July 19, 1932. S. J. MOLLET 1,867,859

PRINTING PRESS

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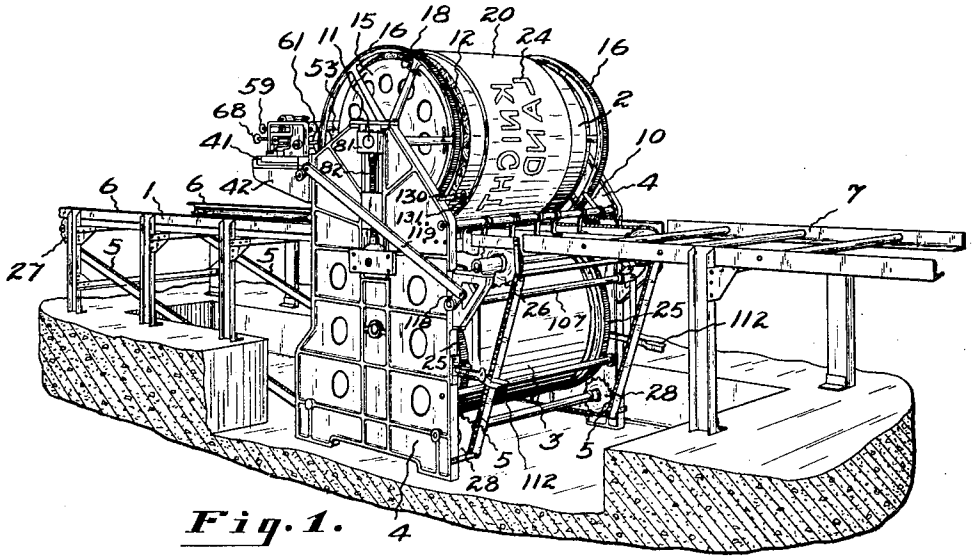


Fig. 1.

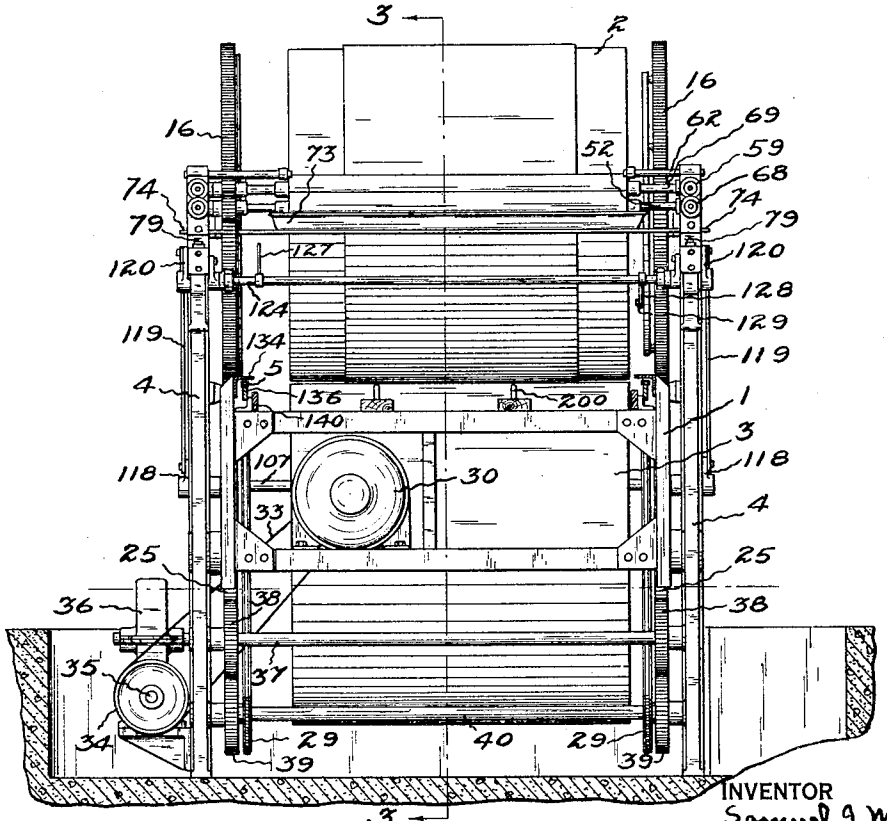


Fig. 2.

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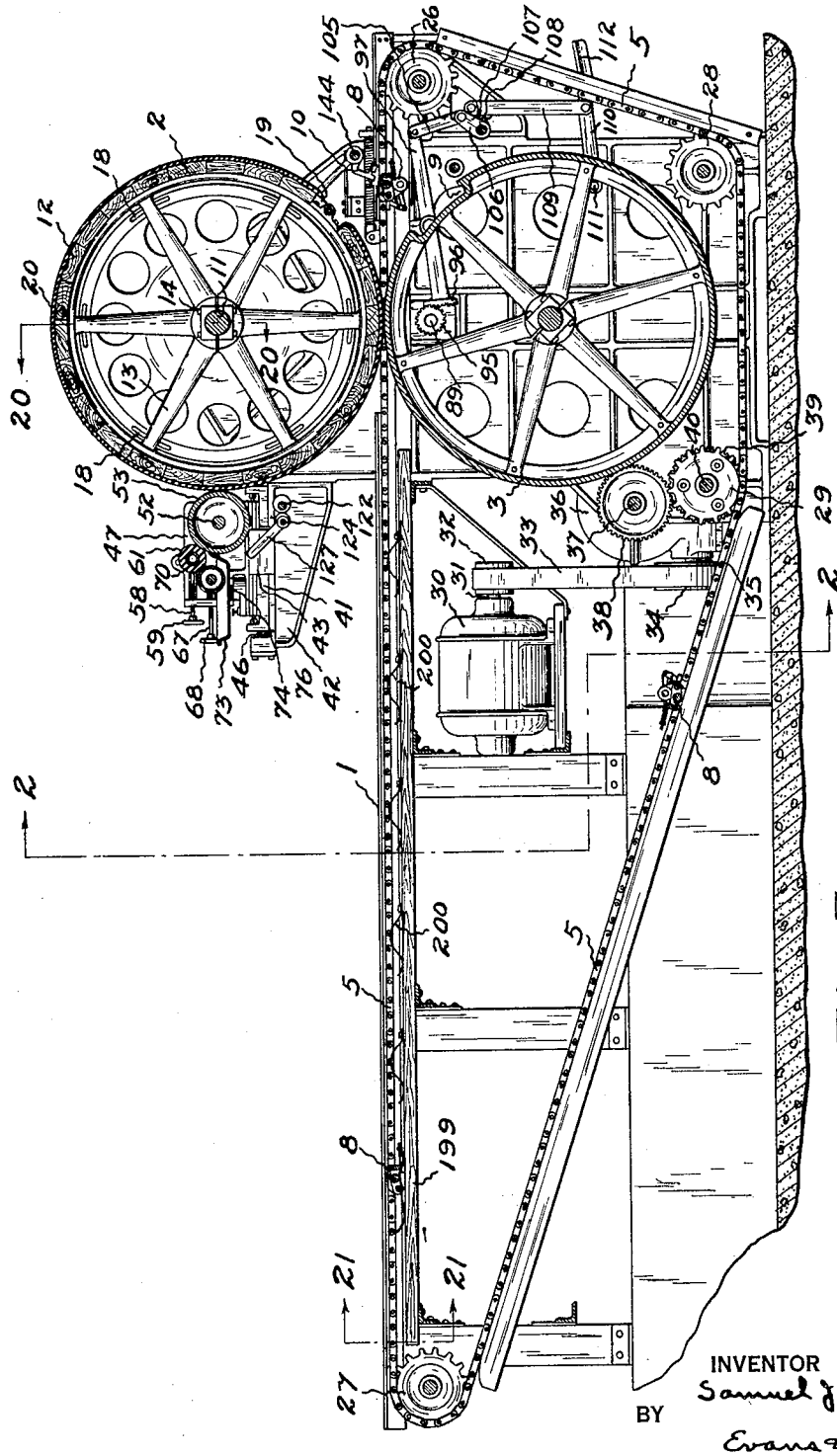


Fig. 3.

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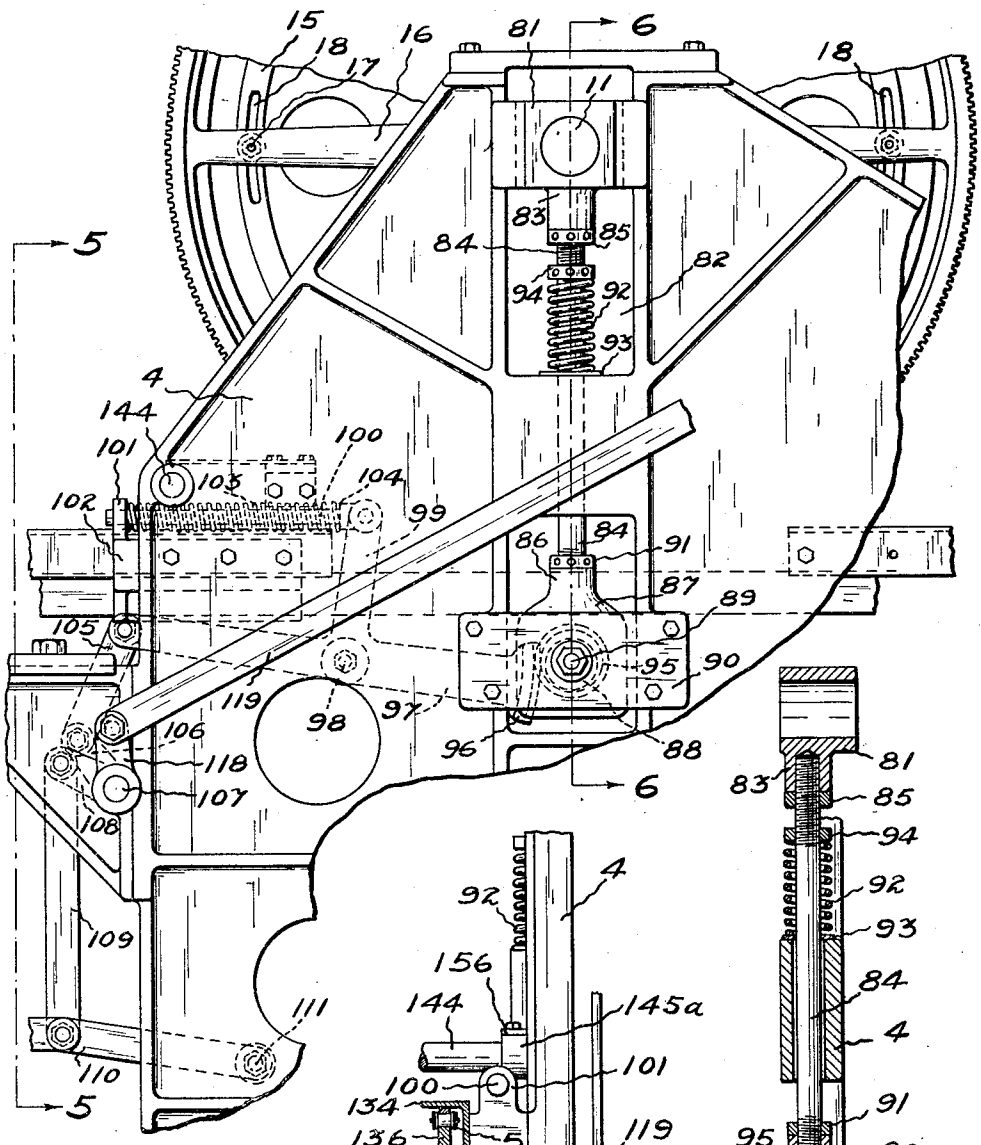


Fig. 4.

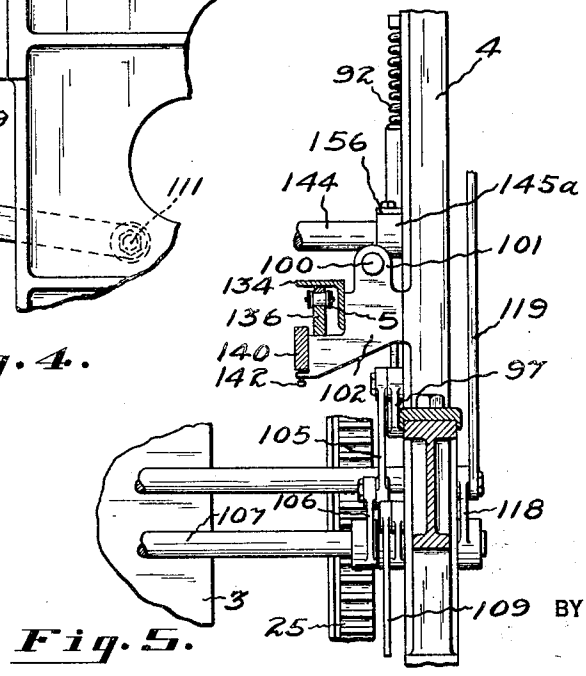


Fig. 5.

Fig. 6.

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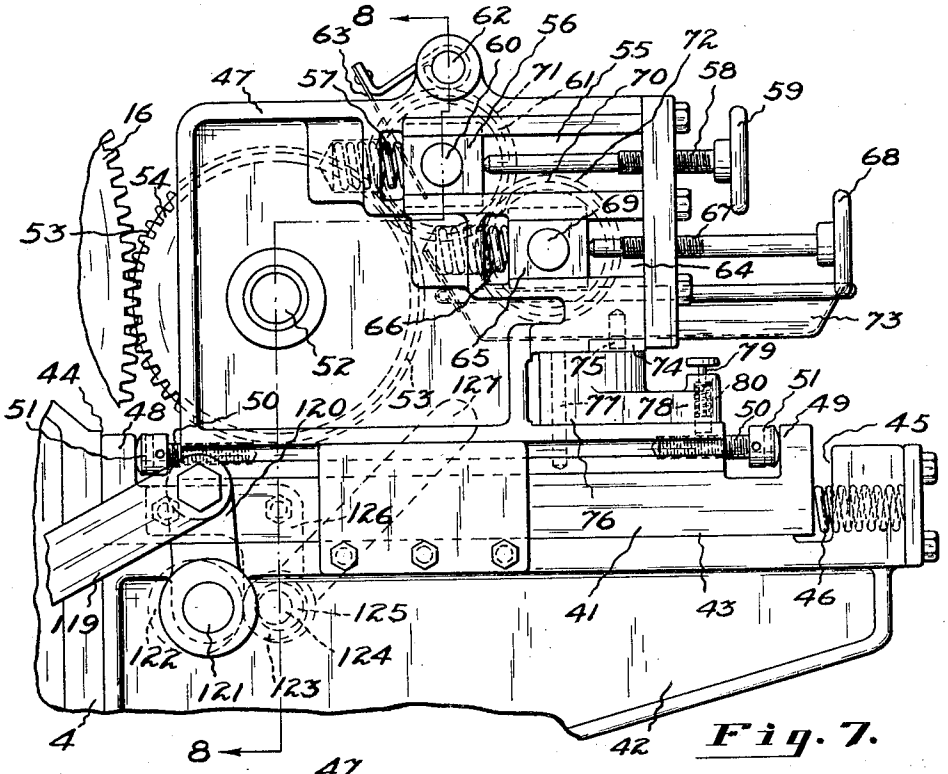


Fig. 7.

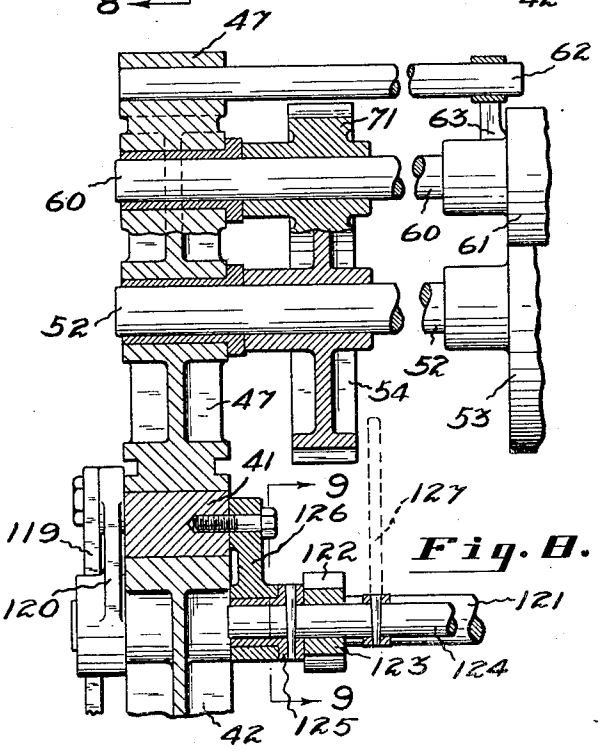


Fig. 8.

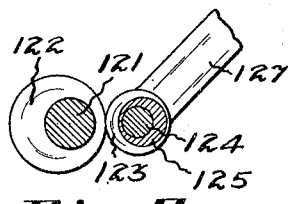


Fig. 9.

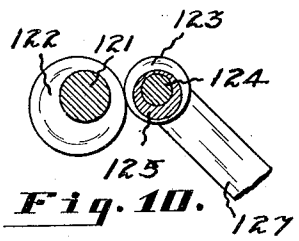


Fig. 10.

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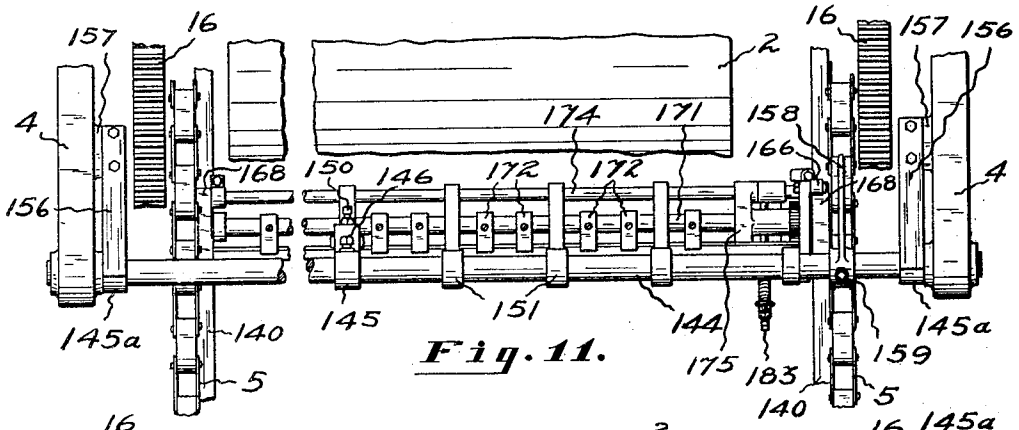


Fig. 11.

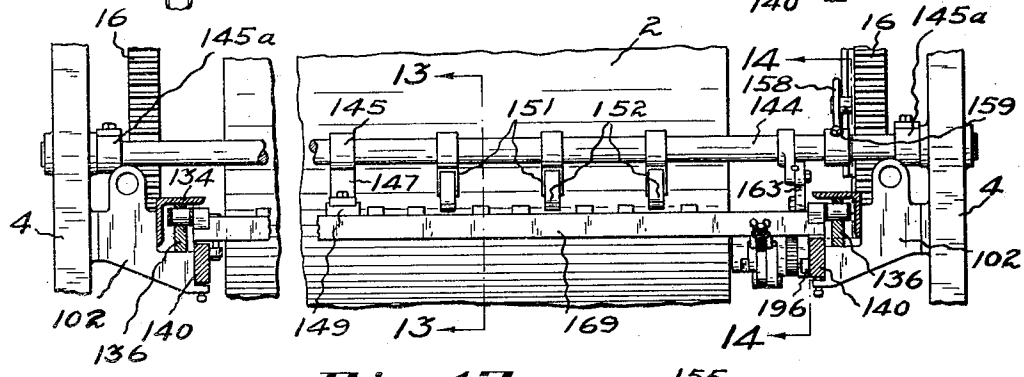


Fig. 12.

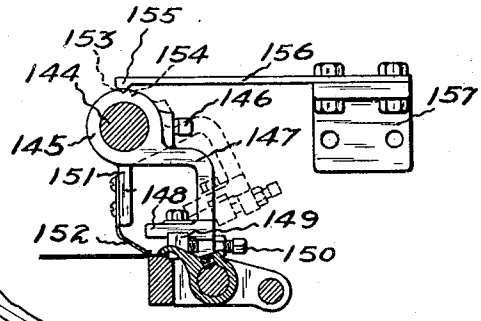


Fig. 13.

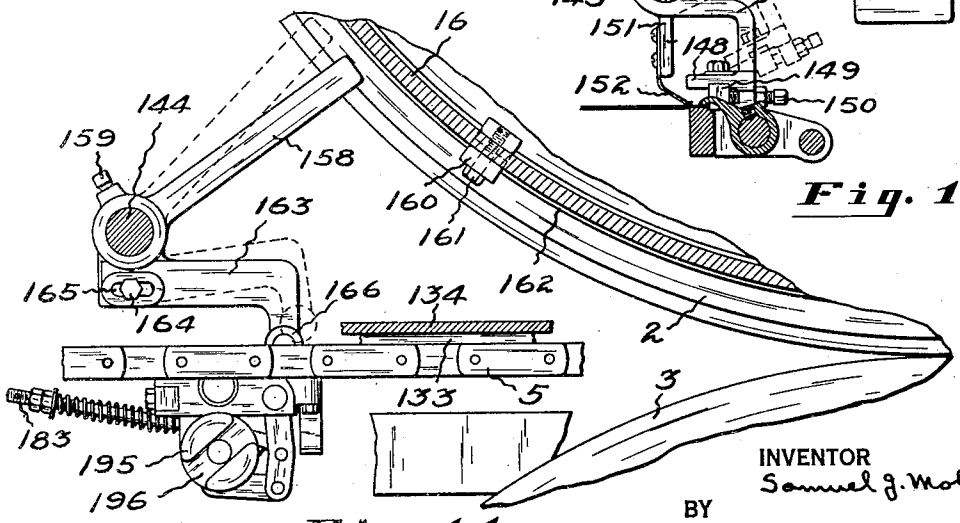


Fig. 14.

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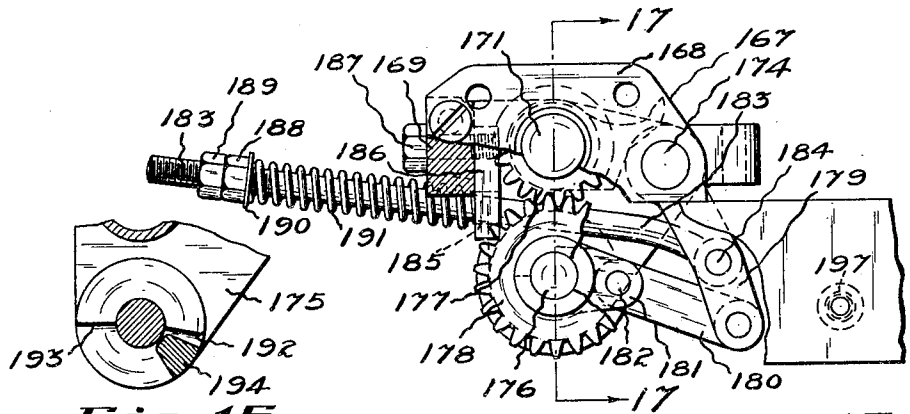


Fig. 16.

Fig. 15.

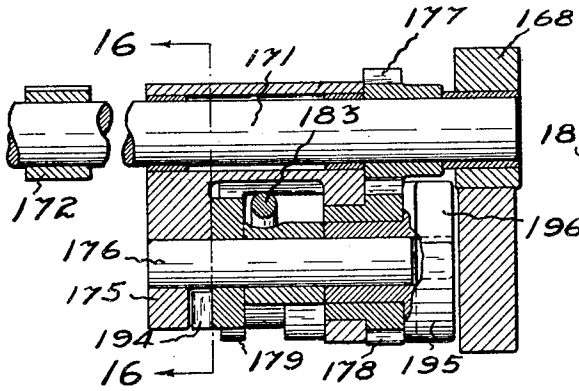


Fig. 17.

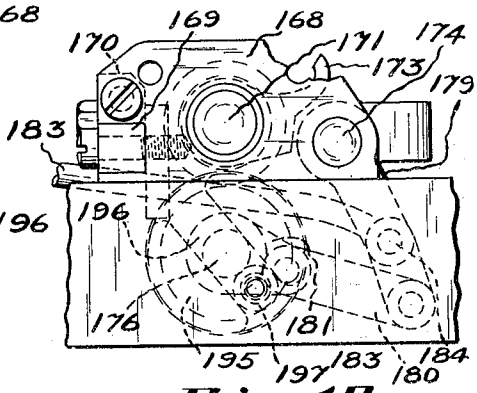


Fig. 18.

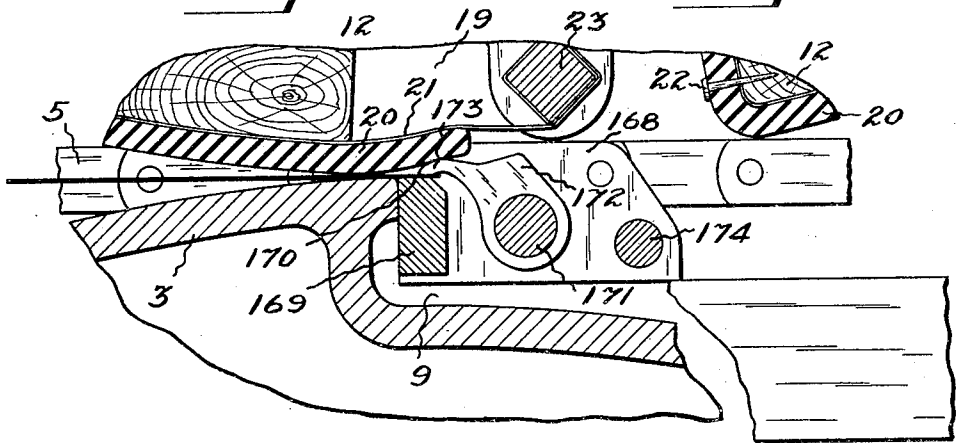


Fig. 19.

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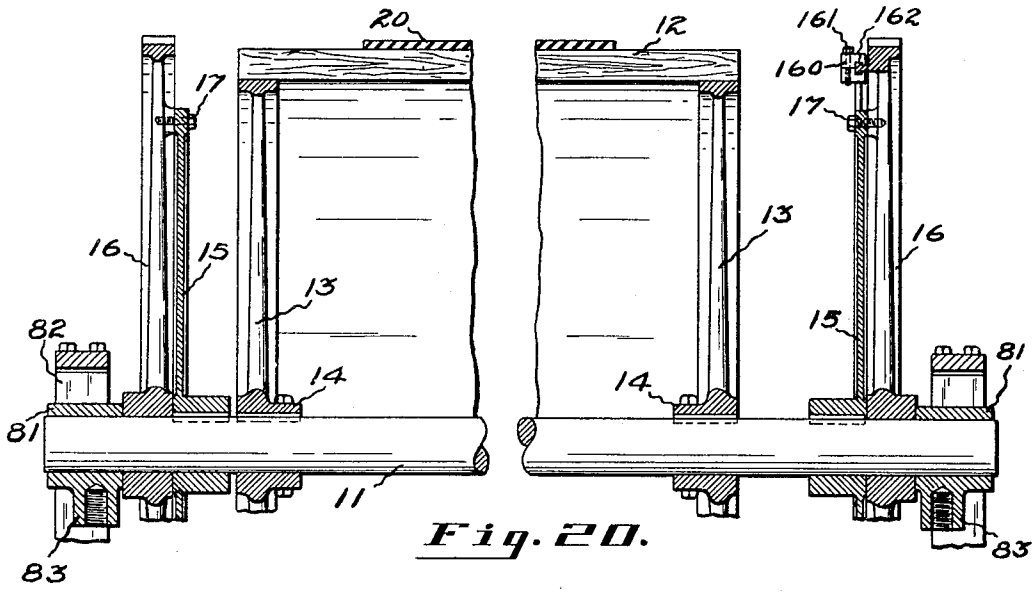


Fig. 20.

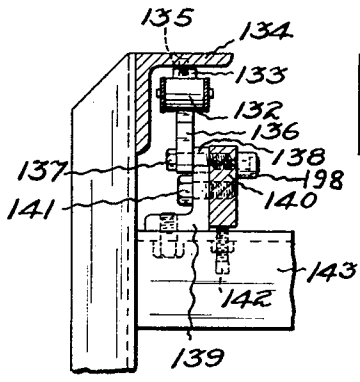


Fig. 21.

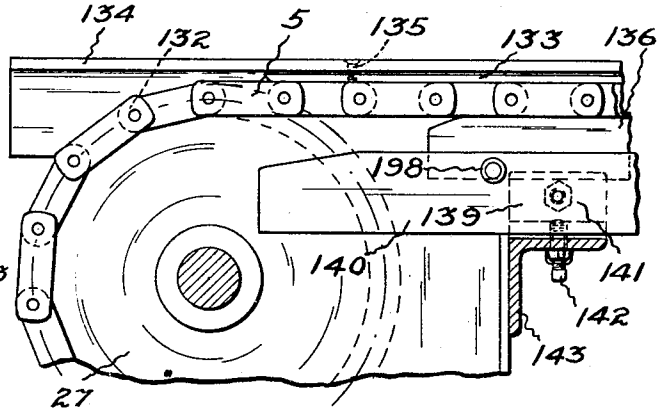


Fig. 22.

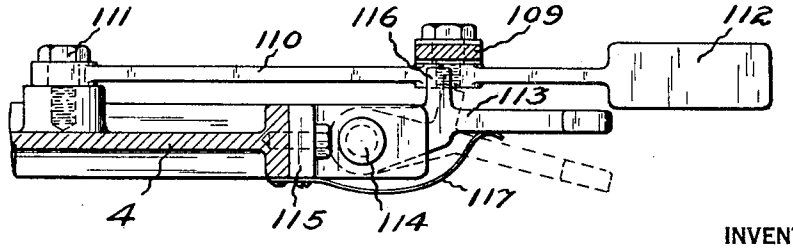


Fig. 23.

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Patented July 19, 1932 1,867,859

UNITED STATES PATENT OFFICE

SAMUEL J. MOLLET, OF MASSILLON, OHIO

PRINTING PRESS

Application filed February 28, 1929. Serial No. 343,523.

This invention relates to printing presses and more particularly to a printing press adapted for printing large signs such as employed for road-side advertising purposes.

The invention has for its object to provide a printing press having means for rapidly and accurately printing upon a surface of a large area and having means independent of the printing cylinders for feeding large sheets or plates between the printing cylinders and delivering them from the machine.

A further object is to provide means for accurately positioning each sheet as it is delivered to the press, together with means independent of the cylinders for automatically feeding the sheets in a straight line between the printing cylinders.

A further object is to provide a printing press having automatic positioning and feeding means which is capable of printing upon sheets or plates varying greatly in length and width.

A further object is to provide a stop device for positioning sheets in a position to be engaged by the grippers of the sheet feeding or conveying means which is automatically shifted by the conveying means to an inoperative position simultaneously with the engagement of the sheet by the grippers and which is automatically returned to operative position after passage of the sheet.

A further object is to provide a trip mechanism for automatically returning the stop mechanism to operating position which is actuated by a moving part of the press and which is adjustable so that the time of the release of the stop mechanism may be regulated in accordance with the length of the sheet.

A further object is to provide an automatic gripper mechanism in which the gripper arms are held both in gripping and releasing position by means of a spring actuated toggle, the operation of the arms in either direction being accomplished by a trip device which acts to shift the pivot of the toggle past its dead center position.

A further object is to provide a feed mechanism consisting of endless conveyor chains mounted for movement past opposite ends of the cylinders and connected by cross bars carrying grippers for engaging the sheets and to provide adjustable supports for the horizontal upper run of the chains by means of which the grippers may be accurately adjusted and maintained in horizontal alinement with the bight of the printing cylinders.

A further object is to provide means for supporting the sheet intermediate its sides and ends after it has passed between the cylinders, the sheet supporting means being so constructed as not to interfere with the passage of the gripper cross bars.

With the above and other objects in view, the invention may be said to comprise the printing press as illustrated in the accompanying drawings hereinafter described and particularly set forth in the appended claims, together with such variations and modifications thereof as will be apparent to one skilled in the art to which the invention appertains.

Reference should be had to the accompanying drawings forming a part of this specification in which:

Figure 1 is a perspective view of a printing press embodying the invention looking toward the feed-in end thereof.

Fig. 2 is a section taken on the line indicated at 2—2 in Fig. 3, looking in the direction indicated by the arrows.

Fig. 3 is a longitudinal vertical section taken on the line indicated at 3—3 in Fig. 2 looking in the direction indicated by the arrows.

Fig. 4 is a fragmentary side elevation of the end of the machine at which the printing cylinders are located.

Fig. 5 is a section taken on the line indicated at 5—5 in Fig. 4, looking in the direction indicated by the arrows.

Fig. 6 is a section taken on the line indicated at 6—6 in Fig. 4, looking in the direction indicated by the arrows.

Fig. 7 is a side elevation of the inking mechanism.

Fig. 8 is a section taken on the line indicated at 8—8 in Fig. 7, looking in the direction indicated by the arrows.

Fig. 9 is a detail view of the cam and roller at one end of the inking mechanism for shift-

ing the inking mechanism, the cam being shown in the position which it occupies when the inking mechanism is in operating position.

Fig. 10 is a detail view of the cam and roller shown in Fig. 9, showing the cam and roller in the positions which they occupy in holding the inking mechanism out of engagement with the form cylinder.

Fig. 11 is a plan view of the stop device for positioning sheets for engagement with the conveying means by which they are moved between the printing cylinders.

Fig. 12 is a vertical section taken immediately in front of the stop device shown in Fig. 11 and showing the stop device in elevation.

Fig. 13 is a section taken on the line indicated at 13—13 in Fig. 12, looking in the direction indicated by the arrows.

Fig. 14 is a section taken on the line indicated at 14—14 in Fig. 12, looking in the direction indicated by the arrows.

Fig. 15 is a side elevation of the gripper device with a portion of the side frame broken away to show the gripper actuating means.

Fig. 16 is a section taken on the line indicated at 16—16 in Fig. 17 looking in the direction indicated by the arrows.

Fig. 17 is a section taken on the line indicated at 17—17 in Fig. 15 looking in the direction indicated by the arrows.

Fig. 18 is a side elevation showing the gripper actuating cam and the trip roller on the frame with which the cam engages.

Fig. 19 is a longitudinal section showing the grippers and forward end of the sheet between the printing cylinders.

Fig. 20 is a fragmentary section taken axially through the form cylinder.

Fig. 21 is a transverse section through one of the chain guides taken on the line indicated at 21—21 in Fig. 3, looking in the direction indicated by the arrows.

Fig. 22 is a fragmentary longitudinal section at the discharge end of the machine showing one sprocket and conveyor chain in side elevation.

Fig. 23 is a detail plan view of the treadle by means of which the form cylinder may be shifted out of engagement with the compression cylinder, together with the retaining latch for holding the treadle in its lower position.

Referring to the accompanying drawings, the main elements of the machine of the present invention are an elongated table 1, along which the sheets are moved during the printing operation, a form cylinder 2 above the level at which the sheets are supported and a compression cylinder 3 immediately beneath the form cylinder, the two cylinders being supported one above the other between suitable standards 4.

Only one pair of printing cylinders is shown in the accompanying drawings, but it is to be understood that, when desired, a number of printing cylinders may be arranged in a row along the length of the table to successively print upon a sheet, fed along the table.

The sheets are fed through the printing cylinders by means of conveyor chains 5 which are supported at opposite sides of the table in horizontal guides 6 which are disposed at the level of the bight of the cylinders. A roller table 7 is placed at the front end of the conveyor table 1 and has rollers positioned at the level of the chains so that sheets may be pushed along a table 7 to position their forward edges immediately in front of the cylinders on the table 1.

For moving the sheets between the cylinders, suitable gripper devices indicated generally by the numeral 8 are supported by the chains and extend across the space between the chains and in order to enable the gripper devices to pass between the cylinders, the gripper deivces are spaced apart a distance equal to the circumference of the compression cylinder and the compression cylinder has an axially extending peripheral recess 9 in which the gripper supporting bars are positioned during their passage between the cylinders.

Co-operating with the gripper devices, there is a stop device indicated generally by the numeral 10, which is positioned immediately in front of the printing cylinders and which serves to position each sheet as it is fed to the machine for engagement by the grippers. During the printing operation, the sheets are moved in a straight line at the peripheral speed of the form cylinder from the front to the rear end of the table 1, the ink or paint being transferred from the form on the form cylinder to the surface of the sheet as the sheet passes between the cylinders.

The present invention resides in various features of construction and various mechanisms employed by which the machine is enabled to rapidly and accurately print upon flat surfaces of large size.

The form cylinder

As best shown in Figs. 1, 19 and 20, the form cylinder 2 is mounted upon a transverse shaft 11 and consists of a cylindrical body portion 12 formed of wood mounted upon a plurality of spiders 13 on the shaft 11. The spiders are preferably formed in two halves and have the mating hub portions 14 thereof clamped together upon the shaft 11. Discs 15 are keyed to the shaft 11 beyond the ends of the cylinders 2 and a pair of large gear wheels 16 are connected to the discs 15 by means of bolts 17 which pass through arcuate slots 18 in the discs. By loosening the bolts 17, the cylinder may be adjusted angularly with respect to the gear wheels so as to accu-

rately register the form with the surface to be printed upon. The peripheral portion of the cylinder 2 has a recess or gap 19 extending from one end of the cylinder to the other which registers with the recess 9 of the compression cylinder 3 during rotation of the cylinders.

Upon the periphery of the cylinder 2, there is secured a form 20 preferably composed of a rubber composition secured upon a fabric backing 21, the form is secured to the cylinder at one end by suitable means such as nails 22 shown in Fig. 19 and at its opposite end the fabric backing 21 extends beyond the end of the composition body of the form and is wrapped about a square shaft 23 which is positioned in the slot or gap 19 of the cylinder and extends from one end of the cylinder to the other.

The shaft 23 is rotatably mounted and forms a reel to wind up the fabric 21 and draw the form tightly about the cylinder, suitable means being provided for locking the shaft 23 after the form is tightened on the cylinder. Any suitable letters and designs may be formed in intaglio on the form 20, as indicated at 24 in Fig. 1. The ink or paint is applied to the smooth surface of the form around the recessed portions coating the sheet on all portions of its surface which contact with the cylinder except those portions which register with the recessed letters, characters or designs on the form.

Driving mechanism for cylinders and conveyor chains

The printing cylinders and the conveyor chains have a common drive which is shown in Figs. 2 and 3 of the drawings. Fixed to the shaft of the compression cylinder 3, and positioned beneath the gear wheels 16, are gear wheels 25 which mesh with the gear wheels 16. The pitch circles of the gear wheels 16 and 25 coincide with the cylindrical surfaces of the cylinders so that the cylinders rotate with equal peripheral speeds.

In order to feed the sheets between the cylinders at a speed equal to the peripheral speeds of the cylinders, the conveyor chains 5 must be driven at a speed equal to the peripheral speed of the cylinders. The conveyor chains are supported at the front and rear ends of the table by means of sprockets 26 and 27 which support the chains in alinement with the guides 6. The lower runs of the chains 5 are below the compression cylinder 3, the chains being guided over the sprockets 28 and 29 positioned to the front and rear of the cylinder 3.

The cylinders and conveyor chains are driven from an electric motor 30 to the shaft 31 of which is fixed a pulley 32 which drives a belt 33 extending over the pulley 34 fixed to a short longitudinal shaft 35 which operates suitable reduction gearing in the gear casing 36 which drives a transverse shaft 37, which has fixed thereto adjacent its ends gears 38 which mesh with the gears 25. The gears 38 also mesh with gears 39 fixed to a transverse shaft 40 to which the sprockets 29 are attached. The gears 25, 38 and 39 are so proportioned that the conveyor chains are driven at a linear speed equal to the peripheral speed of the printing cylinders.

Inking mechanism.

As best shown in Figs. 3 and 7, the inking mechanism which applies a uniform coating of ink or paint to the surface of the form 20 is mounted for movement bodily toward and from the rear side of the cylinder 2 and is supported on a carriage 41 which is mounted for sliding movement upon supporting brackets 42 which are attached to the rear edges of the standards 4. Each of the brackets 42 has a horizontal guideway 43 which extends in a direction longitudinally of the table 1 and the carriage 41 is movable between stop shoulders 44 formed by the rear edges of the standards 4 projecting above the brackets 42 and shoulders 45 at the rear ends of the brackets, the carriage being pressed toward and normally held against the shoulders 45 by means of coil springs 46 interposed between the shoulders 44 and the rear end of the carriage. A supporting frame 47 for the inking mechanism is adjustably mounted upon the carriage 41, the frame 47 being slidable on the carriage 41 between front and rear stop shoulders 48 and 49 and being adjustable by means of front and rear screws 50 adjustable in the frame 47 and having rounded heads 51 engageable with the shouders 48 and 49.

The heads 51 are adapted to receive a suitable tool for turning the screws and, by adjusting the screws, the frame 47 may be adjusted forwardly or rearwardly on the carriage 41. Journaled in the frame 47 adjacent the front end thereof, there is a transverse shaft 52 which is in horizontal alinement with the shaft 11 supporting the form cylinder. The shaft 52 carries an inking roller 53, the surface of which lies closely adjacent to the surface of the form on the cylinder 2. The shaft 52 also has fixed thereto gears 54 which mesh with the large gears 16 of the form cylinder. The pitch circles of the gears 16 coincide with the cylindrical surface of the form and the pitch circles of the gears 54 coincide with the cylindrical surface of the roller 53 so that the peripheral speed of the roller 53 is equal to the peripheral speed of the form cylinder. Adjacent the top thereof, frame 47 has horizontal slots 55 forming guideways at the ends thereof and in these guideways are slidably mounted bearing blocks 56 which are pressed rearwardly by compression coil springs 57 which are interposed between the frame 47 and the forward faces of the blocks. The rear faces of the

blocks are engaged by the forward ends of screws 58 which have threaded engagement in openings in the frame 47 and these screws are provided at their rear ends with hand wheels 59 by means of which the screws may be advanced to move the blocks 56 forwardly in opposition to the springs 57. A transverse shaft 60 is journaled in the bearing blocks 56 and this shaft carries a roller 61 which co-operates with the roller 53, the roller 61 serving to apply a coating of ink or paint to the surface of the roller 53 which in turn applies a coating to the form 20. In the ends of the frame 47 above the shaft 60, there are mounted short shafts 62 which support scrapers 63 which engage the shoulders of the roller 61 to remove any paint or ink thereon.

Beneath the slots 55 are horizontal guide slots 64 in which are slidably mounted bearing blocks 65, the front faces of which bear against compression coil springs 66 seated in the frame 47 and the rear faces of which are engaged by the forward ends of screws 67 which are provided at their rear ends with hand wheels 68. By adjusting the screws 67, the bearing blocks 65 may be adjusted toward or from the forward ends of the slots 64. Journaled in the bearing blocks 65, there is a transverse shaft 69 which carries a roller 70 which co-operates with the roller 61 to apply a coating of ink or paint thereto. Gears 71 fixed to the shaft 60 mesh with the gears 54 on the shaft 52 and gears 72 fixed to the shaft 69 mesh with the gears 71 on the shaft 60. The pitch circles of the gears 71 and 72 coincide with the cylindrical surfaces of the rollers 61 and 70 so that the peripheral speed of the three inking rollers 53, 61 and 69 are equal. The lower portion of the roller 70 dips into paint or ink contained in a pan 73 supported beneath the roller, a portion of this paint or ink adheres to the surface of the roller 70, which applies a coating to the roller 61, which applies a coating to the roller 53, which in turn coats the form on the cylinder 2.

It will be apparent that the clearance between the surface of the form 20 and the surface of the roller 53 may be adjusted by means of the screws 50, that the clearance between the roller 61 and the roller 53 may be adjusted by the screws 58 and that the clearance between the rollers 70 and 61 may be adjusted by means of the screws 67. The thickness of the coating transferred from one roller to the next and from the large roller 53 to the form 20 is dependent upon the amount of clearance between the rollers and by means of the adjustments provided by the screws 50, 58, and 67, a very uniform coating may be applied to each of the rollers and to the form and the thickness of this coating can be very accurately regulated.

The ink pan 73 extends across the frame beneath the roller 70 and has attached to the bottom thereof a longitudinal bar 74 which has upwardly extending dowel pins 75 which fit in sockets in an overhanging portion of the frame 47 to hold the pan against sliding or tilting movements. The ends of the bar 74 are supported upon swinging blocks 76 which are connected to the frame 47 by vertical pivots 77. The blocks 76 have rearwardly extending arms 78 which carry latch pins 79 which are yieldingly pressed downwardly by springs 80 and which engage in sockets formed in the frame 47 to hold the blocks 76 in supporting position. By releasing the latch pins 79, the blocks 76 may be swung outwardly from beneath the cross bar 74 to permit the pan to be lowered and removed from the frame. The ink pan may thus be quickly and easily removed whenever it is desired to clean or replace the pan as, for instance, when an ink or paint of a different color is to be employed. If desired, several pans may be provided and one pan substituted for another when desired.

Throw-out mechanism

In order to enable the operator to instantly stop the printing operation, as for instance, when the sheet being printed upon is misalined with respect to the form, mechanism is provided for shifting the form cylinder out of printing position and means is also provided by which the inking mechanism may be simultaneously rendered inoperative. The throw-out mechanism is shown in Figs. 3 to 10 of the drawings.

As shown in Fig. 4, the shaft 11 of the form cylinder 2 is journaled at its ends in bearing blocks 81 which are slidably mounted in vertically disposed guide openings or bearing windows 82 in the side standards 4. Each of the bearing blocks 81 is provided with a tubular internally threaded extension 83 which receives the upper threaded end of a vertically disposed supporting rod 84, a lock nut 85 being provided on the rod which engages the lower end of the tubular extension to secure the rod in adjusted position therein. The lower end of each supporting rod 84 is threaded and extends into an internally threaded tubular extension 86 of an eccentric member 87 which is supported upon an eccentric 88. Each of the eccentrics 88 is rotatably mounted on a stub shaft 89 which is clamped to a plate 90 secured to the standard 4. The supporting rod 84 has a lock nut 91 thereon which engages with the upper end of the tubular extension 86 of the eccentric member to secure the rod in adjusted position with respect to the eccentric member. Coil springs 92 are interposed between a washer 93 seated on the bottom of each of the bearing windows 82 and a nut 94 on the upper threaded end portion of the supporting rods 84. The coil springs 92 are of sufficient strength to support the major portion of the weight

of the form cylinder 2 and the tension of these springs may be adjusted by adjusting the nuts 94.

The lifting of the form cylinder out of printing position is accomplished by rotating the eccentrics 88 and to accomplish this rotation, each of the eccentrics 88 has formed integrally therewith a gear 95 which is operated by means of a gear segment 96 in mesh therewith. The gear segments 96 are formed on the rear ends of levers 97 which are pivoted at 98 to the standards 4 on opposite sides of the machine. The lever 97 has an upwardly extending arm 99 to the upper end of which is pivoted a rod 100 which extends forwardly from the arm through an opening in a vertical flange 101 of a bracket 102 attached to the side standard 4.

The rod 100 is guided for endwise movement in the flange 101 and the arm 99 is normally held in its forward limit of movement by a coil spring 103 which is interposed between the flange 101 and the shoulder 104 formed on the rod 100 near the rear end thereof. The spring 103 serves to normally hold the segment 96 in its lowermost position in which position the eccentric 88 is in a position to hold the form cylinder 2 in printing position. The pivots 98 are located intermediate the ends of the levers 97 and the forward ends of the levers are adjacent the forward edges of the standards 4. To the forward ends of the levers 97 are pivoted downwardly extending links 105 which are pivoted at their lower ends to arms 106 fixed to a transverse rock shaft 107 journaled in the standards 4. Adjacent the ends thereof, the shaft 107 has fixed thereto forwardly extending arms 108 to which are attached depending links 109 which are pivoted at their lower ends to levers 110. The levers 110 are connected at their forward ends to the standards 4 by pivots 111 and are provided at their forward ends with treadles 112. When the operator steps on either of the treadles 112, the forward ends of the levers 97 are rocked downwardly and the gear segments 96 are swung upwardly rotating the eccentrics 88 in a direction to lift the form cylinder. An operator standing upon either side of the machine at the forward end thereof may instantly shift the form roller out of printing position during passage of the sheet between the cylinders by stepping on one of the treadles 112.

In order to retain the form cylinder in its inoperative position, means is provided for automatically latching the lever 112 in lowered position. This latching means comprises a horizontally swinging latch 113 which is connected by a vertical pivot 114 to a bracket 115 attached to the forward edge of the adjacent standard 4. Each latch member 113 has an inwardly projecting latch shoulder 116 which is engaged by the lever 110 in its downward movement to swing the latch member 113 outwardly to permit the lever to pass the shoulder, a leaf spring 117 being provided for pressing the latch member 113 inwardly so that the shoulder 116 will spring into locking engagement with the lever 110 as soon as the lever has been moved below the shoulder 116. The forward end of the latch member 113 lies alongside and above the treadle 112 so that when the operator desires to return the printing cylinder to printing position, the latch may be released by exerting lateral pressure thereon with the foot engaging the treadle 112 with which the latch is engaged.

In connection with the means for disengaging the form cylinder from the work, means is also provided for simultaneously shifting the inking mechanism to an inoperative position. The shifting means for the inking mechanism is operated by arms 118 fixed to the shaft 107 at the ends thereof and links 119 extending upwardly and rearwardly from the arms 118 outside the standards 4. As best shown in Fig. 7, the rear ends of the links 119 are attached to short arms 120 which are fixed to the opposite ends of a transverse shaft 121 which is journaled at its ends in the brackets 42. Fixed to the shaft 121 adjacent the inner sides of the brackets 42 are eccentric discs 122 which serve as cams for shifting the carriage 41 rearwardly in opposition to the springs 46.

The eccentric discs or cams 122 engage with rollers 123 mounted on a transverse shaft 124 which is supported at its ends in eccentric bushings 125 which are journaled in bearing brackets 126 secured to the carriage 41, as shown in Fig. 8. When the shaft 107 is rocked by the operation of either of the levers 110 to lift the form cylinder, the arms 118 swing forwardly and shift the links 119 rearwardly rocking the shaft 121 in the direction to apply pressure to the rollers 123 engaged by the cams 122, shifting the carriage 41 rearwardly a sufficient distance to separate the inking roller 53 from the form cylinder so that the inking of the form cylinder is discontinued.

Means is provided for shifting the inking mechanism independently of the form cylinder so that the inking of the form cylinder may be discontinued without moving the form cylinder from printing position. To this end, the shaft 124 has fixed thereto adjacent one end a hand lever 127 by means of which the shaft 124 may be turned to rotate the bushings 125 in the bearing brackets 126 to move the shaft 124 bodily with respect to the brackets 126. The engagement of the rollers 123 with the cams 122 holds the shaft 124 at a fixed distance from the shaft 121 and the adjustment of the bushing causes rearward movement of the bearing bracket 126 and of the carriage 41 to which it is at-

tached. Adjacent the opposite end of the shaft 124 to which the hand lever 127 is attached, there is a second lever 128 to which is connected an actuating rod 129 which extends forwardly past the end of the form cylinder through a guide bracket 130 attached to the forward edge of the guide standard 4, the rod 129 being provided at its forward end with a handle 131 so that an operator standing at the front end of the machine may shift the inking mechanism to an inoperative position by pulling forwardly on the rod 129.

Chain guides

In order to obtain a uniform feed of the sheet between the printing cylinders without slippage between the sheet and form, it is highly desirable that the conveying chains be accurately alined with respect to the printing cylinders and in order to maintain this alinement, adjustable guides are provided for the conveyor chains rearwardly of the cylinders, see Figs. 21 and 22. The conveyor chains 5 are cemposed of relatively short links connected by pivots 132 and travel beneath upper guide bars 133 which are carried by the inwardly projecting flanges of angle bars 134 which are mounted along opposite side edges of the table. The upper guide bars 133 are adjustably supported beneath the flanges of the angle bars 134 by means of screws 135. The chains 5 are held in close proximity to the guide bars 134 by means of lower guide bars 136 which are spaced beneath the bars 134, a distance but slightly greater than the thickness of the chains. The guide bars 136 are supported by bolts 137 which extend through the guide bars, through spacing collars 138 located between angle brackets 139 and which are threaded into a supporting bar 140 adjustably mounted on the brackets 139. The angle brackets 139 are fixed to the table frame beneath the guide bars and the supporting bars 140 are secured to the angle bars 139 by bolts 141. The openings in the angle brackets 139 through which the bolts 141 pass are slightly larger than the bolts so as to permit a slight vertical adjustment of the bar 140 and the bar 140 is engaged at spaced points along its lower edge by the upper ends of vertically disposed adjusting screws 142 which are mounted in angle cross bars 143 extending across the frame beneath the guides, the angle cross bars 143 serving also as supports for the angle brackets 139.

By adjusting the guide bars 133 and 136, the grippers may be maintained in accurate alinement with the bight of the printing cylinders and firmly held against vertical movement during the feeding of the sheet between the printing cylinders.

Stop device

In order to enable the machine to operate continuously and at a relatively rapid rate, means is provided for positioning sheets to be fed between the cylinders, and this means is in the form of a stop device immediately in front of the cylinders which is automatically released upon engagement of the grippers with the sheet, and which is automatically restored to the operative position after a sheet being fed through the cylinders has been moved to a position clear of the stop, see Figs. 11 to 14, inclusive. Extending transversely across the table at the forward end thereof and above the conveyor chains, there is a transverse shaft 144 to which are attached a series of collars 145 which are held in adjusted positions on the shaft by means of set screws 146. One of the collars 145 has a rearwardly and downwardly extending arm 147 which has at its lower end a forwardly extending guide portion 148. The guide portion 148 has slidably mounted on the under side thereof a stop block 149 which may be adjusted forwardly or rearwardly by means of a screw 150. The collars 145 have downwardly extending arms 151 to which are attached spring guide aprons 152 in advance of the block 149 which serve to guide the edge of the sheet to the proper position to be engaged by the grippers. The arms 147 are movable from a position in which the stop block 149 is in the path of movement of a sheet being fed to the machine to a position in which the stop block and aprons are entirely clear of the sheet so that the sheet may be advanced between the printing cylinders.

Collars 145*a* near opposite ends of the shaft 144 are each provided with a pair of V-shaped notches 153 and 154 and these notches are engaged by beveled detents 155 carried on the forward end of spring arms 156 attached to brackets 157 attached to the stands 4. The spring actuated detents 155 serve to yieldably retain the stop members either in their operative or inoperative position.

The stop and apron carrying arms 147 and 151 are so disposed with respect to the axis of the shaft 145 that they normally swing to stopping position when released. Adjacent one end thereof, the shaft 144 has attached thereto a trip arm 158 which is angularly adjustable upon the shaft and which may be secured in adjusted position thereon by means of a set screw 159. The trip arm extends rearwardly and upwardly from the shaft 144 with its inner end lying to the inner side of the peripheral portion of one of the gears 16 and is in the path of movement of a lug 160 which is adjustably attached to the gear. The lug 160 is formed in two parts connected by a clamping bolt 161 which serves to secure the lug upon an annular T-shaped rib 162 projecting in-

wardly from the inner face of the gear 16. The engagement of the lug 160 with the arm 158 imparts a turning movement to the shaft 144 and to the arms 147 attached thereto, causing the detent 155 to ride out of the notch 154 so that the arms 147 are caused to swing downwardly to their operative position.

Adjacent the arm 158, a rearwardly and downwardly extending arm 163 is slidably keyed to a collar on the shaft and may be adjusted by means of a bolt 164 and a slot 165. At its lower end the arm 163 carries a roller 166 which is engaged by a cam member 167 which is an extension of one of the end plates 168 by which the gripper devices are attached to the chains 5. The cam 167 swings the arm 163 upwardly, causing the stop arms 147 to be swung upwardly to their inoperative position, in which position the detents 155 enter the notches 154 and retain the stop members in elevated position until they are again released by the lug 160. The spacing of the grippers on the conveyor chains is exactly equal to the circumference of the printing cylinder and the lug 160 is so positioned on the gear 16 that it will not engage with the trip arm 158 until after a sheet being fed between the cylinders has passed to a position entirely clear of the stop members. The size of the sheets printed upon may be of various lengths and the sheets of shorter length will pass to a position clear of the stop members sooner than the sheets of longer length. In operating upon shorter sheets, the stop may be adjusted to return the stop members to operative position after a shorter interval of time so that a longer interval is permitted for the feeding of sheets from the roller table 7 into engagement with the stop.

Gripper devices

As best shown in Figs. 14 to 18 inclusive, each of the gripper devices, by means of which the sheets are drawn through the space between the printing cylinders, is carried by means of the plates 168, which are secured to laterally alined links of the endless chains 5. The plates 168 are rigidly connected adjacent their forward ends by means of a cross bar 169 which is substantially rectangular in cross section, the upper edge 170 of the bar 169 lying substantially in a horizontal plane tangent to the cylindrical surface of the form 20 during its travel along the upper run of the chain.

Intermediate the ends of the plates 168 there is mounted a cross shaft 171 which is journaled in the plates and which carries gripper arms 172 which have fingers 173 which are adapted to engage the top face 170 of the bar 169, the sheet being printed upon being firmly gripped between the fingers 173 and the cross bar 169 during the passage of the sheet between the cylinders. The plates 168 are connected adjacent their rear ends by cross shaft 174. A supporting member 175 is supported on the shafts 171 and 174 adjacent the opposite ends thereof immediately to the inner sides of the end plates 168, and these members support short shafts 176 immediately beneath the shaft 171. The shaft 171 has fixed thereto spur gears 177 which mesh with spur gears 178 mounted on the short shafts 176.

The shaft 174 has downwardly extending arms 179 pivoted thereto and the lower end of each of these arms is connected by a link 180 to an arm 181 fixed to one of the gears 178, link 180 being connected to the arm 181 by means of a pivot pin 182. A rod 183 is pivotally connected at its rear end to the arm 179 intermediate the ends of the arm, and extends forwardly between the shafts 171 and 176, the rod 183 being connected to the arm 179 by the pivot 184 and being guided in an aperture 185 in the plate 186 which is secured to the cross bar 169 by means of bolts 187. The free end of the rod 183 is threaded to receive stop and lock nuts 188 and 189.

A washer 190 is positioned against the inner face of the nut 188 and a compression coil spring 191 is interposed between the washer 190 and the guide plate 186. The spring 191 tends to move the arm 179 forwardly and through the link 180 to impart a turning movement to the gear 178 in one direction or the other, depending on whether the pivot 182 is above or below its dead center position. The spring 191 thus serves to hold the gripper arms 172 either in their gripping position or in an inoperative position, the gripper arms being held in inoperative position when the pivot pin 182 is above dead center, as shown in Fig. 15 of the drawings.

The angular movement of the gears 178 is limited by means of stop shoulders 192 and 193 on the member 175, which are engaged by a lug 194 as shown in Fig. 16, the movement of the gears 178 being sufficient to shift the gripper arms from their gripping position to an inoperative position rearwardly of the shaft 171. In order to shift the pivot 182 in either direction past its dead center position, cams 195 are fixed to the outer ends of the shafts 176 and each of these cams is provided with a diametrical groove 196 which engages with trip rollers 197 and 198 fixed to the side members of the table. The trip rollers 197 are positioned beneath the stop mechanism at the forward end of the table, and the rollers 198 are positioned adjacent the rear end of the table, the rollers 197 serving to actuate the grippers to cause them to swing into engagement with the rear edge of a sheet resting on the cross bar 169, and the trip rollers 198 serving to disengage the grippers from the sheet in the rear end of the table

to permit the sheets to be removed from the table.

The spacing of the grippers on the chains 5 is exactly equal to the circumference of the form cylinder so that the forward end of each sheet always engages with the same portion of the form. In passing from the forward end of the upper run of the chains toward the printing cylinders, the upper face 170 of the cross bar 169 lies immediately beneath a sheet which is positioned on the table with its forward edge in engagement with the stop blocks 149 and the trip rollers 197 are so positioned with respect to the stop blocks that the gripper arms are brought into gripping position at the instant when the rear edge of the sheet lies upon the top face 170 of the gripper bar, the cam 167 being so positioned as to simultaneously sweep the stop arms out of the path of the sheet.

It is desirable that sagging of the sheet between the grippers and the cylinders be prevented since this would tend to cause relative sliding between the surface of the sheet and the surface of the form. Means is therefore provided for supporting the sheet rearwardly of the cylinders. To this end laterally spaced longitudinal bars 199 are mounted on the cross bars 143 rearwardly of the cylinders and upon the upper surface of these longitudinal bars are mounted arched springs 200 which are attached to the bars at their forward ends and which have sliding contact with the bars at their rear ends. The springs 200 provide numerous points of support for the sheet being printed upon by the grippers and cylinders and these springs are also adapted to yield to permit passage of the gripper carrying crossbars, the springs being flattened by the cross bars as they pass over them and springing back to supporting position after the grippers have passed.

Operation

In the operation of the press, a form 20 having the material to be printed in intaglio thereon is mounted on the cylinder 2 and the bearings of the cylinder 2 are adjusted to provide the desired pressure against the compression cylinder. In mounting the form upon the cylinder, one end of the form is secured to the wood covering 12 at one side of the gap or recess 19 and the form is drawn around the cylinder. The projecting portion of the fabric backing 21 is then secured to the square shaft 23, whereupon the form is drawn into snug engagement throughout the periphery of the cylinder by turning the shaft 23 to wind the fabric 21 thereon. The form 20 is thus caused to snugly engage the surface of the cylinder throughout the circumference thereof so that a smooth cylindrical printing surface is provided. After the form is attached, the bearings of the form cylinder are adjusted to provide the desired pressure against the compression cylinder. The driving motor 30 is then started in operation to operate the cylinders and conveyor chains and a sheet to be printed upon is placed upon the roller table 7 and pushed into engagement with the stop block 149 which should be adjusted to cause the sheet to properly register with the form.

While the sheet is in this position, one of the gripper devices will be carried over the front sprockets 26 and will pass rearwardly beneath the sheet. When the cross bar 169 comes beneath the rear edge of the sheet which is in engagement with the stop block 149, the cam 167 will engage with the roller 166, lifting the arm 163 and turning the rock shaft 149 to swing the stop carrying arm 147 to a position clear of the sheet. At the same time the cams 195 will engage with the trip rollers 197, causing the toggle pivot 182 to be moved downwardly past its dead center position, whereupon the spring 191 will act through the toggle and through the gears 178 and 177 to swing the gripper arms 172 into engagement with the rear edge of the sheet resting on the top face 170 of the cross bar 169.

As the gripper device is moved forwardly, it enters the recesses 9 and 19 of the printing cylinders and one end of the form is brought into engagement with the end of the sheet. Since the sheet is moving at a linear speed equal to the peripheral speed of the form cylinder, the surface of the form will roll without slippage on the surface of a sheet and the raised portion of the form will transfer a coating of ink or paint to the sheet while the portions of the sheet registering with the depressed portions of the form receive no coating.

As the gripper passes over portions of the table at the rear of the cylinders, it will press down the successive arched springs 200 which immediately after the gripper has passed will spring back to their original position and provide supports for the sheet in the plane of the bight of the cylinder so that the sheet will not sag between the gripper and the cylinders. After the forward end of the sheet has passed the stop device 10, the lug 168 on the gear 16 will strike the arm 168, rocking the same downwardly and imparting a corresponding movement to the shaft 144 and stop arms 147 to a position in which the stop blocks 149 are in the path of a sheet fed toward the cylinders over the feed table. The yielding latches 155 cooperating with the notches 153 and 154 serve to yieldingly hold the rock shaft in the position to which it is moved by the cam 167 or in the position in which it is moved by the lug 160. After the stop arms are returned to operative position, the operator pushes a second sheet into engagement with the stops ready to be engaged by the next gripper. At the rear end

of the machine, the cams 195 engage with trip rollers 198 which act to rock the toggle pivot 182 to a position above its dead center, swinging the gripper arms 172 rearwardly to release the sheet. After the toggle pivot has been moved above dead center the spring 191 serves to retain the gripper arms in the open position while the chains are passing over the lower run to the forward end of the machine.

The machine of the present invention may be employed to print upon sheets which vary considerably in length, and in printing upon shorter sheets the stop arms may be advantageously returned to operative position sooner than with longer sheets, giving the operator more time in which to position the next sheet against the stops. This may be accomplished by adjusting the stop lug 160 along its supporting rib 162 to provide a shorter arc of travel for the form cylinder during the interval between the actuation of the rock shaft 144 by the cam 167 and the actuation thereof by the lug 160.

In order to provide accurate registry between the form and sheet, the form cylinder may be adjusted bodily by loosening the bolts 17 and turning the cylinder with respect to the gear any desired amount within the limits permitted by the slots 18. If this adjustment of the form cylinder does not cause the form and sheet to register with sufficient accuracy, final adjustments may be made by adjusting the stop block 149 by means of the screw 150.

It is desirable that the path of travel of the gripper be accurately alined with the bight of the cylinders and to enable the path of travel of the grippers to be adjusted to correspond to different adjustments of the form cylinder and different thicknesses of forms mounted thereon, the guides 133 and 136 between which the chain travels may be accurately adjusted by means of the screws 135 and 142.

If at any time during the passage of a sheet between the cylinders it is found that the printing is not satisfactory, the form cylinder may be instantly shifted out of contact with the sheet by stepping on one of the treadles 112 at the front of the machine whereupon the cylinder will be lifted to a position clear of the sheet and will be retained in this position by the latches 113. At the same time the inking mechanism will be shifted rearwardly by the actuation of the link 119 and cams 122 so that the inking of the cylinder will be automatically discontinued when the cylinder is moved out of printing position.

The thickness of the coating applied to the form and from the form to the sheet may be regulated at any time during the operation of the machine by adjusting the rollers 61 and 70 by means of the screws 58 and 67. If, at any time it is desired to disengage the inking mechanism without lifting the form cylinder, this may be done by pulling forwardly on the actuating rod 130 which has a handle 131 at the front of the machine.

It will be readily understood that the printing may be done upon a plain sheet or upon a sheet which has previously been printed upon, as in cases where the printing is done in a number of different colors.

It will also be readily apparent that it is within the scope of the invention to provide two or more sets of printing cylinders along the length of the conveyor table and that such cylinders may be adjusted so that one form cylinder registers with the printing done by the preceding form cylinder. In this way, a multi-color sign may be printed in one pass.

It will be apparent that the present invention provides a machine capable of accurately printing upon sheets having a large surface area, that the sheet positioning, supporting and feeding means enable the sheets to be accurately registered with the form and to be fed between the cylinders without slippage between the surface of the form and the surface of the sheet, the sheet being supported at all times throughout its length in a plane of contact between the form cylinder and sheet.

Furthermore, it will be apparent that the quick throw-out devices for the form cylinder and inking mechanism enable the operator to discontinue the printing operation at any time to prevent spoiling a sheet and to enable the proper adjustments to be made to provide for accurate registry between the sheet and form.

Furthermore, it is to be understood that the particular form of apparatus shown and described, and the particular procedure set forth, are presented for purposes of explanation and illustration and that various modifications of said apparatus and procedure can be made without departing from my invention as defined in the appended claims.

What I claim is:

1. A printing press including a form cylinder and a compression cylinder, a feed table over which sheets may be advanced toward the cylinders, a stop device in front of the bight of the cylinders movable into and out of a position in the path of a sheet being moved toward the cylinders, grippers mounted for movement in a straight line through the bight of the cylinders, means for automatically actuating the grippers to grip a sheet positioned by the stop device and for simultaneously shifting the stop device to a position clear of the sheet, means for retaining the stop device in inoperative position, and independent means for returning the stop device to sheet-engaging position after the sheet engaged by the grippers has been moved to a position clear of the stop device.

2. A printing press including a form cylinder and a compression cylinder, a feed table over which sheets may be advanced toward the cylinders, a stop device in front of the bight of the cylinders movable into and out of a position in the path of a sheet being moved toward the cylinders, grippers mounted for movement in a straight line through the bight of the cylinders, means including a member moving with the grippers for shifting the stop device to a position clear of the sheet, means for automatically actuating the grippers to grip the sheet, means for retaining the stop device in an inoperative position during passage of a sheet, and means for automatically returning the stop device to operative position after the sheet engaged by the grippers has been moved past the stop device.

3. A printing press including a form cylinder and a compression cylinder, a feed table over which sheets may be advanced toward the cylinders, a stop device in front of the bight of the cylinders movable into and out of a position in the path of a sheet being moved toward the cylinders, grippers mounted for movement in a straight line through the bight of the cylinders, means including a member moving with the grippers for shifting the stop device to a position clear of the sheet, means for automatically actuating the grippers to grip the sheet, means for retaining the stop device in an inoperative position during passage of a sheet, and means including a member rotating with one of said cylinders for automatically returning the stop device to operative position.

4. A printing press including a form cylinder and a compression cylinder, a feed table over which sheets may be advanced toward the cylinders, a stop device in front of the bight of the cylinders movable into and out of a position in the path of a sheet being moved toward the cylinders, grippers mounted for movement in a straight line through the bight of the cylinders, means including a member moving with the grippers for shifting the stop device to a position clear of the sheet, means for automatically actuating the grippers to grip the sheet, means for retaining the stop device in an inoperative position during passage of a sheet, and means including a member rotating with one of said cylinders for automatically returning the stop device to operative position, said member being adjustable angularly with respect to the axis of the cylinder to vary the time during which the stop device is held in inoperative position.

5. A printing press including a form cylinder and a compression cylinder, a feed table over which sheets may be advanced toward the cylinders, a rock shaft extending across the table, stop arms fixed to said shaft and movable into and out of a position in the path of a sheet being advanced toward the cylinders, grippers mounted for movement in a straight line through the bight of the cylinders, means for moving said grippers at a lineal speed equal to the peripheral speed of the form cylinder, means including a stationary trip for automatically actuating the grippers to grip a sheet, a cam moving with the grippers and engaging an arm fixed to said rock shaft for actuating the rock shaft to swing the stop arms to a position clear of the sheet, a latch for retaining the rock shaft in the position to which it is shifted by the cam, and a trip device for automatically releasing said latch.

6. A printing press including a form cylinder and a compression cylinder, a feed table over which sheets may be advanced toward the cylinders, a rock shaft extending across the table, stop arms fixed to said shaft, and movable into and out of a position in the path of a sheet being advanced toward the cylinders, grippers mounted for movement in a straight line through the bight of the cylinders, means for moving said grippers at a lineal speed equal to the peripheral speed of the form cylinder, means including a stationary trip for automatically actuating the grippers to grip a sheet, a cam moving with the grippers, a trip lug mounted for rotation with one of said cylinders, arms fixed to the rock shaft and engageable with the cam and trip lug, and a latch for yieldingly retaining the rock shaft in a position in which the stop arms are in the path of a sheet and in a position in which the arms are clear of a sheet.

7. A printing press comprising a form cylinder, a compression cylinder upon which the form cylinder bears, a feed table over which sheets may be advanced toward the cylinders, a stop device in front of the bight of the cylinders for positioning a sheet to be printed upon, grippers mounted for movement in a straight line beneath a sheet positioned in engagement with the stop device and rearwardly through the bight of said cylinder, means for automatically shifting the stop device to a position clear of the sheet and for simultaneously engaging the grippers with the rear end of the sheet, means for retaining the stop device in an inoperative position during passage of the sheet, and means for automatically returning the stop device to operative position after the sheet engaged by the grippers has been moved past the stop device.

8. A printing press comprising a form cylinder, a compression cylinder upon which the form cylinder bears, intermeshing gears fixed to the two cylinders, a feed table over which sheets are advanced toward the cylinders, a rock shaft extending across the table in front of the cylinders, stop arms fixed to said shaft, a latch for yieldingly holding said rock shaft in either of two positions, in one of which the stop arms are in the path of a sheet and in

the other of which the stop arms are clear of the sheet, a cam for actuating said rock shaft in one direction, a lug on one of said gears for actuating the rock shaft in the opposite direction, and means for advancing the sheet between the cylinders.

9. A printing press comprising a form cylinder, a compression cylinder upon which the form cylinder bears, horizontal guides extending past opposite ends of the cylinders at the level of the bight thereof, members mounted for travel in said guides, means for moving said members at the peripheral speed of the form cylinder, a cross bar supported at its ends by said members and having a top face in the plane of the bight of the cylinders, a rock shaft parallel with said cross bar rearwardly thereof and supported in said traveling members, gripper arms fixed to said shaft and movable from a position below the plane of the top surface of the cross bar to a position in which they overlie said surface, means including a toggle mounted beyond the ends of the cylinders for actuating said shaft, a spring connected to the toggle for actuating the same in either direction from a dead center position, means in front of the cylinders for positioning a sheet for engagement by the grippers, and means including trip members attached to the guides adjacent the positioning means for shifting the pivot of the toggle past its dead center position to cause said arms to be moved to sheet gripping position.

10. A printing press comprising a form cylinder, a compression cylinder upon which the form cylinder bears, horizontal guides extending past opposite ends of the cylinders at the level of the bight thereof, members mounted for travel in said guides, means for moving said members at the peripheral speed of the form cylinder, a cross bar supported at its ends by said members and having a top face in the plane of the bight of the cylinders, a rock shaft parallel with said cross bar rearwardly thereof and supported in said traveling members, gripper arms fixed to said shaft and movable from a position below the plane of the top surface of the cross bar to a position in which they overlie said surface, gears fixed to said rock shaft adjacent the ends thereof, short shafts beneath said gears, gears fixed to the short shafts and meshing with the first mentioned gears, arms fixed to the short shaft, actuating arms pivoted rearwardly of the rock shaft, links connecting said arms to said arms fixed to the short shaft, actuating springs connected to said actuating arms, cams fixed to the short shaft, and lugs on said guides engageable with said cams.

11. A printing press comprising a form cylinder and a compression cylinder, endless chains mounted beyond the ends of said cylinders, horizontal guides for said chains extending past the ends of said cylinders for supporting the same at the level of the bight of the cylinders, vertically adjustable supports for said guides at spaced points along the length thereof, means for driving said cylinders and chains with the chains moving at a lineal speed equal to the peripheral speed of the form cylinder, a cross member carried by the chains, and grippers carried by said cross member.

12. A printing press comprising a form cylinder and a compression cylinder having longitudinal recesses in their peripheries which register at the bight of the cylinders, endless chains mounted beyond the ends of the cylinders and having gripper carrying cross members which are received in the recesses of the cylinders, and a supporting table at the rear of said cylinders having supporting members at intervals therealong which have supporting surfaces normally in the plane of the bight of the cylinders and which are yieldable to permit passage of the cross members.

13. A printing press comprising a form cylinder and a compression cylinder having longitudinal recesses in their peripheries which register at the bight of the cylinders, endless chains mounted beyond the ends of the cylinders and having gripper carrying cross members which are received in the recesses of the cylinders, a supporting table at the rear of said cylinders having its surface below said cross members, and sheet supporting members in the form of upwardly arched springs having their forward ends attached to the table and their rear ends slidable on the table.

14. A printing press comprising a supporting frame, form and compression cylinders mounted one above the other in the frame, a feed table over which sheets may be advanced toward the cylinders, a stop member extending across the table parallel with the cylinders and movably mounted in the frame adjacent the bight of the cylinders, means for releasably holding the stop device in an operative position in which it is in the path of a sheet on the feed table and in an inoperative position in which it is clear of the sheet, means for feeding sheets one at a time from said table through the bight of the cylinders, means movable with said feeding means for engaging the stop member and shifting the same to inoperative position, and means movable with a cylinder for engaging the stop member and shifting the same to operative position.

15. A printing press comprising a supporting frame, form and compression cylinders mounted one above the other in the frame, a feed table over which sheets may be advanced toward the cylinders, a stop member extending across the table parallel with the cylinders and movably mounted in the frame adjacent the bight of the cylinders, said stop member having a portion adapted to extend across the plane of a sheet on the feed table

to limit the movement of the sheet toward the cylinders and a portion adapted to overlie the sheet adjacent its rear edge to prevent upward movement of the edge of the sheet, means for releasably holding the stop device in an operative position in which it is in the path of a sheet on the feed table and in an inoperative position in which it is clear of the sheet, means for feeding sheets one at a time from said table through the bight of the cylinders, means movable with said feeding means for engaging the stop member and shifting the same to inoperative position, and means movable with a cylinder for engaging the stop member and shifting the same to operative position.

16. A printing press comprising a supporting frame, form and compression cylinders mounted one above the other in the frame, a feed conveyor having a straight run at the level of the bight of the cylinders and having sheet gripping means thereon which pass betwen the cylinders, a feed table for supporting a sheet adjacent the conveyor to the front of cylinders, a stop device movably mounted in the frame to the front of the cylinders, means for holding the stop device in the path of a sheet on the feed table and for holding the same in a position clear of the table, means controlled by the moving conveyor for shifting the stop device to inoperative position and for simultaneously moving the gripping means into gripping engagement with the edge of the sheet positioned by the stop device, and means for automatically returning the stop device to operative position after a sheet engaged by the grippers has been moved to a position clear of the stop device.

17. A printing press comprising a supporting frame, form and compression cylinders mounted one above the other in the frame, a feed conveyor having a straight run at the level of the bight of the cylinders and having sheet gripping means thereon which pass between the cylinders, a feed table for supporting a sheet adjacent the conveyor to the front of cylinders, a stop device movably mounted in the frame to the front of the cylinders, means for holding the stop device in the path of a sheet on the feed table and for holding the same in a position clear of the table, means controlled by the moving conveyor for shifting the stop device to inoperative position and for simultaneously moving the gripping means into gripping engagement with the edge of the sheet positioned by the stop device, and means controlled by a rotating cylinder for automatically restoring the stop device to operative position.

18. A printing press comprising a supporting frame, form and compression cylinders mounted one above the other in the frame, a feed conveyor having a straight run at the level of the bight of the cylinders and having sheet gripping means thereon which pass between the cylinders, a feed table for supporting a sheet adjacent the conveyor to the front of cylinders, a stop device movably mounted in the frame to the front of the cylinders, said stop device having a portion in the path of the rear edge of a sheet on the table to limit the movement of the sheet toward the cylinders and a portion adapted to overlie the sheet adjacent its forward edge to prevent upward movement of the edge of the sheet, means for holding the stop device in the path of a sheet on the feed table and for holding the same in a position clear of the table, means controlled by the moving conveyor for shifting the stop device to inoperative position and for simultaneously moving the gripping means into gripping engagement with the edge of the sheet positioned by the stop device, and means for automatically returning the stop device to operative position after a sheet engaged by the grippers has been moved to a position clear of the stop device.

19. A printing press comprising a supporting frame, form and compression cylinders mounted one above the other in the frame, said cylinders having longitudinal peripheral recesses adapted to register during rotation of the cylinders, an endless feed conveyor mounted on said frame and having a horizontal upper run at the level of the bight of the cylinders and extending past the same, said conveyor comprising two endless chains mounted beyond the opposite ends of the cylinders and cross members connected at opposite ends to the chains, means for driving said cylinders at equal peripheral speeds and for driving said feed conveyor at a speed equal to the peripheral speed of the cylinders, a feed table for supporting a sheet above the conveyor adjacent the bight of the cylinders, a stop device movably mounted on the frame in front of the cylinders and having a portion extending into the path of a sheet on the table, grippers on said cross members, means controlled by the movement of the conveyor to actuate said grippers to grip the rear edge of a sheet in the position in which it is held by the stop device and for simultaneously shifting the stop device out of the path of the sheet, means for retaining the stop device in inoperative position, and means for automatically returning said stop device to sheet engaging position after a predetermined movement of the feed conveyor.

20. A printing press comprising a supporting frame, form and compression cylinders mounted one above the other in the frame, said cylinders having longitudinal peripheral recesses adapted to register during rotation of the cylinders, an endless feed conveyor mounted on said frame and having a horizontal upper run at the level of the

bight of the cylinders and extending past the same, said conveyor comprising two endless chains mounted beyond the opposite ends of the cylinders and cross members connected at opposite ends to the chains, means for driving said cylinders at equal peripheral speeds and for driving said feed conveyor at a speed equal to the peripheral speed of the cylinders, a feed table for supporting a sheet above the conveyor adjacent the bight of the cylinders, a horizontal rock shaft mounted in the frame in front of the cylinders and above the conveyor, stop arms carried by the rock shaft, means including a yielding detent for holding said rock shaft in a position in which the stop arms project into the path of a sheet on the feed table and for holding the shaft in a position in which the stop arms are clear of the sheet, grippers carried by said cross members, means carried by the conveyor for turning the rock shaft to shift the stop arms to inoperative position, means for automatically actuating the grippers to grip the edge of a sheet positioned by the stop members, and means for automatically returning said stop device to sheet engaging position after a predetermined movement of the feed conveyor.

In testimony whereof I affix my signature.

SAMUEL J. MOLLET.