A. T. H. BROWER & S. MOE.

PRINTING PRESS.

APPLICATION FILED MAY 17, 1917.

1,297,997.

Patented Mar. 25, 1919.

3 SHEETS—SHEET 1.

Fig. 1.

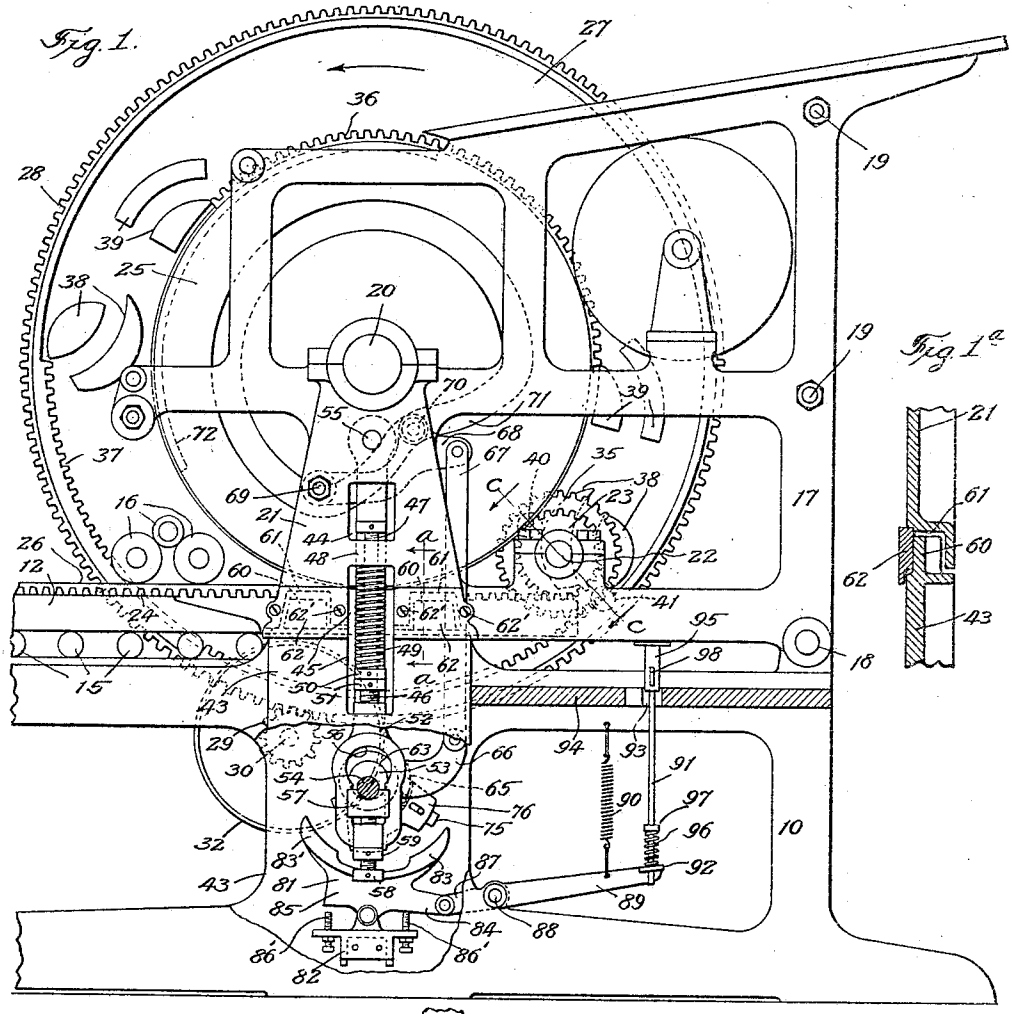


Fig. 1a

Fig. 1b

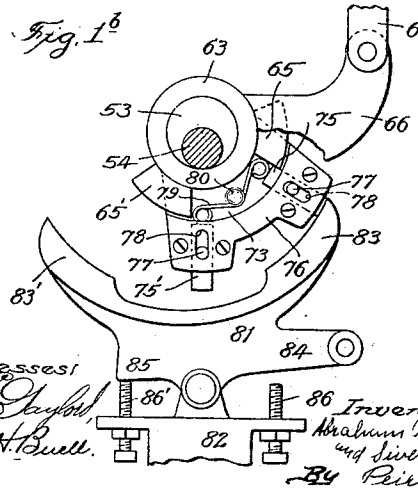
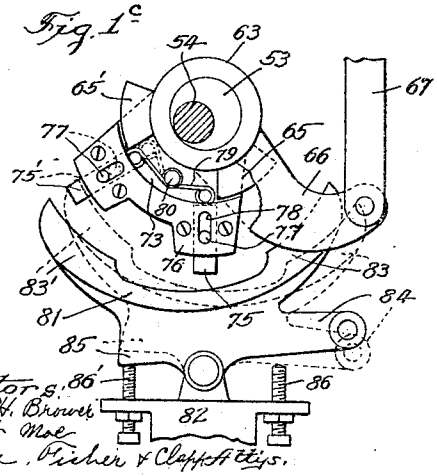


Fig. 1c



Witnesses:
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By Pierce, Fisher & Clapp Attys.

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3 SHEETS—SHEET 2.

Fig. 2.

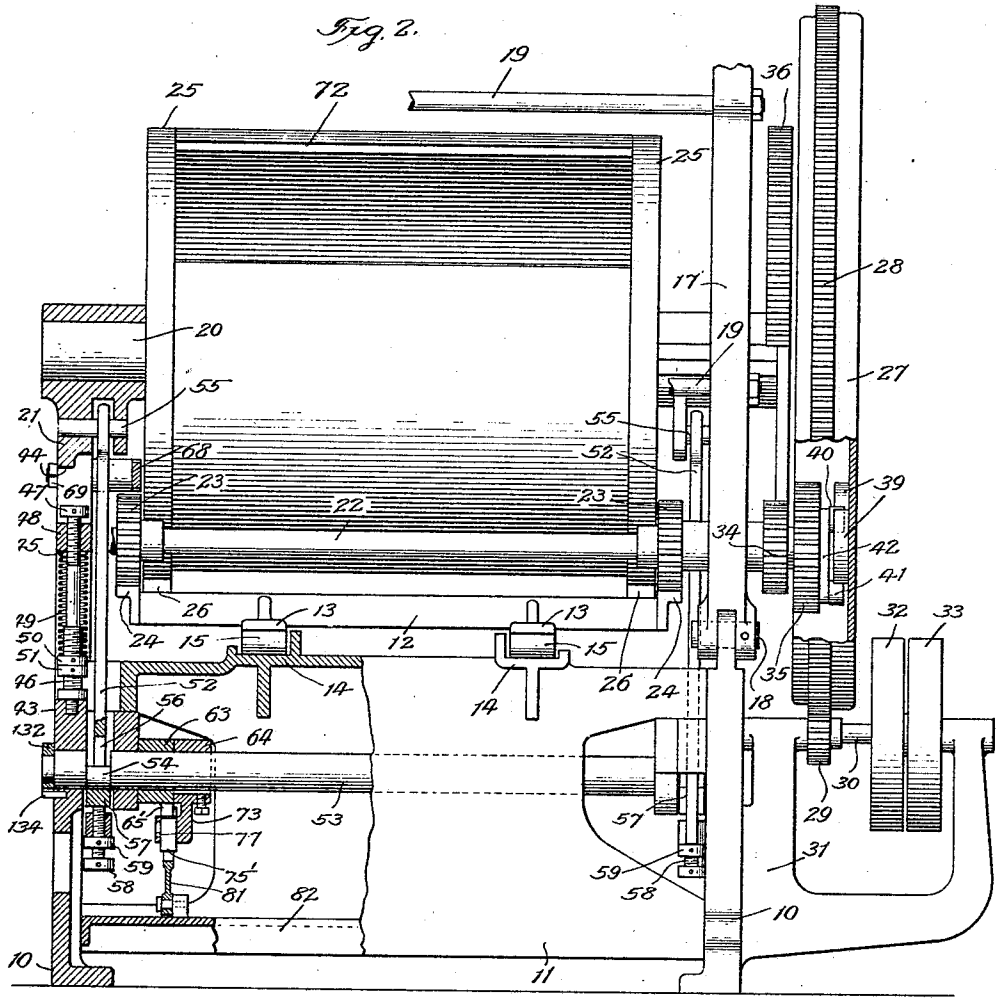


Fig. 2a.

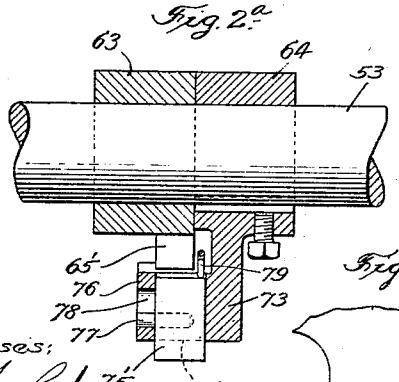


Fig. 2b.

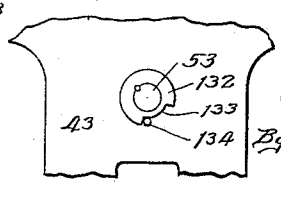
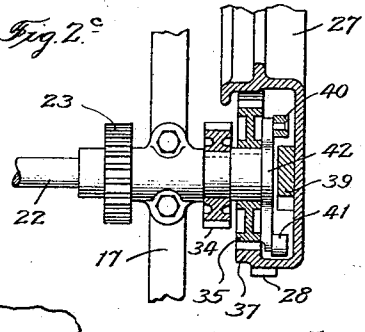


Fig. 2c.



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3 SHEETS—SHEET 3.

Fig. 3.

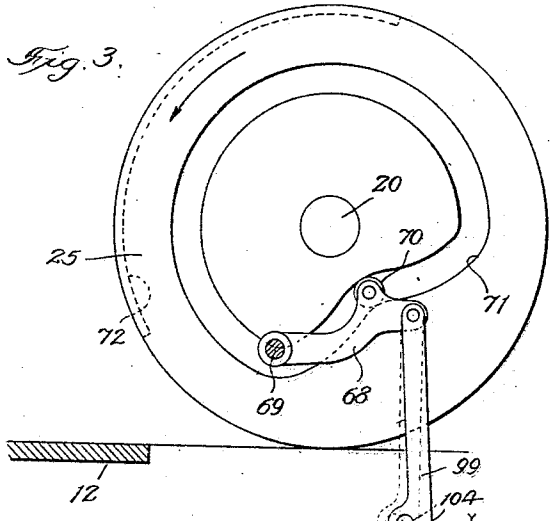
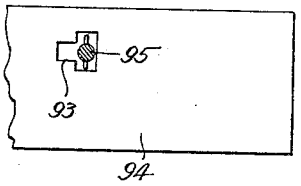


Fig. 3b.



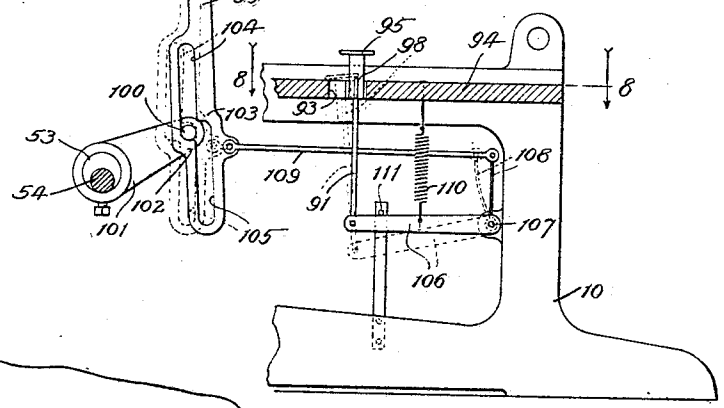
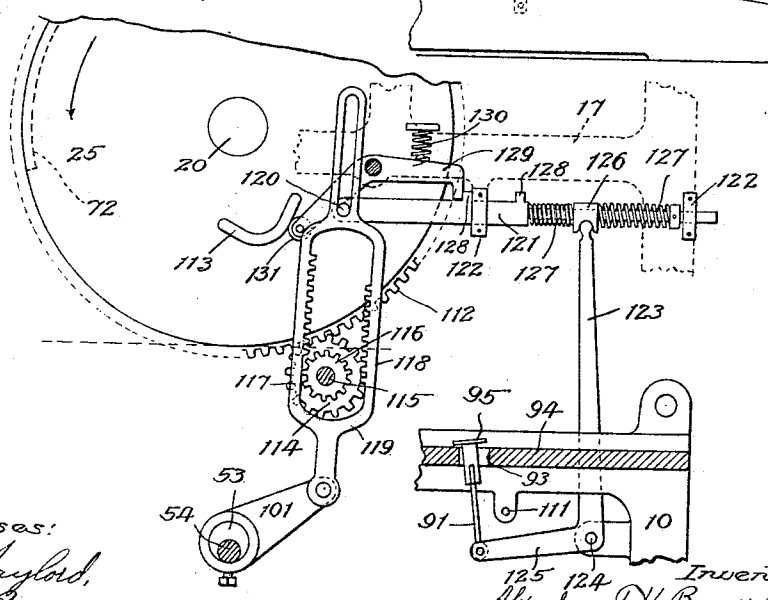


Fig. 3a.



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UNITED STATES PATENT OFFICE.

ABRAHAM T. H. BROWER AND SIVERT MOE, OF CHICAGO, ILLINOIS; SAID MOE ASSIGNOR TO SAID BROWER.

PRINTING-PRESS.

1,297,997. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed May 17, 1917. Serial No. 169,186.

To all whom it may concern:

Be it known that we, ABRAHAM T. H. BROWER and SIVERT MOE, citizens of the United States, and residents of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Printing-Presses, of which the following is a full, clear, and exact description.

The invention relates to bed-and-cylinder printing presses of the one-revolution type in which the impression cylinder is continuously rotated in one direction and the form bed is reciprocated forward and back at each revolution of the cylinder. Such a press does not require mechanism for automatically raising and lowering the cylinder during normal operation, since the impression surface occupies less than half of the periphery of the cylinder and the portion opposite the impression surface is above the bed during the return stroke of the latter. It is desirable, however, to trip or lift the impression cylinder in case the sheet is not properly fed, and the present invention seeks to provide suitable power-actuated trip mechanism for a press of this type which can be controlled manually to raise and lower the cylinder at the will of the operator without stopping the press.

The invention consists in the features of improvement hereinafter set forth, illustrated in different forms in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of a portion of a bed and cylinder press with the preferred form of the improved trip mechanism applied thereto, a portion of the frame being broken away to more clearly illustrate the trip mechanism. Fig. 1^a is a detail section on the line *a—a* of Fig. 1. Figs. 1^b and 1^c are enlarged detail views of portions of the trip mechanism shown in different positions. Fig. 2 is an end elevation of the press with parts broken away and parts shown in section. Figs. 2^a and 2^b are enlarged detail views of parts shown in Fig. 2. Fig. 2^c is a detail section on the line *c—c* of Fig. 1. Figs. 3 and 3^a are detail views in elevation illustrating modifications of the trip mechanism. Fig. 3^b is a detail plan view with a part shown in section on line 8—8 of Fig. 3.

The present improvements are shown applied to a one-revolution bed-and-cylinder press similar to that set forth in Letters Patent of the United States No. 981,056, issued to Abraham T. H. Brower, Jan. 10, 1911. The main frame comprises side and transverse portions 10 and 11. The form bed 12 and the transverse portions of the frame are provided with longitudinally extending tracks 13 and 14 between which are interposed sets of rollers 15. Suitable gibs or shoes (not shown) are also provided to hold the bed in proper position and guide its movement. Means are also provided for holding rollers 16 in proper position to ink the form upon the bed.

In the construction shown the bed rack pinion shaft is driven by a bull wheel on the cylinder shaft, the bull wheel being provided with gear segments and reversing shoes for driving the pinion shaft in opposite directions. To permit the raising and lowering of the cylinder without interfering with the proper engagement of the segment racks and shoes with the gears and studs on the pinion shaft, the cylinder and pinion shaft are both mounted upon a vertically movable supplemental frame. This supplemental frame in the construction shown comprises connected side portions 17 pivoted or hinged at their lower outer corners to the side portion 10 of the main frame. In the construction shown, pivot studs 18 extend through ears or lugs formed upon the main and supplemental frames.

The outer ends of the side portion 17 of the supplemental frame are connected by brace rods 19 and the cylinder shaft 20 is journaled in suitable bearings upon the inner end of the supplemental frame immediately above enlarged portions 21. The bed rack pinion shaft 22 is journaled in the lower central portion of the supplemental frame and carries pinions 23 which mesh with racks 24 on the opposite side edges of the bed 12. The cylinder is provided, as usual with flanged heads 25 at its ends which engage bearers or guides 26 on the opposite edges of the bed adjacent the racks 24. At

one end outside of the frames, the cylinder shaft is provided with a bull wheel 27 having an external gear 28 which meshes with a pinion 29 on a drive shaft 30. The latter is journaled in a bracket 31 mounted on the side of the main frame and carries tight and loose pulleys 32 and 33 or other suitable means for driving the bull wheel and cylinder continuously in the direction indicated by the arrow in Fig. 1.

The end of the bed rack pinion shaft 22 adjacent the bull wheel projects beyond the side portions of the frame and is provided with relatively small and large pinions 34 and 35 which are arranged to mesh respectively with external and internal gear segments 36 and 37 formed upon the bull wheel, the pinions and segment racks being preferably of such sizes as to drive the bed in opposite directions at substantially the same speed. Between the ends of the segment racks, the bull wheel is provided with reversing shoes 38 and 39 having cam grooves which are arranged to coöperate with crank pins on the bed rack pinion shaft to reverse the direction of movement of the bed. Preferably, the crank pins which are engaged by the reversing shoes are in the form of antifriction rollers 40 and 41 and are mounted upon a plate or bar 42 fixed to the end of the shaft 22.

The bed and cylinder movement thus far described is substantially the same as set forth in the prior U. S. Patent No. 981,056 above referred to. Instead of mounting the crank pins or rollers 40 and 41 at equal distances from the axis of the bed rack pinion shaft, the plate or bar 42, in the present construction is arranged to form long and short cranks so that the axes of the crank pins 40 and 41 are arranged in line respectively with the pitch lines of the large and small pinions 34 and 35. That is to say, the crank pin or roller 40 which passes through the shoes 39 as the small pinion 34 engages and is disengaged from the external gear segment has a short crank arm of the same radius as the pitch line of the small gear 34, while the crank pin or roller 41 which passes through the shoes 38 as the pinion 35 engages and is disengaged from the external rack 37 has a crank arm equal in length to the radius of the pitch line of the large pinion. In this way the reversal of the bed rack pinion shaft and the engagement of the pinions 34 and 35 with the racks 36 and 37 is quietly and smoothly effected. Thus, in the position shown in Fig. 1, the pin 41 of the long crank has just passed through the shoes 38 and the gear segment 37 has just engaged the large pinion 35 to drive the bed in forward direction. It is obvious by this arrangement that there will be no sudden change in the speed of movement of the bed as the bed rack pinion shaft passes from the control of the reversing shoes to the control of the gear segments 36 and 37.

The portions 21 of the supplemental frame are arranged above enlarged portions 43 of the main frame and these parts are provided with slots 44 and 45 to receive adjusting stop screws and lift springs. Stop rods 46 arranged in the slots 45 are fixed to the main frame and adjusting stop screws 47 are threaded into the portions 48 of the supplemental frame between the slots 44 and 45, the lower ends of the stop screws being arranged to engage the upper ends of the stop rod as most clearly shown in Fig. 2. Heavy lift springs 49 coiled about the rods 46 and the lower ends of the stop screws 47 engage the portions 48 of the supplemental frame and the lower ends of the springs rest upon adjusting washers 50 threaded on the lower ends of the stop rods 46. Lock nuts 51 for the adjusting washers or nuts 50 are also threaded on the rods 46.

The cylinder is held in normal printing position and its raising and lowering movements are effected by a pair of eccentric straps or rods 52 and a transverse eccentric shaft 53. This shaft is journaled at its ends in the portions 43 of the main frame and, adjacent each end, it is provided with eccentric portions 54 which engage the lower ends of the eccentric straps or rods 52. The upper ends of the latter are connected by pins 55 to the portions 21 of the supplemental frame. The lower ends of the straps or rods 52 are preferably provided with openings 56 and adjustable shoes 57 are vertically guided in the lower portions of the openings 56, the upper faces of the shoes being provided with concave seats for the eccentrics 54. Adjusting screws 58 threaded through the lower ends of the straps engage the shoes 57 and lock nuts 59 are arranged to hold the screws and shoes in adjusted position. Normally, the centers of the eccentrics 54 lie beneath the center of the shaft 53 to hold the supplemental frame and cylinder in lower working position with the adjusting screws 47 in engagement with the upper ends of the stop rods 46. The required degree of pressure for effecting a proper impression can be obtained by adjusting the screws 47 and 58. By rocking the eccentric shaft 53 to move the eccentrics from the position shown in Fig. 1[b] to that shown in Fig. 1[c] the springs 49 will slightly lift the supplemental frame and cylinder to throw off the impression. By moving the eccentric shaft back to normal position the supplemental frame and cylinder are drawn down against the tension of the springs 49 to normally operative position. Preferably the parts are adjusted to move the eccentrics back to a position slightly beyond the center of motion thereof so as to securely lock the impression cylinder in its lowered

position. Other connections between the eccentric shaft and the cylinder may be provided if desired, but preferably the eccentric or trip shaft is arranged to act in opposition to lift springs so that there is no lost motion in the cylinder raising and lowering mechanism.

At its outer end, the supplemental frame is mounted as stated, upon the pivot studs 18. To hold the inner end of the frame and cylinder against lateral movement, the portions 43 of the main frame are provided at each side with a pair of upwardly projecting guide lugs 60 arranged on opposite sides of the slot or opening 45 and extending within recesses 61 of the supplemental frame. A pair of guide plates 62 are fastened to each side of the inner end of the supplemental frame by screws 62′ and extend across the recesses 61. These guide plates snugly engage the outer faces of the guide lugs 60 and hold the inner end of the supplemental frame against lateral movement.

Power driven actuating means is interposed between the cylinder or other moving part of the press and the cylinder trip shaft. The actuating means is normally disconnected, and manually operable controlling devices are provided for throwing the actuating means into operation to raise the cylinder and for subsequently throwing the same into operation to lower the cylinder, the parts being so organized that the cylinder is raised and lowered in proper timed relation with the movements of the impression surface and the form bed.

In the construction shown in Figs. 1 and 2, the actuating mechanism comprises two normally disconnected driving and driven members 63 and 64, one loosely mounted on the eccentric shaft 53 and the other fixed thereto. The driving member 63 comprises a hub loosely mounted on the shaft, a pair of radial lugs 65 and 65′ and a laterally projecting arm 66. The arm 66 is connected by an upwardly extending link 67 to one end of an arm 68. The opposite end of this arm is pivoted on a stud 69 which is fixed to and projects inwardly from the frame portion 21. A pin or roller 70 mounted on the arm 68 adjacent its outer end, engages a cam groove 71 formed in the outer face of the adjacent cylinder head. Throughout the greater portion of its periphery the groove 71 is concentric with the axis of the cylinder but, at a point opposite the impression surface, (which is provided on the portion of the cylinder indicated in dotted lines at 72) the cam has an inwardly extending portion which oscillates the arm 68 and parts connected thereto at each operation of the press. In the position shown in Fig. 1 the crank pins 40 and 41 on the bed rack pinion shaft 22 have passed through the reversing shoes 39 and 38 and the bed has just started on its forward movement. In this position the pin or roller 70 is in the inner portion of the cam groove and the arms 68 and 66 have been raised. The continued rotation of the cylinder in the direction of the arrow will lower the arm 68 and rock the arm 66 and the oscillating member 63 on the eccentric shaft.

The driven member 64 comprises a hub portion fixed to the eccentric shaft and a downwardly projecting portion 73 which is provided at its lower ends with a segmental flange 74 that projects forwardly beneath the path of movement of the lugs 65 and 65′ on the oscillating member 63. The flange 74 is slotted at its ends to receive a pair of blocks or dogs 75 and 75′ which are held in place by a plate 76 secured to and covering the outer face of the flange 74. Pins 77 on the dogs engage radial slots 78 in the plate 76 and limit the shift of the dogs. The latter are normally held in outward position by a spring 79 centrally coiled about a stud 80 on the flange 73 and the ends of which spring engage the inner ends of the dogs. The spring 79 as shown in Fig. 2ª is arranged behind the path of movement of the lugs 65 and 65′. By shifting the dogs inwardly they will be engaged by the lugs 65 and 65′ on the oscillating member 63 to thereby operate the cylinder raising and lowering devices, but normally, the dogs are held by the springs 79 out of the path of movement of the lugs and the cylinder trip mechanism is thus idle during the ordinary operation of the press.

A manually operable controller for the dogs consists of an oscillating shoe 81 pivotally mounted on a cross bar 82 and having oppositely disposed segmental end portions 83 and 83′ with a cut-away space between them. The lower portion of the shoe is provided with a pair of lugs 84 and 85 which are arranged to coöperate with a pair of adjustable stop screws 86 and 86′ threaded through lugs on the cross member 82. The lug or projection 84 is pivoted to the end of a rock arm 87 on a rock shaft 88. This shaft is journaled in bearings on the lower portion of the main frame and its outer end is provided with a horizontal arm 89 which is connected to the frame by a spring 90. The lower end of a rod 91 extends through an ear 92 on the end of the arm 89 and its upper end extends through an opening 93 in the usual operator's platform 94 arranged on one side of the frame. The upper end of the rod 91 is provided with a foot pedal 95 and a spring 96 coiled about its lower end extends between a collar 97 thereon and the ear or projection 92 on the arm 89.

The parts are shown in normal position in Fig. 1. In this position, the spring 90

holds the foot pedal 95 raised and the controlling shoe 81 in engagement with the stop screw 86. The dogs 75 and 75′ are held in their outer position by the spring 79 and the member 63 having the lugs 65 and 65′ thereon oscillates idly on the eccentric shaft. If the operator wishes to trip the cylinder, he depresses the foot pedal and, through the medium of the spring 96, shifts the rock arms 89 and 87 and throws the segment 83 of the controlling shoe against the outer end of the dog 75. The spring 96 permits the operator to fully depress the foot pedal even though the lug 65 prevents the inward movement of the dog 75. Then, when the cylinder reaches the position shown in Fig. 1, the dog 75 will be moved inwardly as shown in Fig. 1[b] into the path of movement of the lug 65. The continued movement of the cylinder then rocks the arm 66 and lug 65 and moves the parts to the position shown in Fig. 1[c] thereby oscillating the eccentric shaft so that the springs 49 slightly lift the cylinder. The trip operating members 64 and 65 are then disconnected and the cylinder will remain in raised position as long as the foot pedal is depressed and the controlling shoe held in the position shown in full lines in Fig. 1[c]. To again lower the cylinder, the operator releases the foot pedal and the segment 83′ of the shoe is pressed inwardly into engagement with the dog 75′. The latter, when the oscillating member 63 reaches the position shown in Fig. 1[c], is moved inwardly into the path of movement of the lug 65′ (as indicated in dotted lines in Fig. 1[c]) and when the arm 66 is again raised, the eccentric shaft is restored to the normal position shown in Fig. 1[b] to again lower the cylinder. The operator can thus positively control at will, the raising or tripping of the cylinder and also the lowering or restoring of the cylinder to normal position. Furthermore, although the operator may either depress or release the foot pedal at any time, the tripping and restoring of the cylinder are effected by the cam operated arm 68 in proper timed relation with the movements of the cylinder printing surface and form bed.

Preferably, the slot or opening 93 in the operator's platform 94 is T-shaped as indicated in Fig. 3[b] and the shank of the pedal is provided with projecting lugs 98 so that the pedal and control devices can be locked in shifted position as indicated in dotted lines in Fig. 3. The vertical movement of the cylinder is, of course, not sufficient to disengage the pinions 23 with the racks 24 of the bed, and, since the shaft 22 and parts carried thereby are mounted on the supplemental rocking frame and move with the cylinder, the tripping of the cylinder does not interfere with the proper operation of gear segments and reversing shoes of the bull wheel 27 which reciprocate the bed. A washer 132 (see Fig. 2[b]) fixed to one end of the eccentric shaft 53 is provided with a recess 133 the ends of which are arranged to engage a pin 134 fixed to the frame to thereby limit the oscillating movement of the shaft.

In the modification shown in Fig. 3, the oscillating arm 68 is connected to the upper end of a driving member link 99, the lower end of which is slotted to receive a pin 100 on the end of a driven member or crank arm 101 that is fixed to the eccentric shaft 53. The link is provided with oppositely acting shoulders 102 and 103 which coöperate with the pin 100 to oscillate the crank arm 101 and eccentric shaft in opposite directions. The shoulders 102 and 103 are vertically and laterally offset from each other and the lower portion of the link is provided with upper and lower, longitudinal slots 104 and 105 arranged respectively in line with the shoulders, these slots being in communication with each other between the shoulders. The rod 91 of the foot pedal 95 is connected to the forward end of an arm 106. The latter is mounted on a rock shaft 107 journaled on the frame and a spring arm 108 projecting upwardly from the inner end of the shaft is connected by a link 109 to the shifter 99. A spring 110 extending between the arm and the platform 94 holds the parts in the normal position shown in full lines with the arm 106 engaging a stop pin 111. During the normal operation of the press, the slotted portion 104 idly engages the crank pin 100. To trip the cylinder, the operator depresses the foot pedal 95 and forces the shifter rod 99 toward the left. When the latter reaches its highest position, shown in Fig. 3, the rod 99 will move to the position shown in dotted lines, bringing the shoulder 103 above the pin 100. Then, when the shifter rod moves down, the crank arm 101 and eccentric shaft will be rocked to trip the cylinder. The cylinder will remain tripped with the slotted portion 105 idly engaging the crank pin 100 until the foot pedal is released. Then, when the shifter rod reaches its lowest position, the shoulder 102 will move beneath the pin and the upward movement of the rod will restore the eccentric shaft and cylinder to normal.

In the form shown in Fig. 3[a], the end of the cylinder instead of being provided with a cam slot, has a gear 112 and a cam lug 113 thereon. The gear meshes with a pinion 114 on a short shaft 115 and a driving member or pinion 116 on this shaft is arranged to coöperate with two oppositely disposed racks 117 and 118 formed upon a driven member or shifter 119, the shifter being connected at its lower end to the

crank arm 101 on the eccentric shaft 53. The extreme upper end of the shifter 119 is slotted and engages a pin 120 on the inner end of a controlling bar 121. The latter is arranged to slide in suitable bearings 122 and is adapted to be shifted by an upwardly projecting rock arm 123. The latter is mounted on a rock shaft 124 which is provided with an arm 125 connected to the pedal rod 91. Preferably the arm 123 engages a sliding block 126 on a reduced portion of the controlling rod 121 and coiled springs 127 mounted on the rod engage the opposite ends of the block. Stop pins 128 are arranged to engage one of the bearings 122 and limit the shift of the rod 121 and a bell crank 129 pivotally mounted on the machine frame is normally held by a spring 130 in engagement with one of the stop pins. The opposite end of the bell crank is provided with a roller 131 arranged to be engaged by the cam lug 113.

The rack 117 is cut away at its lower end and the rack 118 at its upper end as shown, and, normally, the pinion 116 rotates idly. If the operator wishes to trip the cylinder, he depresses the foot pedal and compresses one of the springs 127. The controlling shifter 121 however, is not moved until the cylinder reaches the proper position so that the cam lug 113 will shift the bell crank 129. The controlling member 121 and shifter 119 are then moved to engage the rack 118 with the pinion 116 so that the shifter is moved downwardly and the rock arm 101 and eccentric shaft 53 oscillated to trip the cylinder. The cylinder will be retained in tripped position until the foot pedal is released. Thereupon the pinion 116 will coöperate with the rack 117 to restore the parts to normal position.

While shown in connection with a bed and cylinder movement in which the bed is operated by gear segments and reversing shoes on a bull wheel which rotates with the cylinder, the improved trip may be applied to other types of one-revolution bed-and-cylinder presses. It is also obvious that the details set forth may be varied without departure from the essentials of the invention as defined in the claims.

We claim as our invention:—

1. In a one-revolution bed-and-cylinder printing press, the combination of an impression cylinder, a form bed, mechanism driven from said cylinder for reciprocating said bed, trip mechanism connected to said cylinder and power actuated in timed relation with the bed and cylinder movements for raising and lowering said cylinder, said trip mechanism being normally inoperative, and manually shiftable means for throwing the same into operation to thereby control both the cylinder raising and lowering movements of said trip mechanism.

2. In a one-revolution, bed-and-cylinder printing press, the combination of an impression cylinder adapted to rotate continuously in one direction, a form bed, mechanism connected to said cylinder for reciprocating said bed, power operated trip mechanism comprising normally disengaged driving and driven members arranged to be operatively engaged in two different ways to effect the raising and lowering movements respectively of said cylinder in timed relation with the bed and cylinder movements, a manually operable device and yielding connections between the same and one of said members for effecting such engagements.

3. In a one-revolution bed-and-cylinder press, the combination of an impression cylinder adapted to be continuously rotated in one direction, a form bed, mechanism driven by said cylinder for reciprocating said bed, trip mechanism driven by said cylinder for raising and lowering the latter in timed relation with the bed and cylinder movements, said trip mechanism comprising a driving member and a driven member normally held out of the path of movement of said driving member, and manually operable controlling devices for relatively shifting said members to thereby throw said trip mechanism into operation.

4. In a bed-and-cylinder printing press, the combination with the impression cylinder and form bed and mechanism for operating the same in timed relation, of trip mechanism for raising and lowering said cylinder in timed relation with the bed and cylinder movements, said trip mechanism having coöperating parts arranged to be automatically disengaged at the end both of the cylinder raising and lowering movements of said trip mechanism, and manually operable means for effecting the engagement of said parts.

5. In a one-revolution bed-and-cylinder press, the combination of a cylinder adapted to be rotated in one direction, a form bed, mechanism driven by said cylinder for reciprocating said bed, trip mechanism for raising and lowering said cylinder comprising normally disengaged driving and driven members, said driving member being connected to said cylinder and operated thereby in timed relation with the bed and cylinder movements, and a manually operable controller for relatively shifting said driving and driven members to two different operative positions, said members being operative in one position to raise the cylinder and operative in the other position to lower the same.

6. In a one-revolution bed-and-cylinder printing press, the combination with a cylinder adapted to rotate in one direction, a form bed, mechanism driven by said cylinder for reciprocating said bed, trip mecha-

nism for said cylinder comprising a driving member actuated by said cylinder in timed relation with the bed and cylinder movements, a driven member connected to said cylinder and adapted to be operatively engaged with said driving member in two different positions only of the latter, said driving and driven members being arranged to be automatically disengaged at the ends of the cylinder raising and lowering movements, a shifter for effecting the engagement of said members, a manually operable actuating member for said shifter, and a spring interposed between said member and said shifter.

7. In a printing press, the combination with an impression cylinder, a reciprocating form bed and mechanism for operating the same in timed relation, of a rock shaft connected to said cylinder to raise and lower the same, coöperating fixed and loose members on said shaft, means connected to said cylinder for oscillating said loose member, one of said members having a pair of fixed lugs, two shiftable lugs mounted on the other of said members and normally spring-held out of the path of movement of the other pair of lugs, and a controller manually shiftable in opposite directions for alternately engaging said pairs of lugs.

8. In a printing press, the combination with an impression cylinder, a reciprocating form bed and mechanism for operating the same in timed relation, of a rock shaft connected to said cylinder to raise and lower the same, coöperating fixed and loose members on said shaft, means connected to said cylinder for oscillating said loose member, one of said members having a pair of fixed lugs, two shiftable lugs mounted on the other of said members and normally spring-held out of the path of movement of the other pair of lugs, a controller manually shiftable in opposite directions for alternately engaging said pairs of lugs, a manually operable member for actuating said controller, and a spring interposed between said member and said controller.

9. In a printing press, the combination with a main frame, a cylinder adapted to rotate in one direction, a form bed, mechanism driven by said cylinder for reciprocating said bed, a trip shaft journaled in the main frame and connected to said cylinder, a driven member fixed to said trip shaft, an oscillating driving member therefor connected to said cylinder and operated in timed relation with the bed and cylinder movements, said driving and driven members having two different engaging positions and operative only in one position to raise the cylinder and only operative in the other position to lower the same, a manually operable device connected to said members and adapted to be shifted in opposite directions to effect such engagements, and a spring interposed in the connections between said manually operable device and said members.

10. In a bed-and-cylinder printing press, the combination with the impression cylinder, the reciprocating form bed, a drive shaft for the bed and a bull-wheel on said cylinder having segment racks and reversing shoes for operating said shaft alternately in opposite directions, of a supplemental frame wherein said cylinder and said shaft are journaled, and trip mechanism for raising and lowering said supplemental frame.

11. In a bed-and-cylinder printing press, the combination with the impression cylinder, the reciprocating form bed, a drive shaft for the bed and a bull-wheel on said cylinder having segment racks and reversing shoes for operating said shaft alternately in opposite directions, of a supplemental frame wherein said cylinder and said shaft are journaled, power actuated trip mechanism for raising and lowering said supplemental frame in timed relation with the bed and cylinder movements and manually operable devices for controlling the operation of said trip mechanism.

12. In a bed-and-cylinder printing press, the combination with the impression cylinder, the reciprocating form bed, a drive shaft for the bed and a bull-wheel on said cylinder having segment racks and reversing shoes for operating said shaft alternately in opposite directions, of a supplemental frame wherein said cylinder and said shaft are journaled, power operated but normally inoperative trip mechanism for raising and lowering said supplemental frame, and manually operable means for throwing said trip mechanism into operation and thereby control both its raising and lowering movements.

13. In a bed-and-cylinder printing press, the combination with the impression cylinder, the reciprocating form bed, a drive shaft for the bed and a bull-wheel on said cylinder having segment racks and reversing shoes for operating said shaft alternately in opposite directions, of a supplemental frame wherein said cylinder and said shaft are journaled, tripping means for raising and lowering said supplemental frame, an actuating member driven in timed relation with the bed and cylinder movements, coupling devices for connecting said actuating member to said tripping means arranged in one position to effect the raising movement only thereof and in another position to effect only its lowering movement, and a manually operable controller for shifting said coupling devices.

14. In a bed-and-cylinder printing press, the combination with the main frame, the reciprocating form bed thereon, of a sup-

plemental frame pivoted at its outer end and guided at its inner end on the main frame, a cylinder journaled at the inner end of said supplemental frame, a drive shaft for the bed journaled on the lower central portion of said supplemental frame, said cylinder having means for alternately operating said shaft in opposite directions, a trip shaft journaled in the main frame and connected to said supplemental frame, an actuating member driven from said cylinder, and manually controllable coupling devices for connecting said actuating member to said trip shaft.

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