Aug. 24, 1954 W. B. MILES 2,687,091

PRINTING MACHINE DRIVE MEANS

Filed Aug. 12, 1949 6 Sheets-Sheet 1

FIG. 3.

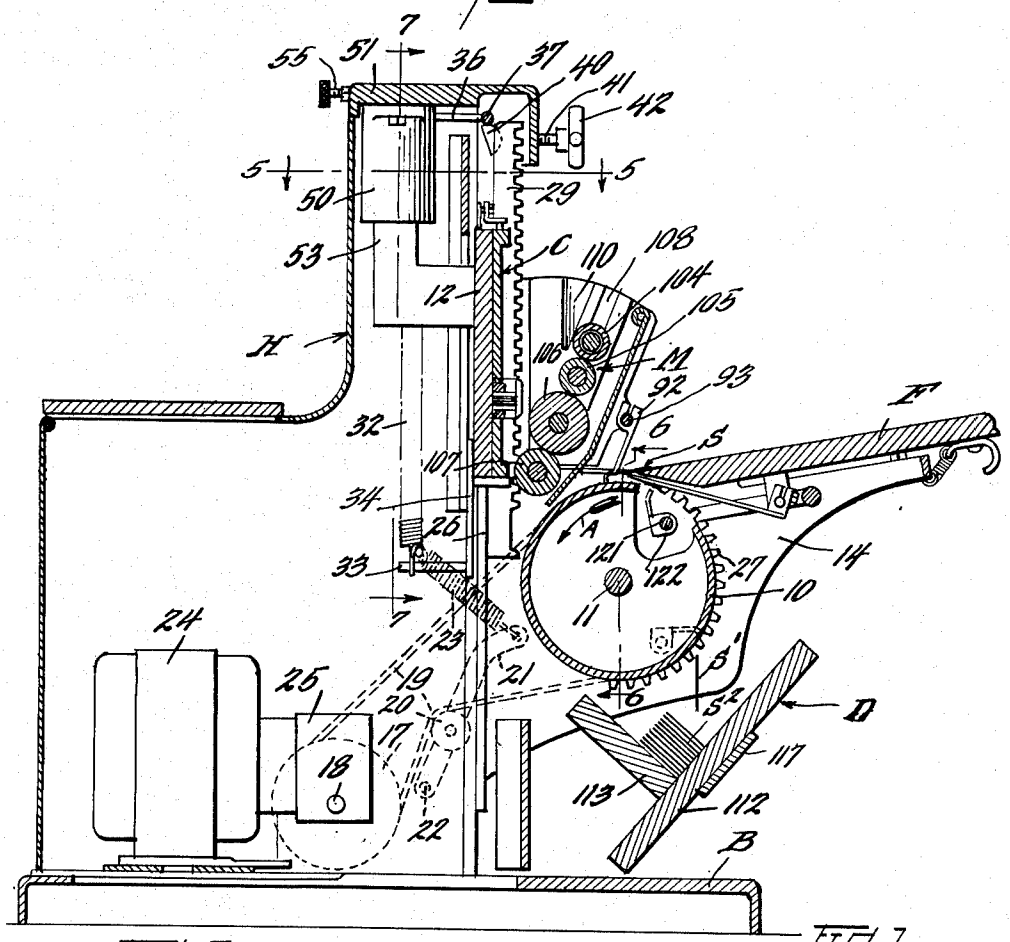


FIG. 2.

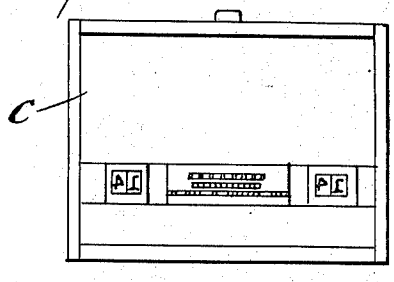
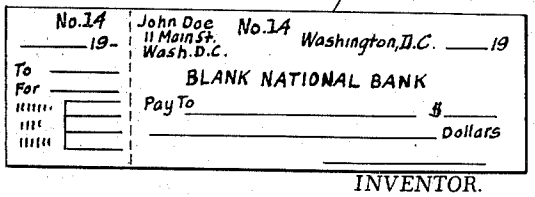


FIG. 1.



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BY William B. Miles

Watson, Cole, Grindle & Watson

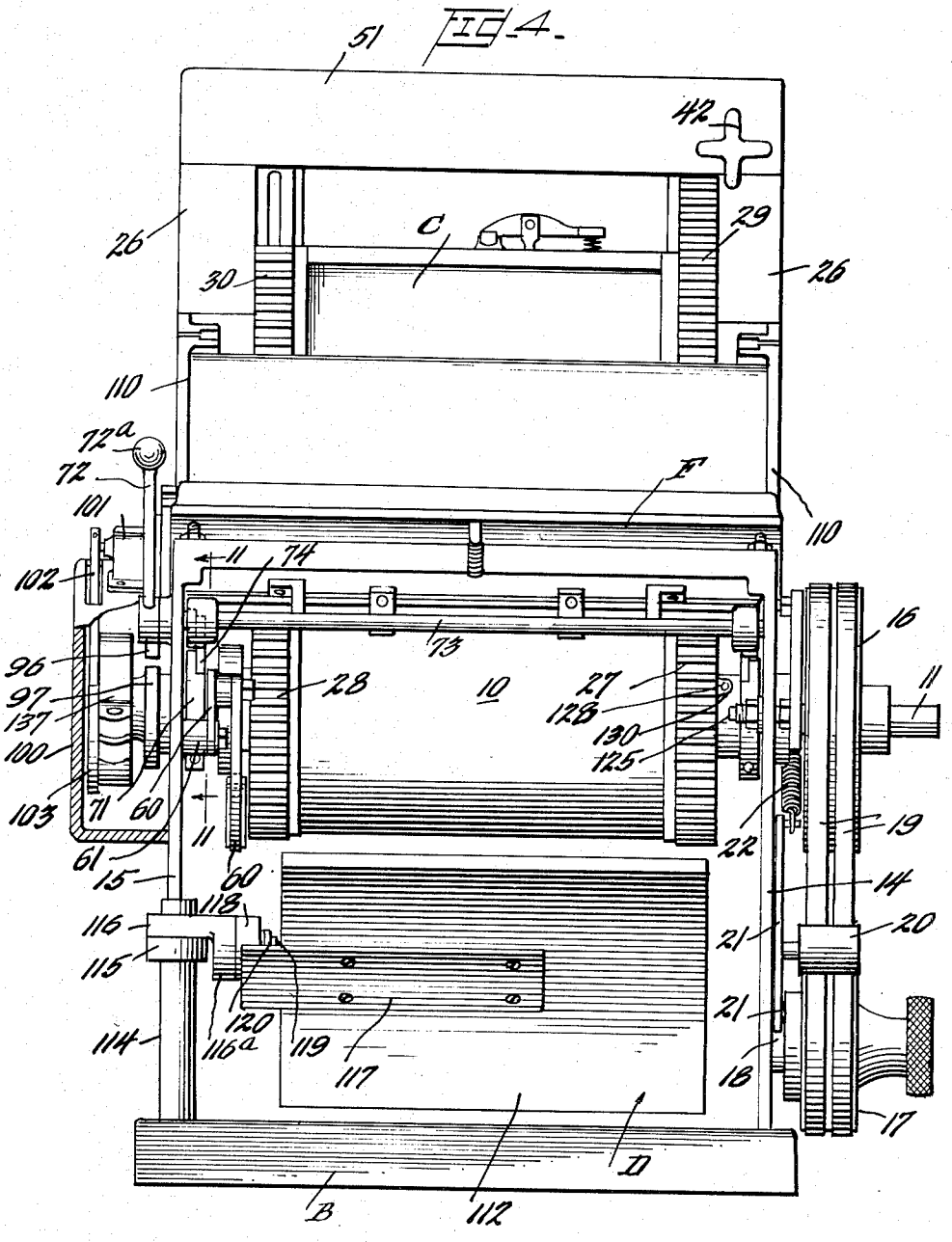
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PRINTING MACHINE DRIVE MEANS

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FIG. 4.



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PRINTING MACHINE DRIVE MEANS

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FIG. 5.

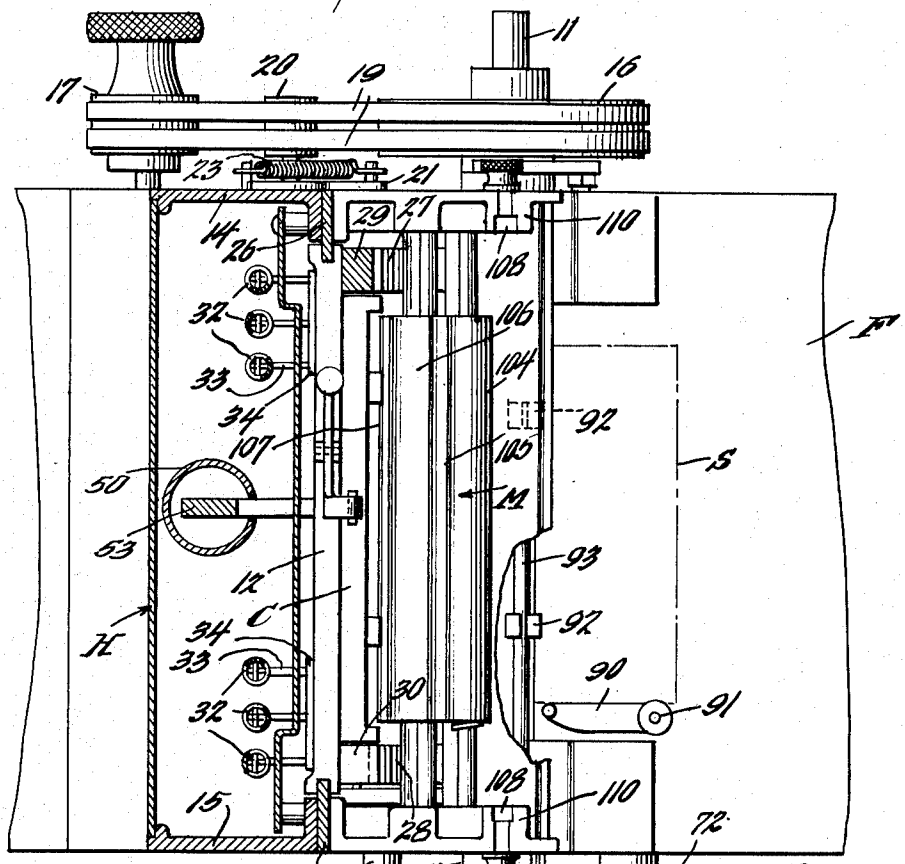


FIG. 6.

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PRINTING MACHINE DRIVE MEANS

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FIG. 7.

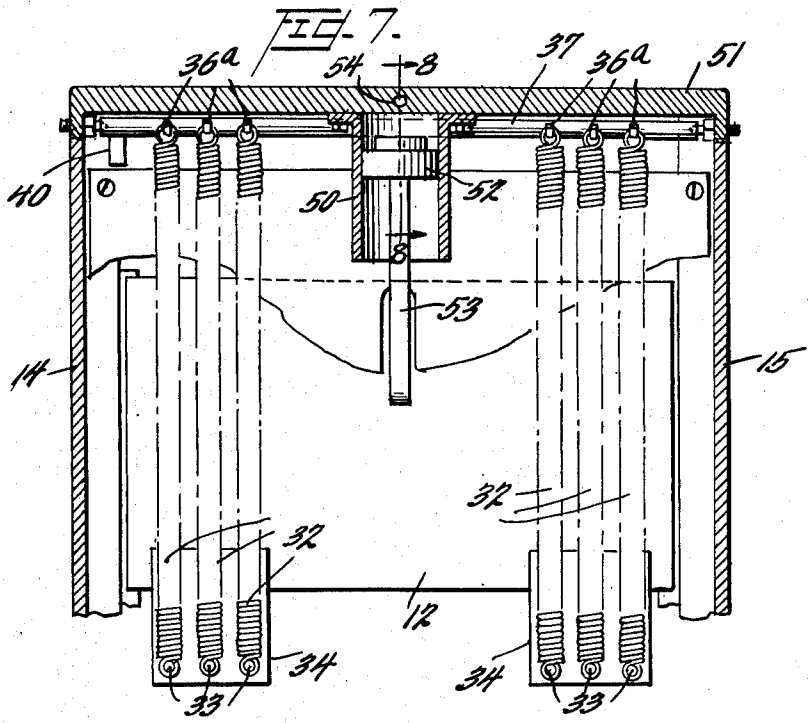


FIG. 10.

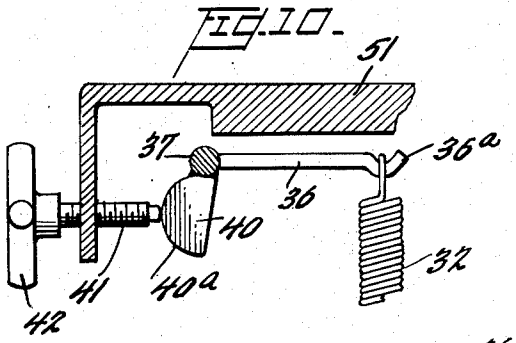


FIG. 8.

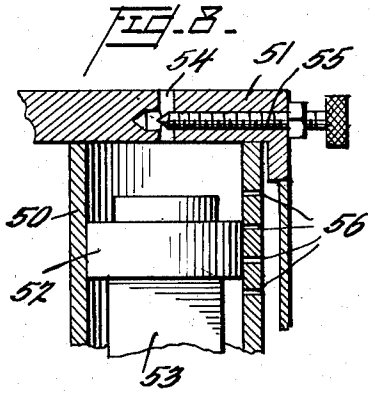
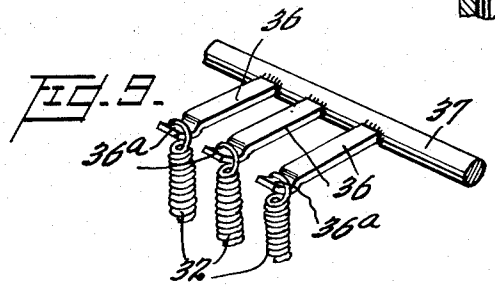


FIG. 9.



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PRINTING MACHINE DRIVE MEANS

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FIG. 11.

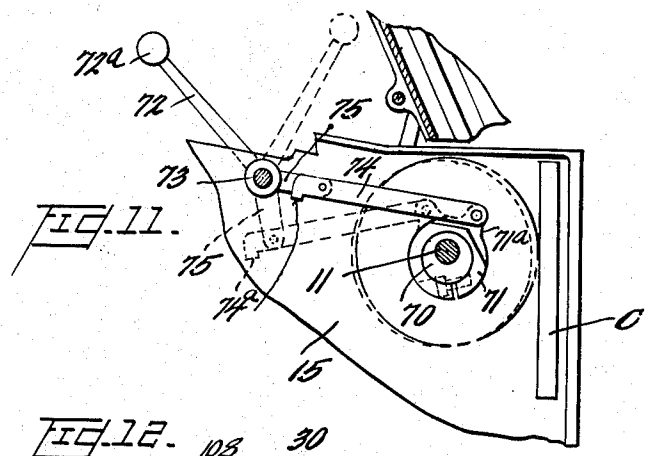


FIG. 12.

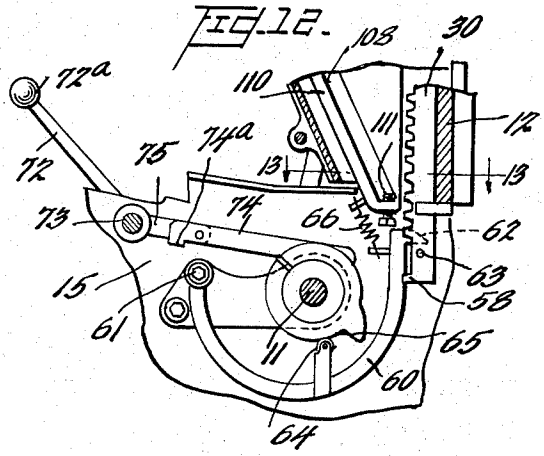


FIG. 13.

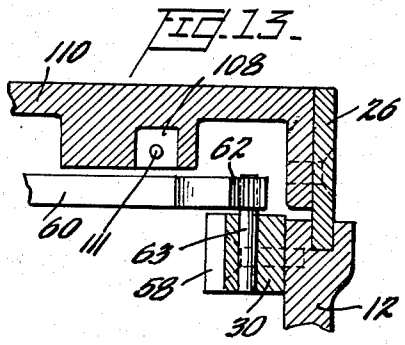


FIG. 14.

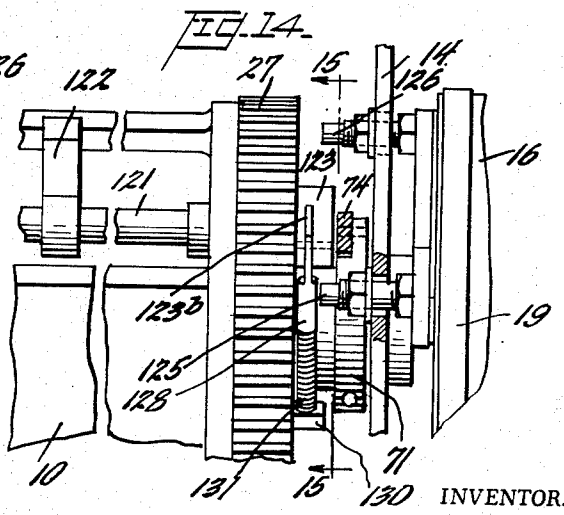
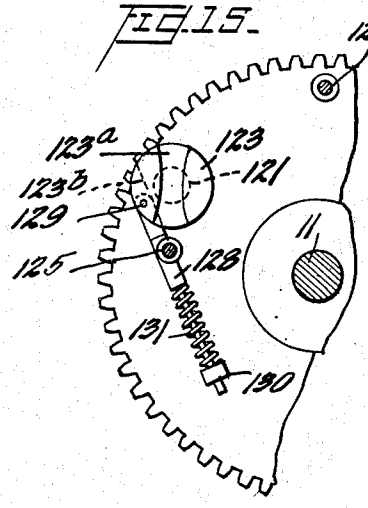


FIG. 15.



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PRINTING MACHINE DRIVE MEANS

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FIG. 16.

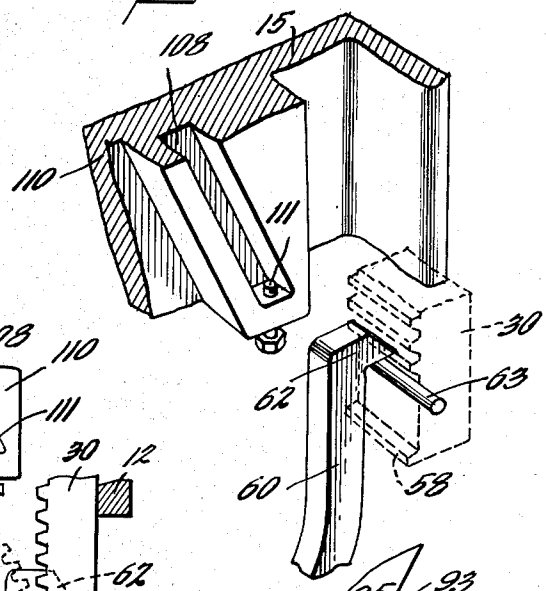


FIG. 17.

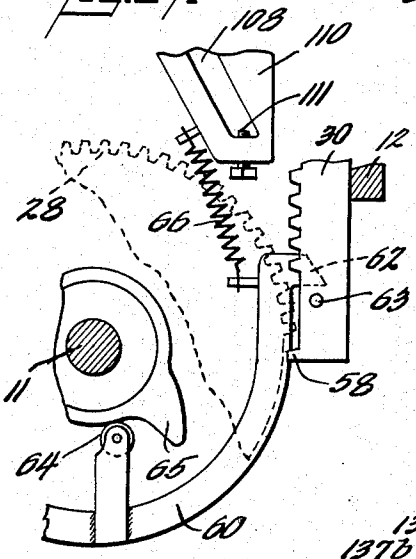
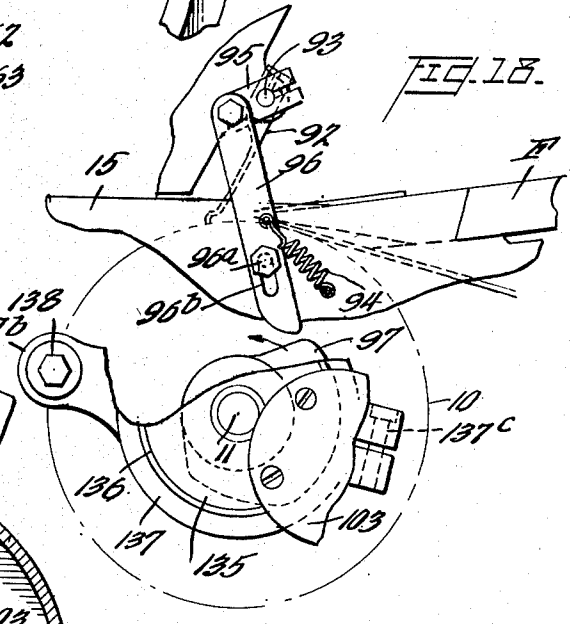


FIG. 18.



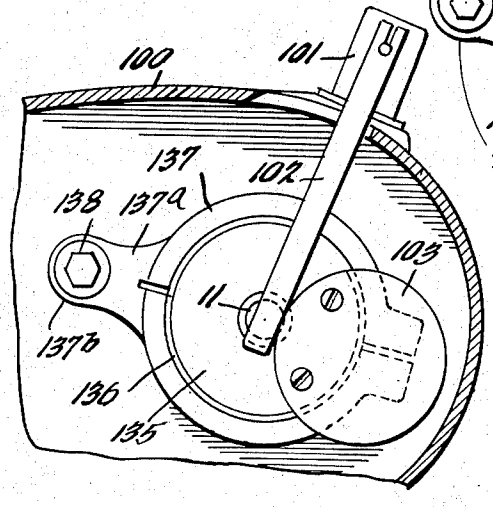


FIG. 19.

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Patented Aug. 24, 1954

2,687,091

UNITED STATES PATENT OFFICE

2,687,091

PRINTING MACHINE DRIVE MEANS

William B. Miles, Bedford, Va.

Application August 12, 1949, Serial No. 109,832

6 Claims. (Cl. 101—286)

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This invention relates to printing machines or presses and particularly to printing machines of the bed and cylinder type.

The bed and cylinder type of printing machine has long been known and many types of such machines have heretofore been employed in the printing of individual sheets of paper of varying sizes. Each such machine includes a bed arranged for reciprocation in a plane and a cylinder mounted for rotation about an axis parallel to that plane, together with means for operatively connecting the bed and cylinder when the bed is moving on its printing stroke. In the usual case the cylinder is constantly revolved in one direction, the bed reciprocates in a horizontal plane below the cylinder and the operative connection between bed and cylinder is interrupted while the bed is retracted or moved on its non-printing stroke, the cylinder continuing to rotate during this return movement of the bed and thus rotating through two complete revolutions for each printing operation accomplished. The quality of work accomplished upon machines of this character is high and, where automatic sheet feeding and delivery mechanisms are associated with the printing couple the output is relatively great.

Generally speaking those machines of the bed and cylinder type which have heretofore been used commercially have been designed and constructed for printing upon sheets of substantial size and, as stated, the bed has been mounted upon its supporting frame for movement in a horizontal plane. Hence the machine occupies a substantial area of floor space in the room in which it is positioned and its operator, who must necessarily move from the sheet feeding end to the delivery end of the machine from time to time when the machine is in operation, is caused to do a substantial amount of walking in the accomplishment of any given printing operation.

It is an object of the present invention to provide a printing machine which is adapted to turn out work of the same high quality as the most efficient types of bed and cylinder presses but which is so designed and constructed that it will occupy a minimum amount of floor space and in such manner as to make it easily possible for the operator to stand approximately in one position while printing a quantity of sheets. To reduce, so far as possible, the size of the machine, measured horizontally, the bed is mounted for reciprocation in a vertical plane instead of a horizontal plane and to make it possible for the operator to stand at one point during a printing operation the mechanism is so arranged that the delivery or pile board is beneath the feed board so that one engaged in hand feeding the press may, at the conclusion of a run, reach down to the delivery board and grasp the printed sheets.

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The press is so designed that, even when fed by hand instead of by an automatic feeder, it will print successive sheets with great rapidity, its output per unit of time being relatively high. Speed of operation is promoted by so relating the bed and cylinder that a printing operation is performed upon each rotation of the cylinder, the actual printing being performed while the cylinder is rotating through a portion only of a complete rotation and the bed being returned or moved on its non-printing stroke to initial position while the cylinder is completing a single rotation after having performed its printing functions. Preferably there is associated with the bed a means normally holding the bed at one end of its reciprocatory path of movement, which means resists movement of the bed on its printing stroke under the influence of the cylinder, when bed and cylinder are operatively engaged, but is overcome by the action of the cylinder and is only effective to return the bed on its non-printing stroke to initial position when the operative connection between bed and cylinder is again interrupted. Conveniently this means may be of resilient nature, for instance comprising a plurality of springs and preferably also there is associated with the resilient devices employed a cushioning device for gradually decelerating the bed at the end of its return stroke so that shock or mechanical impact does not occur.

The arrangement is such that the machine is of quite small size and is adapted to print upon relatively small sheets of paper. In fact it is well suited for use in banks and business houses, as well as in printing establishments, for the purpose of printing upon small sheets, for instance bank checks, indicia such as the name and address of a bank depositor. The reciprocatory bed may not only carry type for printing upon successive sheets the same indicia or information but may also carry automatically acting mechanism for serially numbering the checks or other sheets printed, an advantage of considerable importance, particularly when a series of checks are being especially printed for a bank depositor.

The simplicity of the mechanism makes it possible for an employee of a bank or other industrial establishment, not particularly well versed in the printing art, to quickly and safely per-

form a printing operation and by reason of the simplicity of the design and the relatively small size of the machine it may be produced at a very moderate cost, thus making it easily possible for a relatively small establishment to acquire the printing machine for its own occasional use.

In the accompanying drawings one embodiment of the printing machine is fully illustrated, this being shown by way of example. It will be appreciated that minor changes in the design and arrangement of its component elements may be effected without departure from the invention.

In the drawings:

Figure 1 illustrates in plan a conventional bank check with attached stub, this being the type of sheet which the machine shown is especially adapted to print and serially number;

Figure 2 shows in front elevation the chase upon which the type and the numbering devices are mounted and which in turn is adapted to be mounted upon the bed of the press;

Figure 3 is a vertical section through the printing machine, the section being taken normally to the cylinder axis and to the plane in which the bed reciprocates;

Figure 4 is a front elevation of the complete printing machine;

Figure 5 is a section on line 5—5 of Figure 3;

Figure 6 is a vertical section on line 6—6 of Figure 3 passing through the axis of the cylinder, at one end of the cylinder, showing a counter for recording the number of cylinder revolutions;

Figure 7 is a section on line 7—7 of Figure 3;

Figure 8 is a section on line 8—8 of Figure 7;

Figure 9 is a perspective view of one portion of the bed return means;

Figure 10 is a fragmentary view of another portion of the bed return means;

Figure 11 is a section on line 11—11 of Figure 4;

Figure 12 is a vertical section taken transversely to the cylinder and showing a device for initially positioning the bed just prior to engagement of the bed and means which intermittently connects bed and cylinder;

Figure 13 is a section on line 13—13 of Figure 12;

Figure 14 is a fragmentary side elevation, partly broken away, of one end of the cylinder and the mechanism associated therewith for actuating the cylinder grippers;

Figure 15 is a section on line 15—15 of Figure 14;

Figure 16 is a perspective view of portion of the means for preliminarily positioning the bed just prior to operative connection of bed and cylinder;

Figure 17 is a view generally similar to Figure 12 but showing certain members of the means for preliminarily adjusting the bed in positions somewhat different from those in which these members are shown in Figure 12;

Figure 18 shows in side elevation certain of the elements for registering the front edges of successive sheets; and

Figure 19 is a sectional view taken on line 19—19 of Figure 6.

The impression cylinder of the printing machine is indicated at 10 in the drawings and this cylinder may be of conventional nature and carry conventional sheet gripping mechanism. It is mounted upon the horizontally disposed shaft 11, being preferably keyed to that shaft for rotation therewith. The bed of the printing machine is indicated at 12 and is mounted for reciprocatory movement in a vertical plane which is parallel to the axis of the shaft 11. It will be understood that shaft 11, the bed 12, the inking mechanism, which is generally indicated at M, and all of the other essential operating parts of the printing machine are suitably mounted upon a frame which is for the most part enclosed within a housing H. The details of the frame may be widely varied and are relatively unimportant but the housing H, including the base B, has a uniquely attractive appearance and is quite unlike in appearance that of any printing press housing heretofore proposed.

The feed board of the press is indicated at F and the delivery or pile board at D. A small paper sheet such as a check will be placed upon the feed board F, fed forwardly to the registration point at the forward end of the feed board, one sheet at the registration point being indicated at S in Figures 3 and 5. It is then grasped by the gripper members of the cylinder 10, which is constantly rotating at uniform angular velocity in the direction of the arrow A, is printed while the cylinder is rotating through a portion only of a complete rotation, is released by the grippers when approximately in the position indicated at S′ in Figure 3 and will then fall downwardly upon the pile board D, by which board it is caught and retained, a pile of sheets being indicated at S^2 in Figure 3. It will thus be perceived that an operator standing conveniently adjacent the feed board F for the purpose of feeding sheets to the registration means need only reach down to the delivery board D at the conclusion of the printing operation in order to secure the printed sheets, convenience in operation being thereby realized. Such an operator will be so positioned that the inking mechansim M is constantly in view and so that the face of the chase C may be observed at the conclusion of each printing operation. The printing mechanism will now be described in detail.

The cylinder 10 is, as stated earlier, fixed upon shaft 11 and shaft 11 is supported in suitable bearings mounted in the parallel vertically extending webs or side members 14 and 15 of the frame. The mounting means is such, as will be hereinafter described, that the axis of the cylinder may be adjusted toward and away from the plane of the bed so that the cylinder may be rendered inoperative when the press is in motion and sheets are not to be printed or, in other words, the cylinder is taken off impression in customary manner. Mounted upon that end of shaft 11 which projects beyond the side member 14 of the frame is a pulley member 16 and a second pulley 17 of somewhat smaller diameter is disposed below and to one side of pulley 16, pulley 17 being fixed upon horizontal shaft 18 which is parallel to the cylinder shaft 11 and which is suitably mounted in bearings so as to be retained in fixed spaced relationship to shaft 11. Encircling pulleys 16 and 17 are two endless belts 19, preferably V-belts which engage in V-shaped grooves in the respective pulleys, these belts establishing a driving connection between the pulleys. The belts are maintained taut at all times as a result of the action of the idler 20, mounted upon lever 21 pivotally supported upon a pin 22 rigidly affixed to the side member 14 of the frame of the machine and normally urged by the tension spring 23 to rock in a counterclockwise direction (Figure 3). Shaft 18 is operatively connected to the rotor of an electric

motor 24 mounted upon base B, reduction gearing contained in the housing 25 causing the shaft 18 to be driven at very much less than motor speed, but in a constant direction so that the cylinder 10 is driven at all times at a uniform angular velocity in the direction of the arrow A (Figure 3).

The bed 12 is in the nature of a flat member having thickened vertically extending margins which are longitudinally grooved to receive with a sliding fit, respectively, the vertically extending parallel guides 26. The bed is thus constrained to move in a vertical plane, the guides 26 being rigidly secured in fixed spaced relationship by attachment to the frame of the machine, which frame is preferably a casting of such weight as to successively resist forces tending to distort the same. The cylinder has rigidly secured to each end a curved rack or cylinder gear, these gears being indicated at 27 and 28, and the bed has rigidly affixed thereto vertically disposed parallel racks 29 and 30, the arrangement being such that the teeth of gear 27 are adapted to intermesh with the teeth of rack 29, and the teeth of gear 28 with the teeth of rack 30, when bed and cylinder are engaged in a printing operation. It will be observed from an inspection of Figure 3 that the teeth of the cylinder gear shown, which is the gear 27, extend only part way around the cylinder, as a matter of fact the gear extending less than one-half of the angular distance around the cylinder. Hence, if the cylinder rotates at uniform velocity, it can be in printing relationship with the bed only during a period of time which is less than one-half of that required to effect a complete rotation of the cylinder. Thereafter, and while the cylinder is completing one rotation, bed and cylinder are disengaged and it is during this interval of disengagement that the bed is moved on its return or non-printing stroke and to its initial position, which is the position in which it is illustrated in Figure 3.

Means for thus elevating or retracting the bed, in the embodiment of the invention selected for disclosure, comprises essentially six helical tension springs, indicated at 32 in the drawings. These springs are positioned immediately at rear of the bed and substantially in parallelism to the plane of the bed movement, the lower end of each spring being attached to the bed by suitable connecting means, for instance by means of a pin 33 extending generally horizontally outwardly from a plate 34 rigidly secured to the bed. There are, of course, six pins 33 and, as shown in Figure 7, two plates 34, the springs being in two groups of three each, one group on each side of the machine.

The upper end of each spring encircles an arm 36 rigidly mounted upon and extending normally to a rock shaft 37 extending transversely of the machine and parallel to the plane of bed reciprocation, there being one such arm 36 for each spring and each arm having a hook shaped end portion 36a to receive the upper terminal loop of the associated spring end and to detachably secure the same in such manner that it may not become accidentally disconnected. By rocking the shaft 37 about its axis the arms 36 may be lifted to extend the springs or depressed to allow them to contract, the resistance of the springs to downward movement of the bed being thus increased or decreased as desired, the upward pull of the springs tending to return the bed to starting position after each printing operation, being, of course, varied at the same time. Shaft 37 has secured thereto an arm 40 having an arcuate face 40a which is engaged by the inner end of a screw 41 which projects through and has threaded engagement with the front wall of the removable top of the casing. By means of a handle 42 on the end of screw 41 the screw may be advanced or retracted to increase or decrease the tension in springs 32, as desired.

After the bed has been moved downwardly on its printing stroke by the cylinder, and has been released, the springs return it rapidly toward its uppermost position. To avoid shock resulting from impact of the bed against a mechanical stop a pneumatic shock absorbing means is provided. This comprises essentially a cylinder 50 secured to and depending from the horizontal rather heavily constructed top cover of the frame, and a piston 52 adapted to enter the cylinder from below, this piston being rigidly mounted upon the upper end of a bracket 53 rigidly affixed to the bed 12. As the bed approaches the upper limit of its travel the piston 52 enters the cylinder 50, trapping the air within the cylinder above the piston and compressing the same. The air thus trapped is allowed to gradually escape through a port 54 in cover 51, the effective cross sectional area of the port being enlarged or restricted by means of an adjustable screw 55 so as to regulate the rate of air escape and thus modify as desired the cushioning action of the pneumatic damping means. If desired bleeder ports such as 56 may be formed in the wall 50 of the cylinder the piston 52 acting as a valve in its upward travel and successively closing these ports.

Inasmuch as the cylinder gears 27 and 28 repetatedly engage and disengage the bed racks 29 and 30, respectively, in the operation of the machine, it is essential that means be provided for ensuring that the teeth of racks and gears are brought into perfect meshing relationship at the instant of engagement, otherwise excessive wear, noise and possibly breakage would soon result. It is furthermore highly desirable to initiate movement of the bed prior to engagement of the teeth of cylinder gears and bed racks so that the initial tooth of each gear will not be unduly strained by suddenly contacting and overcoming the inertia of a completely stationary member. Therefore, means is provided for placing the bed in motion just prior to engagement of the bed and cylinder gears so that the initial engagement of the gears takes place smoothly and without noise.

This mechanism is disclosed in Figures 12, 13, 16 and 17 and includes a U-shaped lever 60 pivotally mounted at 61 upon a side frame member of the machine, the lever extending downwardly and forwardly beneath the cylinder shaft 11 and having a horizontally extending end portion 62 which directly overlies and rests upon a pin 63 mounted in a horizontally extending pin receiving aperture formed in the lower end of rack 30. Intermediate its ends the lever 60 is provided with a short upwardly extending arm upon which is mounted the cam follower 64. This cam follower (a roller) lies in the path of a cam 65 fixed upon the shaft 11. Cam 65 is so shaped and follower 64 is so designed that the lever 60 is depressed, and the rack 30 and connected bed are caused to commence to move downwardly, just prior to engagement of the isolated tooth or tooth abutment 58 at the lower end of rack 30 by the leading tooth of the cylinder gear 28. The

rapidity and extent of this initial downward movement of the bed are determined by the shape of the cam 65, which may be varied to suit the circumstances. Hence, initial contact between the cylinder gear and the rack occurs while the rack and bed are in motion, the shock of impact is almost eliminated and proper meshing of teeth and rack ensured. A spring means 66 is employed to maintain follower 64 in contact with cam 65 and to return lever 60 to the position in which it is shown in full lines in Figure 17, after each operation. A similar mechanism may be employed in association with rack 29 and gear 27 so that the motion initiating forces applied to the bed will be balanced. The downward motion of the bed will stop, and the bed will be released for upward movement, when the last teeth of the cylinder gears have disengaged themselves from the racks, respectively. The return movement of the bed under the influence of the springs then immediately begins and is practically noiseless. Since the initial engagement of the cylinder gears with the bed racks is practically noiseless, likewise the downward movement of the bed, the net result is to provide a press which is sufficiently silent in its operation to permit it to be placed in banks, offices, mercantile establishments and elsewhere where quiet running machinery must be utilized.

The printing machine has incorporated therein a number of instrumentalities which are usually included in such machines but which in detail are substantially different from predecessor devices and enter into new relationships with other portions of the mechanism, as will be hereinafter pointed out. Among these mechanisms are the cylinder throw-off by means of which the surface of the cylinder may be moved away from the plane of reciprocation of the bed to prevent imprinting the cylinder surface when sheets are not being fed; a front and side register associated with the feed board and by means of which each successive sheet may be accurately positioned for engagement by the cylinder grippers; a revolution counter, and an inking mechanism. The pile board is of novel character and, as has been previously pointed out, it is positioned in a new relationship with feed board and cylinder.

The cylinder throw-off mechanism may be most clearly seen in Figures 4, 6 and 11. Each end of the cylinder shaft 11 is supported in an eccentric bearing 70 which bearing is rotatably mounted in the adjacent side member of the frame, a portion of such side member being indicated at 15 in Figure 6. When bearings 70 are rotated, therefore, the axis of shaft 11 will be moved relatively to the frame and bed, a slight movement only being necessary to withdraw the cylinder from printing relationship with the bed. A portion of the means for rotating the eccentric bearings 70 is shown in Figure 11 and is seen to comprise a split clamping member 71 encircling the inner end of the eccentric bearing 70 and tightly embracing the same so that the bearing is caused to rotate when clamping strap 71 is oscillated in either direction. Strap 71 has a projection 71*a* which is connected to a manually operable lever 72 having an operating handle 72*a*, the lever 72 being fixed upon a cross shaft 73, disposed parallel to the cylinder axis, the ends of which are rotatably supported in the frame. This connection includes a link 74 and an arm 75, the link connecting projection 71*a* to the end of the arm as shown in Figure 11 and the arm being fixed on shaft 73. A small laterally offset portion 74*a* of link 74 projects into the plane of arm 75 and contacts that arm when it reaches the position in which it is shown in full lines in Figure 11, thus limiting the counterclockwise movement of the arm. When the lever is in the position in which it is shown in full lines in Figure 11 the other elements of the mechanism will likewise be in the positions in which they are shown in full lines and the cylinder will be in operative relationship to the bed. When the lever 72 is moved to its dotted line position the other elements are likewise moved to their dotted line positions and the cylinder is withdrawn from printing relationship with the bed. When the parts are in the positions in which they are shown in full lines the arm 75 and link 74 are in such relationship that they comprise what may be designated a locking toggle, preventing return of the cylinder to operative position until the toggle is manually broken by movement of the lever.

The front register mechanism is illustrated in Figures 5 and 18 and comprises a side guide or side register member 90 attached to the feed board by means, such as clamping screw 91, which permits it to be rocked about an axis normal to the feed board. The leading edge of each successive sheet meets two front register members 92, spaced apart and clamped upon a rock shaft 93 the ends of which are rotatably supported in the side members of the frame. Also secured on shaft 93, toward one end thereof, is an arm 95 extending in a generally horizontal direction and to the free end of this there is pivotally connected the upper end of a thrust rod 96. The lower end of thrust rod 96 is disposed in the path of movement of a cam 97 fixed upon the cylinder shaft 11. Cam 97 will move the rod 96 upwardly and a spring 94 will move it downwardly, the rod being guided in its movements by the pin 96*a* which projects through slot 96*b*.

Thus, at a predetermined point in the rotation of the cylinder, the front guide fingers 92 will be moved out of the path of the sheet which they have just registered, this movement taking place just prior to engagement of the leading edge of the sheet by the cylinder grippers, in customary manner, the fingers 92 being retained in inoperative position while the cylinder rotates through a substantial angle and then being returned to operative position to register the leading edge of the succeeding sheet by the action of spring 94.

A revolution counter may conveniently be positioned adjacent the cam 97 of the sheet registering mechanism, for instance being positioned as shown in Figures 6 and 19 upon a casing or housing 100 provided to enclose the several operating parts just above described. The counter, which is indicated at 101, has a downwardly depending arm 102 which lies in the path of a disc 103 affixed to a drum 135. Hence the counter is actuated upon each revolution of the cylinder and the operator of the machine thus provided with information as to the number of sheets printed in any one run. The counter may, of course, be otherwise mounted.

The inking mechanism is of simple character and may best be seen in Figures 3 and 5. It comprises a plurality of rollers the axes of which are parallel and disposed in a common plane, as shown in Figure 3. The cylindrical outer surfaces of the adjacent rollers are in full length contact and all four of the rollers, which are numbered 104, 105, 106 and 107 respectively, have their ends disposed in parallel inclined slots 108

formed in bracket like portion 110 of the frame. The roll core of the lowermost roll 107 is positively supported upon adjustable stops, one such stop being indicated at 111 in Figures 16 and 17 and comprising an adjusting screw the upper end of which constitutes a bearing surface for the roll core end, a bearing surface upon which the roll core end may revolve. The periphery of the lowermost roll 107 is adapted to engage the face of the type carried by the bed and to supply ink thereto as the bed moves past the roller. Its precise relationship to the bed may be regulated by manipulating the adjusting screws 111. The ends of the cores of the three uppermost rollers are simply guided in slots 108 and the weight of each roller is carried by those below it. Ink is applied to the surface of the uppermost roller 104 and is communicated from that roller to the surfaces of the following rollers, being evenly distributed as a result of its movement from roll surface to roll surface.

The pile board indicated at D is of novel construction. It comprises a principal member 112, preferably a wooden board, and a secondary member 113 disposed at right angles and secured to board 112, thus providing an open pocket within which a pile of sheets S^2 may be readily accumulated. The unit comprising the boards 112 and 113 is supported for rocking movement about a horizontal axis and swinging movement about a vertical axis by the bracket device most clearly illustrated in Figure 4. This device includes a vertical post 114 the lower end of which is affixed to the base member B and which has a collar 115 adjacent its upper end. Rotatably mounted upon post 114 above the collar 115 is a bracket 116 having a downwardly extending vertical flange 116*a*. A plate 117, secured to the undersurface of the board 112 by screws or the like, has attached to its projecting end a boss or flange 118 one surface of which engages the correspondingly shaped surface of flange 116*a* of member 116. A pivot pin rigid with member 116 extends horizontally through an aperture in member 118, the outer end of this pin being indicated at 119, and clamping nuts 120 having threaded relationship with the pin 119 serve to clamp member 118, and hence the entire pile board D, in any position to which it may be angularly adjusted about the axis of pin 119. Falling sheets such as S', which have been printed, will be collected on the pile board and, when the run has been completed, the pile board may be swung outwardly from beneath the cylinder, about the axis of post 114, and the pile conveniently removed. An operator standing in front of the pile board, therefore, may quickly run a few sheets through the press and, without changing position, remove the printed sheets from the pile board.

The sheet gripping mechanism associated with the cylinder is of conventional character and need be only briefly described. The gripper shaft is indicated at 121 and two spaced grippers mounted on that shaft at 122, respectively. One end of the shaft projects through the adjacent end wall of the cylinder and has mounted thereon a generally cylindrical member 123 which is slotted at 123*a*, the width of the slot increasing from its midpoint to its ends as shown in Figure 15. Member 123 is adapted to successively contact stationary pins supported in the side frame as it moves in its circular path around the axis of the cylinder, a first such pin being indicated at 125 and the second at 126. Member 123 contacts the first pin, the gripper shaft is rotated in such direction that the gripper fingers release the sheet which they have been engaged in holding upon the periphery of the drum, being moved, for instance, to the position in which they are shown in Figure 3. As the cylinder angularly advances member 123 contacts the second pin and is revolved thereby, moving from the position in which it is shown in Figure 15 to a position approximately 90° from that position and the gripper fingers being caused to engage the leading edge of a succeeding sheet, member 123, and hence the gripper shaft and fingers, is maintained in its two extreme positions of movement by means including the thrust rod 128 one end of which enters a slot 123*b* in member 123 and is pivotally connected to member 123 at 129. The opposite end of member 128 is reduced in diameter and is slidably supported within an aperture formed in the rocking member 130 pivotally mounted upon the cylinder and, a spring 131, normally under compression, constantly urging rod 128 upward (Figure 15) and hence yieldably retaining member 123 at either one extreme or the other of the rotary movement. Rotation of member 123 in either direction is halted by contact between the edge of thrust rod 128 and the bottom of slot 123*b*.

Smoothness of operation is promoted by the application of a braking force which frictionally opposes rotation of the cylinder. Such a retarding force is developed by means of a braking device which encircles and frictionally engages the periphery of a drum 135 keyed upon one end of the cylinder shaft 11 (Figure 6). A friction band or shoe 136 bears against the cylindrical surface of the drum and is maintained in such position by the split clamping ring 137, this ring having an extension 137*a* which terminates in a cylindrical sleeve 137*b*, rotatably mounted on an anchoring pin 138 rigidly affixed to the frame of the machine. The friction band is thus held against rotation and the amount of retarding force may be controlled by means of an adjusting screw 137*c*.

A machine of the character described may be used with great advantage in the printing of depositors' names and other information upon previously printed bank checks, but may also be used to print upon relatively small sheets of all kinds and is therefore well adapted to be used for many purposes.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a printing press, in combination, a cylinder, means for rotating said cylinder in one direction of rotation about its axis, a reciprocable bed, toothed elements fixed on bed and cylinder respectively and adapted to be periodically engaged to effect periodic advancements of the bed as the cylinder rotates, and means associated with the bed and cylinder for preliminarily adjusting the position of the bed to insure proper meshing of said toothed elements upon engagement thereof, said means comprising a member supported for movement relatively to said bed and said cylinder, and a part connected to and rotatable with said cylinder for intermittently engaging and actuating said member as the cylinder rotates and causing the same to engage said bed only at the start of a printing cycle, said member being substantially stationary and in out-of-contact relationship with said bed throughout the remainder of said cycle.

2. In a printing machine, in combination, a reciprocable bed member, a rotatable cylinder

member, means for driving one only of said members on its printing stroke, and mechanism for operatively connecting and disconnecting said members whereby the first member is intermittently driven from the second member, said mechanism including a device movable independently of said cylinder and adapted to be actuated thereby for engaging and imparting to the first member an initial movement just prior to the establishment of a driving connection between said members said device being substantially stationary and out of contact with said first member while said members are in connection.

3. The combination set forth in claim 2 in which said driving means is connected to the cylinder, and said device is operatively engaged and actuated by the cylinder to give the bed an initial movement just prior to establishment of the driving connection between said members.

4. The combination set forth in claim 2 in which said device includes a lever mounted for rocking movement and a cam connected to and movable with said driven member for rocking said lever, and resilient means for retracting the lever after actuation by said cam.

5. In a printing press, in combination, a cylinder, means for rotating said cylinder in one direction of rotation about its axis, a reciprocal bed adapted to be moved into printing contact with said cylinder, toothed elements fixed on said bed and cylinder respectively and adapted to be periodically engaged to effect periodic advancements of the bed as the cylinder rotates, means manually operable to move said cylinder to a position out of printing contact with said bed, and means associated with the bed and cylinder for preliminarily adjusting the position of the bed to insure proper meshing of said toothed elements upon engagement thereof, said means comprising a member supported for movement relatively to said bed and said cylinder, and a part connected to and rotatable with said cylinder for intermittently engaging and actuating said member as the cylinder rotates and causing the same to engage said bed only at the start of a printing cycle, said member being substantially stationary and in out-of-contact relationship with said bed throughout the remainder of said cycle.

6. In a printing press, in combination, a shaft, a cylinder mounted on said shaft, means for rotating said shaft and cylinder in one direction of rotation about their common axis, a reciprocal bed adapted to be moved into printing contact with said cylinder, means eccentrically supporting said shaft, means engaging said shaft supporting means, a toggle linkage connected to said engaging means and adapted to be manually operated to rotate said shaft supporting means and move said cylinder to a non-printing position, toothed elements fixed on said bed and cylinder respectively and adapted to be periodically engaged to effect periodic advancement of the bed as the cylinder rotates, and means associated with the bed and cylinder for preliminarily adjusting the position of the bed to ensure proper meshing of said toothed elements upon engagement thereof, said means comprising a member supported for movement relatively to said bed and said cylinder, and a part connected to and rotatable with said cylinder for intermittently engaging and actuating said member as the cylinder rotates and causing the same to engage the bed only at the start of a printing cycle, said member being substantially stationary and in out-of-contact relationship with said bed throughout the remainder of said cycle.

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