March 30, 1926. 1,578,330

M. LIPTON ET AL

FEEDING MECHANISM FOR PRINTING PRESSES

Original Filed June 21, 1922 5 Sheets-Sheet 1

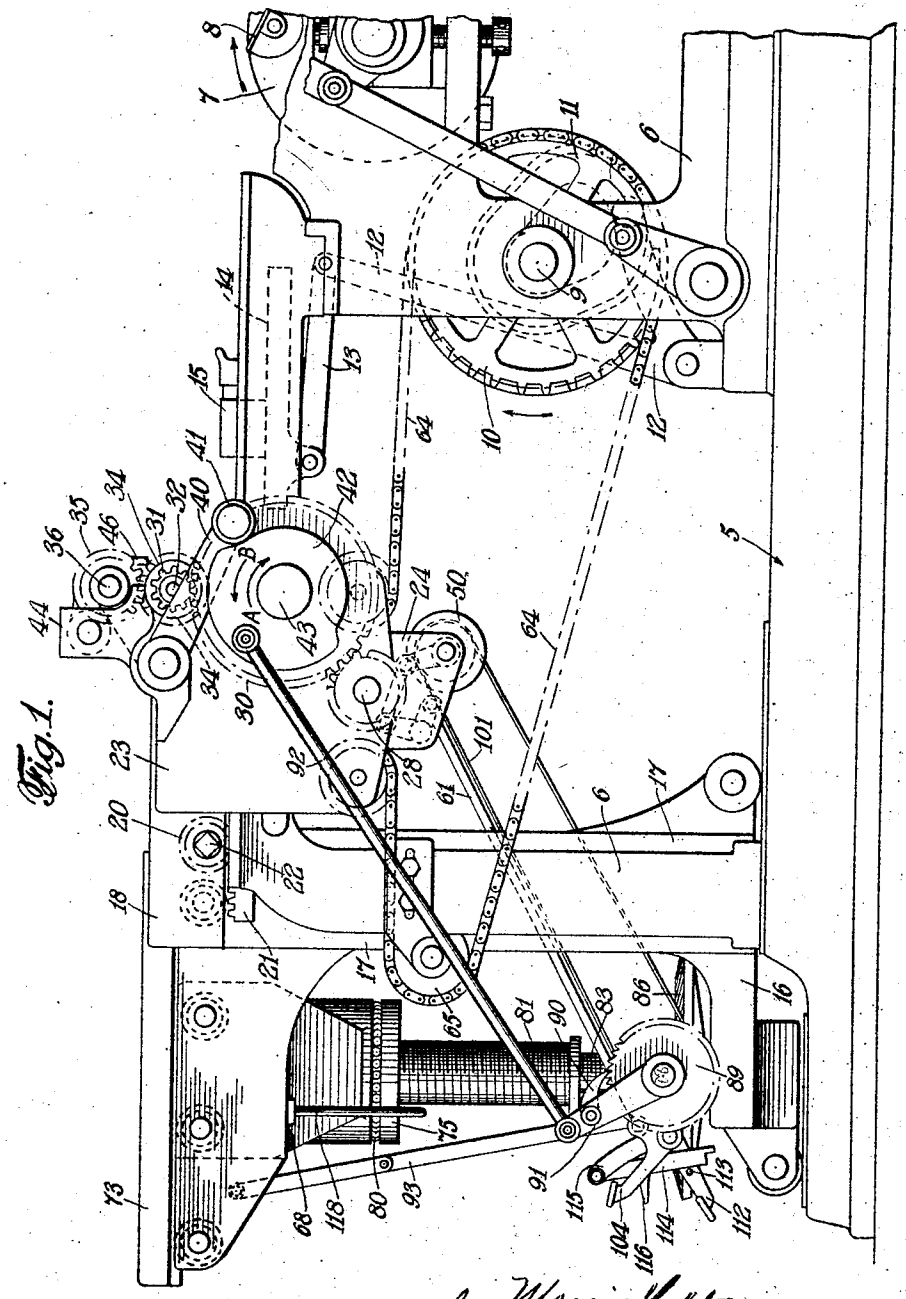


Fig. 1.

Morris Lipton, Louis Hacenbuch and Frederick W. Hill INVENTORS

BY Williams & Critchard ATTORNEYS

March 30, 1926. 1,578,330

M. LIPTON ET AL

FEEDING MECHANISM FOR PRINTING PRESSES

Original Filed June 21, 1922 5 Sheets-Sheet 2

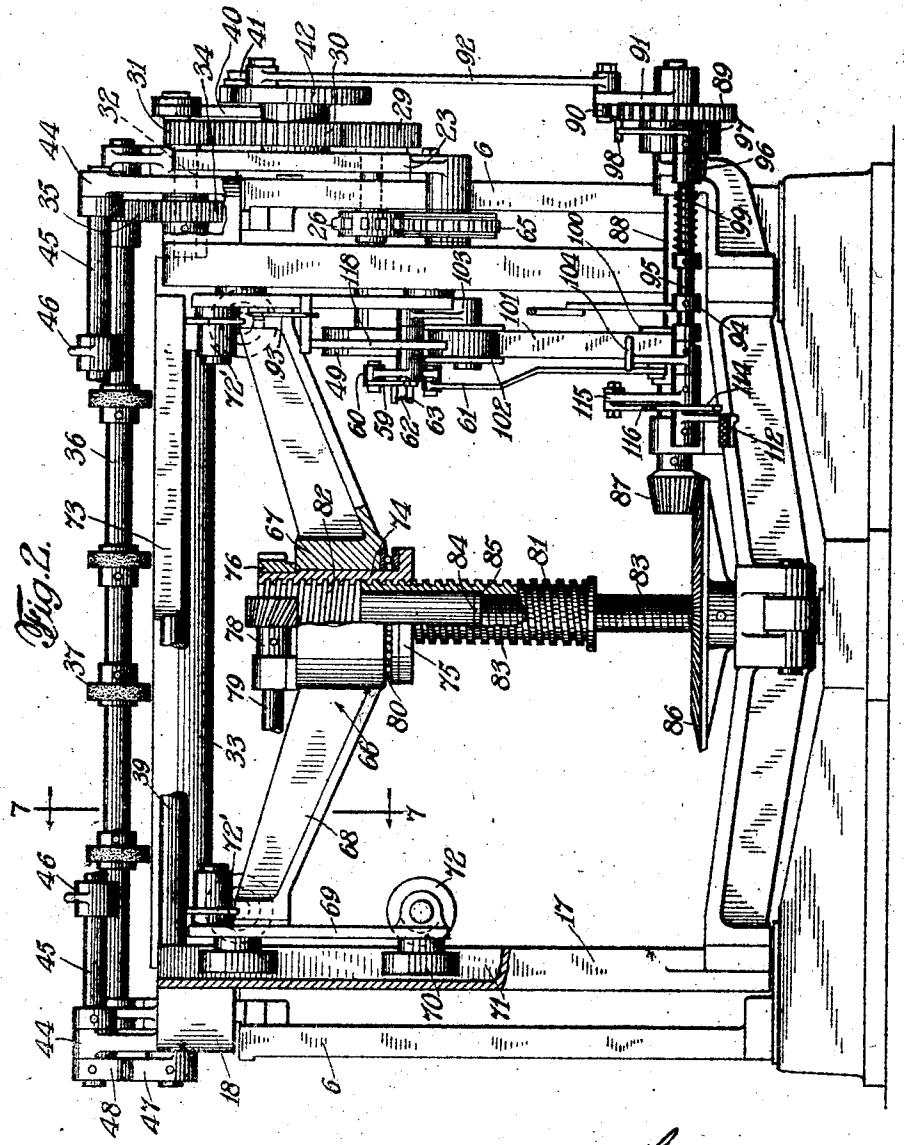


Fig. 2.

Morris Lipton,
Louis Hearleson and Frederick W. Hill
INVENTORS
BY
Williamson & Pritchard
ATTORNEY

March 30, 1926. 1,578,330

M. LIPTON ET AL

FEEDING MECHANISM FOR PRINTING PRESSES

Original Filed June 21, 1922 5 Sheets-Sheet 3

Fig. 3.

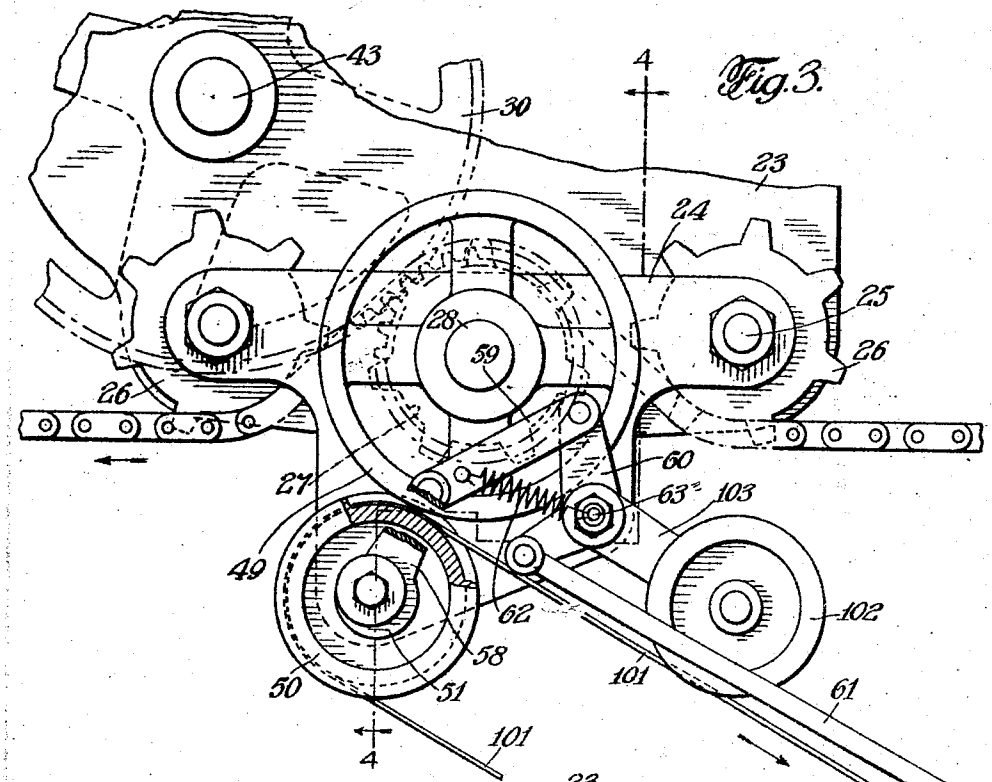


Fig. 4.

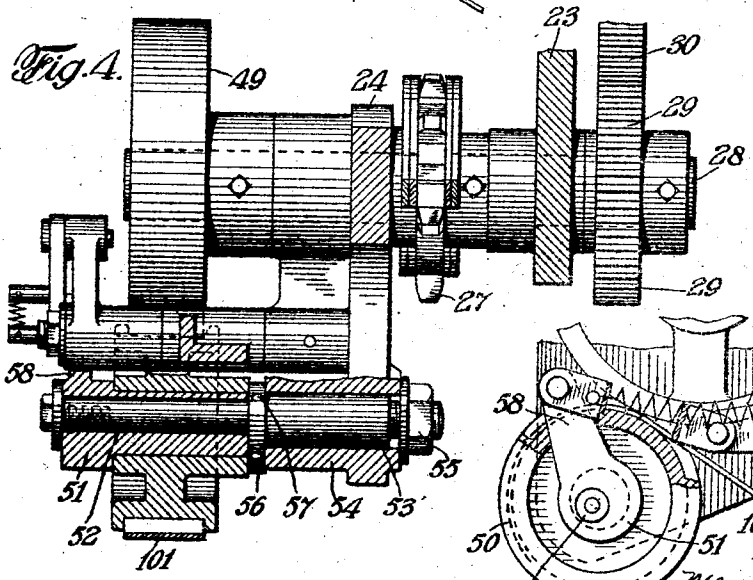
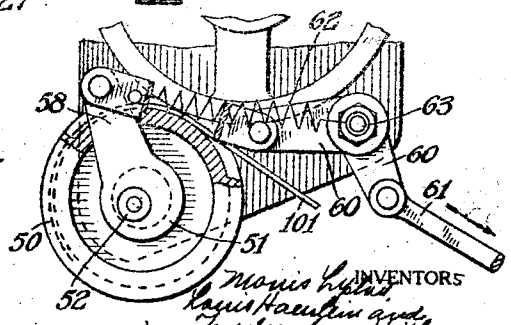


Fig. 5.



INVENTORS
Morris Lipton,
Louis Hamilton and
Frederick Ortell
BY
Williams & Pritchard
ATTORNEYS

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M. LIPTON ET AL

FEEDING MECHANISM FOR PRINTING PRESSES

Original Filed June 21, 1922 5 Sheets-Sheet 4

Fig. 6.

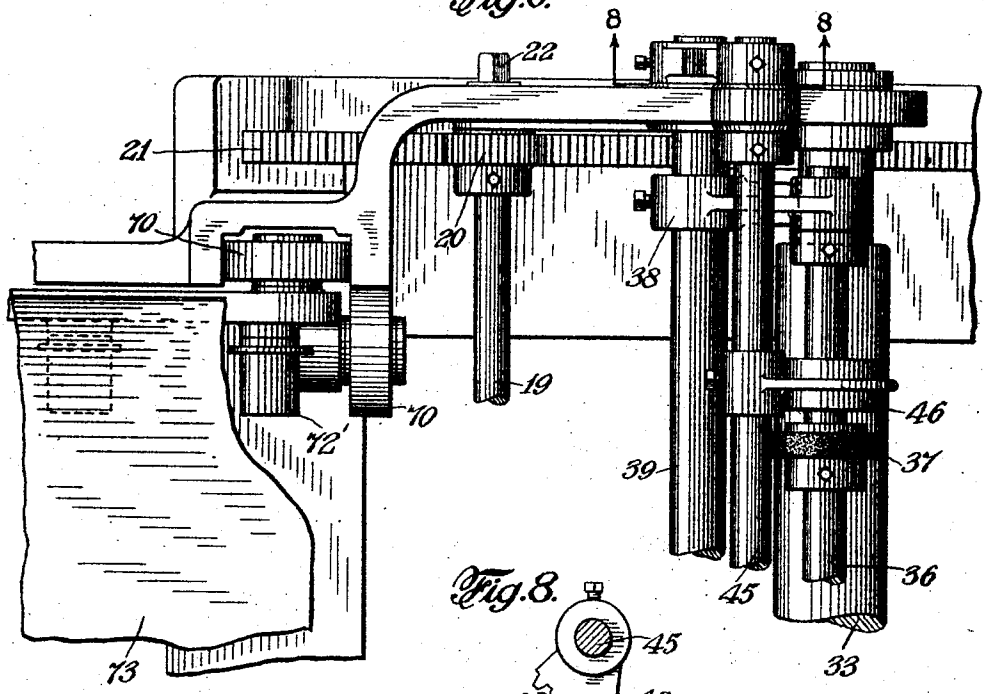


Fig. 8.

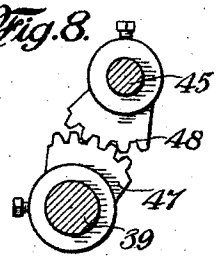
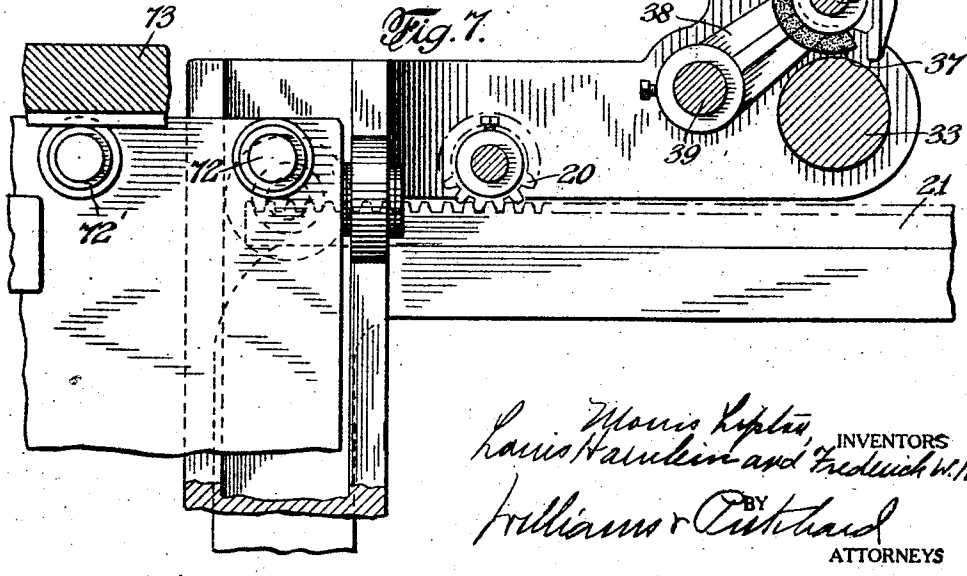


Fig. 7.



Morris Lipton, Louis Hamlin and Frederick W. Hild INVENTORS

BY Williams & Cuthard

ATTORNEYS

March 30, 1926. 1,578,330

M. LIPTON ET AL

FEEDING MECHANISM FOR PRINTING PRESSES

Original Filed June 21, 1922 5 Sheets-Sheet 5

Fig. 9.

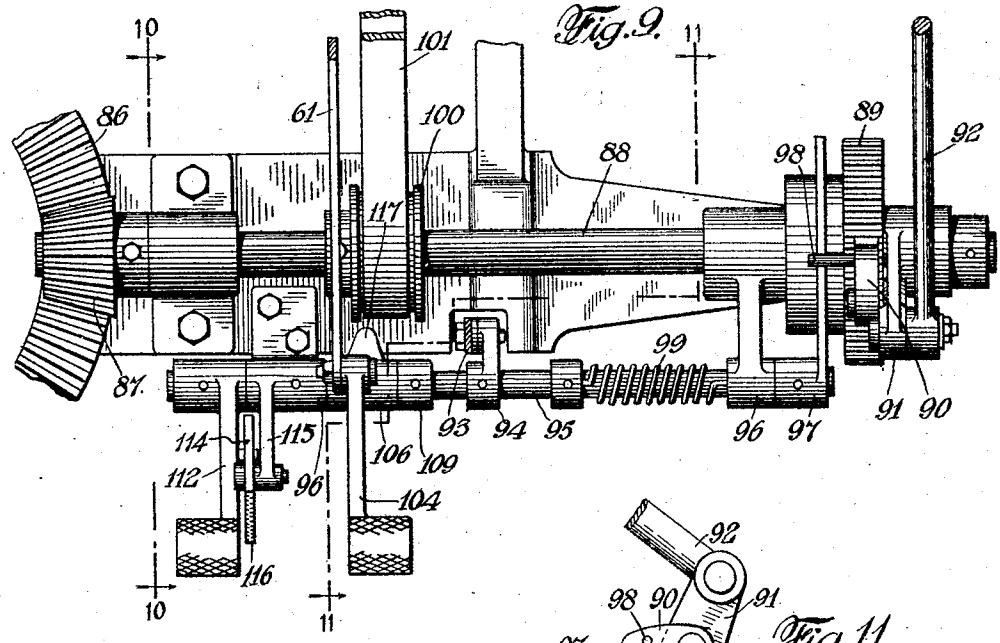


Fig. 10.

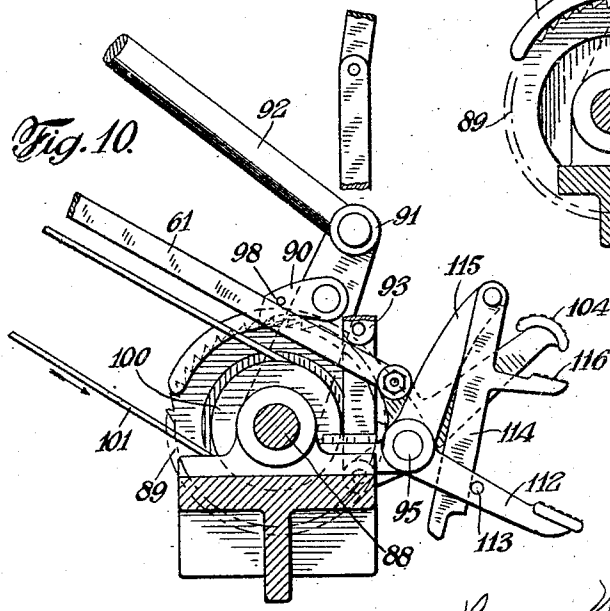


Fig. 11.

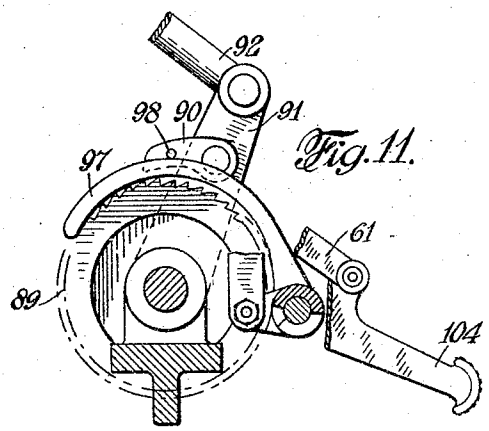
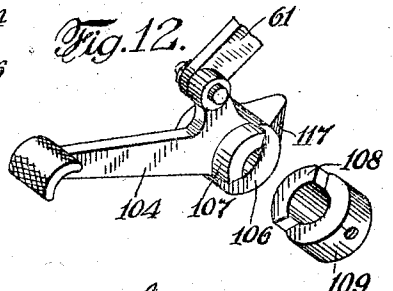


Fig. 12.



Morris Lipton
Louis Haenlein and Frederick W. Kelly
INVENTORS

BY Williamson & Pritchard
ATTORNEYS

Patented Mar. 30, 1926. 1,578,330

UNITED STATES PATENT OFFICE.

MORRIS LIPTON, OF RUTHERFORD, LOUIS HAENLEIN, OF EAST RUTHERFORD, AND FREDERICK W. HILL, OF RUTHERFORD, NEW JERSEY, ASSIGNORS TO THE FUCHS & LANG MANUFACTURING COMPANY, A CORPORATION OF NEW YORK.

FEEDING MECHANISM FOR PRINTING PRESSES.

Original application filed June 21, 1922, Serial No. 570,002. Divided and this application filed December 6, 1923. Serial No. 678,802.

To all whom it may concern:

Be it known that we, MORRIS LIPTON, a citizen of Russia (who has taken out first United States papers), and LOUIS HAENLEIN and FREDERICK W. HILL, citizens of the United States, residents, respectively, of city of Rutherford, county of Bergen, State of New Jersey, city of East Rutherford, county of Bergen, State of New Jersey, and city of Rutherford, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Feeding Mechanism for Printing Presses, of which the following is a specification.

This invention relates to printing presses of the offset type and has particular reference to a novel and generally improved feeding mechanism adapted to be used in connection with such machines.

The present application is a division of one filed June 21, 1922, Serial No. 570,002.

An important object of the invention is to provide an accurate, dependable and generally improved means for so timing the several cooperative elements of the feeding mechanism with respect to the operation of the printing press that a work-sheet of any given length, within certain limits, may be started in its course of travel into the machine at the proper instant to insure its transferal to the impression cylinder thereof.

Other objects and certain advantages of the invention will become apparent from the following description when taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of the machine embodying our invention.

Figure 2 is a front elevation of the machine.

Figure 3 is a fragmental side elevation of a friction drive and releasing mechanism therefor, as seen from the rear in Figure 1.

Figure 4 is a sectional view taken on line 4—4 of Figure 3.

Figure 5 is a view in elevation of a friction pulley showing the same in driving engagement with a cooperative driving element.

Figure 6 is a fragmental plan view of an adjustable feed table having certain cooperative feed elements associated therewith.

Figure 7 is a sectional view taken on line 7—7 of Figure 2, the roller being broken away for the sake of clearness.

Figure 8 is a sectional view taken on line 8—8 of Figure 6.

Figure 9 is a fragmental plan view of a work-table lifting and lowering mechanism.

Figure 10 is a sectional view taken on line 10—10 of Figure 9.

Figure 11 is a sectional view taken on line 11—11 of Figure 9.

Figure 12 is a perspective view of a clutch actuating lever and a cooperative pawl releasing element.

In the drawings, wherein, for the purpose of illustration, is shown what we at present consider the preferred form of our invention, the numeral 5 indicates a base having vertically disposed side members 6, which are adapted to support various cooperative elements of the machine hereinafter more particularly described.

The frame 5, above mentioned, constitutes a portion of the frame of a printing press, not shown, with which the apparatus herein shown is particularly adapted to be used, as a means for transferring work-sheets into the machine, the impression cylinder of which is indicated, as a whole, by the numeral 7. This impression cylinder may be of the conventional type, and is provided with the usual form of gripping fingers, one of which is indicated by the numeral 8, which fingers are adapted to be so actuated as to grip the work-sheets as they are successively fed into the printing machine.

In order that the several cooperative elements of the apparatus embodying our invention may function in a properly timed relation, the impression cylinder 7 is adapted to be so geared to a horizontally disposed shaft 9 carried by the side members 6 that a gear ratio of one to one is maintained between the impression cylinder 7 and shaft 9, to which is suitably connected a sprocket 10, and an operating cam 11. The cam 11 is adapted to cooperate with a bell-crank lever 12, to the upper end of which is pivotally connected a link 13, which in turn is suitably connected with a reciprocating slide 14, carrying feed fingers or elements 15, adapted to be so moved as to carry the work-sheets successively into the printing machine. Since the slide 14 under all conditions moves

a fixed or given distance for each revolution of the cam 11 the feed fingers are, therefore, adjustably mounted upon the slide in order that work-sheets of various lengths may be fed to the impression cylinder in such a timed relation thereto as to enable the gripping fingers 8 to engage the forward ends thereof.

Upon the base 5, at the rear thereof, there is arranged a truck 16, having vertically disposed side members 17, the upper ends of which are connected to overlying frame members 18, through which extends a rotatable shaft 19. To the ends of the shaft 19 there are secured a pair of pinions 20, adapted to mesh with a pair of horizontally disposed racks 21, carried by the side members 6. These racks, together with their cooperative pinions 20, are provided, in order that a longitudinal adjustment of the truck 16 may be made, by rotating the shaft 19 through the instrumentality of a suitable instrument or wrench, which may be applied to the squared ends 22 of the shaft.

To one of the frame members 18, there is suitably connected an apron 23, which is adapted to be moved in either one direction or the other when the truck 16 is moved through the instrumentality of the pinions 20 and racks 21. To the apron 23 there is connected a supporting plate 24, by means of bolts 25, upon which are mounted idler sprockets 26, arranged in direct alignment with a driving sprocket 27, carried by a shaft 28, which is passed through and supported by both the apron 23 and the supporting plate 24. This shaft carries, at its outer end, a pinion 29, which is adapted to mesh with a spur gear 30, which gear, in turn, meshes with a smaller gear 31, suitably connected to a shaft 32, to which is connected a horizontally disposed feed roller 33. The shaft 32 carries a relatively small pinion 34, which in turn meshes with a spur gear 35 carried by a horizontally disposed shaft 36, to which is connected a plurality of friction discs 37, adapted to coact with the feed roller 33, to facilitate the movement of work-sheets into the printing press.

The shaft 36, it will be noted, is journaled at its opposite ends in brackets 38, carried by a horizontally disposed shaft 39, to one end of which is connected an arm 40 having at its free end a roller 41, adapted to cooperate with a cam 42, which is carried by a shaft 43. This shaft is suitably supported with respect to the apron 23, and carries the spur gear 30, which is operably connected to the cam 42. It is obvious that as the gear 30 is operated, the feed roller 33 and the shaft 36 are simultaneously rotated and that, due to the coaction between the cam 42 and the arm 40, the shaft 36, together with the friction discs 37, will be intermittently lifted and lowered with respect to the feed roller 33. It might be remarked that the oscillatory movement of the shaft 36 is so slight that the gears 34 and 35 are permitted, at all times, to remain in mesh.

To a pair of up-standing arms 44, there is suitably journaled a horizontally disposed shaft 45, to which are connected a plurality of stop fingers 46, adapted to maintain such positions with respect to the feed roller 33 and the friction discs 37, when the shaft 36 is in its uppermost position, as to enable the operator to so introduce the work-sheets between the feed roller 33 and friction discs 37 as to insure their being properly started in their course of travel into the machine. In this connection, it might be stated that when the shaft 36 is in its lowermost position, the fingers 46 are lifted with respect thereto, and when the shaft 36 is in its uppermost position the fingers 46 are maintained in their lowermost positions, and in order to insure the proper respective movements between the shafts 36 and 45, we have provided a segmental gear 47, which is carried at one end of the shaft 39 and adapted to mesh with a corresponding segmental gear 48, carried by the corresponding end of the shaft 45. It is obvious that when the shaft 39 is so moved through the instrumentality of the arm 40 as to lift the shaft 36, the shaft 45, by reason of the intermeshing segmental gears 47 and 48, will be so moved as to lower the fingers 46, and that when the shaft 39 is so moved as to lower the shaft 36, the shaft 45 will be so moved as to lift the fingers 46.

To the inner end of the shaft 28 there is suitably connected a friction driving wheel 49, which is adapted to coact with a friction pulley 50. This friction pulley is rotatably mounted upon an eccentric bushing 51 carried by a stub shaft 52, which is eccentrically connected to a pin 53, carried within a boss 54, provided by the supporting plate 24. The pin 53 is adapted to be retained in a given position by means of a nut 55 carried thereby and is provided with a shoulder 56 having a series of openings 57 formed therein. It is apparent that by applying a suitable instrument to the shoulder 56, the pin 53 may be so rotated when the nut 55 is loosened as to adjust the friction pulley 50 to a desired position with respect to the driving wheel 49, such adjustment being made possible by reason of the fact that the shaft 52 is disposed eccentrically with respect to the pin 53. It is desirable to be able to make this adjustment, for the reason that it becomes necessary from time to time to compensate for any wear upon either the driving wheel 49 or the friction pulley 50.

The eccentric bushing 51 is provided, at its outer end, with an operating arm 58, which in turn is pivotally connected to a link 59. This link is in turn pivotally connected to a bell-crank lever 60, adapted to be actuated through the instrumentality of an operating link 61 by a suitable mechanism hereinafter more particularly described. It is apparent that when the bell-crank lever 60 is positioned, as shown in Figure 3, the pulley 50 is maintained out of contact with the driving wheel 49, and that driving engagement between the pulley 50 and the driving wheel 49 is maintained when the bell-crank lever 60 is retained in the position shown in Figure 5. In order to retain the bell-crank lever 60 in either of the positions shown in Figures 3 and 5, we have provided a tension spring 62, which is suitably connected at one end to the link 59 and at its opposite end to the stud 63, upon which the bell-crank lever 60 is mounted. In moving the bell-crank lever 60 from the position shown in Figure 3 to the position shown in Figure 5, the pulley 50 is brought into driving engagement with the driving wheel 49, immediately prior to that instant when the spring 62 assumes its extended position, which driving engagement is maintained even after the link 59 and bell-crank lever 60 have been snapped, under the influence of the spring 62, to their respective positions, shown in Figure 5. It is apparent that in moving the bell-crank lever from the position shown in Figure 5 to the position shown in Figure 3, the driving engagement between the pulley 50 and the driving wheel 49 is maintained even until the spring 62 has assumed a position on the opposite side of the pivotal connection between the link 59 and the bell-crank lever 60.

In order to operatively connect the shaft 28 and 43 with the shaft 9, we have provided a sprocket chain 64, which is passed over the sprocket 10, and an adjustable sprocket 65, carried by one of the frame members 6. This sprocket chain in turn is maintained in engagement with the idler sprockets 26 and the driving sprocket 27. It is highly important that the cam 42 be driven at the same speed as the sprocket 10, and in order to accomplish this proper relative speed the sprocket 27 is of such a size as to complete three revolutions to one of the sprocket 10, and the gear 30 is of such a size with respect to the gear 29 as to complete one-third revolution upon each revolution of the sprocket 27. By so connecting the shaft 43 with the shaft 9 that the cam 42 is caused to make one complete revolution for each revolution of the shaft 9, it follows that the shaft 36, with its discs 37, is lifted and lowered upon each revolution of the cam 42, and that a similar operation of the fingers 46 is afforded. It will be appreciated also that the feeder fingers 15 are caused to complete a cycle of operation for each rotation of the shaft 9. Since the position of the slide 14, with respect to the gripping fingers 8, is under all conditions the same for any given position of the impression cylinder 7, it becomes necessary, as hereinbefore explained, to adjust the fingers 15 upon the slide 14 to accommodate work-sheets of various lengths and when such adjustment is made it becomes necessary to so time the operation of the arm 40 with respect to the feeding fingers 15 that the work-sheets may be so fed, under the influence of the roller 33 and discs 37 as to cause them to drop in front of the feeding fingers 15 after the slide has been moved to its rearmost position and prior to the time it starts forward. In order to time the operation of the arm 40 with respect to the feeding fingers 15, it becomes necessary only to adjust the truck 16, through the instrumentality of the pinions 20 and racks 21, to a position corresponding to the length of the work-sheets which are to be fed. If, for example, a stack of relatively short work-sheets are to be fed into the machine, the truck 16 is moved forwardly, as a result of which the cam 42 is moved in the direction of the arrow "A", shown thereon. By so changing the position of the cam 42 with respect to the arm 40, it follows that the feeding of the sheet is started later with respect to a given position of the feeding fingers 15 than if the truck 16 were moved in the opposite direction. If a stack of longer sheets are to be fed into the machine, it becomes necessary to move the truck 16 away from the feeding fingers 15, by which movement the cam 42 is moved in the direction of the arrow "B", shown thereon, to an advanced position. By so adjusting the position of the cam 42 with respect to the arm 40, it follows that the feeding action of the roller 33 and discs 37 is advanced or started sooner with respect to a given position of the feeding finger 15. Since the finger 15, when moved to its most remote position with respect to the impression cylinder 7, is allowed to remain at rest for about one-eighth a revolution of the shaft 9, due to the peculiar shape of the cam 11, the adjustment of the cam 42 with respect to the arm 40 may be so made as to cause any desired length of work-sheet, within certain limits, to fall directly in front of the fingers 15, while the same is at rest. After the sheet is dropped in front of the fingers 15, it is thereafter so moved, under all conditions into a given position with respect to the impression cylinder 7, as to insure its being gripped by the gripping fingers 8 at the proper instant. Upon some appropriate portion of the machine, a suitable scale may be arranged to indicate the proper position to which the truck 16 is to be moved in order to effect a desired adjustment of the cam 42 to facili-

tate the accurate feeding of a given size work-sheet, and likewise a suitable scale may be provided to determine or facilitate proper adjustment of the fingers 15 upon the slide 14.

At the rear of the frame 5, there is arranged a support 66, which is carried by the truck 66 and includes a hub portion 67 having angularly disposed arms 68, which at their ends are provided with guide roller plates 69, carrying guide rollers 70, adapted to operate within channels 71 formed in the side members 17. These rollers, together with similar rollers 72, serve to guide the support 66, when the same is being moved either upwardly or downwardly, by suitable mechanism hereinafter more particularly described. The support 66 also includes a plurality of rollers 72', which are adapted to receive a removable feed table 73, upon which a stack of work-sheets may be arranged, the rollers being provided in order to enable the table to be easily transferred to the support. After the work-sheets have been relieved from the table 73, the same may be removed to permit the introduction of another table carrying another stack of work-sheets.

Within the hub portion 67 of the support 66, there is rotatably mounted an internally screw-threaded sleeve 74, which is provided at one end with a head 75 and at its opposite end with a gear 76, adapted to mesh with a cooperating gear 78, secured to the end of a shaft 79, which is adapted to be manually operated through the instrumentality of a suitable handle, not shown, when it is desired to lower or elevate the support 66 by hand. In order that the sleeve 74 may be rotated within the hub 67 as easily as possible, we have provided ball-bearings 80, which are arranged between the head 75 and the hub portion 67. Within the screw-threaded sleeve 74, there is arranged a screw-threaded shaft 81, which is counter-bored at its upper end, as shown at 82. Within the shaft 81 there is arranged a screw-threaded shaft 83, which, at its upper end, is provided with a head 84, adapted to operate within the open end of the shaft 81, and cooperate with a shoulder 85, formed therein. The shaft 83 at its lower end is suitably connected with a relatively large beveled gear 86, adapted to mesh with a relatively small bevel gear 87, suitably connected to a shaft 88, to the outer end of which is connected a ratchet wheel 89. This ratchet wheel, together with the shaft 88, is carried by the truck 66 and is adapted to be intermittently rotated to lift the support 66, through the instrumentality of a pawl 90, which is pivotally connected to an oscillatory arm 91, suitably connected, as by means of a link 92, to the cam 42. As the cam 42 is rotated, the arm 91 is oscillated, thereby intermittently rotating the shaft 88 to lift the support 66. When the support 66 is in its lowermost position, the shaft 83 will first turn with respect to the shaft 81, and after the head 84 has been moved into engagement with the shoulder 85, the shaft 81 is locked with respect to the shaft 83 and is rotated therewith, as the result of which a co-action between the screw-threaded sleeve 74 and the shaft 81 is afforded, thereby causing the support 66 to be lifted. The order in which the shafts 81 and 83 are rotated is due to the fact that the friction between the shafts 81 and 83 is less than the friction between the shaft 81 and sleeve 74.

For the purpose of insuring a positive disengagement between the pawl 90 and its cooperative ratchet wheel 89, when the support 66 reaches its maximum elevation, we have provided a plurality of links 93, which are connected to the support 66 and to a lug 94, carried by a shaft 95, journaled in suitable bearings 96, at the rear of the machine. The shaft 95 carries, at one end thereof, a finger 97, adapted to be lifted so as to engage a pin 98 carried by the pawl 90. It is apparent that when the support 66 reaches a predetermined position in its upward movement, the several links 93 will be extended, as shown in Figure 1, and will so rotate the shaft 95 against the influence of a coil spring 99, carried thereby, as to lift the finger 97, whereby the pawl 90 is freed from engagement with its cooperative ratchet wheel 98.

In order that the support 66 may be quickly moved from its uppermost position to its lowermost position, we provide a pulley 100, which is carried by the shaft 88, and connected with the friction pulley 50 by means of a belt 101, which is maintained taut under all conditions, by take-up idler 102 connected to an arm 103, mounted to oscillate upon the shaft 63. By depressing a lever 104, to which the link 61 is connected, the friction pulley 50 is moved from the position shown in Figure 3 to the position shown in Figure 5, in which position a driving engagement is afforded between the driving wheel 49 and the friction pulley 50. As a result of this driving engagement the shaft 88 is so rotated as to cause the shaft 83 to rotate with respect to the shaft 81 until such time as the shaft 81 is brought into engagement with the bevel gear 86. Upon engagement of the shaft 81 with the gear 86, the two shafts 81 and 83 are locked with respect to each other, whereupon the shaft 81 is caused to rotate within the sleeve 74 to enable the support 66 to be moved to its lowermost position. The order in which the shafts 81 and 83 are rotated is due to the fact that the friction between the shafts 81 and 83 is less than the friction between the shaft 81 and sleeve 74.

For the purpose of safety, it is necssary

to disengage the pawl 90 from its cooperative ratchet wheel 89, when the lever 104 is depressed, and to facilitate this disengagement, we provide the lever 104 with a hub 106, which carries a projection 107, adapted to cooperate with a similar projection 108, carried by a clutch member 109, rigidly connected to the shaft 95. After the lever 104 has been depressed a given distance, the lug 107 is moved into engagement with the lug 108 and upon further movement of the lever 104, the shaft 95 is rotated against the influence of the spring 99 a sufficient distance to cause the finger 97 to move the pawl 90 out of engagement with its cooperative ratchet wheel 89. By the provision of the lugs 107 and 108, it is apparent that the pawl 90 may be lifted free of its cooperative ratchet wheel 89 immediately prior to the engagement of the friction pulley 50, with its driving wheel 49, so that the shaft 88 is free to rotate when the driving connection is established between the driving wheel 49 and the friction pulley 50.

For certain reasons it is desirable to positively lock the pawl 90 out of engagement with its cooperative ratchet wheel 89 when the lever 104 is depressed to a predetermined position, and to accomplish this positive locking of the pawl 90 out of engagement with its cooperative ratchet wheel 89 we provide a lever 112 which is rigidly connected to the shaft 95 and adapted to be moved therewith when the lever 104 is depressed. This lever is provided with a stud 113 which is adapted to so coact with a locking finger 114 as to positively retain the lever 112 in its lowermost position, the finger 114 being pivotally connected to a bracket 115 and adapted to move under its own weight into locking engagement with the stud 113. It will be noted that the locking finger 114 is provided with a depression foot 116 by means of which the operator is enabled to readily disengage the locking finger 114 from the stud 113 when it is desired to resume the intermittent operation of the shaft 88 to effect a step-by-step movement of the support 66 in an upward direction.

In order to limit the support 66 in its downward movement, without necessitating the attention of the operator, we have provided the hub 106 with a lip 117, which is adapted to coact with a depending pin 118 carried by the support 66. Upon lowering the support 66 to a predetermined position, the pin 118 is moved into engagement with the lip 118 and upon further downwarwd movement of the support 66, the lever 104 is lifted, thereby moving the friction pulley 50 from the position shown in Figure 5 to the position shown in Figure 3 with a snap action, caused by the influence of a tension spring 62 upon the arm 58, which is connected to the eccentric bearing 51.

Since the support 66 and the operating means, including the gears 86, 87 and shaft 88, for raising and lowering the feed table 73, is carried by the truck 16, it follows that when the truck is bodily moved to effect a change in the timing of the feeding device, including the feed roller 33 and the friction discs 37, the feed table 73 in correspondingly moved bodily to maintain a fixed relation between it and the feeding device. Furthermore, since the driving means, including shaft 28, gears 29, 30 and cam 42, for the feeding device, is indirectly connected to the truck 16 and is adapted to be moved bodily therewith when effecting a change in the timing of the feeding device with respect to the feeding mechanism, it follows that the operable means, including the link 92 and the belt 101 respectively, afforded between the shafts 28 and 88 remain undisturbed when the truck 16 is bodily moved. By combining in a unitary structure the feed table 73, the operating mechanism for lifting and lowering the feed table, the feeding device, the driving means for the feeding device, and the operable connections adapted to connect the driving means for the feeding device with the operating mechanism for lifting and lowering the feed table 73, a cooperation is established between the several parts of the machine which remains unaffected regardless of such bodily movements of the feeding device as may be effected to change the timing of the feeding device with respect to the feeding mechanism which includes the feed fingers 15.

What we claim is:

1. The combination with a printing press having an impression cylinder provided with work-sheet gripping fingers, of a feed-mechanism comprising a feeding finger adapted to be operated in a fixed timed relation with respect, to said impression cylinder, a bodily movable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feed finger, and means, so actuated upon the bodily movement of said feeding device as to change its period of operation with respect to that of said feed finger and impression cylinder.

2. The combination with a printing press having an impression cylinder provided with a plurality of gripping fingers adapted to grip a work-sheet, of a feeding mechanism adapted to transfer work-sheets successively into the printing press, comprising a feed finger, means for reciprocating said feed finger in a fixed timed relation with respect to the operation of said impression cylinder, an intermittently actuated feeding device adapted to successively trans-

fer work-sheets to a point intermediate said impression cylinder and feed finger, means for bodily moving said feeding device, and means operable upon the bodily movement of said feeding device to change its cycle of operation with respect to that of said feeding finger.

3. The combination with a printing press having an impression cylinder provided with a plurality of gripping fingers adapted to grip a work sheet, of a feeding mechanism adapted to transfer work-sheets successively into the printing press, comprising a feed finger, means for reciprocating said feed finger in a fixed timed relation with respect to the operation of said impression cylinder, an intermittently actuated feeding device adapted to successively transfer work-sheets to a point intermediate said impression cylinder and feed finger means for bodily moving said feeding device, means operable upon the bodily movement of said feeding device to change its cycle of operation with respect to that of said feed finger, including a cam adapted to be rotated at the same speed as that of said impression cylinder, and means for advancing said cam when said feeding device is bodily moved in one direction and for moving said cam to a retarded position when said feeding device is bodily moved in an opposite direction.

4. The combination with a printing press having an impression cylinder provided with a plurality of gripping fingers adapted to grip a work-sheet, of a feeding mechanism adapted to transfer work-sheets successively into the printing machine comprising a feed finger, means for reciprocating said feeding finger in a fixed timed relation with respect to the operation of said impression cylinder, an intermittently actuated feeding device adapted to successively transfer work-sheets to a point intermediate said impression cylinder and feed finger, means for bodily moving said feeding device, means operable upon the bodily movement of said feeding device to change its cycle of operation with respect to that of said feed finger, said means including a cam adapted to be rotated at the same speed as that of said impression cylinder, and a driving element so co-operating with said cam as to cause the cam to move to an advanced position when said feeding device is bodily moved in one direction and to cause said cam to move to a retarded position when said feeding device is bodily moved in an opposite direction.

5. The combination with a printing press having an impression cylinder provided with a work-sheet gripping element, of a feeding mechanism adapted to transfer work-sheets into the printing press comprising a feed finger adapted to be reciprocated in a fixed timed relation with respect to the operation of said impression cylinder, means for reciprocating said feed finger in a fixed timed relation with respect to the operation of said impression cylinder, a feeding device comprising a feed roller, rotatable elements adapted to cooperate with said feed roller to successively transfer work-sheets to a point intermediate said impression cylinder and feed finger, driving means for rotating said feed roller and rotatable elements, a cam for intermittently lifting said rotatable elements with respect to said feed roller, means for rotating said cam in a fixed timed relation with respect to the speed of rotation of said impression cylinder, said cam being bodily movable in a horizontal plane, and means so cooperating with said cam and the driving means for said feed roller and rotatable elements as to rotate the cam to an advanced position when the same is bodily moved in one direction and to rotate the cam to a retarded position when the same is moved in an opposite direction.

6. The combination with a printing press having an impression cylinder provided with a work-sheet gripping element, of a feeding mechanism adapted to transfer work-sheets into the printing press, comprising a feed finger adapted to be reciprocated in a fixed timed relation with respect to the operation of said impression cylinder, means for reciprocating said feed finger in a fixed timed relation with respect to the operation of said impression cylinder, a feeding device comprising a feed roller, rotatable elements adapted to cooperate with said feed roller to successively transfer work-sheets to a point intermediate said impression cylinder and feed finger, driving means for rotating said feed roller and rotatable elements, a cam for intermittently lifting said rotatable elements with respect to said feed roller, means for rotating said cam in a fixed timed relation with respect to the speed of rotation of said impression cylinder, said cam being bodily movable in a horizontal plane, means so cooperating with said cam and the driving means for said feed roller and rotatable elements as to rotate the cam to an advanced position when the same is bodily moved in one direction and to rotate the cam to a retarded position when the same is bodily moved in an opposite direction, and stop fingers adapted to so cooperate with said feed roller and rotatable elements as to insure a proper position of the work-sheet with respect to said feed roller and feeding elements, means cooperating with said cam for lifting and lowering said rotatable elements, and means for lifting said stop fingers when said rotatable elements are lowered and for lowering said stop fingers when said rotatable elements are lifted.

7. The combination with a printing press having an impression cylinder provided with a work-sheet gripping element, of a feeding mechanism adapted to transfer work-sheets into the printing press, comprising a feed finger adapted to be reciprocated in a fixed timed relation with respect to the operation of said impression cylinder, means for reciprocating said feed finger in a fixed timed relation with respect to the operation of said impression cylinder, a feed roller, rotatable elements adapted to co-operate with said feed roller to successively transfer work-sheets to a point intermediate said impression cylinder and feed finger, driving means for rotating said feed roller and rotatable elements, a cam for intermittently lifting said rotatable elements with respect to said feed roller, means for rotating said cam in a fixed timed relation with respect to the speed of rotation of said impression cylinder, said cam being bodily movable in a horizontal plane, means so cooperating with said cam and the driving means for said feed roller and rotatable elements as to rotate the cam to an advanced position when the same is bodily moved in one direction and to rotate the cam to a retarded position when the same is bodily moved in an opposite direction, and stop fingers adapted to so cooperate with said feeding elements as to insure a proper position of the work-sheets with respect to said feed roller and feeding elements, and means for lifting said stop fingers when said rotatable elements are lowered and for lowering said stop fingers when said rotatable elements are lifted, the last named means including a pair of intermeshing segmental gears co-operating indirectly with and depending for their operation upon the operation of said cam.

8. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to be operated in a timed relation with respect to said impression cylinder, a bodily movable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism, and means so actuated upon the bodily movement of said feeding device as to change its period of operation with respect to that of said feeding mechanism and impression cylinder.

9. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to be operated in a fixed timed relation with respect to said impression cylinder, a bodily movable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism, driving means for said feeding device, said driving means being adapted to be actuated in a timed relation with respect to said feeding mechanism and, means cooperating with said driving means upon the bodily movement of said feeding device as to change its period of operation with respect to that of said feeding mechanism and impression cylinder.

10. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to be operated in a timed relation with respect to said feeding mechanism, a bodily adjustable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism, driving means in the form of a sprocket chain for operating said feeding device, said chain being adapted to be driven in a timed relation with respect to said feeding mechanism, and means in the form of a sprocket associated with said feeding device and adapted to so engage said sprocket chain as to change the period of operation of said feeding device with respect to that of said feeding mechanism upon bodily adjustment of said feeding device.

11. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to transfer work-sheets successively into the printing press, a bodily adjustable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism and including a cam, driving means in the form of a sprocket chain adapted to operate said feeding device and adapted to be actuated in a timed relation with respect to the operation of said feeding mechanism, and a sprocket operatively connected to said cam and to said sprocket chain whereby said feeding device is operatively connected to said driving means and whereby said cam is advanced when said feeding device is bodily adjusted in one direction and retarded when said feeding device is bodily adjusted in an opposite direction.

12. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to transfer work-sheets successively into the printing press, a bodily adjustable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism and including a cam, driving means in the form of a sprocket chain adapted to operate said feeding device and adapted to be actuated in a timed relation with respect to the operation of said feeding mechanism, a sprocket operatively connected to said cam and to said sprocket chain whereby said feeding device is operatively connected to said driving means and whereby said cam is advanced when said feeding device is bodily adjusted in one direction and retarded when said feeding device is bodily adjusted in an opposite direc-

tion, means for maintaining engagement between said sprocket and sprocket chain, and means for bodily adjusting said timing device.

13. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to be operated in a timed relation to said impression cylinder, a bodily movable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism, means so actuated upon the bodily movement of said feeding device as to change its period of operation with respect to that of said feeding mechanism and impression cylinder, and a bodily movable feed table so associated with said feeding device that when said feeding device is bodily moved the feed table is simultaneously and correspondingly moved.

14. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to be operated in a timed relation to said impression cylinder, a bodily movable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism, means so actuated upon the bodily movement of said feeding device as to change its period of operation with respect to that of said feeding mechanism and impression cylinder, a bodily movable feed table so associated with said feeding device that when said feeding device is bodily moved the feed table is simultaneously and correspondingly moved, driving means for said feeding device, operable means depending for its operation upon said driving means to elevate said table, and operable means depending for its operation upon said driving means to lower said table.

15. The combination with a printing press having an impression cylinder, of a feeding mechanism adapted to be operated in a timed relation to said impression cylinder, a bodily movable feeding device adapted to transfer work-sheets to a position intermediate said impression cylinder and feeding mechanism, means so actuated upon the bodily movement of said feeding device as to change its period of operation with respect to that of said feeding mechanism and impression cylinder, a bodily movable feed table so associated with said feeding device that when said feeding device is bodily moved the feed table is simultaneously and correspondingly moved, driving means for said feeding device, operable means depending for its operation upon said driving means to elevate said table, and operable means depending for its operation upon said driving means to lower said table, the relation of the first and last mentioned operable means to said driving means remaining unchanged when said bodily movable feeding device is moved to effect a change in its period of operation with respect to that of said feeding mechanism and impression cylinder.

In testimony whereof, we have affixed our signatures to this specification.

MORRIS LIPTON.
LOUIS HAENLEIN.
FREDERICK W. HILL.