Nov. 6, 1962 E. W. WORTHINGTON 3,062,138

INKING MECHANISM FOR PRINTING PRESSES

Filed Oct. 9, 1959 3 Sheets-Sheet 1

Fig. 1

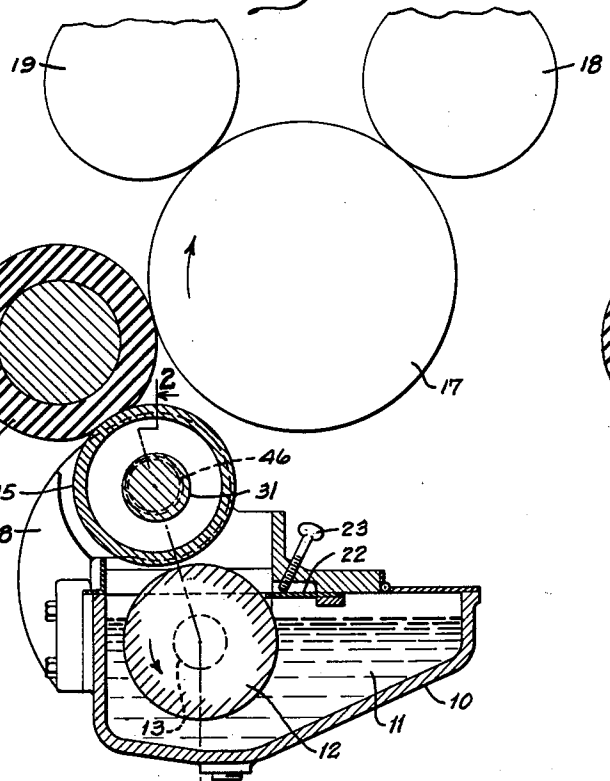
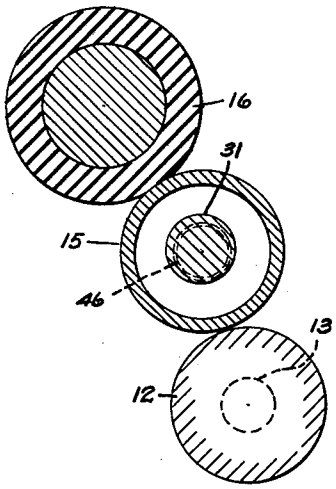


Fig. 3



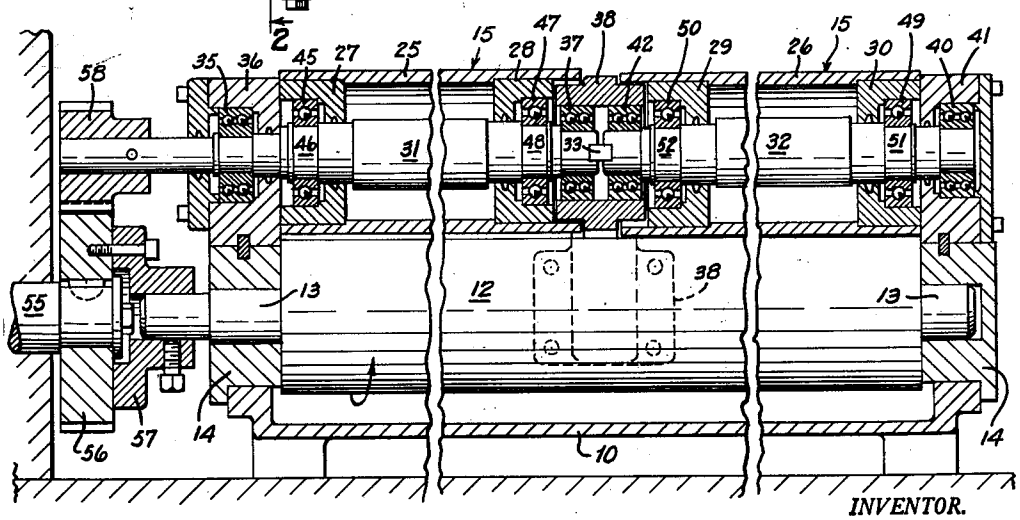


Fig. 2

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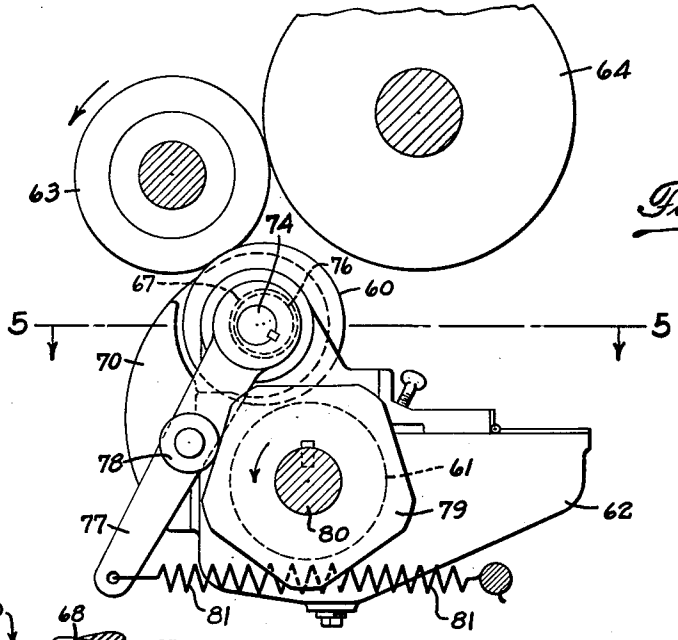


Fig. 4

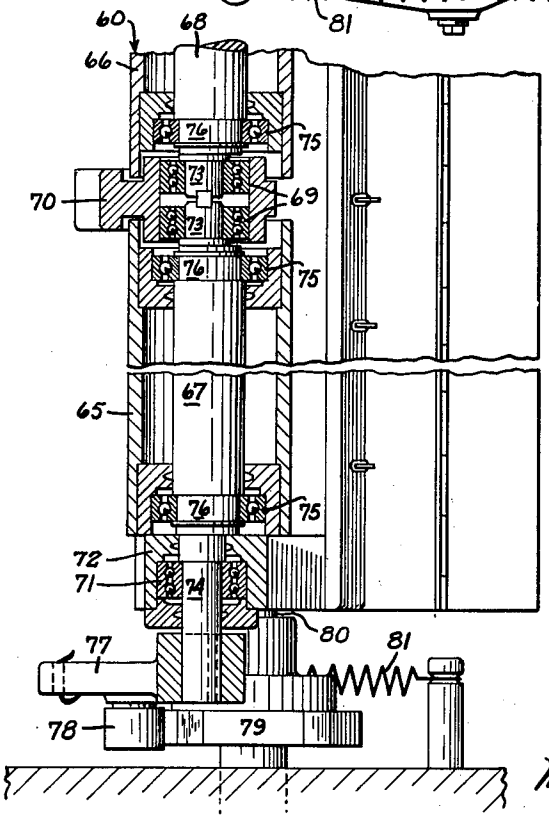


Fig. 5

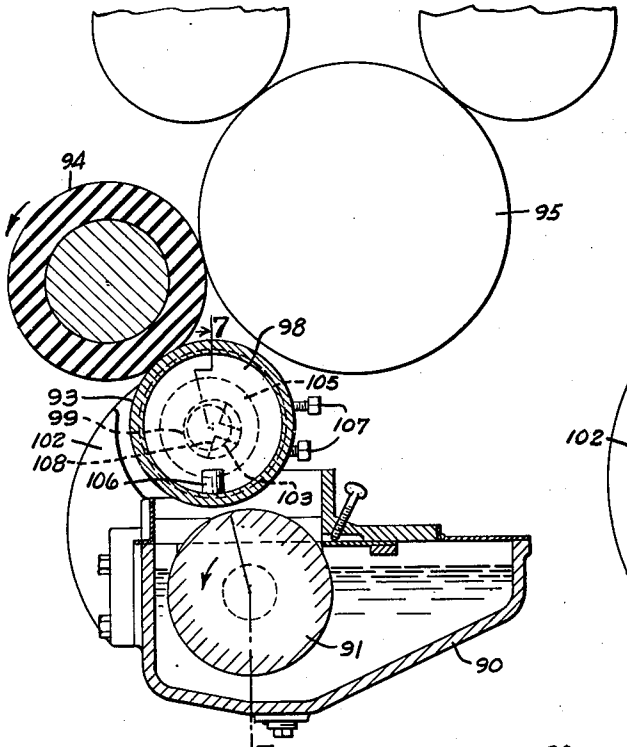
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INKING MECHANISM FOR PRINTING PRESSES

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Fig. 6



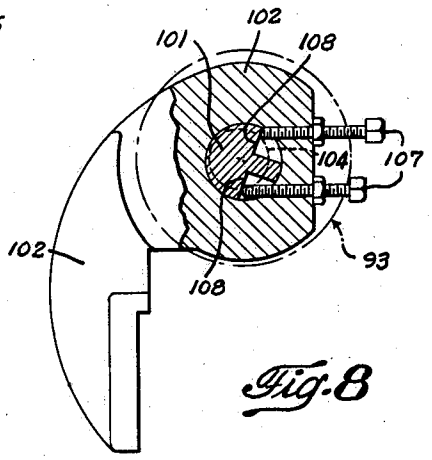


Fig. 8

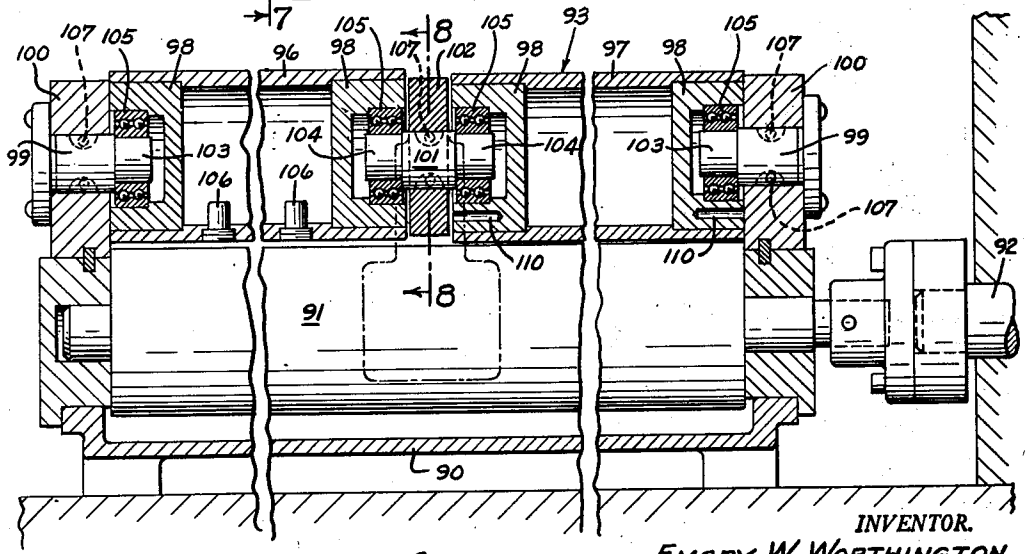


Fig. 7

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United States Patent Office

3,062,138

Patented Nov. 6, 1962

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INKING MECHANISM FOR PRINTING PRESSES

Emory W. Worthington, 957 E. Glen Ave., Ridgewood, N.J.

Filed Oct. 9, 1959, Ser. No. 845,389
16 Claims. (Cl. 101—350)

The present invention relates to improved inking mechanism particularly adapted for use with high speed rotary printing presses.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate embodiments of the invention, and together with the description, serve to explain the principles of the invention.

In the drawings:

FIG. 1 is a fragmentary, vertical, transverse, cross-sectional view of a typical and illustrative embodiment of the invention;

FIG. 2 is a fragmentary longitudinal sectional view of the inking mechanism shown in FIG. 1, taken along the line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view corresponding to that of FIG. 1 but showing only three of the rollers of the inking mechanism of FIG. 1, and in a different positional relationship which occurs during operation of the inking mechanism.

FIG. 4 is a fragmentary view showing in elevation a modified embodiment of the inking mechanism of the present invention taken at one end of the mechanism;

FIG. 5 is a fragmentary view showing in horizontal cross-section and top-plan certain of the elements of the inking mechanism of the embodiment shown in FIG. 4, the view being taken along the line 5—5 of FIG. 4;

FIG. 6 is a fragmentary, vertical, transverse, cross-sectional view of a third embodiment of the invention;

FIG. 7 is a fragmentary longitudinal cross-sectional view of the embodiment of the inking mechanism shown in FIG. 6, being taken along line 7—7 of FIG. 6; and,

FIG. 8 is a detail, vertical, transverse cross-sectional view taken along the line 8—8 of FIG. 7.

The present invention is herein illustratively shown and described as embodied in the inking mechanism of a modern, high speed, rotary newspaper printing press. In such mechanisms the source of ink is an ink fountain wherein a liquid supply of ink is maintained, and the ink is conducted therefrom and applied to the plate cylinder of a printing couple by means which will provide so far as possible a constant and uniform application of ink to the printing plates in the amounts desired and necessary for printing on the moving web of paper. The ink forwarding and distributing system comprises a plurality of rollers the peripheries of which are in contact with adjacent rollers, or at least sufficiently close together for ink contact between adjacent rollers, whereby ink is withdrawn from the ink fountain and progressively attenuated and uniformly distributed during its passage through the system to the plate cylinder of the press.

The present invention provides an inking mechanism wherein better and more uniform inking of the plate cylinder may be realized with the modern high-speed rotary presses. The inking mechanism of the invention permits better ink attenuation, more uniform distribution, and better regulation of ink supply, between fountain and

plate cylinder. The invention further overcomes problems of vibration and movement of relatively massive parts in an inking mechanism which are particularly vexatious as higher press speeds are attained, and likewise minimizes ink spraying or misting, which also becomes increasingly objectionable at high printing press speeds. The inking mechanism of the invention also provides a more efficient and simplified construction for such mechanisms, and one that may be readily applied to printing presses already built in substitution and improvement of their existing ink supply, forwarding and distributing, and applying means for plate cylinder.

In accordance with the present invention and the illustrative embodiments herein shown and described, an ink fountain is provided wherein a supply of liquid printing ink is maintained. A fountain roller is rotated therein to pick up a film of ink on its periphery and present such relatively thick film on the surface of the roller above the surface of the pool of ink in the fountain. An ink transfer roller is rotatably mounted with its axis substantially parallel with respect to the fountain roller, and the periphery of the transfer roller is adapted to engage and pick up ink on the surface of the fountain roller. Thereafter the ink is forwarded from the surace of the transer roller to the peripheral surfaces of other coaxially mounted, rotating transer and distributing rollers, whereby the ink film is progressively attenuated and uniformly distributed for final application by a form inking roller to the plates on the plate cylinder of the press.

The rotatable transfer or pick-up roller for receiving and forwarding ink from the fountain roller is eccentrically mounted whereby its radius with respect to its axis of rotation directed toward a radius of the adjacent fountain roller varies between maximum and minimum extents, as is also the case with the radius of the pick-up roller toward the axis of the transfer roller to which the ink film is forwarded. The periphery of the pick-up roller accordingly moves toward and away from the periphery of the fountain roller, and hence into and out of, or into deeper and shallower, engagement or interference with the relatively thick ink film carried by the surface of the fountain roller. The pick-up roller periphery likewise engages the periphery of the adjacent transfer roller which is rubber or similar flexible material with greater or lesser pressure and in greater or lesser chordal depth or extent, for transfer of ink film from the pick-up roller to the transfer roller. The result is a metering and attenuation of the ink film picked up from the fountain roller and forwarded through the inking mechanism, and a good initial distribution of ink upon the first transfer roller from the pick-up roller, with a relatively small and precision movement of the pick-up roller and without multitudinous, complex and heavy parts and movements in the mechanism.

The invention is herein disclosed in various specific embodiments, and it will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the accompanying drawings showing typical and illustrative embodiments of the invention, and referring first to the embodiment of FIGS. 1 to 3 inclusive of the drawings, the inking mechanism of the invention may comprise an ink fountain **10** to contain a supply of liquid ink **11**. A fountain roller **12** is rotatably mounted in the fountain **10** by means of stub shafts **13** which are seated in suitable bearings **14** in the end walls of the ink fountain. Rotation of fountain roller **12** in the pool of ink **11** picks up a relatively thick film of ink on the periphery of the roller, and said ink film serves as a supply of ink for transfer of ink by pick-up roller **15** to transfer roller **16**, from which the ink is transferred to

ink drum 17, and from there via transfer rollers 18 and 19 to such other ink drums and transfer rollers as may be chosen and desired for eventual application of a thin and uniform film of ink to the plates on the plate cylinder of the press, all as will be fully appreciated by those skilled in the art. The usual blade 22 is provided extending along the length of the ink fountain 10, adjustable by means of screws 23 spaced along its length and adapted to variably space the edge of the knife from the periphery of fountain roller 12 as it approaches pick-up roller 15. Such screws are usually provided one for each column width of the fountain roller, and the entire cooperating mechanism thus adjustably maintains an ink film of predetermined thickness on the periphery of the fountain roller which is available for pick up by roller 15 and advance to and through the balance of the inking mechanism.

Details of the construction and mounting of pick-up roller 15 are best shown in FIG. 2 of the drawings, and as there shown the roller is preferably made of at least two sections comprising hollow cylindrical shells 25 and 26 each of which is suitably supported at its ends for rotation, so that an unduly long unsupported roller extent is not had and troublesome deflection of the roller which would interfere with a uniform advancement of ink is avoided. Outer and inner end pieces 27 and 28 respectively are provided to complete the hollow roller construction in combination with shell 25, and similar end pieces 29 and 30 are provided for the identical shell 26.

The pick-up roller sections 25 and 26 are mounted for independent relative rotation on a central shaft, the axis of which is parallel to that of the fountain roller 12. As shown, said shaft is formed of two parts, the shaft portion 31 extending through shell 25 and shaft portion 32 extending through shell 26, the shaft portions 31 and 32 being keyed together at their adjacent ends by key 33 whereby the shaft portions rotate as one. Each of the shaft portions 31, 32, is suitably rotatably mounted on the fixed frame of the ink fountain. As shown, shaft portion 31 is mounted at its outer end by means of a roller bearing 35 in a suitable bearing holder 36 at one end of the fountain, and at its inner end by a roller bearing 37 in a stationary bracket portion 38 of the ink fountain which is provided centrally of the length of the fountain. The mounting of the other central shaft portion 32 is entirely similar, an outer bearing 40 being provided in a bearing holder 41 which is a part of the end wall construction of the ink fountain, and a bearing 42 serving to rotatably support the inner end of the shaft portion in the bracket 38. The shaft portions 31 and 32 in the bearing mountings just described are mounted for centric rotation, which is to say that the center of the shaft is located at the axis of rotation thereof.

Each of the shells 25 and 26 of the pick-up roller 15 is rotatably mounted upon its respective shaft portion 31 or 32. As shown, the construction comprises a roller bearing 45 seated in the end piece 27 for shell 25, and in turn seated on the circular bearing seat 46 of shaft portion 31. At its inner end, shell 25 has roller bearing 47 seated in end piece 28, and on the circular bearing seat 48 of shaft portion 31. Similarly, the shell 26 is rotatably mounted on shaft portion 32 by means of outer and inner roller bearings 49 and 50, which are seated respectively on circular seats 51 and 52 of the shaft portion 32.

The centers of the shaft seats 46, 48, 51 and 52 whereby the shells 25 and 26 are rotatably mounted on shaft sections 31 and 32 do not correspond with the axis and center of rotation of said shaft sections, but are spaced a slight distance therefrom, and preferably the same distance in the case of each of said bearing seats. By reason of such construction, the shells 25 and 26 are mounted by eccentric bearing means for eccentric rotation, whereby the peripheries of said shells move alternately closer to and away from the adjacent periphery of fountain roller 12 upon rotation of shaft sections 31, 32, as will be later described. Shells 25 and 26 are both mounted so that they do not contact or physically engage fountain roller 12, but the spacing is such that the peripheries of shells 25, 26 may engage the film of ink carried on the periphery of the fountain roller. Thus, with the construction shown, and with the pick-up roller 15 driven at a faster speed than fountain roller 12 as will presently appear, it will be seen that the periphery of the pick-up roller 15 is moved into and out of, or into deeper and shallower, contact or interference with the relatively thick film of ink on the fountain roller, and metering and attenuation of the ink feed results at this point in the ink feed for the press. The centers of shaft seats 46 and 48 for shell 25 may be and preferably are offset in the opposite direction from the axis of rotation and centers of shafts 31, 32, as compared with the centers of shaft seats 51 and 52 for shell 26, as is apparent from FIG. 2 where the outer peripheries of shells 25 and 26 are illustrated as not in alignment with each other. By thus providing the eccentric mountings of the roller sections 180° apart, or 180° out of phase with respect to each other, a more uniform driving condition for the pick-up roller 15 as a whole is provided.

The fountain roller 12 is driven from the printing press driving means through driven shaft 55, gear 56 keyed to the end thereof, and collar 57 which, as shown, is bolted to the inner face of the gear and is secured for correlative rotation to the end of the shaft of fountain roller 12. The shaft 31, 32 for the pick-up roller 15 is also positively driven, having a gear 58 meshing with gear 56, and secured for correlative rotation to an extending end of the shaft portion 31. Thus, the shaft 31, 32, which by reason of the eccentric mounting of the pick-up roller 15 thereon moves the periphery of the pick-up roller toward and away from fountain roller 12, is positively driven to so move the pick-up roller, and said shaft is preferably geared for faster rotation than the fountain roller, as will be seen from the sizes of gears 56 and 58.

The transfer roller 16 of the inking mechanism is frictionally driven in rotary motion from the first ink drum 17 of the ink distribution and is covered with rubber or similarly resilient material. Ink drum 17 is driven in rotary motion from the main driving means of the press and is usually and preferably driven in axially oscillatory motion in order to promote ink distribution on its surface. Transfer roller 16 is mounted with respect to pick-up roller 15 so that shells 25 and 26 are in contact therewith and depress slightly the resilient surface of the transfer roller, whereby the pick-up roller is peripherally driven from the transfer roller, and ink is picked up from the pick-up roller by the transfer roller and distributed over the cylindrical outer surface thereof. With the construction and operation shown and described, it will be apparent that the eccentric movement of the pick-up roller 12 will cause the rubber deflection of the surface of transfer roller 16 to increase and decrease as operation continues by reason of increased and decreased pressure of the one roller on the other, the said deflections and pressures varying continuously and cyclically between maximum values as the operation of the mechanism continues. This effect is illustrated in FIGS. 1 and 3 of the drawings, FIG. 1 illustrating deflection of the rubber surface of roller 16 to a maximum chordal depth, the rollers however always being in close physical engagement for purposes of driving and ink transfer and distribution.

An example for purposes of illustration may be helpful in further elucidating the construction and operation of the inking mechanism of the present invention. The sectional pick-up roller 15 may for instance have an outside diameter of five inches, and have the metallic surface thereof roughened by sand blast or a rough grind. The nominal chordal depth of deflection of the surface rubber covered surface of transfer roller 16 may be on the order of .030 inch. By "chordal depth" is meant the

distance of distortion along a radius of the transfer roller from its normal circular condition, by reason of engagement of the pick-up roller 15, and by nominal chordal depth is meant the deflection at the time when the pick-up roller is half-way between its maximum and minimum movements toward the transfer roller. The pick-up roller 15 may as an example have a movement of .010 inch. Thus, the eccentric movement of the pick-up roller will vary the chordal depth between minimum and maximum of from .025 inch to .035 inch. The movement of .010 inch by the pick-up roller will also vary its distance from the fountain roller 12 by that amount. Thus if the distance were set to a minimum clearance of .002 inch, the maximum clearance with eccentric movement of the pick-up roller would be .012 inch. A considerable degree of ink attenuation is attained in the variation of depth to which the pick-up roller 15 engages the ink film on fountain roller 12, and also by reason of the relative differences in rotational speed at which the two rollers operate.

The fountain roller 12 in the inking mechanism will be driven at a relatively low speed as compared with the speed of the plate cylinder of the press, the ratio being generally from 1 to 5, to a ratio of 1 to 100. Transfer rollers such as roller 16 are usually frictionally driven from ink drum or roller 17 with the peripheral speed of the roller being substantially printing speed of the web since the printing surfaces are inked by the form rollers at substantially web speed. If the plate cylinder was 15 inches in diameter and rotating at a speed of 500 r.p.m. then the transfer roller at a diameter of 5 inches would be rotating at a speed of 1500 r.p.m. The pick-up roller 15 may illustratively be driven in a range to complete an eccentric pick-up movement for every three plate cylinder revolutions, to one movement for every one-half plate cylinder revolution. Thus if the plate cylinder is rotating at 500 r.p.m., the transfer roller 16 will be rotating at substantially 1500 r.p.m. and the eccentric movements of the pick-up roller will be occurring at from 166 to 1000 completed transfer movements per minute.

At such speeds it will be apparent that the relatively small amount of movement of the pick-up roller 15 is a significant feature of the construction of the present invention, to be contrasted with certain other types of inking mechanisms wherein a ductor roller of about the same size and weight is moved between fountain roller and transfer roller through a reciprocating movement of one-half inch or more. The abruptness of ink transfer by such reciprocating ductor roller mechanisms is avoided by the present construction. Also, the pick-up roller may always be in contact with the ink film on the fountain roller, permitting transfer of thinner films of ink, as contrasted wtih the thick intermittent films or globs transferred in the earlier mechanism referred to. It has been found that thicker films produce more ink spray or mist in the operation of an inking mechanism, and the present mechanism thus minimizes such ink spraying or misting, as well as providing for a more uniform distribution of ink at the very outset of the travel of the ink through the inking system. The mechanism of the invention avoids the pick-up striping or streaking inherent in the ductor type of mechanism as well as those types where an interrupted or relieved surface is used for the pick-up roller, since in such inking mechanisms it is very difficult or impossible to obliterate the original ink pattern and bring complete uniformity to the film at the point of its application to the plates in the plate cylinder. The variation in pressure and chordal depth of engagement of the pick-up roller with respect to the transfer roller is an important feature of the present invention, as it will be observed that the portions of the pick-up roller coming closer to the fountain roller and thus picking up the greater amount of ink are the same that engage the transfer roller with greater pressure and greater chordal depth.

In the embodiment of the invention shown in FIGS.

4 and 5 of the drawings, the eccentric movement of the pick-up roller is brought about by rocking the central shaft of the said roller in oscillating rotary motion rather than driving it through continuous complete revolutions as in the case of the embodiment just shown and described for FIGS. 1 to 3 inclusive. Such rocking movement is imparted by means of a lobed cam to a lever secured to the central shaft of the pick-up roller, and eccentric bearing mounting of the pick-up roller on the central shaft moves the roller toward and away from the fountain roller.

In the embodiment of the invention of FIGS. 4 and 5, the structure of the pick-up roller 60 is quite similar to that of roller 15 already described, and the roller likewise cooperates with a fountain roller 61 rotatably mounted and driven in fountain 62, with a rubber covered first transfer roller 63, and with the other rollers and elements of an inking mechanism as exemplified by the ink drum 64 shown in FIG. 4. The pick-up roller 60 is made of two or more roller sections or shells 65, 66, with central shafts 67, 68 keyed together to revolve as one. The shafts in this case are again centrically mounted, at their inner ends in a stationary bracket portion 70 of the ink fountain structure, and at their outer ends in bearing portions 72 which are also a part of the stationary framework of the press. The inner ends of the shafts 67, 68 are mounted for rotary motion by means of anti-friction bearings 69, and the outer ends by bearings 71. Said bearings 69 and 71 engage the shafts at cylindrical seats 73 and 74, respectively. The shells 65, 66 are mounted by eccentric bearing means for free rotation on the shaft portions 67, 68, respectively, by means of bearings 75, and the centers of the seats 76 are eccentric with respect to the axis of the shafts. It will thus be seen that rotary motion of the shafts 67, 68 will impart motion of the pick-up roller toward and away from fountain roller 61 as already described in connection with the first embodiment of the invention and, again, the pick-up roller 60 is in peripheral engagement with transfer roller 63 and is rotated therewith.

Oscillatory rotary motion is imparted to shaft portions 67, 68 by means of a lever arm 77 secured and keyed to the extending outer end of shaft 67, said arm having a cam follower 78 which rides on the exterior camming surface of the cam 79, which arm is suitably keyed to the shaft 80 of fountain roller 61, the shaft 80 being driven from the press unit drive to rotate the fountain roller and the cam 61. A coiled spring 81 is provided to urge the lever arm toward cam 79, and it will be clear that rotation of cam 79 will move shafts 67, 68 through oscillating rotary motion and, by reason of the eccentric mounting of the roller sections on the shafts, will vary the spacement of the periphery of pick-up roller 60 with respect to the adjacent fountain roller 61, as well as the chordal depth of engagement with transfer roller 63, as already fully explained.

In the embodiment of the invention shown in FIGS. 6 to 8 inclusive of the drawings, there is again provided an ink fountain 90 having fountain roller 91 mounted therein and driven from shaft 92 of the unit drive of the printing press. The pick-up roller 93 cooperates with the fountain roller to forward ink to the rubber covered lower transfer roller 94, whereby ink is advanced to the ink drum 95 and other elements of the inking mechanism.

The pick-up roller 93 is eccentrically mounted for oscillating movement toward and away from fountain roller 91 and thus into deeper or shallower contact with the ink film thereon, and into contact with greater or lesser pressure against transfer roller 94. As shown, the pick-up roller again comprises two cylindrical shells 96 and 97 each having a pair of end bearing portions 98. The roller sections are rotatably mounted on adjustable bearing elements 99, one positioned at each end of the fountain in cylindrical seats in stationary parts 100 of the ink fountain structure. At their inner ends the pick-up

roller sections are rotatably mounted by means of a similarly constructed bearing element **101** which is mounted in a cylindrical seat in stationary bracket **102** located centrally of the length of the ink fountain.

Each of the bearing elements **99** is provided with a stub bearing shaft **103**, the central bearing element **101** is provided with a pair of oppositely extending stub bearing shafts **104**, and the pick-up roller shells **96**, **97** are rotatably mounted thereon by means of roller bearings **105**. Said bearings **105** are mounted in cylindrical seats in the end, bearing portions **98** of shells **96**, **97**, and the axial centers of said seats are slightly spaced from the axial centers of roller shells **96**, **97**, whereby the eccentric rotation of shells **96**, **97** is achieved. It will be seen that the pick-up roller sections **96**, **97** rotate independently of each other on their individual bearings and are driven by contact with driven transfer roller **93** as already described, so that the roller sections may be in any phase relationship with respect to each other and such relationship will change from time to time due to slippage of the peripheries of the roller sections on the rubber periphery of transfer roller **93**. A weight **106**, or a plurality thereof if desired, may be secured within each shell **96**, **97**, to counterbalance the eccentric rotation thereof, thus preventing excessive and harmful vibration. The weights **106** will be secured to that part of the roller shell which lies closer to the center axis of the stub shafts, in order to afford better balance to the eccentrically rotating mass of the roller section. The weights **106** are illustratively shown as secured to the shell **96**, and it is understood that such a weight or weights also could be secured to shell **97**. However, with respect to shell **97** there is illustrated an alternative means of balancing the roller section, holes **110** having been drilled into the end bearing portions **98** to lighten the roller section mass at portions thereof further from the center axis of the stub shafts **103**, **104**.

Means are provided for adjustment so that the spacement of pick-up roller **93** with respect to fountain roller **91** may be varied, resulting of course also in variation in the pressure of contact of roller **93** against transfer roller **94**. As embodied, said means comprise adjustment bolts **107** threadedly engaged in the stationary parts of the press framework **100** and **102**, which provide seats for the bearing elements **99** and **101**, and said bolts engage with seats **108** one at either side of the axis of rotation of each of the bearing elements **99** and **101**, as clearly shown in FIG. 8. The stub bearing shafts **103** and **104** of the bearing elements **99** and **101** respectively, are each positioned so that the axis of the bearing shaft is spaced from the axis of its respective bearing portion where said portion is seated for rotary movement in the stationary framework (**100** and **102**).

Thus, adjustment of bolts **107** may be used to vary and fix the rotated position of the bearing elements **99** and **101**, and, by means of eccentrically mounted stub shafts **103** and **104**, vary the relative position of the pick-up roller with respect to its two adjacent rollers. It will be appreciated that the bearing elements **99** at the ends of the fountain may be adjusted individually and at a slightly different setting, if desired, from the adjusted position of element **101** centrally of the fountain. The sections **96**, **97** of pick-up roller **93** may thus be adjusted to more nearly parallelism with respect to fountain roller **91**, which may have some downward deflection due to its unsupported length between its end bearings, and there may also be some deflection of the body of the ink fountain itself due to its own weight and the weight of the volume of ink contained therein.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom, within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. An inking mechanism comprising, in combination a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller in continuous contact with said second roller and adapted to receive ink therefrom, all of said rollers being rotatably supported, and mounting means for said second roller including eccentric bearing surfaces for continuously oscillating the central axis of said second roller with respect to the central axis of said other two rollers in order to vary the pressure between said second roller and said third roller.

2. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, at least one of said second and third rollers having a resilient peripheral surface, said second and third rollers having constant peripheral contact with each other during rotation of the rollers, and means for varying the pressure of said peripheral contact between said second and third rollers in response to rotation of said second and third rollers and the distance between said first and said second rollers so that the pressure between said second and said third rollers varies with thickness of the ink transferred from said first roller to said second roller.

3. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, at least one of said second and third rollers having a resilient peripheral surface, said second and third rollers having constant peripheral contact with each other during rotation of the rollers, and means for continuously cyclically varying the distance between said first and second rollers and for continuously cyclically varying the pressure of said peripheral contact between maximum and minimum values in proportion to the thickness of ink transferred from said first roller to said second roller during rotation of said second and third rollers.

4. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, said third roller having a resilient peripheral surface and said first and second rollers having rigid peripheral surfaces, said second and third rollers having constant peripheral contact with each other during rotation of the rollers and said first and second rollers having their peripheries spaced apart during rotation of the rollers, and means for varying the pressure of said peripheral contact between said second and third rollers and the distance between the peripheries of said first and second rollers during rotation of the rollers.

5. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, said third roller having a resilient peripheral surface and said first and second rollers having rigid peripheral surfaces, said second and third rollers having constant peripheral contact with each other during rotation of the rollers and said first and second rollers having their peripheries spaced apart during rotation of the rollers, and mounting means for said second roller including eccentric bearing surfaces for oscillating the central axis of said second roller with respect to the central axes of said other two rollers, whereby the pressure of said peripheral contact between said second and third rollers and the distance between the peripheries of said first and second rollers are subject to constant cyclical variation during rotation of said rollers.

6. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, and mounting means for said second roller including eccentric bearing surfaces whereby the central axis of said second roller is oscillated with respect to the central axes of said other two rollers to vary the pressure between said second roller and said third roller, said second roller comprising a plurality of roller sections arranged in end-to-end relationship, and said mounting means including eccentric bearing surfaces adjacent each end of each of said roller sections.

7. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, and mounting means for said second roller including a rotatably mounted shaft upon which said roller is eccentrically mounted for rotary eccentric movement for varying the pressure between said second roller and said third roller, means for rotatably mounting said shaft, driving means for rotating said first roller, and means interconnecting said shaft and said driving means for rotating said shaft.

8. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, said second roller comprising a plurality of roller sections arranged in end-to-end relationship, mounting means for said second roller including a rotatably mounted shaft extending centrally of said roller sections, eccentric bearing means between said shaft and sections whereby said sections are mounted on the shaft for rotary eccentric movement with the eccentric motions of said sections being 180° out of phase with respect to each other, said mounting means varying the pressure between said second roller and said third roller, means for rotatably mounting said shaft, and means for rotatably driving said shaft.

9. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, and mounting means for said second roller including a shaft mounted for rotary motion upon which said roller is eccentrically mounted for rotary eccentric movement for varying the pressure between said second roller and said third roller, and means for driving said shaft in oscillating rotary movement.

10. An inking mechanism comprising, in combination, a first roller adapted to carrying a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, and mounting means for said second roller including a shaft mounted for rotary motion upon which said roller is eccentrically mounted for rotary eccentric movement for varying the pressure between said second roller and said third roller, means for rotatably driving said first roller, and means including a cam to rotate with said first roller and a lever secured to said shaft for driving said shaft in oscillatory rotary movement.

11. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, said second roller comprising a plurality of roller sections arranged in end-to-end relationship, mounting means for said second roller including a shaft mounted for rotary motion extending centrally of said roller sections, eccentric bearing means between said shaft and sections whereby said sections are mounted on the shaft for rotary eccentric movement for varying the pressure between said second roller and said third roller, and means for driving said shaft in oscillatory rotary movement.

12. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, and mounting means for said second roller including a pair of stub shafts one at either end of said roller, and eccentric bearing means between said shafts and said roller whereby the roller is mounted on said shafts for rotary eccentric motion which varies the pressure between said second roller and said third roller.

13. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, and mounting means for said second roller including a pair of stub shafts one at either end of said roller, eccentric bearing means between said shafts and said roller whereby the roller is mounted on said shafts for rotary eccentric motion which varies the pressure between said second roller and said third roller, and a bearing element to carry each said stub shaft, each said bearing element being mounted for rotary motion about an axis of rotation spaced from the center axis of the stub shaft carried thereby, and means for adjustably setting the rotated position of each said bearing element.

14. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, said second roller comprising a plurality of roller sections arranged in end-to-end relationship, mounting means for said second roller including a plurality of stub shafts one at either end of each said roller section, eccentric bearing means between each said shaft and its roller section whereby each said roller section is mounted on said shafts for rotary eccentric motion which varies the pressure between said second roller and said third roller, a separate bearing element to carry the said stub shafts at the outer ends of said roller sections and another bearing element carrying both of the stub shafts at the inner ends of said roller sections, each said bearing element being mounted for rotary motion about an axis of rotation spaced from the center axis of the stub shaft or shafts carried thereby, and means for adjustably setting the rotated position of each said bearing element.

15. An inking mechanism comprising, in combination, a first roller adapted to carry a film of ink as an ink source, a second roller adapted to receive ink from said first roller, a third roller adapted to receive ink from said second roller, all of said rollers being rotatably mounted, said second roller comprising a plurality of roller sections arranged in end-to-end relationship, mounting means for said second roller including a plurality of stub shafts one at either end of each said roller section, eccentric bearing means between each said shaft and its roller section whereby each said roller section is mounted on said shafts for rotary eccentric motion which varies the pressure between said second roller and said third roller, each said roller section being more nearly balanced by including in its effective mass a greater weight toward that part of the roller closer to the center axis of its stub shafts.

16. An inking mechanism comprising, in combination, a first hard surfaced roller adapted to carry a film of ink

as an ink source, a second hard surfaced roller adapted to receive ink from said first roller, a third resiliently surfaced roller adapted to receive ink from said second roller, a fourth roller adapted to receive ink from said third roller, all of said rollers being rotatably mounted, said third roller and said fourth roller being mounted for pressure constant peripheral contact, said second roller and said third roller being mounted for constant peripheral contact, and means for varying the pressure between said second roller and said third roller and for varying the distance between said second roller and said first roller.

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