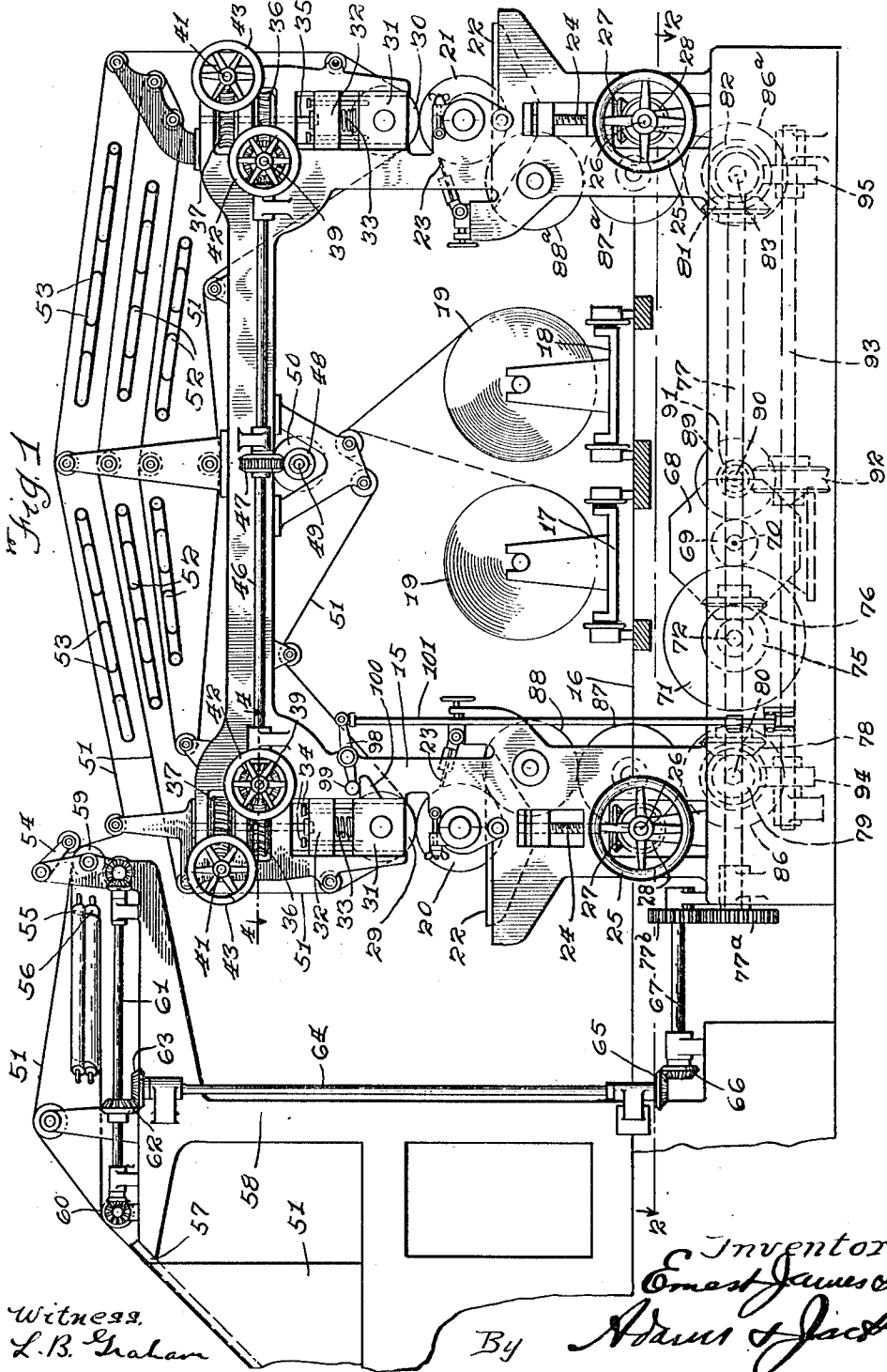


E. J. SMITH.  
INTAGLIO PRINTING PRESS.  
APPLICATION FILED SEPT. 5, 1916.

1,314,543.

Patented Sept. 2, 1919.  
3 SHEETS—SHEET 1.



Witness  
L. B. Graham

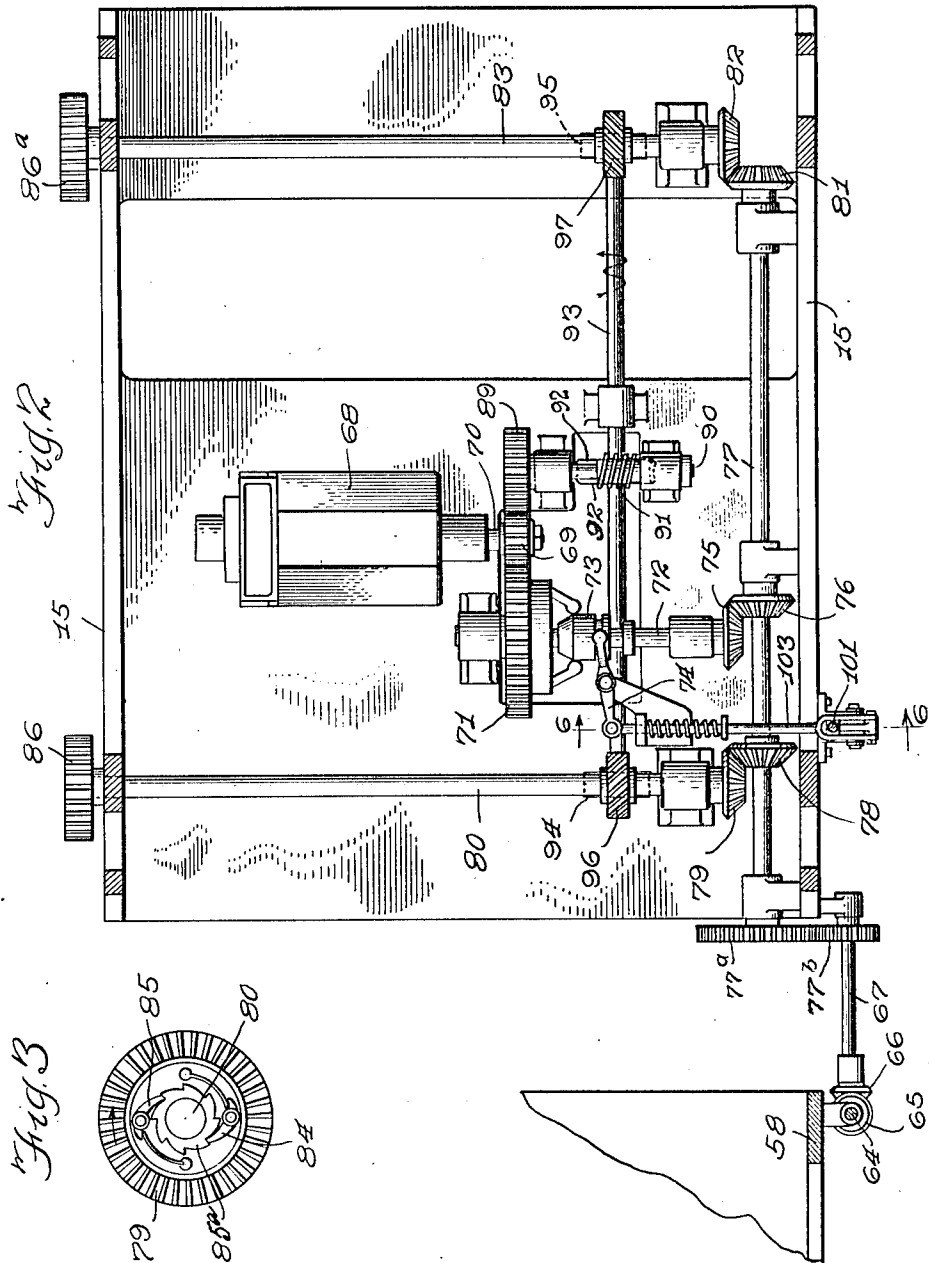
By

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Adams & Jackson  
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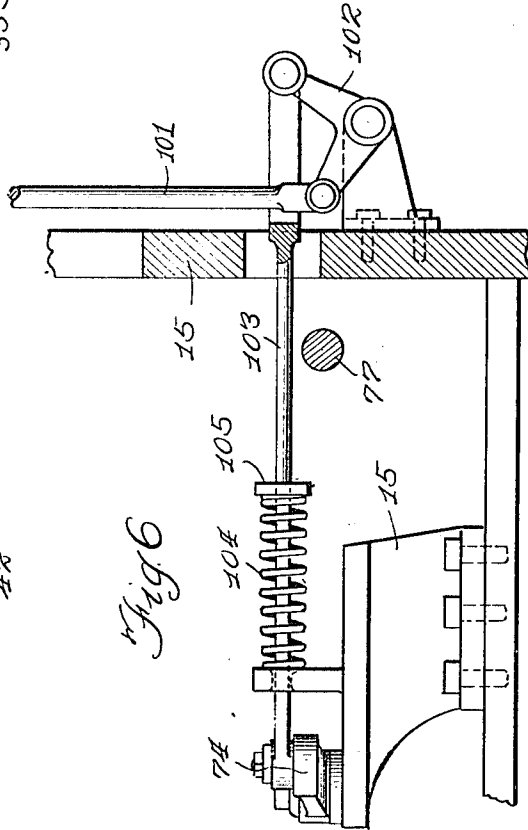
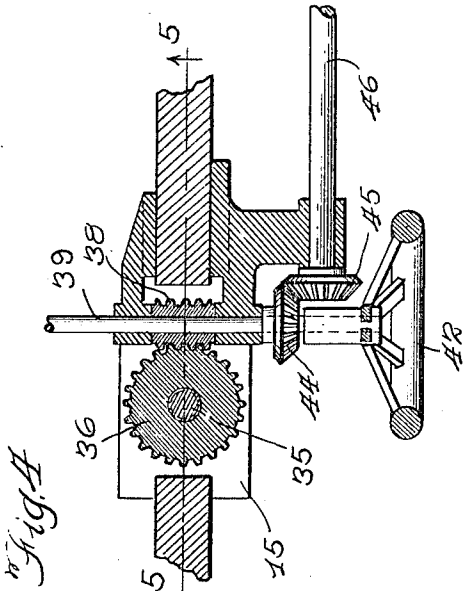
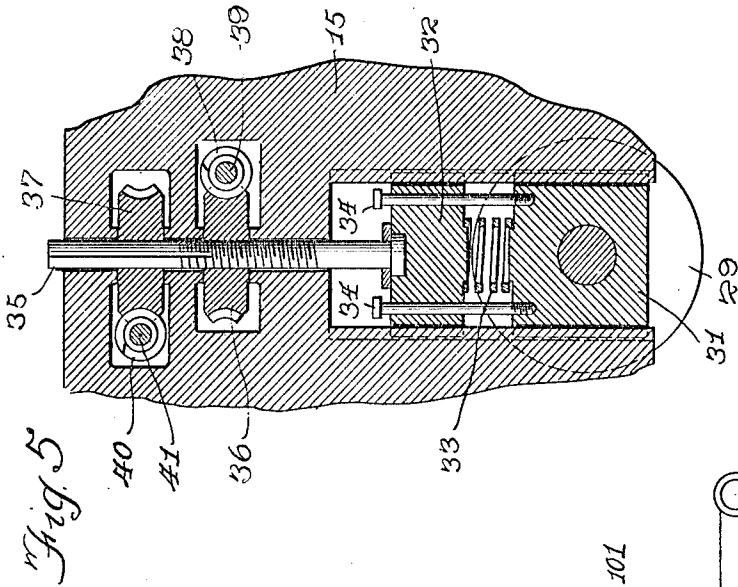
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# UNITED STATES PATENT OFFICE.

ERNEST JAMES SMITH, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## INTAGLIO-PRINTING PRESS.

1,314,543.

Specification of Letters Patent.

Patented Sept. 2, 1919.

Application filed September 5, 1916. Serial No. 118,519.

*To all whom it may concern:*

Be it known that I, ERNEST JAMES SMITH, a subject of the King of England, and a resident of Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Intaglio-Printing Presses, of which the following is a specification, reference being had to the accompanying drawings.

10 My invention relates to intaglio printing presses and it has for its principal object to provide new and improved means for keeping the printing cylinders in rotation after the remainder of the press has been stopped, 15 whereby the ink may be kept from drying upon the printing cylinders. To this end it is one of the objects of my invention to provide such a form and arrangement of the connections between the driving motor for the press and the driven parts that said motor shall be adapted to drive the entire press at the desired operative speed and shall be adapted alternatively to drive the printing cylinders at a comparatively much slower 20 speed while the remainder of the press is permitted to remain at rest. It is another object of my invention to provide means for moving the impression cylinders out of contact with the printing cylinders adapted automatically at the same time to throw out of operation the high speed connections between the motor and the press, permitting the printing cylinders to be driven alone at a slower speed. It is another object of my invention to improve devices of this type in 30 sundry details hereinafter pointed out. The preferred means by which I have accomplished my several objects are illustrated in the drawings and are hereinafter specifically described. That which I believe to be new and desire to cover by this application is set forth in the claims.

In the drawings:—

45 Figure 1 is a side view of a press embodying my improved construction and arrangement;

Fig. 2 is a horizontal section through the machine of Fig. 1, being taken substantially on the line 2—2 of Fig. 1;

50 Fig. 3 is an enlarged detail showing the connections of one of the driving gears with its shaft, as hereinafter described;

Fig. 4 is an enlarged detail, being a sec-

tion taken substantially on line 4—4 of Fig. 1;

Fig. 5 is substantially a vertical section taken on line 5—5 of Fig. 4; and

Fig. 6 is a section taken substantially on line 6—6 of Fig. 2.

Referring to the several figures of the drawings in which corresponding parts are indicated by the same reference characters,—

15 indicates the main frame of my improved press extending above and below a floor 16 provided for supporting carriages 17—18 which are adapted to be pushed along suitable rails extending transversely of the press for supporting in position a plurality of rolls of paper 19. Intaglio printing cylinders 20—21 of any suitable type are revolvably mounted upon the framework 15 at opposite ends thereof. The lower portion of each of the cylinders 20—21 extends down into a suitable container 22 adapted to be provided with a supply of appropriate ink or water color whereby as the cylinders rotate a supply is taken up by the surfaces of the cylinders. Light finely-adjustable scrapers 23 are provided as is common in presses of this type for removing from the surfaces of the cylinders the surplus ink or other coloring matter taken up thereby. The color receptacles 22 are adjustable up and down relative to the cylinders 20—21 by means of screws 24 upon which the receptacles are mounted, the screws 24 for each of the receptacles being adapted to be rotated by means of a hand wheel 25 acting upon the screw through the medium of a shaft 26 and bevel gears 27 and 28.

Impression cylinders 29—30 are slidably mounted in the framework 15 by means of bearing blocks 31 (see Fig. 5). Above each of the bearing blocks 31 is mounted a slide-block 32 which is yieldingly held through the medium of a spring 33 in spaced relation to the block 31, the movement of the block 32 relative to the block 31 being controlled and limited by means of bolts 34. 35 indicates a screw-threaded bolt having a swiveled connection at its lower end with the slide-block 32. A worm gear 36 is mounted by means of screw-threads upon the bolt 35 a short distance above the slide-block 32, and a second worm gear 37 is slidably mounted upon the said bolt 35 a short

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distance above the worm gear 36, being held by a suitable key (not shown) against rotation relative to the bolt 35. The worm gear 36 meshes with a worm 38 fixedly mounted upon the transversely-extending shaft 39, and the worm gear 37 meshes with a worm 40 fixedly mounted upon a transversely-extending shaft 41. Both of the gears 36—37 are held in position relative to the worms 38—40 by reason of engagement with suitable portions of the framework 15. As will be readily understood, when the gear 36 is rotated through the medium of the shaft 39 and the worm 38, the bolt 35 will be raised or lowered relative to the framework 15, the bolt being held against rotation by the worm 40 engaging the worm gear 37. On the other hand, when the worm gear 37 is rotated through the medium of the shaft 41 and the worm 40, the bolt 35 is likewise moved up or down relative to the framework, the gear 36 in that case being held against rotation by its engagement with the worm 38. It will be understood that each end of each of the impression cylinders 29—30 is provided with mechanism of the type just described, the worms 38—40 being mounted upon opposite ends of the shafts 39—41 which extend from one side of the press to the other.

The shafts 39—41 are provided at one side of the press with hand wheels 42—43, respectively, by which the shafts 39—41 may be rotated for moving the bolts 35 up and down as desired. As will be readily understood, when the bolts 35 of either of the impression cylinders 29—30 are moved downward together, the slide-blocks 32 will be moved downward, serving to compress the springs 33, causing such impression cylinder to have the desired pressure upon the adjacent printing cylinder 20 or 21. When the bolts 35 are moved upward, the blocks 32 are given an upward movement, serving first to relieve a part of the tension of the springs 33 and serving later to move the blocks 31 and the impression cylinders 29—30 positively upward out of contact with the printing cylinders.

Means is provided for rotating the shafts 39 at opposite ends of the press in unison, comprising bevel gears 44 mounted upon said shafts (see Fig. 4) meshing with bevel gears 45 mounted upon a longitudinally-extending shaft 46 which is connected by means of a worm gear 47 (see Fig. 1) and a worm 48 with the driving shaft 49 of a motor 50. The motor 50 is provided with suitable controller mechanism whereby it may be set into operation in either direction for rotating the shaft 46 as desired for moving the impression cylinders 29—30 in unison either into or out of operative position.

With the cylinders 20, 21, 29 and 30 being driven in operative position by the means

hereinafter described, a web 51 from one of the rolls of paper 19 is fed between the printing cylinder 20 and the impression cylinder 29, thence over suitable steam drying coils 52 of any suitable type, thence between the printing cylinder 21 and the impression cylinder 30, thence over other steam drying coils 53 to a slitting device 54 of any suitable type. The two portions of the web separated by the slitting device 54 are superposed upon each other by means of angle bars 55—56 of any suitable type, whence they are run together over a former 57 by which they are given a longitudinal fold preparatory to being perfected for delivery by any suitable type of folding device not shown. The slitting device 54, the angle bars 55—56, and the former 57 are supported in position by a suitable framework 58. The web 51, in the construction shown, is led over and about a considerable number of guide rollers which it is not believed to be necessary to describe or to refer to specifically. Two driven rollers 59—60 are provided supported by the framework 58, driven by suitable gearing from a longitudinally-extending shaft 61 which in turn is driven by bevel gears 62—63 from a vertically-extending shaft 64 driven by means of bevel gears 65—66 from a shaft 67. The folding device is also preferably driven from the shaft 67.

The means for driving the press comprises a motor 68 of any suitable type provided with a pinion 69 on the armature shaft 70. A gear 71 is revolubly mounted upon a shaft 72, being adapted to be operatively connected with said shaft so as to rotate therewith by means of a suitable clutch mechanism 73 which is adapted to be thrown into and out of operation by means of a yoke lever 74 pivotally mounted upon the framework of the press. The shaft 72 is connected by means of bevel gears 75—76 with a main driving shaft 77 of the press. The driving shaft 77 is connected by means of bevel gears 78—79 with a transversely-extending shaft 80, and is connected by means of bevel gears 81—82 with a transversely extending shaft 83 at the opposite end of the machine. The gears 79—82 are connected to the shafts 80—83, respectively, by means of suitable ratchet mechanism comprising dogs 84—85 mounted upon the gears adapted to engage suitable ratchet wheels 85<sup>a</sup> mounted upon the shafts. As is best shown in Fig. 3, the gear 79 is adapted to drive the shaft 80 in clockwise direction in Fig. 3. The arrangement of the ratchet mechanism by which the gear 82 is connected to the shaft 83 is reversed, whereby the gear 82 is adapted to drive the shaft 83 in the opposite direction. The shaft 77 is provided at one end with a gear 77<sup>a</sup> which meshes with a smaller gear 77<sup>b</sup> mounted

upon the shaft 67 for driving the folding device and the rollers 60 and 59, as above described. The shafts 80 and 83 serve through the medium of trains of gears to drive the cylinders 20—21, said trains comprising gears 86, 87 and 88 and 86<sup>a</sup>, 87<sup>a</sup> and 88<sup>a</sup>, respectively. With the motor 68 rotating in counterclockwise direction in Fig. 1, and with the clutch 73 in operation for connecting the gear 71 with the shaft 72, the printing cylinder 20 will be driven at the desired speed in counterclockwise direction in Fig. 1, and the printing cylinder 21 will be driven in clockwise direction in said figure, as will be readily understood.

Additional means is provided for driving the printing cylinders 20—21 at a slower speed when the impression cylinders 29—30 have been moved upward out of operative engagement with the printing cylinders 20—21. This rotation of the printing cylinders 20—21 independently of the remainder of the press is provided in order to keep the design upon the printing cylinder in proper condition for printing, this result being attained by the rotation of such printing cylinders in the color receptacles 22, thus preventing the drying of the color upon the designs. In the construction shown means is provided whereby the operation of moving the impression cylinders out of contact with the printing cylinders acts automatically to shift the driving means from the operative full-speed driving of the whole press to the slow-speed driving of the printing cylinders 20—21 independently of the remainder of the press and the folding device.

The means by which the slow-speed driving of the printing cylinders is effected comprises a gear 89 mounted upon a short shaft 90, said gear being in mesh with the driving gear 69 of the motor. The shaft 90 is provided with a worm 91 which meshes with a worm gear 92 mounted upon a longitudinally-extending shaft 93. The gear 92 is provided with pawl and ratchet mechanism similar to that shown in Fig. 3 by which the gear is operative for driving the shaft 93 in the direction indicated by the arrow upon the shaft 93 in Fig. 2, but is adapted to permit the said shaft 93 to rotate at a greater speed in the same direction independently of the said gear 92. The shaft 93 in turn is connected by means of spiral gears with the shafts 80—83, said shaft 93 being provided with spiral gears 94—95 which mesh with spiral gears 96—97 mounted upon the shafts 80—83, respectively.

When the motor 68 is driving the entire press through the clutch 73, the shaft 93 will be driven at comparatively high speed in the direction indicated by the arrow thereon in Fig. 2, the pawl and ratchet connection between the shaft 93 and the gear 92

permitting such rotation of the shaft 93 independently of the much slower rotation of the gear 92 in the same direction. When the clutch 73 is thrown out of operation, the connection between the motor and the printing cylinders through the shafts 72 and 77 is broken. The connection between the motor and the printing cylinders is then maintained through the gear 89, the shaft 90, the worm 91, the worm gear 92, the shaft 93, and the spiral gears 94, 95, 96 and 97, which drive the shafts 80—83 in the same direction as formerly but at a very much reduced speed. By reason of the pawl and ratchet connection between the shafts 80—83 and the gears 79—82, the slow-speed rotation of said shafts through the medium of the shafts 90 and 93 does not serve to rotate the shaft 77, whereby the entire press including the folding devices is permitted to remain silent with the exception of the printing cylinders 20 and 21.

The means for throwing the clutch 73 out of operation for transferring from the full-speed driving of the entire press to the slow-speed driving of the printing rollers alone comprises a lever 98 pivotally mounted upon the framework 15 carrying at one end a lug or roller 99 overlying an arm 100 carried by the slide-block 31 upon which the impression cylinder 29 is revolvably mounted. The opposite end of the lever 98 is pivotally connected to a link 101, the lower end of which (see Fig. 6) is pivotally connected to one arm of a bell-crank lever 102, the other arm of which is pivotally connected to a link 103 which has pivotal connection with the clutch-shifting lever 74. A spring 104 is interposed between a portion of the framework 15 and a collar 105 fixedly mounted upon the link 103, serving to hold the link 103 yieldingly in the position which it occupies when the clutch 73 is in operative position. When the shaft 46, or the hand wheel 43, is rotated for effecting an upward adjustment of the impression cylinder 29, the arm 100 serves to swing the lever 98, moving the link 101 downward and throwing the link 103 to the left in Fig. 6, serving to move the clutch 73 out of operative position, and serving thus to effect the slow-speed driving of the cylinders 20—21 in lieu of the high-speed driving of the entire press.

What I claim as my invention and desire to secure by Letters Patent, is:

1. A printing press comprising cooperating printing and impression cylinders, means adapted to be operated to separate said printing and impression cylinders, and means for driving said printing cylinder at normal speed when printing and at reduced speed when idle.

2. A printing press comprising cooperating printing and impression cylinders, 130

means adapted to be operated to separate said printing and impression cylinders, and means operated by the separation of said cylinders for reducing the speed of said printing cylinder.

3. A printing press comprising cooperating printing and impression cylinders, means adapted to be operated to move said impression cylinder away from said printing cylinder, and means for driving said printing cylinder at normal speed when printing and at reduced speed when idle.

4. A printing press comprising cooperating printing and impression cylinders, means adapted to be operated to move said impression cylinder away from said printing cylinder, and means operated by the movement of said impression cylinder away from said printing cylinder for reducing the speed of said printing cylinder.

5. A printing press comprising cooperating printing and impression cylinders, an ink reservoir into which said printing cylinder dips, means adapted to be operated to separate said printing and impression cylinders, and means for driving said printing cylinder at normal speed when printing and at reduced speed when idle.

6. A printing press comprising cooperating printing and impression cylinders, an ink reservoir into which said printing cylinder dips, means adapted to be operated to separate said printing and impression cylinders, and means operated by the separation of said cylinders for reducing the speed of said printing cylinder.

7. A printing press comprising cooperating printing and impression cylinders, an ink reservoir into which said printing cylinder dips, means adapted to be operated to move said impression cylinder away from said printing cylinder, and means for driving said printing cylinder at normal speed when printing and at reduced speed when idle.

8. A printing press comprising cooperating printing and impression cylinders, an ink reservoir into which said printing cylinder dips, means adapted to be operated to move said impression cylinder away from said printing cylinder, and means operated by the movement of said impression cylinder away from said printing cylinder for reducing the speed of said printing cylinder.

9. A printing press comprising a plurality of sets of cooperating printing and impression cylinders, means adapted to be operated to simultaneously separate the printing and impression cylinders of said sets, and means for driving said printing cylinders at normal speed when printing and at reduced speed when idle.

10. A printing press comprising a plurality of sets of cooperating printing and impression cylinders, means adapted to be

operated to simultaneously separate the printing and impression cylinders of said sets, and means operated by the separation of said cylinders for simultaneously reducing the speed of said printing cylinders.

11. A printing press comprising a plurality of sets of printing and impression cylinders, a motor, means operated by said motor to simultaneously separate the printing and impression cylinders of said sets, and means for driving said printing cylinders at normal speed when printing and at reduced speed when idle.

12. A printing press comprising a plurality of sets of printing and impression cylinders, a motor, means operated by said motor to simultaneously separate the printing and impression cylinders of said sets, and means operated by the separation of said cylinders for reducing the speed of said printing cylinders.

13. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, means for rotating said printing cylinders at normal operative speed, additional means adapted alternatively for rotating said cylinders at a slower speed, means for moving said impression cylinders out of operative position relative to said printing cylinders, and means adapted when said impression cylinders are moved out of operative position to shift the driving means from the normal operative speed driving of said printing cylinders to the alternative slow speed driving.

14. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, a motor, driving connections between said motor and said printing cylinders for rotating the cylinders at normal operative speed, other connections between said motor and said printing cylinders adapted alternatively for rotating said cylinders at a slower speed, means for moving said impression cylinders out of operative position relative to said printing cylinders, and means adapted when said impression cylinders are moved out of operative position to throw out of operation the high speed driving connections between said motor and said printing cylinders.

15. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, a motor, driving connections between said motor and said printing cylinders for rotating the cylinders at normal operative speed but adapted to permit said cylinders to rotate in the same direction independently of driving through said connections, other connections between said motor and said printing cylinders adapted alternatively for rotating said cyl-

inders at a slower speed but adapted to permit said cylinders to be rotated in the same direction at the normal high speed, means for moving said impression cylinders out of operative position relative to said printing cylinders, and means adapted when said impression cylinders are moved out of operative position to throw out of operation the high speed driving connections whereby the low speed connections are rendered effective for driving the printing cylinders in the same direction.

16. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, a motor, driving connections between said motor and said printing cylinders for rotating the cylinders at normal operative speed but adapted to permit said cylinders to rotate in the same direction independently of driving through said connections, said driving connections comprising a clutch adapted to be thrown out of operation for breaking said connections between the motor and the printing cylinders, other connections between said motor and said printing cylinders adapted alternatively for rotating said cylinders at a slower speed but adapted to permit said cylinders to be rotated in the same direction at the normal high speed, means for moving said impression cylinders out of operative position relative to said printing cylinders, and means adapted when said impression cylinders are moved out of operative position to throw said clutch out of operation whereby the low speed connections are rendered effective for driving the printing cylinders in the same direction.

17. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, a motor, driving connections between said motor and said printing cylinders for rotating the cylinders at normal operative speed but adapted to permit said cylinders to rotate in the same direction independently of driving through said connections, said driving connections comprising a clutch adapted to be thrown out of operation for breaking said connections between the motor and the printing cylinders, other connections between said motor and said printing cylinders adapted alternatively for rotating said cylinders at a slower speed but adapted to permit said cylinders to be rotated in the same direction at the normal high speed, means for moving said impression cylinders out of operative position relative to said printing cylinders, yielding means tending to hold said clutch in operative position, and a train of links and levers adapted when said impression cylinders are moved out of operative position to throw said clutch at the same

time out of operation against the action of said spring whereby said low speed driving connections are permitted to drive said printing cylinders.

18. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, shafts by the rotation of which said printing cylinders are driven, gears mounted on said shafts adapted to drive the shafts in one direction but adapted to permit the shafts to rotate in the same direction independently of the gears, a motor, connections between said motor and said gears, comprising a clutch by which said connections may be made and broken, other connections between said shafts and said motor adapted to drive said shafts in the same direction at a slower speed, and means for throwing said clutch into and out of operation.

19. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, shafts by the rotation of which said printing cylinders are driven, a motor, a gear driven by said motor, connections between said gear and said shafts adapted to drive said shafts in one direction but adapted to permit said shafts to rotate in the same direction independently of said gear, and other connections between said motor and said shafts adapted to permit said shafts to rotate at a higher speed than that at which they are driven through said gear.

20. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, shafts by the rotation of which said printing cylinders are driven, a motor, a gear driven by said motor, connections between said gear and said shafts adapted to drive said shafts in one direction but adapted to permit said shafts to rotate in the same direction independently of said gear, and other connections between said motor and said shafts adapted to permit said shafts to rotate at a higher speed than that at which they were driven through said gear, said last-named connections comprising a clutch by which the said connections may be made and broken as desired.

21. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with said printing cylinders, shafts by the rotation of which said printing cylinders are driven, a motor, a gear driven by said motor, connections between said gear and said shafts adapted to drive said shafts in one direction but adapted to permit said shafts to rotate in the same direction independently of said gear, and other connec-



tions between said motor and said shafts adapted to drive said shafts at a higher speed than that at which they are driven through said gear and adapted to permit the  
5 said shafts to rotate in the same direction independently of said connections.

22. In a printing press, the combination of a plurality of printing cylinders, impression cylinders adapted to cooperate with  
10 said printing cylinders, shafts by the rotation of which said printing cylinders are driven, a motor, a gear driven by said motor, connections between said gear and said shafts adapted to drive said shafts in

one direction but adapted to permit said 1 shafts to rotate in the same direction independently of said gear, and other connections between said motor and said shafts adapted to drive said shafts at a higher speed than that at which they are driven 20 through said gear and adapted to permit the said shafts to rotate in the same direction independently of said connections, said last-named connections comprising a clutch by which the said connections may be made and 25 broken as desired.

ERNEST JAMES SMITH.