Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 1

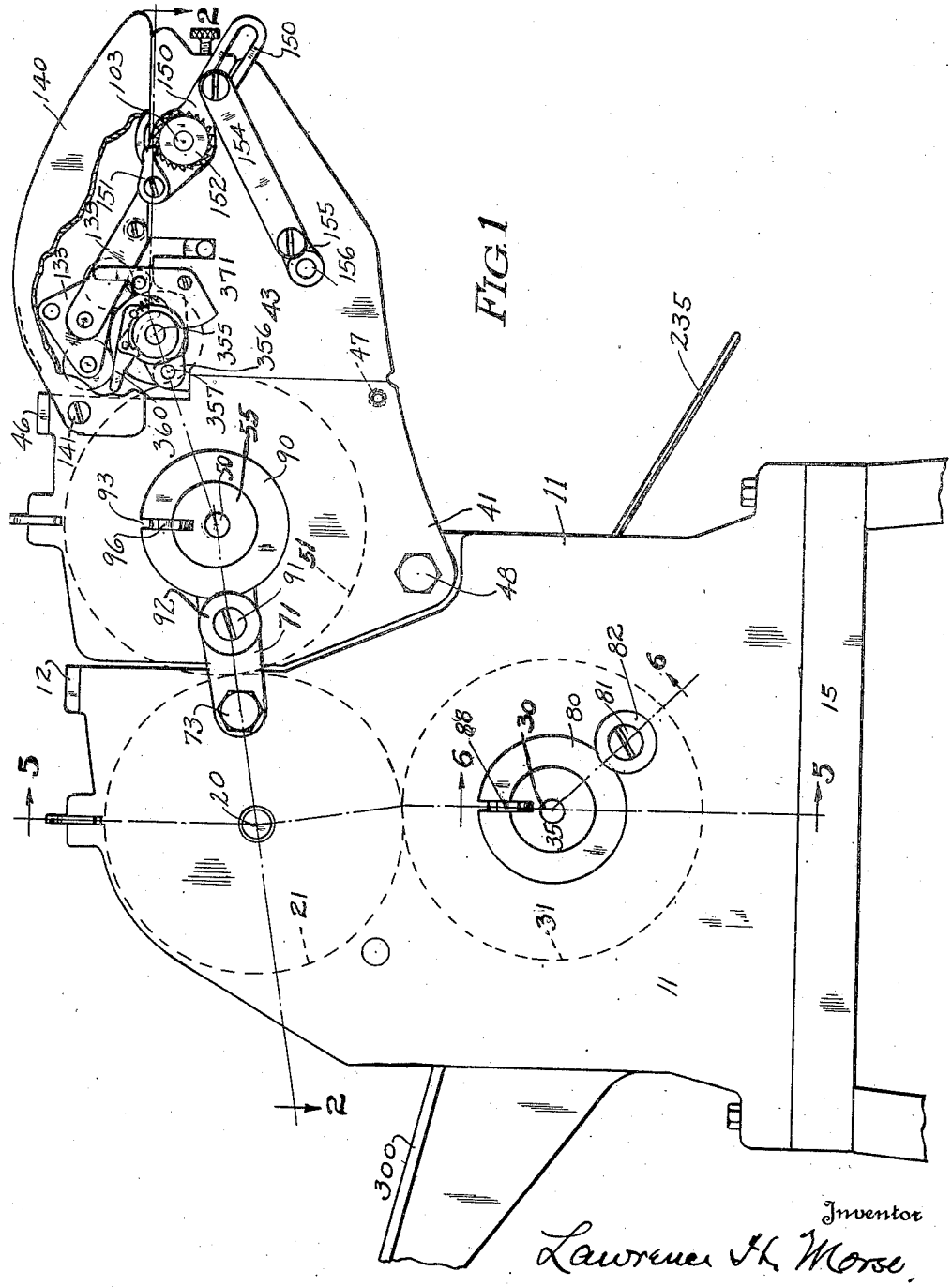


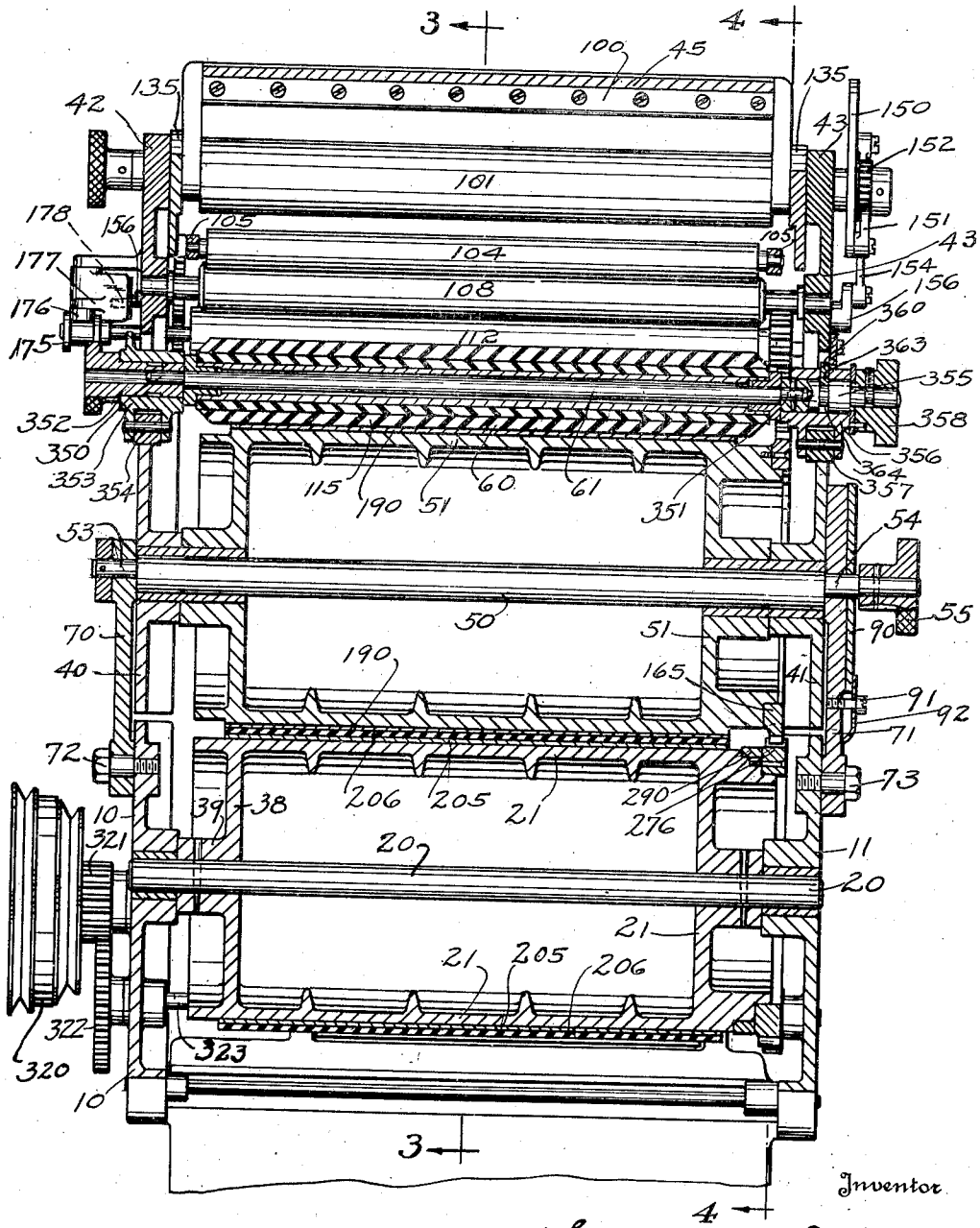
FIG. 1

Inventor
Lawrence H. Morse,
By Dabo, Golrick & Tear
Attorneys.

Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 2



Inventor

FIG. 2

Lawrence H. Morse,

By Bair-Golnick & Tear

Attorneys

Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 3

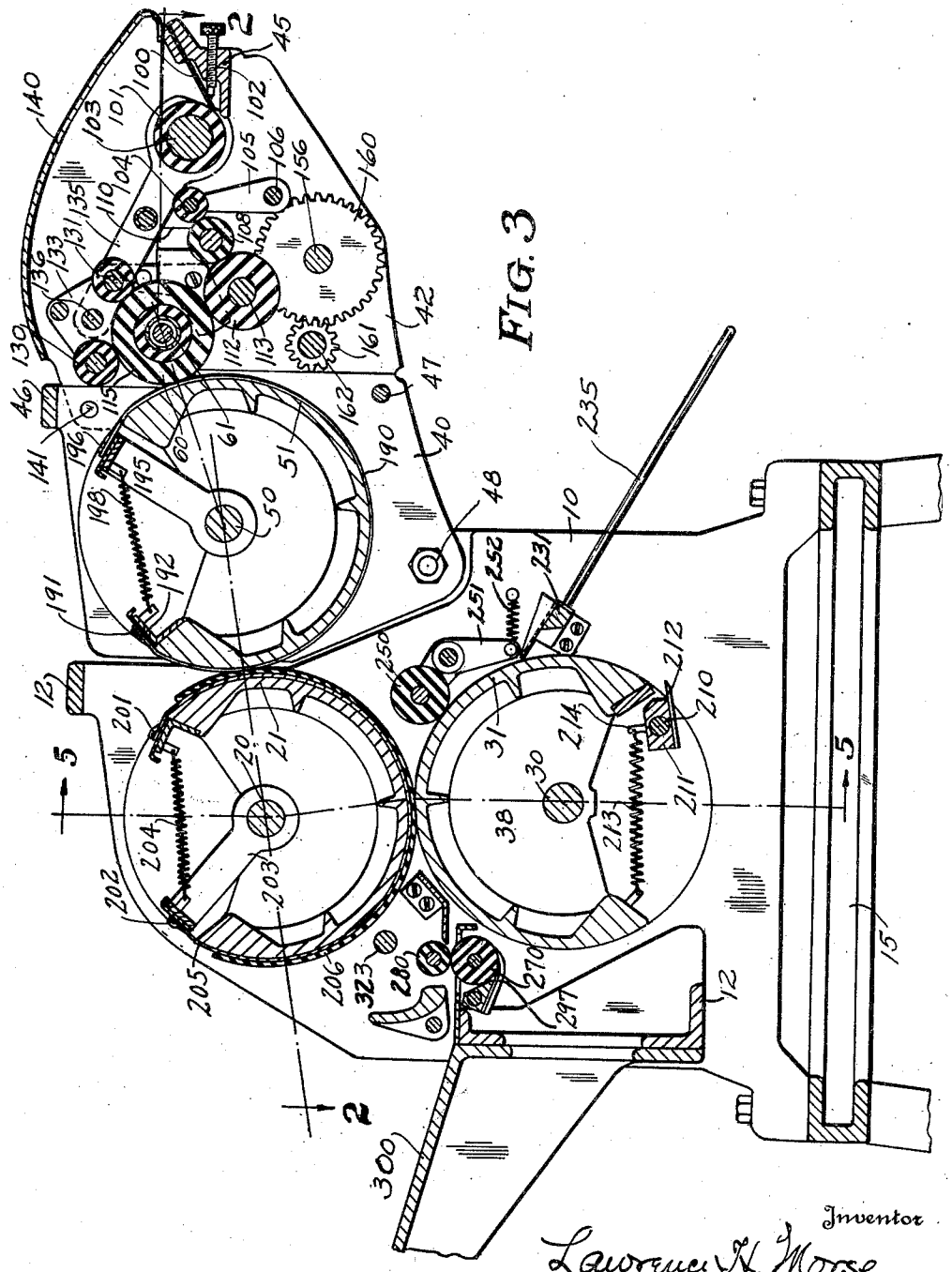


FIG. 3

Inventor

Lawrence H. Morse

By Davis, Golnick & Tear

Attorneys

Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 4

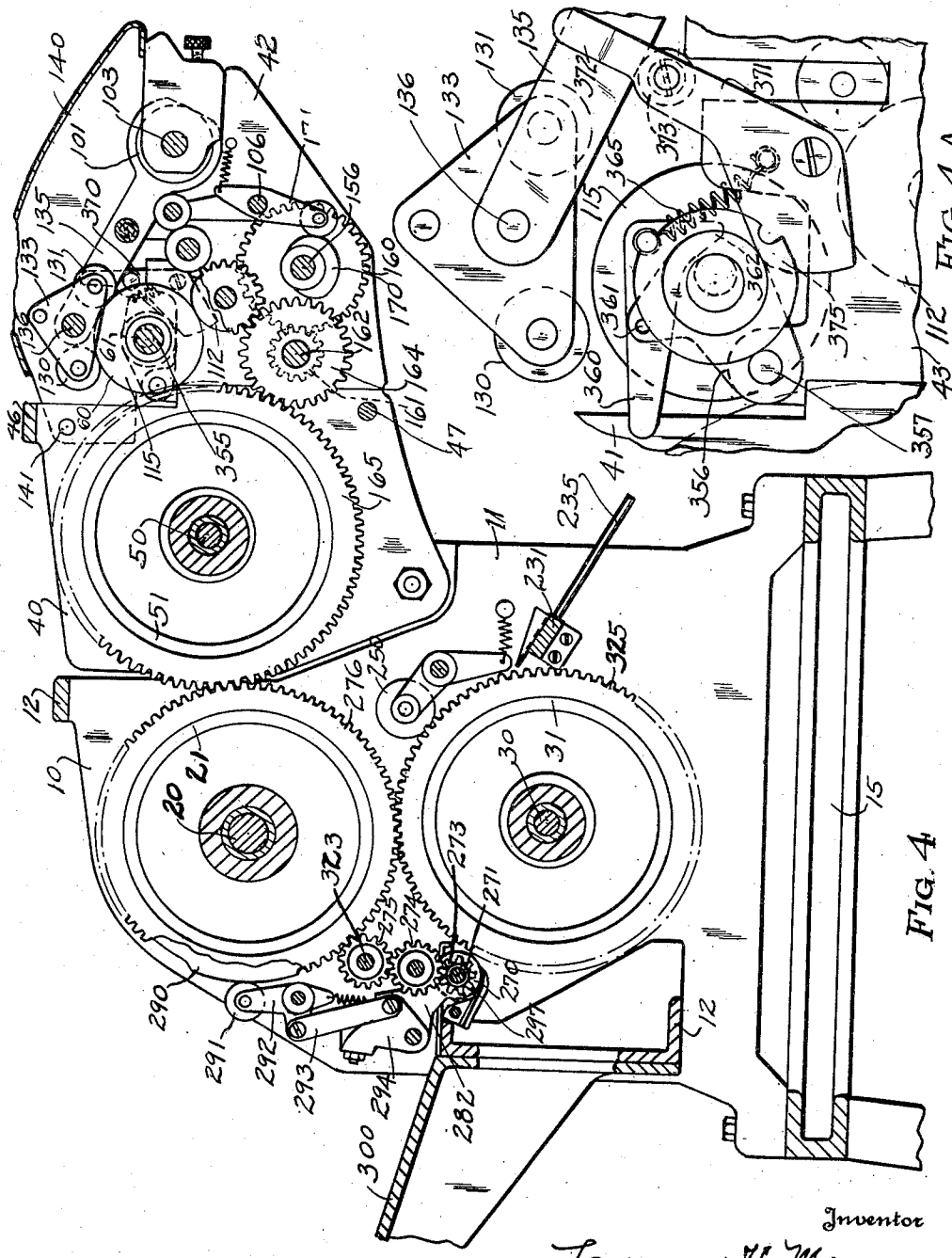


FIG. 4-A

FIG. 4

Inventor

Lawrence H. Morse

By Baker, Golrick & Tears

Attorneys.

Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 5

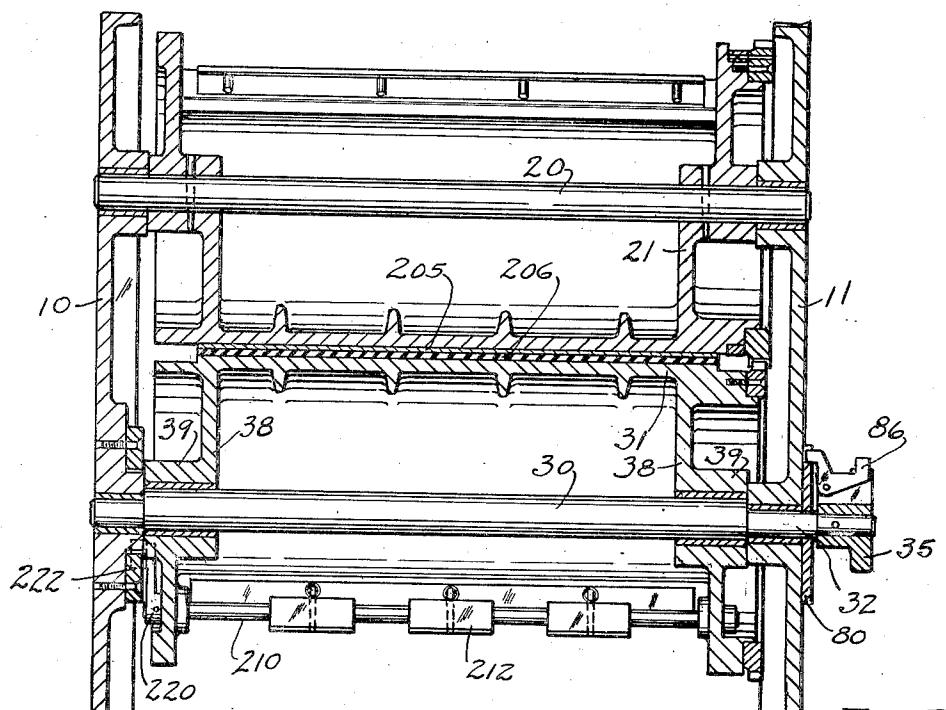


FIG. 5

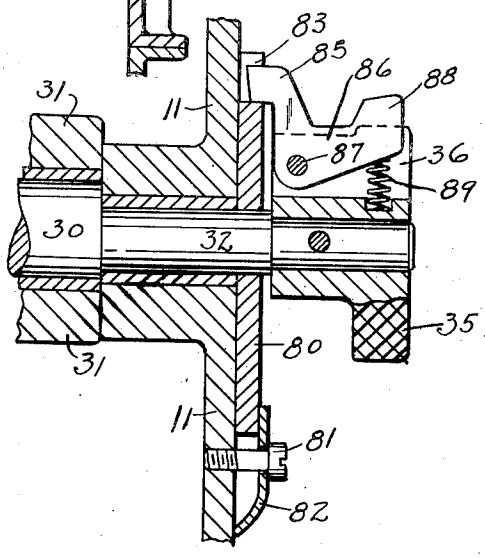


FIG. 6

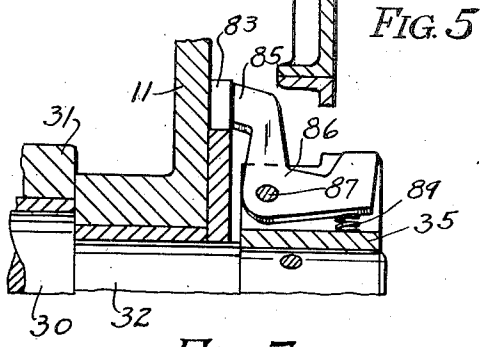


FIG. 7

Inventor
Lawrence H. Morse,
By Davis, Golrick & Tear
Attorneys.

Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 6

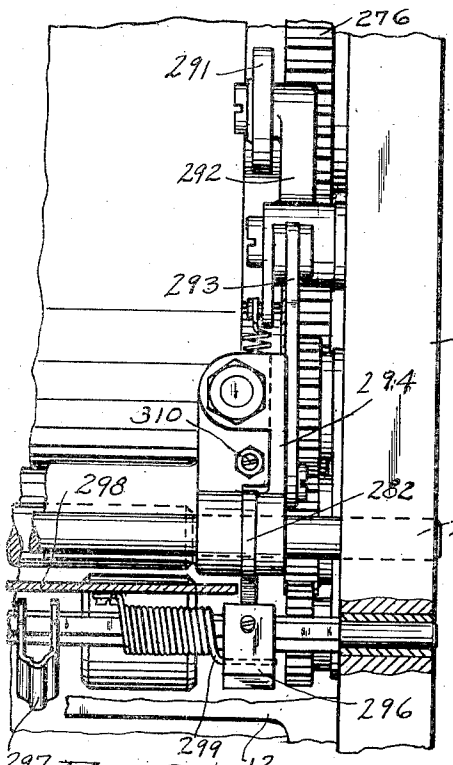


FIG. 9

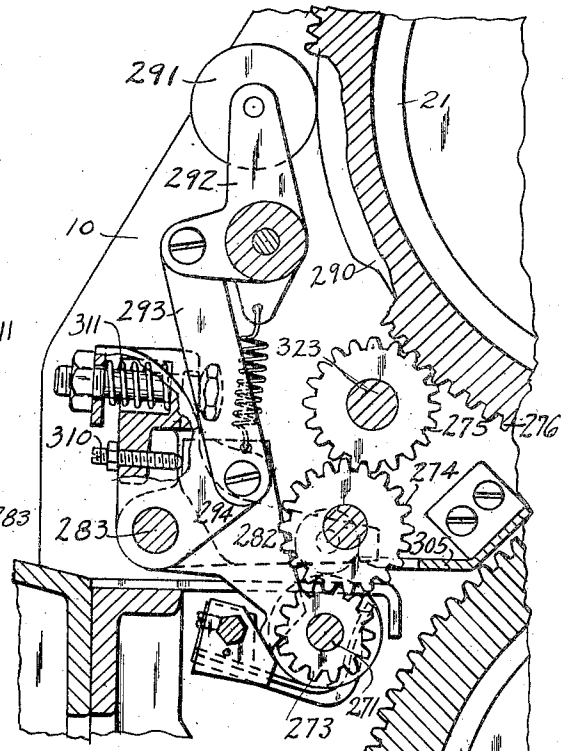


FIG. 8

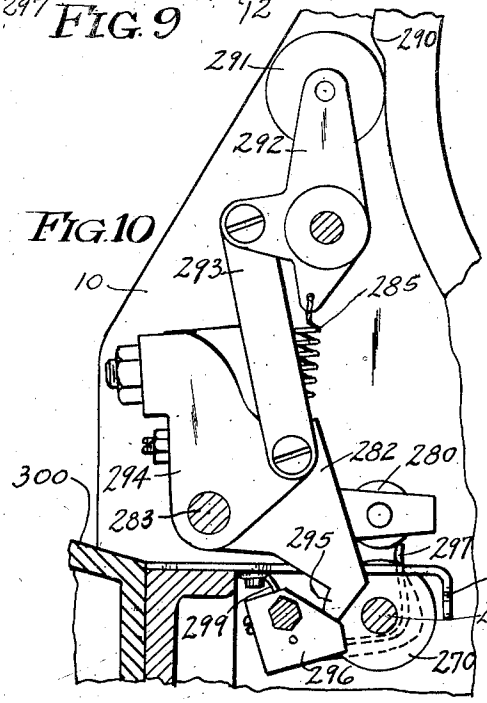


FIG. 10

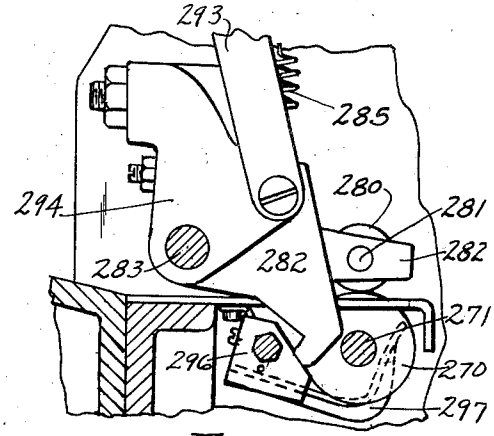


FIG. 11

Inventor

Lawrence H. Morse,

By Bakewell, Gobrick & Kear,

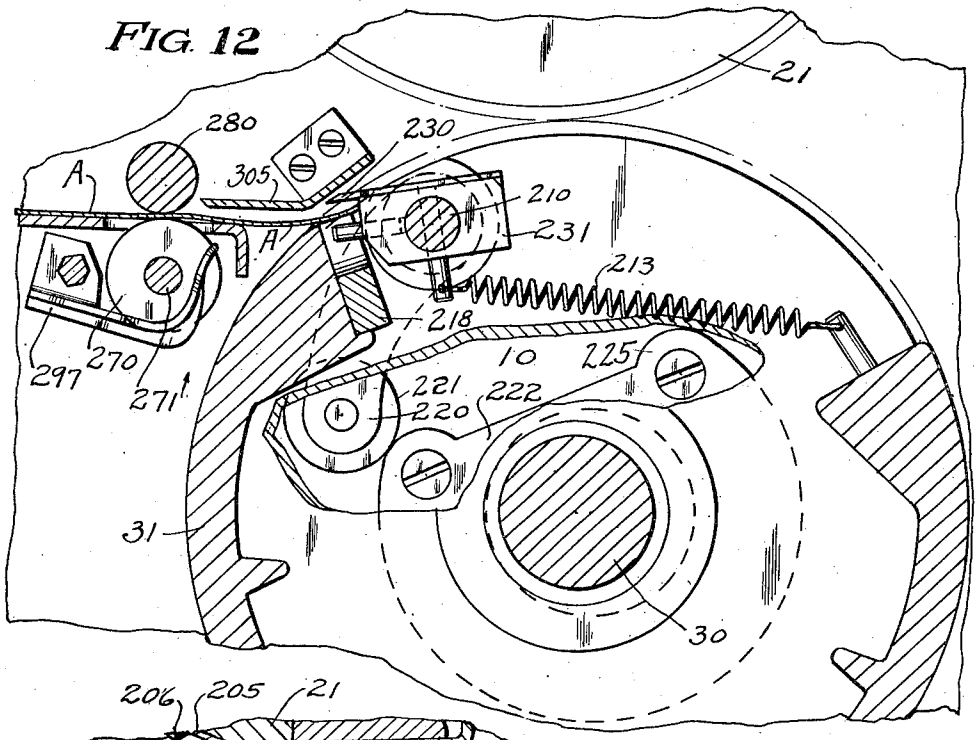
Attorneys.

Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 7

FIG. 12



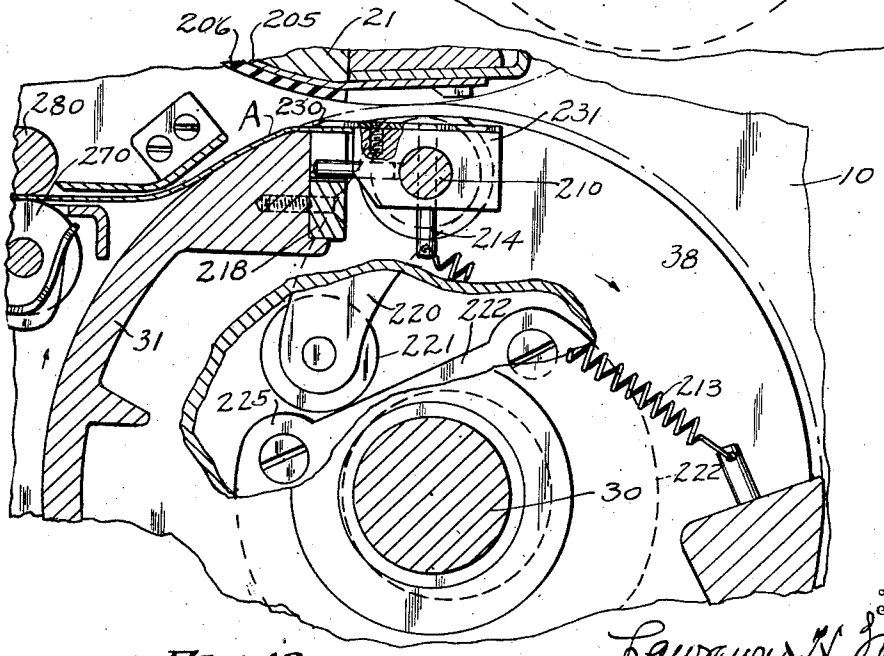


FIG. 13

Inventor
Lawrence H. Morse,
By Bates, Golrick & Tear,
Attorneys.

Aug. 7, 1934. L. H. MORSE 1,968,849

PRINTING MACHINE

Filed Oct. 16, 1931 8 Sheets-Sheet 8

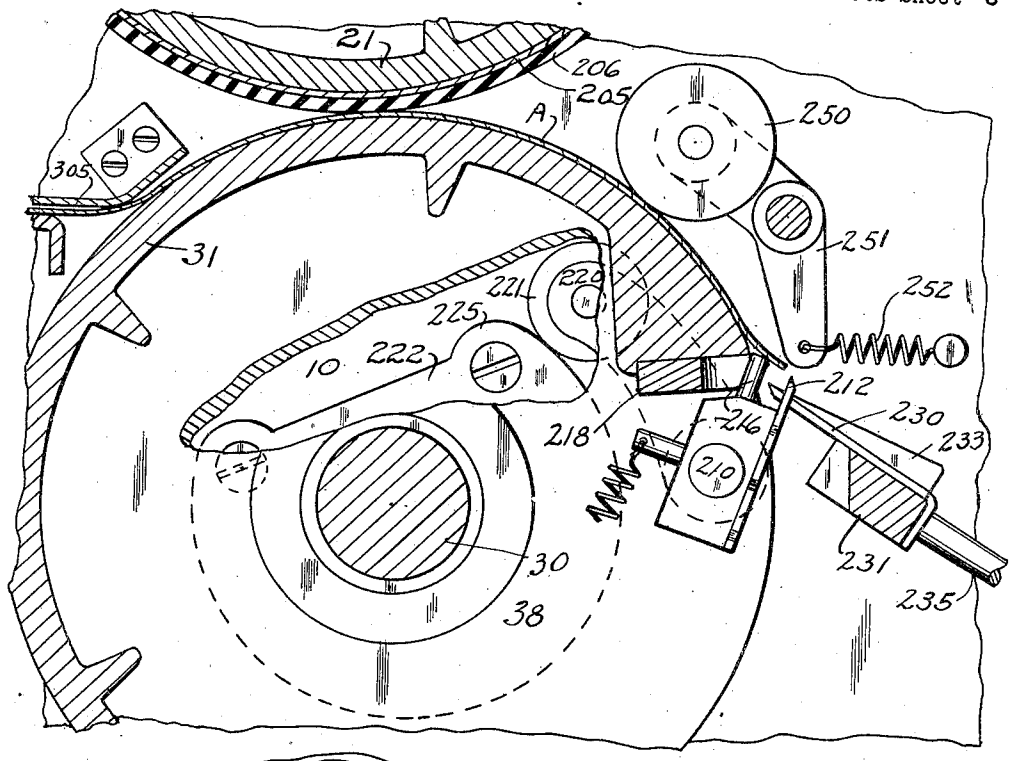


FIG. 14

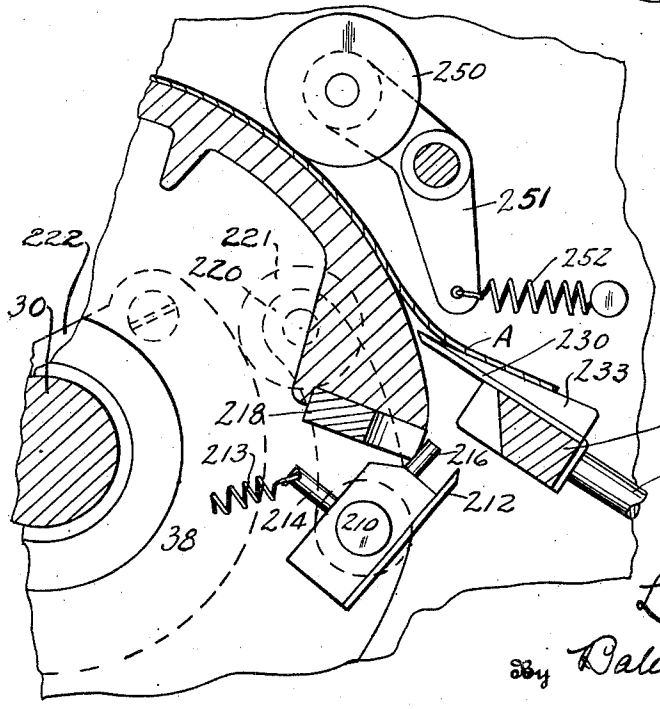


FIG. 15

Inventor
Lawrence H. Morse,
By Dallo, Golnick & Tear
Attorneys

Patented Aug. 7, 1934 1,968,849

UNITED STATES PATENT OFFICE

1,968,849

PRINTING MACHINE

Lawrence H. Morse, Cleveland, Ohio, assignor to Multigraph Company, Wilmington, Del., a corporation of Delaware

Application October 16, 1931, Serial No. 569,289

7 Claims. (Cl. 101—144)

This invention relates to a rotary planographic printing press of the offset type, and is especially concerned with a press of small size and simple construction suitable for office use. The general object of the invention is to so devise such a press that it shall be efficient in operation and, at the same time, so simple in its manipulation that it may be readily handled by those not especially skilled in the planographic art.

My machine, though not confined to the performance of any particular process, is well adapted for carrying out a dry planographic process, where the plate is given a chemical treatment to make its non-image areas receptive to an ink repellent, and the ink carries such repellent incorporated in it, but in operation continually transferred to the plate cylinder.

An important feature of the machine of this invention is the provision for the ready separation of the plate roller from the transfer roller without disturbing the relation of the plate roller to the inking system. Another feature of the invention relates to simple means for assuring proper distribution of the ink as it passes from the fountain to the plate roller. Another feature is concerned with the feeding of the paper and its proper gripping and discharging. Another feature relates to a very convenient form of manually operated knob which may be employed to adjust the platen, also to effect the separation of the plate and transfer rollers above mentioned.

My invention is hereinafter more fully described in connection with the drawings, which show an approved embodiment of the machine involving the different features above referred to.

In the drawings, Fig. 1 is a side elevation of my machine substantially complete; Fig. 2 is an approximately horizontal section thereof through the axes of the transfer roll and plate roll, as indicated by the line 2—2 on Fig. 1; Fig. 3 is a longitudinal vertical section, as indicated by the line 3—3 on Fig. 2; Fig. 4 is a longitudinal vertical section on a plane parallel to Fig. 3, being taken on the line 4—4 on Fig. 2; Fig. 4A is a fragmentary side elevation of the inking mechanism; Fig. 5 is a vertical section through the transfer roll and platen, as indicated by the line 5—5 on Fig. 1; Fig. 6 is a detail of the mechanism for shifting the platen, the section on the line 6—6 on Fig. 1; Fig. 7 is a view of parts of the construction shown in Fig. 1 with the lock in its idle position; Fig. 8 is a vertical section through the mechanism for feeding paper to the transfer roll and platen being substantially an enlargement of corresponding portion of Fig. 4, but showing many of the parts in section; Fig. 9 is an elevation of the paper feeding mechanism shown in Fig. 8; Figs. 10 and 11 are elevations parallel to Fig. 8 of certain parts shown in Fig. 8 into different positions; Figs. 12 to 15, inclusive, are vertical sections through the platen, illustrating various positions and activities of the paper gripper.

As shown in Figs. 1 to 5, inclusive, the main frame of my machine comprises a pair of vertical end plates 10 and 11 connected by suitable transverse frame members 12. This frame is mounted on any suitable support, as indicated at 15 in Figs. 1, 3 and 4.

Mounted in the vertical frame plates 10 and 11 are the shafts 20 and 30, which carry the transfer roller 21 and the platen roller 31, respectively. The transfer roller 21 is shown as pinned to the shaft 20, and the latter rotatably journalled in bearings in the frame plates. On the other hand, the platen is shown as rotatable upon the shaft 30 which has eccentric extensions 32 mounted in the frame plates so that, by turning that shaft on its axis, by means of a knob 35, the platen may be caused to approach or recede from the transfer cylinder. The means for locking such adjustment will be hereinafter described.

Mounted on the frame plates 10 and 11 is a supplemental frame carrying the plate cylinder and the inking system. This supplemental frame comprises end plates 40 and 41, extended by plates 42 and 43 rigidly secured to them, and the whole braced by a cross bar 45 near the outer end and intermediately braced by suitable rods, as 46 and 47. This supplemental frame is secured to the main frame pivotally by bolts 48 and by an adjustable linkage connection, to be presently described, which operates to hold the entire supplemental frame in its active position, as shown in Figs. 1 and 3, or allows it to be tipped back to withdraw the plate roller from contact with the transfer roller without changing the relation of the plate roller to the inking system.

The supplemental frame carries a shaft 50 on which is mounted the plate cylinder 51. The plate cylinder is journalled on the shaft, the shaft journalled in the supplemental frame, so that its axis is fixed with reference to the supplemental frame. The plate cylinder is inked by a suitable inking system, the final member of which includes a form roller 60 on a shaft 61 and likewise journalled in the supplemental frame.

Accordingly, the relation of the inking system and the plate cylinder may be maintained constant.

To adjust the whole supplemental frame with its plate cylinder and inking system toward and from the transfer cylinder, I provide a pair of links 70 and 71 pivoted at 72 and 73 to the frame members 10 and 11, respectively, and connected with eccentrics mounted in the supplemental frame. Accordingly, by turning these eccentrics the supplemental frame is swung toward and from the main frame.

To avoid the necessity of individual eccentric members operating the two links 70 and 71, I prefer to use a through-shaft having eccentric end portions and, in the interest of simplicity and directness, I avail myself of the shaft 50 on which the plate roller is mounted;—that is to say, I provide that shaft with eccentric extensions 53 and 54 beyond the supplemental frame, these extensions occupying openings in the links 70 and 71. Accordingly, the rotation of the shaft 50 does not change the relation of the plate cylinder to the supplemental frame, but does change the relation of the supplemental frame and all of the parts it carries to the transfer cylinder. A knob 55 on the outer portion of the extension 54 furnishes convenient means for turning the shaft.

To lock the shaft 50 of the plate cylinder in any selected position while enabling it to be readily turned therefrom to separate the plate cylinder, with its inking system, from the transfer cylinder, I provide a very simple mechanism readily operable by the hand of the operator grasping the knob 55. A similar construction is employed on the knob 35 of the platen shaft 30, which is best shown in Figs. 5, 6 and 7, and which will now be described.

Surrounding the eccentric extension 32 of the platen shaft alongside of the frame, is a disc 80, clamped in any set position by a screw 81 which passes into the frame through a washer 82 overlapping the disc. The disc has a peripheral notch 83 adapted to receive the nose 85 of a bell crank 86 pivoted at 87 in a radial notch 36 formed in a knob 35. The outer portion of the bell crank is extended, as shown at 88, so that it normally lies above the periphery of the knob, being retained in this position by a spring 89.

The bell crank locks the knob normally to the frame and, as the knob is pinned to the shaft, this locks the shaft. When the operator takes hold of the knob his fingers extend over the bell crank end 88 and press it inwardly into the position illustrated in Fig. 7,—thus withdrawing the nose from the notch 83 and unlocking the knob. Accordingly, by merely grasping the knob, the lock is freed and the shaft may be turned to idle position,—the nose 85 of the bell crank rubbing along or just clearing the outer face of the disc 80.

By adjusting the position of the disc 80, the normal approach of the platen to the transfer cylinder is properly selected to give the desired impression. Whenever it is desired to re-adjust this setting for a heavier or lighter impression, it is only necessary to loosen the screw 81 and turn the shaft by its knob without withdrawing the bell crank lock and this automatically sets the disc 80 in desired position, after which it is clamped by tightening the screw 81.

A similar mechanism to that described is employed for the knob 55. Thus, on the link 71, I form an enlarged disc-like head 75 (Fig. 2) and against this head I seat a disc 90 having a radial notch 93, the disc being held in place by the screw 91 passing through a washer 92 overlapping the disc. The bell crank 96, carried by the knob, already explained in connection with the platen knob, serves to lock the knob to the disc 90, and hence to the links 71, in any selected position.

The inking system is best shown in Figs. 1, 2, 3 and 4. It comprises an inking fountain made by a steel plate 100 carried by the cross bar 45 and a roller 101, which preferably has a substantially unyielding surface or may be of hard rubber. The plate is pressed toward the roller by a series of set screws 102 screwing through the cross bar 45. Adjacent the fountain roller 101 is a ductor roller 104 carried by a rock arm 105 on a rock shaft 106. This ductor roller swings between the fountain roller and a rotary non-shiftable roller 108. This roller may have its shaft loosely mounted in notches 110 in the frame plates so that the roller may be lifted out whenever desired.

The roller 108 coacts with a roller 112 mounted on a shaft 113 which is given a short longitudinal movement to distribute the ink to the form roller 115 with which the roller 112 contacts. The form roller 115 has its shaft 116 loosely occupying open notches in the frame plates.

Riding on the form roller 115 are a pair of idle distributing rolls 130 and 131 which rest by gravity on the form roll. The distributing rolls 130 and 131 are mounted in a cage 133 composed of a pair of end plates and suitable cross rods; and this cage is pivoted to a pair of links 135 by the shaft 136 which is carried by the end plates of the cage 133 equidistant from the rolls 130 and 131, hence the distributing rolls 130 and 131 bear with equal pressure on the form roller 115. The two links 135 are forked at their free ends about bosses on the shaft 103 and extend about the bosses for more than a semi-circumference, and hence are retained thereby, though movable thereon. This construction allows the cage 133 to float, with the two rolls 130 and 131 on top of the form roll 115, maintaining the ink thereon in proper condition. The whole inking system is normally enclosed by a cover 140 which is pivoted at 141 and may be swung up into approximately vertical position to uncover the inking system whenever desired.

When the machine is to stand idle, the cover 140 is tipped up into its open position, the roller cage 133 swung back into the opposite direction away from the form roll, and the form roll 115 is swung away from the roll 112. If desired, the roll 108 may be lifted out of the frame and conveniently stored. This leaves all of the remaining rolls, with the exception of the fountain roll, out of contact with anything and enables them to be readily cleaned when the operation again starts. The fountain roll is maintained in position as ink may remain in the fountain; but whenever desired, its shaft 103 may be drawn out and the fountain roll removed for the purposes of cleaning.

The form roll 115 is arranged so that it may be quickly moved out of contact with the pattern roll 51. As shown in Fig. 2, the form roll is rotatably mounted on the shaft 61, and is provided with eccentric extensions 350 and 351. The shaft extension 350 is journalled in a bushing 352, carried by a link 353, which is pivoted into the frame pipe 40 at 354. The shaft extension 351 is secured to a stub shaft 355, rotatably carried by a link 356, which is pivoted to the frame plate

41, as at 357. The stub shaft 355 extends beyond a link 356 and has secured to its outermost end a knob 358, by means of which the shaft 61 may be rotated by the operator to move the roll to turn the eccentric, thereby moving the roll 115 towards or from the pattern roll.

The form roll 115 is readily removable from the machine by the withdrawal of the shaft 61, which is normally retained in place by a keeper 360. The keeper comprises a lever pivoted at 361 to the link 356, and is provided with a nose 362 arranged to be drawn through a slot 363 in the link 356 and into engagement with an annular recess 364 in the stub shaft 355, by a suitable tension spring 365. The spring is arranged to draw the roll 115 into contact with the roll 112, as well as to retain the keeper in an engaged position. One end of the spring is attached to the keeper and the other end is attached to the frame 41.

When the operator desires to stop the machine, it is highly desirable that the rolls 115, 130, 131 and 112 be separated from each other, and I therefore provide means whereby such separation is simultaneously accomplished by the operator. As shown in Figs. 4 and 4A, I pivot a pair of levers 370 and 371, on respective frame members 42 and 43.

When the machine is operating the position of these levers is that shown in Fig. 4. However, when the operator desires to separate the rolls, he grasps the upper ends 372 of these levers and draws them rearwardly, causing rollers 373, carried by the levers, to contact with the arms 135 which support the cage 133. The action is such that the arms 135 are rocked about their pivots, causing the cage to be raised. Shortly after the initial contact between the rollers 373 and the arms 135 is made, cam portions 375 of the levers 370 and 371 contact with respective links 353 and 356, which support the form roll. The action is such that the links 353 and 356 are rocked above their pivots, raising the form roll clear of the roll 112.

The operation is such that the arms 135 are raised first from the form roll and then the form roll and arms 135 are raised together at approximately the same speed, causing the separation of both the rolls 130 and 131 from the form roll, as well as the separation of the form roll from the roll 112.

When the levers 370 and 371 are in their rearmost positions, the rollers 373 contact with the frames 40 and 41, preventing further rearward movement. The position of the roller 373 is such that the action of the arms 135 thereon is such as will tend to rotate the levers in a clockwise position, retaining their respective rollers in contact with the frame members, until such time as they are manually thrown forward by the operator.

In operation, the fountain roll 101 is gradually fed by a ratchet mechanism shown in Fig. 1; thus, pivoted on the fountain roll shaft 103 is a lever 150 carrying a pawl 151 adapted to engage a ratchet 152 rigid on the shaft. Adjustably pivoted to the lever 150 is a link 154 connected to a crank 155 on a shaft 156. Each rotation of this shaft may thus feed the fountain roll a selected number of teeth corresponding to the adjustment of the pivot of the link 154 in the slot of the lever 150. The shaft 156 is provided with a gear 160 (Fig. 3) which meshes with a pinion 161 on a shaft 162. This shaft is shown as carrying a gear 164 (Fig. 4) meshing with a gear 165 on the plate cylinder, thus causing the fountain roller to operate in timed relation with the plate cylinder.

The ductor roller may be operated by a cam 170 on the shaft 156 engaging a roller on an arm 171 rigid with the rock arm 106 carrying the ductor roller arms. The distributing roller 112 may be reciprocated longitudinally by providing its shaft with a collar 175 (Fig. 2) occupied by a roller 176 on a bell crank 177 which is acted on by a crank or eccentric end 178 of the shaft 156. The form roller 115 may be driven by frictional contact with the roll 112 and the plate drum 51. Thus, all of the parts of the inking system are moved in unison with the plate cylinder.

The plate cylinder 51 may carry its plate 190 in any suitable manner. I have indicated the plate anchored at 191 to stationary pins carried in a cleat 192 on the edge of the roller segment, and I have shown a swinging frame 195 carrying pins 196 to engage openings in the other end of the plate, this frame being drawn toward the other set of pins by the tension springs 198.

The transfer cylinder, as shown in Figs. 3 and 5, may be formed with stationary pins 201 and movable pins 202 on an arm 203 drawn by a spring 204 similar to the plate cylinder. In this case, the pins engage openings in the base portion 205 of the rubber transfer blanket 206, this blanket being preferably a sheet of rubber mounted on a metal base which projects beyond its ends for attachment to the anchoring devices described.

The platen cylinder may be of the form shown in Figs. 3 and 12 to 15, inclusive. As appears in these figures, this cylinder has a segmental portion 31 extending for considerably over half a circumference and having end walls 38 with external hubs 39 bearing on the shaft 30. Mounted in the end walls is a longitudinal shaft 210 on which are pinned a series of blocks 211, each carrying a blade 212 to provide gripper fingers. Suitable springs 213 engage pins 214 projecting inwardly from the blocks and thus tend to swing them to cause the fingers to engage the paper. Each block has a pin 216 projecting from its end and adapted to move into a notch 217 in a strip 218 secured along the open edge of the segment, the base of the notches forming stops for the movement of the blocks. The blocks may be pinned to the shaft 210 by the same pins 214 to which the springs are anchored. The shaft 210 is journalled in the end plates 38 of the segment. Beyond one of the end plates, it carries a rock arm 220 (Fig. 13) carrying a roller 221 adapted to coact with a stationary cam 222 secured to the inner face of one of the frame plates 10. This cam rocks the shaft 210 and swings the fingers in opposition to the springs 213 to cause the grippers to act as about to be described.

Fig. 12 shows the position of the gripper fingers when the platen is positioned to receive the paper designated A,—this paper being shoved by the feeding mechanism (to be described) into the mouth of the grippers; that is, between the blades and the projecting pins. At this stage, the transfer roller is out of engagement with the platen.

Fig. 13 shows the position of the gripper after the platen has rotated somewhat farther and the cam roller 221 has passed off of the enlargement of the stationary cam 225. This enables the springs 213 to swing the rock shaft and gripper blocks to grip the paper between the fingers and the top of the strip 218. In this position, the blanket 206 of the transfer roller 51 is just about to coact with the platen.

Fig. 14 illustrates the position of the grippers

after a material portion of the sheet of paper A has passed between the platen and transfer blanket 206 and the paper has been freed by the grippers and is now being fed by the coacting transfer blanket and platen. This freeing of the grippers is caused by the cam roller 221 again coming onto a larger portion of the stationary cam 225 to swing the gripper fingers away from the blade 218 to free the paper.

230, in Fig. 14, indicates a stripper plate carried by cross bar 231. This plate has notches registering with the fingers of the gripper; and thus, when the platen comes into the position shown in Fig. 14, the fingers 212 of the gripper pass across the plate. At the same time, the pins 216 of the gripper block tend to shove the free end of the paper away from the platen surface. The result is that the paper is deflected to pass onto the top of the plate 230.

The printed sheet is retained in position on the drum between its freed front edge and the transfer cylinder by a roller 250 mounted on rock arms 251 and pressed toward the platen by springs 252. These rollers, coacting with the platen, serve to hold the paper against the platen and insure the free edge thereof traveling downwardly to pass onto the top of the stripper.

The action just described is illustrated in Fig. 15, which shows the position a few degrees farther around, where the paper A has passed well onto the top of the stripper plate 230 between guide blocks 233 thereon. This allows the paper to feed downwardly along the supporting rods 235 (Fig. 4) which may diverge so as to drop the sheet near their free ends.

To feed the paper to the grippers of the platen, I prefer to employ such mechanism as illustrated in Figs. 4 and 8 to 11, inclusive. As there shown, there are a succession of cylindrical rolls 270 on a shaft 271 which carries a gear 273 connected by idle pinions 274 and 275 with a gear 276 on the transfer cylinder. Directly above the rolls 270 are rolls 280 on a shaft 281 carried by a yoke 282 which is pivoted at 283 to the frame. The rolls 280 are normally maintained out of contact with the rolls 270 by a suitable spring 285. At the proper time, the yoke is swung to depress the rolls 280 into engagement with the rolls 270 and feed the paper. This depression is effected by means of a cam 290 on the transfer cylinder which acts on a roll 291 on a bell crank 292. This bell crank is connected by a link 293 with a rocking frame 294 which is adjustably connected with the yoke 282 as hereinafter described. Rigid with the yoke is a downwardly projecting finger 295, which acts against a block 296 which carries upturned stop fingers 297 projecting through openings in a shield plate 298.

Fig. 10 indicates the position of the paper feed before the paper is engaged. The sheet of paper, lying on the table 300, or other support, is shoved by hand, or otherwise, toward the machine to pass between the rollers 270 and the rollers 280 (standing some distance above them) until the advance edge of the paper abuts the fingers 297. Then, at the proper time for feeding, the cam 290 engages its roller, and swings the bell crank and linkage to lower the finger 295 and thereby swing the block 296 (against the action of the coiled spring 299) to withdraw the fingers 297, and the same movement lowers the rollers 280 into engagement with the rollers 270,—all as indicated in Fig. 11. The paper thus freed by the fingers 297 and gripped by the rollers 270 and 280 is fed beneath the guiding strip 305 in position to be engaged by the gripper, as illustrated in Fig. 12.

To adjust the pressure of the rolls 280 on the rolls 270, I provide a movable connection between the swinging frame 294 and the yoke 282. This is illustrated in Fig. 8, where it appears that the two members may be forced apart by an adjusting screw 310, but are normally pulled together as much as the screw will allow by the spring 311. Accordingly, the simple turning in or out of the screw 310 causes the adjustment described.

Power may be supplied to the machine at any convenient rotating part thereof, since the three drums, the inking system and the paper feed are all positively geared together. I have found it convenient to deliver the power through the paper feed mechanism. Thus, as shown in Fig. 2, I provide a belt pulley 320 on a stub shaft carried by the frame plate 10, and, on the hub of this belt pulley, I form a gear 321 which meshes with a gear 322 on a shaft 323 carrying the gear 275 heretofore described and which meshes with and carries the power from the pinion 275 to the gear 276 on the transfer roller, and the transfer roller passes it by the gears 325 and 165 to the platen and plate roller, and the gear on the latter roller drives all of the inking mechanism.

When the machine is in operation, and the paper is fed manually, or otherwise, along the table 300, it is printed and suitably discharged along the ejector rods 235. The platen roller is preferably of steel or other hard surface so that there is no material offsetting if a sheet of paper misses and the transfer roller acts directly on the platen. However, in case of failure to feed a sheet, or for any other reason, the operator may instantly grasp the knob 35 releasing the latch 86 and swinging the platen down to idle position. Likewise, at any time, he may instantly release the plate cylinder from the transfer roller by similar operation of the knob 55. This latter operation does not at all disturb the relation of the inking system to the plate cylinder; and, accordingly, the printing may be immediately resumed simply by giving restoring turns to the two knobs 35 and 55. In neither instance are either of the gears 325 or 165 withdrawn entirely from mesh with the gear 276. Accordingly, the timing relationship of the various drums is undisturbed.

It will be noted that no provision has been referred to for supplying dampening liquid to the plate cylinder, as is usual in planographic operations. This is because I prefer to operate a process of dry lithography, wherein the plate and the ink carry all the ingredients necessary for maintaining the image on the plate inked and the non-image areas clear.

Reference is made to my copending application No. 631,031, filed August 30, 1932, (as a continuation in part of this application) for claims relating to the inking mechanism per se herein illustrated.

I claim:

1. In an offset printing machine, the combination of an inking form roll, a plate cylinder, transfer cylinder and a platen, each of said elements contacting with the next mentioned element to comprise a couple, means for independently adjusting the pressure of each of said three couples, and means for separating and returning each of said couples without changing the adjustment thereof.

2. In an offset printing machine, the combination of a main frame, a transfer cylinder carried thereby, a supplemental frame pivoted to the main frame, a plate cylinder and inking sys-

tem carried by the supplemental frame, a pair of links connected to one of the frames, an eccentric shaft mounted in the other frame journalled in said links, and means for rotating said shaft.

3. The combination of a main frame, a transfer cylinder and a platen cylinder mounted therein, a supplemental frame pivoted to the main frame, a plate cylinder and inking system mounted in the supplemental frame, a pair of links pivoted to the main frame, a shaft mounted in the supplemental frame and having eccentric portions journalled in the links, a knob on one end of the shaft for turning it, and means for latching the knob.

4. In an offset printing machine, the combination of a main frame, a transfer roller carried thereby, a supplemental frame movably mounted with reference to the main frame, a plate roller and inking system carried by the supplemental frame, the shaft of the plate roller being journalled in the supplemental frame and having an eccentric extension, and a connection between such eccentric extension and the main frame whereby the rotation of said shaft may change the relation of the frames.

5. The combination of a main frame, a transfer roller carried thereby, a supplemental frame pivoted to the main frame, a plate roller and inking system carried by the supplemental frame, the plate roller being rotatable upon a normally stationary but turnable shaft mounted in the supplemental frame, said shaft having eccentric extensions, links leading from said extensions to the main frame, means for turning the plate roller shaft, and means for locking the shaft in stationary position.

6. In an offset printing machine, the combination of a main frame, a transfer cylinder and platen cylinder carried thereby, a supplemental frame pivotally connected to the main frame, a plate cylinder and inking system carried by the supplemental frame, and means for swinging the supplemental frame on its pivot.

7. In an offset printing machine, the combination with the transfer cylinder, of a pivotally mounted supplemental frame carrying the plate cylinder and inking system and an eccentric shaft rotatable to swing the supplemental frame on its pivot to change the relation of the supplemental frame to the transfer cylinder.

LAWRENCE H. MORSE.