June 4, 1929. L. W. CLAYBOURN 1,715,741

INKING MECHANISM FOR PRINTING MACHINERY

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Fig. 1.

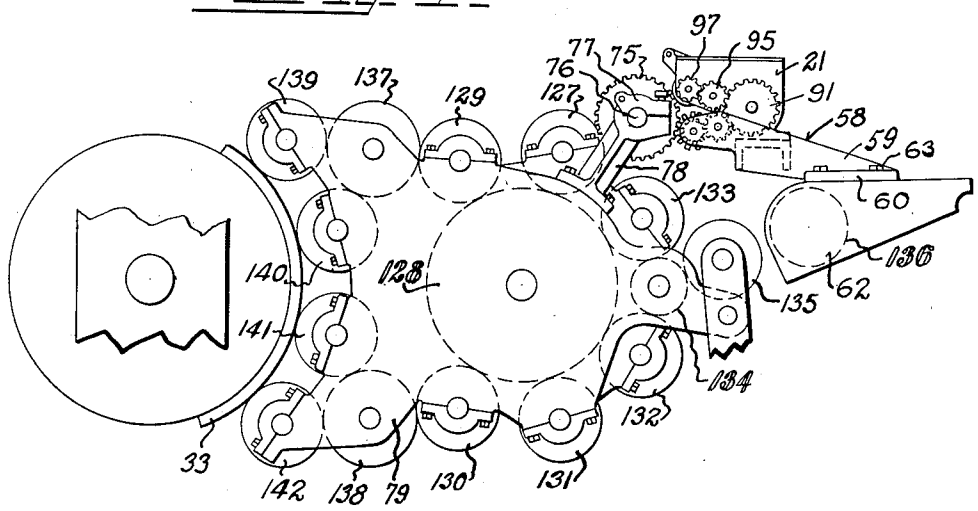
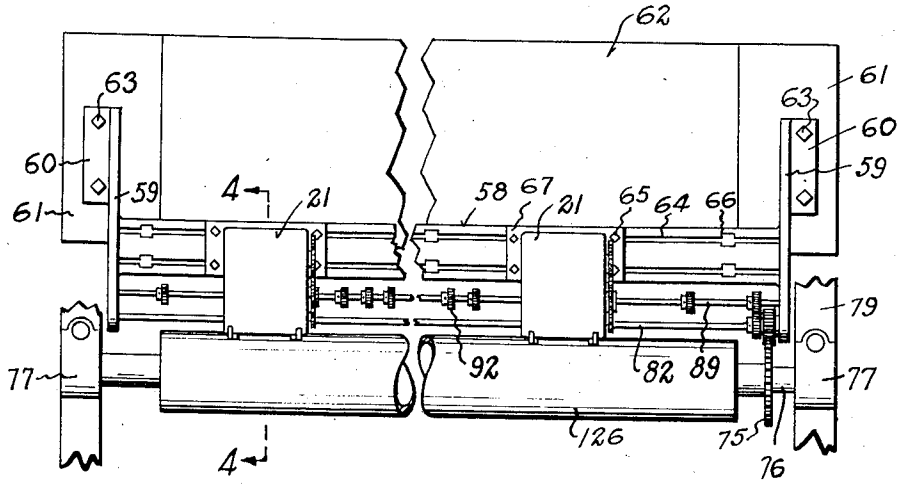


Fig. 2.



INVENTOR.

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INKING MECHANISM FOR PRINTING MACHINERY

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Fig. 3.

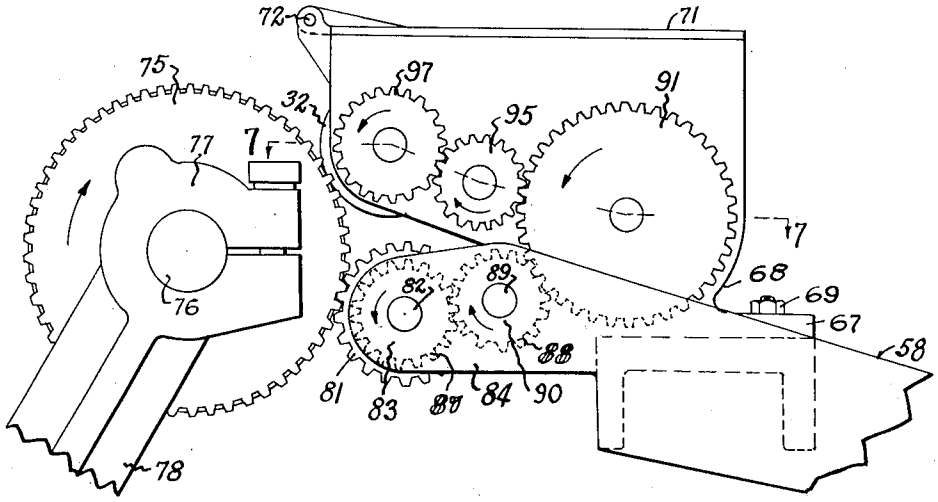


Fig. 4.

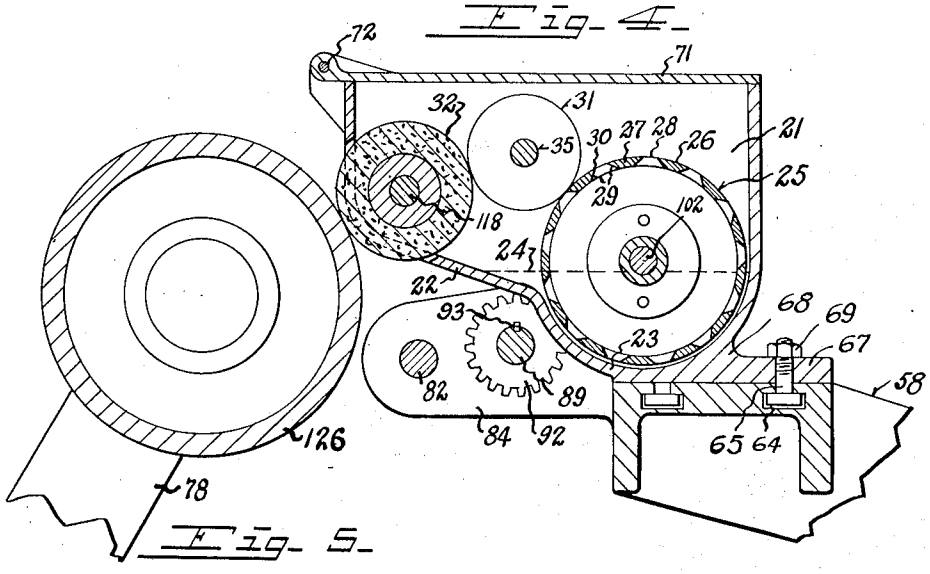
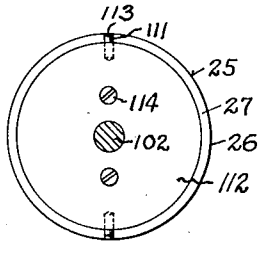


Fig. 5.



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INKING MECHANISM FOR PRINTING MACHINERY

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Fig. 6.

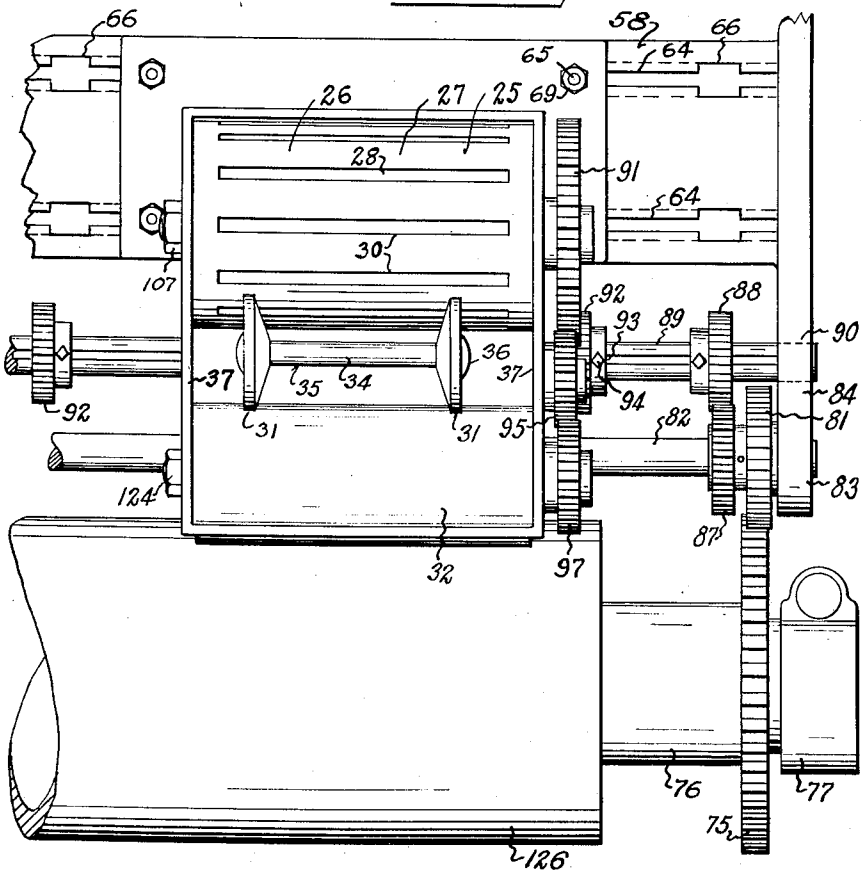


Fig. 7.

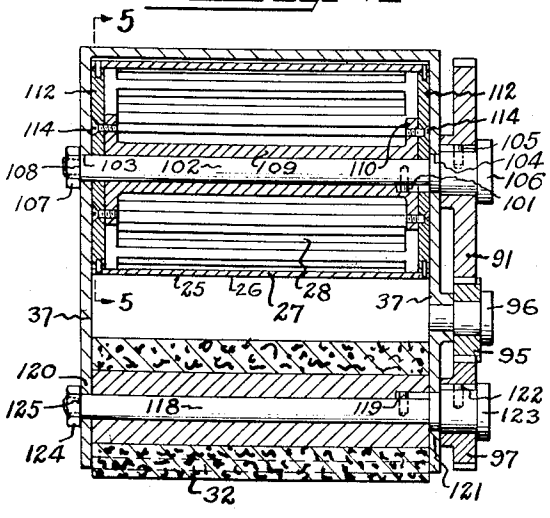


Fig. 8.

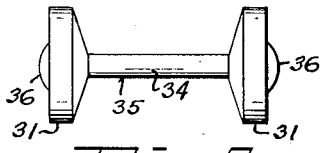
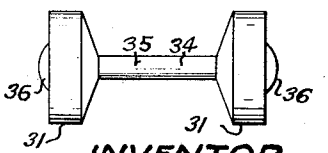


Fig. 9.



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INKING MECHANISM FOR PRINTING MACHINERY

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Fig. 10.

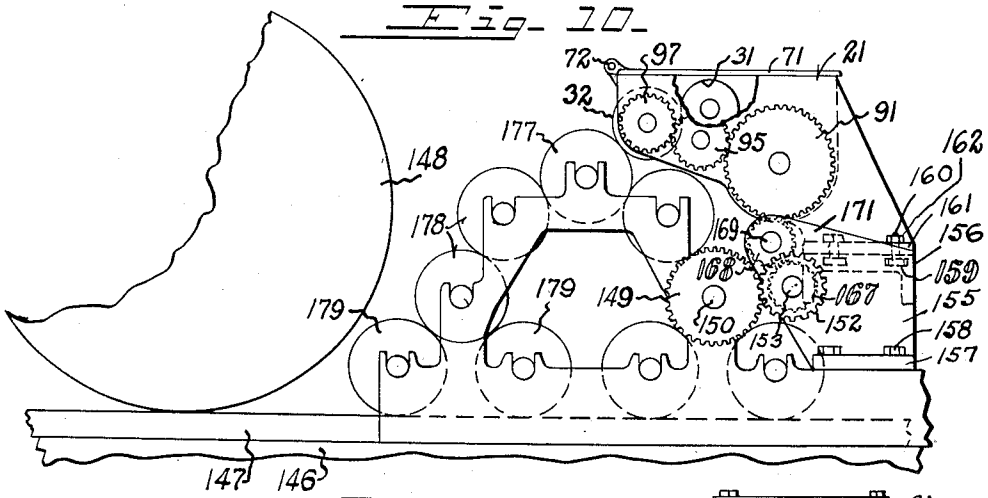


Fig. 11.

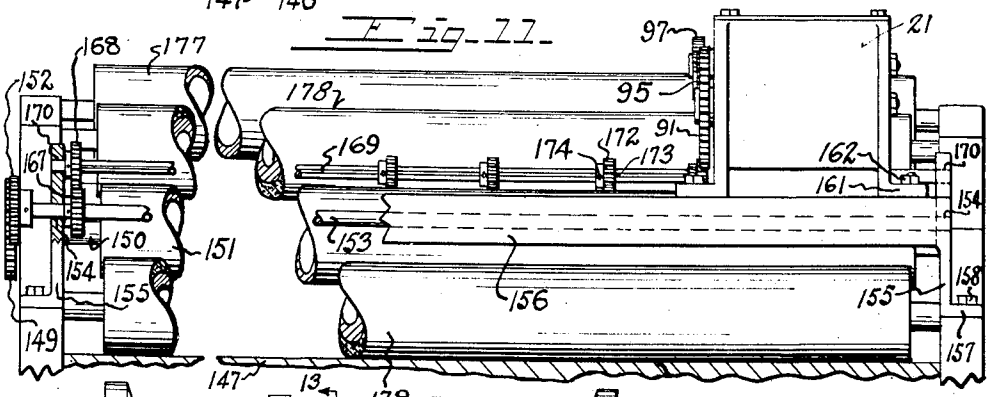


Fig. 12.

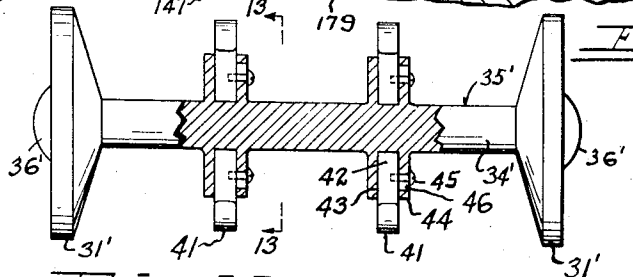


Fig. 14.

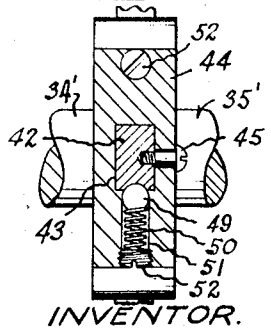
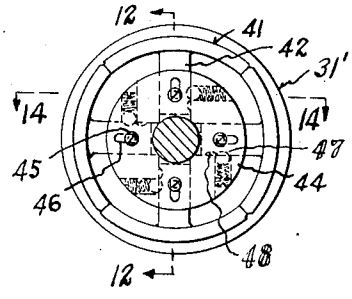


Fig. 13.



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Patented June 4, 1929. 1,715,741

UNITED STATES PATENT OFFICE.

LESLIE W. CLAYBOURN, OF MILWAUKEE, WISCONSIN.

INKING MECHANISM FOR PRINTING MACHINERY.

Application filed November 7, 1927. Serial No. 231,581.

My invention relates to inking mechanism for printing machinery, and is especially useful in connection with inks whose color constituents are of substantially greater specific gravities than the other constituent parts of the ink.

My invention is especially useful in connection with so-called gold printing. Gold printing has heretofore been usually performed by applying a printed impression of sizing or viscous substance to the paper or other object being printed, hereinafter referred to as paper, and then passing the paper through a so-called bronzing machine, in which the paper has the color, in the form of a metallic powder, dusted thereon, the coloring matter thus dusted on the printed paper adhering to the sized printed portions. The surplus powder was supposed to be removed from the paper in the bronzing machine. It has heretofore been found impossible, however, to remove all of the surplus gold, bronze or other color constituent, leaving color constituents on the paper or imbedded in the pores or interstices in the surface thereof, making an unclean appearance, and interfering more or less with subsequent printings or operations upon the paper.

Color constituents of this character are usually metallic, such as powdered gold, bronze, copper or other metals, or precipitates thereof, or coloring matter in imitation thereof, the color constituents being of greater specific gravity than the vehicle in which they are contained for producing the ink. The color constituents in ink of this character quickly settle, and transfer thereof to the paper being printed has been found to be impractical in methods heretofore in general use.

It is the object of my invention to provide a new and improved method for maintaining the color constituents in proper mixed condition with the other ingredients of the ink, and for transferring the same to the paper being printed; further, to provide novel means for conveying the color constituents to the paper being printed; further, to provide novel means for maintaining the ink in mixed condition; further, to provide novel means for transferring the mixed ink to the form-inking rollers; and, further, to provide novel means for controlling the quantity of ink being fed in the printing machine.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Fig. 1 is a side elevation showing my improved device applied in a so-called rotary printing press, partly broken away.

Fig. 2 is a plan view of a portion of the same, partly broken away.

Fig. 3 is an enlarged end view of my improved device, partly broken away.

Fig. 4 is a vertical cross-section of the same, taken in the plane of the line 4—4 of Fig. 2.

Fig. 5 is an end view of the agitator-drum, partly in section on the line 5—5 of Fig. 7.

Fig. 6 is a plan view of my improved device, partly broken away.

Fig. 7 is a horizontal section of the same, taken in the plane of the irregular line 7—7 of Fig. 3.

Figs. 8 and 9 are plan views of transfer spools of different sizes.

Fig. 10 is an end elevation of my improved device applied to a so-called flat bed press, partly broken away.

Fig. 11 is a rear elevation of the same.

Fig. 12 is a modification showing a transfer roller adjustable for regulating the amount of ink transferred thereby, partly in side elevation, and partly in section on the line 12—12 of Fig. 13.

Fig. 13 is a cross-section of the same, taken in the plane of the line 13—13 of Fig. 12, and,

Fig. 14 is a detail of the same, taken on the line 14—14 of Fig. 13.

My improved device comprises an ink reservoir 21, the bottom 22 of which has a wall 23. The wall 23 is arranged as substantially the sector of a cylinder, and forms a cavity for the body of ink in the reservoir, which is advisedly on a level with the dotted line 24, shown in Fig. 4. An agitator-drum 25 is located in the reservoir and preferably has an outer periphery 26, which is substantially cylindrical in form, and includes a shell 27 in which there are slots 28, the slots preferably extending through the body of the shell and forming openings through the shell. The slots preferably have

converging walls 29 forming scraping edges 30. The shell rotates in the bottom of the reservoir with its periphery close to the wall 23.

The body of ink containing the metallic powder or other color constituent is placed in this reservoir and the drum is rotated in the body of ink, the lower portion of the drum being imbedded in the body of ink. Rotation of the drum causes agitation of the ink and thorough mixing of the same. The outer periphery of the drum and the scraping edges of the shell move close to the inner face of the cylindrical bottom of the reservoir and cut into and pierce the body of the ink.

They scoop the heavier ingredients of the ink or color constituents thereof and raise the same and mix the same thoroughly with their vehicle, that is, the other ingredients of the ink, which carry the heavier color constituents, the heavier constituents passing with the other constituents through the slots into the interior of the shell and being tumbled and rolled with the other constituents therein, being raised and then dropped, and again passing out of the shell through other slots, for insuring thorough mixing of the ingredients. The ink is preferably quite liquid and flows freely, and my improved device provides effective means for maintaining the ink thoroughly mixed and for conveying the color ingredients to the paper.

A film of the mixed ingredients adheres to the outer periphery of the shells. A transfer disk 31 make edge contact with said periphery and receives a film of the mixed color particles and other ingredients, and transfer the adhering mixed ingredients to a roller 32, which coacts with other rollers, for distributing the ink thus transferred, and applying the same to the form, exemplified at 33, from which the printing is done.

The particles of bronze or other color constituents are respectively coated with their vehicle in the ink, and are moved bodily with the vehicle out of the body of ink and transferred to the inking rollers, which transfer the same to the form, the same being transferred from the form to the paper being printed, the color constituents being conveyed out of the body of ink to the paper being printed.

There is preferably a plurality of the edge conveying disks provided, two of the same being shown in Figs. 6, 8 and 9, connected by a shank 34, the same being shown as a spool 35. The spool preferably has end contact lugs 36 to space the disks from the end walls 37 of the reservoir, upon endwise movement of the spool. The spools are shown shorter than the rollers with which they contact.

Means are provided for adjusting the quantity of ink transferred from the mixing drum to the inking rollers, accomplished for instance by providing transfer disks having contact surfaces of different areas, as exemplified for instance in Figs. 8 and 9, in which the edges of the disks are of different widths from each other and from the width of the disks shown in Fig. 6, and form a series of disks having different transfer areas. Other disks may also be provided for the series having greater or less contact areas.

These disks are readily substituted for each other in the reservoir. The spools lie on top of the shell and the roller 32, being rotated by contact with the same. The shanks of the spools may be readily grasped by the fingers for substituting one for the other.

I have in Figs. 12, 13 and 14 shown a modification of means by which adjustments of transfer areas are obtained. The means exemplified are shown as spools 35′, similar to the spools 35, the parts thereof similar to the parts of the spools 35 being designated by similar but primed reference numerals. These spools are provided with additional contact parts 41, which are adjustable into and out of contact with the coacting rollers. These contact parts are shown as sectors having peripheral contact edges, and provided with stems 42, adjustable radially in guideways 43 in flanges 44 of the shank 34′. These guides and guideways are shown rectangular in cross-section to prevent relative turning between the same.

These sections are movable inwardly to place the same out of contact with the coacting rollers, and are movable outwardly in line with the contact faces of the disks 31′ for making transferring contact with the rollers. The movements of the sectors are limited as by a screw 45, shown threaded into the stem 42 and movable in a radial slot 46 in the wall of the guideway 43, for preventing outward unintentional release of the sectors. The sectors are readily released, as by unscrewing the screw 45, for cleaning purposes. The sectors are held in adjusted positions by being provided with recesses 47, 48, in which a ball 49 is received, a spring 50 urging the ball into the recesses. The ball and spring are located in a bore 51 in the flange of the spool, and are held therein by a plug 52 threaded into the outer end of said bore. The agitator-drum and transfer disks and segments may constitute rollers for agitating and transferring the ink.

The reservoir is preferably comparatively short with relation to the width of the printing press, and one or more of the reservoirs may be provided so as to supply the ink at the point or points in the widths of the printing press at which the particular kind of ink in the reservoir or reservoirs is

to be printed. For instance, if only a small portion of the width of the printing press is to be supplied with metallic printing, only one of the reservoirs with transfer disks of narrow width therein may be employed. Transfer disks of various sizes may also be substituted in the reservoir and transfer parts of various sizes and in desired numbers may be employed for transmitting the required amount of ink. If the metallic printing is of greater width or is in various positions crosswise in the printing press, a desired greater number of the ink fountains may be employed. As many as a dozen or more of the ink transferring means may be employed.

The ink reservoirs are exemplified as narrow in width and as capable of being arranged side by side or spaced apart in the width of the printing press. Thus a bridge-piece 58 is provided, which extends across the width of the machine, and is provided with legs 59 at its respective ends, having feet 60, which are secured to the respective side frames 61 of the usual ink fountain 62 by means of bolts 63. The bridge-piece is provided with upwardly opening T-slots 64, into which the heads of bolts 65 may be received through openings 66. The bolts are received through apertures in feet 67 of the frame 68 of the ink reservoir, which may be placed in adjusted positions lengthwise of the bridge-piece and across the printing press, and clamped in adjusted positions by means of nuts 69.

Each of the ink reservoirs is also preferably provided with a cover 71 hinged to the reservoir by means of hinges 72.

The agitator drum is exemplified as driven from a gear 75, fixed to a shaft 76, journaled in bearings 77 on brackets 78 at the respective ends of the shaft, the brackets being secured to the side-frames 79, rigid with the side-frames of the printing press. The gear 75 may be driven in any suitable manner, as by one of the usual gears of the usual inking roller mechanism. The gear 75 meshes with a gear 81 fixed to a cross-shaft 82, journaled in bearings 83 in brackets 84 at the respective ends of the bridge-piece. A gear 87 fixed to said shaft meshes with a gear 88 fixed to a cross-shaft 89, journaled in bearings 90 in the respective brackets 84.

The agitator drum of each of the reservoirs is provided with a gear 91 which meshes with a gear 92, the gear 92 rotating with the shaft 89. There are preferably as many of the gears 92 on said shaft as there are reservoirs which can be placed on the bridge-piece. These gears 92 are adjustable lengthwise of the shaft, as by having spline groove and key connection 93 therewith, so that one of these gears 92 may be placed in mesh with the gear 91 of each of the reservoirs which may be placed on the bridge-piece. The gears 92 may be held in axially adjusted positions by set-screws 94.

The gear 91 meshes with a gear 95 on a stud-shaft 96 fixed to the frame of the reservoir. The gear 95 meshes with a gear 97 rotating with the roller 32.

The agitator drum and the roller 32 are preferably so mounted as to be readily removed from the reservoir for cleaning purposes. Thus the agitator drum 25 has pin and slot connection 101 with a shaft 102 journaled in bearings 103, 104, in the end walls of the reservoir. The bearing 104 is preferably of sufficient diameter or is so constructed as to readily permit passage of the pin therethrough. The shaft 102 has pin and slot connection 105 with the gear 91. The shaft is provided with an end flange 106. A nut 107 received over the threaded end of the shaft holds the shaft endwise in the reservoir. The nut coacts with a shoulder 108 on said shaft so that rotation of the shaft is permitted in its bearings. If it is desired to remove the agitator drum, the nut 107 is unscrewed and the shaft moved axially out of the agitator drum and its bearings, the shaft and its gear being removable.

The agitator-drum is constructed so as to be readily taken apart for cleaning purposes. It may for instance comprise a hub 109 having lugs 110. The shell is provided with end recesses 111. The end plates 112 are provided with pins 113. The end plates are received within the respective ends of the shell, the pins 113 being received in the recesses 111. The end plaees are fixed to the hub, as by screws 114 threaded into the lugs 110.

The roller 32 is mounted in similar manner. Thus the roller 32 has a shaft 118 therein, which has pin and slot connection 119 therewith. This shaft is journaled in bearings 120, 121, in the end walls of the reservoir. The bearing 121 is of such diameter or is so formed as to permit the pin of the pin and slot connection 119 to pass endwise therethrough. The gear 97 has pin and slot connection 122 with said shaft. The end of said shaft is provided with a flange 123, the gear being held between said flange and the end wall of the reservoir. The other end of the shaft is threaded, a nut 124 being received over said threaded end, inward movement of the nut being limited by a shoulder 125 on said shaft. The shaft rotates freely in its bearings. Removal of the nut permits endwise movement of the shaft out of the roller 32 and permits removal of the roller.

The roller 32 coacts with a roller 126 fixed to the shaft 76. Directions of rotations of the rollers and gears are indicated by the arrows respectively applied thereto.

The roller 32 is preferably a composition roller, and the roller 126, the agitator-drum

25 and the transfer disks 31 are preferably of hard material, for instance metal.

The ink for my improved device, in the present exemplification of roller mechanism, is transmitted from the roller 126 to a composition roller 127, and thence to a hard endwise reciprocating roller 128, with which the composition roller 127 and composition rollers 129, 130, 131, 132, 133, coact. A hard intermediate roller 134 coacts with the composition rollers 132, 133, and a composition ductor roller 135 coacts with the roller 134. The ductor roller is continuously held against the roller 134, out of contact with the usual fountain roller 136 of the usual fountain 62. Other roller mechanism may of course be employed.

When my improved device is being used in connection with the roller mechanism as an attachment in a usual printing press, the usual ink fountain mechanism is placed out of action. My improved device may also be employed in substitution of other usual automatic inking mechanisms in printing presses.

The rollers 129, 130, coact with endwise reciprocating hard rollers 137, 138, which in turn coact with composition form rollers 139, 140, 141 and 142, these form rollers inking the form 33. Such an arrangement of rollers herein shown and described as inked by my improved device is more fully shown and described in my Patent No. 1,627,483, for inking mechanism for printing machinery, dated May 3, 1927.

I have in Figs. 10 and 11 exemplified my invention applied to a so-called flat-bed printing press, in which there is a reciprocating bed 146 sustaining a form 147, from which the printing is done in connection with the complemental member of the printing couple, represented as the tympan cylinder 148. In the form exemplified, there is a gear 149, which is driven through the usual gearing operating the printing rollers of the printing press. This gear is fixed to a shaft 150 rotating in suitable bearings in the side frames of the inking mechanism of the printing press, this shaft also having an inking roller 151 fixed thereto.

The gear 149 meshes with a gear 152 fixed to a cross-shaft 153. The cross-shaft 153 is journaled in bearings 154 of legs 155 of a bridge-piece 156, provided with feet 157 fixed to the side walls of the printing press by bolts 158. One or more of the ink-reservoirs 21 are mounted on the bridge-piece crosswise of the printing press. The bridge-piece is provided with T-slots 159 in which T-bolts 160 are adjustable lengthwise of the bridge-piece, the bolts being received through holes in feet 161 in the frame of the reservoir, nuts 162 clamping the reservoir in adjusted position to the bridge-piece. A desired number of these reservoirs may be employed crosswise of the printing press as hereinbefore explained in connection with the rotary printing press.

The shaft 153 also has a gear 167 fixed thereto, which meshes with a gear 168 fixed to a shaft 169 extending across the printing press and journaled in bearings 170 in brackets 171 of the bridge-piece. The shaft 169 has gears 172 thereon. These gears are rotatable with the shaft and are adjustable lengthwise of the shaft, there being preferably one of the gears for each of the greatest desired number of reservoirs which it may be desired to place on the printing press. These gears have spline groove and key connection 173 with the shaft 169, and respectively mesh with the gears 91 of the respective reservoirs, being held in adjusted positions by clamp screws 174.

These reservoirs and the rollers, agitator-drums and transfer disks therein, and the gears therefor, are similar to the corresponding parts shown and described in connection with the reservoir and its attendant parts in the form of printing press shown in Fig. 1, similar parts being designated by similar reference numerals.

The composition roller 32 coacts with an inking roller 177, which is one of the sets of distributing and inking rollers comprising composition rollers and endwise reciprocating rollers shown generally at 178, in the form of flat-bed printing press exemplified in Figs. 10 and 11, for supplying ink to form rollers 179. The agitator-drum 25, the disks 31 and the roller 32 may intermittently rotate in opposite directions with the inking rollers of the reciprocating bed press.

By means of my improved device the usual inking table in a reciprocating bed printing press of the character described may be dispensed with, as my improved inking mechanism may be substituted therefor, and the ink, regardless of its character, may be properly and evenly distributed, so that the form rollers will supply an even and sufficient supply of ink to the form. Dispensing with the usual inking table enables the reciprocating bed printing press to be built much shorter, and produces a material saving in cost and floor space occupied by the printing press.

By means of my invention the particles of metallic powder are carried bodily to the printed sheet and affixed thereto in the printing so that the printed portions of the printed sheet thus printed have the appearance of gold laid upon the sheet when powdered gold or imitation thereof is employed, or the bronze or other color constituent is similarly laid thereon, producing a vivid printing, in which the metallic powder is densely laid upon the sheet to produce a solid layer of such powder throughout the printed area; furthermore, the individual

particles of the powder are imbedded in their vehicle so as to confine the application of the powder to the printed lines and areas, avoiding contact of the powder with other portions of the paper, and dispensing with subsequent removal of powder and cleaning of paper.

My improved mechanism has the further advantages that the ink is confined and maintained in applying condition in a closed reservoir; that by employment of my invention in a flat-bed press the inking table, which exposes a large evaporating area, is dispensed with; and that by employment of my invention a highly volatile vehicle for the heavier color constituents in the ink may be employed with the result that the ink dries quickly when applied to the paper, thereby preventing smutting and offsetting, and producing cleanly printed sheets.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In an ink applier for inking mechanism for printing machinery, the combination of an ink reservoir, an agitator drum rotatable in said ink reservoir and extending above the body of ink therein, said agitator drum provided with openings, the walls of which are arranged to agitate the ink, and with a periphery to which the ink is arranged to adhere, an ink receiving roller, and ink transferring means between said drum and said ink receiving roller provided with adjustable fields of contact contacting said periphery and said ink receiving roller for transferring adjustable fields of ink from said drum to said roller.

2. An ink applier for inking mechanism for printing machinery which comprises an ink reservoir arranged for receiving a body of ink, an agitator drum rotatable in said body of ink and extending thereabove, said agitator drum provided with ink agitating means and with a periphery for receiving a film of ink, an ink-receiving roller, and adjustable ink transferring means between said drum and said roller.

3. In inking mechanism for printing machinery, the combination of a plurality of ink reservoirs, each of said reservoirs comprising an agitator drum, an ink receiving roller and adjustable transferring means for transferring the ink from said drum to said roller, and means whereby a plurality of said reservoirs are arranged side by side crosswise of the printing press.

4. In inking mechanism for printing machinery, the combination of a plurality of ink reservoirs, each of said ink reservoirs comprising agitating means provided with a periphery for receiving a film of ink, an ink receiving roller, and adjustable ink transferring means between said agitating means and said roller, means for mounting a plurality of said reservoirs crosswise of the printing machine, a rotating means on said printing machinery, and means for driving said respective agitating means from said rotating means.

5. In inking mechanism for a printing machine, the combination of a plurality of ink reservoirs, said respective ink reservoirs comprising an agitator drum, an ink receiving roller, and ink transferring means between said agitator drum and said ink receiving roller, means for adjustably positioning said reservoir crosswise of the printing machine, and means whereby to adjust the ink transferring capacity of said ink transferring means.

6. In inking mechanism for printing machinery, the combination of a reservoir having a lower wall, a rotatable agitator drum comprising a shell having a periphery provided with openings, the walls of which openings are arranged to move through the body of ink in said reservoir, which ink is arranged to move through said openings into the interior of said drum for kneading and rolling said ink, and said drum provided with a periphery for receiving a film of said ink, and adjustable means coacting with said drum for transferring selected areas in said film.

7. In inking mechanism for printing machinery, the combination of an ink reservoir, an agitator drum therein, an ink receiving roller mounted in said ink reservoir, ink transfer means between said agitator drum and said ink receiving roller, means mounting said agitator drum and said ink receiving roller in said reservoir comprising shafts, bearings in said reservoir for said shafts, and means for removing said shafts from said bearings and from said agitator drum and from said ink receiving roller respectively for release of said agitator drum and said ink receiving roller from said reservoir.

8. An ink applier for inking mechanism of printing machinery comprising an ink reservoir, an agitator drum rotatable therein and provided with a periphery arranged for receiving a film of ink, an ink receiving roller, and a spool provided with peripheral ink receiving edges between said agitator drum and said ink receiving roller.

9. In an ink applier for inking mechanism of printing machinery, the combination of a reservoir, an agitator drum therein provided with a periphery arranged for receiving a film of ink, an ink receiving roller, and ink transferring spools respectively provided with ink transferring peripheral edges of different widths arranged to be selectively placed between said drum and said roller for adjustably regulating the quantity of ink transferred from said agitator drum to said ink receiving roller.

10. In an ink applier for inking mechanism for printing machinery, the combination of an ink reservoir, an agitator drum rotatable therein, an ink receiving roller, and ink transferring means between said agitator drum and said ink receiving roller provided with ink transferring faces of various sizes arranged to be selectively placed between said agitator drum and said ink receiving roller.

11. In an ink applier for inking mechanism of printing machinery, the combination of an ink reservoir provided with an ink receiving cavity having a lower wall which is substantially the sector of a cylinder, an agitator drum provided with an outer periphery of substantially cylindrical form rotatable closely adjacent to said first-named wall, said wall of said drum provided with slots having sloping inner faces to form ink cutting edges at the outer periphery of said drum arranged to move in close proximity to said first-named wall of said reservoir for piercing the ink in said reservoir and for conveying the heavier constituents of said ink in the bottom of said cavity upwardly for thoroughly mixing said ink, said slots arranged for having the ink pass therethrough into said drum, said ink arranged to pass through said slots to outside of said drum, the periphery of said drum arranged to have a film of said agitated ink adhere thereto, and ink transferring means coacting with said periphery, said ink transferring means adjustable for adjusting the area of ink so transferred.

In testimony whereof, I have hereunto signed my name.

LESLIE W. CLAYBOURN.