C. A. McCAIN.

PRINTING PRESS IMPRESSION MECHANISM.

APPLICATION FILED JAN. 5, 1916.

1,225,667.

Patented May 8, 1917.

2 SHEETS—SHEET 1.

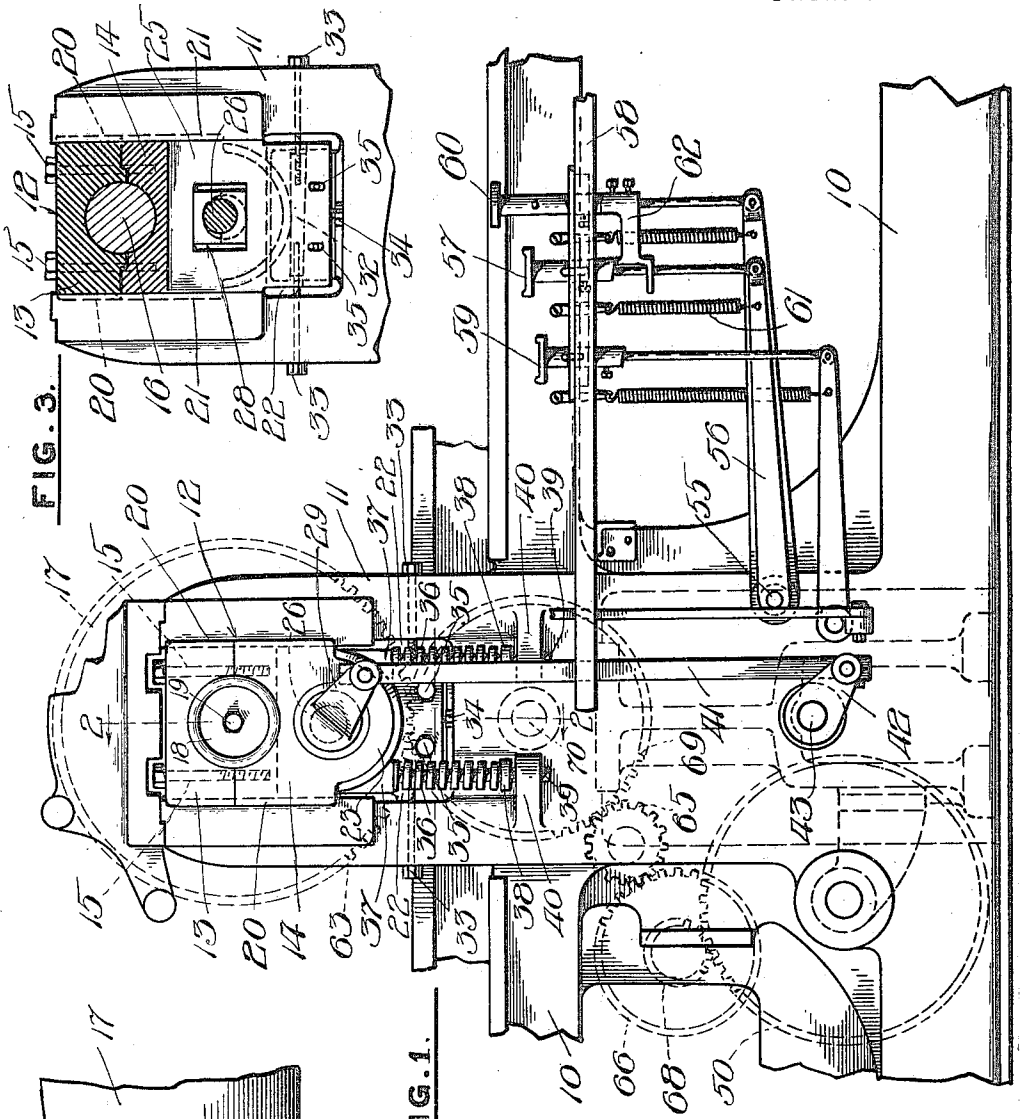


FIG. 1.

FIG. 3.

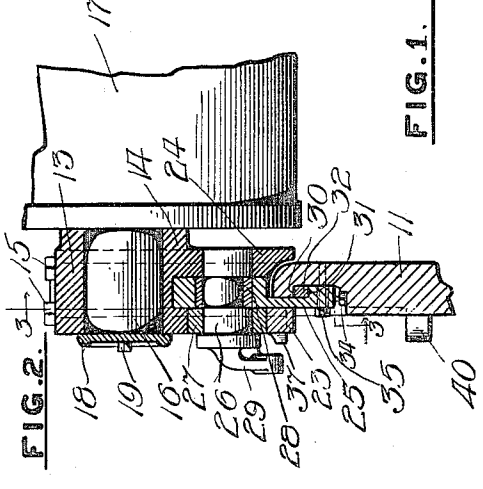


FIG. 2.

INVENTOR.

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by Thomas H. Ferguson

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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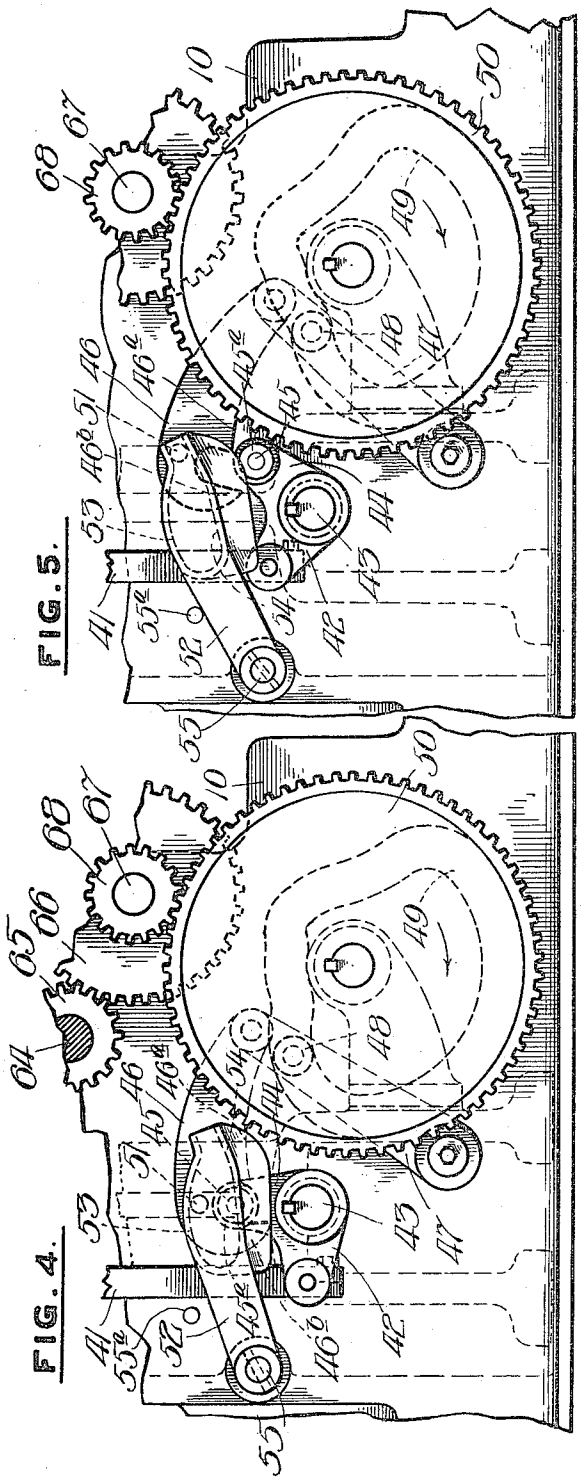


FIG. 5.

FIG. 4.

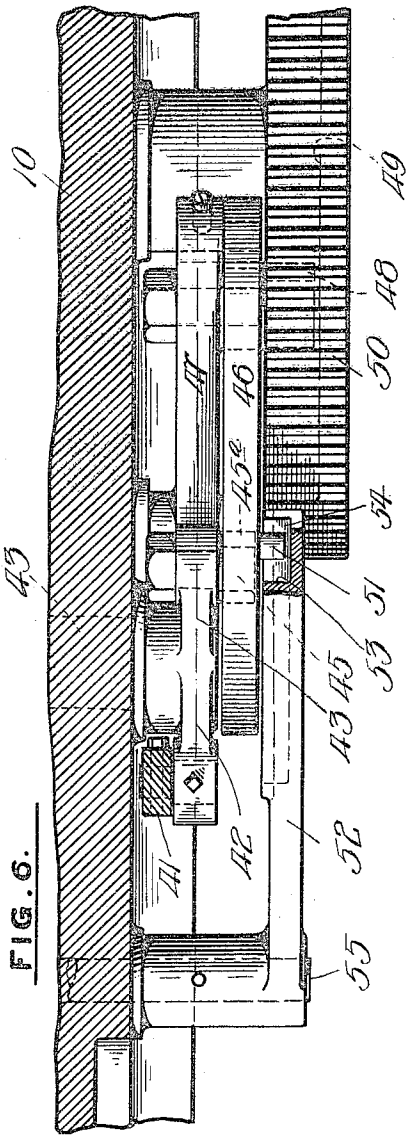


FIG. 6.

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UNITED STATES PATENT OFFICE.

CYRUS A. McCAIN, OF BENSONHURST, NEW YORK.

PRINTING-PRESS IMPRESSION MECHANISM.

1,225,667. Specification of Letters Patent. Patented May 8, 1917.

Application filed January 5, 1916. Serial No. 70,411.

To all whom it may concern:

Be it known that I, CYRUS A. McCAIN, a citizen of the United States, residing at Bensonhurst, in the county of Kings, State of New York, have invented certain new and useful Improvements in Printing-Press Impression Mechanisms, of which the following is a specification.

The present invention relates to flat bed cylinder printing presses in which the cylinder which makes two or more revolutions for each impression, is moved toward the printing surface to make the impression upon the movement of the type bed in one direction, and away from the printing surface to be clear of the form upon the return movement of the bed. More particularly my invention relates to the impression mechanism, that is to say, the mechanism by which the cylinder is raised into its clearance position and lowered into its printing position and by which it is held in either of said positions.

The principal objects of the invention are to provide a press of the above class with simple, durable, and powerful impression mechanism which shall perform its functions positively and with little or no yielding of the parts; to construct and arrange the parts so that they may be readily accessible for attention, repair and adjustment and so that they may be easily removed and reassembled; to provide an adjustment of the cylinder journal boxes which can be made without altering the throw of the eccentric by which those boxes are actuated; and to provide a construction in which the eccentrics by which the cylinder is actuated will always have a full throw, that is to say, will always reach the lowest point of their eccentricity whenever the cylinder is lowered to its impression plane.

With these ends in view, my invention consists in certain novel features of construction and details which will be more fully understood upon reference to the following detailed description taken in connection with the accompanying drawing. The scope of the invention will be particularly set forth in the appended claims.

It may be well to say at the outset that the embodiment of the invention herein presented is an application of the invention to the press disclosed in my United States Patent No. 1063273, granted June 3rd, 1913. It may also be well to state that inasmuch as the impression mechanism is the same in construction and arrangement at each end of the impression cylinder, a description and illustration of one mechanism will suffice for both. The mechanism on the left hand or feeder's side of the press will be chosen for that purpose.

In said drawing, Figure 1 is a side elevation of a portion of a printing press embodying an impression mechanism constructed in accordance with the present invention; Fig. 2 is a central section of the left hand cylinder journal box and associated parts, the section being taken on a plane indicated by the line 2—2 of Fig. 1; Fig. 3 is a partial sectional elevation of the same, the plane of section being indicated by the line 3—3 of Fig. 2; Fig. 4 is an elevation, viewed from the other side of the press illustrating a portion of the gearing and a portion of the mechanism by which the impression cylinder is moved up and down; Fig. 5 is a similar elevation showing the parts in a different position; and Fig. 6 is a plan view of the parts illustrated in Figs. 4 and 5, portions being shown in section or broken away for clearness. Throughout these views like characters refer to like parts.

Referring to the drawing in detail, 10 designates one of the side frames of the press which is provided with an upright portion 11 upon which the impression cylinder box 12 is mounted. This box is composed of an upper part 13 and a lower part 14 secured together by bolts 15, preferably four in number, which pass through the upper part into threaded engagement with the lower part. The journal box 12 supports the left hand journal 16 of the impression cylinder 17. A disk 18 is secured to the end of the journal 16 by a screw 19 and serves to limit the lateral movement of the journal in its box. The edges of the parts 13 and 14 of the journal box are flanged, as shown at 20, and these flanges are fitted upon the adjacent edges 21 of the upper portion of the frame upright 11, the latter being recessed at its upper end for the reception of the box 12 and the associated parts, thereby forming the rectangular journal box opening 22.

The lower part 14 of the journal box is provided with two downward projections 23, 24, and between these extends an upward

supporting projection 25, forming an extension of the supporting frame upright 11. The projections 23, 24, and 25 are apertured to receive an eccentric 26. The apertures in the projections 23 and 25 are made larger than the corresponding engaging portions of the eccentric 26. Boxes or bushings 27 and 28 are positioned in these openings so as to provide a suitable fit with the corresponding portions of the eccentric 26. In the case of projection 25, the aperture is square and the bushing or box 28 rests in the square aperture and closely fits the offset journal of the eccentric. To enable the box to be thus assembled, it is split or made in two parts. In the case of projection 23, the aperture is made large enough to allow the eccentric and its box to be passed through it. By having the eccentric box 28 in two parts which both closely fit the eccentric journal and the walls of the aperture, the cylinder journal box is positively actuated by the eccentric in each direction, both up and down, and such actuation is wholly independent of the counterbalancing springs hereinafter referred to. As shown, the alined journals of the eccentric are located in the downward projections 23 and 24, and the offset journal of the eccentric engages the box 28 positioned in the upward projection 25. A crank arm 29 extending laterally to the axis of the eccentric serves when actuated, to rotate the eccentric. As shown in Figs. 1 and 2, the journal box 12 is in its lowest position. As the eccentric is rotated from the position shown, the projections 23 and 24 move upward with reference to the upward projection or eccentric plate 25, and thereby raise the journal box.

The journal box together with the projections 23, 24 and 25, that is to say, the journal box and all the parts which engage the eccentric, may be adjusted with reference to the support 11 without changing in any way the adjustment or throw of the eccentric. For this purpose the engaging faces of the support 11 and the extension plate 25 are provided respectively with an upper ledge 30 and a lower ledge 31. These ledges are substantially horizontal and they are arranged to coöperate with an intervening wedge 32. The latter is provided with a slight taper and its movement in either direction determines the adjustment of the extension 25 relative to the support 11. In order to actuate the wedge 32, two adjusting screws 33 are provided. These screws pass through openings in the adjacent portions of the support 11 and extend into threaded engagement with opposite ends of the wedge 32. By turning one of these screws in one direction and the other in the opposite direction, the position of the wedge may be shifted. At the time the wedge is being shifted to determine the adjustment of the parts, the set-screw 34 must be turned in a direction to accommodate the movement of the eccentric plate 25. The set-screw 34 is tapped into the under side of the extension 25 and is arranged to rest upon a shoulder formed on the support 11. When the plate 25 has been adjusted to its desired position as a result of shifting the wedge 32 and rotating the screw 34, the plate may be held or set in position by means of the cap screws 35 which pass through slots in the plate 25 and into threaded engagement with the support 11. By screwing down these screws their heads are brought into close engagement with the plate 25 and the latter is thereby firmly held in adjusted position.

From the construction thus far described it will be seen that the journal box 12, together with its projections 23 and 24, is movable relative to the support 11 and its extension 25 in response to the movements of the eccentric. In order to overcome the weight of the cylinder and its journal boxes upon the eccentric and its coöperating engaging parts, springs 36 are positioned so as to act between the support 11 and the journal box projection 23. These springs, of which there are two, abut at one end against projections 37 upon the extension 23, and at the other end against the collars 38 of the studs 39 which are threaded at their lower ends and are screwed into threaded openings in the projections 40 upon the face of the support 11. These studs 39 also extend upward into the interior of the coiled springs, as shown. By screwing the studs into and out of projections 40, their collars 38 are moved up and down and thereby vary the compression of the springs. By adjusting the compression of the springs in this way, the desired counterbalancing effect may be produced.

In order to actuate the eccentric 26, I preferably connect the outer end of the arm 29 to one end of the connecting rod 41 and in turn connect the lower end of said rod to the outer end of a crank arm 42 located upon a rock shaft 43. In the mechanism of the complete machine these connecting rods and crank arms are duplicated. In the drawing, the second pair are illustrated in Figs. 4 and 5, which are views taken from the opposite side of the press. In practice this rock shaft 43 may be operated in various ways. In the present instance I have illustrated mechanism for operating the shaft 43 which is similar to that disclosed in United States Patent No. 550,992, granted Dec. 10, 1895 to Miehle. In the adaptation of this construction, the parts are arranged somewhat differently than shown in the Miehle patent. In this adaptation, shaft 43 is provided with an arm 44 which carries a pin 45 at its outer end, upon which an anti-friction roller 45ª

is journaled. This pin extends laterally from the arm, and the roller is in position to be engaged by the outer end of a pivoted latch or dog 46, which in turn is pivoted to the outer end of a pivoted arm 47. The arm 47 is provided with a cam roller 48 which engages a cam groove 49 formed on the inner surface of a gear wheel 50. Provision is made for raising the latch 46 out of engagement with the anti-friction roller 45^a upon the pin 45, through the agency of a pin 51 extending laterally from the latch 46 and a rock arm 52 having cam surfaces 53 and 54 formed by the walls of a portion of the arm which is channeled or grooved out for this purpose. The arm 52 is secured to transverse shaft 55 so as to be actuated as the latter is rocked. A stop pin 55^a serves to limit the upward movement of the arm 52. During normal operation the latch 46 engages the pin roller 45^a, as illustrated in Fig. 4, and as the cam groove 49 actuates the arm 47, the latch 46 is reciprocated and the rock shaft 43 rocked to move the impression cylinder up and down between its clearance and impression positions. During this movement the pin 51 just clears the upper cam face 53 of the arm 52. When it is desired to trip the impression mechanism, the shaft 55 is rocked and arm 52 is moved thereby against the stop pin 55^a and the latch 46 is raised out of its normal engagement with the pin roller 45^a. However, the upward movement of the latch 46 is such as to bring the lower edge 46^a just clear of the roller 45^a, while the latch point 46^b extends down so as to engage the roller 45^a. As a result of this construction, the point 46^b of the latch 46 will not disengage the roller 45^a until it has moved it to approximately the position illustrated in Fig. 5, that is to say, until it has moved the impression cylinder to the clearance position. It therefore follows that no matter in what position the parts may be when the trip arm 52 is actuated, the rock shaft 43 and its associated parts will be moved into the position of Fig. 5, or approximately that position, before the movement of the impression cylinder will stop. This operation results in always obtaining a full impression when the impression mechanism is once started, even though the trip arm 52 should be actuated by the operator before the roller 45^a has reached the limit of its return stroke. The position of the parts in Fig. 4 corresponds approximately to the impression position of the cylinder and the position of the parts of Fig. 5, as before stated, similarly corresponds to the clearance position of the cylinder. In reaching the disengaged position of Fig. 5, the latch pin 51 rides upon the cam face 54 of the arm 52. In the normal operation, as before pointed out, this pin clears the cam face 53 and does not engage it, but the face 53 is provided so as to engage the pin 51 to prevent the latch 46 from jumping up too far in case the operator should actuate the trip too violently.

For the actuation of the rock-shaft 55, an arm 56 is secured to the shaft at the opposite side of the press, and a pedal 57 is secured to the outer end of the arm and extended through the foot-board 58 in association with the pedals 59 and 60. These latter pedals are for the purpose of operating other mechanisms of the press and need not be particularly described. The pedal 57 is normally held in the position shown in Fig. 1 by a spring 61 acting between the arm 56 and a portion of the frame 10. The interlocking part 62 upon the shank of the pedal 60, is merely for the purpose of bringing about a joint operation of the latter and pedal 57 when the latter is operated. By swinging the pedal 60 away from the pedal 57, the part 62 is disengaged from the pedal 57 and the latter is thus free to operate independently of the pedal. This interlock, however, forms no part of the invention claimed in the present application but is not hereby disclaimed since the same is set forth and claimed in a companion application, Serial No. 70,694, file January 6, 1916.

In the arrangement of the driving mechanism it is necessary to maintain a timed relation between the operation of the latch 46 and the rotation of the impression cylinder 17. This is brought about by drivng both gear wheel 50 and the gear wheel 63 upon the cylinder 17 from the same driving shaft 64 and through intermeshing trains of gear wheels. In the one case the train includes the driving pinion 65 meshing with gear wheel 66 mounted on shaft 67, and the pinion 68 mounted on shaft 67 and meshing with gear wheel 50, and in the other case, the train includes driving pinion 65 meshing with gear wheel 69 upon a shaft 70 and wheel 69 in turn meshing with the gear wheel 63 of the cylinder 17. The diameters of these pinions and gear wheels are so proportioned that one revolution of the gear wheel 50 will occur for each two revolutions of the impression cylinder. Or, expressed somewhat differently, there is one revolution of the gear wheel 50 for each impression.

From the above description it will be seen that I am enabled to obtain a full throw of the eccentrics for all adjustments of the impression cylinder from the impression plane. In other words, for every adjustment of the cylinder the eccentrics reach the lower limit of their throw at the time the cylinder reaches its impression plane. The lowermost limit of the throw of the eccentrics is the position they occupy when the impression cylinder is tangent to the impression plane. In this way I provide a much more rigid construction than would be the case

if there was not this relation. With the construction shown, when in their lowermost position, the eccentrics will hold the cylinder down in its impression position, that is, tangent to the impression plane, even though the connecting rods 41 be removed, thus showing that in the impression position there is great rigidity and no strain upon the bars 41 which would tend to cause the eccentrics to work back on the impression. When the cylinder is being set to the type form, the cylinder is positioned with the eccentrics occupying their lowermost position and then the parts are drawn together by means of the wedges 32. This feature of a full throw for the eccentrics for all adjustments of the cylinder is an important part of my invention as it provides great rigidity in the parts at the instant of making the impression.

In carrying out my invention it will be obvious that certain minor changes may be made in the structure herein disclosed without departing from the spirit and scope of my invention. I therefore do not wish to be limited to the exact structure and details of the present disclosure but aim to cover all alterations and modifications coming within the scope of my invention by the terms of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A printing press impression mechanism comprising an impression cylinder, journal boxes for said cylinder, a support for one of said boxes having a substantially horizontal ledge, an extension of said support having a coöperating substantially horizontal ledge, a wedge between said ledges for determining the vertical adjustment of said extension relative to said support, an eccentric acting between said extension and the associated journal box, and means for actuating said eccentric to raise and lower the associated journal box.

2. A printing press impression mechanism comprising an impression cylinder, journal boxes for said cylinder, a support for one of said boxes having a substantially horizontal ledge, an extension of said support having a coöperating substantially horizontal ledge, a wedge between said ledges for determining the vertical adjustment of said extension relative to said support, a screw passing through a portion of said support and into the end of said wedge and operative to move said wedge longitudinally, an eccentric acting between said extension and the associated journal box, and means for actuating said eccentric to raise and lower the associated journal box.

3. A printing press impression mechanism comprising an impression cylinder, journal boxes for said cylinder, a support for one of said boxes having a substantially horizontal ledge, an extension of said support having a coöperating substantially horizontal ledge, a wedge between said ledges for determining the vertical adjustment of said extension relative to said support, a screw passing through a portion of said support and into the end of said wedge and operative to move said wedge longitudinally, cap screws passing through said support and extension to clamp the latter in adjusted position when once adjusted by said wedge, an eccentric acting between said extension and the associated journal box, and means for actuating said eccentric to raise and lower the associated journal box.

4. A printing press impression mechanism comprising an impression cylinder, journal boxes for said cylinder, a support for one of said boxes having a substantially horizontal ledge, an extension of said support having a coöperating substantially horizontal ledge positioned beneath the ledge of said support, a wedge between said ledges for determining the vertical adjustment of said extension relative to said support, means acting against the under side of said extension and between it and said support to force the ledge on said extension against said wedge, means for adjusting said wedge, means for clamping said extension in adjusted position, an eccentric acting between said extension and the associated journal box, and means for actuating said eccentric to raise and lower said associated journal box.

5. A printing press impression mechanism comprising an impression cylinder, journal boxes for said cylinder, a main frame, a support extending upward from said frame toward one of said boxes, an extension on said support extending upward from a portion of said support into engagement with portions of the underside of the associated box, an eccentric located below the axis of said cylinder and acting between said extension and portions of the under side of said associated box, and means acting between said support and extension for adjusting said extension and box as a unit relative to said support.

6. A printing press impression mechanism comprising an impression cylinder, journal boxes for said cylinder, a main frame, a support extending upward from said frame toward one of said boxes, an extension on said support extending upward from a portion of said support into engagement with portions of the under side of the associated box, an eccentric located below the axis of said cylinder and acting between said extension and portions of the under side of said associated box, and a wedge acting between said support and extension to determine the adjustment of said eccentric and associated parts.

7. A printing press impression mechanism comprising an impression cylinder, journal boxes for said cylinder having an inner and outer downward projection, an eccentric journaled in said projections, the outer projection having a large opening to allow for passing the eccentric through it into final position, a bushing in said large opening to fit the corresponding journal of said eccentric, a supporting eccentric plate lying between said projections and having an opening to receive said eccentric, and eccentric boxes in said latter opening to fit the corresponding part of said eccentric.

In testimony whereof I have hereunto subscribed my name this 4 day of January, 1916.

CYRUS A. McCAIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."