

No. 806,464.

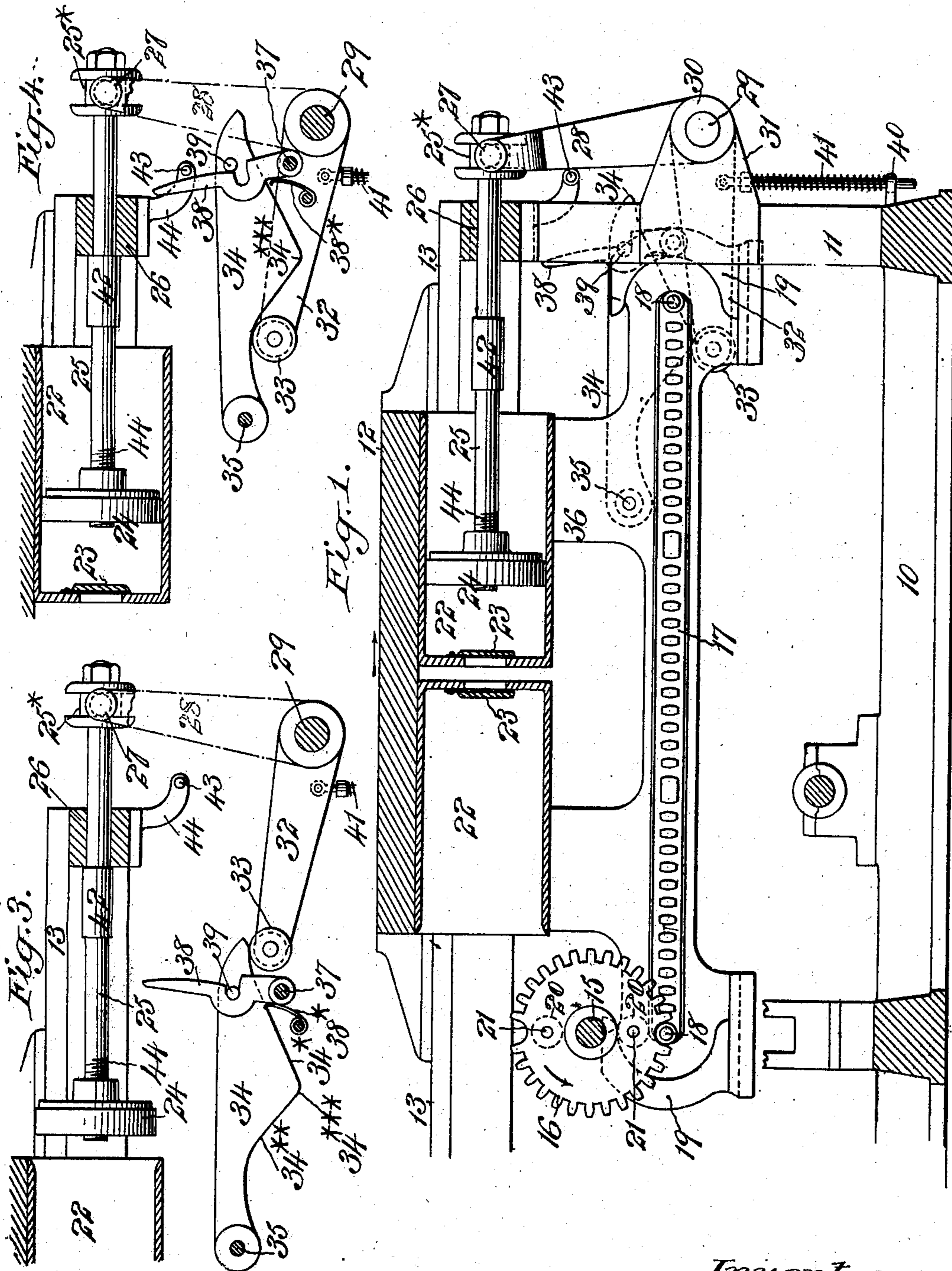
C. P. COTTRELL.

PATENTED DEC. 5, 1905.

PRESSURE CONTROLLING DEVICE FOR THE AIR SPRINGS OF PRINTING PRESSES.

APPLICATION FILED MAR. 3, 1905.

2 SHEETS—SHEET 1.



Witnesses:  
J. George Barry.  
Henry Whiteman.

Inventor:  
Charles P. Cottrell  
By attorneys  
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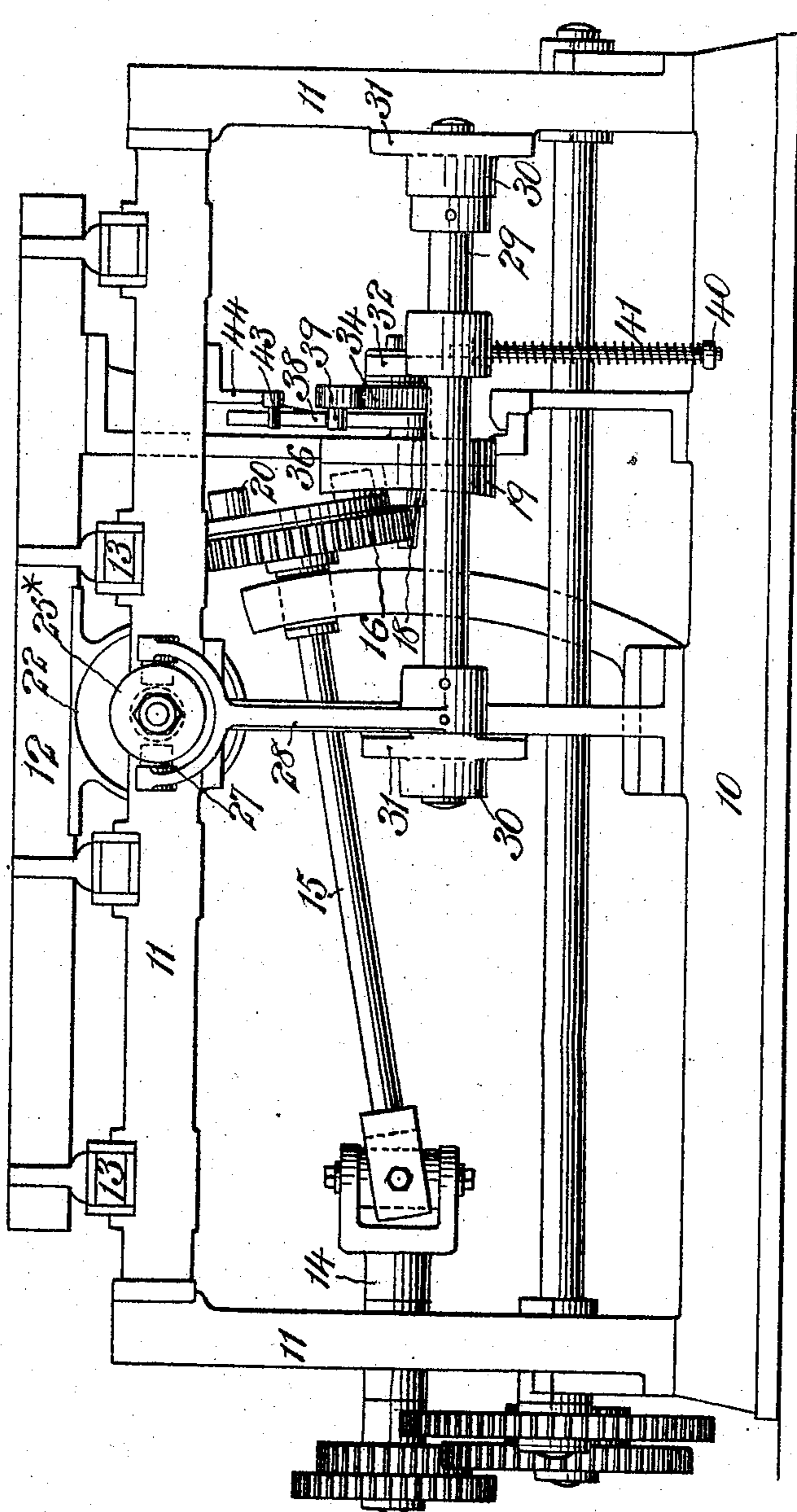
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Henry Thieme,

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# UNITED STATES PATENT OFFICE.

CHARLES P. COTTRELL, OF WESTERLY, RHODE ISLAND, ASSIGNOR TO  
C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

PRESSURE-CONTROLLING DEVICE FOR THE AIR-SPRINGS OF PRINTING-PRESSES.

No. 806,464.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed March 3, 1905. Serial No. 248,275.

*To all whom it may concern:*

Be it known that I, CHARLES P. COTTRELL, a citizen of the United States, and a resident of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Pressure-Controlling Devices for the Air-Springs of Printing-Presses, of which the following is a specification.

10 The object of this invention is to so control the action of the air-springs of a reciprocating-bed printing-press that the requisite compression and resistance of the springs for counteracting or reducing the momentum of the bed during a portion of the travel of the latter and up to a predetermined point in said travel in either direction are obtained and maintained, but that beyond said point there shall be no seriously-increased compression of the air and consequent unnecessarily-increased resistance to the bed's travel or, as may be determined upon, there shall be beyond that point a gradually-diminished resistance; yet, if desirable, there may be left in the springs at the still-point or termination of the movement of the bed in either direction sufficient compression of the air to assist in starting the bed on its return; and the invention consists in means hereinafter described and claimed, consisting in provision for moving the cylinder and piston of the air-springs in opposite directions relatively to each other for so controlling the action of said air-springs.

35 The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section of such parts of a reciprocating-bed printing-press as are necessary for the explanation of the improvement; Fig. 2, an elevation of that end which appears at the right hand of Fig. 1. Figs. 3 and 4 are detail views of parts shown in Fig. 1, representing them in different positions.

45 10 represents the bed-plate; 11, the framing; 12, the reciprocating bed, and 13 the ways upon which the bed runs. The bed is represented as driven by the mangle-shaft 14 15, gear 16, and rack 17, commonly used for driving the reciprocating beds of printing-presses, the said rack being furnished, as usual, at each end with a stud 18 and a semicircular shoe 19, in the latter of which run the rollers 20 on the crank-pins 21 of the mangle-gear 16

for directing said gear from the upper to the lower side of the rack, and vice versa. 55

Fixedly attached to the bed 12 are the air-spring cylinders 22, provided at their inner ends with the inwardly-opening vacuum-valves 23 and each fitted with a piston 24, the rod 25 of which instead of being, as is usual, 60 fixedly attached to the framing is fitted to slide lengthwise in a guide 26 in one of the cross-ties of the framing, so that the piston may have a movement in the cylinder independently of the movement of the cylinder 65 itself with the bed. Only one of these pistons is shown, that being sufficient for the illustration of the invention.

The piston-rod 25 of each piston 24 is provided at its outer end with a grooved collar 70 25\*, which receives the roller 27, provided on the forked upper end of the arm 28 of a rock-shaft 29, which is fitted to fixed bearings 30 in brackets 31, carried by the framing. The said rock-shaft 29 has also another arm 32, between which and an abutment 40 on the framing there is applied a pushing-spring 41, which tends to hold back the piston 24 as far as permitted by a stop-collar 42, provided on the piston-rod inside of the guide 26 on the 80 framing. The said arm 32 of the rock-shaft carries a roller 33, which is situated under a lever 34, which is pivoted by a pin 35 to the rack-hanger 36, so that it moves back and forth with the bed. The lower edge of the 85 lever 34, which runs over the roller 33, is formed as a cam 34\* 34\*\* 34\*\*\*. The rack-hanger has also pivoted to it by a pin 37 a locking device (represented as consisting of a gab-hook 38) for engagement with a pin 90 39, projecting from one side of the cam-lever 34, and there is a spring 38\*, attached to the rack-hanger, to constantly press the gab-hook toward said pin 39. There is a stationary stop (represented as consisting of a pin 43) carried 95 by a bracket 44 on the framing for the disengagement of the gab-hook from the pin 39 on the cam-lever, and so unlocking said lever.

The operations of the cylinders and pistons will now be explained with reference to Figs. 100 1, 2, 3. First suppose the bed to be moving to the right and the cylinder moving with it to be about to take in the piston, which is at the time stationary, as shown in Fig. 3, being held by the spring 41 with the collar 42 of its 105 rod abutting against the stationary guide 26.

The cam-lever 34, moving with the bed and cylinder, is held down by the engagement of the gab-hook 38 with its pin 39. The continued movement of the bed and cylinder causes the cylinder to take in the piston, and as the piston enters the cam-lever begins to pass over the roller 33, when the cam-incline 34\*, acting as a wedge on the roller 33, causes the piston to advance into the cylinder at a greater speed than that of the bed, thus rapidly increasing the compression of the air in the cylinder and the resistance of the spring until the point 34\*\*\* of the cam-lever arrives, as shown in Fig. 1, at the roller 33, after which the part 34\*\* of the cam-lever passing over the roller 33 gradually permits the piston to be drawn back by the spring 41, and therefore during the continued movement of the bed and cylinder there is no or very little further increase of compression of the air in the cylinder, and in fact according to the form of the part 34\*\* of the cam-lever and the speed at which the piston is thereby permitted to retire there may be a continued diminution of said pressure until the cam-lever is released from the gab-hook by the upwardly-projecting part of the latter striking the stationary pin 43, when the cam no longer depresses the roller 33, but rises with the latter and permits the piston to move back to its stationary position shown in Fig. 4, in which the stationary guide 26 serves as a stop to the collar 42 on the rod. This movement is effected by the pressure of air in the cylinder assisted by the action of the spring 41. After this movement of the bed has been reversed the piston continues to be held stationary and the cam-lever passes inoperatively over the roller 33 until it has dropped to the position shown in Fig. 3. The gab-hook, since its release from the pin 39, as before described, has been held by its spring 38\* with its gab below the pin 39; but on the descent of the cam-lever to the position just described the pin 39 comes opposite the gab, which is then thrown into engagement with the said pin by the spring 38\*, as shown in Fig. 3, and there locked during the movement of the bed to the left and until during its return to the right the cylinder arrives nearly at the position shown in Fig. 4 when the operation of the piston as described again takes place. A similar operation, it will be understood, will take place between the cylinder and piston at the other end of the press. By these operations the bed is made to assist in checking its own momentum.

By giving the cam 34\* 34\*\* 34\*\*\* a proper form, the movement of the piston within the cylinder independently of the movement of the latter itself may be so controlled that its advance within the cylinder to increase the compression of the air and its retirement therefrom may be made to commence at such points in the travel of the press-bed as may be desired and that the retirement may take

place at such speed relatively to that of the bed and cylinder that the compression may either continue uniform or be gradually reduced during the remainder of the travel of the bed or be first reduced and afterward increased near the termination of the travel; but I prefer that the retiring movement shall commence at or about at that point in the travel at which the retardation commences, as illustrated by Fig. 1, in which the mangle-rack and pinion are represented in the positions they occupy at that point.

To provide for further determining the degree of compression of the air which may be obtained in the cylinder before the retirement of the pistons takes place, the pistons are made adjustable lengthwise upon their rods by being screwed thereon, as indicated at 44.

What I claim as my invention is—

1. In a reciprocating-bed printing-press, the combination with the air-spring cylinder and piston, of mechanism deriving motion from the press for moving said cylinder and piston in opposite directions at the same time while the piston is in the cylinder.

2. In a reciprocating-bed printing-press, the combination with the air-spring cylinder carried by the bed, and the air-spring piston having a stationary support, of mechanism deriving motion from the press for moving said piston within the cylinder lengthwise thereof during the movement of the latter.

3. In a reciprocating-bed printing-press, the combination with the bed and an air-spring cylinder thereto attached, of a movable air-spring piston and mechanism deriving motion from the press for moving said piston within the cylinder independently of the movement of the bed and cylinder.

4. In a reciprocating-bed printing-press, the combination with the bed and an air-spring cylinder thereto attached, of an air-spring piston, and mechanism deriving motion from the press for effecting the movement of the piston within the cylinder in the opposite direction to the movement of the bed.

5. In a reciprocating-bed printing-press, the combination with the bed and an air-spring cylinder thereto attached, of an air-spring piston, and mechanism deriving motion from the press for effecting the movement of the piston within the cylinder in the same direction as the movement of the bed.

6. In a reciprocating-bed printing-press, the combination with the bed and an air-spring cylinder thereto attached, of an air-spring piston movable independently of the cylinder and mechanism deriving motion from the press for giving the said piston a movement in the cylinder in opposite directions during the movement of the cylinder in one direction.

7. In a reciprocating-bed printing-press, the combination with the bed and an air-spring cylinder thereto attached, of an air-spring pis-

ton, and mechanism deriving motion from the press for first producing the movement of the piston in the opposite direction to the cylinder and afterward permitting and controlling the movement of the piston in the same direction as the cylinder.

8. In a reciprocating-bed printing-press, the combination with the bed and an air-spring cylinder thereto attached, of an air-spring piston movable independently of the cylinder, a stationary support and guide for said piston, a stop to limit the movement of said piston in the same direction with the bed and means for moving said piston in the opposite direction to that of the bed.

9. The combination with a printing-press bed and mechanism for giving said bed a reciprocating movement retarded at a certain stage of its progress, of an air-spring cylinder carried by said bed, an air-spring piston movable within the cylinder independently of the movement of the cylinder itself, means for producing the movement of the piston within the cylinder in the opposite direction to the movement of the cylinder itself and means timed to the movement of the bed for producing and controlling the movement of the piston in the same direction with the bed from about the point at which the retardation of the movement of the bed commences.

10. In a reciprocating-bed printing-press, the combination with the bed and an air-

spring cylinder thereto attached, of mechanism actuated by the bed itself for first producing the movement of the piston within the cylinder in the opposite direction to the movement of the bed and afterward permitting, producing and controlling the movement of the piston within the cylinder in the same direction as that of the bed.

11. The combination with a reciprocating printing-press bed, an air-spring cylinder carried by said bed and an air-spring piston movable within said cylinder independently of the movement of the cylinder itself, a fixed stop for arresting the movement of said piston away from the cylinder, a cam-lever pivoted to the bed, a rock-shaft having stationary bearings and having one arm in engagement with said piston and another for engagement with said cam-lever for producing and controlling the movement of the piston, a locking device for locking said lever in its operative position and a fixed stop for disengaging said locking device and liberating said lever to its inoperative position.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 28th day of February, 1905.

CHARLES P. COTTRELL.

Witnesses:

F. GEORGE BARRY,  
FREDK. HAYNES.