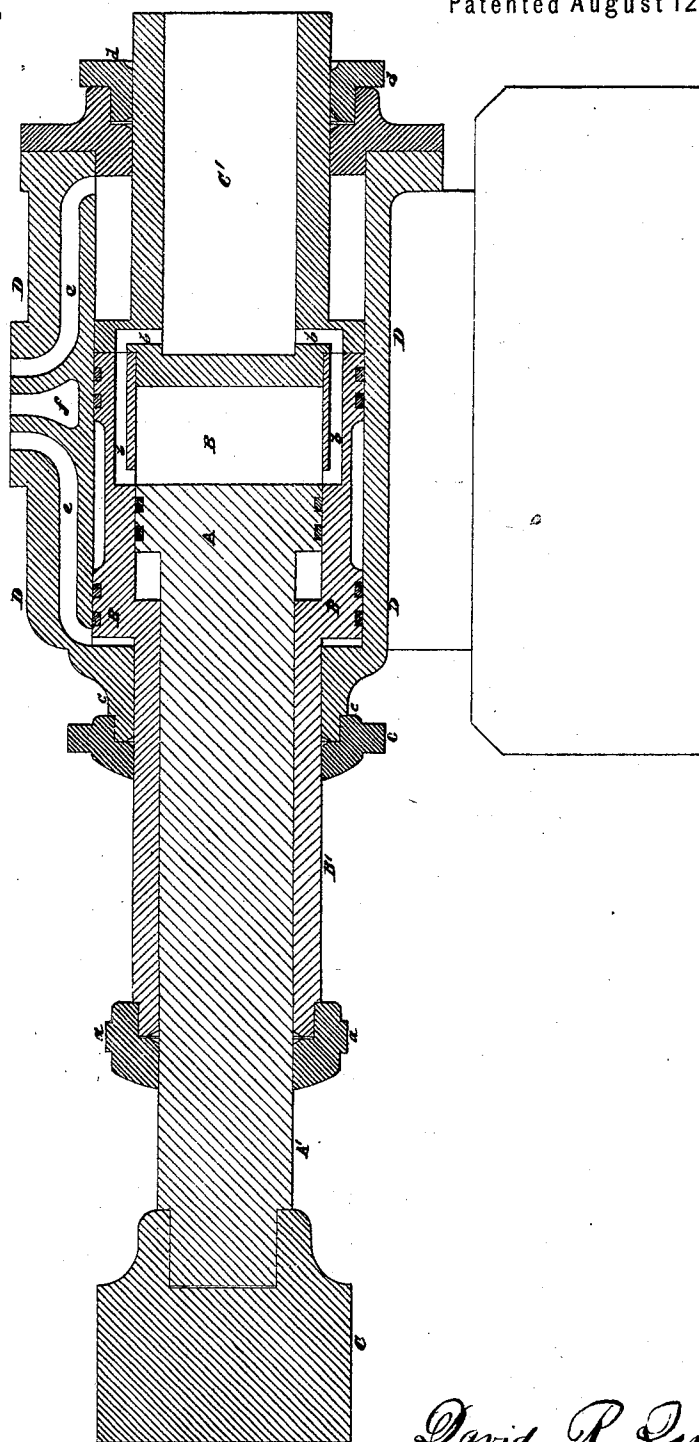


D. R. QUICK & G. A. GARDNER.
Steam-Hammers.

No. 141,667.

Patented August 12, 1873.



Witness

C. A. Valentine

C. L. B. Gardner

David R. Quick
G. A. Gardner

UNITED STATES PATENT OFFICE.

DAVID R. QUICK AND GEORGE A. GARDNER, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-HAMMERS.

Specification forming part of Letters Patent No. **141,667**, dated August 12, 1873; application filed August 31, 1872.

To all whom it may concern:

Be it known that we, DAVID R. QUICK and GEORGE A. GARDNER, of the city, county, and State of New York, have invented certain Improvements in Steam-Hammers, applicable for drilling, forging, stamping, and other purposes, of which the following is a specification:

This invention relates to that class of apparatus used for forging, drilling, stamping, cutting, and analogous purposes, in which the reciprocating motion of the piston actuating the tool is derived from the corresponding movement of a working-cylinder having air or other elastic fluid interposed between the piston and the inner end of the said cylinder, both to diminish the jar and by its reaction under compression to increase the impact of the blow. It consists in the arrangement of the working-cylinder and its piston within a motor-cylinder, from which, through the agency of steam or compressed air, it receives its reciprocating motion, previously referred to, whereby the machine is rendered very compact and simple in construction and effective in operation. The invention also consists in a novel arrangement, with reference to the piston, the working-cylinder, and the motor-cylinder, of passages or ports, whereby the elastic or fluid medium employed between the piston and the working-cylinder is allowed free access thereto at the proper time, without interfering with the operation of the motor-cylinder in giving motion to the other.

The drawing represents a vertical longitudinal section of an apparatus constructed according to our invention.

A is the piston, arranged to operate within the working-cylinder B, and having its portion A' extending through the sleeve B' of the working-cylinder. The sleeve may be furnished with a gland, *a*, to facilitate forming a tight joint about the portion A', just mentioned, of the piston. The piston carries upon its outer extremity the hammer C, or, in lieu thereof, as occasion may require, a cutter, die, drill, or other tool operating by striking or percussion. The inner end of the working-cylinder is closed. Opening into the cylinder,

at a suitable distance from such inner end, are ports or passages *b*, which establish communication between the interior of the working-cylinder and the open internal space of the sleeve C' of the same. The sleeves B' and C', at opposite ends of the working-cylinder, work through suitable bearings *c d*, provided in the ends of the motor-cylinder D. As will be seen from the drawing, the working-cylinder fits like a piston within the motor-cylinder, the sleeves B' C' extending through the packing rings or bearings *c d*. The motor-cylinder is provided with inlet and exhaust ports *e f*, connecting with a valve-chest furnished with a valve of any appropriate kind.

Steam, compressed air, or other elastic fluid being admitted alternately at each end of the motor-cylinder, a reciprocating movement is given to the working-cylinder. The movement of the latter in the direction toward the tool-end of the piston causes it to advance upon the latter. This movement of the cylinder relative to the piston causes the latter to pass upon or over the ports or passages *b*, thereby inclosing a quantity of air in the cylinder between the inner end thereof and the piston, which, the advance of the cylinder upon the piston being continued, is compressed, so that when the hammer or other tool strikes the material to be wrought upon, the reaction of the compressed air adds to the force of the impact due to the weight of the piston and the tool. At the same time, the working-cylinder, from which motion is given to the piston, being cushioned, so to speak, by the air inclosed, as herein previously described, all sudden jar to the moving parts is effectually prevented, and breakage and rapid deterioration of the mechanism are consequently avoided.

It is manifest that any elastic fluid medium admitted to the working-cylinder in a like manner would produce similar results. The lift or reverse movement of the piston is, of course, provided for by the return or reverse movement of the working-cylinder, the stroke of this latter being of sufficient length for the purpose.

What we claim as our invention is—

1. The combination, substantially as herein shown and described, of the external motor-cylinder D, the contained working-cylinder B, forming the piston of the said cylinder D, and the internal striking-piston A, for the purpose specified.

2. The arrangement, substantially as herein shown and set forth, of the ports or passages

b of the working-cylinder B, with reference to the piston A and external cylinder D, for the purpose specified.

DAVID R. QUICK.
GEO. A. GARDNER.

Witnesses:

C. A. WATERBURY,
E. LE B. GARDNER.