

Sept. 11, 1928.

1,683,840

L. H. MORSE

INKING ATTACHMENT FOR PRINTING MACHINES

Filed Nov. 5, 1926

5 Sheets-Sheet 1

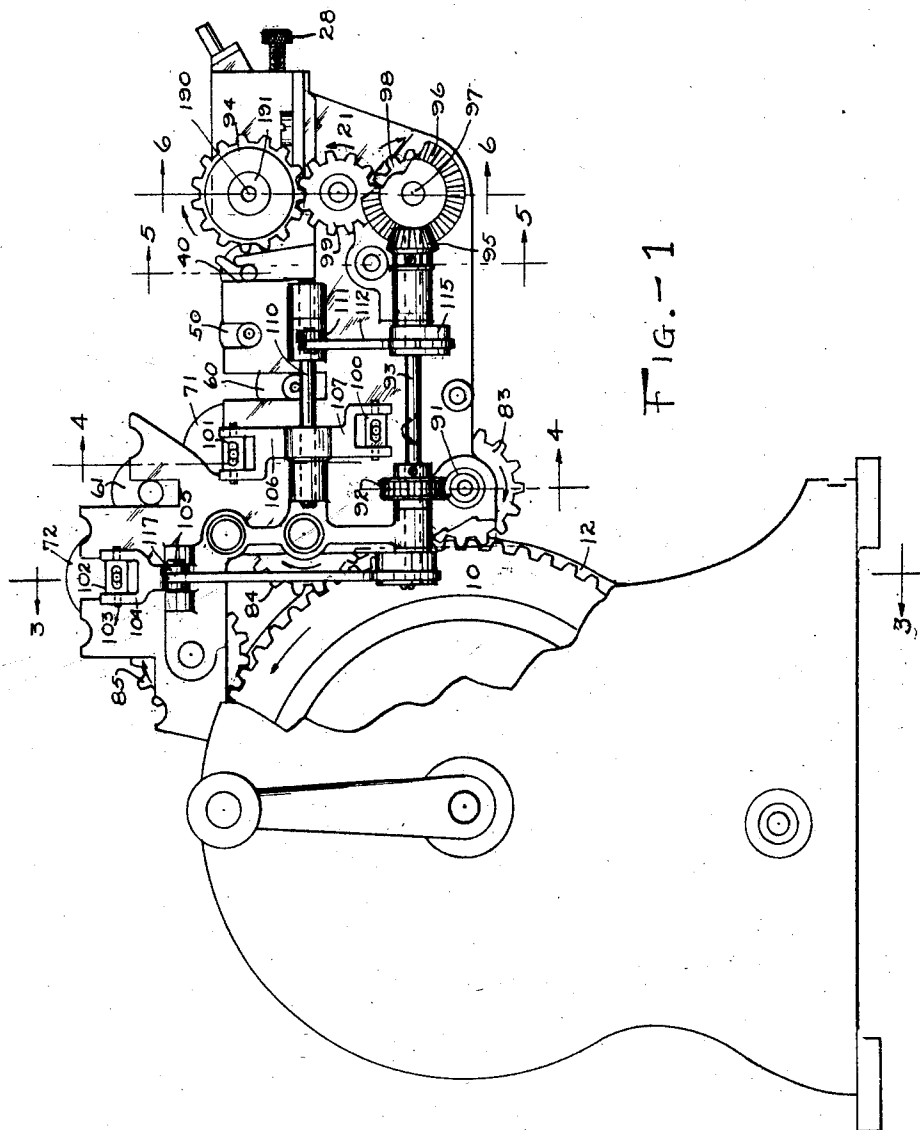


FIG. 1

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5 Sheets-Sheet 2

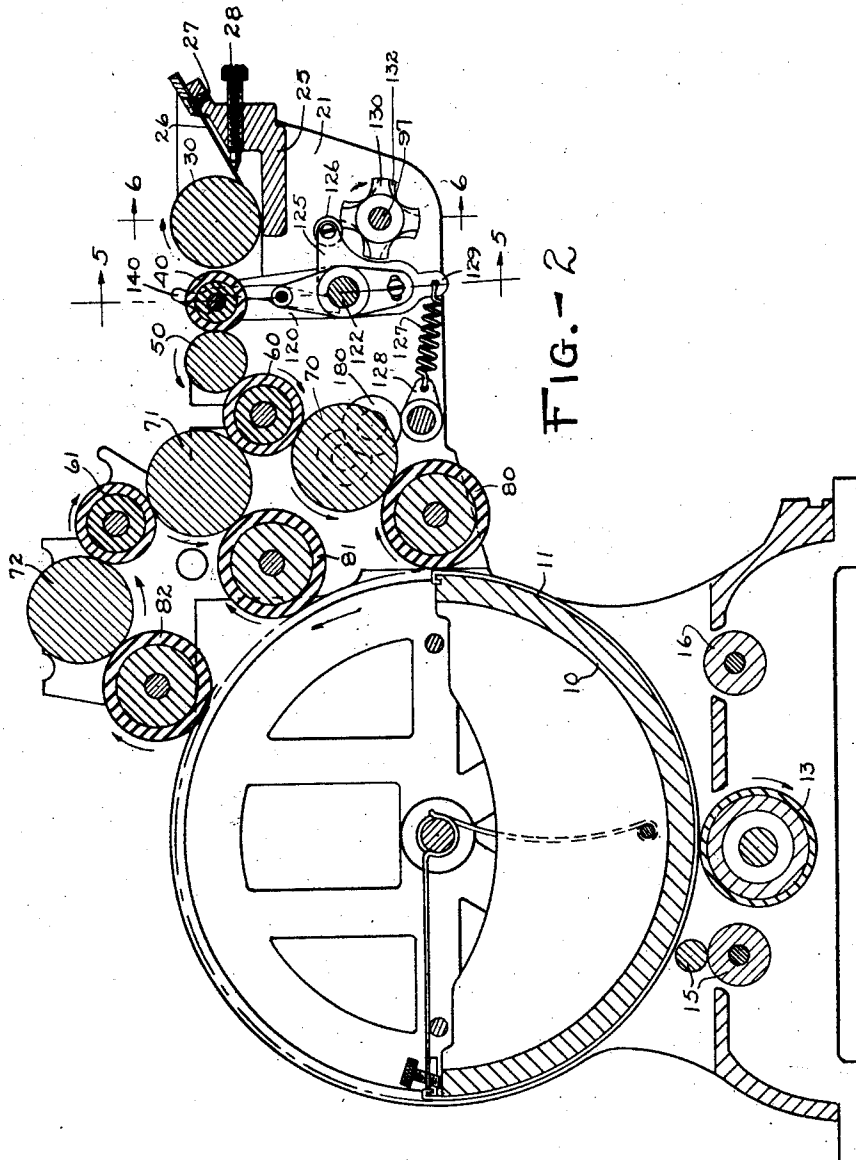


FIG. 2

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5 Sheets-Sheet 3

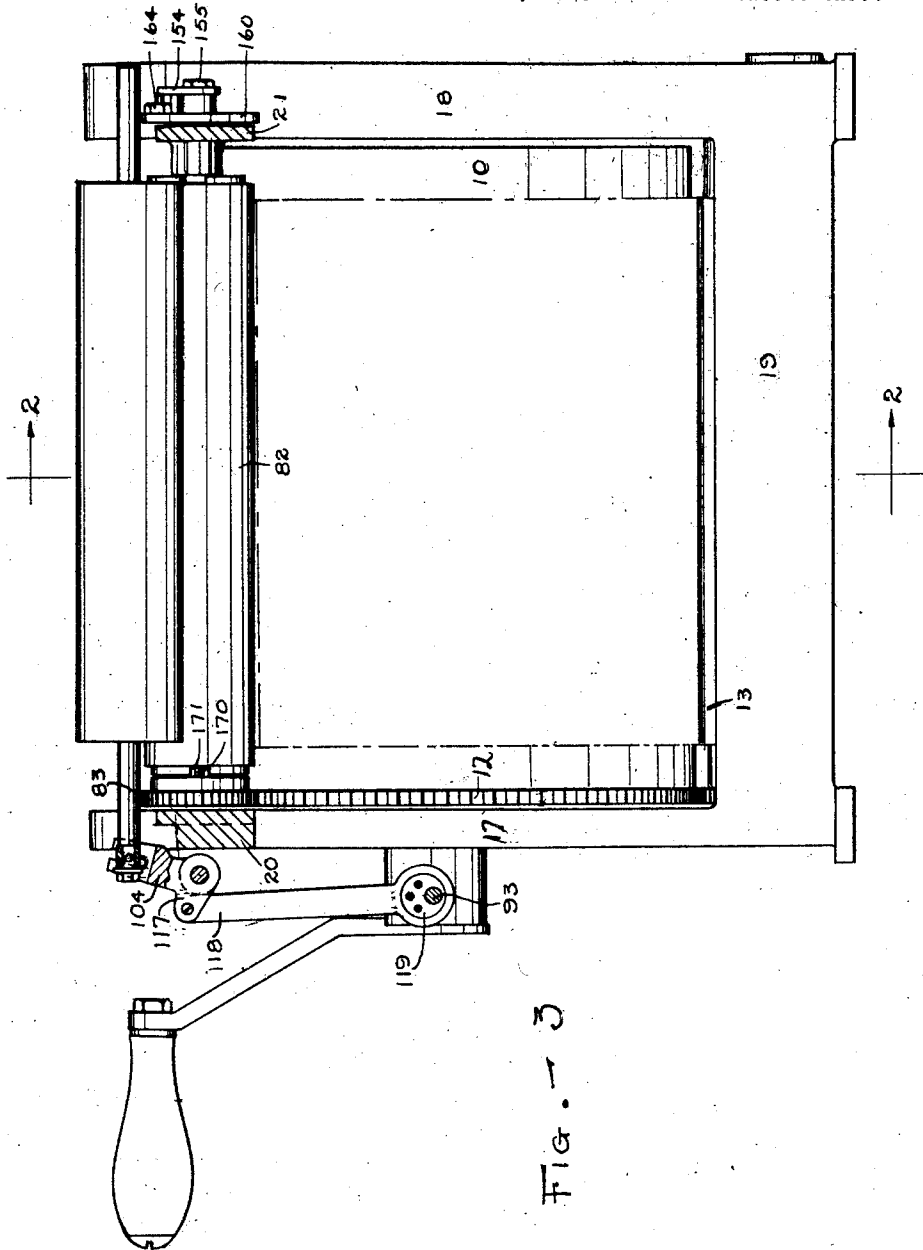


Fig. 1

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5 Sheets-Sheet 4

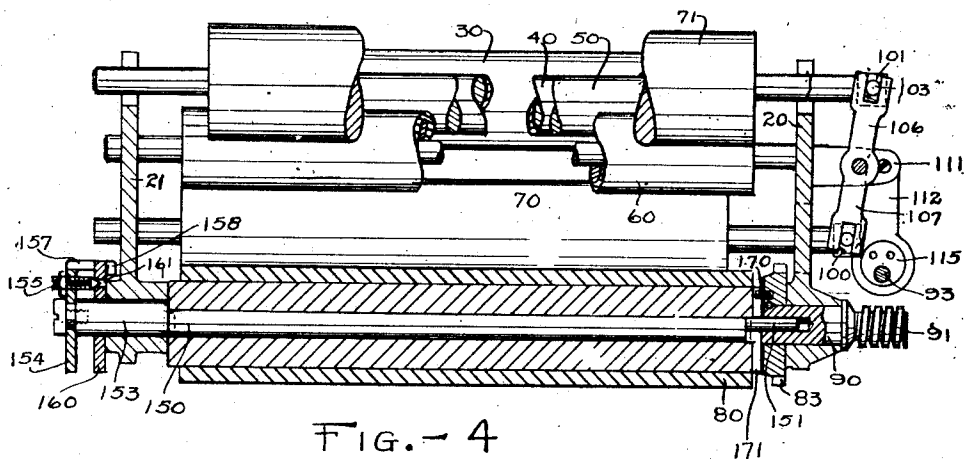


FIG.-4

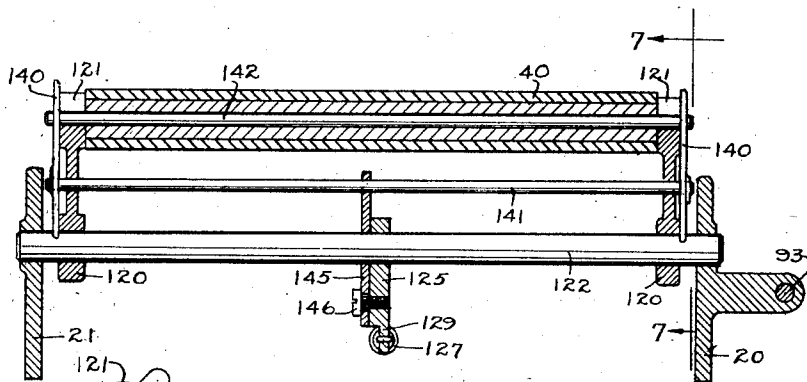


FIG.-5

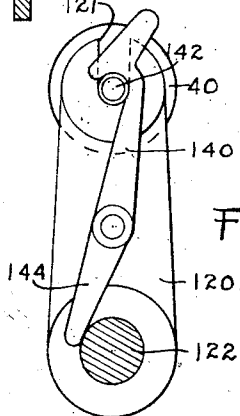


FIG.-7

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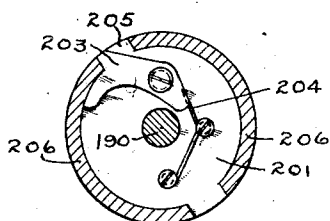
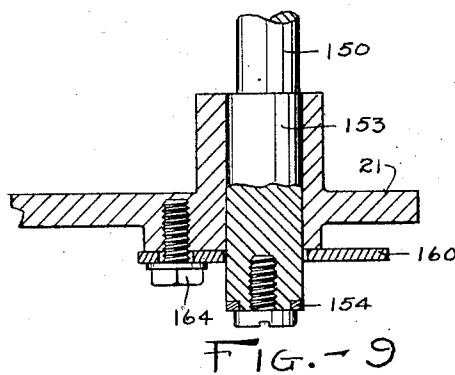
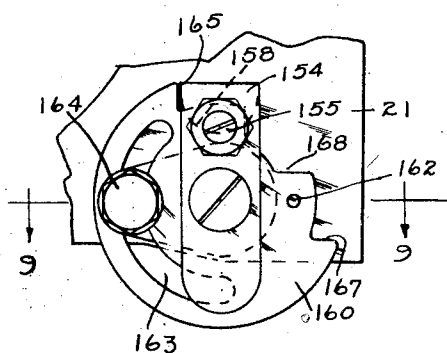
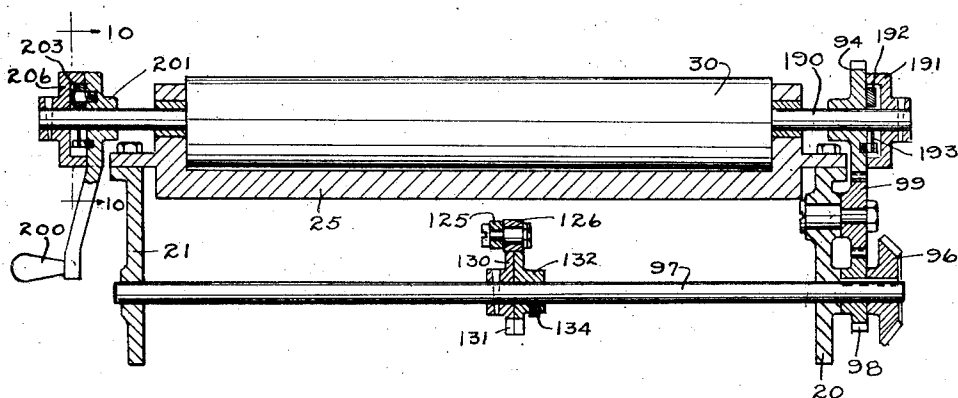
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INKING ATTACHMENT FOR PRINTING MACHINES

Filed Nov. 5, 1926

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE.

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INKING ATTACHMENT FOR PRINTING MACHINES.

Application filed November 5, 1926. Serial No. 146,338.

This invention relates to an inking attachment adapted to deliver ink directly to a plate or form on a rotary printing machine. The object of the invention is to provide an inking device which will deliver a sufficient quantity of ink very evenly distributed and which shall be readily adjustable for various conditions of use. Experience has demonstrated that my inking attachment delivers the ink so completely and smoothly that by means of it good half tone work can be done on a small office printing machine, such as the multigraph. My invention is hereinafter more fully described in connection with the drawings, and the particular features contributing to the desired result explained in connection therewith.

In the drawings Fig. 1 is an end elevation of my inking attachment mounted on a multigraph; Fig. 2 is a vertical section of the same in a plane parallel with Fig. 1; Fig. 3 is a rear elevation of the multigraph and a vertical section through a portion of the inking attachment in a plane indicated by the line 3—3 on Fig. 1; Fig. 4 is a vertical section through the inking attachment, the section being taken on an offset plane indicated by the line 4—4 on Fig. 1; Fig. 5 is a vertical section along the axis of the ductor roll; Fig. 6 is a vertical section along the axis of the fountain roll, the planes of these views being indicated by correspondingly numbered lines on Fig. 1; Fig. 7 is an elevation, on a larger scale, of the ductor roll latch in a plane parallel with Fig. 1; Fig. 8 is a detail illustrating the adjusting device at the end of a form roll, the mechanism being the same for each of the three form rolls shown; Fig. 9 is a horizontal section of this adjustment, as indicated by the line 9—9 on Fig. 8; Fig. 10 is a detail illustrating one of the clutches employed on the fountain roll, being a vertical section on the line 10—10 on Fig. 6.

Figs. 1, 2 and 3 illustrate a multigraph office printing machine comprising a rotary drum 10 carrying a suitable printing surface indicated conventionally at 11. This drum has at one end an annular gear 12 which meshes with a gear on a roller platen 13. Suitable paper feed rolls 15 and usually employed in front of the platen and an ejector roll 16 at the rear. This whole construction is mounted between suitable end frame

plates 17 and 18 held together by a base portion 19.

My inking attachment is designed to be carried at the rear of the upper portion of the multigraph, being mounted directly on the multigraph end plates 17 and 18. To this end the frame of the inking attachment comprises side plates, 20 and 21 braced by suitable cross rods and a cross web 25, and adapted to be secured to the multigraph plates 17 and 18. Each of the form rolls of the inking attachment, as hereinafter described, has a gear meshing with the gear 12 of the multigraph drum.

Referring now more particularly to my Fig. 2, an inking fountain is provided in the form of a fountain roll 30 which is journaled on a fixed axis between the end plates 20 and 21, and a flexible scraper plate 26 mounted (by means of screws 27) on the cross web 25 and having its free edge adjustably pressed against the roll by a row of set screws 28.

Directly in front of the fountain roll is the shiftable ductor roll 40 and in front of it is a transfer roll 50 on a normally stationary axis. This transfer roll coacts with another transfer roll 60, also on a normally stationary axis, the transfer roll 60 coacting with two longitudinally shiftable distributor rolls 70 and 71. The distributor roll 71 coacts also with a transfer roll 61 on a normally stationary axis, and the latter roll with a longitudinally shiftable distributor roll 72. The distributor rolls 70, 71 and 72 contact respectively with the form rolls 80, 81 and 82, which rolls lie against the form.

As indicated in Fig. 2 the fountain roll, transfer roll 50 and the distributor rolls are preferably of steel, whereas the ductor roll, transfer rolls 60 and 61, and form rolls have yielding surfaces, as for example, printing roll composition.

As heretofore mentioned, each form roll is geared with the printing drum. Thus the ends of the form roll 80, 81 and 82 have coupled to them respectively gears 83, 84 and 85 as indicated in Figs. 1 and 3. There is a shiftable coupling hereinafter described between each gear and corresponding roll, so that the latter may be readily adjusted while preserving the mesh of the gears with the drum gear.

The gear 83 is rigid on a short shaft 90 Fig. 4, which on its projecting portion car-

ries a worm 91. This worm meshes with a worm wheel 92, Fig. 1, on a horizontal shaft 93 mounted in bearings secured to the side of the frame plate 21. On the far end of this shaft 93 is a bevel pinion 95 which is shown as meshing with a bevel gear 96 on a shaft 97 journaled in the plates 20 and 21. On this shaft 97 is a spur gear 98 meshing with an idler 99 which meshes with a gear 94 on the shaft of the fountain roll 30.

It will be seen from the above description that the three form rolls and the fountain roll are positively rotated by the rotation of the drum. The other rolls of the inking attachment receive their rotations by contact with some of these rolls or with each other.

To shift the distributor rolls longitudinally, I mount their shafts slidably at one end and at the other end in a bearing block which has trunnions pivoted in a swinging arm. Thus the roll 72 is journaled in the block 102 which has trunnions 103 in the arm 104, pivoted at 105. Similarly the shaft of the roll 71 has a bearing block 101, the trunnions of which are mounted in the arm 106. The shaft of the roll 70 has a bearing block 100 journaled in a downwardly extending arm 107. The two arms 106 and 107 are preferably portions of the same lever rigidly mounted on a rock shaft 110. On this shaft is a rock arm 111 (Fig. 4) to which is connected an eccentric strap 112 extending around an eccentric 115 on the shaft 93. Likewise the arm 104 which carries the distributor roll 72 has a bell crank arm 117 to which is connected an eccentric strap 118 from an eccentric 119 on the end portion of the shaft 93.

It results from the described mechanism that when the multigraph is in motion, the shaft 93 is slowly revolved by its worm drive and acts to rock the arms 104, 106 and 107, and thereby axially shift the corresponding distributor rolls, the rolls 70 and 71 moving in opposite directions.

To move the ductor roll back and forth between the fountain roll and the transfer roll 50, I mount this ductor roll in the upper end of a pair of arms 120 and 121 (Figs. 2 and 5) which are mounted on a rock shaft 122, journaled in the frame plates of the inking attachment. Rigidly held (though adjustable) on this rock shaft is an arm 125 which carries a roller 126 coacting with an adjustable cam 130 (hereinafter specifically described) on the rotating shaft 97. This cam has periodic engagement with the roller 126, and thus operates to rock the ductor roll back and forth between the fountain roll and the transfer roll. The roller is pressed toward the cam by the spring 127, anchored at one end to a stationary support 128 and at the other end to a downward extension 129 of the arm 125.

The adjustable cam 130 above referred to is shown in Figs. 2 and 6. It comprises a multi-lobed member 131 pinned to the shaft and a similar member 132 loose on the shaft and adjustably clamped to it by a set screw 134. By loosening this screw, the member 132 may be swung axially, thus increasing or reducing the effective cam arm provided by the two members. I have shown each member having four lobes, which gives reciprocation of the ductor roll at the desired speed.

To enable the ductor roll to be readily removed for cleaning, I mount it in slots in the upper end of the rock arms 120 and 121, and to hold it in place I provide hooks 140, Figs. 5 and 7, which are pivoted on a rod 141 mounted in the arms 120 and 121 and overhang the end portions of the shaft 142 on which the ductor roll is rigidly mounted. The hooks 140 may have tail portions 144 bearing against the shaft 122 and limiting the movement in that direction. They are preferably made of spring metal and to free the ductor roll they are simply swung backwardly with sufficient force to spring them off of the ductor roll shaft.

To enable proper adjustment of the ductor roll between the fountain roll and transfer roll, I make the arm 125 which carries the cam roller 126 adjustable on the rock shaft 122. This is conveniently effected by making this arm loose on the rock shaft and adjustably securing it to a plate 145 (Fig. 5) mounted on the rock shaft 122 and the rod 141 and thus rigid with reference to the two arms 120 and 121. I have shown a clamping screw 146 passing through a slot in the plate 145 and threaded into the arm 125.

As heretofore mentioned, each form roll is mounted on an adjustable axis so that it may be properly presented to the printing surface. The construction is substantially the same at each form roll and therefore it is believed to be sufficiently illustrated by Figs. 3 and 4. As shown in Fig. 4, the form roll 80 is loose on the shaft 150 which at one end has an eccentric extension 151 journaled axially in the shaft 90, which carries the gear 83, and at the other end has an eccentric extension 153 journaled in the frame plate 21. Rigidly secured to the outer end of the shaft extension 153 is an arm 154 by which the shaft may be turned manually to adjust the presentation of the roller to the form.

Normally the arm 154 is locked in place by a set screw 155, the pointed inner end of which engages an opening as 161 Fig. 4, in a keeper plate 160. This plate is normally stationary, but is adjustable about the axis of the shaft extension 153. It is provided with an arcuate slot 163 (Fig. 8) through which extends a clamping screw 164 threaded into the frame plate 21. The plate 160 has also a shoulder 165 adapted

to about the overhanging tongue 157 of the arm 154. By loosening the set screw 164, the roll shaft, the arm 154 and the clamping plate 160 may be turned axially as a unit to shift the form roll axis. When in the desired position, such adjustment may be locked by turning in the set screw 164.

It is sometimes desirable to throw the form roll back from the form without losing its adjustment with reference thereto. The mechanism being described provides for this. To effect such operation, the keeper plate 160 is left tight, but the set screw 155 is loosened whereupon the arm 154 and the shaft may be given a quarter turn to carry the roll away from the form. Such quarter turn brings the flange 157 of the arm into engagement with another shoulder 167 (Fig. 8) on the keeper plate. The form roll may be locked in this position by turning the set screw 155 into a depression 162 in the keeper plate.

As the eccentric adjustment above described causes the axis of the form roll to shift with reference to the axis of the driving gear, a suitable coupling is provided between the gear and roll. As shown in Figs. 3 and 4, the gear is provided with a pin 170 which occupies a slot 171 in the end of a roll, although if desired, a standard Oldham coupling may be provided between these parts.

It will be noticed that the inwardly projecting flange 157 on the form roll arm 154 has a downturned lip 158 at its inner end. In the normal position of the parts as illustrated in Fig. 8, this lip lies behind the keeper plate 160, and thus retains the shaft against longitudinal shifting. Similarly, when the shaft is swung to the extreme idle position, this lip again comes behind the keeper plate back of the opening 162 and retains the shaft. However, when it is desired to remove the shaft, it is only necessary to loosen the set screw 155 and turn the shaft so that the lip 158 is opposite a recess 168 in the keeper plate, then the shaft is free to be drawn lengthwise out of the roller.

All of the composition rolls of the inking device are readily removed for purposes of cleaning and for storage. At this end the ductor roll is mounted in slots and may be lifted off as soon as the hooks 140 are swung backwardly. The transfer roll 50 and the distributor roll 72 are likewise supported in slots and may be lifted off. The removal of the roll 72 frees the roll 61 so that it may be lifted off, and this frees the roll 71, leaving the roller 60 free to be lifted from the machine. When the shafts are removed from the form rolls 81 and 82, they will be lifted out upwardly while when the shaft is removed from the roll 80, it may be removed downwardly.

To enable the removal of the transfer

roller 70, I provide large openings as shown in dotted lines in Figs. 2 and 4 around the shaft in the respective frame plates. The weight of the roller is taken by the form roll 80. The box 100 prevents its lateral shifting at that end and at the opposite end I provide a roller 180 journalled on the shank of a screw secured to the plate 21. If desired a similar roll may be employed mounted on the frame plate 21 and engaging the shaft of the roller 70 near the other end. After the form roll 80 has been removed, the box 100 drops free of the arm 107 and then the roller 70 may be shifted endwise until the roller shaft is entirely withdrawn from the opening in the plate 20, allowing that end to drop, when the whole roller may be drawn out sufficient for the box to pass through the opening in the plate 21, thus freeing the roller from the frame.

In my inking mechanism, I obtain at the start the desired amount of ink on the fountain roll by the adjusting screws 28. I obtain the transfer of the desired amount to the transfer roller 50 by varying the cam 130 and the position of the roller 126, and I thus deliver to the composition roller 60 just the proper amount of ink required for the particular form. Now, practically half of this ink passes from this transfer roll 60 to the distributor roll 70 and thence to the form roll 80 which first engages the form, while the remainder passes to the distributor roll 71. The ink is here again divided, a part passing to the form roll 81 and part via the transfer roll 61 and the distributor roll 72 to the form roll 82.

It will be seen that by this arrangement the first acting form roll 80 gives the form its primary inking with a considerable quantity of ink, while the subsequently acting form rolls give a less quantity. I find that by this arrangement the form may be very thoroughly inked without an excess of ink being supplied. Also, due to the various distributor rolls, the ink is applied to the form very smoothly. By properly adjusting the fountain roll, the ductor roll mechanism and each form roll with reference to the form by the various adjustments shown and described, I am enabled to obtain the accurate inking necessary for half tone work and for very fine impressions.

In order to enable the multigraph machine to be turned backward if desired without turning the fountain roll, I prefer to drive such roll through a friction clutch. As shown particularly in Fig. 6 the gear 94 is loose on the shaft 190 of the fountain roll but has a ratchet connection with a cup shaped collar 191 pinned to the shaft, the gear carrying a pawl 192 which is pressed into a notch in the flange of the collar by a spring 193. The pawl however, has a bevelled nose so that on backward turning, it

simply cams itself inwardly out of engagement with the notch.

The construction above described is illustrated in vertical section in Fig. 6. The various parts are similar to a corresponding clutch on the other end of the fountain roll shaft, shown more fully in Fig. 10. This latter clutch is to enable a hand crank 200 to turn the fountain roll in the feeding direction to work up the ink by hand. This crank has its hub 201 loose on the shaft 190. This hub carries the pawl 203 which is pressed by a spring 204 to give it a tendency to pass into a notch 205 in the flange of a collar 206 pinned to the shaft. Thus the crank may drive the fountain roll whenever desired. On the other hand, when the fountain roll is driven by the gear 190, the collar flange engages the inclined back of the pawl and cams it inwardly to clear the notch, so that the collar and shaft rotate independently of the crank.

I claim:

1. The combination with a rotary printing drum, of several form rolls adapted to coact therewith and a corresponding number of distributor rolls coacting with said form rolls respectively, a fountain roll, mechanism for transferring ink therefrom jointly to two of said distributor rolls, and means for transferring ink from one of said distributor rolls to another of said distributor rolls.

2. The combination of a rotary printing drum, at least three form rolls coacting therewith, a corresponding number of distributor rolls coacting with the form rolls, two transfer rolls, one engaging with the first and second distributor rolls, and the other with the second and third distributor rolls, and means for supplying ink to one of said transfer rolls.

3. In an inking attachment, the combination of a roll on a removable eccentrically mounted shaft, an arm for turning the shaft, an adjustable keeper plate having a plurality of shoulders, and means on the arm adapted to coact with the different should-

ders, and means for holding the roll in its bearings when the arm is in an active position but allowing it to be removed when the arm is in another position.

4. In an inking attachment, the combination of a roll mounted on a removable shaft, said shaft being eccentrically mounted, an arm on the shaft, a keeper carried by the frame, said arm having a portion which normally overhangs the inner face of the keeper to retain the shaft in position, the keeper being recessed at one portion whereby when the arm is in registration with such recess the shaft can be withdrawn.

5. The combination with a roll, of a shaft carrying the same, an arm on said shaft, an adjustable keeper plate, a detent between the arm and keeper plate to hold the arm in either of the extreme positions, the extreme end of the arm having a lip overhanging the inner portion of the keeper plate and the keeper plate being recessed intermediately enabling the removal of the arm and shaft when they are in an intermediate position.

6. The combination of a rotary printing drum, means for inking the same including a rotary fountain roll, a shaft for the fountain roll projecting in each direction, a gear loose on one end of said shaft, a member keyed to the shaft, a ratchet connection between said members, a crank loose on the other end of the shaft, a member keyed to the shaft adjacent the crank, and ratchet connection between the latter member and crank.

7. In an inking attachment for a printing machine, the combination of a fountain roll, gearing for driving it comprising a gear on the fountain roll shaft, a cooperating cup on said shaft facing the gear and having a notch in its flange, and a pawl carried by the gear within the cup and spring pressed outwardly into cooperation with its flange and adapted to enter the notch.

In testimony whereof, I hereunto affix my signature.

LAWRENCE H. MORSE.