

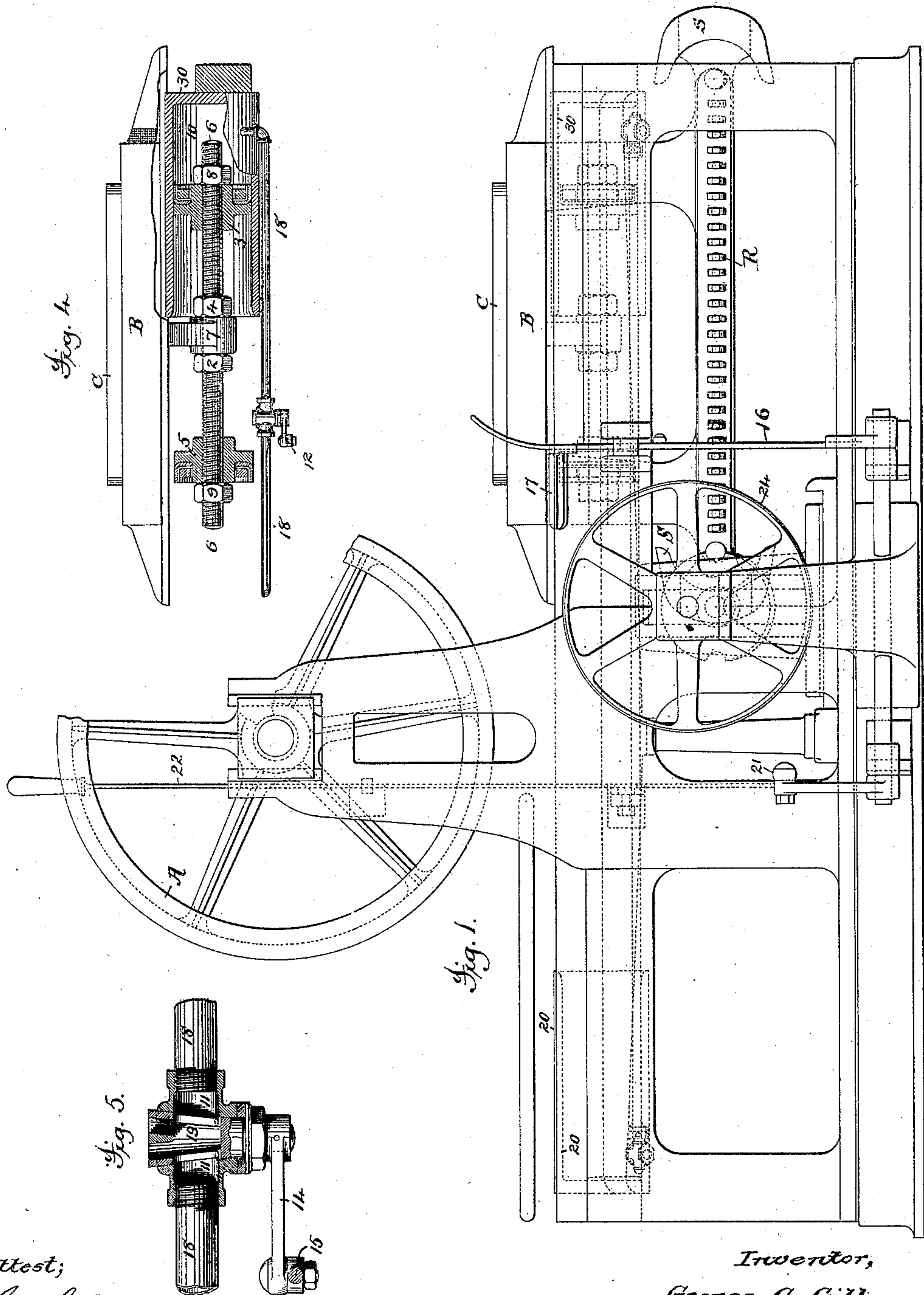
(No Model.)

3 Sheets—Sheet 1.

G. C. GILL.
PRINTING MACHINE.

No. 311,976.

Patented Feb. 10, 1885.



Attest;

Edw. H. Graham
J. W. Palmer

Inventor,
George C. Gill,
by *Munson & Philipp*
Attys.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 6.

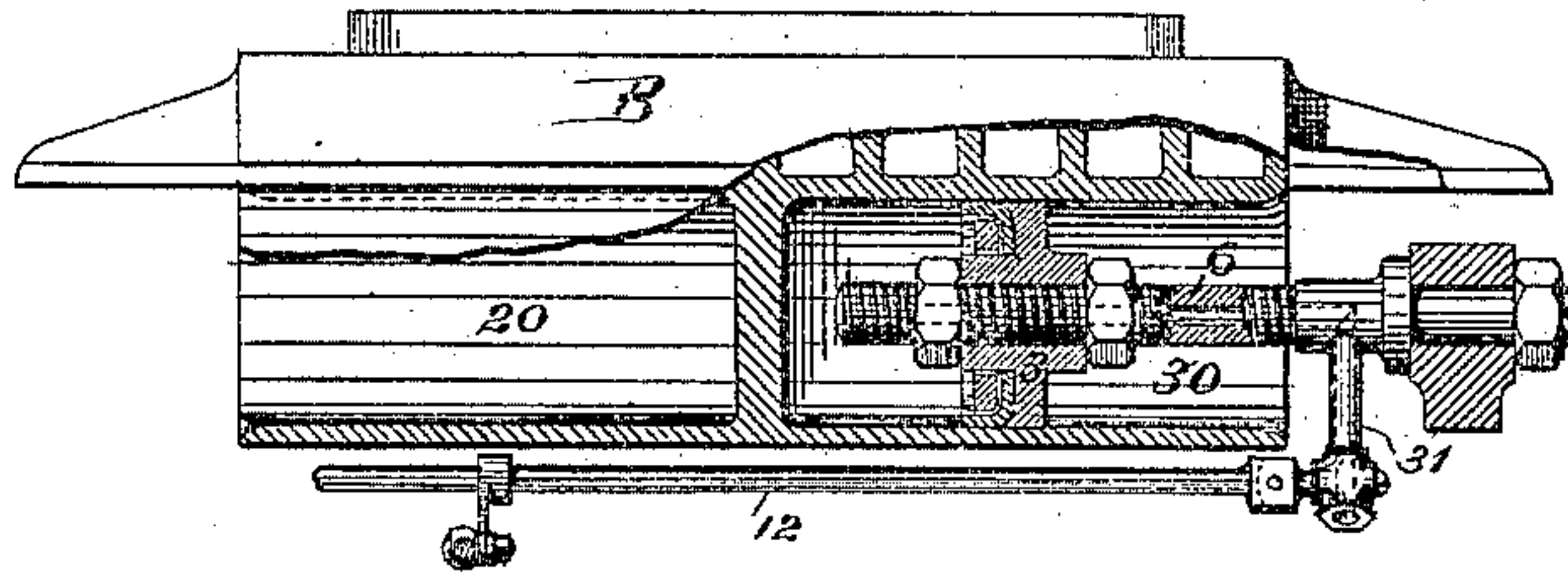
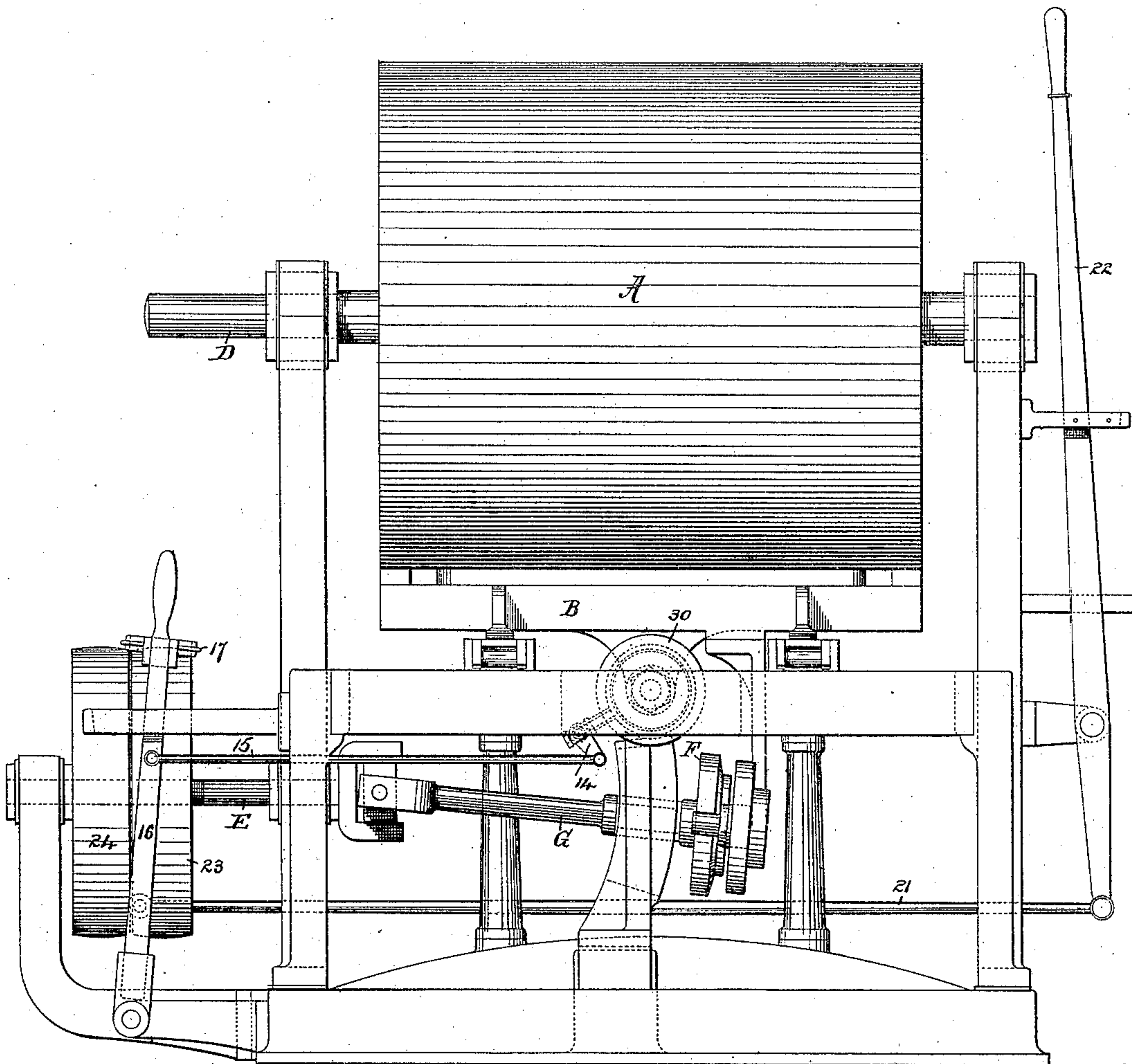


Fig. 2.



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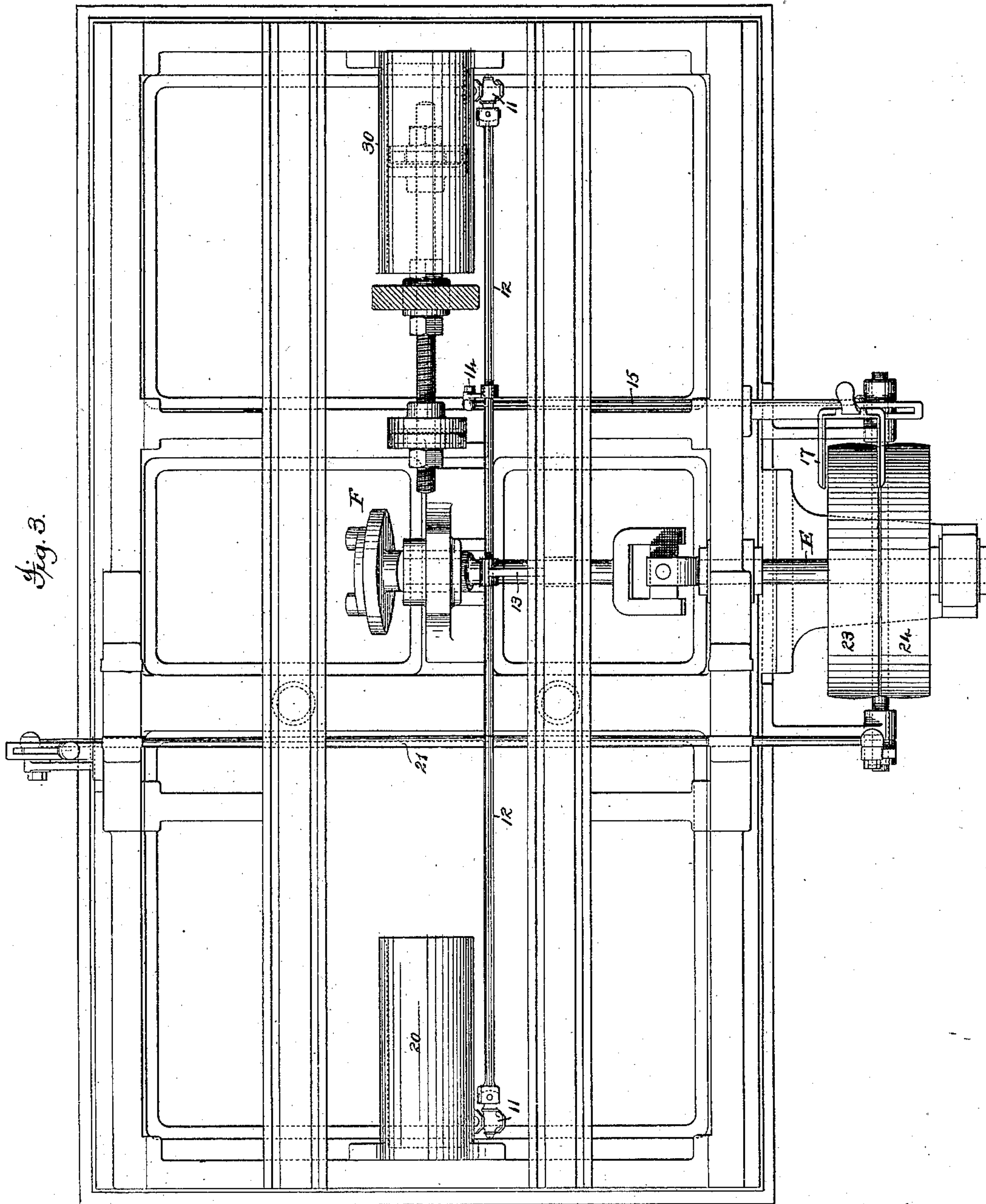
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3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

GEORGE C. GILL, OF BROOKLYN, ASSIGNOR TO R. HOE & CO., OF
NEW YORK, N. Y.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 311,976, dated February 10, 1885.

Application filed March 12, 1881. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. GILL, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to that class of printing-machines which are provided with reciprocating type-beds, said invention being particularly directed to means for aiding the mechanism that drives the type-bed, to gradually arrest the motion of said type-bed at the termination of its travel in one direction, and to start it in an opposite direction. These bed-arresting mechanisms are commonly located at or near each end of the stroke of the reciprocating bed, and in an improved form consist of cylinders, the pistons of which are attached to or otherwise moved by the said bed, or vice versa, the said cylinders and pistons constituting an air-spring.

25 The improvement now effected consists, mainly, in furnishing each cylinder of such air-springs with a relief cock or orifice at a point beyond that reached by the piston in its inward movement, and by which movement the air is compressed in said cylinder, said cocks or orifices being provided with means for opening and closing them that are connected with the belt-shifter or similar device moved thereby. Thus, when the machine is stopped by the operation of the belt-shifter, the said cocks or orifices may be opened to form a free communication from the cylinders to the external air, and thus permit an easy and ready movement of the bed by hand when required in making up or examining the form, and closing said cocks or orifices when the belt-shifter is moved to set the machine in operation, whereby the air in the cylinders is confined therein, so that it may be compressed by the pistons, and thus act as a spring. A particular construction of mechanism is also embraced in the said invention. A practical embodiment of these improvements is illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation, and Fig. 2 an end elevation, of a printing-machine containing them. Fig. 3 represents a plan view of such machine, with a portion of the upper works removed to more clearly expose the lower mechanisms and illustrate the application of these improvements. Fig. 4 represents the type-bed and the air-spring at one end of the machine, and Fig. 5 illustrates the details of construction of a peculiar valve. Fig. 6 represents a modification.

The principal feature of a printing-machine of the class to which this invention is applicable is an impression-cylinder, A, that is mounted to turn in suitable bearings, and to co-operate with a reciprocating type-bed, B, upon which is secured the form C.

There are various well-known arrangements of mechanisms for causing the impression-cylinder A and type-bed B to travel in unison during the printing operation, and to admit of the return movement of said bed. In this class of presses the motions of their parts are all derived from a main driving-shaft, as E. In most approved constructions the reciprocating bed B is driven back and forth by the shaft E by means of a vibrating shaft, G, that carries a pinion, F, which travels on the upper and under sides of a toothed rack, R, provided with end shoes or reversing-guides S, as is common; but this motion is sometimes given by other means.

One manner of connecting the driving-shaft E with the impression-cylinder A is by a toothed wheel on the shaft driving an intermediate wheel which meshes with a toothed wheel on the shaft D of the cylinder A, all of which will be well understood by those conversant with this art, and no further or more particular description of the class of printing-presses having reciprocating beds to which these improvements are applicable is necessary for a thorough understanding of the same.

In the structure herein shown an air-cylinder is employed at each end of the machine. These cylinders are marked, respectively, 20, 30, and are secured to the frame of the machine in any suitable manner, as is seen particularly in Figs. 3 and 4. One of these cylinders that is marked 30 (see Fig. 4) will now

be particularly described, together with its appurtenances. It is cylindrical or of other proper shape, closed at its outer end and having an open mouth at its inner end, which mouth is preferably beveled, so as to permit the ready entrance of the piston. The piston 3, which enters in this cylinder 30, is provided with a cup-packing or any other suitable packing, and is supported upon a piston-rod, 6, that is sustained by a boss, 7, depending from the under side of the bed B. This piston-rod is secured thereto, and has a screw-thread cut upon it, so that the piston 3, which is adapted to rotate upon it, may be adjusted longitudinally to determine its extent of entrance into the said cylinder, a jam-nut, 8, securing its adjustment. This piston-rod 6 extends in opposite directions from the boss 7, and is furnished at the opposite end with a piston, 5, and a jam-nut, 9, whereby said piston may, like the piston 3, be adjusted in its position thereon. This piston-rod 6 passes through a hole in the boss 7, so that it may be adjusted therein as may be required, nuts 2 and 4 securing it in place. As the type-bed is reciprocated to and fro it carries with it the pistons 3 5, and causes the same, as they enter the cylinders 20 30, to compress the air therein, and thus cause it to act as a spring to gradually check up, and finally, in concert with the driving mechanism, arrest the movement of the bed in one direction, and to aid in starting and impelling the bed in the opposite direction; and the piston 3, when in the position shown in Fig. 4, which is that of the bed when in its position of farthest travel in one direction, by the action of its driving mechanism, then compresses the air in the cylinder 30 to the greatest degree, which should be just sufficient to counteract the momentum of the bed. Now, it is a necessity that some provision should be made to relieve the air-pressure in such cylinder when the machine is at rest, to enable the operator to run the bed outward and inward by hand when such movement is desirable, as in making ready forms or otherwise examining the same. A simple cock communicating with the chamber 10, in which the compressed air is held, would be sufficient for this purpose; but it would obviously require the attendant to open the same by hand and to close it before again setting the machine into operation. To avoid the loss of time and inconvenience attending this hand operation, and to prevent its being omitted, and thereby breaking or otherwise injuring the machine, the cylinders 20 30 are each provided with a relief-orifice at a point beyond that to which the piston enters them, which orifices are provided with cocks 11, (see Fig. 3,) the valve-stems of which are provided with a valve-rod, 12, that is journaled to turn in a bracket, 13, and provided with a rock-arm, 14, to which is pivoted a rod, 15, the outer end of which is also pivoted to the lever 16 of the belt-shifter 17, which belt-shifter, as shown, is also provided

with a rod, 21, connecting it with an auxiliary lever, 22, whereby the belt-shifter 17 may be operated from either side of the machine. From this description it will be obvious that when the belt-shifter 17 is operated to throw the driving-belt from the fast pulley 23 to the loose pulley 24, and thus suspend the operation of the driving mechanism, the rod 15 will, through the rock-arm 14 and the valve-rod 12, open the cocks 11, so as to make a free passage from behind the piston then entered into the cylinder to the external air, and thus relieve the air-pressure, and this will permit the easy movement of the piston in said cylinder, and thereby enable the operator to run the bed in and out without exerting any undue power.

When it is desired to start the machine, the air-spring is brought into action again by the operation of throwing the driving-belt onto the fast pulley through the reversed action of the rods 15 and 12, which closes the cocks 11, and thereby closes the air-passage, so that the entrance of the piston therein will cause the pressure of air to act as a spring, as before described.

It will be apparent that the relief-orifices in the cylinders may be extended by pipes, as 18, that communicate with a double cock of a construction such as is shown in Fig. 5, where the passages are marked 11 11 to show their correspondence in function to the passages of the cocks 11. The plug of this cock is provided with two side openings adapted, when the plug is in a certain position, to communicate simultaneously with the passages 11, which openings lead to a common central chamber, 19, in said cock, said chamber being open at the top to the external air. The plug of this cock is provided with a rock-arm marked 14, to show its correspondence with the rock-arm 14 shown in the other figures, and which, like said rock-arm, is provided with an operating-rod, 15, suitably connected with the belt-shifter 17, so as to be rocked when it is moved as follows: When the shifter is moved to carry the driving-belt onto the loose pulley, the arm 14 will be so rocked as to bring it into the position shown in Fig. 5, and thus establish communication from the cylinders 20 30 with the external air, whereby the air-pressure is relieved, as is readily apparent. When the driving-belt is moved onto the fast pulley, the rock-arm 14 will be simultaneously moved to close the passages 11, and thereby confine the air within the cylinders, so that it may be compressed therein in like manner as has been explained. It will thus appear that the operation of stopping the driving mechanisms of the press simultaneously performs the operation of relieving the air-pressure in the cylinders, and that the operation of setting in motion the driving mechanisms of the press simultaneously closes the cock, so that the air may be compressed in the cylinders to form air-cushions for coaction with the type-bed in

checking up its momentum in one direction, stopping the same, and aiding to start it in its movement in the opposite direction, thus avoiding any manipulation by the operator
 5 other than that required to stop the machine, so that whenever the machine is at rest, which is the time when the manipulation of the type-bed must be performed, said type-bed is always relieved from the action of the air-spring, and is in a condition to be run in and
 10 out without any undue labor.

It is obvious that the cylinders may be attached to the bed and the pistons to the framework, as in Fig. 6. In this arrangement the
 15 piston-rod is made hollow a certain distance, and a short pipe, 31, is inserted into its bore, near the end frame, beyond a point to which the piston is ever adjusted. The relief-cock 11 is connected to this pipe, and its plug is operated by the valve-rod 12 through the rock-
 20 arm 14, as already described. The piston-stem might be made hollow its whole length and the cock 11 be connected with its outer end; but in that situation it would be more
 25 exposed to accidents; or the short pipe 31 may be bent at a right angle, one arm of which, with the cock 11 at its lower end,

would be secured to the end frame, and the other arm would run horizontally through the piston some distance through a suitable slip-
 30 joint, the piston in such case being adjusted on its stem without being revolved by means of a nut at either side of it, as shown in Fig. 6.

What is claimed is—

1. The combination, with the reciprocating
 35 bed, pistons 3 5, and cylinders 30 20, of air-passages communicating with said cylinders at a point beyond that to which the piston enters, which passages are governed by a cock or cocks that are controlled by the belt-shift-
 40 ing mechanism of the machine, substantially as described.

2. The combination, with the bed B, pistons 3 5, cylinders 30 20, cocks 11 11, rod 12, and rock-arm 14, of means connecting said
 45 rock-arm with the lever of the belt-shifter, all substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE C. GILL.

Witnesses:

CHAS. W. CARPENTER,
 ERNEST VOORHIS.