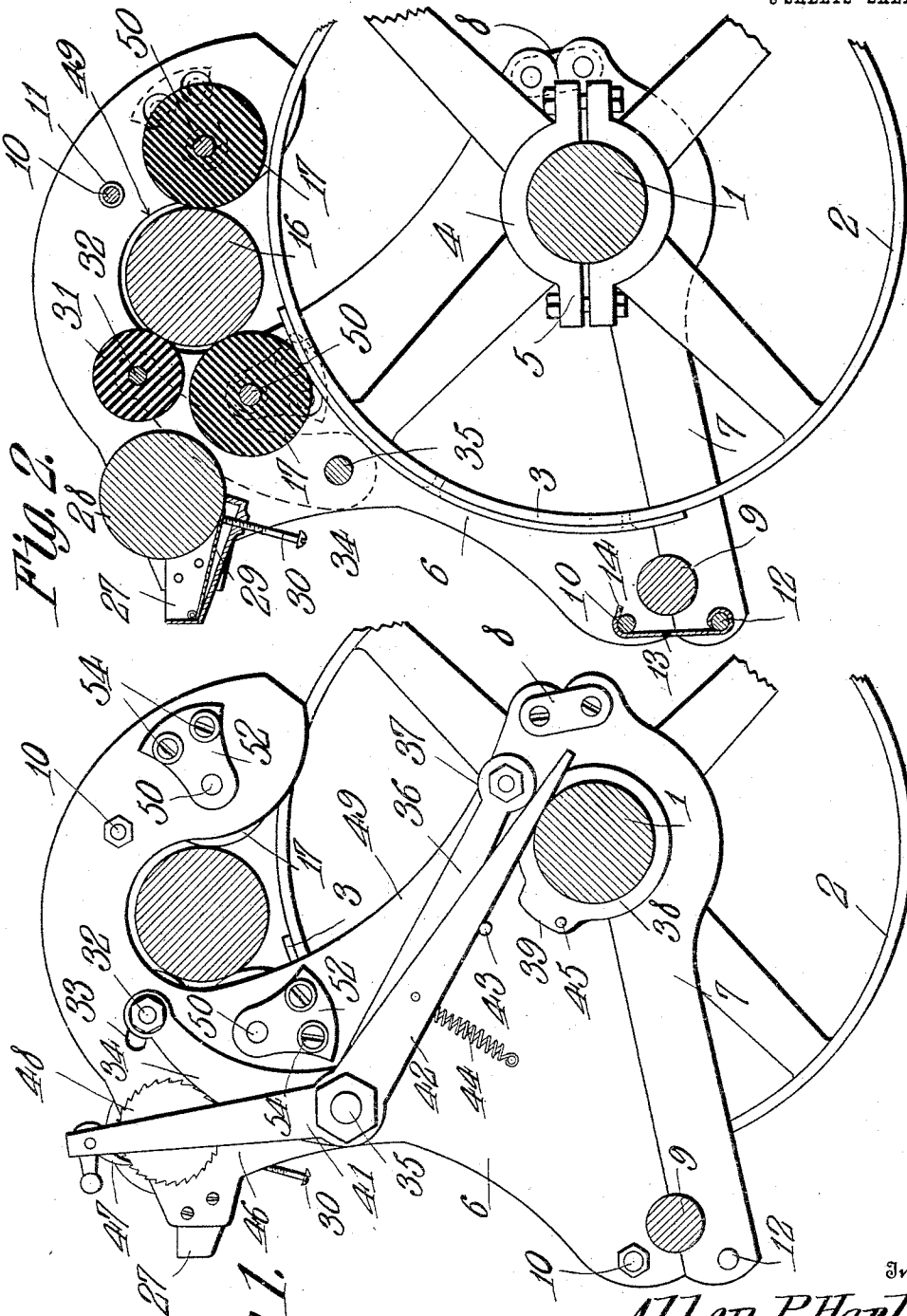


A. P. HARLAND.
 MULTICOLOR PRINTING PRESS.
 APPLICATION FILED FEB. 15, 1909.

934,911.

Patented Sept. 21, 1909.

3 SHEETS—SHEET 1.



Witnesses
E. J. Hunt
F. J. Chapman

Inventor
Allen P. Harland

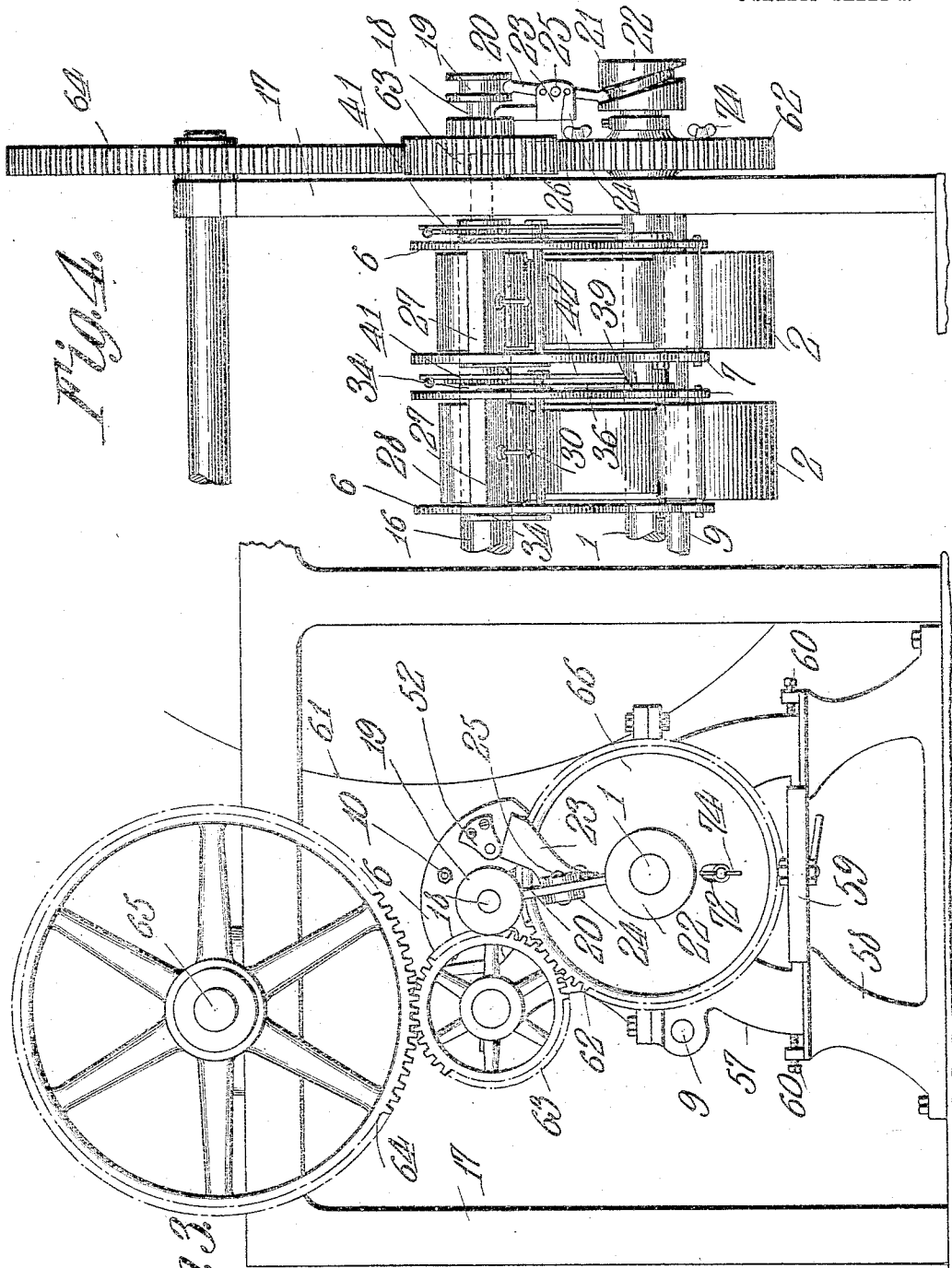
By *C. A. Snow & Co.*
 Attorneys

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3 SHEETS—SHEET 2.



Witnesses

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3 SHEETS—SHEET 3.

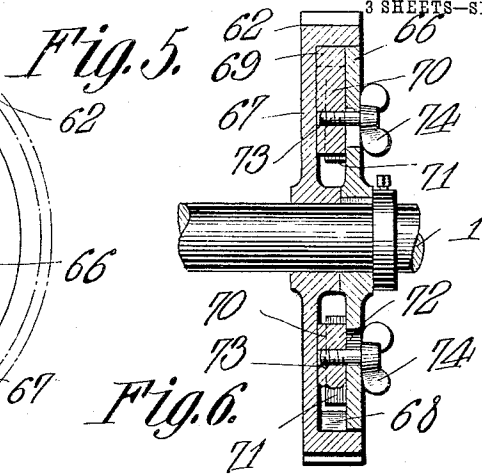
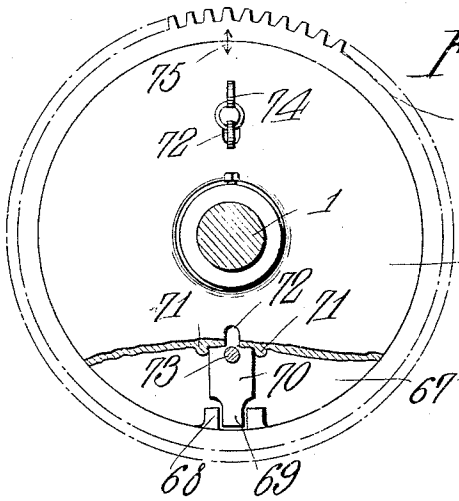


Fig. 7.

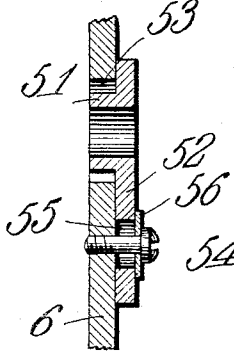


Fig. 8.

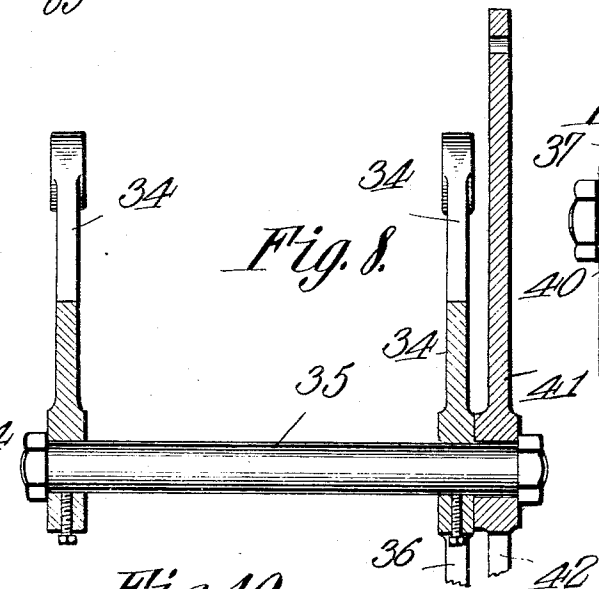


Fig. 9.

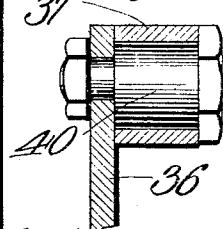
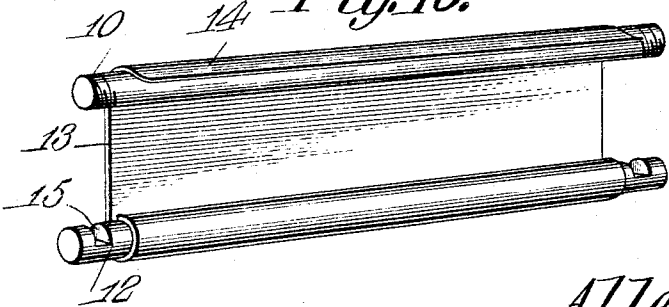


Fig. 10.



Witnesses

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UNITED STATES PATENT OFFICE.

ALLEN P. HARLAND, OF TUPELO, MISSISSIPPI.

MULTICOLOR-PRINTING PRESS.

934,911.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed February 15, 1909. Serial No. 477,915.

To all whom it may concern:

Be it known that I, ALLEN P. HARLAND, a citizen of the United States, residing at Tupelo, in the county of Lee and State of Mississippi, have invented a new and useful Multicolor-Printing Press, of which the following is a specification.

This invention has reference to improvements in multi-color printing presses and more particularly to an attachment for printing presses whereby an ordinary printing press may be converted into a multi-color printing press at small cost.

I have already devised a multi-color attachment for ordinary printing presses wherein provision is made for a number of drums or rollers capable of receiving suitable printing surfaces such as stereotype plates and which may be brought into register with any portion of a sheet being printed by an ordinary printing press to fill in in colored impressions portions of the sheet being printed which portions are left blank in the impression made by the ordinary printing press.

For the purposes of the aforesaid invention removable and interchangeable inking units are provided, one for each printing drum or combination of printing drums so that with a minimum amount of trouble and expenditure of time differently colored inks may be used at will and in different positions as desired and changes in the color of the imprint or the location of the imprint with or without changes of color may be made with great facility.

While the former structure which I have devised answered the purpose admirably I have found that the former structure may be advantageously changed in some particulars with added facility in handling.

The present invention relates to these details of construction whereby the former structure has been improved by rendering the inter-change of the inking units more easily performed and by a simplification of the structure in some directions while in other directions the structure is amplified and increased advantages thereby obtained.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of the specification, in which drawings,

Figure 1 is a side elevation of an improved inking unit applied to one of the adjustable

printing drums or cylinders, with parts shown in section. Fig. 2 is a central section through the structure of Fig. 1. Fig. 3 is an elevation of a portion of one end of a printing press with the invention applied. Fig. 4 is an elevation of the same end of the printing press but viewed at right angles to the showing of Fig. 3. Fig. 5 is an end elevation with parts broken away of the shaft and gears thereon for carrying the adjustable printing drums or cylinders. Fig. 6 is a central cross section through the structure of Fig. 5. Fig. 7 is a section through the adjusting means for the composition rollers of the inking units. Fig. 8 is a detail section showing the shaft and journal supporting arms of the ink transfer roller of the inking unit and also showing other parts, Fig. 9 is a detail section of the means for adjusting the throw of the structure shown in Fig. 8. Fig. 10 is a detail perspective showing a latch mechanism employed in connection with the inking units.

Referring to the drawings there is shown in Figs. 1 and 2 and also in Figs. 3 and 4 a shaft 1 extending across the printing press and driven in a manner to be presently described. Mounted on this shaft are a number of drums or cylinders 2 designed to receive on the periphery stereotype plates 3 or other suitable printing surfaces. The cylinders 2 are designed to be adjusted longitudinally of the shaft 1 and secured in the adjusted positions as may be desired. For this purpose the hub 4 of each cylinder 2 is split as indicated and the sections may be drawn together by bolts 5 or otherwise to clamp the cylinders 2 on the shaft 1 when the adjustment has been accomplished.

Assuming that the main imprinting surfaces of the press are designed to print with black ink upon the paper and that it is desirable to produce insert in colored ink in spaces left for the purpose in the main imprint, then the cylinders 2 are properly adjusted so that their printing surfaces 3 will register with the blank spaces of the main imprint and by properly inking these printing surfaces 3 with the desired colored ink the inserts are imprinted in the blank spaces in colors instead of black. The fact that the invention is designed more particularly for the use of colored inks does not preclude the use of black ink for the imprinting surfaces if occasion should arise for such use.

The cylinders 2 are provided with remov-

able and interchangeable inking units which may be of a width sufficient to supply one cylinder 2 or supply two or more such cylinders when brought into end engagement.

5 Each inking unit is provided with a frame composed of two spaced side members 6 arranged at one point to embrace the shaft 1 on each side of a cylinder 2 or group of cylinders 2. Where the side members 6 of the inking unit frame embrace the shaft 1 there is provided a latch member 7 co-acting with the corresponding side member 6 to complete the embracing of the shaft 1. At one side of the shaft 1 the member 7 is hinged to the

10 corresponding member 6 by a hinge link 8. Extending across the machine parallel with the shaft 1 is a bar 9 and this bar is embraced by a corresponding portion of each side member 6 and latch member 7, the said members being suitably notched or recessed for this purpose.

The side members 6 of each printing unit are connected together by bolts or rods 10 some or all of which may be provided with spacing sleeves 11. One of the rods 10 extends between the two end members 6 of the printing frame unit adjacent to the rod 9 and similarly located with reference to the rod 9 is another rod 12 extending between

25 the ends of the latch members 7 adjacent to the rod 9. The rods 10 are secured to the side members 6 by nuts or otherwise so that they may be considered for all practical purposes as permanent connections. The rod

30 12 is however simply passed through suitable perforations in the latch member 7 and is only temporarily connected thereto. This rod carries an elongated hook member 13 bent on itself at one end to encircle the rod

40 12 and at the other end formed into a hook extension 14 adapted to engage over the adjacent rod 10 so that when so engaged the latch members 7 are made fast at the corresponding end of the side members 6, but the elasticity of the hook member or lip 14 will permit the disengagement of the hook 13 from the corresponding rod 10 at will. The rod 12 near each end is provided with a notch 15 of such width as to readily but

50 snugly receive the corresponding portion of the latch members 7. When the hooked end 14 is engaged over the corresponding rod 10 then the rod 12 is moved at right angles to its longitudinal axis to a sufficient extent to cause the latch members 7 to enter the recesses 15 and in this position the latch members 7 are brought into snug engagement with the corresponding portions of the side members 6.

60 In the structure which I previously devised and which is in many respects similar to the inking unit shown in the present drawings, the rod 12 was in fixed relation to the latch members 7 and hence the inking

65 unit could only be removed from the shaft 1

and corresponding cylinder 2 by moving the latter well out of engagement with the surface on which the imprints were to be made. With the structure just described with relation to the present invention the

70 hook 13 may be disengaged from the rod 10 and then by disengaging the rod 12 from the members 7 by the complete removal of said rod from said member 7 together with the hook 13 it will be seen that the inking

75 unit may be readily removed from both the cylinder 2 and shaft 1 without disturbing either of them, the latch members 7 being carried along the sides of the cylinder 2 without interference from the rod 12 which

80 has already been removed.

Extending across the frame of the printing press parallel with the shaft 1 and out of engagement with but in operative relation to the cylinders 2 is a vibrating roller

85 16 designed to apply ink to composition rollers 17 carried by the inking units and to which rollers reference will presently be made. The roller 16 is common to all the individual inking units and is mounted in

90 suitable journal bearings in a frame independent of the main frame 17 of the printing press, and is capable of a limited movement in the direction of its longitudinal axis. To provide this movement one end of

95 the roller 16 has a continuation 18 carrying a grooved wheel 19 which engages one end of a lever 20 the other end of which latter engages in a cam groove 21 in a cam wheel 22 fast on the shaft 1. The lever 20 is

100 mounted in a bracket 23 secured to an appropriate portion of the frame 17 and this bracket is provided with two ears 24 between which the lever 20 is pivotally supported by means of a suitable pivot pin 25. Each ear

105 24 is provided with a series of perforations 26 for the reception of the pivot pin 24 and the lever 20 is provided with like perforations so that by introducing the pivot pin 24 in any one of the sets of perforations the

110 relative movement of the two ends of the lever 20 may be adjusted at will and consequently the cam groove 21 acting on the lever 20 may be made to cause a large or small longitudinal movement of the roller

115 16. Each inking unit carries a suitable ink fountain 27 in which dips a roller 28 while the amount of the ink carried by the roller 28 is determined by an adjustable lip 29 under the control of a screw 30.

120

Ink is transferred from the roller 28 to the roller 16 by a transfer roller 31 having its journal 32 extending through slots 33 in the end plates 6 of the inking unit and there carried by arms 34 exterior to the end plates

125 6 but in close relation thereto. These arms 34 are made fast to an arbor 35 extending through the inking unit from one end plate 6 to the other and journaled in said end plates and extend beyond the same. One of

130

the arms 34 is extended beyond the arbor 35 in the form of an angle arm 36 and carrying at the free end a roller 37 arranged to engage the periphery of a cam collar 38 made fast to the shaft 1 close to the corresponding side member 6 of the inking unit. The collar 38 is provided with a cam projection 39 adapted to engage with the roller 37 and so move the arm 36 that it will rock the arbor 35 sufficiently to carry the roller 31 from contact with the roller 16 into contact with the roller 28. When the roller 37 is free from engagement with the cam projection 39 the parts will immediately gravitate to their normal positions which is with the roller 31 in engagement with the roller 16. Since it is sometimes advisable to adjust the throw of the roller 31 this is accomplished by mounting the roller 37 on an eccentric stud 40 carried by the arm 36. By this means the relation of the roller 37 to the arm 36 may be established at the will of the operator.

At one end the arbor 35 extends beyond the corresponding arm 34 and there carries an angle lever 41 one arm 42 of which is long enough to normally rest on or in close relation to the shaft 1, its movement in this direction being limited by a pin 43 projecting from the corresponding end plate 6 of the inking unit. This arm 42 is normally under the action of a spring 44 tending to maintain it in contact with the pin 43. The cam projection 39 carries a pin 45 in the path of which the end of the arm 42 is located so that while the arm 36 is still under the action of the cam 39 the pin 45 will engage the arm 42 and move it a corresponding distance. The lever 41 has at the end remote from the arm 42 another arm 46 carrying at its free end a pawl 47 in operative relation to a ratchet wheel 48 on the arbor of the roller 28 which at this point projects beyond the corresponding end plate 6. The pawl 47 is shown as of the gravity type but it will be understood that it may be spring constrained instead of gravity constrained. When the pin 45 engages the arm 42 and moves it against the action of the spring 44 then the arm 46 is moved in a direction which causes the pawl 47 to engage the ratchet wheel 48 and rotate the roller 27 a commensurate distance. This action occurs while the roller 31 is in contact with the roller 28 because of the action of the cam 39 on the roller 37 carried by the corresponding end of the lever 36. It therefore transpires that the ink roller 28 causes a rotative movement of the roller 31 and consequently the ink is transferred to a considerable surface of said roller 31 instead of depositing a narrow band of ink thereon. When the cam 39 has moved out of engagement with the roller 37 and the pin 45 is out of engagement with the arm 42 then the roller 31 returns into en-

gagement with the roller 16 and the spring 44 returns the lever 41 inactively about the ratchet wheel 48 to its normal position.

The composition rollers 17 are supported on each side of the roller 16 when the inking unit is in place so as to be in engagement with the roller 16 and also with the printing surface being carried by the drum 2. But since each inking roller is designed to be readily removable from operative relation to any particular drum 2, and since the roller 16 is continuous across the machine provision is made for the ready removal of this portion of the inking unit from engagement with the roller 16. For this purpose the side members 6 of each unit are cut away or recessed as shown at 49 so as to receive the roller 16 between the composition rollers 17 and when an inking unit is in proper position with relation to a drum 2 then these portions of the side members 6 of an inking unit overhang and straddle the roller 16.

In the device which I previously devised the composition rollers 17 carried on their arbors end disks rolling on the periphery of the drum 2 and so imparting motion to these rollers. Because of the wear of the composition rollers the latter will become reduced in diameter to an extent to carry them out of contact with the roller 16 or its equivalent, the said roller 16 being replaced by a similar roller individual to each inking unit in the aforesaid structure which I have devised, while the end disks of the rollers 17 would have practically no wear at all.

In the present structure there is shrinkage of the rollers 17, but provision is made for compensating for this shrinkage so that the roller 17 may always be maintained in proper contact with the roller 16 and with the surfaces to be inked. For this purpose the journal or shaft 50 of each roller 17 is mounted in a journal bearing 51 in the form of a projecting sleeve from a plate 52. The sleeve 51 extends through a passage 53 in the corresponding side member 6 of the inking unit, which passage is of such size as to permit considerable movement of the sleeve within said passage in a direction lateral to the length of the passage. The plate 52 is secured to the corresponding end member 6 of the inking unit by screws 54 or other such means passing through enlarged holes 55 in the plate 52 while the heads of the screws or other such devices 54 engage washers 56 of sufficient size to always cover the hole or perforation 55 in the plate 52. By this means a universal adjustment of the rollers 17 with relation to the roller 16 and the printing surfaces on a drum 2 is provided.

It is at times necessary to move the drums 2 away from the surface to be printed or to move them into operative relation thereto. For this purpose the shaft 1 is mounted near each end in a frame 57 interior to the main

frame 17 of the machine and this frame also carries the rod 9 and the roller 16. The frame 57 is mounted to slide upon a base or supporting frame 58 secured to the main frame or the bed of the main frame and a clamp member 59 is employed to lock the frame 57 to the frame 58 in any desired position of adjustment, the latter being accomplished by means of set screws 60 acting on opposite sides of ends of the frame 57. By loosening the clamp members 59 and suitably manipulating the screws 60, the frame 57 may be moved in a direction to carry the drums 2 away from the surface to be imprinted or to carry it into operative relation thereto as may be desired. A small portion of the cylinder designed to carry the surface to be imprinted is indicated in Fig. 3 at 61.

Power is applied to the shaft 1 by means of a gear wheel 62 mounted on said shaft at one end thereof and coupled thereto in a manner to be described, and this gear wheel is in mesh with an idler pinion 63 mounted in journal bearings on the frame 57. The idler 63 is in mesh with a gear wheel 64 mounted on a shaft 65 which may be a shaft forming part of an ordinary printing press such, for instance, as a part of the paper delivering mechanism of the press, and this shaft receives power from the prime mover of the press in any suitable manner. Of course where the shaft 65 is not present in the machine other driving means may be provided for the shaft 1. Where the gear wheel 64 and idler 63 is employed to drive the gear wheel 62, the normal position of the axis of the idler 63 is directly beneath the axis of the shaft 65 so that under power conditions the pinion 63 and gear wheel 64 should be in mesh in the best relation of the teeth. When the shaft 1 is moved away from the surface to be imprinted, that is away from the cylinder 61 then the teeth of the pinion 63 are no longer in the best relation with the teeth of the gear wheel 64 but the movement of the frame 57 with the shaft 61 is so limited that the pinion 63 is still in mesh with the gear wheel 64 and therefore the adjustments of the parts is maintained even though the imprinting from the surfaces 3 is not proceeding. Under these last conditions however, the load on the pinion 63 is very light and the slight imperfection of mesh between the pinion 63 and gear wheel 64 is of no moment.

It is often desirable to rotate the shaft 1 with the drums 2 thereon about its longitudinal axis without preventing the ready reestablishment of the proper relation of the parts which might occur if the gear wheel 62 was moved to a position out of mesh with the driving element. For this purpose the gear wheel 62 is mounted loosely on the shaft 1 and provision is made for coupling the gear wheel to the shaft or un-

coupling it at will while provision is also made that when the shaft is recoupled to the gear wheel the original relations shall be established. Keyed upon the shaft 1 is a disk 66 inset into the gear wheel 62, the web 67 of which latter is displaced to one side of the median line of the periphery of the wheel so as to form a recess or chamber in which the disk 66 may be housed. The inner face of the toothed periphery of the gear wheel at points diametrically opposite is formed with spaced ears 68 designed to receive a tongue 69 on one end of a block 70 adapted to slide between guiding ribs 71 on the inner face of the disk 66. Between the guiding ribs 71 on each side of the center the disk 66 is formed with a radial slot 72. Through each slot there projects a pin 73 threaded at one end to enter a corresponding threaded passage in the block 70, and at the other end exterior to the disk 66 the pin is formed with a winged head 74, the rod 73 and head 74 constituting a thumb screw of ordinary construction.

When the blocks 70 are projected radially outward the tongues 69 engage between the ears 68 and the gear wheel 62 is thereby locked to the disk 66 and through it to the shaft 1 so that on rotating the gear wheel 62 the shaft 1 will participate in such movement. When the thumb nuts 64 are loosened then the blocks 70 may be retracted toward the axis of the shaft 1 until the tongues 69 are free from engagement with the ears 68 and then the shaft 1 may be rotated independent of the gear wheel 62. Under such circumstances the drums 2 may be rotated to any position desired for the cleaning or inspection or inter-change of the printing surfaces 3. By providing suitable indicating marks 75 upon the disk 66 and an adjacent part of the gear wheel 62 the proper relation of the shaft and members carried thereby to the gear wheel 62 may be always reestablished after this relation has been disturbed for the purposes mentioned or for any other purpose. When the blocks 70 have been again moved radially outward and the tongues 69 are brought into position between the ears 68 then the thumb nuts 73, 74 may be tightened and the machine is ready for operation.

It will be observed that the shortest distance between the adjacent peripheries of the rollers 17 is less than the diameter of the roller 16, but this will not interfere with either the placing of the inking unit or the removal thereof since the rollers 17 being of composition are more or less elastic, and will readily permit the passage of the roller 16 between them.

Movement of the inking unit in the direction of the length of the shaft 1 is prevented by the comparatively close fit of the side members 6 to the sides of the drums 2, so a

slight play between the parts is not at all harmful.

What is claimed is:—

1. In an attachment for printing presses,
5 a plurality of inking units each composed of an ink reservoir, inking rollers and an oscillatory ink transfer roller, and a vibrating distributing roller common to all of said units.

10 2. In an attachment for printing presses having a plurality of printing drums adjustable in the direction of their axes of rotation, a plurality of inking units each composed of an ink reservoir, inking rollers, and an oscillatory ink transfer roller, and an ink distributing roller common to all the inking units.

3. An attachment for printing presses having a plurality of printing drums adjustable in the direction of their axes of rotation,
20 a plurality of inking units each composed of an ink reservoir, inking rollers, and an oscillatory ink transfer roller, and a vibratory ink distributing roller common to all the inking units.

4. In a printing press, an ink reservoir, a roller for delivering ink therefrom, an ink transfer roller, an arbor provided with arms carrying the ink transfer roller, another arm
30 fast on the arbor, a pawl and ratchet mechanism for the ink delivering roller, a lever mounted on the arbor and carrying the pawl, and a cam member having means for simultaneously engaging the last named arm on the arbor and the pawl carrying lever.

5. In an attachment for printing presses, a plurality of type or printing drums, a shaft carrying the same and along which they are adjustable, a plurality of movable and interchangeable inking units each comprising an
40 ink reservoir, a roller for delivering ink therefrom, an ink transfer roller, an arbor provided with arms carrying the ink transfer roller, another arm fast on the arbor, a pawl and ratchet mechanism for the ink delivering roller, and a lever carrying the pawl, and a cam member on the shaft adjacent to each type or printing drum and having means for simultaneously engaging the
50 second named arm on the arbor and pawl carrying lever of an inking unit.

6. In a printing press, a removable and interchangeable inking unit comprising an ink reservoir, ink delivering and transfer rollers, and inking rollers, and an ink spreading roller to which the inking unit may be applied at different points and adapted to be interposed between the transfer and the inking rollers of the said inking unit.

7. In a printing press, a plurality of type
60 or printing cylinders or drums, removable and interchangeable inking units each comprising an ink reservoir, ink rollers and an ink transfer roller, and an ink distributing roller common to all the inking units and

adapted to be interposed between the inking rollers and the transfer roller.

8. In a printing press, a plurality of type or printing cylinders or drums, removable and interchangeable inking units each comprising an ink reservoir, inking rollers, and
70 an ink transfer roller, and an ink distributing roller common to all the inking units and adapted to be interposed between the inking rollers and the ink transfer roller, said inking unit having the ink rollers spaced apart and adapted to engage the distributing roller on the opposite sides of its longitudinal axis.

9. In a printing press, a plurality of type
80 or printing drums or cylinders, removable and interchangeable inking units each comprising an ink reservoir, ink rollers, and an ink transfer roller, and a vibratory ink distributing roller common to all the inking units and adapted to be interposed between the inking rollers and the ink transfer roller, said inking unit having the inking rollers spaced apart and adapted to engage the distributing roller on opposite sides of its longitudinal axis.

10. In a printing press, a shaft, type or printing drums or cylinders thereon, a roller parallel with the shaft, and removable and interchangeable inking units each provided
95 with spaced side plates engaging the shaft and rod parallel therewith, latch members pivoted at one end to the side plates and adapted to coact with the side plates to lock the latter to the shaft and rod, and means
100 for securing the latch member to the main portion of the inking units at the ends remote from the pivoted ends comprising a removable rod engaging the latch members at the ends and the hook member carried by
105 the rod and adapted to engage the main portion of the inking unit.

11. In a printing press, a shaft, type or printing drums or cylinders thereon, a rod parallel with the shaft, and removable and
110 interchangeable inking units each provided with spaced side plates engaging both the shaft and rod parallel therewith, latch members pivoted at one end to the side plates and adapted to coact with the side plates to lock the latter to the shaft and rod, and means
115 for securing the latch members to the main portion of the inking unit at the end remote from the pivoted ends comprising a removable notched rod engaging the latch member at the notches, and a hook member carried by the rod and adapted to engage the main portion of the inking unit.

12. An attachment for printing presses comprising type or printing drums, a shaft
125 carrying the same, a frame in which the shaft is journaled, said frame being adjustable in a direction at right angles to the length of the shaft, a gear wheel mounted on the shaft, an idler gear mounted on the
130

frame and in mesh with the gear on the shaft, and a drive gear having its axis fixed with relation to the axis of the idler, the plane of the axes of the drive gear and idler being perpendicular to the plane of movement of said frame when the type or printing drums are in active position.

13. An inking unit for printing presses having spaced side plates, composition ink rollers, and journal bearings for the inking rollers each comprising a plate with an extended bearing for the journal of the ink roller and fastening means for the plates en-

gaging the side plates of the inking unit, said side plates having enlarged openings for the reception of the journal bearings on the first named plates and the latter having enlarged openings for the passage of the fastening devices.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ALLEN P. HARLAND.

Witnesses:

E. HUME TALBERT,
E. DANIELS.