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INK ROLLER VIBRATOR

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4 Sheets-Sheet 3

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The present invention relates to printing presses and more particularly to an improved means for reciprocating the rollers in the inking mechanism. It is an object of the present invention to provide a novel and improved ink roller vibrator unit of self-contained construction in which the reciprocating effort is applied axially to the shaft of the ink roller and in which side thrust thereon is substantially eliminated.

It is another object of the invention to provide an improved ink roller vibrator unit which may be detachably secured to the side frame of a rotary printing press adjacent the ends of an ink roller and a driven member such as an ink drum, and in which the rotation of the latter is utilized to produce axial reciprocation of the ink roller. It is a related object to provide a separable coupling between the vibrator unit and the ends of the ink rollers which enables the ink rollers to be adjusted to a laterally offset position to accommodate various roller sizes and which further enables either the vibrator unit or the rollers to be removed and replaced with a minimum expenditure of time and effort.

It is a further object of the invention to provide an improved mechanism for axially vibrating a pair of ink rollers in which the axial movement of the rollers is oppositely phased and which includes unitary means for simultaneously adjusting the stroke or amplitude of vibration.

It is still another object of the invention to provide a unitary ink roller vibrator of the above type which includes a self-contained lubricating system and in which the movement of the output member is such as to enable the use of simplified sealing means for preventing the escape of lubricant.

It is a still further object of the present invention to provide a self-contained roller vibrator unit utilizing an off center driving means and having provision for adjusting the eccentricity thereof which is readily accessible from the outside of the unit and which further includes means for positively preventing any accidental change in such adjustment once it has been made.

In general, it is an object of the invention to provide an ink roller vibrator unit of improved and inexpensive construction, smooth and quiet in operation, and in which the bearing surfaces are constructed and arranged and so lubricated that maintenance is reduced to a minimum.

Other objects and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 shows a typical arrangement of rollers and drums employed to convey an evenly distributed film of ink from the fountain to the plate cylinder and incorporating rollers to be actuated by a vibrator constructed in accordance with our invention.

Fig. 2 is an enlarged detailed view in partial section of a vibrating unit constructed in accordance with our teachings and as arranged along the section line 2—2 of Fig. 1.

Fig. 3 is a sectional view in elevation taken along line 3—3 of Fig. 2.

Fig. 4 is a fragmentary sectional view taken along line 4—4 of Fig. 2 and showing the socket arrangement for supporting the ink rollers and for laterally adjusting the rollers with respect to a cooperating drum.

Fig. 5 is a fragmentary plan view in partial section taken along line 5—5 of Fig. 2 and showing in detail the means for coupling the vibrator unit to the shaft of an ink roller.

Fig. 6 is a sectional plan view taken along line 6—6 of Fig. 2 and showing the means for adjusting the amplitude of roller vibration.

Fig. 7 is a vertical sectional view of a modified form of vibrator embodying the invention in which four ink rollers may be simultaneously vibrated by power derived from a single drive shaft.

Fig. 8 is a view in partial section taken along line 8—8 of Fig. 7.

Fig. 9 is a sectional view in elevation taken along line 9—9 of Fig. 8 and axially with respect to the ink rollers.

While the invention is susceptible of various modifications and alternative constructions, we have shown in the drawings and will herein describe in detail two preferred embodiments, but it is to be understood that we do not thereby intend to limit the invention to the specific forms disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

In the design of rotary printing presses it is important that the ink be worked into a film which is as nearly as possible of uniform thickness before it is conveyed to the printing surface of the plate cylinder. Experience has shown that the best way of effecting uniform ink transfer, in view of the serious space limitations and high operating speeds of a modern letter press, is by means of auxiliary ink transferring rollers which are axially vibrated. To accomplish this, various types of vibrating mechanisms have been devised and are shown in the patented art. However,
such prior art vibrators have various shortcomings and defects which, as a practical matter, have severely limited their usefulness.

As an example of the above, the use of a bell crank frequently employed for effecting reciprocation of the ink rollers is disadvantageous since the force applied to the roller has a component perpendicular to the bearing surfaces. Even where the parts are so arranged as to reduce such lateral force, the repetitive application causes an increased amount of wear so that the bearings soon become noisy and unsatisfactory. Then too, prior art vibrators are not well adapted for ready removal nor are they applicable for use with a wide variety of roller sizes.

It is desirable, on the other hand, that a vibrator be so constructed and arranged as to operate satisfactorily with a range of roller diameters without changing the direction of the force applied to the ink roller. Furthermore, in view of the high cost of maintenance and shutdowns, it has been found highly desirable that a vibrator be of a unitary construction which is both independent of the press as regards lubrication and which may be easily and quickly removed and replaced should the latter become necessary for any reason whatsoever. As the discussion proceeds, it will be seen that the novel and improved structure which is disclosed herein not only contains to a marked extent the advantages alluded to, but includes many additional structural advantages and features.

In order more readily understand the construction of the vibrator, it is pointed out that the figures may be divided into two primary groups. The first group consists of Figs. 1 to 6 showing the construction and manner of use of a preferred embodiment, while the second group includes Figs. 7 to 9 showing an alternative structure which will be described in detail under a separate heading.

Embodiment of Figs. 1 to 6

Referring now to Fig. 1, the arrangement of rollers and drums for conveying a film of ink from the fountain to the surface of the plate cylinder is shown schematically and without reference to mechanical detail. While this arrangement is one which has been advantageously used in connection with our invention, it is hardly necessary to point out that the scheme shown in this figure is merely one of many which may be used. As shown, ink passes from a fountain roller 10 to a first ink drum 11 and a second ink drum 12 via intermediate feed rollers 14 and 15. Vibrating rollers 16, 18 and 19, 20, whose amplitudes of vibration is fixed, bear upon the ink drums 11 and 12 respectively, and assist in producing an even film of ink thereon. Next, ink is transferred to a main ink drum 21 by means of a transfer roller 22. The ink passes successively to auxiliary ink drums 24, 25, and thence to the plate cylinder 26. Inserted between the main ink drum 21 and the auxiliary ink drums 24 are vibrating rollers 28, 29 and it is with the vibration of the latter rollers that the present invention is particularly concerned. The structure for accomplishing such vibration to be described in detail is oriented generally along the line 2—2.

As shown in detail in Fig. 2 and in accordance with the present invention, the vibrating mechanism is driven from a rotating element here drum 21, which is aligned with and adjacent to the vibrated rollers 28, 29. Prior to discussing the details disclosed in Fig. 2 it will be helpful to consider the vibrator in a broader sense as a self-contained unit which may be bolted or otherwise fastened to the side frame of a modern letterpress. The entire vibrating mechanism, it will be noted, is contained within a unitary housing 30, having a support or bracket being fastened to the same to the exterior of the side frame 31 of the press, for example, by means of bolts 32. Shaft 33 of the main ink drum 21 is rotatively received in the side frame 31, being provided at its end with a separable coupling 34 which drives in engaging a stub shaft 35 projecting inwardly within the supporting bracket 27. With the housing 30 arranged as shown the portions thereof adjacent the bracket are spaced from and "overhang" the press frame.

The vibrating rollers 28, 29 which rollingly engage the main ink drum 21 terminate in roller shafts 36, 38 respectively, which are supported in adjustable sockets indicated generally at 39 and 40 respectively. Although the sockets are adjustable, they are firmly secured to the side member 31 by means to be described.

Extending outwardly from the housing 30 and in general alignment with the roller shafts 36, 38 are push rods 41, 42 which act through couplings 43, 44 on the ink rollers 28 and 29. Suffice it to say at this point that the couplings 43, 44 are of a novel and improved nature enabling the generally aligned shafts 41, 36, and 42, 38 to be laterally offset by a limited amount without interfering with the nature or direction of the reciprocating force applied to the ink rollers. Considering the unit as a whole, then, and without reference to mechanical detail, it will be apparent that the vibrating unit may be readily mounted on the side frame of a press, rotation of the drive shaft 35 being effective to reciprocate the adjacent ink rollers. The inclusion of a self-contained and sealed lubricating system (to be discussed) increases the readiness with which the unit may be detached for occasional replacement or repair. Conversely, the rollers 28, 29 and the drum 21 may be removed for cleaning or repair without loosening the housing or disturbing the vibrating mechanism.

Referring now to the mechanism contained within the housing 30, it will be seen that the drive shaft 35 is journaled in bearing 45 which are mounted in the abutting end portion 27 of the housing. Supported by the side walls of the housing 30 by bearing brackets 37, 41 and at right angles to the drive shaft 35 is a driven shaft 46 (see Fig. 6) which may be rotated by the drive shaft by any desired means. As shown, this is preferably taken care of by a pair of bevel gears 48, 49 which are mounted on the drive shaft 35 and the driven shaft 46 respectively.

In accordance with the invention, means are provided for interconnecting the driven shaft 46 and the push rods 41, 42 for reciprocating the latter. This is accomplished in the present instance by utilizing a rocker arm 50 (Fig. 2) which is pivotally supported on a shaft 51 which extends from side to side within the housing and parallel to the driven shaft 46. The rocker arm 50 includes an upper portion 50A extending into engagement with the push rod 41 and a lower portion 50B extending downwardly into engagement with the push rod 42. With the arm 50 arranged in this manner, limited oscillatory movement thereof may be utilized to cause reciprocation of the push rods.

In the practice of the invention, oscillatory movement is imparted to the rocker arm 50 from...
the driven shaft 48 by means of an off-center or eccentric mechanism. In the present embodiment the latter includes an eccentric 54 having an outer surface 58 which is bored to receive it. The slide block 53 which is bored to receive it. The slide block 53 is in close sliding engagement with the rocker arm 50, riding within a slot 54 formed in a laterally extending portion 56C of the rocker arm 50. Disturbance of this sliding engagement is effectively prevented by integral overhanging edges 58, 59. It will be apparent that rotation of the shaft 48, acting through the eccentric 52, will cause the slide block to be translated to an orbital path about the center line of shaft 48.

The horizontal component of motion of the slide block 53, as viewed in Fig. 2, merely causes the block to be moved back and forth in sliding engagement with the edges of the slot 54 while the vertical component causes limited oscillatory motion of the rocker arm 50 bodily about the shaft 51.

The manner in which such oscillatory movement is converted into purely reciprocating movement of the push rods 41, 42 is more clearly brought out in the following description. Here it will be seen that the upper and lower ends of the rocker arm 50 carry forked portions 60, 61 respectively. Projected within the forked portions on bolts 62 or the like are U-shaped pieces 63, 64 including slots 55, 56 respectively, arranged parallel to the plane of movement of the rocker arm. Received well down within the slots 55, 56 are the push rods 41, 42 respectively. The latter have flanges or collars 65, 66 thereon which are rigidly fixed to the push rods in spaced relation just sufficient to include the U-shaped pieces 63, 64 between them. While it is true that the oscillatory movement of the upper and lower portions of the rocker arm consists of both a horizontal and vertical component of movement, it is clear that the structure which has been outlined enables the horizontal component to be utilized exclusively. The vertical component, which is very slight, merely results in a small amount of movement of the U-shaped pieces 63, 64 in a direction laterally away from the associated push rods 41, 42.

The use of bushings near each end of the push rods 41, 42 insures that they are guided in paths of pure reciprocating movement. Thus each push rod has an outer end bushing 69 and an inner end bushing 70. The latter are preferably formed of bronze or like material carefully machined to prevent lateral play. Associated with each of the bushings 69 is a key 71 which rides in an axial slot 73 of the associated push rod to prevent rotation of the latter about its axis, being secured by bolts 72. Adjacent the inner end bushing 70 is a stuffing box containing chevron type packing material 74. Pressure may be adjusted to apply to the latter by advancement of a packing sleeve or ferrule 75 to force the packing material into fluid sealing engagement with the associated push rod.

**Stroke adjustment**

Referring now to Fig. 6 it will be seen that our invention includes a provision for adjusting the amplitude or "throw" of the eccentric 52, such adjustment enabling the stroke of the push rods 41, 42, and therefore of the printing rollers 28, 29, to be varied from zero to approximately one inch or more. The latter has been found especially desirable in order to achieve particularly fine control of the formation of the ink film. In the present embodiment this is accomplished by utilizing two eccentrics, one lying within the other and by providing means for angularly adjusting the position of one with respect to the other. As shown, the inner eccentric 52 is mounted on a shaft 58 located at 78, Fig. 2) is preferably machined directly on the shaft 48. The outer eccentric, in the form of a sleeve 73, has an inner surface 75 which is snug-fitting engagement with the inner eccentric 77, and an outer surface 76, already referred to, received within the slide block 53. It will be understood, of course, that sufficient clearance is allowed between the registering parts to enable free relative rotation to take place between them.

Provision is made for enabling the inner eccentric 78 which is integral with the shaft 48 to be locked in an angularly adjusted position with respect to the outer eccentric 73. This is accomplished in the present instance by using two radial flanges 78A, 78A (Fig. 6) in side-by-side relation, the flange 78A being keyed to the inner eccentric 78 and the flange 78A being formed as an extension of the eccentric sleeve 78. As a means of locking the flanges in an adjusted position, registering teeth 82, 83 are machined on the periphery of each at a predetermined radius. An adjusting and locking collar 84 carrying corresponding internal teeth is slid over the teeth 82, 83 to prevent relative rotation.

The adjusting collar 84 normally occupies the position shown in Fig. 6 in which it bridges the teeth 82, 83 being held in such position by a spring pressed detent 85. When it is desired to change the amount of eccentric "throw" it is merely necessary to force the locking collar 84 axially out of engagement with the teeth 82, after which the collar 84 (and the flange 78A) may be turned to a new relative position with respect to the flange 78. Rotation of the collar may be accomplished by means of a suitable wrench engaging holes 85 in the collar, the correct amount of adjusting movement being determined by noting the reading indicated by pointer 88 on cooperating indicia which may be imprinted on the collar.

It will be noted that the arrangement of parts within the housing as disclosed enables a change in the adjustment of the eccentric to be readily effected. Even though the eccentric surfaces are located centrally, the adjusting portion including the collar 84 and the associated indicia are located closely adjacent the side wall of the housing and readily accessible through a cover 86 (Fig. 3) pivoted to the housing at its lower edge by means of a pivot pin 80.

**Push rod coupling**

In the operation of a printing press it is frequently necessary to use vibrating rollers of various diameters and it is common practice to include adjustable sockets for the shafts of the rollers so that they may be laterally moved to an adjusted position in which the correct amount of pressure exists between the roller and the associated drum (see sockets 35, 40, Figs. 2, 3, 5). Although the variation in roller diameter is generally only a fractional portion of such diameter, nevertheless the problem of coupling a reciprocating mechanism with an adjustable roller while maintaining the associated housing upright has not been satisfactorily solved by any prior art arrangements.

In order to appreciate the difficulty of coupling it is necessary to understand a typical arrangement used to effect roller adjustment. The ad-
Justable socket 30 may be readily understood by inspection of Figs. 4 and 5. Here it will be seen that the roller shaft 30 is mounted in a socket frame 91 which is generally U-shaped in form being flatly against the side frame 91 of the press. The roller shaft 30 is maintained seated within the socket frame 91 by means of a pivoting retaining cap 92 which is secured thereto by a bolt 94 or the like. The socket frame is maintained in contact with the side frame by reason of bolts 95 which pass through slots 96 machined near the ends of the socket frame. Included under the heads of the bolts 95 are threaded blocks 98, respectively, which are threadedly engaged by capstan headed adjusting screws 99. Fixed to the shank of each screw 99 and spaced from the head thereof is a fixed collar 100, the space between the collar and the screwhead being occupied by a boss 101 which is U-shaped, being rigidly integral with the socket frame 91 and presenting its free ends outwardly. Each adjusting screw 99, upon being threaded an adjustable amount into the threaded blocks 98, determines the position that the corresponding side of the socket frame 91 will occupy with respect to the fastening bolts 95, the range of adjustment being determined primarily by the length of the shaft 96. It will be apparent, therefore, that adjusting screws 99 serve to laterally offset the shaft 30 by an amount which is dependent upon the diameter of the roller 28 and upon the pressure which is to be exerted upon the drum 21. Although the roller socket arrangement has been described in detail only in connection with socket 99, it will be understood that the structure of socket 49 carrying shaft 38 is similar in every respect and carries the same reference numerals.

Considering Fig. 2 and the earlier discussion thereof, it is apparent that the bushings 69, 70 and the associated packing 74 constrain the push rod 41 to a purely axial path of movement. In accordance with the present invention, the couplings 43, 44 are provided which enable such axial movement to be transmitted to the shaft 38 in spite of lateral offset of the shaft. Such coupling in the present instance (see especially Fig. 5) includes a yoke-shaped member 104 bearing inwardly directed fingers 105, the latter being engaged by spaced collars or flanges 106, 107 mounted at the end of the roller shaft 38. Since flanges 106, 107 are preferably mounted for rotation with shaft 38, it is desirable that the inwardly projecting fingers 105 be of a nature which will reduce friction to a minimum. Accordingly, such fingers are formed as rollers which may freely rotate about the axis of fastening bolts 108.

It will be observed that the above structure enables the roller shaft 38 to be laterally moved with respect to the axis of the push rod without affecting the reciprocating function of the latter. In this connection it should be noted that the yoke-shaped member 104 is mounted on the push rod 41 by a fastening bolt 109 which at the negative angular adjustment of the rod and yoke member. This enables each yoke member 104 to be angularly positioned in a plane which is perpendicular to the direction of lateral adjustment of the roller shaft 38. In other words the fingers are so arranged that the offset is in a direction perpendicular to the plane thereof. Such arrangement prevents the rollers 105 from "getting in the way" of shaft 38 regardless of its lateral position. It will be understood, however, that the yoke members as shown in Figs. 4 and 5 are somewhat rotated from the optimum position to reveal the mounting details.

The structure outlined immediately above is of great advantage from a practical standpoint since it enables axial reciprocation of a roller of any desired diameter by reciprocating push rod which is mounted in simple oil tight packing and not laterally adjustable.

**Lubrication**

It has already been stated that the effective lubrication to which the unitary vibrator structure is adapted is one of the main factors contributing to the readiness with which the unit may be installed and to long trouble-free operation. In the present embodiment oil is preferably forced to a point near the top of the housing, descending by gravity to an oil sump at the bottom thereof. It has been found that the agitation of the lubricant caused by movement of the parts within the housing insures that all points including the drive shaft bearings 45 are adequately lubricated. In order to simplify the drawing, only the pump and the driving means therefor is shown is Fig. 6. Here it will be observed that the pump consists of a stationary oil chamber 118 which is bored out to carry a plunger 111 outwardly biased by means of a spring 112.

The plunger is reciprocated by an auxiliary eccentric 114 mounted on the transverse driven shaft 48. It may be incidentally noted that the shoulders defined by the eccentric 114 serve as stops for fastening both the bevel gear 49 and the main eccentric drive mechanism.

Upon being reciprocated, the plunger 111 forces entrapped oil outwardly through a discharge check valve (not shown), drawing fresh oil inwardly through a suction check valve (also not shown) from the bottom of the housing. The valves are connected to any necessary tubing for conveying the oil in the manner described, such structure being of a well known type and understood by those skilled in the art.

**Modified embodiment of Figs. 7 to 9**

The vibrating unit which has been described immediately above and which serves to reciprocate a single pair of ink rollers, will be found satisfactory for most applications. However, where it is desired that more than two vibrating ink rollers be employed in order to produce a more finely worked ink film, it is desirable to cause the unit to vibrate two pairs of rollers which may or may not engage a common ink drum. Structure for accomplishing the latter is shown in Figs. 7, 8 and 9. These views are respectively very similar to the corresponding Figs. 2, 6 and 3 already discussed and similar parts have been assigned corresponding reference numerals wherever possible with the addition of the subscript a or b.

The primary differences between this embodiment and that already discussed are brought out to the best advantage in Figs. 8 and 9. Here it will be seen that the base 9a of the frame 46a is located in the central part of the housing 39a. This enables rocker arm eccentrics 52a, 52b to be mounted on opposite sides of the driving bevel gear. In order to balance the forces within the driving unit and to produce the desired ink pattern, the eccentrics 52 are preferably displaced in positional phasing by an angle of 90 degrees although other amounts of displacement may be used if desired.

Upon inspection of Figs. 8 and 9 it will be seen that a further difference lies in the fact that the instant vibrating mechanism has been simplified by the elimination of means to adjust the throw
the eccentric. This has merely been done to illustrate that the vibrator constructed in accordance with the invention may be simplified without departing from our primary teachings. Although the modified vibrator has been shown driving four rollers, it will be obvious that six or even more may be driven if desired from the same vibrator unit.

Résumé of operation

Although the operation of the vibrator unit will be apparent from the foregoing, it will be helpful to summarize briefly. First of all, let it be assumed that the unit has been removed and is to be replaced. This merely requires that the inner end of the vibrator housing be brought into engagement with the outer face of the side frame of the press. The two halves of the coupling are slipped together and the fastening bolts are inserted. During installation it is desirable to slide the unit toward its final place of attachment in such a direction as to cause the yoke members of the push rods and the attached roller members to be inserted in the grooves provided on the roller shafts respectively.

After the unit has been attached and the rollers are properly adjusted, power may be applied to the drum. Rotation of the latter transmitted through shaft 33 and the coupling 34 causes rotation of the drive shaft 35 and the bevel gear 43 which is keyed to it. The latter produces rotation of the bevel gear 49 and the attached driven shaft 46 on which the driving eccentric 52 is mounted. Since the slide block 53 with which the eccentric is register is constrained against rotation, orbital movement of the eccentric therein will cause reciprocation of the slide block in the cooperating slot 54 together with oscillatory movement of the rocker arm 55 about its shaft 51. Such oscillatory movement is translated into pure reciprocation of push rods 41 and 42 by means of the coupling 53, 65, 68 at the ends of the rocker arm. Movement of a given one of the push rods is transferred to the attached yoke member 104, the roller members 105 within the yoke, and thence to the flanges or collars 106, 107 on the associated ink roller shaft. By arranging the push rods on opposite sides of the rocker arm 51 and equally spaced therefrom, the mechanical system is largely balanced and vibration is kept to a minimum. In addition, the latter arrangement causes the phasing or instantaneous direction of movement of the rollers 28, 29 to be in opposite directions, which produces a very satisfactory ink pattern.

As to the adjustment of the amplitude of vibration, this is readily effected by lowering the cover 89, moving the adjusting collar 84 rearwardly and turning it until the desired amount is secured with a suitable wrench. Using techniques well known to those in the mechanical art the eccentrics 76, 79 may be so proportioned that their effect may be completely neutralized, reducing the amplitude of vibration to zero for a proper setting of the collar 84, or allowing it to be increased to an inch or more. It has been found that the adjusting means disclosed operates in the manner of a vernier, enabling the desired amplitude to be chosen very exactly.

The installation and operation of the modified embodiment shown in Figs. 7, 8 and 9 is substantially the same as that already described and it will therefore not be necessary to repeat it. It should be noted, however, that the angular displacement between the two eccentrics 82a, 82b enables any dynamic unbalance in the mechanism to be neutralized to an even greater extent and still quieter operation to be achieved. We claim as our invention:

1. In an inking mechanism for a rotary printing press, a combination of an olitight housing, an axially reciprocable push rod projecting out of said housing and having sealing means for preventing the escape of lubricant along the same, a rotary drive shaft extending into said housing, means within said housing and driven by said drive shaft for imparting reciprocating motion to said push rod, means mounting a reciprocally driven roller in general end-to-end relation with said push rod but allowing for a limited amount of lateral offset adjustment so that rollers of various diameters may be accommodated, and a connector for connecting said push rod and said roller, said connector including means on said roller defining an annular groove having opposed bearing walls, a U-shaped yoke on said push rod straddling said annular groove and carrying fingers projecting mutually inward into said grooves at diametrically spaced points and in snug engagement with the walls thereof to produce axial reciprocation of said roller by said push rod even though said roller is adjusted to a laterally offset position and without interfering with the free rotation thereof.

2. In an inking mechanism for a rotary printing press having a rotating drum and a pair of ink rollers in engagement therewith, an ink roller vibrator comprising in combination a drive shaft coaxially driven by said rotating drum, a T-shaped rocker arm pivotally mounted for limited oscillatory movement in the plane of said ink rollers, the central leg of said rocker arm having a longitudinal slot therein, an eccentric rotated by said drive shaft for engaging said slot and imparting oscillating movement to said rocker arm, a pair of push rods in push-pull engagement with the laterally extending portions of said T-shaped rocker arm and arranged to project toward said ink rollers respectively in general alignment therewith, and means for connecting the projecting ends of said push rods to said ink rollers respectively to cause reciprocation of the latter as incident to the rotation of said drive shaft.

3. In an inking mechanism for a rotary printing press having a rotating drum and a pair of ink rollers in engagement therewith, an ink roller vibrator comprising in combination a drive shaft coaxially driven by said rotating drum, a T-shaped rocker arm pivotally mounted for limited oscillatory movement in the plane of said ink rollers, the central leg of said rocker arm having a longitudinal slot therein, a slide block mounted in said slot and having a circular aperture therein, an eccentric registered in said aperture and rotated by said drive shaft for imparting oscillating movement to said rocker arm, a pair of push rods in push-pull engagement with the laterally extending portions of said T-shaped rocker arm and arranged to project toward said ink rollers respectively in general alignment therewith, and means for connecting the projecting ends of said push rods to said ink rollers respectively to cause reciprocation of the latter as incident to the rotation of said drive shaft.

4. In an inking mechanism for a rotary printing press, an ink roller vibrator comprising in combination a rocker arm pivotally mounted on said press so that one end thereof is free to move
in a direction generally aligned with the axis of an ink roller, a shaft parallel to the pivoting axis of said rocker arm and arranged to be driven from the press drive mechanism, an eccentric surface on said driven shaft, a sleeve on said eccentric surface and having an outer surface which is eccentric with respect to its inner surface, means for fixing said sleeve to said shaft in a position of angular adjustment, means bearing on the outer surface of said sleeve for imparting oscillatory movement to said rocker arm and means coupling the end of said rocker arm to said ink roller for reciprocating the latter.

5. In an inking mechanism for a rotary printing press an ink roller vibrator comprising in combination a housing, a rocking arm pivotally mounted in said housing so that one end thereof is free to move in a direction generally aligned with the axis of an ink roller, a shaft mounted in said housing parallel to the pivoting axis of said rocker arm and arranged to be driven by the press drive mechanism, an eccentric surface on said driven shaft, a sleeve having an inner surface registering with eccentric surface on said shaft and having an outer surface which is eccentric with respect to the inner surface thereof, means bearing on the outer surface of said sleeve for imparting oscillatory movement to said rocker arm, and means coupling the end of said rocker arm to said ink roller for reciprocating the latter, said sleeve and said driven shaft having radially extending flanges in side-by-side relation located near the end of said driven shaft and readily accessible through an aperture in the wall of said housing and means for locking said flanges in a selected angular relation to vary the throw of said rocker arm.

6. In an inking mechanism for a rotary printing press the combination of a housing adapted for mounting in the side frame of said printing press, axially reciprocable push rods projecting out of said housing and in general alinement with a pair of ink rollers, a rocker arm in said housing centrally pivoted for rocking movement in the plane of said push rod, means coupling said push rods to said rocker arm at points spaced from the pivoting axis of the latter, a shaft in said housing parallel to the pivoting axis of said rocker arm and having mounted thereon eccentric means for imparting oscillatory movement to said rocker arm, said push rods being coupled to said rocker arm at points lying on opposite sides of the pivoting axis thereof so that the movement of said push rods is oppositely phased, and means associated with said eccentric for adjusting the throw thereof so that the amplitude of reciprocating movement of said push rods may be simultaneously varied.

7. For application to the side frame of a rotary printing press, in which are journaled the ends of a rocking ink roller and drum at adjacent points, a self contained roller vibrating unit comprising an oil tight housing, means for detachably securing said housing to the exterior of the side frame, a rotary drive shaft and an axially reciprocable push rod extending into said housing in bearing and at points corresponding substantially to the center of gravity of the drum and roller for connection to the latter, means within said housing including an eccentric driven by said shaft for reciprocating said push rod, means also driven by said shaft for circulating lubricant within the housing to the bearing surfaces therein.

8. In an ink roller vibrator mechanism for a rotary printing press having one or more reciprocably mounted rollers in laterally spaced relation, the combination comprising a unitary housing for securing to the side frame of the printing press and adapted to contain a housing bearing lubricant, a rotary drive shaft extending into said housing and adapted to be driven by a roller in said printing press, a driven shaft mounted in said housing at right angles to said drive shaft, gears coupling said driven shaft to said drive shafts, a roller member pivoted on said housing for rocking movement about an axis parallel to said driven shaft and including means spaced from the rocking axis for engaging the end of at least one of said rollers to impart reciprocating movement thereto, an eccentric on said driven shaft, and an eccentric-engaging arm rigid with said roller member to subject the latter to limited rocking movement upon rotation of said drive shaft, and means completely contained within said housing and actuated by said drive shaft for continuously subjecting the eccentric surfaces and gears to a bath of lubricant.

9. In a vibrator mechanism for a rotary printing press having an ink roller and a power driven shaft, the combination of an oil tight housing having a bracket for supporting the same on the frame of the printing press, a push rod projecting out of said housing adjacent said bracket in a direction parallel to the frame and in general allinement with said ink roller, bearing means for preventing the escape of lubricant along the push rod as a result of reciprocating movement of the latter, a rotary drive shaft extending into said housing and lying within said supporting bracket, means totally contained within said housing and driven by said drive shaft for imparting pure reciprocating movement to said push rod, and a connector for connecting the outer end of said push rod to the shaft of said ink roller, said connector being so constructed and arranged as to impart reciprocating movement to the ink roller while allowing rotation of the roller and limited misalignment of the push rod and roller, said drive shaft being disengageable from the power driven shaft in the region of the end of the bracket so that the housing and the associated parts may be disengaged from said press as a unit without substantially affecting the oil-tight nature of the same.

10. In a vibrator mechanism for a rotary printing press having an ink roller and a power driven shaft, the combination of a housing, an integrally formed bracket for supporting said housing on the frame of the printing press with a portion of the housing in overhanging relation thereto, a push rod projecting out of the overhanging portion of the housing in a direction toward said printing press and in general allinement with the shaft of said ink roller, sealing means for preventing the escape of lubricant along the push rod as a result of reciprocating movement of the latter, a rotary drive shaft extending into said housing and completely enclosed within said supporting bracket, means totally contained within said housing and driven by said drive shaft for imparting pure reciprocating movement to said push rod, and a connector lying adjacent said bracket for connecting the outer end of said push rod to the shaft of said ink roller, said connector having means providing a finger and groove connection with said ink roller for causing the same to be captive in the axial direction by allowing disengagement when the rod and shaft are offset from one another, said drive shaft being disengageable from the power driven shaft at a point adjacent the end of the bracket so that the
housing and the associated parts may be disengaged from said press as a unit.

11. In a vibrator mechanism for a rotary printing press having a reciprocable ink roller and providing a limited amount of offset adjustment therefor to accommodate various roller diameters, the combination comprising a housing having means for fastening the same to the frame of the printing press with a portion thereof spaced from the frame and overhanging the end of the ink roller, an axially reciprocable push rod projecting out of said housing in generally aligned relation with said ink roller, a rotary drive shaft extending into said housing and having provision for connection to the press drive, means within said housing and driven by said drive shaft for imparting reciprocating motion to said push rod, said roller having an annular groove formed in the end portion of the shaft thereof, said push rod having at its exposed end a U-shaped yoke axially aligned therewith and having portions straddling said annular groove, fingers on said yoke projecting mutually inward into said groove at diametrically spaced points and in snug engagement with the walls of the groove, means permitting adjustment of said yoke about its axis and for fixing the yoke in a position in which the fingers lie in a plane perpendicular to said lateral offset.

12. In an inking mechanism for a rotary printing press having a rotating drum and a reciprocable ink roller mounted for rolling on the same and having an outwardly projecting shaft, the combination comprising, a vibrator housing, a drive shaft mounted in said housing and adapted to be coaxially coupled to said rotating drum, a rocker arm pivoted for rocking movement in a plane which is parallel to said drive shaft, eccentric means rotated by said drive shaft and engaging said rocker arm to oscillate the latter, a push rod mounted in said frame for reciprocation parallel to said drive shaft and in general alignment with the projecting shaft of the ink roller, said push rod having provision for push-pull engagement with said rocker arm at one of its ends and carrying means at its other end for imparting pure axial reciprocating movement to said roller shaft.

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