E. J. F. REA.

FORM ROLLER MECHANISM FOR PRINTING PRESSES.

APPLICATION FILED FEB. 17, 1913.

1,084,296.

Patented Jan. 13, 1914.

5 SHEETS—SHEET 1.

Fig. 1.

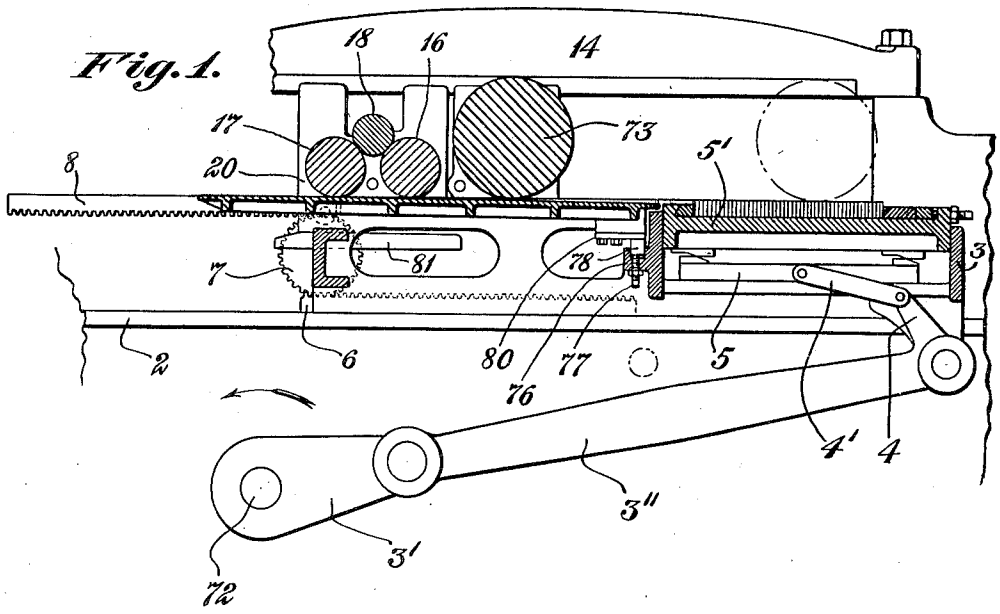


Fig. 2.

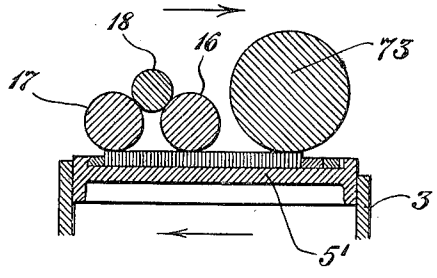
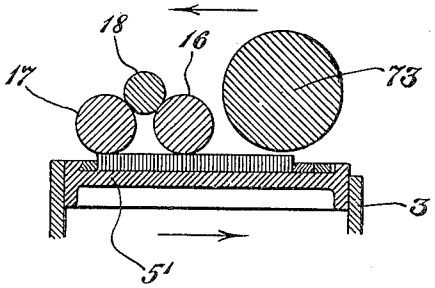


Fig. 3.



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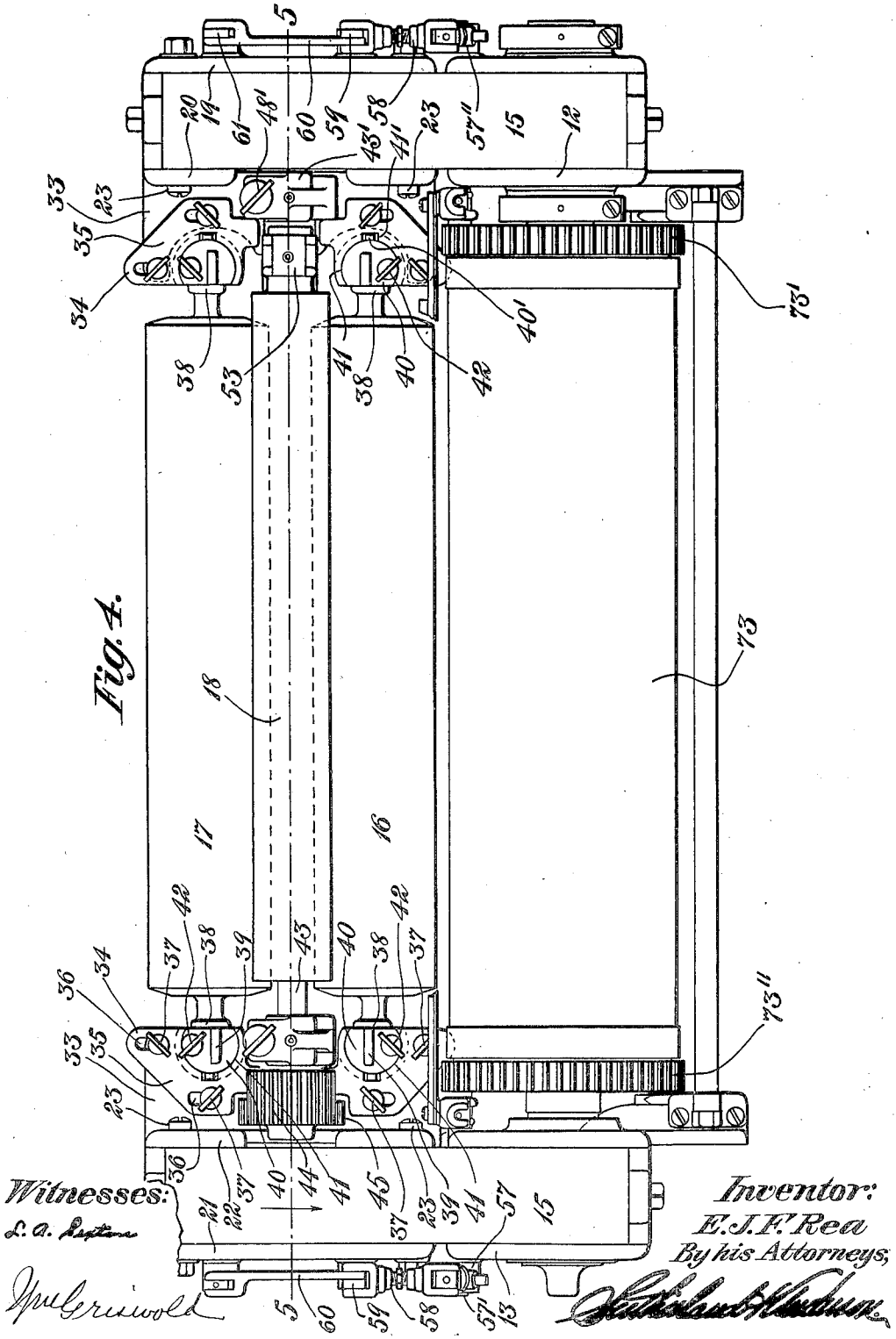


Fig. 4.

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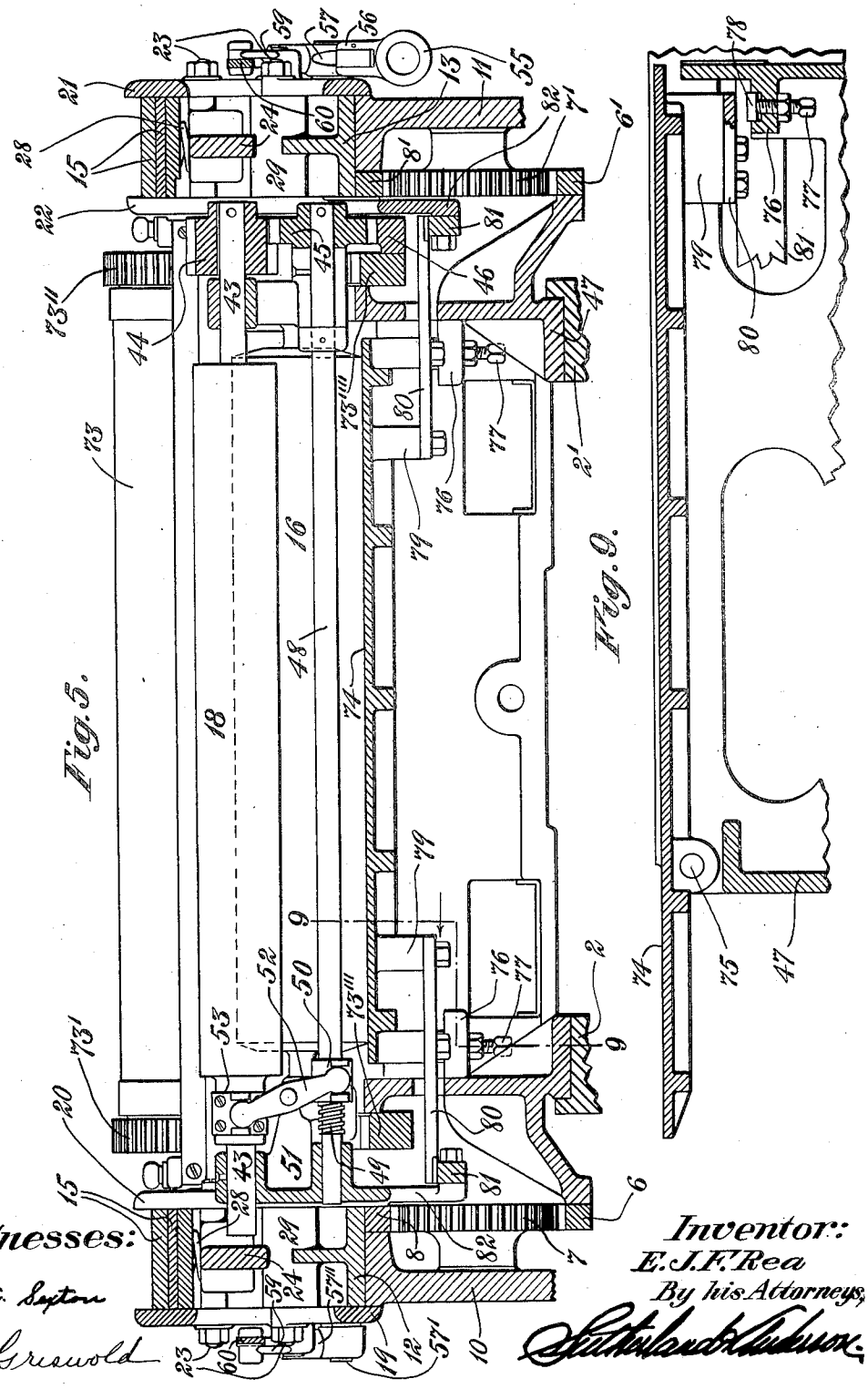


Fig. 5.

Fig. 6.

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FORM ROLLER MECHANISM FOR PRINTING PRESSES.

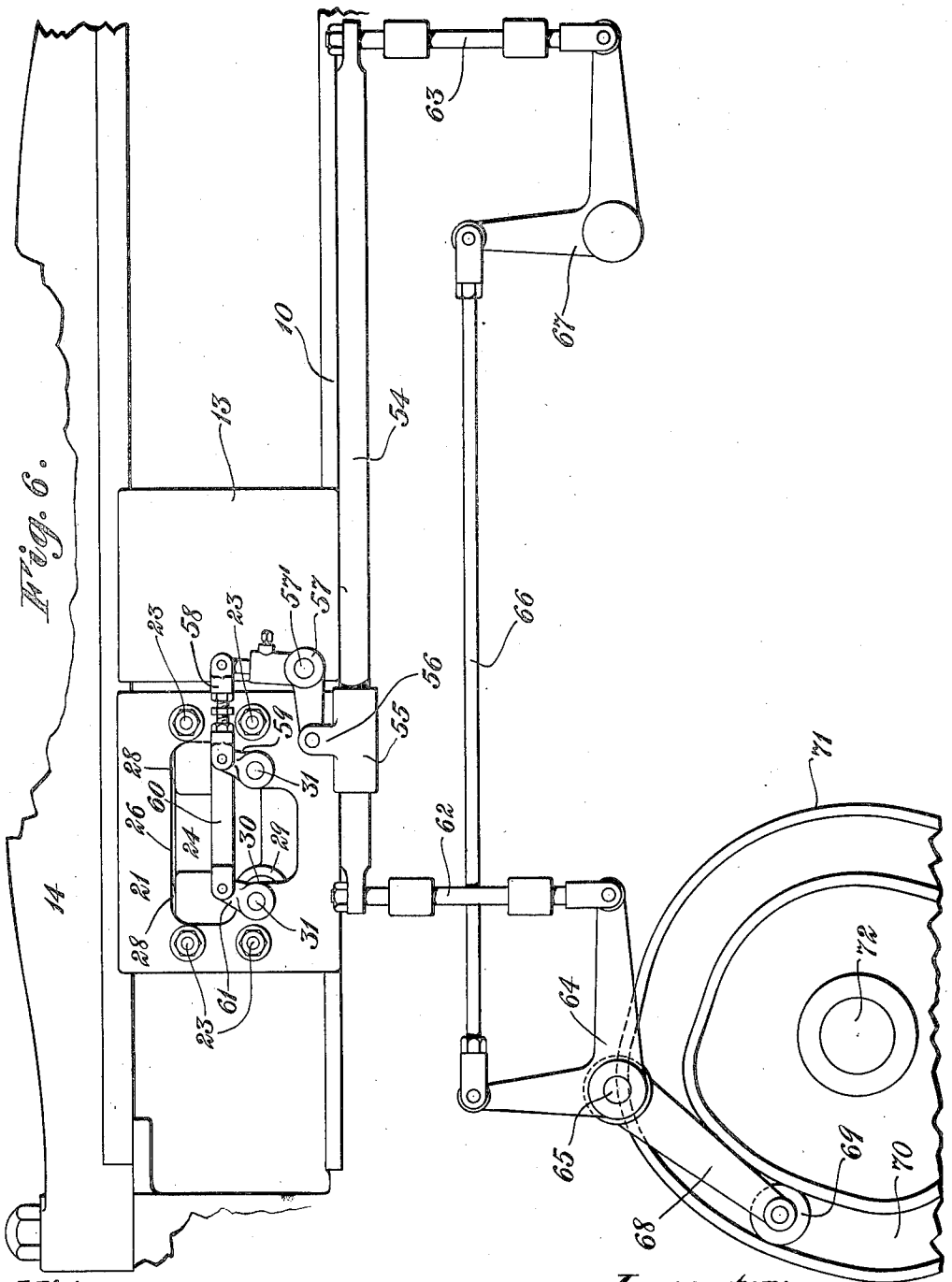
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5 SHEETS—SHEET 4.

Fig. 6.



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FORM ROLLER MECHANISM FOR PRINTING PRESSES.

APPLICATION FILED FEB. 17, 1913.

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5 SHEETS—SHEET 5.

Fig. 7.

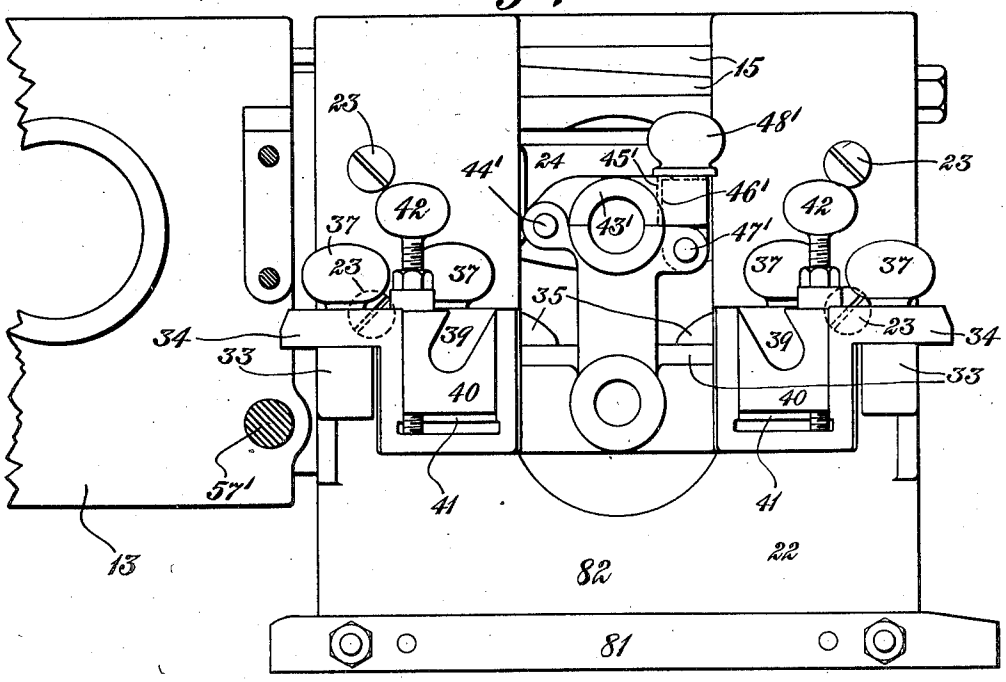
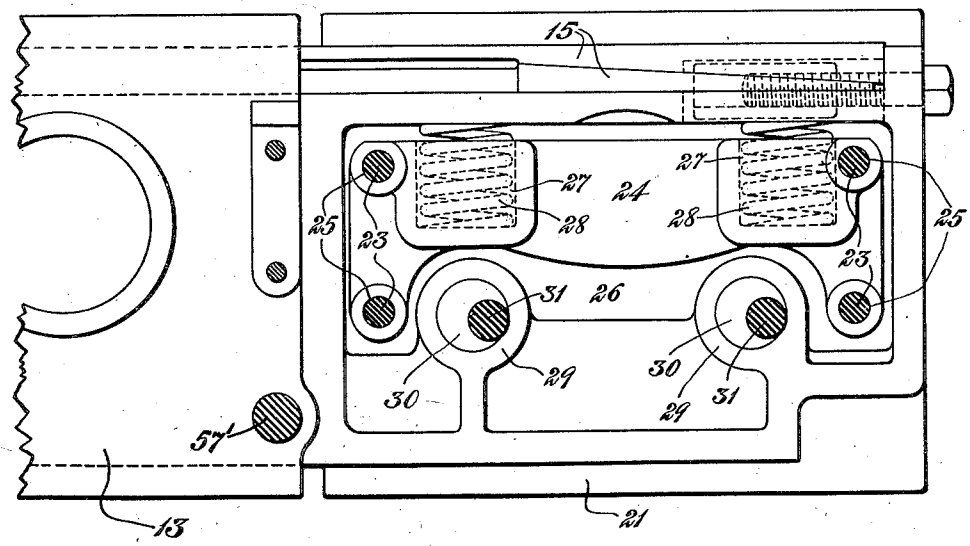


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWARD J. F. REA, OF CRANFORD, NEW JERSEY, ASSIGNOR TO AMERICAN AUTOMATIC PRESS COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

FORM-ROLLER MECHANISM FOR PRINTING-PRESSES.

1,084,296. Specification of Letters Patent. Patented Jan. 13, 1914.

Application filed February 17, 1913. Serial No. 748,919.

To all whom it may concern:

Be it known that I, EDWARD J. F. REA, a citizen of the United States, residing at Cranford, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Form-Roller Mechanism for Printing-Presses, of which the following is a specification.

This invention relates to form-roller mechanism for printing presses, one of the objects of the invention being to provide means by which the form can be automatically shifted to different positions and inked while occupying both of such positions.

The machine comprises other features of novelty and advantage which with the foregoing will be stated at length in the following description wherein I will set forth in detail that one of the several forms of embodiment of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification.

Referring to said drawings: Figure 1 is a longitudinal sectional view of the cylinder, form, form-bed, and form rollers and certain mechanisms associated therewith. Figs. 2 and 3 are diagrammatical views showing relative positions of cylinder, form rollers and form. Fig. 4 is a top plan view of form-roller mechanism involving my invention. Fig. 5 is a transverse section on the line 5—5 of Fig. 4 looking in the direction of the arrow. Fig. 6 is a side elevation of parts shown in Figs. 4 and 5, and it illustrates means for effecting the raising and lowering of the form rollers. Figs. 7 and 8 are inside face views of carriers hereinafter described. Fig. 9 is a sectional view on the line 9—9 of Fig. 5.

Like characters refer to like parts throughout the several figures.

While I do not limit myself to the embodiment of the invention or any one or more of the several features thereof, in a press of any particular type, the same are of particular utility when incorporated in a press comprising a traveling or reciprocatory bed and a traveling or reciprocatory and rotary cylinder. As is understood a press of this nature has a form-carrier, and this form-carrier by means of suitable mechanism, is raised and lowered with respect to the bed during the motion thereof. The form roller or rollers, as will be understood, inks the form, and mechanism is provided for raising and lowering the form rollers to the same extent that the form is raised and lowered, said form roller or rollers in addition to being rotary also having a reciprocatory movement or one bodily, and owing to this condition the form can be inked, while traveling at both levels and in both directions. It will be clear, therefore, that one of the primary purposes I have in view is means for elevating a form roller or rollers, a plurality of such rollers generally being provided. While I have shown certain mechanism for raising and lowering the form or type, other means might be employed to accomplish the same result, for instance the type might rise or lower with the bed instead of relatively thereto. In Letters Patent No. 843,535 granted February 5, 1907 to James W. Hoag is shown a press having a reciprocatory bed and a bodily-movable rotative cylinder.

The framework of the press includes in its make-up two sets of ways, there being supported for sliding movement by one set 2 and 2′ (see Fig. 5) the form-bed 3 while the other ways support for sliding movement certain carriers hereinafter described. There is shown for reciprocating the form-bed 3, a crank arm 3′ preferably on the main or power shaft of the press, said crank arm being connected with the form-bed by a pitman as 3″. Extending from the end of the pitman which is pivoted to the form bed is a short arm 4 connected by a link 4′ with a wedge plate 5 mounted for sliding movement in ways of the form bed, the wedges carried by said plate being adapted to engage similar wedges on the under side of the form or form carrier 5′. As the form-bed is moved back and forth by the pitman 3″ the latter will oscillate slightly about the pivot connecting it to the reciprocatory form-bed and this oscillation is imparted from arm 4 through link 4′ to the wedge plate 5, so that the wedges thereon will alternately raise and lower the form 5′; that is, at one end of the stroke of the form-bed the form is raised and at the opposite end it is lowered, and inasmuch as sufficient movement of the wedge plate to accomplish either raising or lowering of the form is imparted through the parts described while the wrist-pin of crank arm 3′ is passing from a short distance one side of the dead center to a

short distance the other side thereof, it will be obvious that the form is elevated practically throughout the extent of travel of the form-bed in one direction and similarly lowered during its travel in the opposite direction. On movement of the form-bed to the left (as seen in Fig. 1) the form will initially be raised and then held in its upper or printing position until just as its direction of movement is changed when it will be lowered into inking position and out of the path of the impression cylinder. Secured to the side of an extension of the form bed 3 are racks as 6 and 6′ meshing respectively with gears 7 and 7′ mounted on opposite inner faces of the side framing of the machine. Also in mesh with these gears 6 and 6′ are respectively the racks 8 and 8′ secured to the carriers which support the cylinder and form rollers and which carriers will hereinafter be described in detail. Denoted by 10 and 11 are the duplicate side rails or ways forming one of the two sets of ways before referred to in a general way, the other set having been just described as forming a support for the form-bed.

Numerals 12 and 13 designate the substantially similar carriers supported by the ways 10 and 11. In the present instance these carriers 12 and 13 move in a straight path, although they support other parts as will hereinafter appear for vertical movement, and these other parts support the form roller or rollers. Above the carriers or main bearings 12 and 13 are mounted cap or arch members 14 fastened at their ends to the framework of the machine and between which and the respective carriers, wear plates as 15 are disposed, the spaces between these cap or arch members 14 and the respective rails 10 and 11 constituting as will be understood guide ways or slots to receive the two carriers.

By noting the rack and gear connections between the form-bed 3 and the carriers 12 and 13 (comprising the racks 6 and 6′, gears 7 and 7′ and racks 8 and 8′) it will be apparent that when the form bed is moved in one direction the carriers supporting the cylinder and form rollers will move in the opposite direction, this being due to the fact that the gears 7 and 7′ are fixed with respect to both rack supporting members. This relative direction of movement is indicated by arrows in the diagrammatical Figs. 2 and 3 which also illustrate the relative planes of reciprocation of the several coacting parts.

In the construction shown there are two form-rollers denoted by 16 and 17 respectively, although this is not always essential, and in addition to these form rollers there is what is known as a "vibrator." In the construction shown the vibrator consists of a roller 18, the two form rollers 16 and 17 and the vibrator or roller 18 being disposed in substantially triangular order, the axes of the form rollers being in parallelism, while the periphery of the vibrator is contiguous to those of the two form-rollers. This roller 18 as will hereinafter appear is given a vibratory motion in the direction of its axis of rotation and in parallelism with the axis of rotation of the two form rollers its office being to distribute or evenly spread the ink upon the two form rollers.

At opposite sides of the two carriers 12 and 13 are plates 19, 20, 21 and 22, the plates 19 and 20 coöperating with the carrier 12, while the plates 21 and 22 coöperates with the carrier 13. The two pairs of plates are rigidly connected with each other, and for this purpose bolts as 23 may be provided, said bolts tying firmly together the respective plates of the pairs. Between each pair of plates is a separating or spacing block 24 and each block has perforations 25 to receive the tie-bolts 23 already referred to, there being in the construction shown four bolts in each case. Each pair of plates with the spacing or separating blocks therebetween and rigidly connected therewith, constitutes an auxiliary carrier, capable of vertical movement with respect to the main carrier associated therewith, each main carrier (12 and 13) having an opening or slot 26 of rather large size to accommodate and receive the separating or spacing block 24. In the upper sides of the respective blocks 24 are counterbores or pockets 27 to receive the coiled springs 28, the lower ends of which bear against the bottoms of the respective pockets 27 and the upper ends of which bear against the top walls of the respective slots 26 thereby in the present case to constantly force said blocks downward. The purpose of these springs is to take up backlash. Each of the carriers 12 and 13 is provided within its slot, with bearings 29 to receive for rocking motion, shafts 30 provided with eccentric pins or studs 31 to fit holes or seats on the respective plates 19, 20, 21 and 22. It will, therefore, be clear that when the shafts 30 are oscillated or rocked, the eccentric or wrist pins 31 will be carried through arcs to thereby raise and lower the blocks 24 and necessarily the plates connected with said blocks. I might state at this point and as will hereinafter appear that the form rollers 16 and 17 are connected with the plates 19, 20, 21 and 22, and it will, therefore, be clear that as said plates are raised and lowered, the form rollers partake of such motions. The same statement of course applies to the vibrator 18.

The inner plates 20 and 22 are shown having flanges or ledges 33 and each flange supports a pair of brackets 34, the brackets 34 having flanges 35 overlying the flanges 33. The brackets 34, it should be stated, are

arranged in pairs, those of each pair being adjustable toward and from each other by reason of which the form rollers 16 and 17 can be correspondingly adjusted, the primary purpose of this being to compensate for shrinkage in said form rollers. The flanges 35 are shown having elongated slots 36 and through the same are extended thumb-screws 37 tapped into the supporting flanges 33. By loosening the thumb screws 37 of the brackets they can be adjusted to bring the rollers carried thereby into proper contact with the vibrator 18. In some cases it may, as a matter of fact, be necessary simply to adjust one bracket and there may be other cases where it will be necessary to adjust them all. In any event I provide a simple way of adjusting the form rollers toward and from the vibrator 18. In addition to this particular adjustment I provide a second adjustment which is primarily intended to bring the axes of the rollers in alinement, and to also position them to make proper contact with the form or type, and this I secure by a vertical adjustment of the form rollers as will now appear.

The form rollers 16 and 17 have journal portions 38 fitting slots 39 in the bearings 40 which bearings as shown are cylindrical to fit cylindrical openings 41 in the bodies of the brackets 34. The cylindrical bearings 40 are somewhat loosely fitted in the openings 41 so that when the form-rollers are put in place, said bearings will be free to turn and therefore automatically aline with the form roller journals. Were no means provided to prevent unlimited turning of these bearings (they would be liable,) (when the form rollers are removed from the press,) to work loose and foul moving parts of the machine. This liability, however, is overcome by slotting the walls of the openings 41 as at 41′ to receive pins 40′ inserted in the bearings 40, enough play being provided between the slots and pins to allow proper alining of the bearings with journals of the form-rollers when the latter are put in place. Tapped into said bearings 40 are adjusting screws 42, the lower ends of which bear against the bottoms of the openings 41. By turning these adjusting screws in or out the bearings 40 can be vertically adjusted to thus level the form-rollers or to insure them being brought into proper contact with the printing surface of the type. The vibrator 18 has journals 43 to slidingly fit bearings in the two inner plates 20 and 22, by reason of which said vibrator can be readily reciprocated in the direction of its axis of rotation. The vibrator as will hereinafter appear is positively driven, and owing to its surface contact with the two form-rollers 16 and 17 frictionally rotates said form-rollers. Fastened to one of the journals 43, (the one on the right in Fig. 5) is a pinion 44 and in mesh with said pinion is a spur gear 45 which in turn meshes with a rack 46 fastened to the reciprocatory bed 47. It will, however, be clear that as the bed 47 moves back and forth, it will carry therewith the rack 46, said rack serving to rotate the spur gear 45 and therefore the pinion 44.

The spur gear 45 to which I have already referred is fastened to the shaft 48 supported for rotation by bearings upon the plates 20 and 22. This shaft 48 near one end is provided with a threaded portion 49 to receive the nut 50 which as will be clear is moved alternately in opposite directions by the threaded portion 49 as the shaft 48 is oppositely rotated, it being clear that when the bed 47 moves in one direction the shaft 48 through the described connections therewith will be turned one way, while on the opposite movement of said bed through said connections, said shaft 48 will be turned in the opposite direction. The nut 50 constitutes in the present case a convenient means for reciprocating the vibrator or endwise reciprocative roller 18. To a bracket or bearing as 51 extending inwardly from the plate 20 is pivoted between its ends the rocker 52, the lower branch of said rocker being jointed to the feed nut 50, while the upper branch thereof is likewise connected with the block 53 non-rotatively fitted to one of the journals 43 of the vibrator 18. It will, therefore, be clear that as the feed nut 50 is moved back and forth on opposite rotary movements of the shaft 48 as already described, the rocker 52 will be swung or oscillated so as to reciprocate the vibrator or roller. It is desirable that the vibrator roller be so mounted as to be readily removable and for this reason the bearings for the journals 43 are provided with caps as 43′ pivoted as at 44′ and notched in the side opposite said pivot as at 45′ to receive a swinging bolt as 46′ which is pivoted at 47′ and fitted with a clamping thumb screw 48′. From this it will be obvious that removal of the vibrator roller and replacement thereof are simple operations.

There is shown as mounted at one side of the press the rod 54 which as will hereinafter appear is given upward and downward movements in alternation, and these movements are transferred to the auxiliary carrier to which I have already referred and to which the form rollers 16 and 17 and vibrator 18 are connected, the consequence being that these two rollers and vibrator are moved upward and downward. The rod or bar is practically a floating element, and there is shown fastened to it the sleeve or tube 55 having a lug or ear 56 to which one arm of an angle lever 57 is jointed, said angle lever being secured at its elbow to a shaft 57′ supported for rocking movement by the main

carriers 12 and 13. The upper branch of said angle lever 57 is connected to the link 58 consisting as shown of several relatively adjustable sections. This link 58 is shown pivoted to a crank arm 59 which is connected by a link 60 to a companion crank arm 61, said crank arms being fastened to two of the outer eccentric or wrist pins 31. A duplication of this link mechanism interposed between lever 57 and the wrist pins 31 is provided at the opposite side of the press and is connected by an arm 57″ with shaft 57′ so that its action will be identical and in unison with that of the link mechanism already described. It will, therefore, be apparent that as the rod or bar is raised and lowered, the crank arms 59 and 61 are swung back and forth thereby correspondingly operating the wrist pins 31 connected therewith and rocking the shafts 30 so that the plates 19, 20, 21 and 22 are raised and lowered, these actions occurring at the proper points in the travel of the carriers 12 and 13. There are shown connected to the opposite ends of the rod 54, the pendent rods 62 and 63. The lower end of the rod 62 is shown as pivoted to one branch of the angle lever 64 fastened at its elbow to the rockshaft 65 on the framework of the machine, one end of the link 66 being jointed to the other branch of the angle lever 64. The opposite end of said link 66 is pivoted to one arm of an angle lever 67 fulcrumed at its elbow to the framing of the machine, the rod 63 being jointed to the other arm of said angle lever 67, by reason of which connection the two angle levers 64 and 67 can be operated in unison. There is also shown fastened to the shaft 65 an arm 68 having a stud 69 shown as an anti-friction roller, adapted to enter the cam race 70 of the cam 71 on the shaft 72, power to rotate which can be applied thereto in any desirable manner. The cam race 70 is so formed that the arm 68 is given substantially two complete swings on each complete rotation of the cam 71, the consequence being that the form rollers 16 and 17 and vibrator 18 are raised and then lowered to maintain proper relation between the form rollers and coacting surfaces, at different points in the travel of the reciprocatory bed 47. The carriers 12 and 13 also support the cylinder 73 being equipped with suitable bearings for this purpose. At its ends said cylinder is provided with gears designated by 73′ and 73″ which mesh respectively with racks 73‴ and 73⁗ secured on opposite sides of the form-bed 47. This construction insures the positive movement and necessary correspondence of speed of the print surface and surface to be printed.

It will be understood that in a printing press it is generally the custom to apply the ink from an ink roller or something of an equivalent nature to what is known as a table and which ordinarily consists of a plate 74, and that the ink form rollers take the ink from this plate. The table or plate 74 in the present case is movably mounted, being pivoted as at 75 near its outer end to the traveling bed 47. The forward portion of the table or plate (which is to the right and in its raised position as seen in Fig. 9) is adapted to be elevated and lowered to thus conform with the movements of the form rollers 16 and 17 and the vibrator 18 and thereby insure the proper application of the ink to said form roller. Furthermore it is of course, essential that contact of the cylinder with plate 74 be prevented during that part of the reciprocatory movement of the cylinder which brings it over said inking plate. When the plate 74 is in its lower position, it rests upon suitable stop means on the traveling bed 47, as will now appear. On the inner side of the traveling bed 47, are two lugs 76 and extending through perforations in the same are screws 77 engaging blocks 78 upon which the forward portion of the plate 74 is adapted to rest when in its lower position. By the operation of the screws 77 the vertical position of the stop members 78 can be adjusted. Pendent from the forward portion of the table 74 are two lugs 79 to which are attached plates as 80, extending outwardly therefrom and operable by lifting devices or shelves as 81 on the lower ends of the arms 82 depending from the inner plates 20 and 22, the construction being such that on the movement of the carriers 12 and 13 to the right as seen in Fig. 1 to such an extent as to carry the cylinder from over the inking plate 74 and just after the form rollers 16 and 17 have crossed the inner or pivoted end of the table or plate 74 the lifting devices or shelves 81 pass under the plates 80, so that when the carriers 12 and 13 are elevated as already described the table or plate will be lifted to maintain said table in contact with the form rollers 16 and 17.

What I claim is:

1. The combination of a reciprocatory bed and a form carrier thereon, means for raising and lowering the form carrier at different points in the travel of the bed, a reciprocatory form roller, and means for raising and lowering the form roller to cause the same to traverse the form when the latter is in its upper and lower positions.

2. The combination of a reciprocatory bed and a form carrier thereon, means for raising and lowering the form carrier and thereby the form at different points in the travel of the bed, an ink table, a form roller to traverse the ink table, a cylinder in advance of the form roller, means for raising and lowering the form roller at different points in the travel of the bed to thereby cause the same to travel in contact with the form

when the latter is in its upper and lower positions, and means for raising and lowering the ink table to cause the same to clear the cylinder.

3. The combination of a reciprocatory bed and a form carrier thereon, means for raising and lowering the form carrier and thereby the form at different points in the travel of the bed, an ink table, a form roller to traverse the ink table, a carrier for said form roller, a cylinder in advance of the form roller, means for raising and lowering the form roller at different points in the travel of the bed to thereby cause the same to travel in contact with the form when the latter is in its upper and lower positions, and means connected with the form roller carrier, for raising and lowering said ink table to thereby clear the cylinder.

4. The combination of a reciprocatory bed and a form carrier thereon, means for raising and lowering the form carrier and thereby the form at different points in the travel of the bed, a plurality of form rollers, a reciprocatory form roller carrier, means for raising and lowering said form roller carrier to thereby cause the form rollers to travel across the form when the latter is in its upper and lower positions, an ink table across which the form rollers run, a traveling cylinder in advance of the form rollers, and means connected with said form roller carrier for raising and lowering said ink table to clear said cylinder.

5. The combination of a reciprocatory bed, a reciprocatory rotary cylinder cooperative with said bed, a form on one of said parts, means for automatically causing the movement of the form transversely of the line of reciprocation of the bed and the cylinder at different points, and means for applying ink to the form when the same is in its different transverse positions.

6. The combination of a reciprocatory bed, a form carrier on said bed, means for automatically raising and lowering the form carrier at different points in the travel of the bed, a form roller mounted for traveling movement, a rail extending in the direction of traveling movement of said form roller, a device movable upon said rail, means for automatically raising and lowering said rail, and means connected with said movable device for raising and lowering the form roller upon corresponding movements of the rail.

7. The combination of a reciprocatory bed, a reciprocatory rotary cylinder cooperative with said bed, a form carrier on the bed, means for automatically raising and lowering the form carrier on the bed at different points in the travel of the bed, a reciprocatory rotary form roller, a rail extending in the direction of traveling movement of the form roller, means for automatically raising and lowering the rail at different points in the travel of the bed, and a device slidable on the rail and provided with means for moving the form roller up and down on corresponding movements of the rail.

8. The combination of a reciprocatory bed, a reciprocatory rotary cylinder cooperative with said bed, a form carrier on the bed, means for automatically raising and lowering the form carrier at different points in the travel of the bed, a reciprocatory rotary form roller, a device to travel with said form roller, and means for raising and lowering said device, the latter having means for raising and lowering the form roller on corresponding movements of said device.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD J. F. REA.

Witnesses:
CLAY PETERS,
WILLIAM MATTHEWS.