L. BAKKE.

PRINTING PRESS.

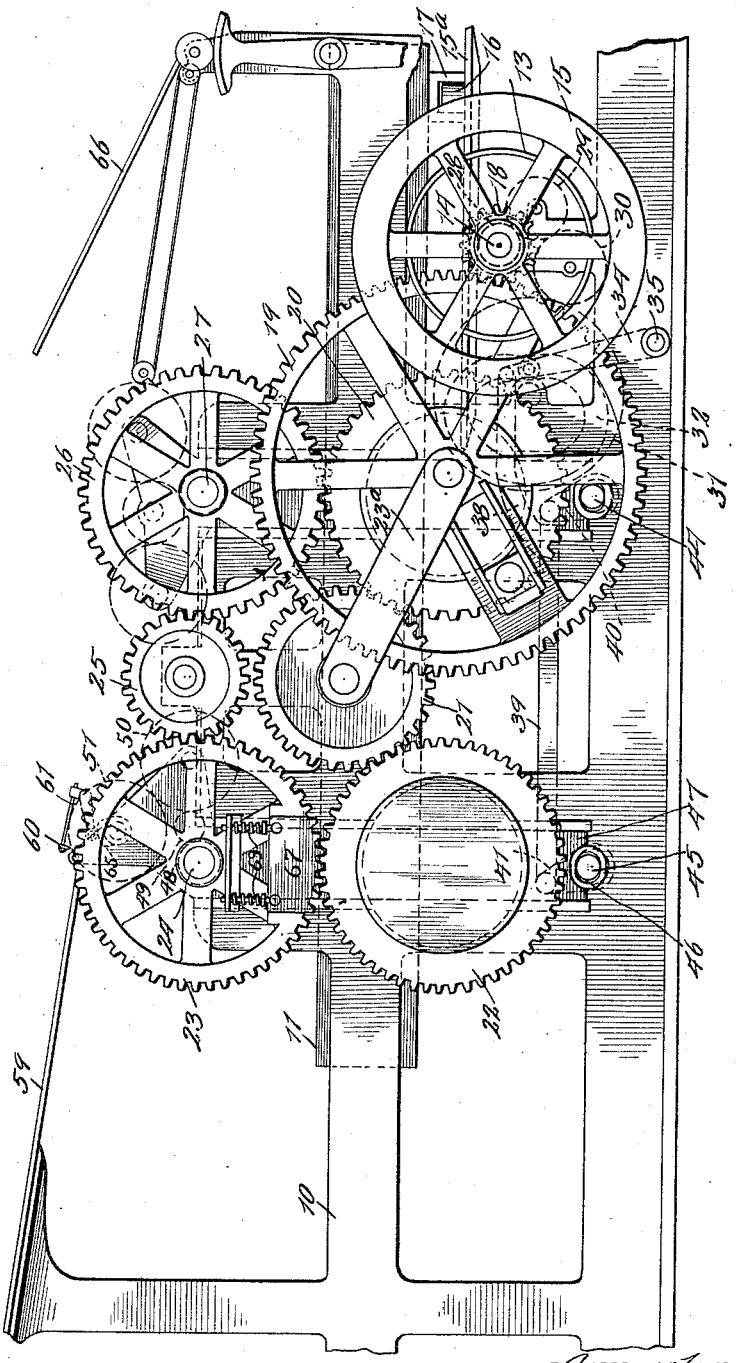
APPLICATION FILED FEB. 20, 1911.

1,006,176.

Patented Oct. 17, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Ira P. Perry

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Inventor:

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his Atty.

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3 SHEETS—SHEET 2.

Fig. 2.

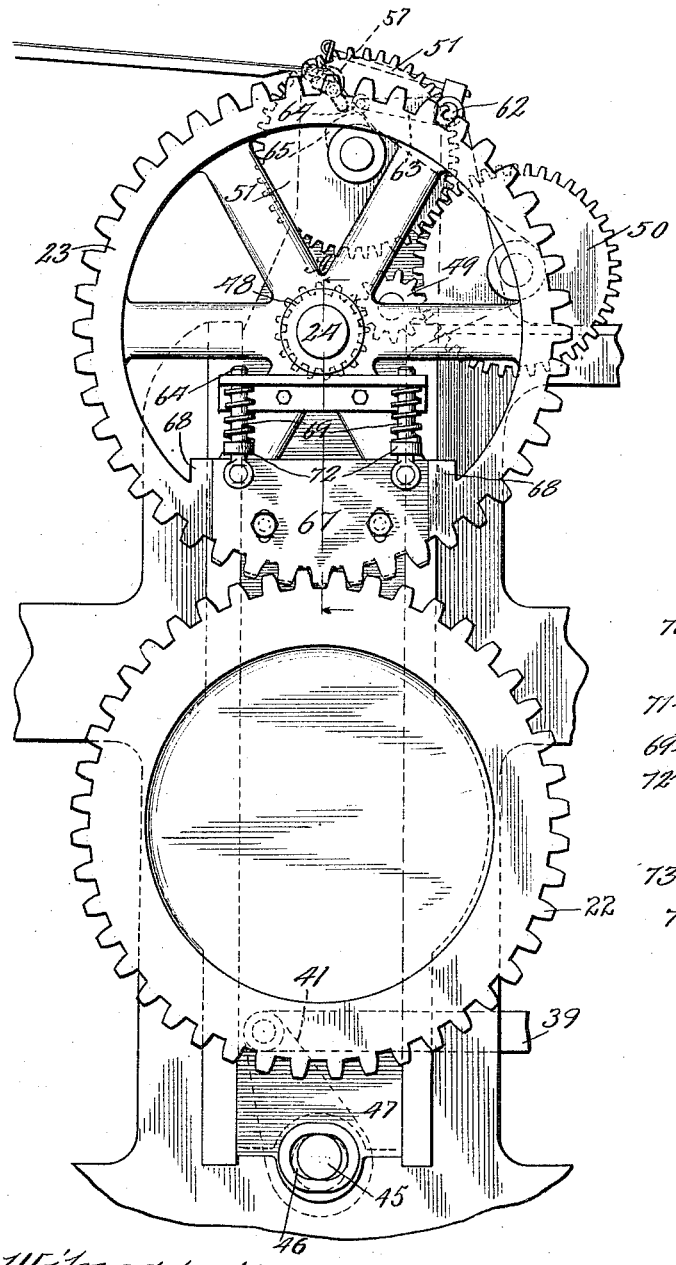
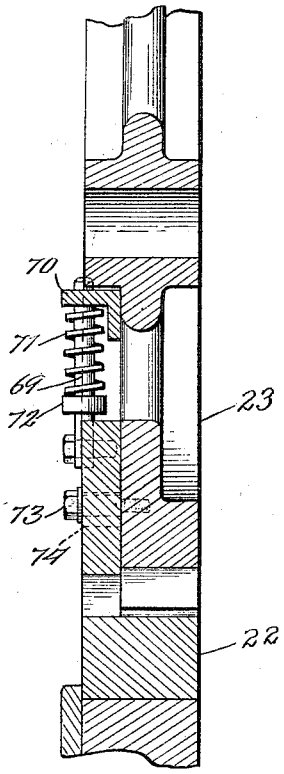


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

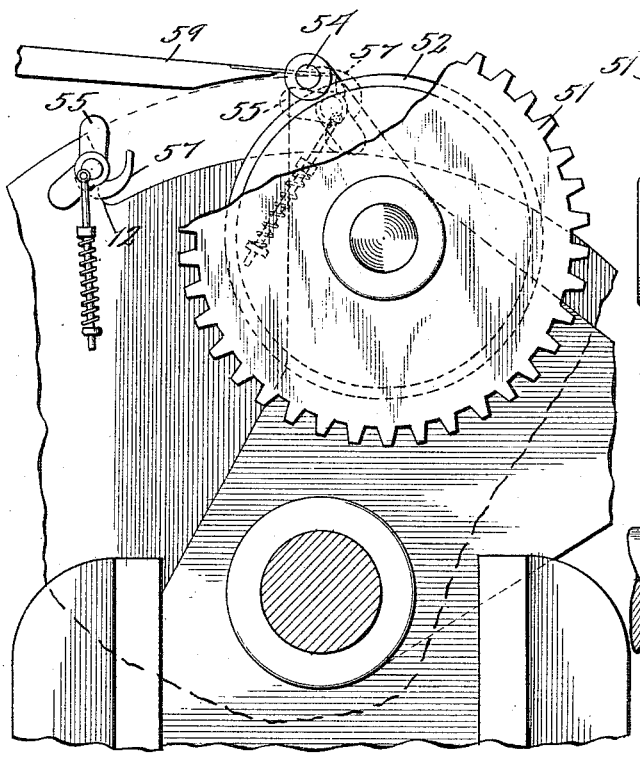


Fig. 5.

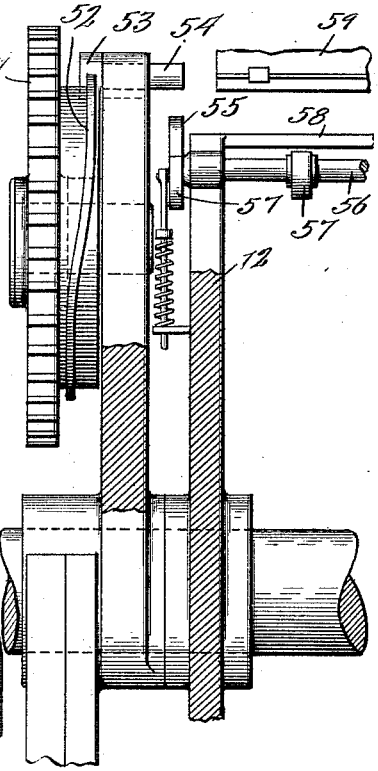
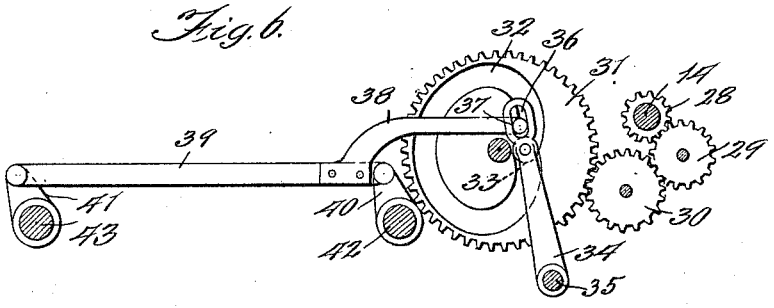


Fig. 6.



Witnesses:

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Inventor:

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By Johnston and McElroy

his Attys.

UNITED STATES PATENT OFFICE.

LEOPOLD BAKKE, OF CHICAGO, ILLINOIS.

PRINTING-PRESS.

1,006,176. Specification of Letters Patent. Patented Oct. 17, 1911.

Application filed February 20, 1911. Serial No. 609,759.

To all whom it may concern:

Be it known that I, LEOPOLD BAKKE, a citizen of the United States, and a resident of 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.

My invention is concerned with printing presses, mainly of the two-color or cylinder type, and is designed to overcome a difficulty which has been found to exist in these presses as heretofore constructed. In these presses of the prior art, the gearing between the reciprocating bed-plate and the grippers on the cylinder has been loosely meshed at the time the grippers acted, owing to the separation of the two spur gear wheels in the train necessitated by the raising of the cylinder as the reciprocating bed-plate returns after the impression is taken. This lost motion in the gearing makes it possible for the grippers to act with the cylinder in slightly different positions relative to the bed-plate, so that the registrations of two different impressions on the same sheet, as would be desired in two-color work, or for other reasons, might not necessarily be the same, with the result that the two impressions would not register properly, thereby producing very inferior work. To overcome this objection, I have introduced into the gearing a radially sliding segmental gear section which serves to maintain the exact mesh and prevent the lost motion in spite of the separation of the two spur gear wheels with which it is associated, due to the lifting of the cylinder.

To illustrate my invention, I annex hereto three sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Figure 1 is a side elevation showing somewhat diagrammatically the gearing and driving connections of a Huber two-color press to which my invention has been applied; Fig. 2 is a side elevation of that portion of the gearing to which my invention is especially applied, on an enlarged scale from that shown in Fig. 1; Fig. 3 is a detail in section on the line A—A of Fig. 2, on a still larger scale; Fig. 4 is a side elevation of the upper portion of the mechanism shown in Fig. 2, on a still larger scale; Fig. 5 is an end elevation of the mechanism shown in Fig. 4; and Fig. 6 is a detail showing part of the interior mechanism which is partly shown in Fig. 1.

The ordinary construction of the Huber two-cylinder press to which I have shown my invention as applied, although it will, of course, be understood that it might be applied to other similar presses, consists of the customary framework 10, in which the horizontal bed-plate 11 reciprocates. Coöperating with this bed-plate 11 are a pair of cylinders 12, a portion of one of which is best seen in Figs. 4 and 5. The power is applied to the pulley wheels 13 secured on the shaft 14, which has the fly-wheel 15 thereon, and this shaft 14 carries a bevel pinion, not shown, which meshes with a bevel gear wheel 15^a, which carries a pin or anti-friction roller 16 which coöperates with the transverse slot bearing 17 secured on the bottom of the bed-plate, so that as the shaft 14 is rotated the bed-plate 11 will be reciprocated to and fro to carry the type thereon beneath the impression cylinders.

The shaft 14 has secured thereon the spur gear pinion 18 which meshes with the spur gear wheel 19, which has secured on the hub thereof the eccentric spur gear wheel 20 which meshes with the swinging idle gear 21, which in turn meshes with the spur gear wheel 22. The gear wheel 21 is journaled in a bearing carried by the swinging frame 23^a, so that the wheel 21 may rise and fall as is necessary to keep it in mesh with both the eccentric wheel 20 and the wheel 22 as the different portions of the eccentric wheel 20 mesh therewith. The spur gear wheel 22 meshes with the spur gear wheel 23, which is secured on the shaft 24, upon which the first cylinder 12 is secured. The spur gear wheel 23 meshes with an idle spur gear wheel 25 suitably journaled in the frame, which in turn meshes with the spur gear wheel 26 corresponding to the spur gear wheel 23 and secured on the shaft 27, on which the second impression cylinder is secured. With the mechanism thus far described, it will be seen that as the shaft 14 is rotated, the bed-plate 11 will be reciprocated and the cylinders rotated, it being given one complete reciprocation to each two rotations of the impression cylinders 12.

Referring now to Figs. 1 and 6, the shaft 14 will be seen to have secured thereon a spur gear pinion 28 which meshes with one of the two idle spur gear pinions 29 and 30, by which motion from the shaft 14 is

transmitted to the spur gear wheel 31 in such proportion that the spur gear wheel 31 will be given one complete rotation to each reciprocation of the bed-plate. This spur gear wheel 31 carries the face cam 32 with which coöperates the roller 33 carried by the arm 34 pivoted on the framework at 35. The upper end of this arm has therein the slot 36, which coöperates with the pin 37 carried by the end of the arm 38 which is secured to the link bar 39 connecting the arms 40 and 41 secured on the rock shafts 42 and 43. These rock shafts carry the eccentrics 44 and 45, which coöperate with the slightly horizontal, elongated bearing apertures 46 in the bottoms of the vertically reciprocable bearing frames 47, in the upper end of which the shafts 24 and 27 are journaled. With this arrangement, it will be apparent that at each rotation of the spur gear wheel 31, the two cylinders will be raised during the return movement of the bed-plate 11 and lowered during the printing movement thereof.

Referring now especially to Figs. 2, 4 and 5, it will be seen that the shaft 24 carries a spur gear pinion 48 which meshes with the idle pinion 49, which in turn meshes with the idle spur gear wheel 50, which in turn meshes with the spur gear wheel 51, the ratio of the gearing being such that the spur gear wheel 51 is given one rotation for each two rotations of the spur gear wheel 23. The spur gear wheel 51 carries the cam 52, which coöperates with a groove formed in the head 53 of the sliding pin 54, which is thus thrust inward at each second revolution of the cylinder into the path of the arm 55 secured on the gripper shaft 56 carrying the grippers 57, which are adapted to coöperate with the edge 58 of the cylinders 12 at the proper time to grip the sheet of paper placed on the feed table 59 and resting against the stop fingers 60 carried by the arms 61 secured on the rock shaft 62, which has the arm 63 having the roller 64 on the free end thereof coöperating with the cam 65 on the shaft of the spur gear wheel 51 at the proper time to lift the fingers 60 just at the time that the grippers seize the sheet of paper and secure it to the cylinder. The sheet of paper thus gripped is carried on the cylinder during the succeeding rotation, taking an impression from its portion of the type on the bed-plate, after which, after it has been released by the grippers of the first cylinder, it is carried to a corresponding set of grippers on the second impression cylinder on the shaft 27, and after an impression has been taken from the second type portion of the bed-plate, the grippers of the second cylinder are opened and the sheet discharged on the carrier 66, which is swung to throw the printed sheet off of the machine by the customary mechanism.

The mechanism thus far described is that of the ordinary Huber press, which I have illustrated as one form of press to which my invention may be applied. As heretofore noted, when the bed-plate is returned, and the wheel 23 is raised slightly and out of full mesh with the wheel 22, the gripper operates to take the sheet of paper from the table 59, and owing to the fact that the wheels 22 and 23 are not in full mesh, there is no certainty that the grippers will always be actuated at the same relative position of the cylinder and the bed-plate. To overcome this difficulty is the object of my invention, the novel portion of which is best illustrated in Figs. 2 and 3, where it will be seen that, in combination with the gear wheel 23, I employ a radially sliding gear segment 67 sliding in ways 68 formed or secured on the face of the wheel 23. The segment is provided with the upwardly extending pins 69, which pass through apertures in the lugs 70, so that helically coiled expanding springs 71 may be interposed between the lugs 70 and the collars 72 secured on the pins 64. The segment 67 is guided and held in position by the pins 73 passed through slots 74 and screwed into the face of the wheel 23.

With the construction thus shown, it will be obvious that when the wheel 23 is raised so that its teeth are out of full mesh with the teeth of the wheel 22, the springs 71 will throw the segment outward radially so that its teeth, which of course are exactly coincident with the adjacent teeth of the wheel 23 when the latter is in full mesh with the wheel 22, will now be projected outward, so that when they come in mesh with the teeth of the wheel 22 at the time that the grippers act, the teeth of the segment 67 will be in full mesh with the teeth of the wheel 22, so that there can be no lost motion between the wheels 22 and 23 at this critical time, although said wheels are separated as indicated in dotted lines in Fig. 2. This keeping the two wheels 22 and 23 in full mesh at this critical time, despite the fact that the ordinary teeth of the wheel 23 are moved out of full mesh at that time, serves to overcome entirely the difficulty above noted, and produces a press in which much more satisfactory work can be done.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a printing press, the combination with a horizontally reciprocating bed-plate,

of a vertically movable impression cylinder coöperating therewith, grippers carried by the cylinder, driving means for reciprocating the bed-plate and raising the cylinder out of contact therewith during its movement in one direction, and gearing connecting said driving means and cylinder for rotating said cylinder and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinder, said gearing including a gear wheel on the end of the cylinder, a gear segment carried by said gear wheel, movable radially thereon, whose teeth when the segment is pushed in are in exact registration with those of the gear wheel, a second gear wheel beneath the first whose teeth mesh with the teeth of the first gear wheel and those of the gear segment, and means for moving said segment radially downward when it engages the second gear wheel and the cylinder is raised.

2. In a printing press, the combination with a horizontally reciprocating bed-plate, of a vertically movable impression cylinder coöperating therewith, grippers carried by the cylinder, driving means for reciprocating the bed plate and raising the cylinder out of contact therewith during its movement in one direction, and gearing connecting said driving means and cylinder for rotating said cylinder and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinder, said gearing including a gear wheel on the end of the cylinder, a gear segment carried by said gear wheel, movable radially thereon, whose teeth when the segment is pushed in are in exact registration with those of the gear wheel, a second gear wheel beneath the first whose teeth mesh with the teeth of the first gear wheel and those of the gear segment, and springs interposed between said wheel and the segment carried thereby for moving said segment radially downward when it engages the second gear wheel and the cylinder is raised.

3. In a printing press, the combination with a horizontally reciprocating bed-plate, of a vertically movable impression cylinder coöperating therewith, grippers carried by the cylinder, driving means for reciprocating the bed plate and raising the cylinder out of contact therewith during its movement in one direction, and gearing connecting said driving means and cylinder for rotating said cylinder and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinder, said gearing including a gear wheel on the end of the cylinder, a second gear wheel beneath the first and meshing therewith, a gear segment carried by one of said gear wheels, whose teeth when the segment is forced in are in exact registration with those of the wheel which carries it, and means for moving said segment radially when it engages the other gear wheel and the cylinder is raised.

4. In a printing press, the combination with a horizontally reciprocating bed-plate, of a vertically movable impression cylinder coöperating therewith, grippers carried by the cylinder, driving means for reciprocating the bed plate and raising the cylinder out of contact therewith during its movement in one direction, and gearing connecting said driving means and cylinder for rotating said cylinder and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinder, said gearing including a gear wheel on the end of the cylinder, a second gear wheel beneath the first and meshing therewith, a gear segment carried by one of said gear wheels whose teeth when the segment are forced in are in exact registration with those of the wheel which carries it, and springs interposed between said segment and the wheel which carries it for moving said segment radially when it engages the other gear wheel and the cylinder is raised.

5. In a printing press, the combination with a horizontally reciprocating bed-plate, of a pair of vertically movable impression cylinders coöperating therewith, grippers carried by the cylinders, driving means for reciprocating the bed plate and raising the cylinders out of contact with the bed plate during its movement in one direction, gear wheels on the ends of said cylinders, a gear pinion interposed between said gear wheels, and gearing connecting said driving means and one of said cylinders for rotating said cylinders and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinders, said gearing including the before-mentioned gear wheel on the end of one of the cylinders, a second gear wheel beneath said last-mentioned gear wheel on the cylinder and meshing therewith, a gear segment carried by one of the two last-mentioned gear wheels, whose teeth when the segment is forced in are in exact registration with those of the wheel which carries it, and means for moving said segment radially when it engages the other gear wheel and the cylinder is raised.

6. In a printing press, the combination with a horizontally reciprocating bed-plate, of a pair of vertically movable impression cylinders coöperating therewith, grippers carried by the cylinders, driving means for reciprocating the bed plate and raising the cylinders out of contact with the bed plate during its movement in one direction, gear

wheels on the ends of said cylinders, a gear pinion interposed between said gear wheels, and gearing connecting said driving means and one of said cylinders for rotating said cylinders and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinders, said gearing including the before-mentioned gear wheel on the end of one of the cylinders, a second gear wheel beneath said last-mentioned gear wheel on the cylinder and meshing therewith, a gear segment carried by one of the two last-mentioned gear wheels, whose teeth when the segment is forced in are in exact registration with those of the wheel which carries it, and springs interposed between the segment and the wheel which carries it for moving said segment radially when it engages the other gear wheel and the cylinders are raised.

7. In a printing press, the combination with a horizontally reciprocating bed-plate, of a pair of vertically movable impression cylinders coöperating therewith, grippers carried by the cylinders, driving means for reciprocating the bed plate and raising the cylinders out of contact with the bed plate during its movement in one direction, gear wheels on the ends of said cylinders, a gear pinion interposed between said gear wheels, and gearing connecting said driving means and one of said cylinders for rotating said cylinders and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinders, said gearing including the before-mentioned gear wheel on the end of one of the cylinders, a gear segment carried by the last-mentioned gear wheel, movable radially thereon, whose teeth when the segment is pushed in are in exact registration with those of the gear wheel which carries it, a second gear wheel beneath the one carrying the segment whose teeth mesh with the teeth of said gear wheel and those of the segment, and means for moving said segment radially downward when it engages the gear wheel beneath it and the cylinder is raised.

8. In a printing press, the combination with a horizontally reciprocating bed-plate, of a pair of vertically movable impression cylinders coöperating therewith, grippers carried by the cylinders, driving means for reciprocating the bed plate and raising the cylinders out of contact with the bed plate during its movement in one direction, gear wheels on the ends of said cylinders, a gear pinion interposed between said gear wheels, and gearing connecting said driving means and one of said cylinders for rotating said cylinders and maintaining the exact registration of the bed plate and grippers at the time the latter operate despite the upward movement of the cylinders, said gearing including the before-mentioned gear wheel on the end of one of the cylinders, a gear segment carried by the last-mentioned gear wheel, movable radially thereon, whose teeth when the segment is pushed in are in exact registration with those of the gear wheel which carries it, a second gear wheel beneath the one carrying the segment whose teeth mesh with the teeth of said gear wheel and those of the segment, and springs interposed between said wheel and the segment carried thereby for moving said segment radially downward when it engages the gear wheel beneath it and the cylinder is raised.

In witness whereof, I have hereunto set my hand and affixed my seal, this 24th day of September, A. D. 1910.

LEOPOLD BAKKE. [L. S.]

Witnesses:
JOHN HOWARD MCELROY,
JNO. G. ELLIOTT.