

W. H. SMITH.
PRINTING PRESS.
APPLICATION FILED NOV. 26, 1910.

1,040,448.

Patented Oct. 8, 1912.

3 SHEETS—SHEET 1.

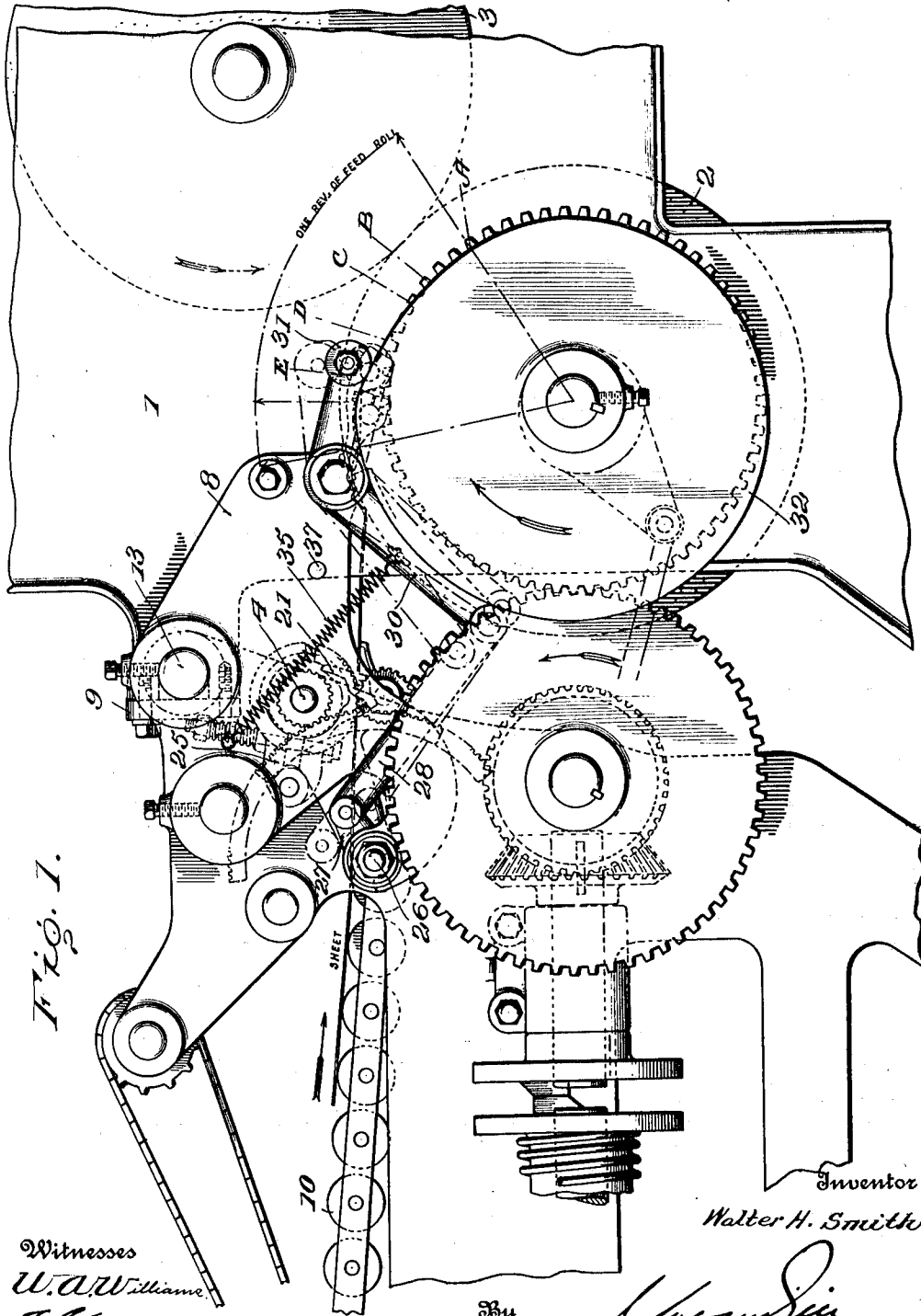


Fig. 1.

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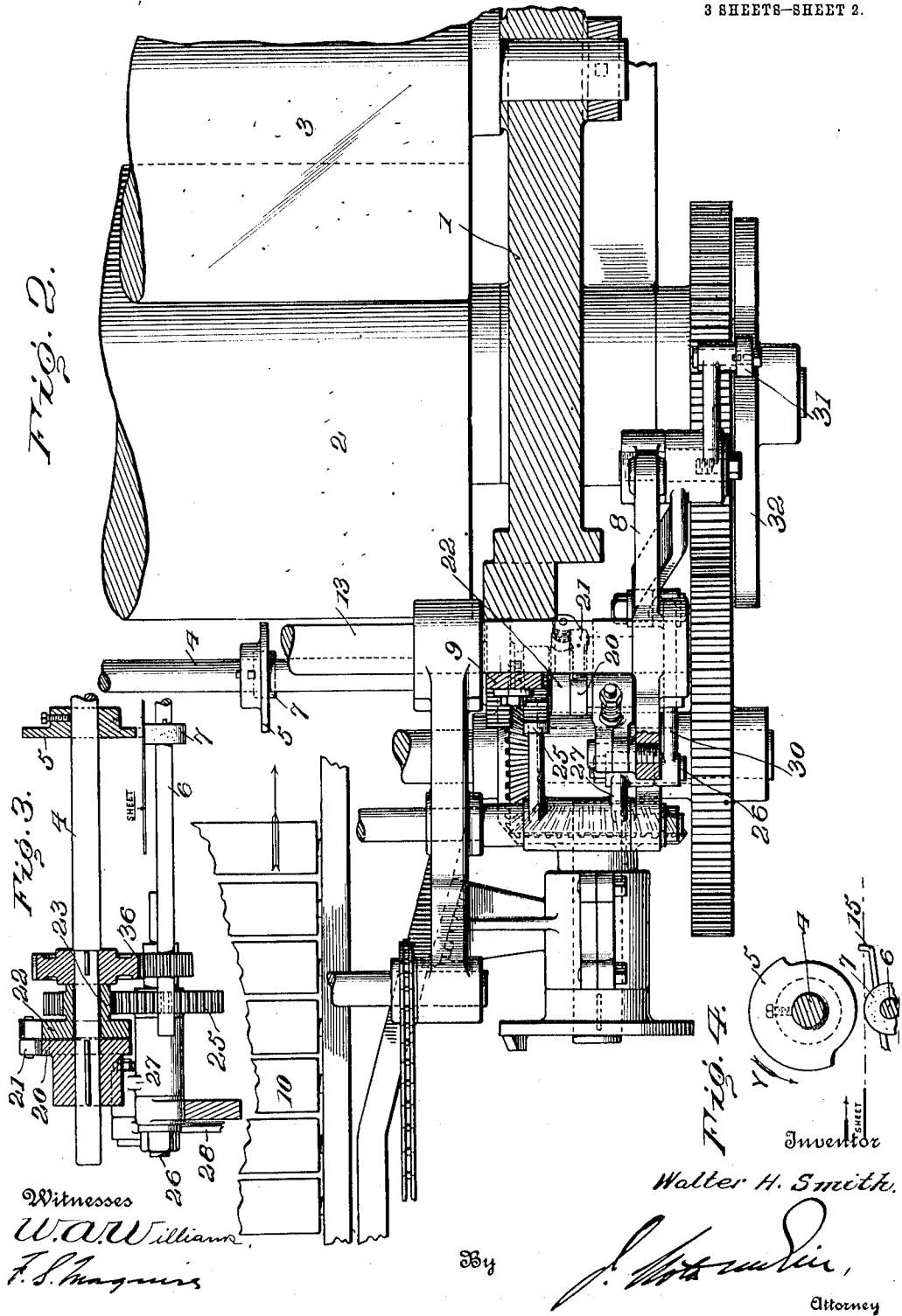
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3 SHEETS-SHEET 3.

Fig. 5.

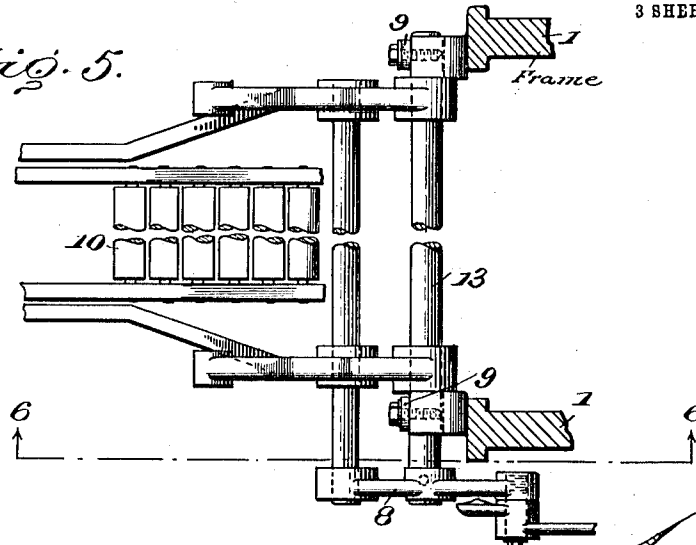


Fig. 6.

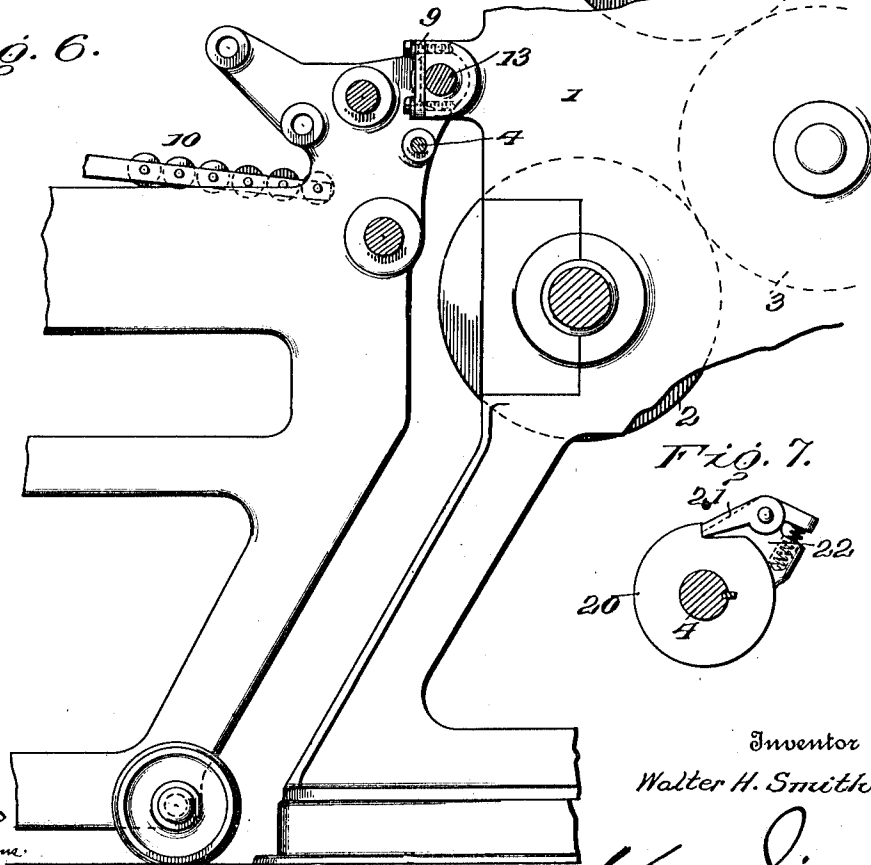
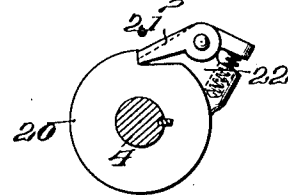


Fig. 7.



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UNITED STATES PATENT OFFICE.

WALTER H. SMITH, OF NILES, OHIO, ASSIGNOR TO THE HARRIS AUTOMATIC PRESS COMPANY, OF NILES, OHIO, A CORPORATION OF OHIO.

PRINTING-PRESS.

1,040,448.

Specification of Letters Patent.

Patented Oct. 8, 1912.

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To all whom it may concern:

Be it known that I, WALTER H. SMITH, of Niles, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Printing-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of printing presses having stops on one of the rotating cylinders and means for feeding stock up to the stops at a speed greater than the speed of rotation of the cylinder, such means being shown in patent to Charles G. Harris No. 577,299, dated February 16, 1897.

The present invention has special reference to the means for driving the feed rolls by which the stock is given the necessary accelerated motion to enable it to be fed up to the stops on the press cylinder; and the primary object is to enable the driving means to be readily adjusted to obtain at any predetermined point in the revolution of the cylinder the variable speed necessary in feeding the stock to register with the stops of the cylinder while in motion.

A further object is to enable the feed-rolls and their support to be moved bodily away from the press without disturbing the relation of the prime mover to the press, whereby even though there be a change in the positions of the press cylinders while the feed-rolls and their support are removed from the press, the operation of the feed rolls will be properly timed when restored to working position relatively to the press cylinders.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of a portion of a printing press equipped with my present improvements. Fig. 2 is a plan view thereof, with parts broken away. Fig. 3 is an enlarged sectional view showing portions of the two feed-roll shafts and the operating means therefor. Fig. 4 is a side elevation of two of the feed-rolls. Fig. 5 is a fragmentary plan view, with parts omitted and others broken away. Fig. 6 is a fragmentary side view showing the feeder frame connected to the press frame. Fig. 7 shows the pawl engaging the one tooth ratchet.

Referring to the drawings, 1 designates the frame of a printing press, a portion only of which is shown; 2 the impression cylinder, and 3 a second cylinder for co-acting with the impression cylinder, and which may be either a plate carrying cylinder in a two-cylinder press, or the transfer cylinder in an off-set press.

4 is the shaft of the upper feed rolls, one of which latter is shown at 5; and 6 is the shaft of the lower feed rolls, one of which is shown at 7. These shafts, 4 and 6, are mounted at their ends in the housings 8 which form portions of a supplemental frame which is detachably secured to press frame 1 by bolted cap plates of said frame, one of which is shown at 9. It will be understood that the housing 8 is the same at both sides of the machine. This supplemental frame forms the forward end of the support for the conveyer, portions of which are shown at 10, by which the stock is carried from a support or feed table to the feed rolls. A tie rod 13 extending transversely of the press frame is held in cut outs of the latter by cap plates 9.

The upper feed-rolls 5 have effective peripheries for only about one-half of their diameters, the remaining one half being cut away or reduced. These upper feed-rolls and their shafts are intended to make one complete revolution in each operation, and when idle such rolls stand about in the position shown in Fig. 4 so that the cut-away portion thereof will be directly above the lower feed-rolls. The object of providing the upper feed rolls with segmental peripheral reductions is to allow stock to be readily passed between the upper and lower feed-rolls and against stops 15 which are intended to be moved out of the way by known means, not shown, when the stock is being fed forward by the feed rolls. The latter must remain stationary during the greater portion of the cycle of operation of the press; and according to my invention they are given a variable speed, that is to say, when the upper feed-rolls engage the stock their speed is less than that of the press cylinder in order not to mar or mark the stock, and avoid slipping between the rolls and the stock. As soon, however, as the rolls have firmly taken hold of the stock their speed is increased and thus an accelerated motion will be imparted to the stock to enable it to

travel at a speed greater than the face speed of the cylinder and overtake the stops thereon. The point in the cycle of operation at which the accelerated motion is to be imparted to the feed-rolls is, according to my invention, capable of being readily adjusted so that the amount of overfeed, or the relative time at which the overfeed takes place, may be regulated.

The upper feed-roll shaft 4 has a one tooth ratchet-disk 20, the hub of which is keyed to said shaft. This tooth is designed to be engaged by a pawl 21 mounted on a laterally projecting pivot of a pawl carrier 22, the hub of which is formed with or secured to a pinion 23, such carrier and pinion being loose on the feed-roll shaft. For rotating the pawl carrier in opposite directions, in one of which it carries the upper feed-roll and its shaft, I provide a toothed sector 25 whose shaft 26 is mounted in the supplemental frame, and an arm 27 of said shaft is connected by a link 28 to one end of a lever 30, the short arm of which carries a roller 31 which engages a prime mover shown in the form of a cam disk 32 by which lever 30 is caused to move sector 25 in one direction such sector being moved in the opposite direction by the recoil action of a spring 35. When sector 25 is moved downwardly the pawl 21 upon engaging the single tooth of ratchet 20 will effect the revolution of feed roll shaft 4 in the direction indicated by arrow Y in Fig. 4. The completion of this revolution is coincident with the downward travel of the sector, and upon the return stroke of the latter the pawl carrier and the pawl are given a reverse movement, the feed roll shafts remaining idle. At the completion of this reverse movement the pawl will lie in close proximity to, but not in engagement with, the single tooth of the ratchet, so that the pawl will have a slight forward movement, in the next cycle of operation before engaging the tooth. The feed roll shafts 4 and 6 carry intermeshing pinions shown at 36.

In order to make variable the speed of the feed rolls the cam 32 is of special formation, permitting the amount of overfeed or relative time at which the overfeed takes place, to be varied. As stated, the cam forming the prime mover, is shown as adjustably located on the shaft of the impression cylinder. This is preferable, although it may be otherwise located provided its operation be timed with that of the impression cylinder. This cam is so formed that it will first impart a gradual movement to the feed rolls which will be slower than the face speed of the cylinder at the time the stock is gripped between the lower feed rolls and the effective portions of the upper feed rolls; and thereafter impart to the stock a speed greater than the face speed of the cylinder

carrying the stops, such speed increasing until the stock arrives at the stops and the grippers carried by the cylinder close onto the stock to hold it to the cylinder. At this point the feed-rolls will release the stock but will continue to revolve until they have completed one revolution, when they will be again in the position shown in Fig. 4. I have indicated by dotted lines in Fig. 1 the effective area on the periphery of the prime mover which effects the downward stroke of the sector to cause one revolution of the upper feed-roll shaft. It will be noted that the cam disk 32 first acts gradually upon the lever 30, the initial movement of which, acting through the sector, causes the pawl carrier to travel the necessary distance to permit the pawl to engage the single tooth of disk 20. The portion of the cam which so acts on the lever is indicated in Fig. 1 between the points A and B; at the point B the feed rolls start to turn; at the point C they begin to grip the stock; at the point D the stock arrives beneath the overhanging ends of the grippers of the impression cylinder; and at the point E the stock arrives at the guides or stops, being overfed thereto at an accelerated speed, and the grippers then close. At the same time the effective portions of the peripheries of the upper feed-rolls disengage the stock. It will be noticed that the most pronounced eccentricity in the periphery of the cam is between the points D and E where the necessary acceleration in the travel of the stock is required to effect the overfeed to the guides or stops. The cam disk will continue to act on lever 30 until the upper feed-rolls have been returned to their starting position. The cam then ceases to act on lever 30, and as the reduced portion of the cam disk comes beneath roller 31 of said lever the latter will be acted upon by spring 35 to move sector 25 in the reverse direction to reposition the pawl in line with the tooth in the ratchet disk. I provide a suitable stop, shown at 37, for limiting the movement of lever 30 under the action of its spring, such stop being necessary only when the feed-rolls and their shafts, together with the supplemental frame, are detached and moved bodily away from the press frame. It will be noted that the accelerated motion of the feed-rolls may be imparted thereto at any predetermined point in their revolution; it being necessary merely to adjust the position of cam 32 relatively to the impression cylinder. In this way it is possible to vary the amount of overfeed as well as the time at which it takes place.

After the effective portions of the upper feed-rolls have disengaged the stock, the remaining one-half revolution of such rolls can be performed at a comparatively longer period of time, and they can be brought to

rest gradually to insure being correctly positioned for the next cycle of operation.

In many styles of printing presses, it is desirable, for various reasons, to be able to remove the feed-rolls and their operating mechanism from the press. This, according to my invention, I am enabled to do, but without disturbing the prime mover, which should always be in fixed relation to the press cylinders. Upon withdrawing the feed-rolls and their supporting frame, it is immaterial whether or not the press cylinders be revolved during the time the feed-rolls are being disengaged from the press, since upon reconnecting the feed-rolls, their operation will be properly timed by the engagement of the cam with the actuating lever. Hence the feed-rolls may be disconnected and again placed in position without any lost motion occurring between the driving shaft and the actuating mechanism of the feed-rolls. This is of decided advantage, since with such feed-rolls it is essential to obviate, as far as possible, all danger of lost motion.

I claim as my invention:—

1. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, and adjustable means for imparting a gradually increasing speed to the last mentioned means.

2. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, and means for imparting a gradually increasing speed to said feed-rolls.

3. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, and means for imparting to said feed-rolls first a slow motion and then an accelerated motion.

4. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, and adjustable means for imparting to said feed-rolls first a slow motion and then an accelerated motion.

5. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, shafts carrying said feed-rolls, a disk fast on the shaft of one set of rolls, a pawl for engaging said disk at a single point, a pawl-carrier loose on said latter shaft, and means for completely rotating said pawl member first in

one direction and then in the other once in each cycle of operation of the feed rollers, said pawl effecting a complete revolution of said disk and the feed roller shaft upon which it is mounted.

6. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, shafts carrying said feed-rolls, gearing between said shafts, the rolls of one set having segmental effective peripheries, a disk fast on the shaft of the latter rolls, a pawl for engaging said disk at a single point, a pawl-carrier loose on said latter shaft, and means for reciprocating said pawl-carrier once in each cycle of operation of the feed-rolls.

7. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, shafts carrying said feed-rolls, gearing between said shafts, a disk fast on the shaft of one set of rolls, said disk having a single tooth, a pawl for engaging said tooth, a pawl-carrier loose on said latter shaft, and means for completely rotating said pawl member first in one direction and then in the other once in each cycle of operation of the feed rollers, said pawl effecting a complete revolution of said disk and the feed roller shaft upon which it is mounted.

8. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, a separable frame supporting said feed-rolls and detachably secured to the press frame, means for actuating the feed-rolls carried by said separable frame, and a prime mover for said actuating means carried by said cylinder.

9. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, a separable frame supporting said feed-rolls and detachably secured to the press frame, means for actuating the feed-rolls carried by said separable frame, and a prime mover for said actuating means carried by and adjustable relatively to said cylinder.

10. In a printing press, a rotary cylinder provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, a separable frame supporting said feed-rolls and detachably secured to the press frame, means for actuating the feed-rolls carried by said separable frame, and a cam disk movable with the press cylinder for imparting to said

feed-rolls through said actuating means first a slow movement and then an accelerated travel.

11. In combination with a rotary cylinder
5 provided with stops on its periphery, means for feeding stock on said cylinder against said stops while the same is in motion, comprising two sets of feed-rolls, shafts carrying said feed-rolls, gearing between said
10 shafts, rotating means for intermittently engaging one of said shafts and comprising an actuating lever, a separable frame supporting said feed-roll shafts and rotating means,

said separable frame being detachably secured to the press frame, a cam operable 15 with the press cylinder for actuating said lever in one direction, and a spring for moving said lever in the opposite direction.

In testimony whereof, I have signed this specification in the presence of two subscrib- 20 ing witnesses.

WALTER H. SMITH.

Witnesses:

J. NOTA MCGILL.

C. G. PRITCHARD.