings, the invention is disclosed as embodied in a web fed printing press of the variable cutoff type which is adapted to accommodate interchangeable printing cylinders of different diameters for the purpose of printing a multiplicity of different size products. The press may be adapted to print by either the offset or letterpress process and the printing cylinder may be individually interchangeable or they may comprise part of interchangeable modules which are adapted to be readily inserted into and/or removed from an operative position in the main press frames. In any event, all of the interchangeable plate cylinders, such as that indicated by the reference number 10 in FIG. 1, are adapted to be inked by a common inking mechanism which is a component of the main unit of the press and which must be relatively flexible in order to function efficiently under all circumstances.

In the interest of simplicity, the entire inking mechanism has not been illustrated in the drawings, but it will be understood that it comprises a conventional train of coacting rollers suitably supported on the main press side frames and which are adapted to distribute and convey a continuous and uniform supply of ink from the usual ink reservoir to the form inking rollers 11, 12, 13 and 14. The latter rollers perform the final and critical function of distributing the ink in the form of a thin uniform film over the entire printing area of a plate carried by the plate cylinder regardless of the diameter of said cylinder within maximum and minimum limits of the press.

In the instant embodiment, the train of distributing rollers is adapted to supply ink to the surface of the vibrator roller 16 from which surface it is transferred by the form inking rollers 11 and 12 to the plate on the plate cylinder 10. A portion of the ink is also transferred by means of the oscillator roller 17 to the form inking roller 13 and from the latter roller through a second vibrator roller 18 to the form inking roller 14.

With this arrangement it will be evident that the plate cylinder, due to its rotation in a clockwise direction as viewed in FIG. 1, receives the major portion of its ink from the form rollers 11 and 12 which are the first to engage the plate and the other form roller 13 and 14 serve primarily to distribute the transferred ink evenly in a uniform film over the entire printing area of the plate. In addition to their distributing function, however, the form rollers 13 and 14 also serve to supply additional ink to the plate in those areas which otherwise would tend to become "starved" and which condition is evident in the finished prints in a form commonly referred to as "ghosting".

It is essential, therefore, that when a press is put into operation, the inking mechanism quickly reach and thereafter maintain a certain balanced condition so that the respective form inking rollers will function continuously to distribute a uniform film of ink over the entire printing area of the plate during each cycle of operation. This requires that the various inking rollers in the entire train be accurately set relative to the coating rollers and the form inking rollers in particular must be set very accurately relative to the plate and the coating vibrator rollers. Moreover, in order for the form rollers 13 and 14 to consistently perform their final inking and distributing function it is imperative that the oscillator roller 17 remain in constant and uniform contact throughout its entire length with the adjacent form rollers 12 and 13. Any variation in or loss of contact between the oscillator roller and the coating form rollers will disturb the balanced condition of the system and affect the quality of the work produced.

The manner in which the present invention provides the necessary control of the oscillator roller will now be described with particular reference to FIGS. 1 and 2 which disclose the roller mounting means at one side only of the press. It will be understood, of course, that substantially identical mounting means are provided for supporting the rollers at both sides of the press with but minor exceptions which will be explained hereinafter.

As shown in FIG. 1, the form inking rollers are arranged in pairs with the rollers 11 and 12 being mounted on the respective brackets 19 and 20 for pivotal motion about the axis of the vibrator roller 16 whereas the form rollers 13 and 14 are mounted on the respective brackets 21 and 22 for pivotal motion about the axis of the other vibrator roller 18. The brackets 19 and 20 are pivotally mounted on a sleeve bushing 23 in the frame 24 which also serves to journal the shaft 26 of the vibrator roller 16 and brackets 21 and 22 are similarly mounted on a sleeve bushing 27 in the frame 24 and which serves to journal the shaft 28 of the vibrator roller 18. A lock nut 29 and washer 30 serve to retain the brackets in position on the respective bushings.

Each one of the brackets is arranged to be biased toward the plate cylinder by suitable resilient biasing means which may be in the form of springs, fluid actuated cylinders or the like, not shown, but which are connected to the brackets by the respective actuating rods 31, 32, 33 and 34 and which serve to maintain the control cam discs 36, 37, 38 and 39 on the respective brackets in contact with respective coating stops 41, 42, 43 and 44 associated with the plate cylinder. Each interchangeable plate cylinder has its own set of stops which are located at predetermined radii dependent upon the radius of the plate cylinder and they coast with the respective cam discs to automatically locate the respective form rollers in operative position relative to the plate cylinder upon insertion of the latter into the press. It will thus be seen that the form rollers are pivotally mounted so that they can readily be displaced to accommodate plate cylinders of different diameters and that they will automatically assume operative positions relative to the respective plate cylinders through the coaction of the respective cam discs and coating stops. For more complete explanation of the function of the cam discs and coating stops reference may be had to my copending application Ser. No. 598,983, filed Dec. 5, 1966 and entitled "Form Roller Setting and Control Means", now U.S. Pat. No. 3,448,686, issued June 10, 1969.

To support the respective form rollers, each bracket is provided with a socket assembly at the free end thereof which comprises a socket body 46 having an axially projecting, arcuate shaped pocket 47 formed thereon which is adapted to receive the outer race of a bearing 48 secured to the end of the form roller shaft. The bearing is retained in the pocket 47 by means of a cap member 49 which is pivotally mounted on the socket body by means of the pin 51 and is releasably secured in roller retaining position by the screw 52.

The opposite end of the socket body 46 is provided with an axially projecting, reduced diameter portion 53 which is formed eccentric to the socket body and is rotatably mounted in a bore 54 in the respective brackets. Worm teeth 56 are provided about the periphery of the portion 53 and these teeth have meshing relation with a worm gear 57 which is fixed to a shaft 58 that is rotatable in the bracket. One end of the shaft extends beyond the bracket and it is squared as at 59 to accommodate a tool for adjustment purposes.

Mounted within the socket body 46 for relative rotation about an axis coincident with the axis of the form roller is a cylindrical control member 61, one end 62 of which is formed on an enlarged radius and has worm teeth 63 provided about its periphery. These teeth are adapted to mesh with a worm gear 64 which is mounted for rotation in the socket body 46 on a shaft 66 that extends beyond the socket body and has a squared end 67 to accommodate a tool for adjustment purposes.

The opposite end of the control member 61 extends beyond the socket body 46 and it is adapted to support the cam disc 38 which is splined to the control member 61 for rotation therewith. The entire assembly includes the socket body 46, the control member 61 and the cam disc such as 38 are secured in position on the bracket by means of the bolt 68 which extends axially through the socket body to receive a nut 69 which acts through the spacer bushing 71 to retain the cam disc against axial displacement.

The assemblies described thus far are essentially the same for each of the form rollers and, as will be described hereinafter, provide means for adjusting the respective form rollers relative to the plate cylinder and the coating vibrator rollers. In addition to this adjustability, the center form rollers, namely 12 and 13 are adapted to provide support for the center oscillator roller 17 and, therefore, the respective control members 61 thereof are somewhat longer and are adapted to pivotally support the respective oscillator roller brackets 72 and 73.

Bracket 72 is rotatably mounted on the spacer bushing 71 of the socket assembly for the form roller 13 whereas bracket 73 is pivotally mounted on the spacer bushing 71 of the socket assembly for the form roller 12. These two brackets provide pivotal support for the oscillator roller socket assembly which essentially consists of a generally cylindrical socket body 76 which has a reduced diameter portion 77 which is formed eccentric with respect to the axis of the socket body and is rotatably mounted in a bore 78 in the bracket 72. Worm teeth 79 are formed in the periphery of portion 77 and these teeth are adapted to mesh with a worm gear 81 carried by the bracket 72. The worm gear is mounted on a shaft 82 which is rotatable in the bracket and it has a squared end 83 extending beyond the end of the bracket for purposes of adjustment.

Projecting laterally from the portion 77 of socket body 76 is another portion 84 which is of still further reduced diameter and it is formed about an axis which is coincident with the axis of the socket body. This latter portion is adapted to fit rotatably within an eccentric bore 86 in a bushing 87 which in turn is rotatably mounted in a bore 88 in the bracket 73. The bushing 87 has worm teeth 89 about its periphery and these teeth mesh with a worm gear 91 carried by the bracket 73. The latter gear is mounted on a shaft 92 which is rotatable in the bracket and has a projecting squared end 93 by means of which it can readily be adjusted. The socket body 76 is retained in position in the two brackets 72 and 73 by means of the bolt 94 which is inserted through the socket body and

receives a retainer 96 which is threaded onto the end thereof to secure the respective members together as a unit.

At the opposite end thereof the socket body 76 has two spaced, parallel axially projecting cheek plates 97 and 98, see FIGS. 1 and 3, for supporting the oscillator roller shaft 99 which is provided with flattened areas 101 and 102 at the end thereof so that said shaft can be mounted between the two cheek plates. The shaft is secured in operative position at this end by means of a quick release pin 103 which is inserted through aligned holes formed in the cheek plates and the end of the oscillator shaft 99, so that the oscillator roller can be quickly released when necessary for access to the form rollers 12 and 13.

The shaft 99 is accordingly fixed so that it does not rotate. However, it will be understood that the oscillator roller 17 is mounted on the shaft 99 in a manner permitting rotation and also providing for axial movement on the shaft as is well known for rollers of the oscillator type.

The mounting means for the opposite end of the oscillator roller are substantially the same as those just described with the exception that the socket body 76 is formed with a centrally disposed cylindrical recess 104, see FIG. 4, instead of spaced cheek plates. Moreover, the oscillator roller shaft 99 is formed with a rounded knob 106 which fits snugly in the recess and which permits angling of the roller shaft during insertion and removal.

From the foregoing description it will be evident that when a new or different plate cylinder is installed in the press and the various form inking rollers are initially made ready they must be adjusted to obtain a predetermined squeeze against the plate cylinder and the coating vibrator roller. This is accomplished by first adjusting the worm gear 57 to effect rotation of the socket body 46 in the bracket 21. Since the portion 53 thereof is eccentric with respect to the socket body such adjustment will adjust the socket body and therewith the form roller toward or away from the vibrator roller until the desired squeeze is obtained.

Once this setting is completed the worm gear will retain the socket body against unintended movement and the center distance between the form roller and the vibrator roller will remain constant regardless of any pivoting motion of the bracket 21 about the vibrator roller axis.

Next, the form roller must be adjusted relative to the plate cylinder to achieve optimum distribution of the ink over the image areas of the plate. As explained hereinbefore, the form rollers are biased toward the plate cylinder by resilient means and the contact relation between the form rollers and the plate cylinder is controlled by the cam discs 38 and coating stop 43. The periphery of the cam disc is of spiral configuration and therefore by rotating said disc relative to the socket by means of the worm gear 64, the effective radius thereof can be adjusted until the desired squeeze between a form roller and the plate is obtained. Here again this setting will remain fixed regardless of any pivoting motion of the form roller about the vibrator roller due to the inherent self locking nature of the worm and worm teeth.

Insofar as the form rollers are concerned once the foregoing settings are completed they are ready for operation with plate cylinders of any diameter. However, the oscillator roller must be accurately set relative to the form rollers 12 and 13 to obtain the necessary balance and distribution through the system. Adjustment of the oscillator roller 17 relative to the form roller 13 is effected by rotating the worm gear 81 which imparts relative angular motion to the socket body 76. Since the portion 77 thereof is formed eccentric to the socket body it will be seen that the socket body and therewith the oscillator roller 17 will be adjusted toward or away from the form roller 13 until the desired squeeze between these two rollers is obtained.

The next step is to adjust the oscillator roller relative to the form roller 12 and this is accomplished by rotating the worm gear 91 which is effective to rotate the eccentric bushing 87 in the bracket 73 about the concentric portion 84 of the socket

body. This adjustment obviously will alter the center distance between the oscillator roller and the form roller 12 until the desired squeeze therebetween is obtained.

It will be noted that the adjustment of the oscillator roller 17 relative to the respective form rollers 12 and 13 is effected independently and moreover that the adjustment to one of the form rollers will not disturb the adjustment to the other roller. This is due to the fact that the portion 84 of the socket body is formed concentric therewith and therefore when the socket body is rotated to effect an adjustment of the oscillator roller relative to the form roller 13 the portion 84 merely rotates in the bushing 87 and the center distance between the oscillator roller and the form roller 12 remains unchanged although the bracket 73 may pivot somewhat about the axis of the vibrator roller 16.

By the same token, when the oscillator roller is adjusted relative to form roller 12 it will not disturb its setting relative to form roller 13. In this instance the worm gear 91 rotates the eccentric bushing 87 relative to the bracket 73 and the socket body 76 to thereby vary the center distance between the oscillator roller and the form roller 12 but the setting between the oscillator roller and the form roller 13 will remain unchanged. The bracket 72 will pivot however to a limited extent about the axis of the vibrator roller 18.

Accordingly, once the respective settings are made it will be apparent that because of the rigid connections between the form rollers 12 and 13 and the oscillator roller 17, the latter roller will move in precise unison with the form rollers when the latter are tripped off the plate cylinder or when their positions are altered, as indicated in FIG. 5, to accommodate different diametered plate cylinders.

Moreover, when the plate cylinder is skewed for register purposes as by rotating the eccentric bushing 110 which journals the bearing at one end of the plate cylinder, it will be understood that the respective stops 41-44 will shift in unison therewith.

Since the form rollers are biased toward the plate cylinder they will tend to remain in contact with the stops and thus will move in unison and maintain uniform contact with the plate cylinder and due to the rigid connecting brackets 72 and 73 the oscillator roller will maintain constant and uniform contact with the two form rollers 12 and 13.

This mounting arrangement provides complete flexibility for the oscillator roller which enables it to assume infinitely variable positions as indicated by the positions of the coating form rollers while maintaining constant the center distances between the respective rollers. This constitutes a significant advance over previous oscillator roller mounting arrangements and provides for optimum ink distribution under all operating conditions.

Having thus described a preferred embodiment of the invention, it will be recognized that modifications in the arrangement and functions of the various elements will become apparent to persons skilled in the art without departing from the spirit of the invention. It is intended, therefore, to encompass all such modifications as come within the scope of the appended claims.

I claim:

1. In a printing press having a plate cylinder, the combination comprising, a first form inking roller for transferring ink to a plate carried by the plate cylinder, means mounting said first form inking roller for pivotal movement about a first fixed axis spaced from the axis of rotation of said first form inking roller, a second form inking roller for transferring ink to the plate carried by the plate cylinder, means mounting the second form inking roller for pivotal movement about a second fixed axis spaced from the axis of rotation of said second form inking roller, said first axis being located in spaced relationship to said second axis, a third roller located intermediate and adapted to have peripheral contact with said first and second form inking rollers, journaling means for supporting said third roller, said journaling means including bracket means pivotally connected between the rotational axis

of said third roller and each of the said axes of rotation of the respective first and second form inking rollers for maintaining constant the center distance between the third roller and the respective form inking rollers when the latter rollers pivot about their respective first and second axis, and means for pivoting said first and second form inking rollers about their respective first and second axis.

2. Apparatus as set forth in claim 1, wherein said journaling means includes adjustable members for selectively adjusting the center distance between the third roller and the respective form inking rollers.

3. Apparatus as set forth in claim 2 wherein said adjustable members comprise coaxially mounted, independently adjustable eccentrics for selectively adjusting the third roller relative to the respective form inking rollers.

4. Apparatus as set forth in claim 2 wherein the journaling means at one end of said third roller includes a socket for receiving the adjacent end of the shaft on which the roller is mounted for rotation, the journaling means at the other end of said roller including spaced, axially projecting flanges, aligned holes formed in said flanges, a corresponding hole formed in the adjacent end of said shaft, and a releasable pin extending through said holes for releasably locking the shaft for said roller in an operative position.

5. Apparatus as set forth in claim 4 wherein the end of the shaft which fits into said socket is formed with a substantially round knob to permit pivoting of the oscillating roller during insertion and removal.

6. In a variable cutoff rotary web printing press of the type adapted to accommodate interchangeable plate cylinders of varying diameters for printing variable size products, the

provision of inking mechanism for inking a printing plate carried by any one of said cylinders comprising a first vibrator roller mounted for rotation about a fixed axis spaced from said plate cylinder, a second vibrator roller mounted for rotation about a fixed axis spaced from the first vibrator roller and also from the plate cylinder, a first form inking roller, a bracket for the first form inking roller mounted for pivotal movement about the axis of the first vibrator roller, a second bracket for the second form inking roller mounted for pivotal movement about the axis of the second vibrator roller, means for automatically shifting the first and second form inking rollers about the axes of the respective vibrator rollers upon insertion of a plate cylinder to thereby locate the respective form inking rollers in operative position relative to the plate cylinder, an oscillating roller located intermediate and adapted to have peripheral contact with the said first and second form inking rollers, and bracket means pivotally connected between the oscillator roller and the respective first and second form inking rollers for maintaining the contact relation between the oscillator roller and the respective form inking rollers constant for all positions of the said form inking rollers.

7. Mechanism as set forth in claim 6 wherein adjustable means are provided for adjusting the first and second form inking rollers relative to their respective vibrator rollers.

8. Mechanism as set forth in claim 6 wherein means are provided for adjusting the respective form inking rollers relative to the plate cylinder.

9. Mechanism as set forth in claim 6 wherein means are provided for selectively adjusting the oscillator roller relative to the respective first and second form inking rollers.

35

40

45

50

55

60

65

70

75