A. F. HARRIS.

PRINTING PRESS.

APPLICATION FILED AUG. 6, 1915.

1,307,969.

Patented June 24, 1919.

5 SHEETS—SHEET 1.

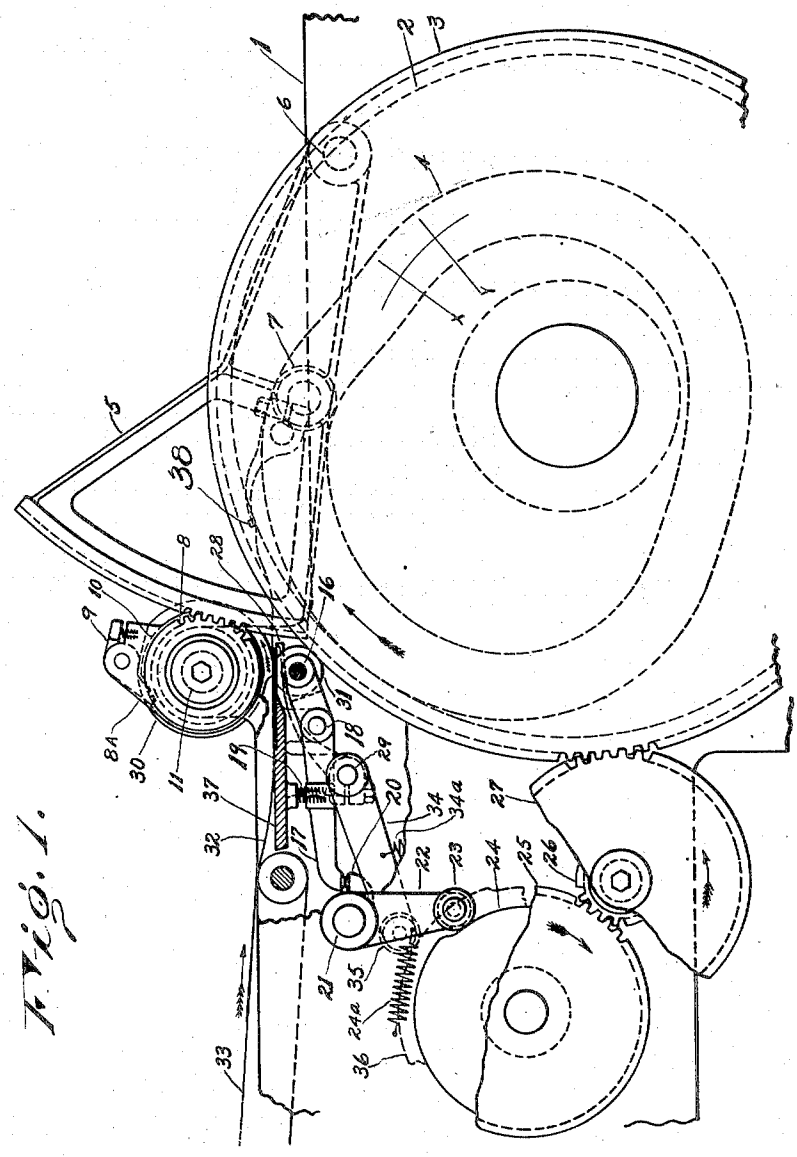


Fig. 1.

WITNESS

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5 SHEETS—SHEET 2.

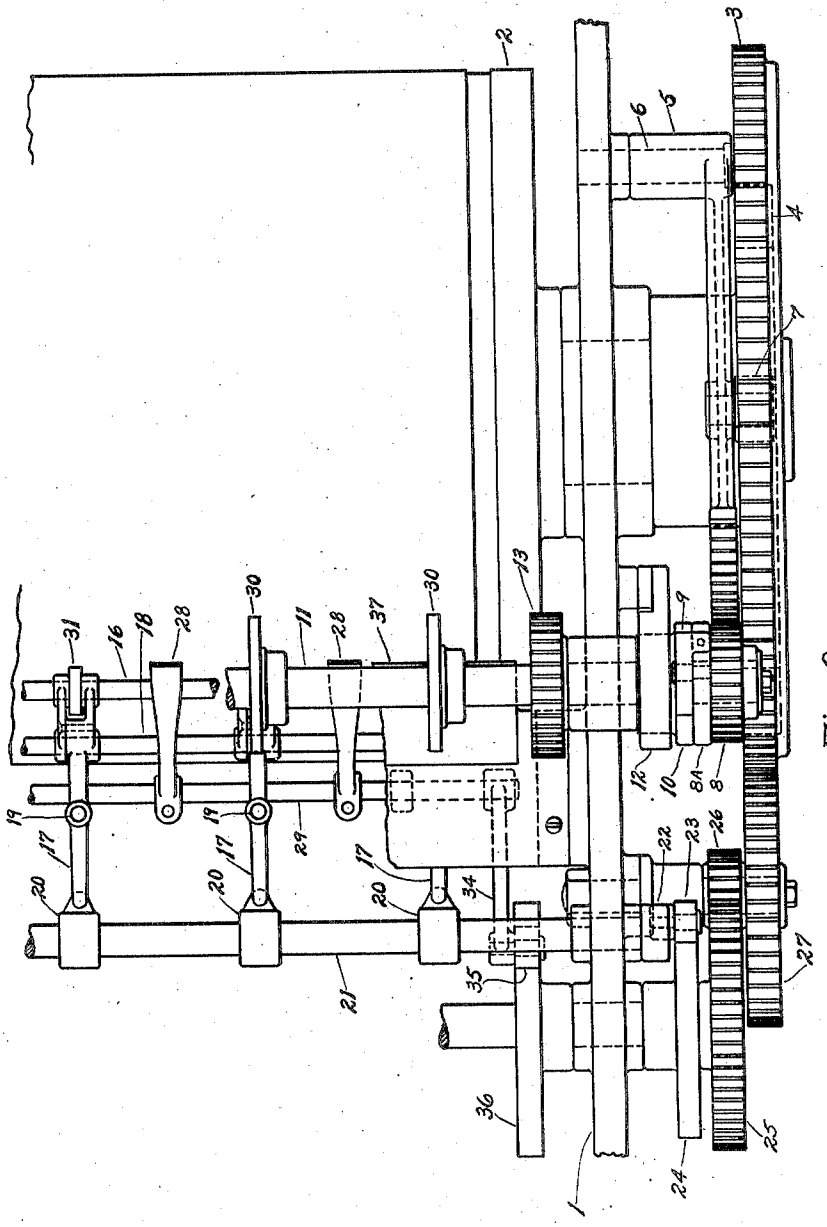


Fig. 2

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5 SHEETS—SHEET 3.

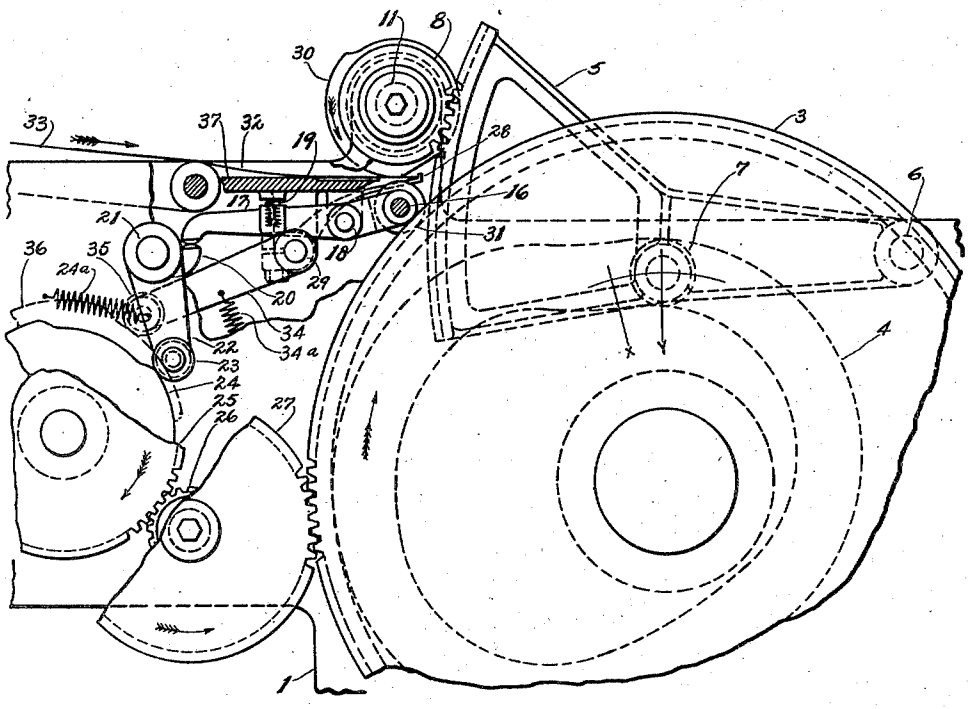


Fig 4

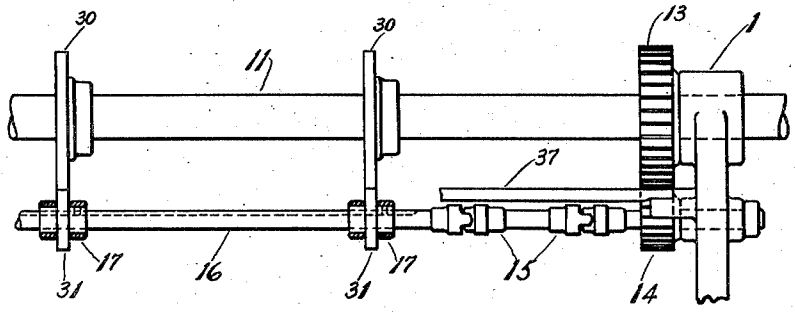


Fig. 3

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5 SHEETS—SHEET 4.

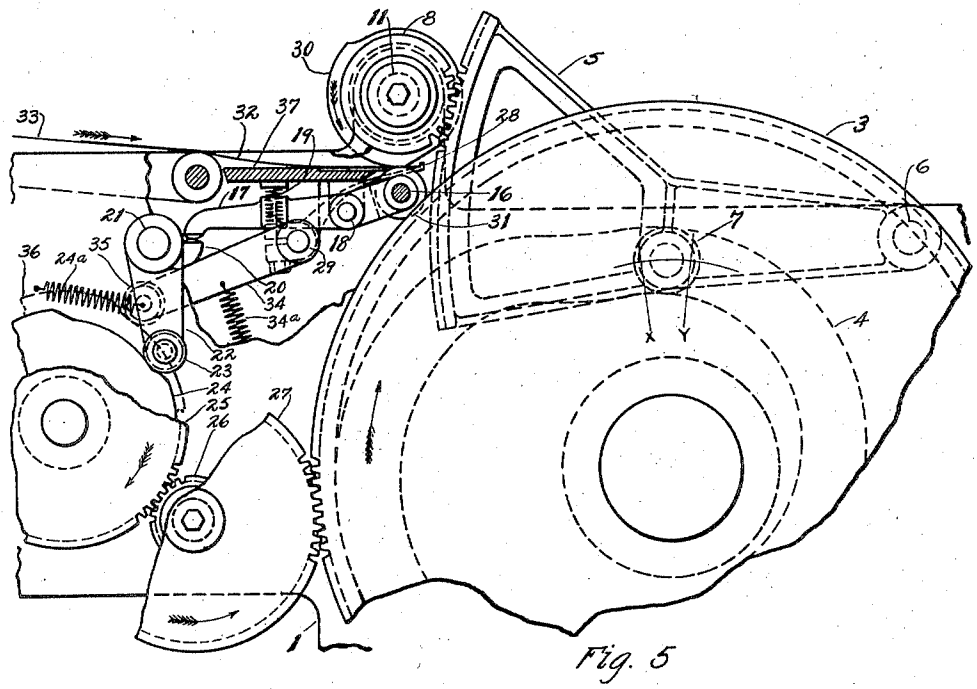


Fig. 5

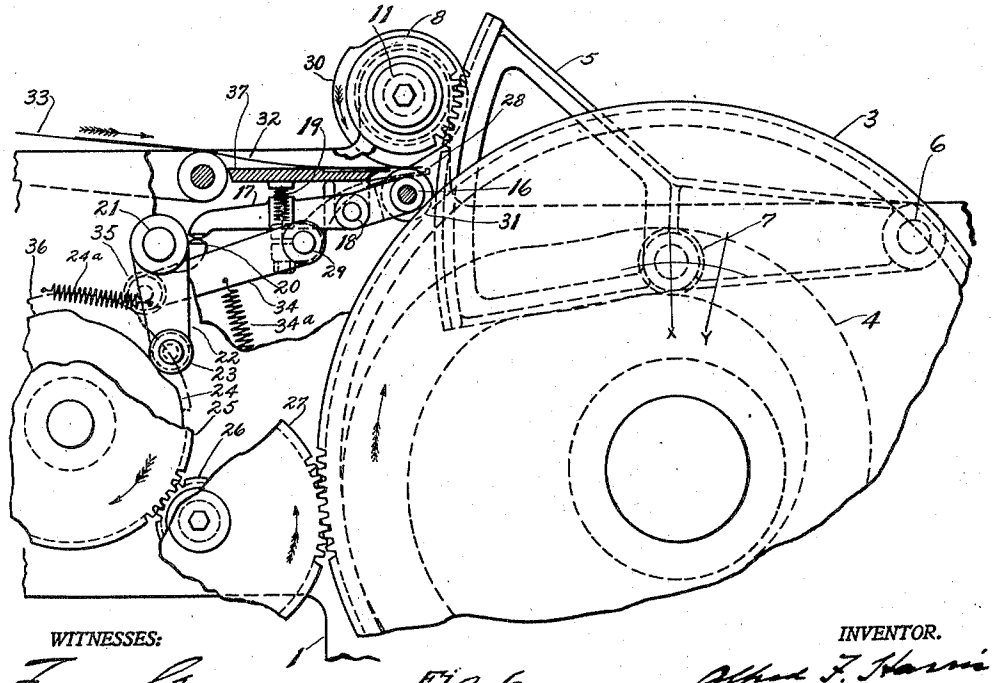


Fig. 6

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APPLICATION FILED AUG. 6, 1915.

1,307,969.

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5 SHEETS—SHEET 5.

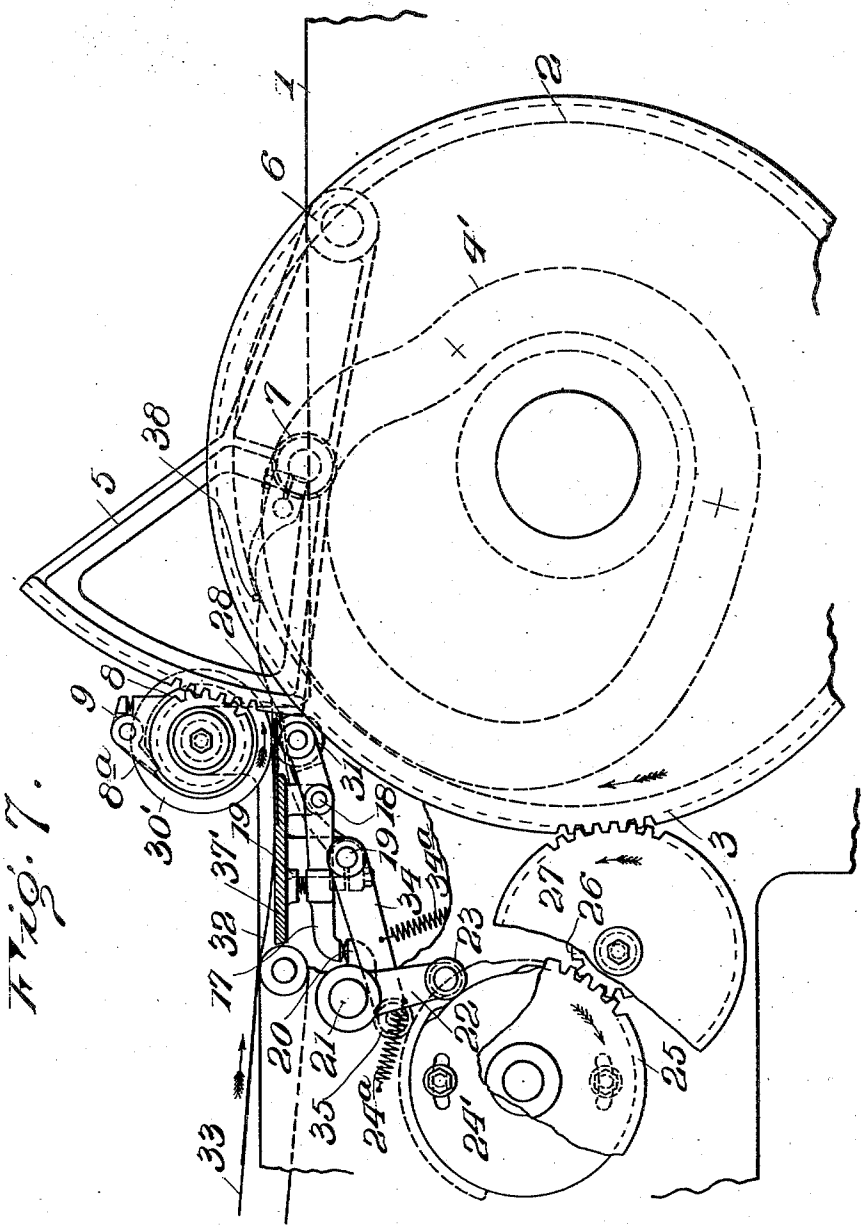


Fig. 1.

WITNESS

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UNITED STATES PATENT OFFICE.

ALFRED F. HARRIS, OF WARREN, OHIO, ASSIGNOR TO THE HARRIS AUTOMATIC PRESS COMPANY, OF NILES, OHIO, A CORPORATION OF OHIO.

PRINTING-PRESS.

1,307,969. Specification of Letters Patent. Patented June 24, 1919.

Application filed August 6, 1915. Serial No. 44,033.

To all whom it may concern:

Be it known that I, ALFRED F. HARRIS, of Warren, 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.

In the well-known Harris rotary press wherein the stock is fed to stops on the rotating press-cylinder at a speed greater than the speed of rotation of the cylinder, care has to be exercised in setting the feed-rolls, since according to the means heretofore employed each sheet or piece of stock is taken up by the rolls while they are in motion, and hence if there is the least variation between the different feed-rolls the sheet is liable to be wrinkled or improperly fed.

In Letters Patent to Walter H. Smith No. 1,040,448, dated October 8, 1912, and which had reference to the Harris rotary press, the two feed-rolls are positively driven at equal surface speeds, but the surface contact of one of the rolls is relieved or cut away, but in this instance, as in that of patent to Charles G. Harris No. 577,299, dated February 16, 1897, the sheet is gripped between the feed-rolls while the latter are in motion, but in the later patent the speed of the rolls is gradually increased instead of being constant as in the earlier patent.

In both instances care has to be exercised in setting the feed-rolls for the reason above stated. The object of my invention is to overcome this difficulty, and this I accomplish by having the engagement between the stock and the feed-rolls occur while all three elements are at rest, thus eliminating any possibility of the sheet shifting as the rolls take hold, and enabling the sheet to remain in engagement with the front stop-fingers until the feed-rolls have taken hold thereof, whereas under the former construction it was necessary to lower the stops an appreciable time before the feed-rolls caught the sheet, and in the interval there was danger of the sheet shifting its position, at least to a slight extent.

In the accompanying drawings, Figure 1 shows in side elevation a portion of a press constructed in accordance with my present improvements. Fig. 2 is a fragmentary plan view with parts broken away. Fig. 3 is an elevation, partly in section, showing two of the upper and lower feed-rolls. Figs. 4, 5 and 6 are in the main similar to Fig. 1 showing the parts in different relative positions. Fig. 7 shows a modified form of upper feed-rolls.

Referring to the drawings, 1 designates the press frame, a portion only of which is shown; 2 the impression cylinder; 3 the gear of the impression cylinder; and 4 a cam groove carried by such gear for operating a sector 5 pivoted at 6 and by which an intermittent rotary motion is imparted to the feed-rolls. I have shown sector 5 as having a roller 7 fitting in cam groove 4 by means of which the sector is rocked. This sector meshes with a gear pinion 8 loose on the upper feed-roll shaft 11 and carrying a pawl 9 which drives a ratchet 10 keyed to said shaft, the construction employed being substantially that pointed out in the above mentioned Smith patent. The ratchet 10 has one notch and is driven forward one complete revolution in each complete cycle of the sector, or each revolution of the impression cylinder, which directly drives the cam 4. At 12 I have shown a brake which steadies the feed-rolls by taking up any play or back lash and prevents any rebound or running ahead. On shaft 11 is a gear 13 which meshes with a pinion 14 on the lower feed-roll shaft 16, which latter embodies in its construction universal joints 15 to allow the desired up and down movement to the lower feed-roll shaft, such movement being necessary in order to cause the lower feed rolls 31 to engage the upper feed-rolls 30.

Various means may be employed for imparting the necessary up and down movement to the lower feed-roll shaft, but the means shown by me for that purpose comprises a series of levers 17 fulcrumed on a hanger shaft 18 and at their forward ends forming bearings for the feed-roll shaft 16. These levers 17 are constantly under the tension of springs 19 which tend to raise the lower feed-rolls into engagement with the upper feed-rolls. These levers 17 may be rocked on their pivots to effect the disengagement of the lower feed-rolls, and the means shown for accomplishing this purpose comprises fingers 20 extending laterally from a shaft 21 which is oscillated by an arm 22 whose roller 23 is engaged by

a constantly-rotating cam 24, such cam being rotated by gearing 25, 26 and 27 driven by cylinder gear 3. Normally the cam 24 so acts on arm 22 as to hold the lower feed-rolls 31 out of engagement with the upper feed-rolls 30, but when the roller 23 of arm 22 is drawn against the reduced portion of cam 24 by the influence of a spring 24^a the levers 17 are allowed to rock under the influence of springs 19 and thereby elevate the lower feed-rolls 31 into engagement with the upper feed-rolls 30.

28 designates forward stop-fingers against which the stock is fed for final positioning. These fingers, which may be of usual design, are shown as mounted on a shaft 29 which is rocked by a cam 36 engaging a roller 35 of an arm 34 of said shaft. When the roller 35 is drawn by a spring 34^a against the depressed portion of cam 36 the stop-fingers 28 will be raised into the path of the sheet which latter is indicated at 32 as resting in part on the conveyer 33, by which it is fed to its initial position between the feed rolls, and on a feed table 37, further advance of the sheet by the conveyer causing it to register with the fingers 28 for final positioning. Where side registering of the stock is also desired it is customary to provide suitable means for moving the sheets sidewise while resting against the front stops.

I have shown the upper feed-rolls 30 as having peripheral cut-away portions, the remaining segments of such rollers being alone designed to engage with the stock and through the coöperation of the lower feed-rolls effect the feeding thereof to the guides or stops on the impression cylinder, as indicated at 38, Fig. 1, so that register is had by reason of the over-feed of stock after the manner of the well-known Harris automatic press. According to my present invention the upper and lower feed-rolls are at rest, as is also the stock, at the moment the feed-rolls are brought into engagement with the latter, thereby obviating any likelihood of shifting the sheet as the rolls take hold. The means shown for arresting the travel of the feed-rolls at the moment of engagement with the stock may be widely varied. In the construction shown in the drawings, the contour of the sector operating cam groove 4 is so formed that the sector will be at rest for an appreciable length of time notwithstanding the fact that the press cylinder gear 3 carrying such cam groove is constantly rotating. Through the action of cam 4 on the sector the feed-rolls are turned to the proper contact position as shown in Fig. 4, at which time the stock is in contact with stop fingers 28. The upper feed-rolls which are actuated by the sector will pause, after being brought into proper position, and will remain at rest until the lower feed-rolls have been raised into contact with the stock in such manner that the latter is held firmly between the upper and lower feed-rolls. Thereupon the rotation of both feed-rolls is renewed and the sheet is fed forward to the press cylinder, but immediately preceding this forward feeding the fingers 28 are lowered out of the way. That portion of the cam groove which is ineffective on the sector roller 7 is indicated as being between lines X—Y. In Fig. 4 I have shown the sector roller as just entering on the dwell portion of the cam, at which time the upper feed-rolls 30 have completed their first or preliminary movement caused by the travel of cam roll 7 from the extreme low portion of the cam groove to the position shown in Fig. 4. During the period of dwell, the roll 23 of arm 22 will drop to the low portion of cam 24, permitting springs 19, acting on levers 17 to raise the lower feed-rolls and in conjunction with the upper feed-rolls take firm grip on the stock. As this occurs both sets of feed-rolls are stationary, that is to say, neither is rotatable, since both sets are controlled by gear 8 on the upper feed-roll shaft and the co-acting gears 13 and 14 (Fig. 3) operated thereby. The parts in the position just recited are indicated in Fig. 5, the stop-fingers 28 continuing to hold the forward edge of the sheet until the feed-rolls have fully closed. The cam roll 7 is now half way along the dwell portion of cam groove 4. In Fig. 6, at the end of the dwell, cam 36 has just raised arm 34, thereby removing the stop fingers 28, and the sheet is then ready to be advanced to the press cylinder as roll 7 is engaged by the high portion of cam groove 4. By the time the stock has overtaken the stops on the press cylinder, and the necessary over-feed is effected, the lower feed-rolls are lowered by the turning of lever 17.

While I have described the upper feed rolls as formed with relieved or cut-away portions, this construction is not essential to the operation of the device or to the over-feeding of the stock. In Fig. 7, wherein the lower feed-rolls have closed and are just concluding the over-feed of the stock to the grippers, I have shown the upper feed rolls 30′ of full circle or continuous surface. Where this type of feed-rolls is used, in order to regulate the amount of over-feed the cam 24′ is split or otherwise made adjustable so that the separating of the feed-rolls may be timed to take place just as the edge of the sheet reaches the guides, or earlier or later, as desired. As shown in Fig. 7 the feed-plate 37′ is on a slightly lower plane than the plane of the effective portion of the upper feed-roll so as to provide sufficient clearance between such plate and feed-roll in order that a sheet may pass to the stop-fingers without interference from the upper feed-rolls. The lower feed-rolls in

closing project slightly above the table-plane. In the modified form of feed-rolls described no preliminary movement thereof is necessary to bring the feed-rolls in proper contact position prior to closing. The period of dwell of the cam 4' is indicated between the marks + and + in the cam path.

The advantages of my invention will be readily appreciated by those skilled in the art. It will be seen that by means thereof I am enabled not only to effect the necessary over-feed of the stock in order to secure stock registration, but all danger of the stock being moved out of proper position or wrinkled when engaged by the feed-rolls is obviated, and likewise the necessity of using extraordinary care in the setting of the feed-rolls.

I claim as my invention:

1. In a printing press, a constantly rotating cylinder having stops on its periphery, means for feeding stock to said stops, including an intermittently rotating roller, a roller in constant gear with said last mentioned roller and coöperating therewith to grip the stock, said rollers being each locked against rotation when gripping the stock, and means for accelerating the rotation of said rollers after the stock has been gripped.

2. A sheet feeding apparatus comprising gaging means, an intermittently rotating roll, a second roll maintained in constant geared relation with said first mentioned roll, means for moving said second roll into coöperative relation with said intermittently rotating roll to engage a sheet while each of said rolls is locked against rotation and while said sheet is lined against said gaging means, and means for moving the gaging means out of the path of the sheet.

3. In a printing press having a rotary cylinder provided with stops on its periphery, means for feeding stock to said cylinder against said stops while the same is in motion, comprising two sets of feed rolls in constant gear, means for separating and closing said feed rolls while maintaining the rolls in constant gear, and means for intermittently rotating the latter, said last mentioned means being adapted to lock each set of feed rolls against rotation during the actuation of the closing means.

4. In a printing press having a rotary cylinder provided with stops on its periphery, means for feeding stock to said cylinder against said stops while the same is in motion at a speed greater than that at which the cylinder is rotated, comprising two sets of feed rolls in constant gear, means for separating the stock engaging portions of said feed-rolls without breaking said constant gear, means for feeding the stock to initial position between the feed-rolls while the latter are separated, and means for intermittently rotating each of said feed-rolls in unison, which latter are each locked against rotation when brought into engagement with the stock.

5. In a printing press having a rotary cylinder provided with stops on its periphery, means for feeding stock to said cylinder against said stops while the same is in motion at a speed greater than that at which the cylinder is rotated, comprising two sets of feed-rolls in constant gear, means for separating the stock engaging portions of said feed-rolls without breaking said constant gear, means for feeding the stock to initial position between the feed-rolls while the latter are at rest and separated, and means for positively rotating each of the feed rolls in unison after they have been brought into engagement with the stock.

6. In a printing press, a constantly rotating cylinder having stops on its periphery, means for feeding stock to said stops comprising intermittently rotatable feed rolls brought into coöperative engagement with said stock while said rolls are each locked against rotation, and means for thereafter positively rotating each of said feed rolls in unison at a common variable speed.

7. In a printing press, a constantly rotating cylinder having stops on its periphery, means for feeding stock to said stops comprising intermittently rotatable feed rolls brought into coöperative engagement with said stock while said rolls are each locked against rotation, and means for thereafter positively rotating each of said feed rolls in unison at a common accelerated speed.

8. In a printing press, a constantly rotating cylinder, means for gaging stock to be fed to said cylinder, means for feeding the stock to said cylinder comprising a pair of coöperating intermittently rotatable feed rolls, both positively driven in unison and always maintainable in constant gear, means for bringing said feed rolls into engagement with said gaged stock while said rolls are each locked against rotation, and means for thereafter positively rotating each of said feed rolls at a common variable speed.

9. In a printing press, a constantly rotating cylinder, means for gaging stock to be fed to said cylinder, means for feeding the stock to said cylinder comprising a pair of coöperating intermittently rotatable feed rolls, both positively driven in unison and always maintainable in constant gear, means for bringing said feed rolls into engagement with said gaged stock while said rolls are each locked against rotation, and means for thereafter positively rotating each of said feed rolls at a common accelerated speed.

10. In a printing press having a rotary cylinder provided with stops on its periphery, means for feeding stock against said stops while the latter are in motion, com-

prising a pair of geared together feed-rolls, means for separating and closing said feed-rolls without breaking the constant gear of said feed-rolls during said separating and closing, and means for intermittently rotating each of said feed-rolls in unison, said last mentioned means locking each of said feed-rolls against rotation when brought into engagement with the stock by said closing means.

11. A sheet feeding apparatus having in combination gaging means, a pair of intermittently rotatable feed-rolls maintained in constant gear, means for separating and closing said feed-rolls without breaking said constant gear, means for positively rotating each of said feed-rolls in unison, said last mentioned means locking each of the feed-rolls against rotation during the actuation of said closing means, and means for moving the gaging means out of the path of the sheet.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALFRED F. HARRIS.

Witnesses:
A. D. LOOP,
FREDERICK W. DUNN.