

No. 620,630.

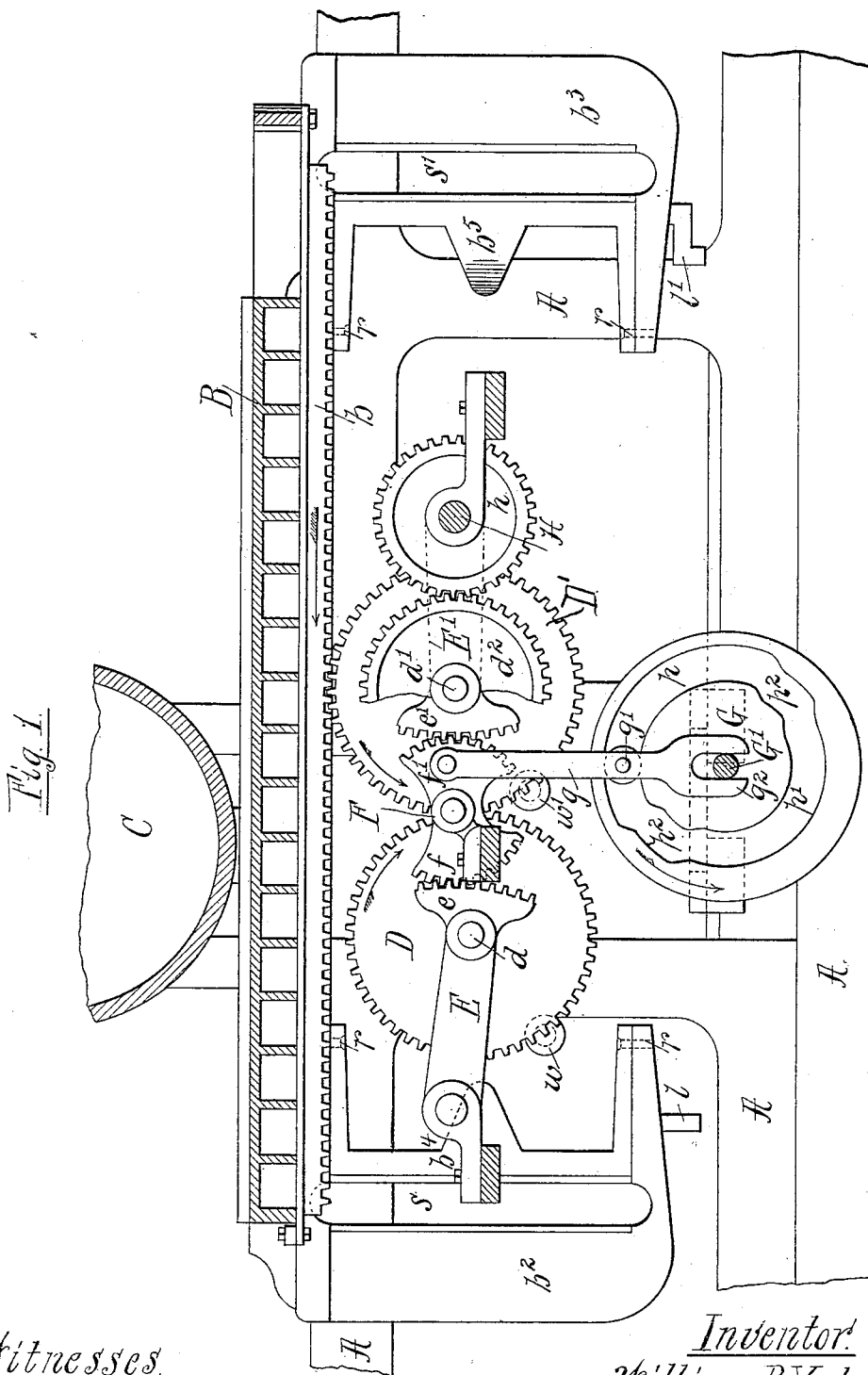
Patented Mar. 7, 1899.

W. B. YATES.
BED MOTION FOR PRINTING PRESSES.

(Application filed Nov. 8, 1892.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
John W. Adams
Henry H. Carter

by

Inventor
William B. Yates
Dayton, Cook & Brown
his Attorneys

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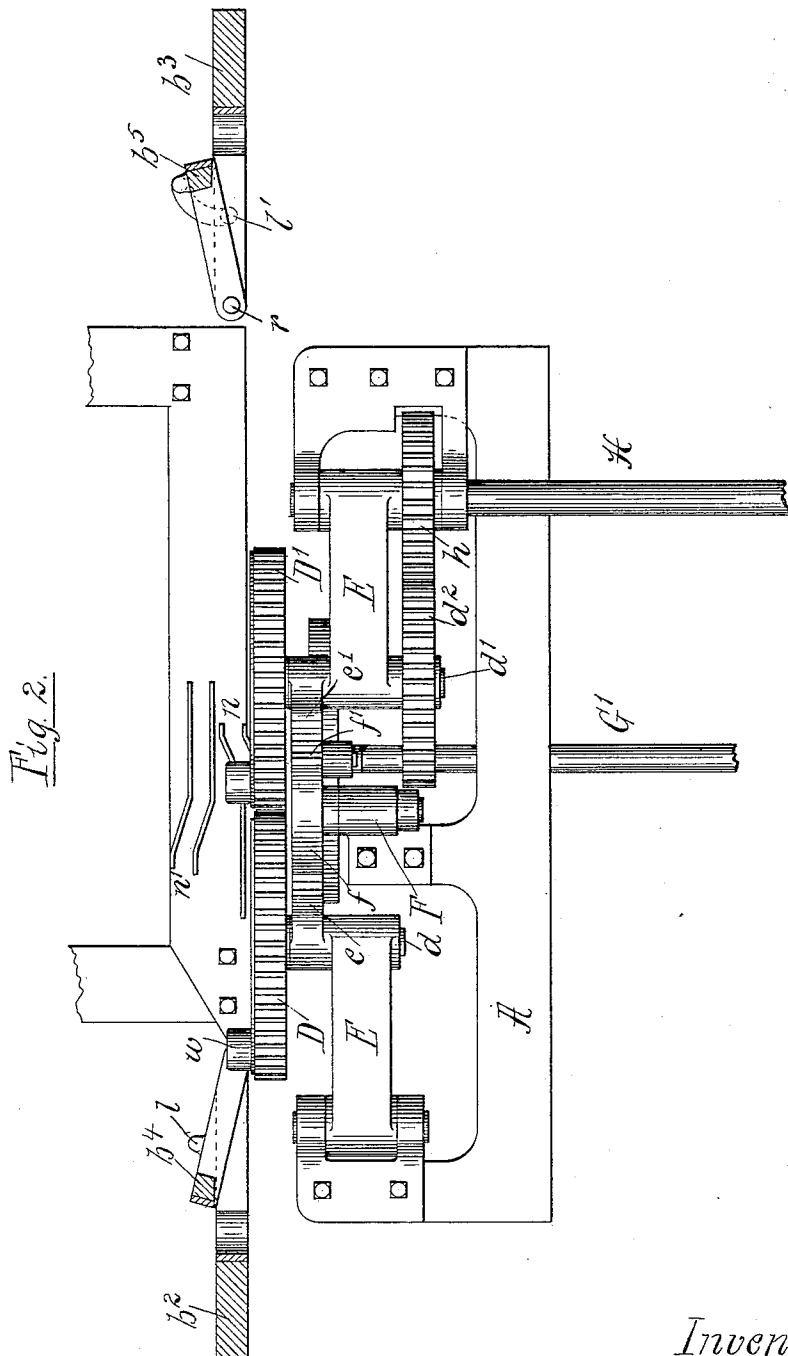
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3 Sheets—Sheet 2.



Witnesses

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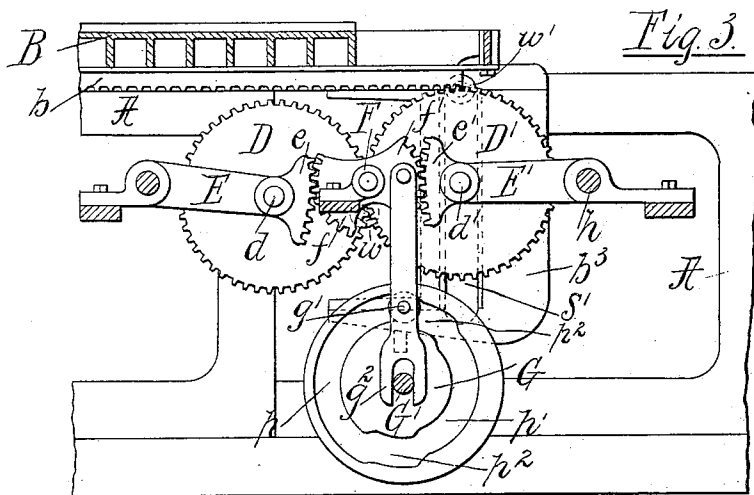
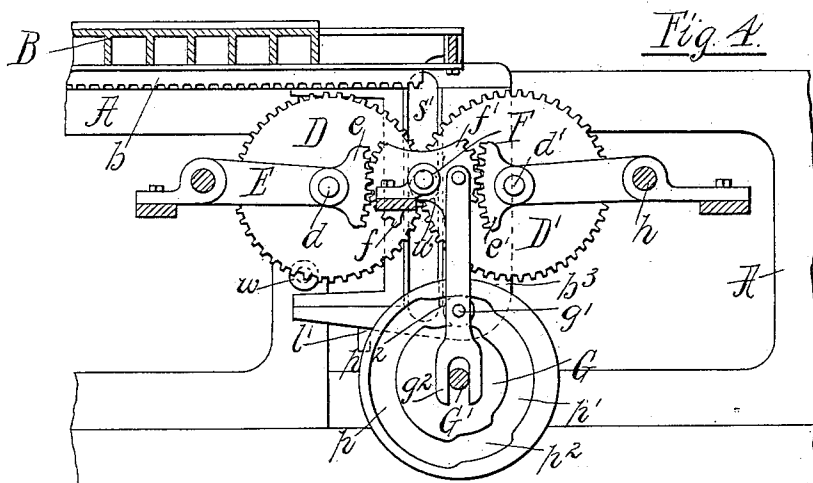
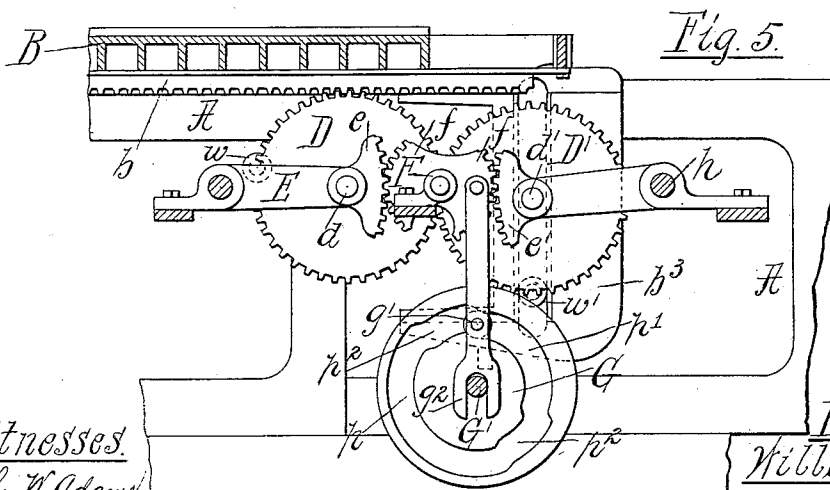
W. B. YATES.

BED MOTION FOR PRINTING PRESSES.

(Application filed Nov. 8, 1892.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses.

John W. Adams.
Henry H. Carter.

Inventor.

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UNITED STATES PATENT OFFICE.

WILLIAM B. YATES, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE MIEHLE
PRINTING PRESS AND MANUFACTURING COMPANY, OF SAME PLACE.

BED-MOTION FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 620,630, dated March 7, 1899.

Application filed November 8, 1892. Serial No. 451,300. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. YATES, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bed-Motions for Printing-Presses; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to mechanical movements used to convert rotary into reciprocatory motion, and more particularly to mechanism for giving reciprocatory motion to the bed of a printing-press or for actuating other similar reciprocating parts.

The object of the invention is to provide an improved construction in reciprocating mechanisms of the character described; and it consists in the matters hereinafter set forth, and pointed out in the claims.

The mechanism shown as embodying my invention is of that class which comprises devices for giving motion to the bed or other reciprocatory part through the principal extent of its movement, together with reversing mechanism acting to gradually bring the bed or part to a state of rest at each end of its throw and to start it backward with a gradually-accelerated velocity until it has acquired the same speed given to it by the mechanism by which it is principally moved, the general principle of the devices for effecting these latter results being similar to that disclosed in the patents to Miehle, No. 317,663, dated May 12, 1885, and No. 322,309, dated July 14, 1885.

Referring to the drawings, Figure 1 is a sectional side elevation of a portion of a machine embodying the improvement, and Fig. 2 is a plan view of the same with the bed removed, parts being in section. Figs. 3, 4, and 5 are broken side elevations showing the working parts in different positions.

In detail, A is the main frame, upon which a bed B, an impression-cylinder C, (in the case of a printing-press,) and all other parts of the machine are supported.

The bed B reciprocates in suitable ways on the main frame and is principally actuated by gearing constructed as follows: On the lower

side of the bed and extending longitudinally thereof is secured a toothed rack *b*. Movably supported beneath the rack, with their peripheries in proximity to it, are two oppositely-rotating spur-gears D and D', said gears having a bodily movement toward and from the rack in such manner that they will be thrown alternately into engagement with the rack and will both be held free from it at proper intervals for a purpose hereinafter set forth. To provide for such bodily movement of the gears, swing-bars E E' are pivoted to the main frame in such manner that their free and adjacent ends may swing toward and from the rack-bar, and in said free and adjacent ends of the bars the shafts *d d'* of the gears are journaled. An oscillating lever F, pivoted at or near its center to the main frame at a point between the adjacent ends of the bars, has at its ends gear-segments *f f'*, which engage similar gear-segments *e e'* on the said adjacent ends of the pivoted bars, and as a result of this connection any movement of the lever causes a simultaneous movement of the adjacent ends of the pivoted bars and of the gears carried thereon, the direction of the movement of one bar and gear being the reverse of that of the other bar and gear, the one moving up while the other is moving down, and vice versa. To actuate the oscillating lever, a cam G is provided which is connected therewith in any suitable manner, as by a rod *g*, pivoted to the lever and engaging the cam through the wrist-pin *g'*, the rod being further guided by the engagement of its forked end *g²* with the cam-shaft G'. The cam G is rotated from the driving-shaft by any suitable gearing, the specific form of which is unimportant and which has accordingly not been shown. For rotating the driving-gears, however, the following mechanism is preferred, though other means might be employed. In this case the pivot of one of the bars E' is the driving-shaft H of the machine, and on this driving-shaft is keyed or otherwise secured to rotate therewith the driving-pinion *h*. In the other end of this forked bar E' is journaled the shaft *d'*, as before described, to which is affixed, in addition to the gear D', an intermediate gear *d²*, with which the driving-pinion intermeshes,

and the continuous rotation of the driving-shaft H is thus transmitted to the gear D' without being in any way affected by the vibratory movement of the supporting-bar E' about its pivot. The rotation of the gear D is in the form shown effected by its intermeshing with the gear D', being thus continuously driven thereby in a direction opposite to the direction of the rotation of the said gear D'.

The operation of the main driving mechanism thus far described will be to drive the bed in the one direction or the other, accordingly as the gear D or the gear D' is in mesh with the rack, and as said gears are alternately so engaged with the rack as the lever F is moved by the action of the cam G a reciprocatory movement of the bed will result. In connection with such main driving mechanism I employ an auxiliary reversing device, operating at each end of the throw of the bed to gradually bring the same to a state of rest and to start it in its return movement with a speed which is constantly accelerated until it equals the velocity given to the bed by the main driving mechanism. To permit the use of such reversing mechanism in connection with a single rack and oppositely-rotating gears, the devices for throwing the gears into engagement with the rack are so constructed that said gears are held free from the rack for a certain period at the time the reversing mechanism is operating. This result in the present instance is accomplished by the peculiar formation of the cam G, the operating-surface of which comprises portions p and p' of greater and less radii, respectively connected by portions p^2 p^2 of intermediate radii. When the wrist-pin g' enters the portion p of larger radius, one end (the right-hand in the drawings, Fig. 1) of the oscillating lever F and with it the pivotal bar E' and the gear D', supported thereon, are raised until the latter engages the toothed rack b , the other end of lever F, with the pivoted bar E and gear D, being at the same time correspondingly depressed. At the proper moment, which occurs near the end of the throw, the wrist-pin g enters one of the intermediate portions p^2 and oscillates the lever F enough to withdraw gear D' from its engagement with the rack, but not sufficiently to raise the gear D into engagement. Both gears being thus held free from the rack, the reversing mechanism operates without interference to the completion of its action, when the wrist-pin g' enters the portion p' of less radius and raises the gear D into mesh with the rack b to continue the reverse movement. As the reciprocating part reaches the other limit of its movement the wrist-pin g' enters the second intermediate portion p^2 and holds both gears free from the rack during the operation of the reversing mechanism at this end of its throw. It is obvious that various forms of reversing-gear may be used in this connection, the one shown being an adapta-

tion of the mechanism disclosed in the patents to Miehle, No. 317,663, dated May 12, 1885, and No. 322,309, dated July 14, 1885, hereinbefore referred to, the essential features of which are slotted parts of or upon the reciprocating bed which engage a wrist-pin on the driving-gear. The construction shown differs from this in having a wrist-pin on each of two driving-gears with which the slotted parts of or upon the adjacent ends of the reciprocating bed engage. The specific shape of the slots and the construction of the parts forming the same form no part of this invention and any of the types of this feature shown in the Miehle patents before referred to may be used, one of such types being accordingly here shown for the purpose of illustration. Considering these features in detail and referring again to the drawings, the bed B has at or near each end a depending bracket b^2 b^3 , to the inner extending ends of which are pivoted at r r the swinging shoes b^4 b^5 , which, with their respective brackets, form slots s s' to engage the wrist-pins w w' of the gears D D'. The shoes are moved into and out of the path of the wrist-pins in any preferred manner, as by the engagement of their depending lugs l l' with the cam-slots n n' on the main frame, said shoes being held from movement when the lugs are not in the cam-slots by the friction of the parts or in any other suitable manner. The wrist-pins w w' are fixed to the gears at a distance from the center thereof equal to the radius of their pitch-circles, thus having a velocity identical therewith in order that the transfer of the driving function from the gears to the pins, and vice versa, may be accomplished with perfect smoothness and without jar, as will hereinafter be explained.

The machine as a whole operates as follows: The direction of movement of the parts being as indicated by the arrows, the gear D' drives the bed to the left until the end of the rack, which is exactly at the center of the slot s' , is directly above the center of the gear. At this moment the wrist-pin w' , then at its highest point and directly beneath the end of the rack, is inclosed in the slot s' by the closing in of the shoe b^5 . As the gear runs off the rack the wrist-pin now inclosed in the slot continues to move the bed to the left with a gradually-decreasing velocity and finally brings it to a state of rest. Meantime the wrist-pin g' , entering one of the intermediate portions p^2 of the cam G, has shifted the gear, so that both of them are disengaged from the rack, and the gears are held by the cam in such disengaged position, as the wrist-pin by its continual revolution starts the bed on its return stroke with a gradually-accelerated velocity until its speed equals the peripheral speed of the main reciprocating gears D D'. At the moment this occurs the wrist-pin g' enters the portion p' of the cam and raises the gear D into engagement with the rack to continue the return movement, while at the

same time the wrist-pin *w'* is released from the slot *s'* by the swinging back of the shoe *b'* as its lug *l'* passes out of the cam-groove *n'*.

The utility of holding both gears free from the rack during the action of the reversing mechanism will be made apparent by consideration of the fact that if shifting of the gears were accomplished by a single movement and took place before the speed of the bed on its return reached its maximum there would be an interference between the rack and the gear D, while if such shifting were delayed until the proper moment for the gear D to be thrown into engagement the gear D' would before this point was reached come violently into contact with the end of the rack, then moving in a direction opposite to that of the periphery of the gear. By the double shifting movement hereinbefore set forth both of these difficulties are avoided. The reversal of the movement at the other end of the throw is accomplished in like manner by the engagement of the wrist-pin *w* with the slot *s*, the several parts coacting in the same manner, as hereinbefore described.

The device for giving the principal movement to the bed in itself contains features of novelty which may be employed separately from the other features of the invention illustrated.

I claim as my invention—

1. In a machine of the class described, the combination with a main frame, of a reciprocating part, a rack secured thereto, oppositely-rotating gears journaled on movable supports, means for rotating said gears, an oscillating lever pivoted to the main frame with the ends engaging the supports and means for giving oscillatory movement to the lever.

2. In a machine of the class described, the combination with a main frame, of a reciprocating part, a rack secured thereto, oppositely-rotating gears journaled on movable supports, means for rotating said gears, an oscillating lever pivoted to the main frame with its ends engaging the gear-supports and a cam for oscillating the lever.

3. In a machine of the class described, the combination with a main frame, of a reciprocating part, a rack secured thereto, oppositely-rotating gears journaled on movable supports, wrist-pins on said gears, parts upon the reciprocating part having slots to engage the wrist-pins, an oscillating lever pivoted to the main frame with its ends engaging the movable gear-supports, and means for giving oscillatory movement to the lever.

4. In a machine of the class described, the combination with a main frame, of a reciprocating part, a rack secured thereto, bars pivoted to the main frame, oppositely-rotating gears journaled in the adjacent ends of the bars, wrist-pins on the gears, parts upon the reciprocating part having slots to engage the wrist-pins, an oscillating lever pivoted to the main frame with its ends engaging the adjacent ends of the pivoted bars, a cam for giving

oscillatory movement to the lever and means for rotating the gears and cam.

5. In a printing-press, the combination with a main frame, of a reciprocating bed, a rack secured thereto, bars pivoted to the main frame, shafts journaled in the adjacent ends of the bars, intermeshing gears fixed to the shafts, a second gear fixed to one of the shafts, a driving-pinion journaled concentrically with the pivot of the bar carrying the second gear and intermeshing with said gear, gear-segments on the adjacent ends of the pivoted bars, an oscillating lever pivoted to the main frame and having at its ends gear-segments engaging the segments on the adjacent ends of the pivoted bars, a cam for giving oscillatory movement to the levers, wrist-pins on the intermeshing gears carried by the pivoted bars, parts upon the bed having slots to engage the wrist-pins, and means for rotating the driving-pinions and cam.

6. In a machine of the class described, the combination with a main frame, of a reciprocating part, a rack secured thereto, bars pivoted to the main frame, oppositely-rotating gears journaled on the adjacent ends of the bars, an oscillating lever pivoted to the main frame with its ends engaging the adjacent ends of the pivoted bars, means for giving oscillatory movement to the levers, and means for rotating the gears.

7. In a machine of the class described, the combination with a main frame, of a reciprocating bed, a rack secured thereto, bars pivoted to the main frame, oppositely-rotating gears journaled on the adjacent ends of the bars, gear-segments on the adjacent ends of the bars, an oscillating lever pivoted to the main frame and having at its ends gear-segments engaging the segments on the adjacent ends of the pivoted bars, means for giving oscillating movement to the lever and means for rotating the gears.

8. In a printing-press the combination with a main frame, of a reciprocating bed, a rack secured thereto, bars pivoted to the main frame, shafts journaled in the adjacent ends of the bars, intermeshing gears fixed to the shafts, a second gear fixed to one of the shafts, a driving-pinion journaled concentrically with the pivot of the bar carrying the second gear and intermeshing with said gear, gear-segments on the adjacent ends of the pivoted bars, an oscillating lever pivoted to the main frame and having at its ends gear-segments engaging the segments on the ends of the pivoted bars, means for giving oscillatory movement to the lever and means for rotating the driving-pinion.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

WILLIAM B. YATES.

Witnesses:

C. CLARENCE POOLE,

GEORGE W. HIGGINS, Jr.