

W. MANSON.
Atmospheric Power Hammers.

No. 152,390.

Patented June 23, 1874.

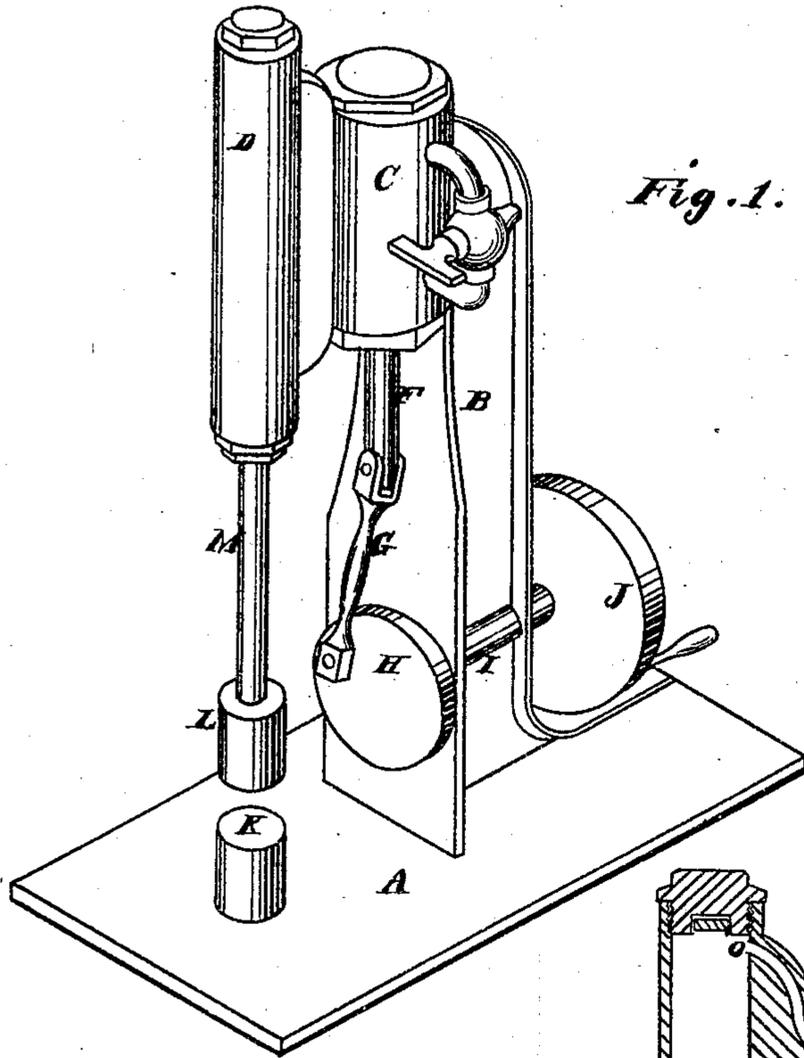


Fig. 1.

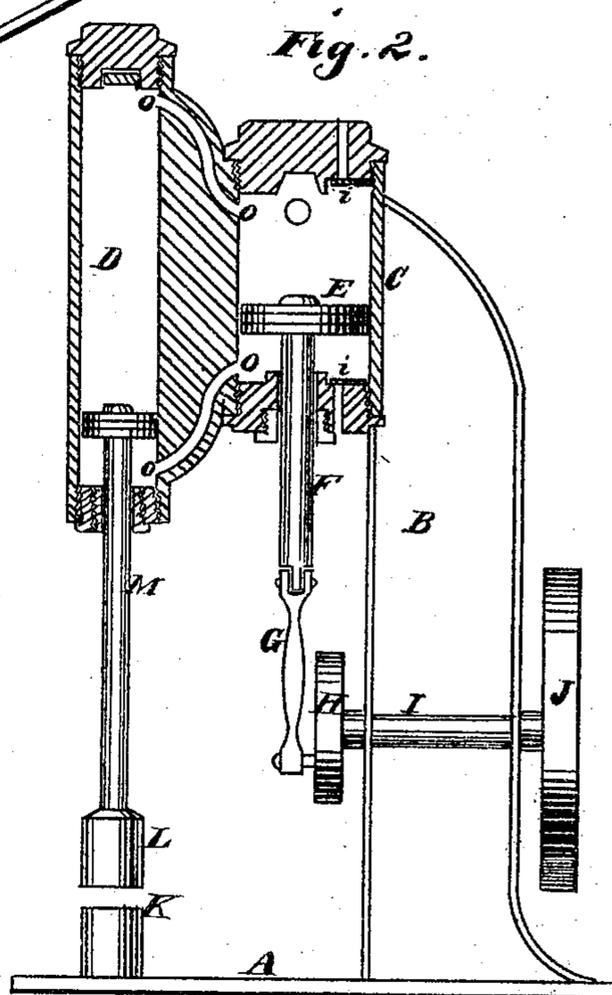


Fig. 2.

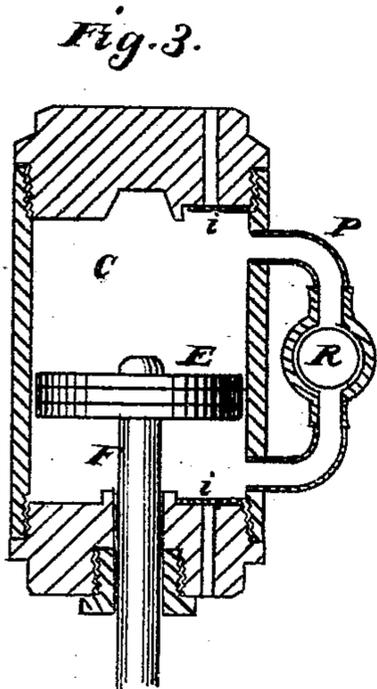


Fig. 3.

Witnesses

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WILLIAM MANSON, OF DOWNIEVILLE, CALIFORNIA.

IMPROVEMENT IN ATMOSPHERIC POWER-HAMMERS.

Specification forming part of Letters Patent No. 152,390, dated June 23, 1874; application filed April 9, 1874.

To all whom it may concern:

Be it known that I, WILLIAM MANSON, of Downieville, Sierra county, State of California, have invented an Atmospheric Power-Hammer; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

My invention relates to certain improvements in power-hammers, and their propulsion by compressed air, and in the means by which the air is compressed and supplied alternately above and below the piston of the direct-acting hammer; and it consists in the combination of the devices hereinafter explained.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a perspective view of my machine. Fig. 2 is an elevation in section.

A is a base-plate, having the frame B suitably formed to support the cylinders C and D.

If found preferable or convenient, the whole of these parts may be molded and cast in one piece.

The cylinder C is made short and of comparatively large diameter, and within it the piston E works, being operated by the piston-rod F and the connecting-rod G from the crank-wheel H. This wheel is mounted upon the driving-shaft I, and a pulley, J, upon this shaft receives a driving-belt from any suitable power.

The cylinder D is made as long as may be desired for the stroke of the hammer, and of a small diameter, as compared with the cylinder C. The cylinder D is placed beside the cylinder C, and vertically above the anvil K, upon which the hammer L is to fall.

The piston-rod M is made of sufficient size and strength to serve as a stem for the hammer, and to its upper end is secured the piston N. This piston is made of considerable thickness, both to serve as a guide to the rod in its movements, and also to prevent undue wear of itself, and the interior of the cylinder.

Ports *o o* connect the upper and lower ends, respectively, of the cylinders C and D, as shown.

Now, when the shaft I and crank-wheel H are set in motion, the piston E will receive a reciprocating motion, and will, alternately, compress the air above and below itself in the cylinder C. This compressed air escapes through the ports *o o*, first below and then above the piston N in the small cylinder, so as to raise it and the attached hammer L, and then to force it down.

As the cylinder D is so much smaller than the cylinder C, it will be manifest that the air forced into it will act with greater force and velocity upon the piston N, and through it upon the hammer, thus giving it a longer and more rapid stroke than that of the piston E; consequently the momentum of the hammer will be greatly increased.

In order to regulate the length and force of the stroke of the hammer, I connect the two ends of the cylinder C by a pipe, P, which opens into it above and below the piston-stroke. A cock, R, is placed in this pipe, and by opening this cock more or less of the air can be allowed to pass above and below the piston as it works, thus lessening by so much the amount which goes to operate the hammer, the stroke of which will be correspondingly moderated. The passage P and cock R may be placed at any point to effect the above result.

By this construction I simplify the mechanism, as the air originally contained within the cylinders is alternately compressed at one end and the other, and no new additions are required, except to make good the loss from leakage through the stuffing-boxes. This is done by means of a small valve, *i*, which opens inward when there is any lack of air, but which remains closed at all other times, thus preserving the ordinary atmospheric pressure within the cylinders.

The operation of the hammer is minutely adjusted by the simple cock R, and the whole is very economical and durable.

When employed for crushing quartz, it will be more convenient to connect a number of small cylinders, D, to the large condensing-cylinder C, and they may be set in a circle around it, or in a line, or at some distance.

The connecting-passages *o* from the bottom of the condensing-cylinder may be carried to

the bottom and top, alternately, of every other operating-cylinder D, the passages from the top being, of course, also reversed, so that one-half of the stamps will go up when the other half are coming down.

The stem M may also pass out through a stuffing-box at the top of the cylinder D, and be provided with any of the appliances for rotating it as it rises or falls.

It will be seen that the lift of the hammer can be varied according to the size of the work beneath it, or, in ore crushing, by the amount of feed, and the wear of the shoes and dies, but the operation will always be the same, whether the piston N makes a short stroke near the top of the cylinder, or near the bottom, or a stroke of the full length.

Having thus described my invention, what I

claim, and desire to secure by Letters Patent, is—

An atmospheric engine, consisting of the operating-cylinder D, with its piston N, in combination with the condensing-cylinder C of larger diameter, and having the condensing-piston E, the two cylinders being connected by ports *o o* both above and below the pistons, and having the supply-port and valve *i*, substantially as and for the purpose above described.

In witness whereof I hereunto set my hand and seal.

WILLIAM MANSON. [L. S.]

Witnesses:

JNO. L. BOONE,

C. M. RICHARDSON.