

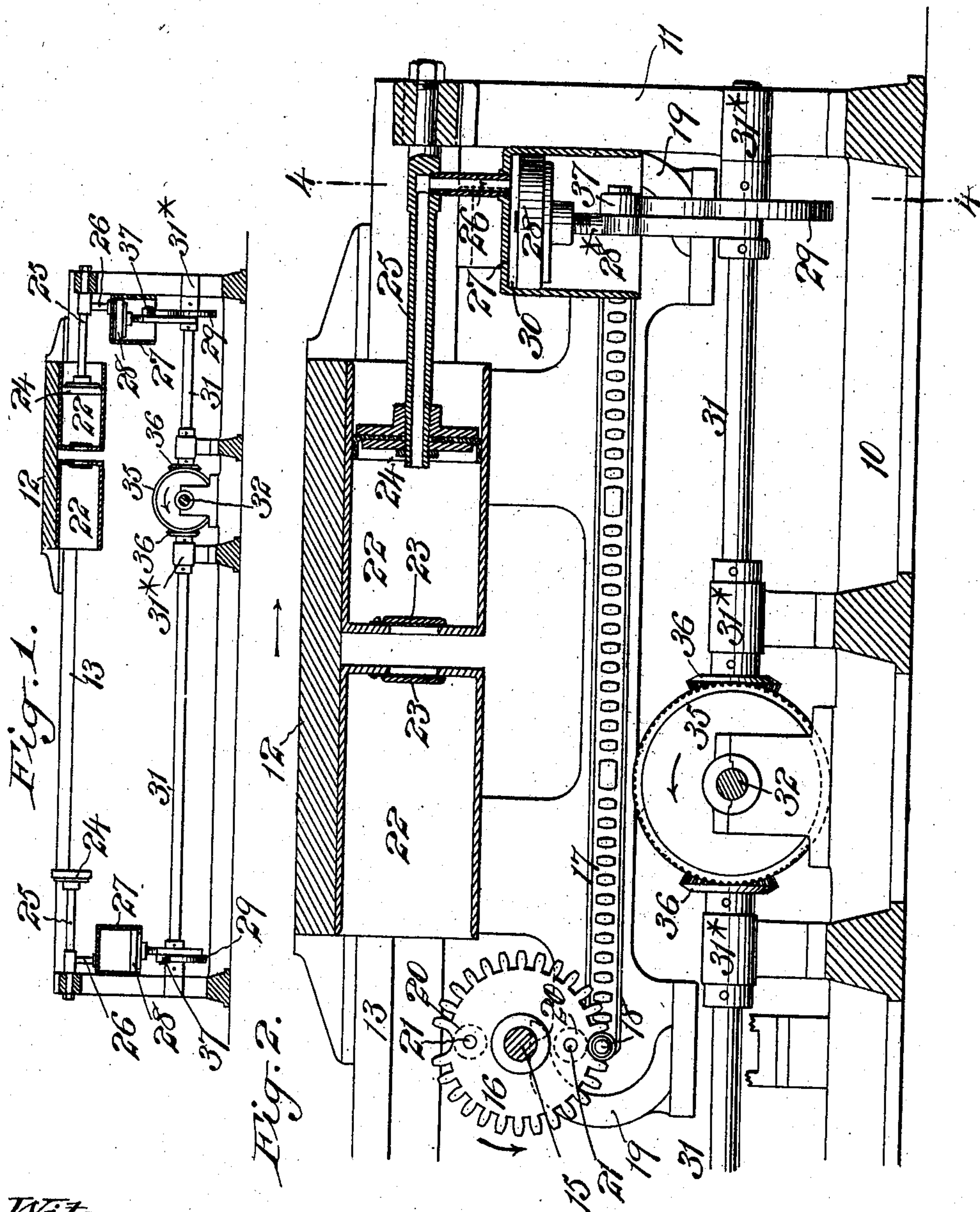
No. 806,463.

PATENTED DEC. 5, 1905.

C. P. COTTRELL.
PRESSURE CONTROLLING DEVICE FOR THE AIR SPRINGS OF PRINTING
PRESSES.

APPLICATION FILED MAR. 3, 1905.

2 SHEETS—SHEET 1.



Witnesses:
F. George Barry,
Henry Thome,

Inventor:
Charles P. Cottrell
by attorneys
Brown & Seward

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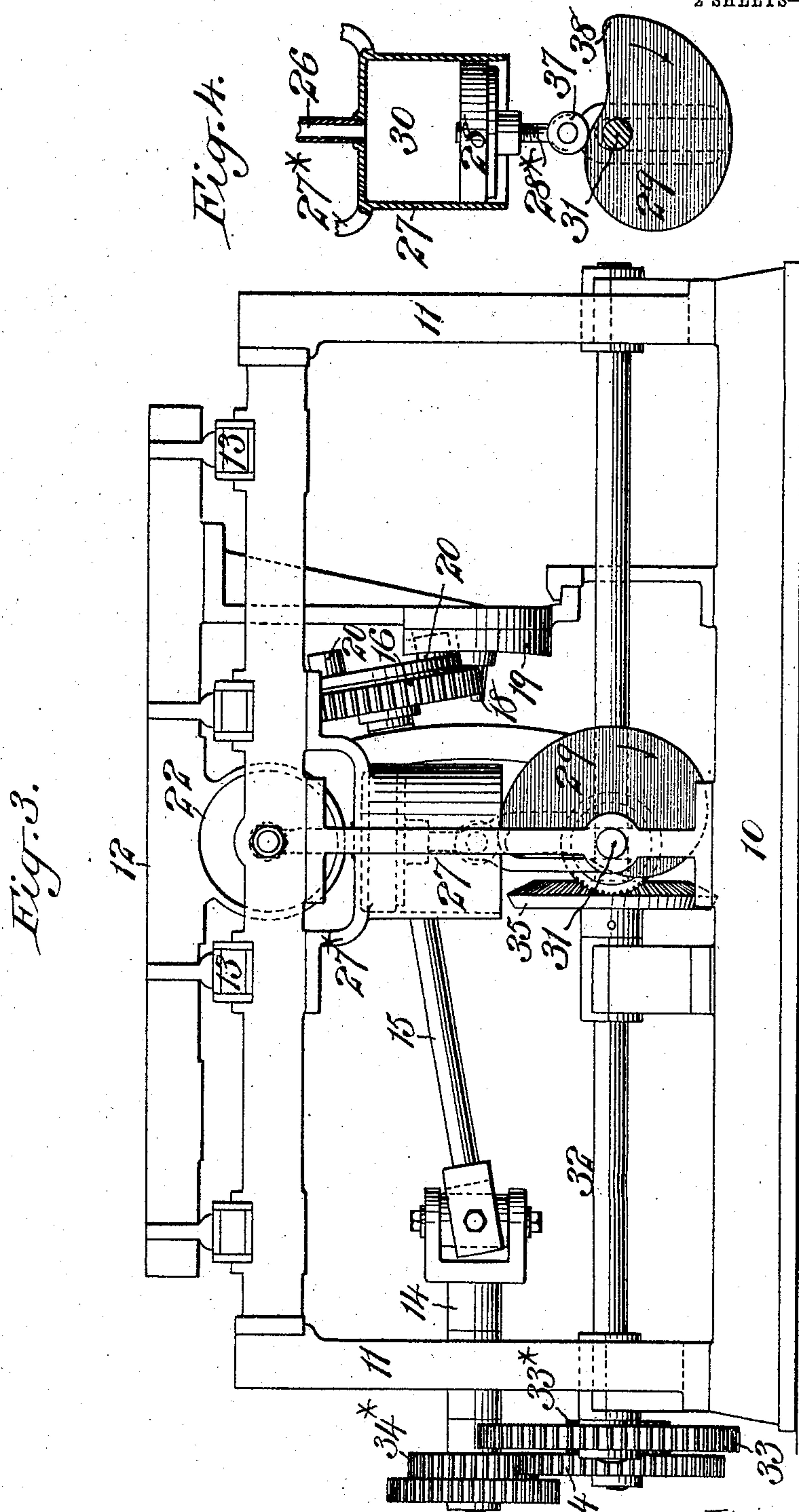
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34
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Charles F. Coffell
by attorneys
Brown & Leonard

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. 806,463.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed March 3, 1905, Serial No. 248,274.

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 or cushions of a reciprocating-bed printing-press that the requisite compression and resistance of the
5 air in the said springs or cushions for counteracting or reducing the momentum of the bed during a portion of the travel of the latter and up to a certain predetermined point in such travel in either direction are obtained and maintained, but that beyond said point
20 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
25 in the spring 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
30 the invention consists in means hereinafter described and claimed, consisting principally in an expansion-chamber with which the air-spring cylinder is placed at proper times in and out of communication by the movement
35 of the bed for so controlling the action of said air springs or cushions.

The invention is represented in the accompanying drawings, in which—

40 Figure 1 represents a longitudinal vertical section of as much of a reciprocating bed printing-press as is necessary for the explanation of the invention; Fig. 2, a section corresponding with a portion of Fig. 1, on a larger scale; Fig. 3, an end elevation corresponding
45 with the right-hand end of Fig. 2; Fig. 4, a transverse vertical sectional view, taken on the line 4 4 of Fig. 2, of certain details to be hereinafter described.

10 designates the bed-plate; 11, the framing; 12, the reciprocating bed, and 13 the ways on which the bed runs. The bed is represented as driven by the mangle-shaft 14
50 15, gear 16, and rack 17 commonly used for

driving the reciprocating beds of printings presses, the said rack being furnished, a-
usual, at each end with a stud 18 and a semi-circular shoe 19, in the latter of which run the
rollers 20 on the crank-pins 21 of the mangle-gear for directing said gear from the upper to
60 the lower side of the rack, and vice versa.

Attached to the bed 12 are the air-spring cylinders 22, provided at their inner ends with the inwardly-opening valves 23 and fitted with the pistons 24, the rods 25 of which are secured to the ends of the press-
65 framing. These piston-rods are hollow for the greater portion of their length and open at their inner ends through their pistons; but they are closed at their outer ends, near which their hollow interiors have communication, by
70 means of short pipes 26, with what I term "expansion-chambers" 30, which constitute the principal element of the means for controlling the action of the air-springs which constitute the present invention. The said expansion-
75 chambers 30, one at each end of the press, are represented as each formed within a stationary cylinder 27 between the upper end of said cylinder and a piston 28, fitted to work therein, the said cylinder being open at its lower
80 end but being closed at its upper end, except as to the opening provided for its pipe 26, through which and the piston-rod 25 and piston 24 communication is formed between the expansion-chamber 30 and its respective
85 air-spring cylinder 22 at the corresponding end of the press, as shown in Fig. 2, when its piston 24 is in that cylinder. The cylinder 27 of the expansion-chamber is represented as carried by brackets 27*. The piston 28
90 of each expansion-chamber is supported by its rod 28* on a cam 29 on a rotary horizontal shaft 31, which runs in bearings 31* on the framing. One such shaft and cam are represented for each expansion-chamber, the
95 two being only necessary in the example represented because of their being on a level with the shaft 32, from which the movements of the cams 29 are derived. This shaft 32 is what is commonly known in reciprocating-
100 bed printing-presses as the "cam-shaft" and carries cams commonly employed in such presses, but not necessary to be herein represented or described. The said shaft 32 is geared by gears 33 33* 34 34* with the man- 105

gle-gear shaft and is represented as geared with and driving the two cam-shafts 31 by means of a bevel-gear 35 on itself and a bevel gear 36 on each of said cam-shafts 31. The gearing above described is so proportioned that the cams 29 make two revolutions to each complete movement of the press-bed back and forth. The piston-rods 28* are represented (see Figs. 2 and 4) as furnished with rollers 37, which bear on the perimeters of their cams 29, and their lower parts are forked to pass over their shafts, which thus form guides for their pistons. The form of these cams and their arrangement on their shafts will depend upon the time during the travel of the press-bed at which the control of the air-springs by the expansion-chambers is intended to commence and terminate and upon the degree of such control desired. Said cams in the example represented have (see Fig. 4) nearly half their perimeter in the form of an arc concentric with their shafts and a gradual rise to and an abrupt fall from said concentric portion, and they are so arranged on their shafts with reference to the travel of the bed that their operation is so timed to the travel of the bed that the point 38 of each at which its piston is permitted to descend passes the roller 37 just as the bed-rack 17 and mangle-gear 16 pass the position shown in Fig. 2 at which the retardation of said travel commences.

The operation of the expansion-chamber to control the action of the air-springs is as follows: When in the movement of the press-bed in either direction one of its air-spring cylinders 22 begins to take in its piston 24, the piston 28 of the respective expansion-chamber is near the top of its cylinder 27, as shown in Fig. 2, and the expansion-chamber has its smallest capacity. The piston remains in this position until the bed, the mangle-rack, and mangle-gear have arrived in the positions represented in Fig. 2, when the retardation of the movement of the bed is about to commence. Up to this point the necessary resistance to the movement of the bed and air-spring cylinder have been obtained and maintained, the compression of the air in the air-cylinder having been gradually increased with the corresponding increased resistance to the travel of the bed; but as the point 38 of the cam passes the roller 37 of the piston of the expansion-chamber the said piston is liberated and free to descend under the influence of the pressure in the air-spring cylinder, and thus increase the capacity of the expansion-chamber 30 to such extent that, air flowing freely thereinto from the air-cylinder, the pressure in the latter may be either reduced or only prevented from being increased by the further movement of its piston with the bed. The degree of this reduction or prevention of increase of pressure will depend on the capacity of the expansion-

chamber provided for by the diameter of its cylinder and piston or by the movement permitted to the piston, and it may be so regulated as to leave as little pressure as desired in the air-spring cylinder, but preferably enough to assist in starting the bed on its return. This action takes place at each end of the press and with each expansion-chamber in turn, the piston of each of said chambers being raised to the position illustrated by Fig. 2 after the taking in of the respective air-spring piston into its cylinder and until the bed has passed that point in its travel where the retardation of its speed commences.

Although it may be preferable that the cams should be so constructed and arranged that their action will be so timed to the travel of the bed that the reduction of compression in the air-spring cylinders may commence at or near the point where the retardation of the speed of travel of the bed commences, they may be constructed and arranged to produce such reduction at any point in the travel of the bed, and this without regard to the means employed to produce the movement of the latter or to the character of said movement.

What I claim as my invention is—

1. In a reciprocating-bed printing-press, the combination with the bed and the air-spring cylinder and piston, of an expansion-chamber of varying capacity which is brought into and out of communication with said cylinder by the movement of the bed.

2. In a reciprocating-bed printing-press, the combination with the air-spring cylinder and piston, of an expansion-chamber, and means actuated by the movement of the press for automatically varying the capacity of said chamber during the advance of the air-spring cylinder and piston the one relatively to the other.

3. In a reciprocating-bed printing-press, the combination with the air-spring cylinder and piston, of a second cylinder for communication with the air-spring cylinder, and a cam-controlled piston in said second cylinder.

4. In a reciprocating-bed printing-press, the combination with the air-spring cylinder and piston, of a second cylinder for communication with the air-spring cylinder, a piston in said second cylinder actuated in one direction by the pressure of air from the air-spring cylinder, and mechanism timed to the movement of the bed for actuating said piston in the opposite direction.

5. In a reciprocating-bed printing-press, the combination with the air-spring cylinder and piston, of a second cylinder and piston, the said cylinders having communication with each other provided by a passage through the air-spring piston.

6. In a reciprocating-bed printing-press, the combination with the air-spring cylinder and the piston therein having a hollow rod,

of a second cylinder and piston, and a communication between said second cylinder and the air-spring cylinder through said hollow rod.

5 7. In a reciprocating-bed printing-press, the combination of an air-spring cylinder attached to the bed, a stationary piston fitted to said cylinder, a second cylinder and piston and an air-passage through the first-men-
10 tioned piston to said second cylinder.

8. In a reciprocating-bed printing-press, the combination of an air-spring cylinder attached to the bed, a stationary piston fitted to said cylinder, a second cylinder for com-
15 munication with the air-spring cylinder through its piston, and a cam-controlled piston in said second cylinder.

9. The combination with a printing-press bed and mechanism for giving said bed a re-
20 ciprocating movement retarded at a certain stage of its progress, of an air-spring cylinder and piston, an expansion-chamber for communication with said cylinder, and mechan-

ism timed to the movement of the bed for controlling the capacity of said chamber 25 during the retarded portion of said movement.

10. The combination with a printing-press bed and mechanism for giving said bed a re-
ciprocating movement retarded at a certain 30 stage of its progress, of an air-spring cylinder and piston, a second cylinder for communication with the air-spring cylinder, a piston in said second cylinder and a cam timed to the movement of the bed for controlling the 35 action of the latter piston during the retarded portion of said movement.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 28th day of 40 February, 1905.

CHARLES P. COTTRELL.

Witnesses:

F. GEORGE BARRY,
FREDK. HAYNES