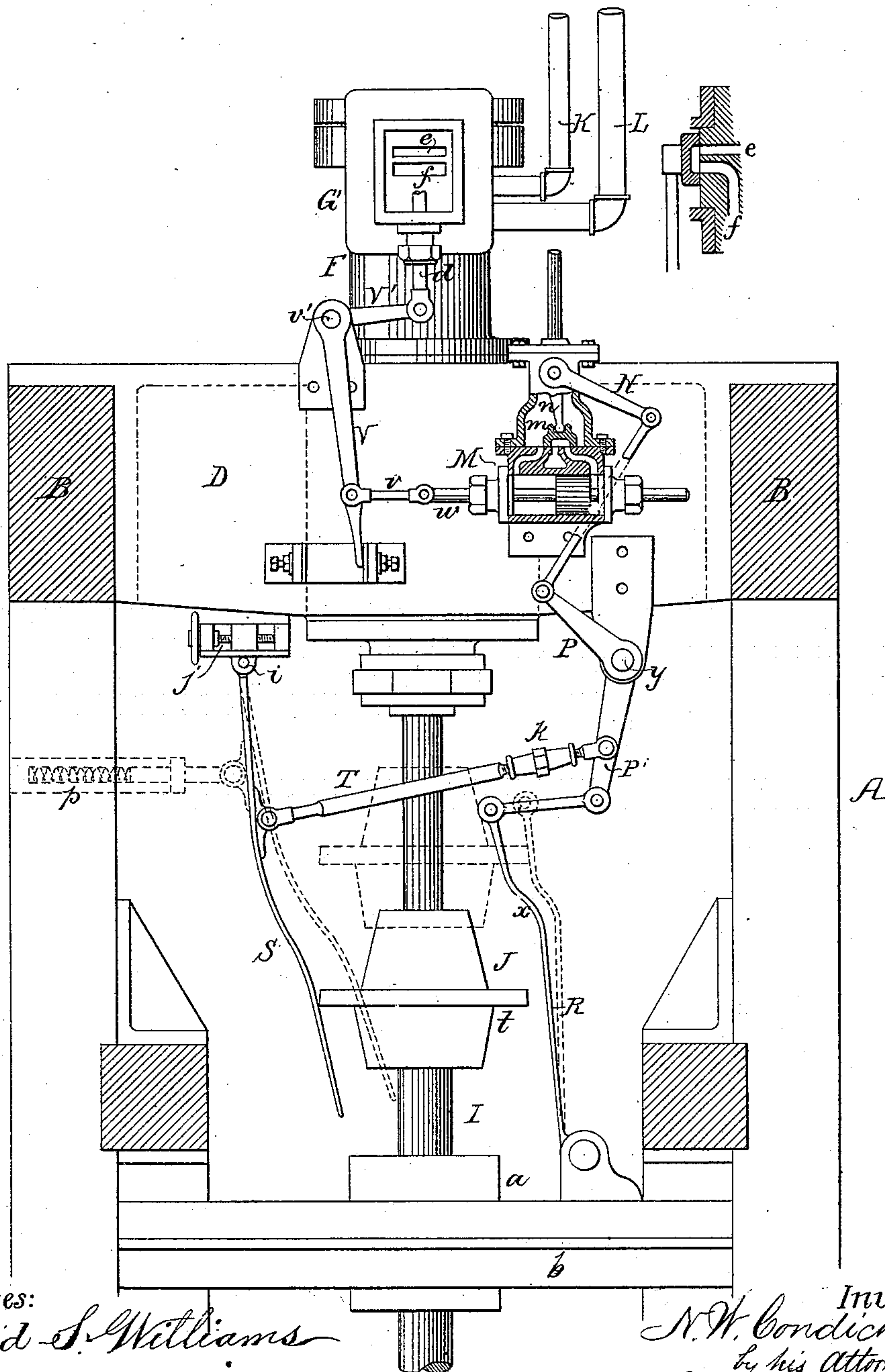


3 Sheets—Sheet 1.

No. 275,358.

Patented Apr. 10, 1883.

FIG. 1.



Witnesses:

Witnesses:
David S. Williams
James F. Tobin.

Inventor

Inventor
N. W. Condict Jr
by his Attorneys
Howe and Jones

(No Model.)

3 Sheets—Sheet 2.

N. W. CONDUCT, Jr.
STEAM STAMP OR HAMMER.

No. 275,358.

Patented Apr. 10, 1883.

FIG. 2.

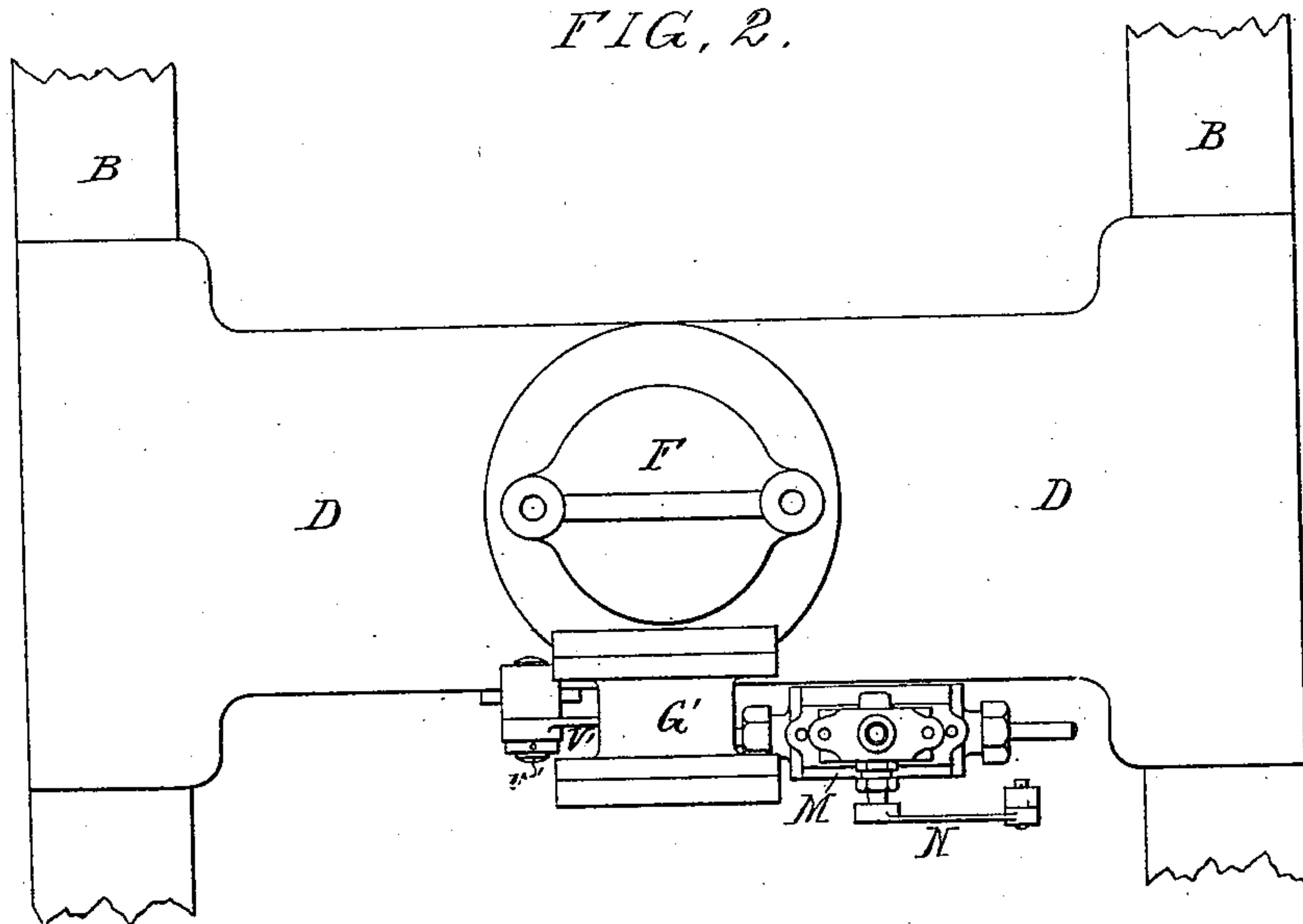
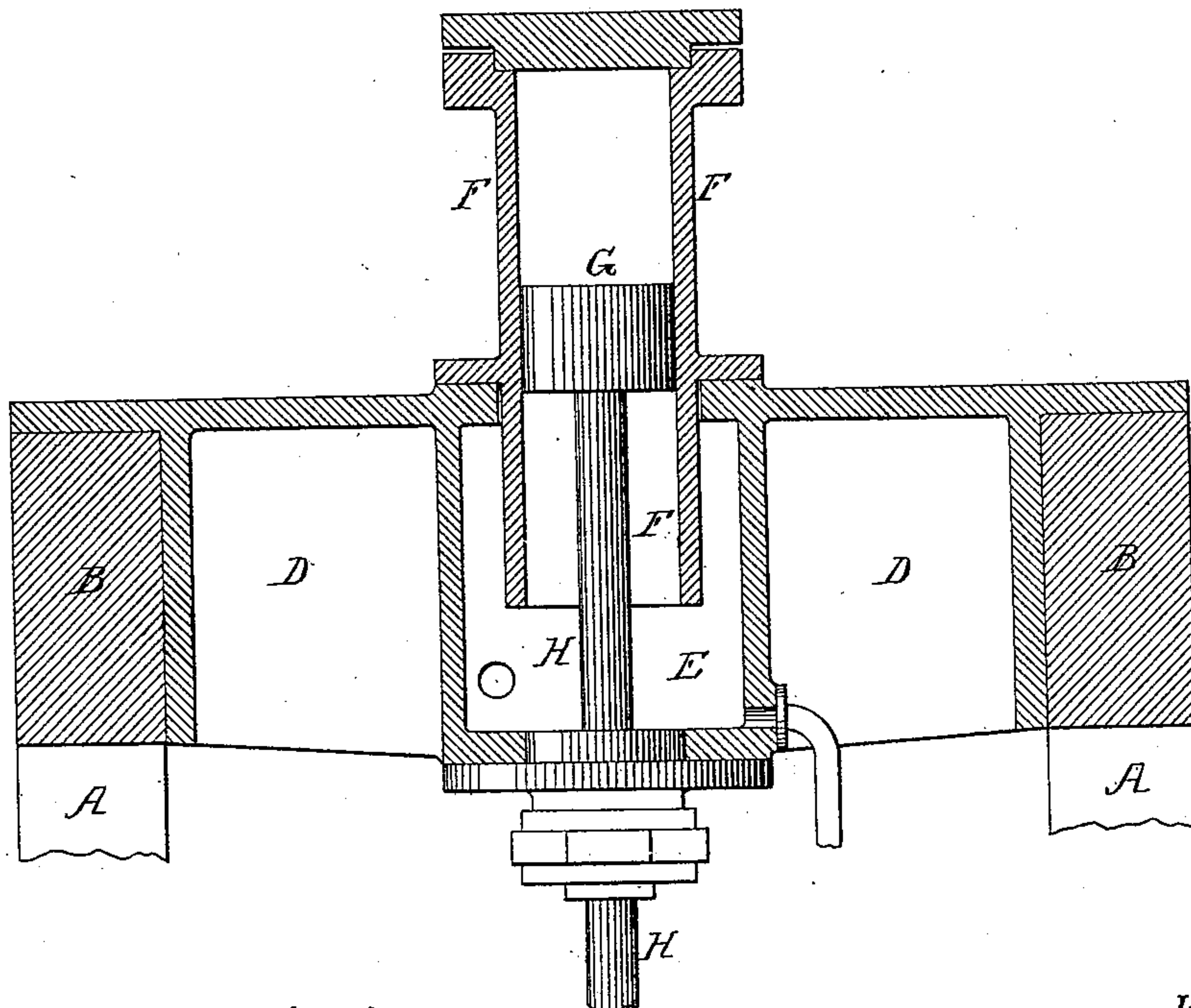


FIG. 3.



Witnesses:

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(No Model.)

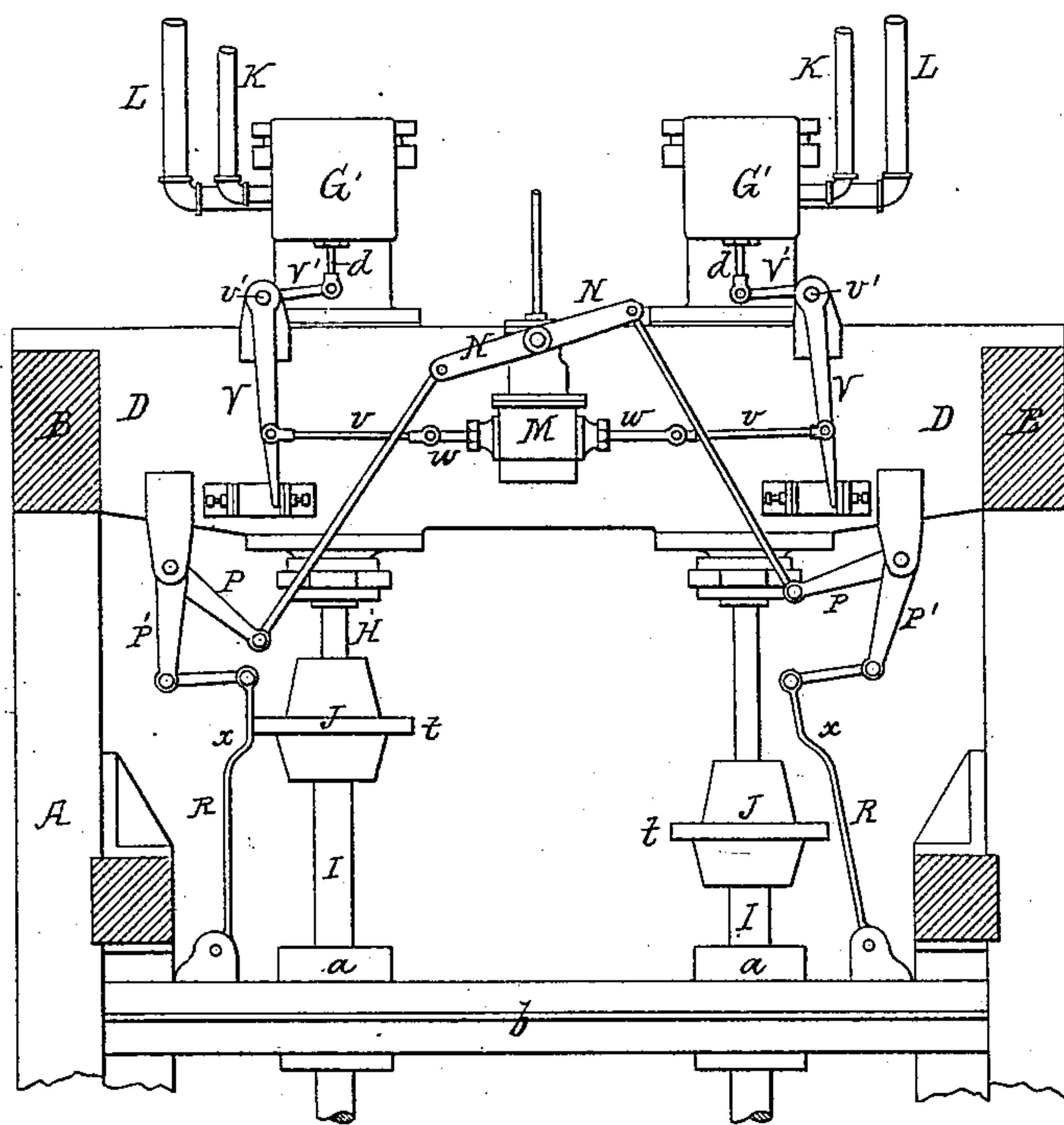
3 Sheets—Sheet 3.

N. W. CONDUCT, Jr.
STEAM STAMP OR HAMMER.

No. 275,358.

Patented Apr. 10, 1883.

FIG. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

NATHAN W. CONDUCT, JR., OF JERSEY CITY, NEW JERSEY.

STEAM STAMP OR HAMMER.

SPECIFICATION forming part of Letters Patent No. 275,358, dated April 10, 1883.

Application filed November 23, 1881. Renewed September 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, NATHAN W. CONDUCT, Jr., a citizen of the United States, residing in Jersey City, New Jersey, have invented certain Improvements in Steam Stamps or Hammers, of which the following is a specification.

My invention consists of mechanism, fully described hereinafter, for operating the valves of that class of steam stamps or hammers in which the stamp-rod is raised by the pressure of steam always in communication with the cylinder below the piston of the stamp-rod, and in which the descent of the stamp-rod and force of the blow is due to the action of steam on the top of the piston at a pressure in excess of that below the same, as described in the Reissued Letters Patent No. 2,461, granted to O. R. James and myself, January 15, 1867. Original patent June 19, 1866.

In the accompanying drawings, Figure 1, Sheet 1, is a front view of part of a steam-stamp of the class referred to, with mechanism for operating the valve; Fig. 2, Sheet 2, a top view; Fig. 3, a vertical section of the cylinder, and Fig. 4, Sheet 3, a front view, illustrating the mode of carrying out my invention in connection with a duplex steam-stamp.

Referring to Figs. 1, 2, and 3, A A are posts, which, with suitable cross-pieces, B, and a hollow casting, D, constitute the frame of the machine. Within the said casting D is formed a chamber, E, Fig. 3, and into the latter extends a portion of the cylinder F, G being the piston and H the piston-rod, which is connected to the stamp-rod I by a coupling, J, referred to hereinafter, the stamp-rod being arranged to slide in a guide, a, secured to the frame through the medium of cross-bars b.

It has not been deemed necessary to show the lower end of the stamp-rod or the mortar or anvil in connection with which it operates, for if a mortar in which to crush minerals be employed, it may be similar to those used in connection with other stamps for crushing ores, &c., and if an anvil be required it may be similar to the anvils of steam-hammers.

Steam at a low pressure just sufficient to raise with the required rapidity the stamp, stamp-rod, piston, and piston-rod is always maintained within the chamber E when the machine is in operation. For this purpose I generally use a small steam-pipe provided with

a valve weighted to blow off at the desired pressure and communicating with the said chamber.

G' is the steam-chest, containing an ordinary slide-valve attached to the valve-spindle d, the valve-seat having two ports, e and f, the former affording, when the valve permits it, a communication between the interior of the cylinder above the piston and the valve-chest, to which steam from the boiler is directed through a pipe, K, the lower or exhaust port, f, forming a communication between the cylinder above the piston through the port e, and the recess of the valve with an exhaust-passage communicating with the exhaust-pipe L when the valve is open to the exhaust.

A small steam-engine, M, is secured to the frame, and has a cylinder, piston, and piston-rod, steam and exhaust passages, a valve-chest, and valve, precisely as in an ordinary steam-engine. The valve m of this small engine is operated in the present instance by an arm, n, on a spindle, which passes through the steam-chest, and which has a lever, N, connected by a rod to an arm, P, on a shaft, y, having its bearing in a bracket on the frame, and to this shaft is secured an arm, P', connected by a link to an arm, R, the lower end of which is pivoted to the frame, this arm being bent at x, for a purpose explained hereinafter.

An elastic arm, S, is pivoted at its upper end to the frame, is bent as shown, and is free at its lower end, a link, T, serving to connect this arm to the above-mentioned arm P'.

The valve-spindle d of the main cylinder is connected to the piston-rod w of the small-cylinder through the medium of a link, v, and a rock-shaft, v', having two arms, V and V', the arm V being connected to the piston-rod and the arm V' to the valve-spindle, and the rock-shaft having its bearings in an attachment to the frame.

The coupling J has a flange, t, which, during the upward stroke of the piston, strikes against the bent portion x of the arm R and forces it to the position shown by dotted lines in Fig. 1, moves the valve m of the small engine in one direction through the medium of the connections described, and causes the piston of the said small engine to so operate the valve of the main cylinder that steam will be admitted to the latter above the piston, thereby

insuring the prompt descent of the stamp-rod, the flange *t* striking the arm *S* and moving the valve *m* in a contrary direction to that in which it was moved by the striking of the arm *R*, thereby causing the piston of the small cylinder to so move the valve of the large cylinder that the steam will be exhausted from the latter above the piston, thus permitting the steam at a lower pressure in the chamber *E* to elevate the piston and stamp rod. It will be seen that the movement of the valve of the main cylinder is directly effected by the pressure of steam on the piston of the small engine in obedience to the action of the flange *t* on the arms *R* and *S*, as this action controls the valve of the small engine. Hence, as the small valve is of limited area, it can be operated by a slight effort, and the wear on the said arms *R* and *S* will be slight.

My invention is not dependent upon the precise style of small engine used, nor the connections described between the piston-rod of the small engine and the main valve, or those between the arms *R* and *S* and the valve of the said small engine, for the latter may be located in different positions, demanding different connections.

As before remarked, the arm *S*, or the lower portion of the same, is elastic, so that on the descent of the stamp-rod the said arm will yield before it acts on the valve of the small cylinder and permit an effective blow to be delivered before the movement of the valve of the small engine causes the piston of the latter to so move the main valve as to effect the rising of the stamp-rod. In other words, owing to the elasticity of this arm *S*, there is a very slight hesitancy in its operation of the valve of the small engine; but the hesitancy is of sufficient duration to permit the stamp-rod to deliver the desired blow before it rises.

The arm *S* must be nicely adjusted. Hence I prefer to pivot it to a block, *i*, Fig. 1, adapted to guides on the frame and controlled by a screw, *j*. It is also important that the arm *S* should be nicely adjusted in respect to the arm *R*. Hence I provide the link *T* with a screw-coupling, *k*, by which the said link may be lengthened or shortened. This link may, if desired, be connected directly to the arm *R*. It is not essential that the arm *S* should possess inherent elasticity. It may be rigid, provided that it is acted on by any elastic medium. It may, for instance, be acted on by a spiral spring contained in a casing, *p*, secured to the frame, as indicated by dotted lines in Fig. 1, the spring bearing against a rod jointed to the bar, in which case the latter, although of itself rigid, would be substantially an elastic arm.

Suitable projections on the main piston-rod or stamp-rod may be made to perform the same duties as the flange *t* on the coupling, by which the two rods are connected together.

In making stamps for crushing minerals it is sometimes advisable to employ two stamp-rods and two cylinders, as shown in Fig. 4, Sheet 3, in which case I connect one end of the piston of the small engine to the valve of one cylinder, and the other end of the piston to the valve of the other cylinder, and, dispensing with the arm *S*, use two arms, *R R*, one to be operated by the flange *t* of one stamp-rod and the other by the flange of the other rod, and both arms being connected to a lever on the spindle which passes into the steam-chest of the small engine. The two arms *R R* may be connected together by a rod, if desired.

The operation of this duplex steam-stamp will be understood without explanation.

I claim as my invention—

1. A steam-stamp in which the following elements are combined, namely: first, a steam-cylinder to the piston of which the stamp-rod is connected; second, a chamber in which steam at a low pressure is maintained for acting on the underside of the piston; third, a valve for admitting steam to and exhausting it from the cylinder above the piston; fourth, a small steam-engine, the piston of which is connected to the main valve; and, fifth, mechanism through the medium of which the valve of the small steam-engine is controlled by the piston or stamp rod of the main cylinder, all substantially as set forth.

2. The combination of a projection on the piston-rod or stamp-rod of the large cylinder and the small engine having its piston connected to the main valve, with an arm, *R*, and mechanism through the medium of which the said arm is caused to act on the valve of the said small engine, substantially as described.

3. The combination of a projection on the piston-rod or stamp-rod of the large cylinder and the small engine, having its piston connected to the main valve, with an elastic arm, *S*, and mechanism through the medium of which the said arm is caused to act on the valve of the said small engine, substantially as specified.

4. The combination of the piston or stamp rod and its projection and the elastic arm *S*, with an adjustable block, *i*, to which the arm is pivoted, substantially as set forth.

5. The combination of the piston-rod or stamp-rod of the main cylinder, the arm *R*, and the elastic arm *S*, connected to the said arm *R*, all substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

N. W. CONDUCT, JR.

Witnesses:

HARRY DRURY,
HARRY SMITH.