

(No Model.)

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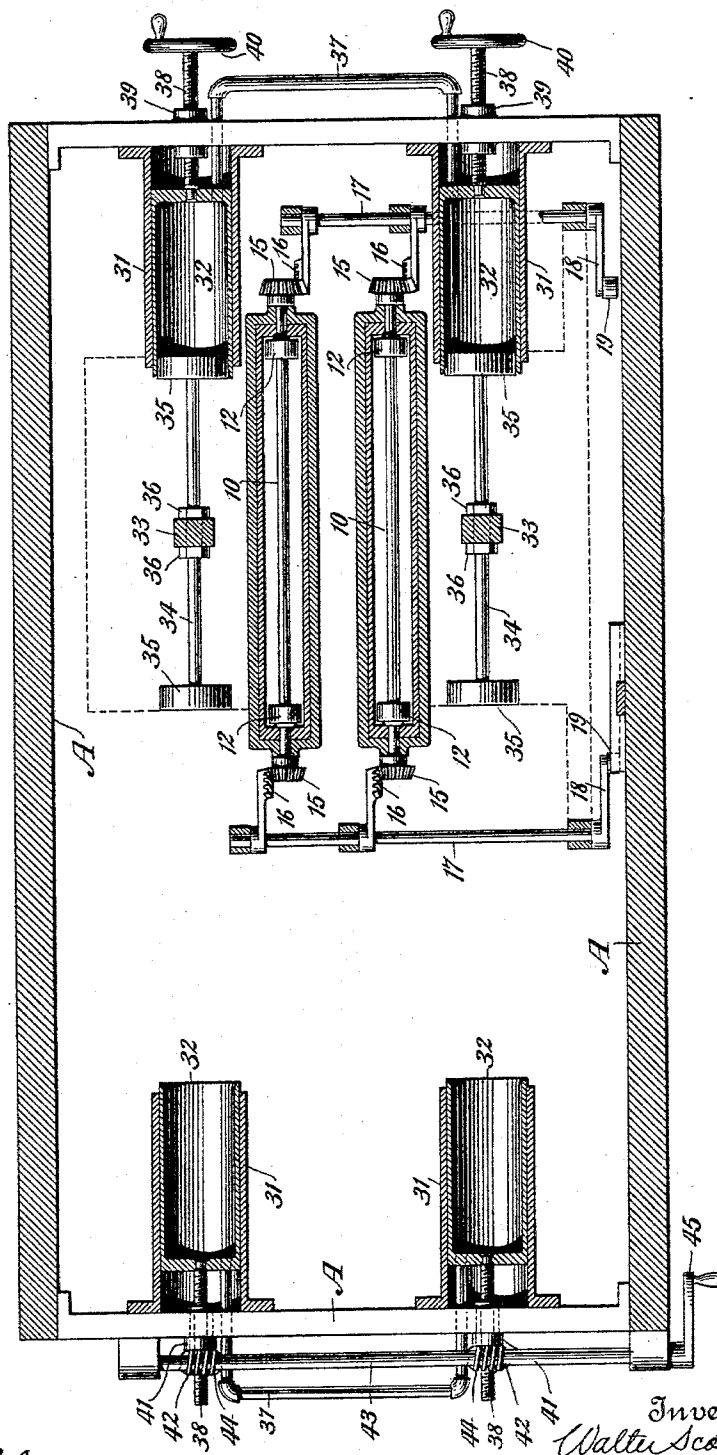
W. SCOTT.

BED MOTION FOR CYLINDER PRINTING MACHINES.

No. 583,948.

Patented June 8, 1897.

Fig. 1,



Witnesses

C. E. Ashley
W. W. Lloyd

By his Attorneys

Wilcox, Rankley & Proctor

Inventor
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(No Model.)

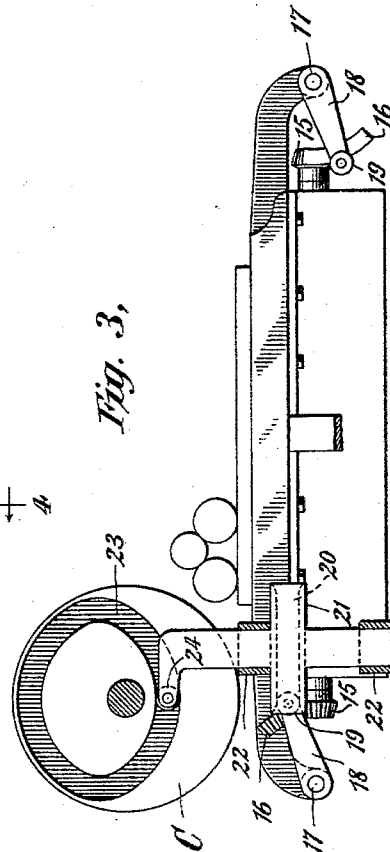
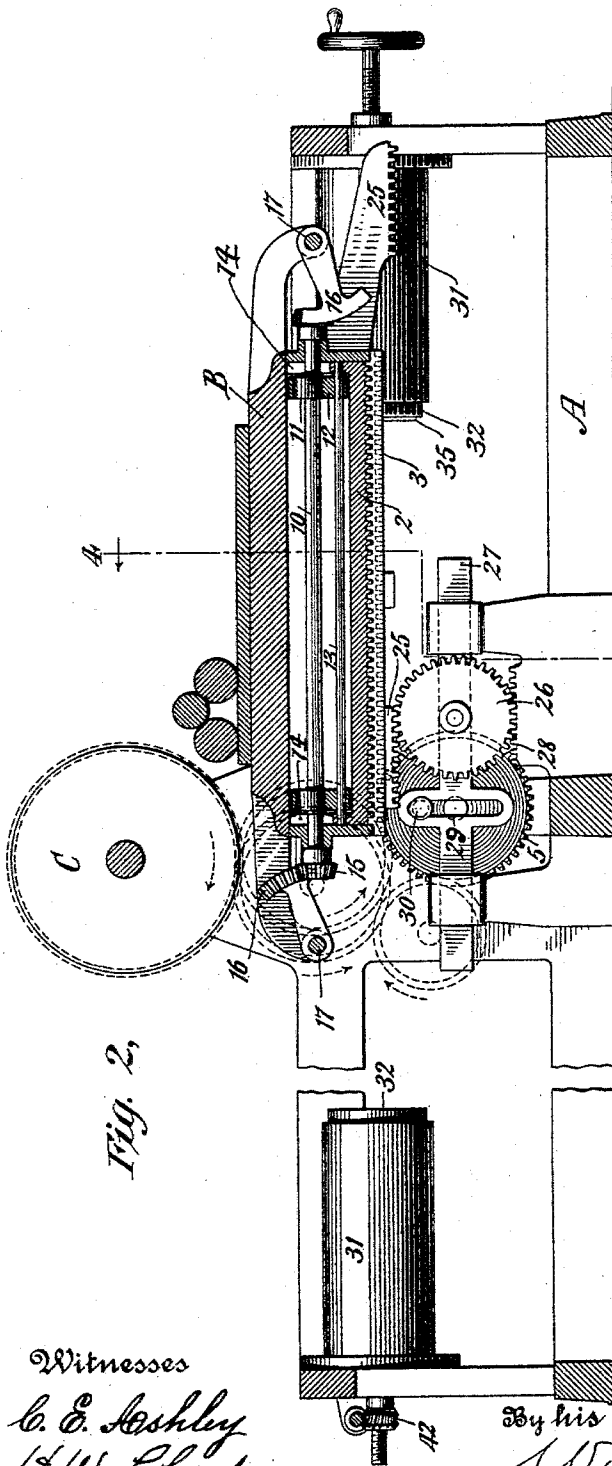
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Fig. 4,

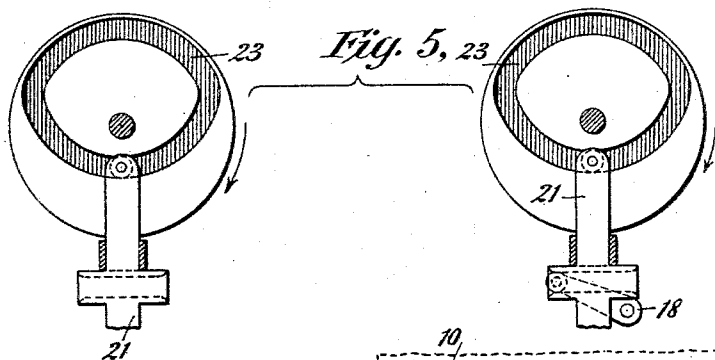
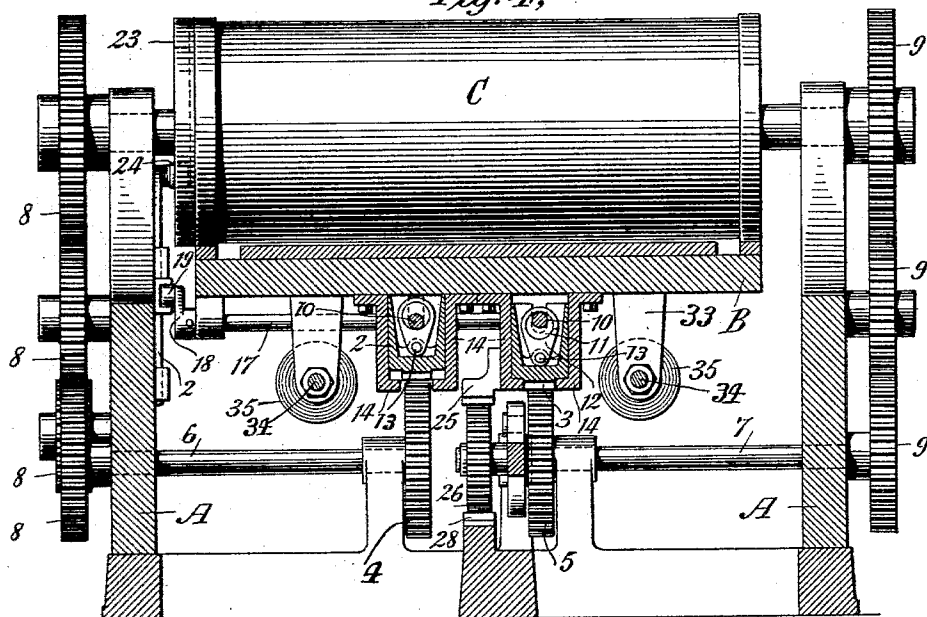
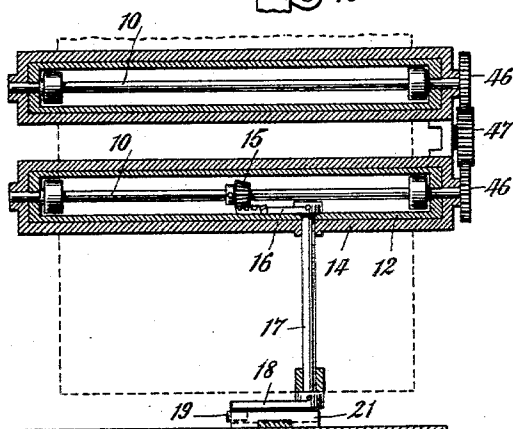


Fig. 6.



Witnesses

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4 Sheets—Sheet 4.

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Fig. 7,

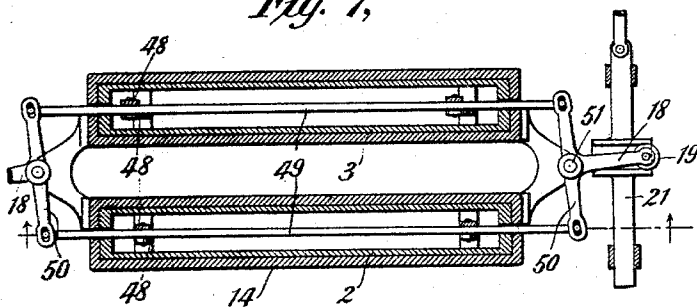


Fig. 8,

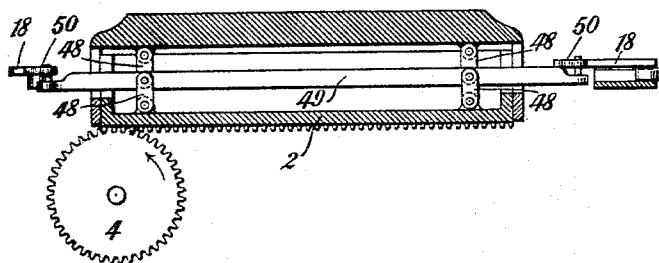


Fig. 11,

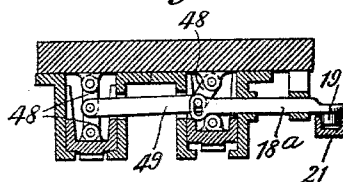


Fig. 9,

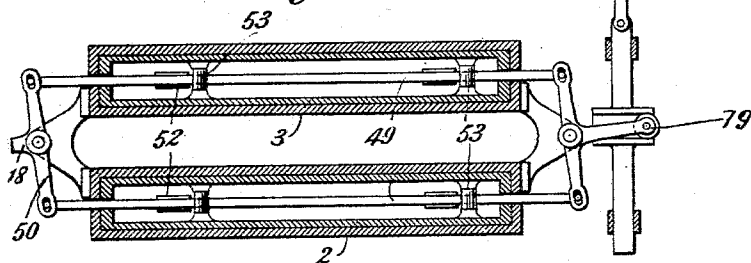


Fig. 10.

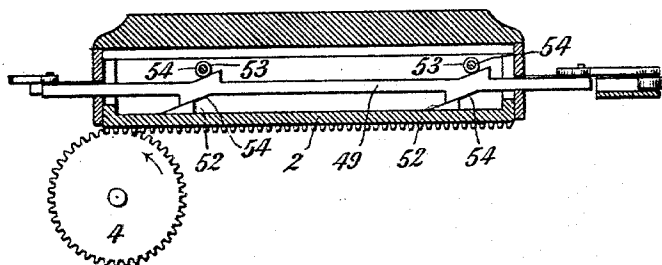
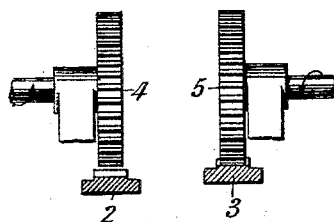


Fig. 12.



Witnesses

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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

BED-MOTION FOR CYLINDER PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 583,948, dated June 8, 1897.

Application filed May 8, 1894. Serial No. 510,554. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Bed-Motions for Cylinder Printing-Machines, of which the following is a specification.

This invention relates, primarily, to means for giving a reciprocating motion to the beds of cylinder printing-machines, but it is equally applicable in other classes of machinery wherein there is employed a reciprocating member, as planers, &c. There are several classes of such printing-machines, the invention being applicable to all of them. One of these classes includes cylinders which revolve continuously, being lifted during the return or non-printing stroke of the bed or having a depressed part which is opposite the bed during such stroke. A second class of these machines includes a cylinder which is at rest during the return stroke of the bed, but which moves in unison with the bed during the forward or printing stroke thereof, and which is either lifted during such return stroke or has a flat or depressed portion to come opposite the same during the return stroke. In another class there is an oscillating impression-cylinder commonly driven by a rack on the bed, which takes impressions in several ways, as during one stroke only of the bed, being lifted during the other stroke, or it may take impressions during both strokes. There is another class of such machines wherein a number of impression-cylinders coact with one bed in a variety of ways, but as these are well known to makers and users of this class of machines it is not necessary to here specify them. The aim of the maker in all these cases is to obtain and maintain an exact quality of speed of the printing and impression surfaces during the printing and a quick reversal of the motion of the bed with smoothness of motion of all parts. Such is the end of this invention.

In the practice of this invention there are employed two movable racks upon the bed, which are independent of each other, but which in practice are moved by the same mechanism, two rotating driver-gears, alternately acting (each with its own rack) to

move the bed throughout the greater extent of its motion in each direction, and suitable means for completing, stopping, and reversing the motion of the bed when it passes from the control of the driver-gears. It also includes an air-cylinder check for the bed, which check comprises a number of air-cylinders at each end of the frame or bed and air connections between the air-cylinders at each end, whereby any inequality of air-pressure in the cylinders at each end is avoided. The invention also includes other combinations of devices, as will hereinafter fully appear.

Forms of this invention are shown in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional plan view on planes passing through the air-cylinders and the boxes containing the racks, showing mechanism for operating the racks and adjusting the air-check. Fig. 2 is a sectional view showing the movable racks, driving mechanism for one of them, means for completing, reversing, and stopping the motion of the bed, and other parts. Fig. 3 is a side view just inside the inside frame in Fig. 4, showing arms and slot-bar for operating the rack-moving mechanism. Fig. 4 is a sectional end view in the direction of the arrows on the plane indicated in Fig. 2 by the line 4 4. Figs. 5 and 6 are side and plan views of a modification of the rack-operating mechanism. Figs. 7 and 8 are plan and side views of another modification of said mechanism. Figs. 9 and 10 are plan and side views of still another modification of said mechanism. Fig. 11 is a cross-section of another arrangement of the modification shown in Figs. 7 and 8. Fig. 12 is a view showing driver-gears and bed-racks below them.

Referring to Figs. 1, 2, 3, and 4, a suitable framework A supports the moving parts, consisting of the impression-cylinder C, the bed B, and the mechanism for operating the latter. The bed B is guided in any usual or common way upon the frame (not shown) and is provided with two racks 2 and 3, which are independently movable thereon to bring them into position for meshing with the driver-gears 4 and 5, which are respectively borne by the shafts 6 and 7, journaled in the

framework A. These drivers are operated in any suitable way, as by the train of gearing 8 9, connecting them together through the shaft of the cylinder C, the power being applied to the shaft of any of these gears, as desired. The gears 4 and 5 (shown in the drawings) rotate continuously in opposite directions, the driver-gear 4 coacting with the rack 2 during the motion of the bed in one direction to drive said bed throughout the greater extent of said motion, and the driver-gear 5 coacting with the rack 3 in like manner during the other stroke of the bed. The racks 2 and 3 are moved into and out of their positions for coaction with their respective driver-gears by means of the supporting-shafts 10, the eccentrics 11 thereon, and the strap-links 12 on the said eccentrics. These shafts 10 form points of support by which the racks are attached to the bed. These links are pivotally connected to or articulated with the said racks, as by the rods 13. The racks are guided in their up-and-down motion by means of suitable boxes or guides 14, which are fast to the bed B. The shafts 10 are given partial rotations to raise and lower the rack-bars by means of the gears 15 on said shafts and the rocking gear-segments 16 of the shafts 17, (journaled in arms projecting from the bed,) which are provided with arms or cranks 18 and antifriction-rollers 19. These antifriction-rollers 19 are alternately engaged and operated by the slot 20 of the bar 21 as the bed ends one stroke and begins the next. The bar 21 has an up-and-down motion in guides 22 on the frame A and is operated by means of the cam 23 on the cylinder C, with which an antifriction-roller 24 on the bar 21 engages. The racks 2 and 3 are of such length that they roll out of engagement with their respective driver-gears as the bed approaches the end of its motion, and it is between the time that one of said racks so rolls out of mesh and the time when the bed completes and stops its motion in one direction and begins its motion in the other direction that one rack is moved out of and the other into position for coaction with its driver-gear.

For the purpose of completing, stopping, and reversing the motion of the bed any known or suitable means may be employed. One such means is shown in the drawings and will now be described, said means consisting of the mutilated rack 25 on the bed with which the gear 26 meshes periodically to complete, stop, and reverse the motion of the bed. Said gear 26 is journaled upon the sliding bar 27 and rolls upon and meshes with the fixed rack 28 on the framework. The bar 27 is provided with a transverse slot 29, which is engaged and operated by the pin 30 upon the face of the gear-wheel 5 above named, by which means the said bar 27 and its gear 26 are given a reciprocating motion relatively to the framework of the machine. If desired, suitable bed-checking devices may also be

employed, such as springs or air-cylinders, the latter being shown in the drawings. In the construction shown the hollow cylinders 31, which guide and support the air-cylinders 32, are fixed to the framing A. Supported in arms 33 on the bed are the rods 34, which carry the pistons 35, the said rods being locked against endwise motion by means of screw-nuts 36 or other devices. The air-cylinders 32 at each end of the bed are connected together by suitable air-pipes or connections 37 for the purpose of avoiding any inequality of or equalizing the air-pressure in the air-cylinders at that end when the pistons 35 enter the same. The air-cylinders 32 are shown as being adjustable longitudinally of their guide-cylinders 31 by means of the screw-threaded rods 38, which at the right of Fig. 1 are swiveled to the air-cylinders 32 and pass through the fixed threaded bearing 39. At the right of Fig. 1 these screw-threaded rods 38 are shown as provided with hand wheels or levers 40 for turning them and moving the air-cylinders 32. At the left-hand end of Fig. 1 the threaded rods 38 are fast to the cylinders and engage the screw-threads of the sleeves 41, which are swiveled in the framework A and which have worm-gears 42 thereon. A transverse rod 43 is journaled in the framework A and is provided with worms 44, which engage the worm-gears 42 above named, the said shaft being provided with a suitable crank 45 for turning it. By turning the said crank 45 in either direction the air-cylinders 32 at that end of the machine are simultaneously and equally moved in or out, as the case may be, the air-pipe moving with them. This air-pipe (on the left hand of Fig. 1) may be rigid. At the right-hand end of Fig. 1 that part of the air-pipe which is outside the framing should be flexible in order to allow or to compensate for any inequality of motion of the air-cylinders 32.

The operation of the devices thus far described is as follows: When the parts are in the positions shown in Figs. 1, 2, 3, and 4, the bed B is moving to the right in Fig. 2, the rack 3 is about to roll out of mesh with its driver-gear 5, the rolling gear 26 has just rolled into mesh with one end of the rack 25, and the antifriction-roller 19, to the left in Figs. 1 and 3, is just entering the slot 20 of the bar 21; also, the pistons 35 (see Fig. 1) are just entering the corresponding air-cylinders 32. During the continued rotation of the driver-gear from the position shown in Fig. 2 with the pin 30 directly above the axis of said gear until the said pin 30 is below said axis the bed is under the control of the rolling gear 26, which, reciprocating upon the rack 28, moves the bed to the right, stops it, and reverses the motion thereof, while the cam 23 by its rotation pushes down the bar 21 and with it the antifriction-roller 19 in engagement therewith (which antifriction-roller during the motion of the bed to the right and back again to the posi-

tion shown in Fig. 2 moves from the position shown in Fig. 3 along the slot 20 to the other end thereof and back again and out) and so rocks its shaft 17 and moves the shafts 10 to push down rack 2 into its position for engagement with its gear 4 and to lift rack 3 out of its position where it can engage with its driver. The said rack 2 rolls into mesh with its driver 4, which now operates to drive the bed throughout the greater extent of its motion toward the left hand of Fig. 2. The rack 26 of course rolls out of mesh with that portion of rack 25 with which it is in engagement in Fig. 2, and as the bed approaches the limit of its motion to the left in Fig. 2 said rack 26 engages with the other portion of rack 25 at a time when the pin 30 is in or approaching its lowest position. The antifriction-roller 19 at the right in Fig. 3 is, as the bed moves to the left in Fig. 2, in its upper position and enters the slot 20 from the right. (See Fig. 3.) The various parts described operate in a manner similar to that described above to lift the rack 2 and depress the rack 3 and reverse the motion of the bed on the left of Fig. 2.

In the modification shown in Figs. 5 and 6 the change in the mechanism from that described above lies in the means by which the shafts 10 are operated. But one shaft 17 is employed, which shaft has but one segment 16. The shaft 17 passes through the sides of one of the boxes 14 and the side of the rack 2, the latter being slotted for that purpose. This segment 16 engages with the gear 15 inside the box or guide 14. The shafts 10 at one end are provided with gears 46, which are connected by a gear 47, so that the first shaft 10 communicates its motion to the second. Instead of one slot-bar 21, as described above in connection with Figs. 1, 2, 3, and 4, there are two such slot-bars and two cams 23 for operating them, said cams being placed upon the framework and operated by suitable means (not shown) to raise and depress the slot-bars and operate the arm or crank 18 of the shaft 17. One of said slot-bars, during the to-and-fro motion of the bed, engages with the arm 18 when the latter is in its lower position and raises it and the other engages therewith when the arm is in its upper position and depresses it, as will be readily understood.

In the modification shown in Figs. 7 and 8 the slot-bars are raised and depressed by means of toggles 48, which are fast to the bed and to the bars and which are connected by means of the rods 49 to the levers 50, which are pivoted at 51 upon the bed or arms therefrom. The levers 50 are connected with the bars 49 in any suitable way, as by a slot-and-pin connection like that shown. The said levers 50 are provided with arms 18 and antifriction-rollers 19 for coaction with the slot-bar 21, which in this instance has a motion transversely to the bed instead of up and down, as in the constructions hereinbefore described, and which is operated by suitable

means. (Not shown.) The motion of the levers 50 in one direction raises one and depresses the other of said racks, and a reverse motion of the levers causes reverse motions of the racks. In this construction the bars 49 move longitudinally of the bed and the slot-bars 21 are at the end of the framework.

In the modifications shown in Figs. 9 and 10 the slot-bars are still at the ends of the framework and operate levers 50 by means of the arms 18 and rollers 19, which levers operate the slide rods or bars 49, as in the construction above described. The racks 2 and 3 are provided with inclines or wedges 52 and rollers 53 for coaction with the wedges 54 on opposite sides of the bars 49. Motion of the bar 49 to the left (see Fig. 10) causes the upper incline or wedges 54 thereon to raise the rack by means of the rollers 53, while motion of said rod to the right (see Fig. 10) depresses the rack by the coaction of the said inclines or wedges 54 on the bar and the wedges or inclines 52 on the rack. With the construction shown in Figs. 9 and 10 one rack is raised while the other is depressed.

The construction shown in Fig. 11 differs from that shown in Figs. 7 and 8 only in the fact that the toggles (but one toggle is shown at the right-hand side, however) are caused to move transversely of the bed rather than longitudinally thereof and in being so arranged that each bar 49 operates a toggle of each rack-bar instead of each bar 49 operating both toggles for one rack-bar, as in Figs. 7 and 8. The slide-bar 18^a carries an antifriction-roller 19 for engagement with the slot-bar 21 and is connected with the rod 49 of one of the toggles by a slot-and-pin connection such as that shown.

In the modification shown in Fig. 12 the rack-bars are placed beneath instead of above their respective driver-gears, whence it results that the racks 2 and 3 move the bed in directions opposite to those in which they moved them in the constructions shown in the prior figures.

Other devices may be employed to give the racks motion into and out of their positions for coaction with their respective driver-gears, and, as above stated, any suitable or known means for completing, stopping, and reversing the motion of the bed may be employed in lieu of that shown, which is not herein specifically claimed.

Other changes in details and arrangements of parts may be made without departing from the spirit of this invention.

Having thus fully described my invention, what I claim as new, and desire Letters Patent for, is—

1. The combination of a reciprocatory member or bed, independent movable racks thereon, driver-gears alternately operating to drive said bed throughout the greater extent of its motion in each direction, mechanism on said bed, and having one or more arms, for moving one rack into and the other out of posi-

tion for engagement with its driver-gear, to-and-fro-moving bars on the framework for operating said arm or arms, and means for completing, stopping and reversing the motion of said bed, substantially as described.

2. The combination of a reciprocatory member, or bed, independent movable racks thereon, driver-gears alternately operating to drive said bed throughout the greater extent of its motion in each direction, mechanism on said bed, and having one or more arms, for moving one rack into and the other out of position for engagement with its driver-gear, a moving slot bar or bars on the framework for operating said arms or arm, and means for completing, stopping and reversing the motion of said bed, substantially as described.

3. The combination of a reciprocatory member or bed, independent movable racks thereon, having points of support attached to the bed, driver-gears alternately operating to drive said bed throughout the greater extent of its motion in both directions, mechanism on said bed, and having one or more arms, for moving the racks toward and from their points of support, to-and-fro moving bars on the framework for moving said arm or arms, and means for completing, stopping and reversing the motion of the bed, substantially as described.

4. The combination of a reciprocatory member or bed, independent movable racks thereon, having points of support attached to the bed, driver-gears alternately operating to drive said bed throughout the greater extent of its motion in both directions, mechanism on said bed, and having one or more arms, for moving the racks toward and from their points of support, a moving slot bar or bars on the framework for operating said arms or arm, and means for completing, stopping and reversing said motion of the bed, substantially as described.

5. The combination of a reciprocatory member or bed, independent movable racks thereon, eccentrics and connections therefrom to the racks to move the racks, mechanism for moving said eccentrics, driver-gears alternately operating to drive said bed throughout the greater extent of the motion thereof in each direction, and means for completing, stopping and reversing said motion, substantially as described.

6. The combination of a reciprocatory member or bed, independent movable racks thereon, eccentrics and connections therefrom to the racks to move the racks, mechanism on said bed, and having one or more arms, for moving one rack into and the other out of position for engagement with their driver-gears during each stroke of said bed, means on the frame to move said arm or arms, and means for completing, stopping and reversing the motion of said bed, substantially as described.

7. The combination of a reciprocatory member or bed, independent movable racks thereon, eccentrics and connections therefrom to the racks to move the racks, mechanism on said bed, and having one or more arms, for moving one rack into and the other out of position for engagement with their driver-gears during each stroke of said bed, shafts bearing said eccentrics, gearing on the bed for operating said shafts, an arm or arms for operating said gearing, a moving slot bar or bars on the frame to operate said arms or arm, and means for completing, stopping and reversing the motion of said bed, substantially as described.

8. The combination of a reciprocatory member or bed, independent movable racks thereon, eccentrics and connections therefrom to the racks to move the racks, shafts on which said eccentrics are mounted, one or more crank-shafts on the bed, toothed gearing to said eccentric-carrying shafts, one or more slot-bars on the framework to operate said crank shafts or shaft, and means for completing, stopping and reversing the motion of said bed, substantially as described.

9. The combination of a reciprocating bed, two air-cylinders arranged to check the bed at the end of its stroke in one direction, said cylinders being at opposite sides of the machine, independent adjustable means for adjusting said cylinders independently of each other, an air-pipe connecting the air-spaces, and pistons arranged for coaction with said cylinders, substantially as described.

Signed at New York, in the county of New York and State of New York, this 7th day of May, A. D. 1894.

WALTER SCOTT.

Witnesses:

R. W. BARKLEY,
CHAS. A. BRODEK.