3 Sheets—Sheet 1.

J. B. ELLENBECKER.

Steam-Stamp.

No. 198,509. **Patented Dec. 25, 1877.**

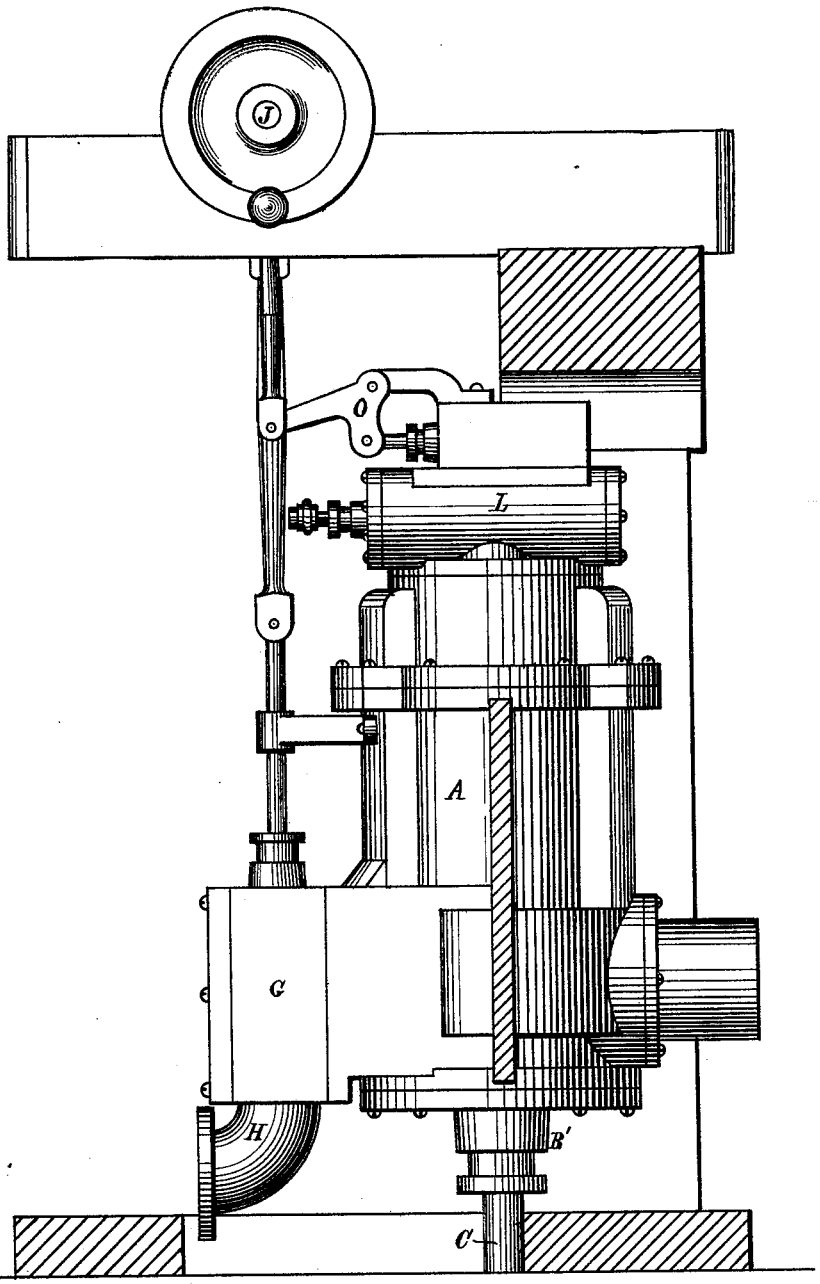

FIG. 1.

WITNESSES.

E. A. Hemmenway.
Benj. Andrews, Jr.

INVENTOR.

John B Ellenbecker By
Wm. C. Hibbard his Atty.

J. B. ELLENBECKER.

Steam-Stamp.

No. 198,509. Patented Dec. 25, 1877.

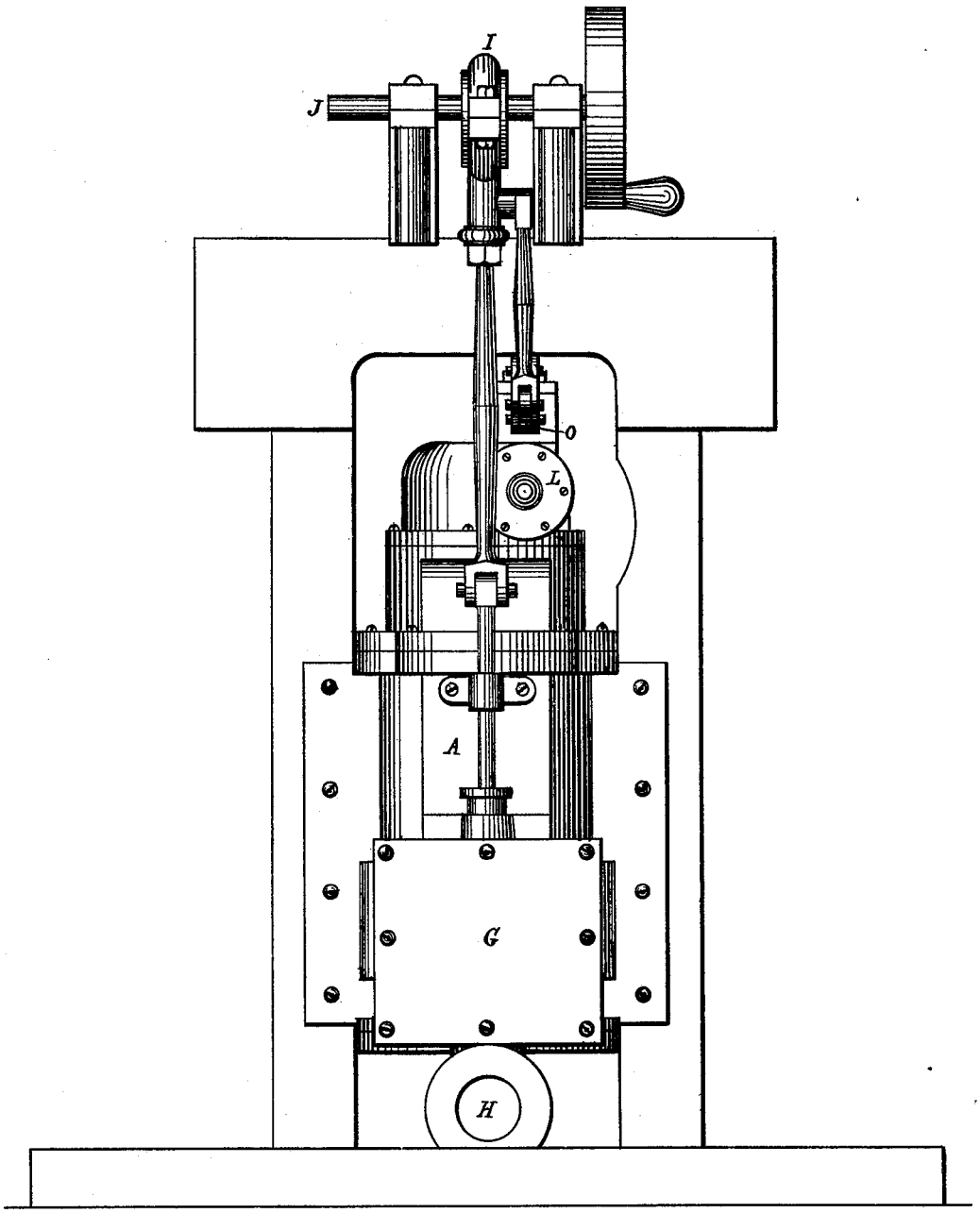

FIG. 2.

WITNESSES.

E. A. Hemmenway.
Benj. Andrews. Jr.

INVENTOR.

John B. Ellenbecker By
Wm. C. Hibbard his Atty

3 Sheets—Sheet 3.

J. B. ELLENBECKER.

Steam-Stamp.

No. 198,509. Patented Dec. 25, 1877.

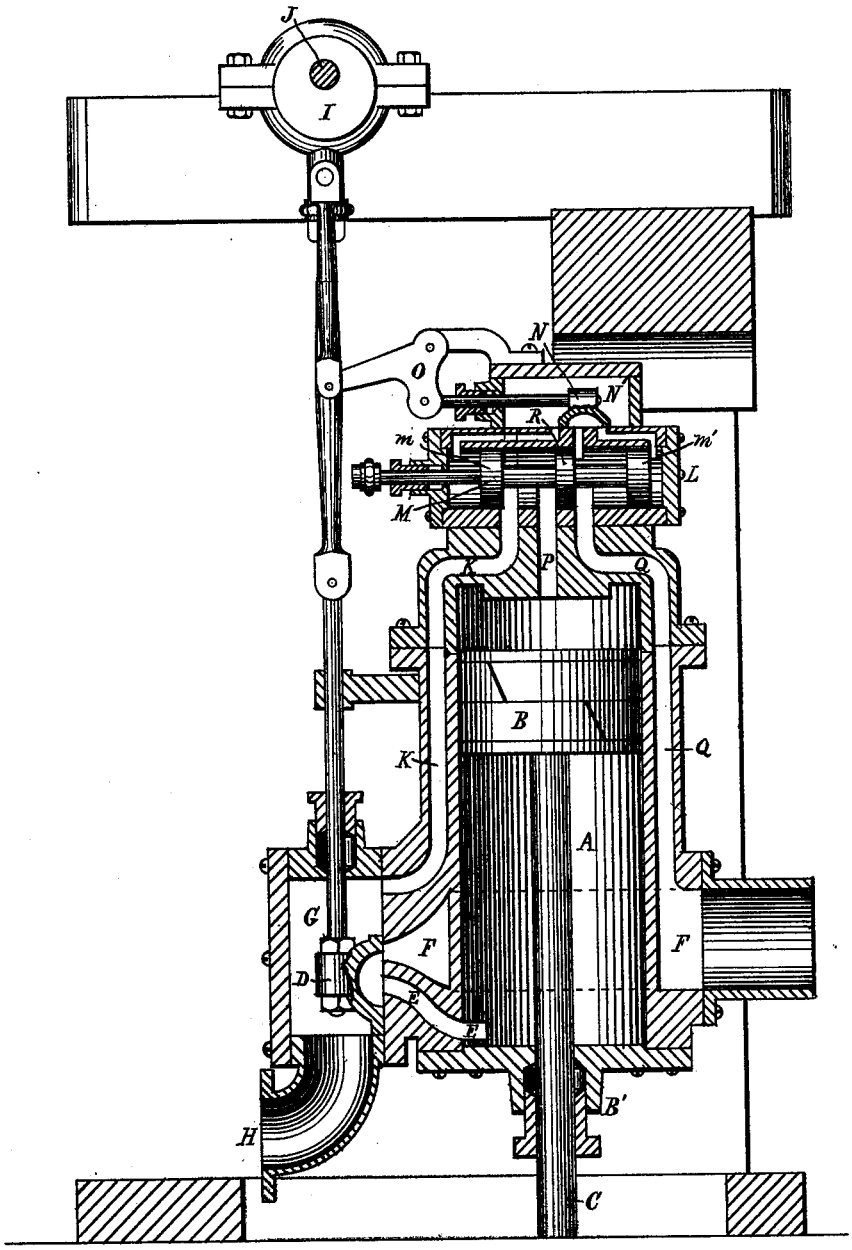

FIG. 3.

WITNESSES.

E. A. Hemmenway

Benj. Andrews. Jr.

INVENTOR.

John B Ellenbecker By

Wm C Hibbard his Atty.

UNITED STATES PATENT OFFICE.

JOHN B. ELLENBECKER, OF LAKE LINDEN, MICHIGAN.

IMPROVEMENT IN STEAM-STAMPS.

Specification forming part of Letters Patent No. **198,509**, dated December 25, 1877; application filed April 4, 1877.

To all whom it may concern:

Be it known that I, JOHN B. ELLENBECKER, of Lake Linden, in the county of Houghton and State of Michigan, have invented certain Improvements in Steam-Stamps, of which the following is a specification:

My improvements relate to the construction of steam-stamps, so called, in which the stamp is raised by the direct action of the steam upon a piston which is attached to the bar or stamp-rod which raises the stamp-head, and works in a cylinder placed above, in a manner similar to the steam-hammer.

My improvement relates to the construction and arrangement of the mechanism for working the steam which raises the stamp, and also throws it down to crush the ore; and consists in placing the upper valve and its valve-chest, which admits the steam that throws down the piston and stamp to strike its blow, upon the top of the cylinder, and near a right angle to the main valve at the bottom of the cylinder, which admits the steam to raise the stamp, each of them being worked by separate mechanisms having different movements, by which the timing of the movements of the two valves may be better adapted to the different action of the steam in raising the stamp from that required in throwing it down.

In this machine the valves are worked from a separate revolving shaft which has a rate of rotation not dependent on the action of the stamps. This part of my invention, therefore, consists in combining with the cylinder a separate upper valve, placed above it and in a horizontal position, and worked by a movement different from that of the main valve; and it also consists in operating this valve by means of mechanism having a different action from that of the other valve, so that the direct or live steam will act with full force upon the piston to send the stamp down, and thus increase the intensity of the blow upon the ore or other matters to be crushed.

The drawings represent that part of the structure of a steam stamping mechanism with which the steam works, and which raises the stamp and throws it down to crush the ore or other matters placed in a heavy mortar beneath, and this part of the mechanism shown is supposed to be connected with substantially such stamping mechanism and structure as are shown in the patent granted to William Ball, December 31, 1867, No. 72,715, and the lower end of the piston-rod in the steam-cylinder is supposed to be directly connected with the upper end of the stamp rod or shaft by an elastic coupling, to protect, to some extent, the piston from the shock of the blow of the stamp when it strikes the ore or other matters in the the mortar beneath.

In the drawings, Figure 1 represents a side elevation of the steam-cylinder and its attached mechanism. Fig. 2 is an elevation at a right angle to Fig. 1. Fig. 3 is a vertical section through the center of the cylinder.

A is the steam-cylinder. B is the piston. C is the piston-rod, projecting downward through the stuffing-box B′ in the lower head of the cylinder, and is attached directly to the top of the stamp-shaft by an elastic coupling, to prevent the shock of the blow of the stamp from injuring the piston, as is described in the aforesaid Ball's patent, No. 72,715. D is the lower steam-valve by which the steam is admitted beneath the piston through the port E to raise the stamp, and also to exhaust the steam through the exhaust-passage F. G is the lower valve-chest, and H is the steam-pipe. The valve D is worked by an eccentric, I, on the shaft J, as shown, which is rotated by power independent of the stamp.

K is a steam-passage, which leads from the lower valve-chest G to the upper valve-chest L, from which the steam is led to the top of the piston B, to throw it down to strike its blow. The valve-chest L is in the form of a hollow cylinder, as shown, in which is fitted the piston or upper valve M, which is driven in both directions by the direct action of the steam acting upon its piston-surfaces *m m′*, and which is controlled by the primary valve N, which is reciprocated by the lever O and its connections, as shown, from the eccentric I, and admits the steam from the steam-chest N′ to the piston-valve.

The steam passes into the cylinder A through the port P, and is exhausted through the passage Q, which leads to the exhaust-passage F. The middle part R of this valve is the working-face. The action of this valve mechanism is similar to what has been used in steam-ham-

mers and steam-pumps for working the shifting-valve.

By this construction the valve M is moved suddenly its full throw as soon as the valve N commences to open its induction-ports, which insures the full and instantaneous action of the direct steam upon the main piston B, to throw down the stamp upon the ore in the mortar faster than it would fall by gravity, and thus intensify the blow.

What I claim as my invention is—

1. The combination, with the main cylinder A, of the upper valve M, and its primary valve N, and the eccentric I, which works independently of the steam mechanism which raises the stamp, and operates substantially as described.

2. The combination of the upper valve M or its shifting-valve N, and the eccentric I, and the main piston B, substantially as described.

3. The combination of the steam-cylinder A, the upper valve M, and the lower valve D, the two valves being operated, as described, by means independent of the main piston, each valve being separately timed, substantially as described.

Executed March 23, 1877.

JOHN B. ELLENBECKER.

Witnesses:
WILL A. CHILDS,
E. D. LEAVITT, Jr.