(No Model.)

2 Sheets—Sheet 1.

J. T. HAWKINS.

CUSHIONING APPARATUS FOR PRINTING MACHINES.

No. 604,752. Patented May 31, 1898.

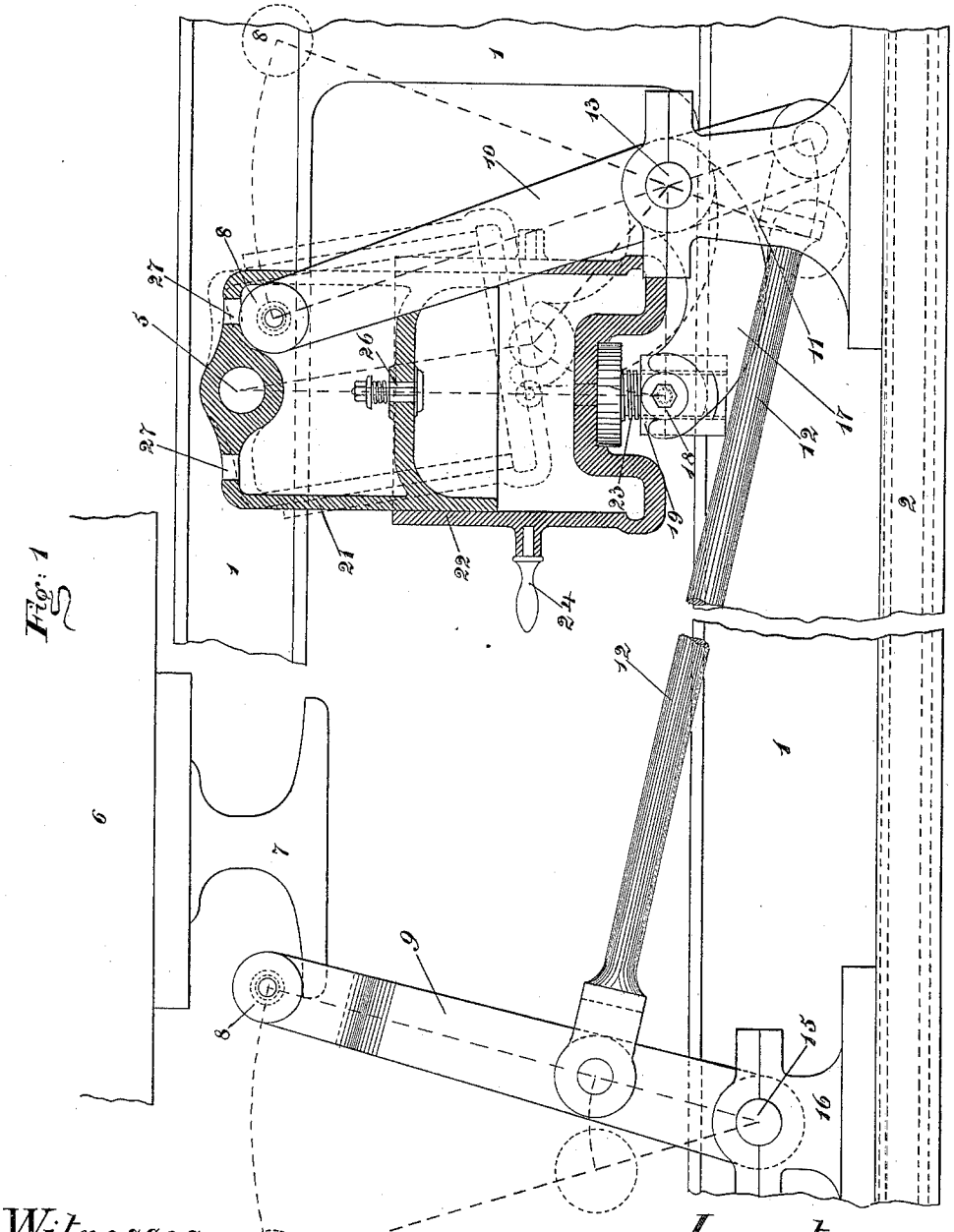


Fig. 1

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(No Model.)

2 Sheets—Sheet 2.

J. T. HAWKINS.

CUSHIONING APPARATUS FOR PRINTING MACHINES.

No. 604,752. Patented May 31, 1898.

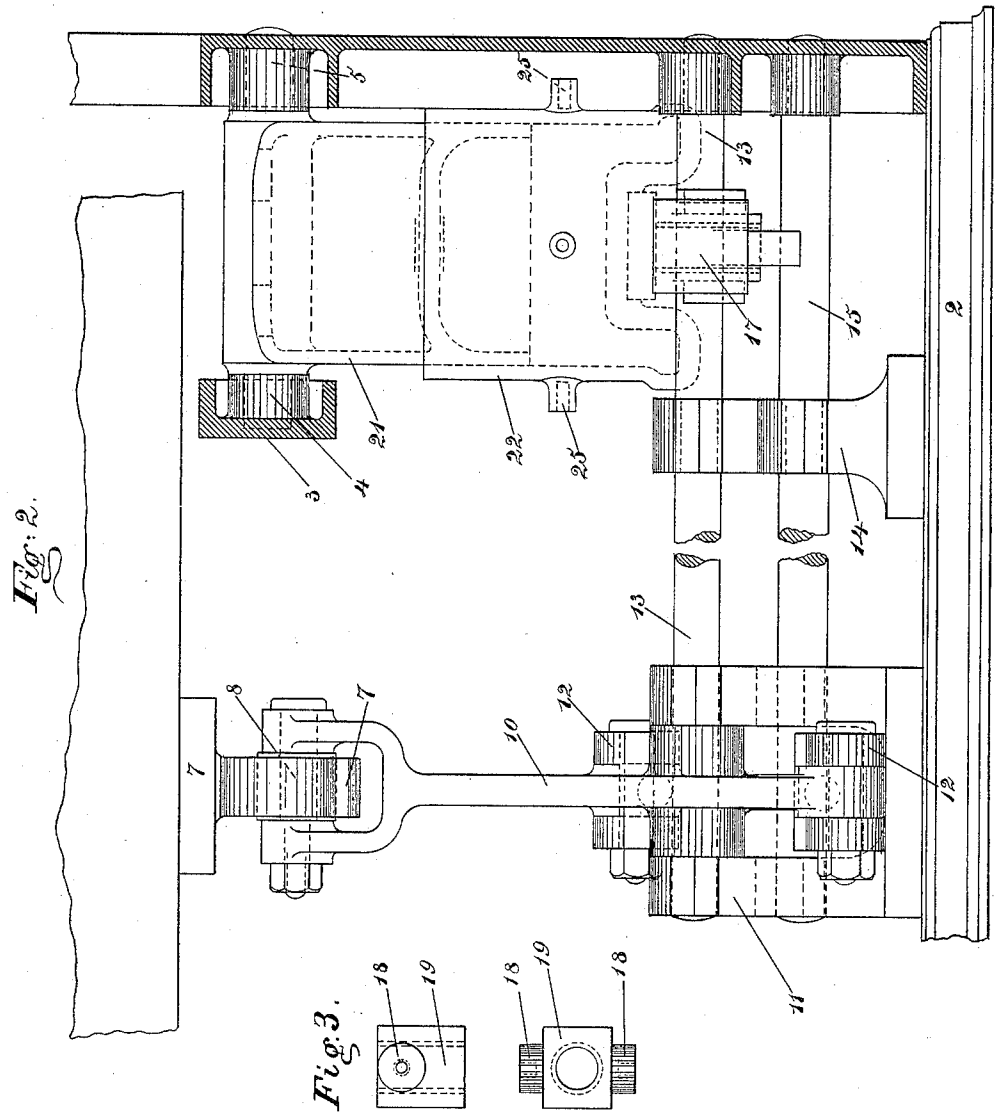


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN T. HAWKINS, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO THE CAMPBELL PRINTING PRESS AND MANUFACTURING COMPANY, OF NEW YORK, N. Y.

CUSHIONING APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 604,752, dated May 31, 1898.

Application filed July 10, 1890. Renewed October 30, 1897. Serial No. 656,961. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. HAWKINS, of Taunton, in the county of Bristol and State of Massachusetts, have invented a new and useful Cushioning Apparatus for Printing-Machines, which invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to provide an air-cushioning mechanism for printing-machines having reciprocating type or form beds in which the air-compressing cylinder acts in a generally vertical direction and in which the plunger will be the upper and stationary and the air chamber or cylinder the lower and movable member with its mouth upward, and to so arrange this air-cushion apparatus that the cylinder and plunger shall oscillate upon trunnions, so as to permit of adjusting the ratio of compression for a given amount of lineal movement of the type-bed in the proper proportion and in the direction of action of the moving levers, and for adjusting the amount of compression and initial resistance of the air at the point of the beginning of reversal of the type-bed without changing the ratio of compression thereafter for a given amount of motion of the said type-bed. One of the objects of so placing the air-cushion is to have the mouth of the cylinder upward, and thus prevent the oil necessary in its use from running out, and with this arrangement I arrange the levers and connections so as to make one and the same compression-cylinder operate in arresting the momentum of the bed at each end of its stroke.

The invention will first be described in detail, and then particularly set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the parts of a printing-machine constituting the cushion apparatus. Fig. 2 is an end elevation of the same. Fig. 3 shows in two views an adjusting-nut detached.

In the figures the several parts are respectively indicated by reference-numbers as follows:

The number 1 indicates one of the main frames, 2 the bed-plate, and 3 a longitudinal girder in which one of the trunnions 4 of the plunger 21 is journaled, its other trunnion 5 being journaled in the frame 1.

The number 6 indicates a portion of the reciprocating type-bed, to which is attached a double-horned roller-shoe 7, formed so as to give easy entrance to the rollers 8 upon it. In some constructions it is advisable to form the upper ends of the levers 9 and 10 into horns of similar shape to the horns of the shoe 7, placing the roller or rollers to engage them in suitable bearings attached to the type-bed in lieu of placing the rollers on the levers and the horns on the type-beds, as in this case. These constructions are, however, mutually equivalent, and this invention embraces one or both of them. A two-armed lever 10 is secured to a rock-shaft 13, which rock-shaft is journaled at one end in a bracket 11, secured to the base 2, and at the other end in the frame 1 and in an intermediate position in a bracket 14, also attached to said base. In the upper forked end of lever 10 is journaled a roller 8, which engages one horn of the shoe 7, and to the lower end of said lever is articulated one forked end of a connecting-rod 12. A lever 9 for the other end of the machine is secured to a rock-shaft 15, which is journaled at its inner end in a bracket 16, secured to the bed-plate, and at the outer end in the frame 1, the upper end of lever 9 similarly carrying a roller 8, which engages the corresponding horn of shoe 7. The other forked end of connecting-rod 12 is articulated to lever 9 at a suitable point between the fulcrum and the roller 8, so as to give the same compression to the air-cushion for a corresponding movement of roller 8 as for lever 10. Secured to rock-shaft 13 is a curved forked lever 17, the forked free end of which lever forms open bearings for the trunnions 18 of the adjusting-nut 19.

The number 21 indicates the oscillating plunger; 22, the reciprocating and oscillating air-chamber; 23, a screw secured to the bottom of the chamber 22, and 24 a pin or capstan-wrench, by means of which pin the chamber 22, and with it the screw 23, may be rotated by inserting it into suitable holes 25 in the chamber 22, prepared for that purpose.

A vacuum-valve 26 is located in the lower

head of the plunger 21 to permit of the entrance of air from the outside to compensate for leakage and prevent the formation of partial vacuum in the air-chamber, holes 27 being made in the upper head of plunger 21 for supplying air to it.

Under most conditions and proportions of such printing-machines in order to absorb the momentum of the bed, so as to release the working parts from the stresses which would otherwise come from the *vis viva* of the working parts of the bed, it is desirable that after compressing the air or other form of spring to a certain resistance at the commencement of the reversal period the ratio of compression or increase of resistance of the spring thereafter for a given linear movement of the bed shall differ considerably from the resistance which would accumulate by compressing said spring or cushion in a direct ratio of the linear movement of the bed, and it is also desirable that this ratio of resistance or accumulation of resistance should not be changed when the total resistance is changed, as may be required for changes in velocity of the bed, as for different speeds of the machine.

In many machines of this kind the compression of the spring or cushion is effected in the direct ratio in the linear motion of the bed by attaching the plunger directly to the bed and the chamber to some part of the framing of the machine, or vice versa, and in nearly all others a change in the volume of the chamber, and thus in the maximum resistance offered, is obtained for different speeds of machine by changing the relative positions and directions of effort of the levers employed, and therefore producing a change in the ratio of compression or accumulation.

In this construction it will be noted that by rotating the chamber 22 and with it the screw 23 the volume of the air-chamber, and therefore the maximum compression which may be obtained, may be varied to suit the different velocities of the bed without changing the diminishing ratio of compression effected by the relative action of the lever-arm 17 and the oscillation of the air-chamber 22. In the drawings it is so proportioned that the ratio of compression for a given linear movement of the bed after full entrance of the rollers 8 upon the horns 7 is such as to be less than would obtain by the compression or movement of the air-chamber when proportional to the linear movement of the bed at all points, and a diminishing ratio of compression is found to be most desirable and productive of less stress upon the working parts which impart motion to the bed.

I do not confine myself to an oscillating air-chamber in order to produce, in connection with the operating-lever, a reduced ratio of compression, as the same effect may be produced by means of a link connecting said lever to a vertically-sliding air-chamber without oscillating by using a proper proportion of link and lever.

Having thus fully described my said invention, I claim—

1. In a printing-machine, the combination with a reciprocating type-bed, of a vertical plunger, as 21, a vertically-moving air-chamber, or cylinder, sliding thereon; levers, as 9 and 10, and a lever, as 17, for transmitting the motion of said bed to said cylinder, or air-chamber; said levers being fulcrumed and connected substantially as described so that the motion of either of levers 9 and 10 transfers the motion of said bed to said air-chamber: whereby one and the same air-chamber, or cylinder, is utilized as a cushion for both strokes of said bed, substantially as set forth.

2. In a buffer, or cushioning, apparatus of a printing-machine, in combination with a reciprocating type-bed, a vertically-moving air-chamber, as 22, sliding upon a vertically-set plunger; levers, as 10 and 17, for transmitting the motion of said bed to said air-chamber; a nut, as 19, journaled in said lever 17, and a screw, as 23, operating within said nut, secured to said air-chamber; whereby, by the rotation of said screw, the volume of said air-chamber may be varied, substantially as and for the purposes set forth.

JOHN T. HAWKINS.

Witnesses:
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