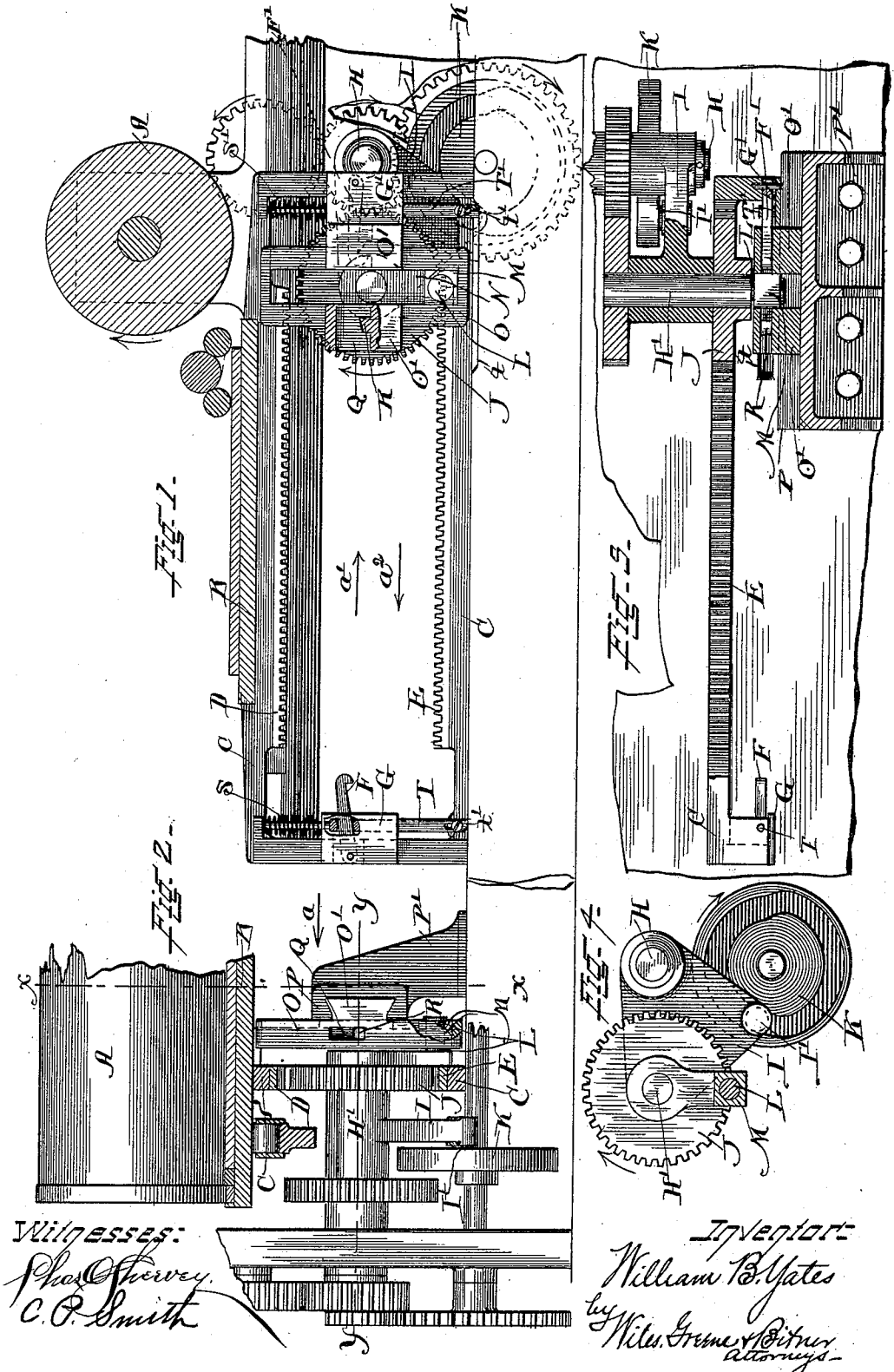
(No Model.)

W. B. YATES.

RECIPROCATING MECHANISM FOR PRINTING PRESSES.

No. 471,369. Patented Mar. 22, 1892.



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RECIPROCATING MECHANISM FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 471,369, dated March 22, 1892.

Application filed November 9, 1891. Serial No. 411,261. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. YATES, a citizen of the United States of America, residing in the city of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Mechanism Adapted for Communicating Suitable Recipricating Movement to the Form-Supporting Bed of a Cylinder Printing-Press, of which the following is a specification.

Numerous devices for attaining this end are now in use—as, for instance, the mangle-rack, better known as the "Napier movement"—in which grooved or slotted shoes are fastened to the opposite ends of the reciprocating rack, and a wrist-pin attached to the propelling pinion or wheel moves in said slots alternately in passing from the top to the bottom of the rack, or vice versa, thereby arresting and reversing the movement of the bed. In this and other devices of the same general class either using one double-faced rack or separate racks at top and bottom the rack has always been provided with shoes of some form, curved or straight, fastened to its opposite ends and adapted to receive the wrist-pin of the driving-pinion immediately before the arrest and reversal of the movement of the rack and to release the wrist-pin after such reversal is completely accomplished, and these shoes in all such previous forms have been permanently and securely fastened to the ends of the rack.

My invention has for its object the use of a single slotted shoe or yoke which is independent of the rack and is wholly free from it during the greater part of its movement, this yoke or shoe being so constructed and arranged as at all times to inclose the wrist-pin of the driving-pinion, from which it receives a varying reciprocating movement so timed as to supplement the reciprocating movement of the bed caused by the engagement of the driving-pinion with the racks thereon, and thereby to control the arrest and reversal of the movement of the bed.

The invention is fully described in the following specification and shown in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of a press embodying my improvements, the plane of section being through the line $x\,x$, Fig. 2, the view being in the direction indicated by the arrow a, Fig. 2, and the support and guide P P′ being removed to show the parts behind it. Fig. 2 is a view partly in elevation and partly in vertical section, the view being in the direction indicated by the arrow a', Fig. 1. Fig. 3 is a view partly in top plan and partly in horizontal section, the plane of section being through the line $y\,y$, Fig. 2. Fig. 4 is a side elevation of the driving-pinion, the plate which supports it, the shaft on which the plate is mounted, and the cam by which the plate is governed for the purpose of raising and lowering the driving-pinion and bringing it into engagement alternately with the top and bottom racks of the machine.

In the views, A is a cylinder of ordinary construction securely supported in suitable bearings and rotating at a uniform velocity, and B is a reciprocating type-carrying bed supported on the usual anti-friction rollers resting on a suitable frame and having a reciprocating movement imparted to it by suitable gearing. To the under side of the bed B is attached a reciprocating frame C, supporting upper and lower racks D E, and at opposite ends of the frame are latches F F′ and bumper-plates G G′, the latches being pivoted and the plates rigidly secured in any suitable manner.

In the frame of the machine is journaled a horizontal shaft H, on which is hung a preferably triangular vibrating plate I, carrying at one of its angles the shaft H′ of the driving-pinion J, and at another angle a stud or roller I′, which lies in a groove in the face of a rotating cam K, the groove being of such form as to vary the distance of the stud I′ from the center of rotation of the cam, thereby alternately raising and lowering the pinion J and bringing it alternately into engagement with the racks D and E for the purpose of moving the rack-carrying frame first in one direction and then in the other. A wrist-pin L, fastened to the driving-pinion J, carries a wrist-pin block M, which lies in a vertical slot N, formed in a reciprocating yoke O, provided with a dovetail tenon O′, sliding freely in a corresponding groove in a guide P, formed on a support P′, Fig. 2, bolted to the frame of the machine. The tenon O′ is

held in a horizontal position by the groove in which it slides, and thus holds the slot N of the yoke vertical, and the movement of the wrist-pin block M in this vertical slot as the pinion rotates imparts a varying reciprocating motion to the yoke, the yoke coming to rest at the instant when the wrist-pin is in the horizontal plane of the pinion-shaft and the yoke being at its maximum motion in either direction when the wrist-pin is in the vertical plane of the pinion-shaft. Within the yoke and the tenon formed thereon are two chambers Q Q, and in these chambers, respectively, are formed catches R R′, adapted to engage, respectively, with the latches F F′ at the opposite ends of the rack-frame C, when the respective ends of the rack-frame come in contact with the opposite faces of the yoke. The latches F F′ are governed by vertical rods T T′, Figs. 1 and 2, these rods being actuated by springs S S′, which tend to hold them down and hold the latches in engagement with the catches and to resist their disengagement. The disengagement of the latches from the catches, respectively, is secured by means of inclined planes $t t'$, formed in the base of the machine. The space between these inclined planes is lower than the general surface of the base on which the rack-frame and the vertical rods T T′ move, and the parts are all so arranged that when either one of the rods T T′ is between the two inclined planes it is pressed down by the corresponding spring into a position in which it may engage the corresponding catch; but as the vertical rod leaves this lower space and passes up either of the inclined planes to the general level of the base of the machine it is lifted up and raises the latch above the level of the corresponding catch, thereby disengaging it from the catch, if already in engagement, and holding it in such a position that it cannot again engage until is has passed downward over the inclined plane.

The operation of the mechanism thus described may be briefly stated as follows: The parts being in the positions indicated in Fig. 1 and the movements of the driving-pinion and the cam K being in the directions indicated by the arrows at their margins, it is evident that the rack-frame must be moving in the direction indicated by the arrow a^2, Fig. 1, that the driving-pinion is at its last point of engagement with the lower rack E, and that the cam is in that position in which its next movement must raise the plate I and driving-pinion J to the level in which the pinion may engage the upper rack D. At the instant when the pinion is thus raised, however, the rack-frame will have moved a sufficient distance in the direction indicated by the arrow a^2 to carry the rack D out of reach of the pinion J, so that the engagement of the pinion with the rack will be for the time being prevented. The rotation of the pinion will continue, however, and this rotation must move the yoke O in the direction indicated by the arrow a^2 at a varying speed, the initial movement being equal to that of the rack-frame. This rate of movement must decrease until when the wrist-pin is on a level with the pinion-shaft it will have ceased entirely, and at this point the movement of the yoke will be reversed, the reverse movement being at first slow, but gradually increasing until at the instant when the wrist-pin is directly above the pinion-shaft it will be equal to the maximum speed of the rack-frame. As the yoke during this entire movement is connected with the rack-frame by means of the latch F′ and the corresponding catch R′ on the yoke, the rack-frame must move in unison with the yoke, its movement in the direction indicated by the arrow a^2 being gradually decreased and finally wholly arrested and its movement in the direction indicated by the arrow a' being begun and brought to a maximum by the movement of the yoke. A half-revolution of the pinion O from the position shown in Fig. 1 will accomplish the reversal of the movement of the rack-frame and bring it back to the position shown in Fig. 1, its movement when it reaches that position being in the direction indicated by the arrow a' and its speed of movement being exactly equal to the rate of motion of the edge of the pinion. When the rack-frame reaches this position, the pinion will be in its raised position ready to engage the rack D, and the rack and pinion will therefore come into engagement, and the further movement of the rack-frame in the direction indicated by the arrow a' will be continued through this engagement of the rack and pinion. As soon as the yoke moves from the position shown in Fig. 1 in the direction indicated by the arrow a' the vertical bar T′ will move up the corresponding inclined plane t', thereby raising the latch F′ out of engagement with the corresponding catch on the yoke and freeing the rack-frame from the yoke. The rack-frame will thus be enabled to move at an unvarying speed so long as the pinion remains in engagement with the rack D, while the yoke will continue its short and varying reciprocating movement in the manner already described.

At the instant that the driving-pinion reaches the end of its engagement with the upper rack D the left-hand end of the rack-frame will reach the yoke, the bumper-plate G will come in contact with the end of the tenon O′, and the latch F will engage the corresponding catch in the yoke. The yoke will thus again obtain control of the movement of the rack-bar, and will arrest and reverse its movement in the manner already fully explained. This engagement of the yoke with the opposite ends of the rack-frame, its control of the movements of the rack-frame through such engagement, and its release therefrom makes up one complete motion of the machine and this motion is repeated so long as the machine is in operation.

In order to prevent shock or jar of the parts,

the yoke O or the rack-frame C, or both, may be provided with air-cushions or with springs equivalent thereto; but as the cushioning of reciprocating parts in machines of this class is old I consider this no part of my invention and have not thought it necessary to illustrate it in the drawings.

It is evident that various details of the construction, movement, and engagement of the parts which go to make up my invention may be varied without affecting its principle, and I desire, therefore, not to be limited to the exact devices shown and described or to circumscribe my invention in any way except in the manner expressed in the following claims, to wit:

1. In a machine of the class described, the combination, with a reciprocating bed provided with a frame supporting upper and lower racks, of a driving-pinion lying between said racks and adapted to engage them alternately, means for raising and lowering said pinion for the purpose of bringing it into such engagement, a horizontally-reciprocating yoke, a wrist-pin on said driving-pinion engaging said yoke and imparting a varying reciprocating movement thereto, means for locking said yoke to the respective ends of said rack-supporting frame, and for unlocking the yoke from said ends at predetermined intervals, substantially as shown and described.

2. In a machine of the class described, the combination, with a reciprocating bed provided with a frame supporting upper and lower racks, of a driving-pinion lying between said racks, means for raising and lowering the pinion to bring it into engagement with said racks alternately, a horizontally-reciprocating yoke provided with catches adapted to engage coacting latches on the opposite ends of the rack-supporting frame and formed with a vertical slot, a wrist-pin mounted on the driving-pinion and carrying a wrist-pin block seated in said vertical slot, and means, substantially as shown and described, for securing the engagement and disengagement of the catches on said yoke with the coacting parts on the ends of the rack-supporting frame at predetermined intervals in the movement of the machine, substantially as shown and described.

3. The combination, with the reciprocating bed B, the rack-frame C, and racks D E, of the pinion J, adapted to engage said racks alternately, means, substantially as shown and described, for raising and lowering the pinion, the horizontally-reciprocating yoke O, provided with catches R R′ and slot N, the wrist-pin L and wrist-pin block M, lying within the slot N and imparting varying reciprocating movement to the yoke, the latches F F′, pivoted to the opposite ends of the rack-frame and adapted to engage the catches R R′, respectively, and means, substantially as shown and described, for lifting the latches out of engagement with said catches at suitable intervals in the movement of the machine, substantially as shown and described.

4. The combination, with the bed, the rack-frame, and racks, of a shaft H, the plate I, oscillating thereon, the cam K, governing the movement of the plate, the pinion J, supported by the plate and thereby raised and lowered for the purpose of engaging the racks alternately, the horizontally-reciprocating yoke O, formed with the slot N and provided with the catches R R′, the wrist-pin L and block M, mounted on the pinion and traveling in the slot in the yoke, the latches F F′, pivoted to the ends of the rack-frame, respectively, the spring-actuated rods T T′, governing said latches and resting on a horizontal surface on the frame of the machine, and the inclined planes *t t′*, adapted to co-operate with the rods T T′ and to raise and lower them at predetermined intervals in the movement of the rack-frame, whereby the latches F F′ may be thrown into and out of engagement with the catches on the yoke, substantially as shown and described.

5. The combination, with a reciprocating bed provided with a rack-carrying frame having upper and lower racks, of a driving-pinion lying between said racks, means for raising and lowering the pinion, whereby it may engage said racks alternately, a horizontally-reciprocating yoke receiving from the pinion a varying reciprocating movement, locking devices on the yoke and the ends of the rack-frame, whereby the yoke may be connected with either end of the rack-frame, and bumper-plates on the yoke and the ends of the rack-frame adapted to lie in close contact when the yoke is locked to either end of the frame, whereby when the yoke is in connection with either end of the rack-frame its movement in either direction is communicated directly to the rack-frame and governs the motion thereof, substantially as shown and described.

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