No. 881,139. PATENTED MAR. 10, 1908.

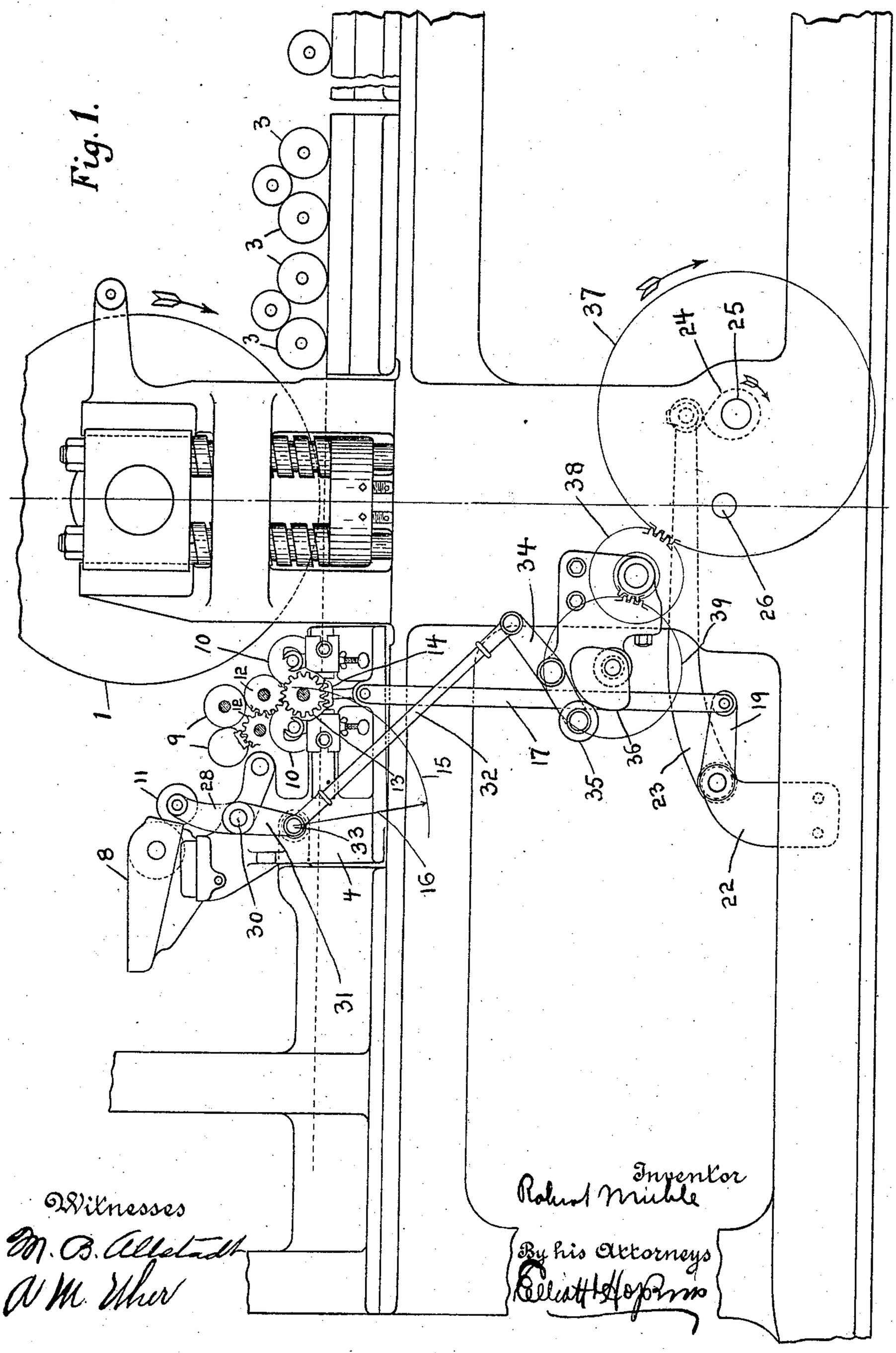
R. MIEHLE.

PRINTING PRESS.

APPLICATION FILED JUNE 13, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

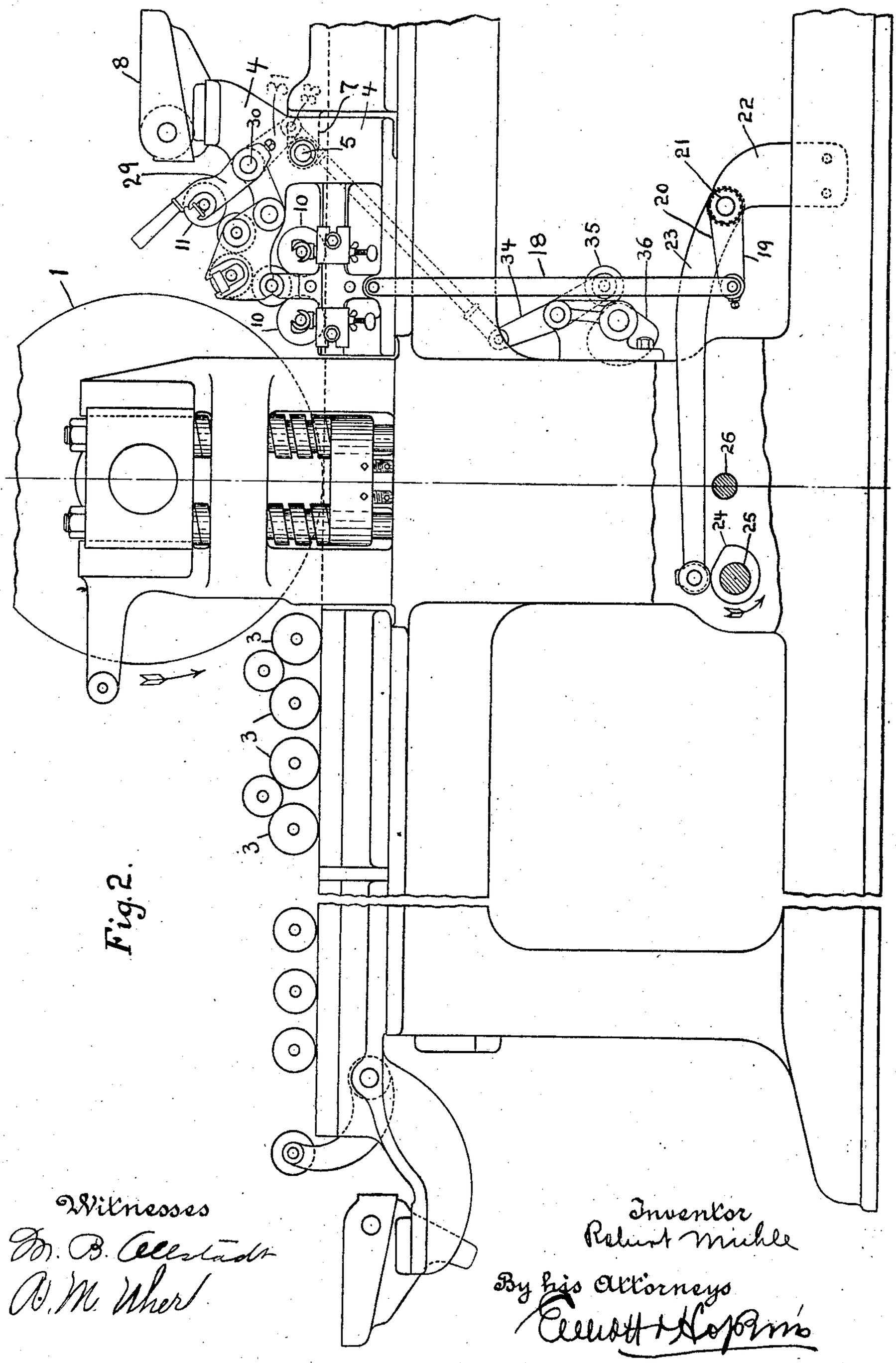

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 3.

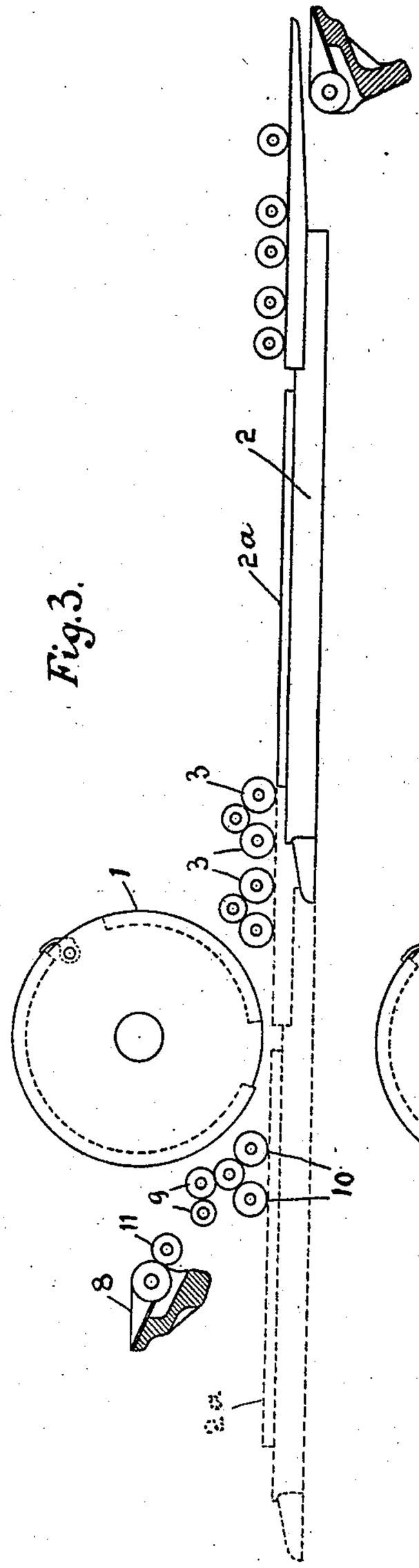


Fig. 4.

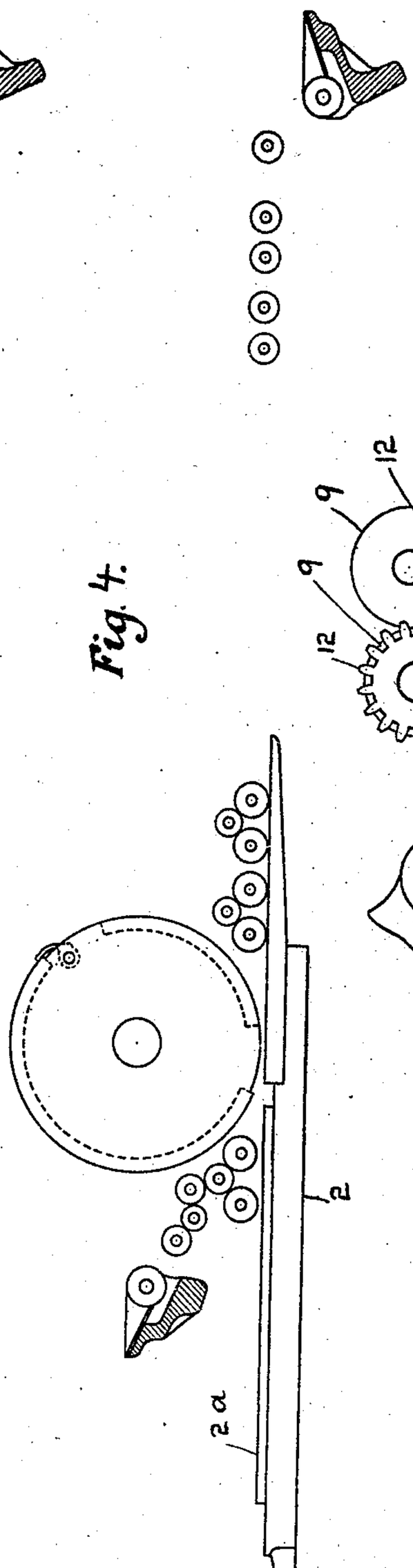


Fig. 5.

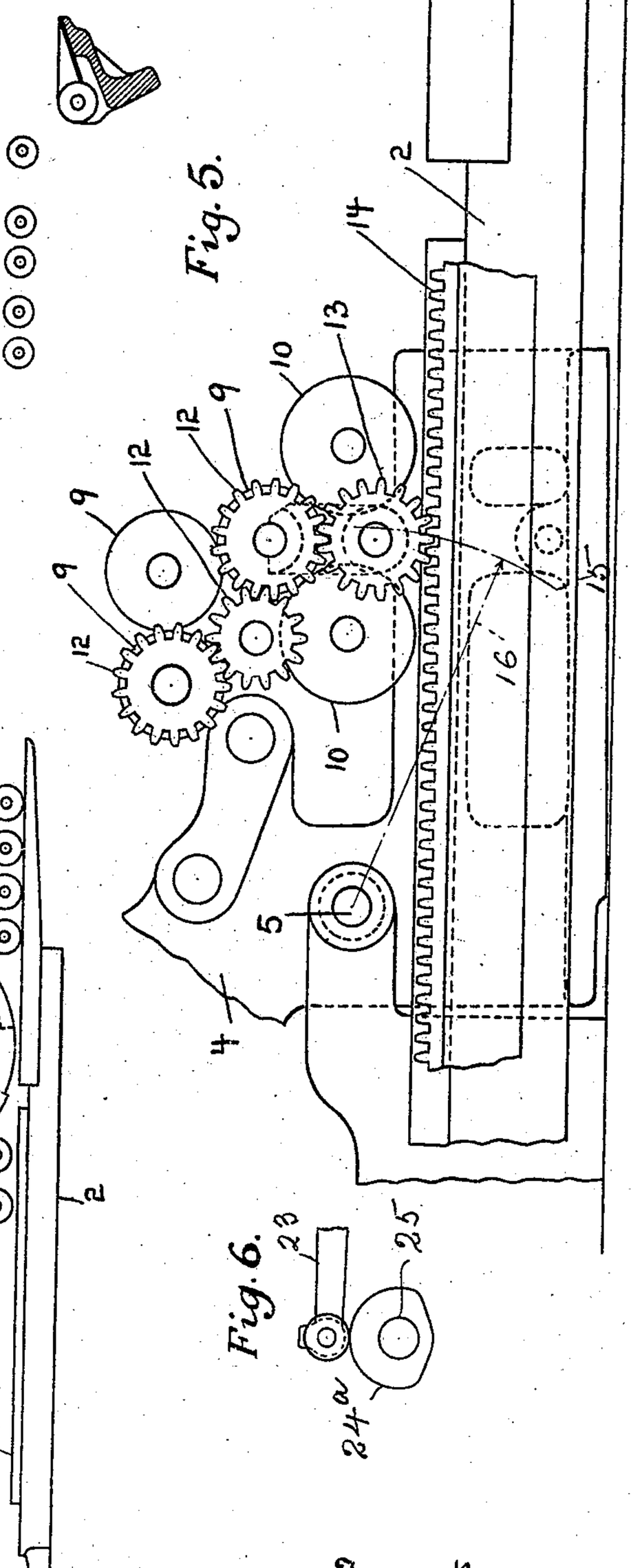
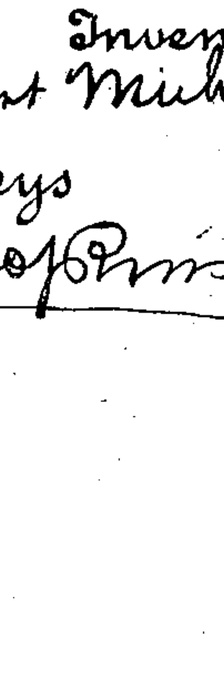


Fig. 6.



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PRINTING-PRESS.

No. 881,139. Specification of Letters Patent. Patented March 10, 1908.

Application filed June 13, 1904. Serial No. 212,326.

To all whom it may concern:

Be it known that I, ROBERT MIEHLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Presses, of which the following is a full, clear, and exact specification.

This invention relates to that class of reciprocating-bed printing presses well known in the art as "double end inkers" with an ink fountain and inking rollers at each side of the impression cylinder, and are designed to ink the form from both ends by two sets of form rollers located at both sides of the cylinder and alternately engaging the form as the latter reciprocates thereunder, one set of form rollers being designed to compensate for the decreasing inking efficiency of the other set which, as is well known, ink the form with gradually diminishing strength towards the tail end.

As heretofore constructed, with the form rollers divided into two groups, one at each side of the cylinder, so that the form passes under and clears both sets, it has not been practicable to use only one ink fountain on some classes of work which require both sets of form rollers to roll over the form and therefore this invention is designed to obviate the necessity of using both ink fountains and yet have all the advantages of a single end inking apparatus as well as a "double end inker" employing a fountain at each end; and it has for its primary object to provide improved means whereby one set of form inking rollers, or other equivalent device, may be lifted out of engagement with the form before the form entirely clears the same so that the movement of the form may be reversed without completely clearing or passing the elevated or inactive inking device, and consequently the regular inking apparatus comprising four, or other desired number of form rollers, may be employed at one side of the cylinder in conjunction with an auxiliary inking apparatus at the other side; thus subjecting the entire form to contact with the regular inking apparatus and also making the press a double end inker while vesting it with the important advantage of being able to ink the form from both ends without the necessity of making the form travel far enough to clear both sets of form rollers.

Another object of the invention is to elevate the form roller or rolls from the form without changing its or their speed of rotation whereby the wiping action thereof against the form will be prevented.

With these ends in view, my invention consists in certain features of novelty in the constructions, combination and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings,—Figure 1 is a conventional illustration of a reciprocating bed cylinder printing press with this invention applied thereto, in side elevation, and Fig. 2 is a similar view of the opposite side, Fig. 1 showing the auxiliary inking apparatus elevated, and Fig. 2 showing it lowered in its operative position. Figs. 3 and 4 are diagrammatic views illustrating the form in different positions, Fig. 5 is an enlarged detail view, and Fig. 6 is a modified form of same.

1, is the cylinder, 2 the bed which carries the form 2^a, and 3 the form rollers of the ordinary inking apparatus arranged at one side of the cylinder, four of said form rollers being shown as an example. In this class of inking devices the form rollers are required to make two or more revolutions over the form at each stroke and it is therefore obvious that the part of the form which is inked by the second or last revolution is not inked as thoroughly as that part of the form upon which the rollers make the first revolution. This is partly due to the rollers exhausting their supply and to the fact that the rollers do not have enough movement, after passing over the form, to be recharged again from the rider rollers or distributers before rolling again into contact with the form on their reverse revolution. Therefore on the side of cylinder opposite that at which the regular rollers (3) are located is arranged the auxiliary inking apparatus comprising a frame 4, which is pivoted on trunnions or pivots 5 secured to projecting brackets 7, the usual ink fountain 8 mounted on the frame 4, the cluster of ink distributing rollers 9, the form rollers 10, two of which are shown but any number of which may be employed, and the ductor roller 11 for conveying ink from the fountain to the distributing rollers and which

distributing rollers are rotated in the usual or any suitable way, as for example by pinions 12, meshing with a pinion 13 or other rotary toothed member suitably mounted on and carried by the pivoted frame 4 and adapted to mesh with a rack bar 14, or other suitable toothed member, mounted on or moving in conjunction with the reciprocating bed for imparting rotation to the pinion 13 and through it to the distributing rollers 9. The distributing rollers 9 being in contact with the form rollers 10, it is quite obvious that they rotate in unison, and if anything occurs to suddenly either retard or accelerate the speed of rotation of the pinion 13 independently of the movement of the bed, the form rollers 10 will be caused to "wipe" either the form or the rollers 9, and in either event will produce an objectionable accumulation of ink. In order, therefore, that this speed may remain practically constant while the teeth of the pinion 13 are in engagement with the teeth of the rack bar 14 and during their partial disengaging movement as the pinion rises with the frame 4, the pinion 13 is so situated with relation to the center of oscillation of the frame 4 that the side of that one of the teeth which is lowermost or in engagement with the teeth of the rack 14, will be concentric with the arc described by this oscillating movement of the frame 4 so that as the pinion 13 moves upwardly in its bodily movement the rotative action of the rack 14 thereagainst will remain constant notwithstanding the gradually diminishing or tapering form of such tooth and the sloping form of the tooth of the rack bar which is in engagement therewith and which decreases the effect of the rack bar on the pinion 13 as the pinion rises. This concentric relation of the side of the tooth of the pinion to the center 5 is illustrated by the curved line 15 which is struck from such center with the straight line 16 as its radius, and it is of course understood that it is the outer or remote side of the tooth which is referred to, and that the pinion 13 rises while the bed or rack bar 14 is moving towards the center 5 or towards the left as viewed in Fig. 1.

The purpose of this auxiliary inking apparatus just described is to ink the tail of the form or that portion of the form where the ink supplied thereto by the regular form rollers 3 is insufficient in a degree making it perceptible in the impression, and consequently the form does not pass entirely under or clear of the form rollers 10, but only so far as the weak area of ink distribution. Hence, the auxiliary inking apparatus begins to rise and lift its form rollers 10 out of engagement with the form while still contacting therewith but without totally disengaging the pinion 13 and rack 14; and this disengaging movement of the auxiliary inking apparatus is accomplished by vertically oscillating the frame 4 on its pivots 5 as before described, through any suitable operative connection with the operating mechanism of the press, such for example, as two rods 17, 18 pivoted at their upper ends to the frame 4 and at their lower ends to rocker arms 19, 20 on a rocker shaft 21 journaled in suitable supports 22 and secured to a lever 23 having one end arranged over and adapted to be elevated at each stroke of the bed by a cam 24 secured to shaft 25 suitably connected with the operating mechanism of the press, the dwell of the cam 24 being so proportioned as to hold the frame 4 elevated after the tail of the form is inked by rollers 10 and the active part of said cam so proportioned as to elevate the frame 4 as soon as said weak area passes the form rollers and without waiting for the entire form to clear said rollers.

In order that the relation fo the ductor roller 11 to the ink fountain may be maintained the same when the ink fountain is in different positions the mechanism which oscillates said ductor roller from the operating mechanism of the press comprises a pivoted connection which is arranged concentric with the center of oscillation of the frame 4, or at least cuts through said center of oscillation and is capable of being arranged concentric therewith while the frame 4 is being elevated as shown in Fig. 1. The ductor roller 11 is mounted in a pair of pivoted arms 28, 29 on a suitable rocker shaft 30 journaled in the frame 4, and the arm 28 has an extension 31 to which is pivoted a rod 32 and which extension and rod constitute an exemplification of the aforesaid pivoted connection, the pivot of which (shown at 33 and as illustrated in Fig. 1) is concentric with the center trunnions 5, one of which is hidden by the pivot 33 in Fig. 1, but the other of which appears in Fig. 2. The lower end of rod 32 is connected to an arm 34 carrying an anti-friction roller 35 adapted to be engaged by a cam 36, and this latter is rotated from the shaft 25 by a suitable train of gears 37, 38, 39, thus connecting ductor roller 11 with the operating mechanism of the press.

In some instances as in heavy solid forms that contain little or no engraving it may be necessary or desirable to ink six inches, more or less, of the tail end of the form by the auxiliary inker in both going and coming and in others to ink it going one way only. In the first of these cases it is obvious that the form rollers of the auxiliary inker should rise out of contact with the form before the movement of latter reverses and without changing their speed, to avoid "wiping" and should descend into engagement again with the form after the movement of the latter reverses, but since the center 33 cannot be at once the center of the arc 15 and the center of an arc concentric with the opposite side of the same tooth, it is apparent that as the form rollers descend

when the bed is undergoing its reverse movement, their speed of rotation will vary and if not otherwise provided against they will objectionably "wipe" the form. Hence they are lowered very slowly so that the wiping effect will be distributed over a wide area and therefore not be noticeable in the impression and yet ink a sufficient part of the tail end of the form. To this end, therefore the cam 24 is given the peculiar shape shown in Fig. 2, the flat or rapid portion being the part that raises the form rollers 10 and the gradually curving portion the part that lowers them.

In the latter one of the cases above noted *i. e.*, inking one way only the cam may be formed as shown at 24^a in Fig. 6 with a long dwell, by which the form rollers 10 are maintained in their elevated position until the form passes from under them in making its reverse movement.

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

1. In a printing press of the character described, the combination with the cylinder, the reciprocating bed and two inking apparatuses located one at each side of the cylinder and each comprising a form roller, of means for passing the form completely past one of said rollers and only partially past the other, and means for elevating the form roller of one of said inking apparatuses while the form is still in contact therewith.

2. In a printing press of the character described, the combination with the impression cylinder, the form bed movable forward and back with respect to the cylinder, an inking apparatus comprising a form roller and means whereby the roller is rotated, of means for elevating said form roller clear of the form after the bed has made a portion of its stroke, and means for compensating in the speed of rotation of the roller, the variation in the differing effect of the bed due to the elevation of the roller.

3. In a printing press of the character described, the combination with the cylinder, the reciprocating bed for carrying the form, an inking apparatus comprising a form roller, an ink fountain and a ductor roller movable towards the fountain, of means for moving said form roller and fountain bodily away from the bed and means for maintaining the ductor roller in operative relation to the fountain in the different positions of the fountain.

4. In a printing press of the character described, the combination with the reciprocating bed for carrying the form, the cylinder and an inking apparatus comprising a form roller, ink fountain and a ductor roller, of means for moving the form roller and fountain bodily away from the bed on the arc of a circle and means operatively connecting the ductor roller with the operating mechanism of the press for oscillating it towards and from the fountain, comprising a pivoted connection having its center concentric with the bodily oscillation of said form roller.

5. In a printing press of the character described, the combination with the reciprocating bed for carrying the form, and the cylinder, of an inking apparatus comprising a form roller, a fountain and a ductor roller all movable as a whole on the arc of a circle, a lever for oscillating said ductor roller movable bodily therewith and a pivoted connection for oscillating said lever from the operating mechanism of the press, having its center concentric with the center of oscillation of said inking apparatus.

6. In a printing press of the character described, the combination with the reciprocating bed for carrying the form, and the cylinder, of an inking apparatus comprising a fountain, and a ductor roller, said ductor roller being oscillatory towards and from the fountain, and said inking apparatus being movable as a whole on the arc of a circle to and from the bed, a pivoted arm carrying said ductor roller and movable bodily therewith, a rod pivoted to said arm and having the center of said pivot concentric with the center of oscillation of said inking apparatus, a pivoted arm for reciprocating said rod and a cam operatively connected with the press mechanism for oscillating said second arm.

7. In a printing press of the character described, the combination with the reciprocating bed carrying the form, and the cylinder, of an inking apparatus comprising a form roller and rotary ink distributing means, said form roller being movable bodily to and from the bed, a toothed member movable in conjunction with the bed and a rotary toothed member engaging said first toothed member for imparting motion to said distributing means, said rotary toothed member being movable towards and from said first toothed member on the arc of a circle concentric with the side of the tooth thereof which is in engagement with said first toothed member whereby such movement will not vary the speed of rotation of said rotary toothed member.

8. In a printing press of the character described, the combination with the reciprocating bed for carrying the form, and the cylinder, of an inking apparatus comprising a form roller and rotary ink distributing means, a toothed member movable in conjunction with the bed, a pinion engaging said toothed member and geared to said ink distributing means and movable bodily into and out of engagement with the teeth of said first toothed member on the arc of a circle concentric with the side of the tooth thereof which is in engagement with the first toothed member, whereby such bodily movement will not vary the speed of rotation of said pinion, said form roller being also movable bodily

out of engagement with the form together with said pinion.

9. In a printing press of the character described, the combination with the reciprocating bed, and the cylinder, of a rack bar movable with the bed, an inking apparatus comprising an ink fountain, a form roller, distributing rolls, a ductor roll and a frame pivoted to oscillate on the arc of a circle, a pinion journaled on said frame and adapted to engage with said rack bar and operatively connected with said distributing rolls, said pinion being so located with reference to the pivot of said frame that the tooth of the pinion which engages the rack bar will be concentric with the arc of the circle on which the frame oscillates while said tooth is in engagement, and operating means connecting the ductor roller with the operating mechanism of the press comprising a pivoted connection having its center located concentric with the center of oscillation of said frame.

10. In a printing press of the character described, the combination with the reciprocating bed, the cylinder and a toothed member movable in conjunction with the cylinder, of an inking apparatus comprising a frame pivoted to oscillate on the arc of a circle towards and from the bed, a form roller and rotary distributing means, and a rotary toothed member carried by said frame for driving said rotary distributing means and adapted to engage said first toothed member, the tooth of said rotary toothed member which is in engagement with the first said toothed member having its side arranged in an arc concentric with the arc described by said pivoted frame whereby the oscillation of said pivoted frame will not vary the speed of rotation of said rotary toothed member while disengaging therewith.

11. In a printing press of the character described, the combination with the reciprocating bed for carrying the form, the cylinder and two inking apparatuses located one at each side of the cylinder, and one of which is movable into and out of engagement with the form, of means for moving said movable apparatus in one direction while the form is thereunder, and means for moving it in the opposite direction very gradually while the form is still thereunder.

12. In a printing press of the character described, the combination with the reciprocating bed for carrying the form, the cylinder and two inking apparatuses located one at each side of the cylinder, of means for raising one of said inking apparatuses out of engagement with the form while the form is still thereunder and means for very gradually lowering the same again into engagement with the form after the movement of the bed reverses and while the form is still thereunder.

13. In a printing press of the character described, the combination with the reciprocating bed for carrying the form, the cylinder and two inking apparatuses located one at each side of the cylinder and one of which is movable into and out of engagement with the form, of means for moving said movable apparatus in one direction while the form is moving in one direction thereunder and means for moving it in the opposite direction very gradually while the form is moving in the opposite direction and is still thereunder.

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