E. T. Steen.

Ore Crusher.

No. 25234 Patented Aug. 23, 1859.

FIG. 2.

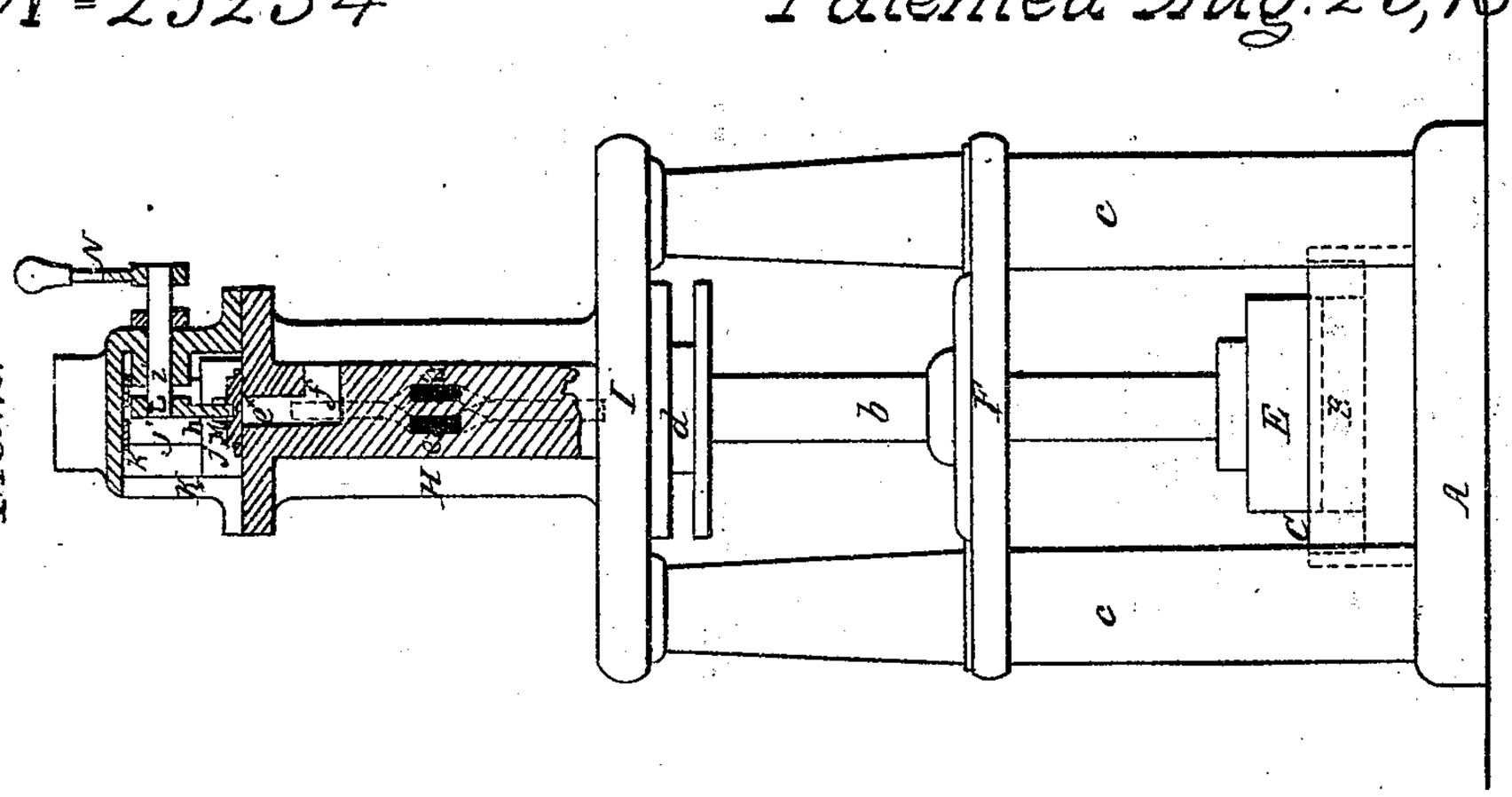
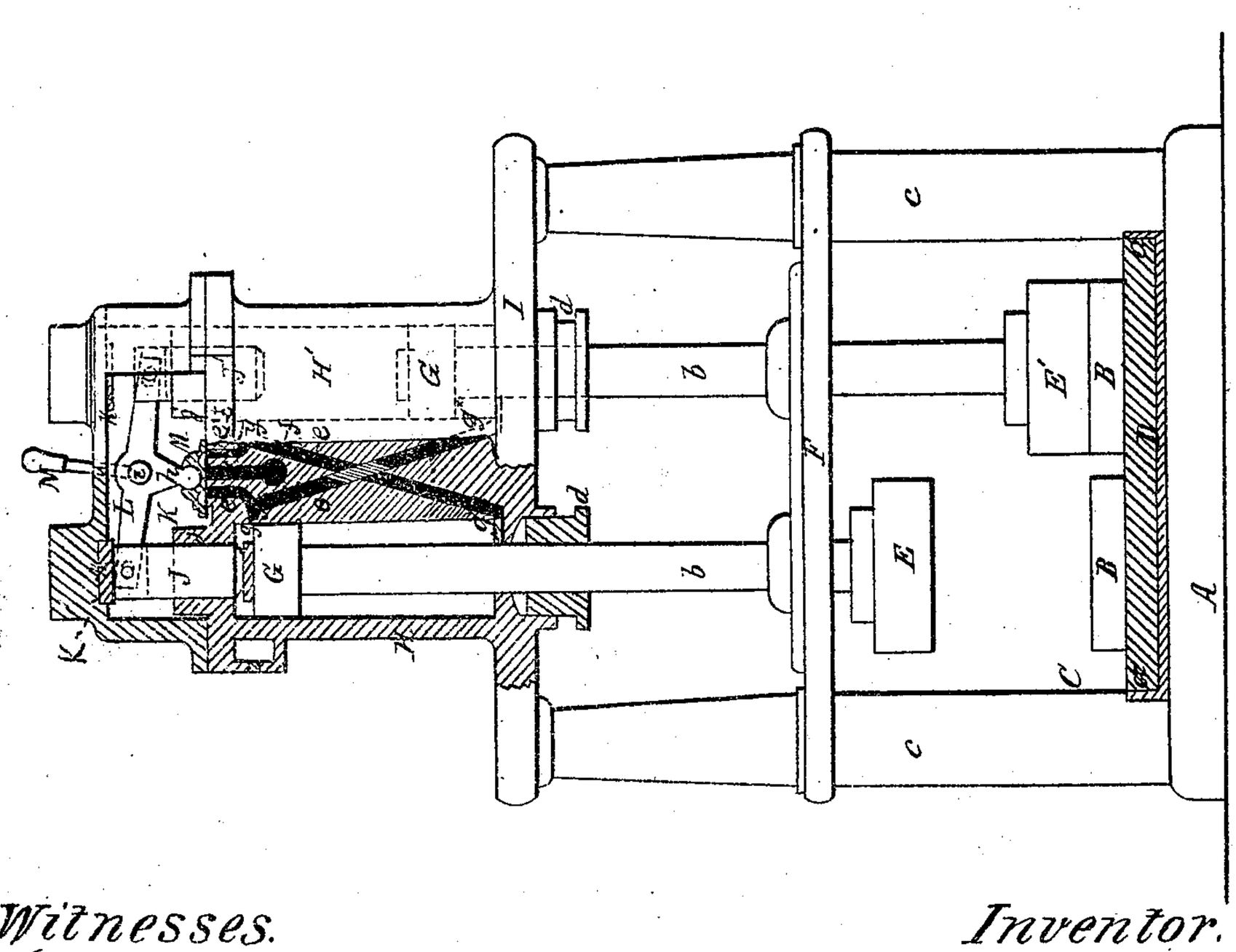


FIG. 1.



Witnesses.
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UNITED STATES PATENT OFFICE.

EDWARD T. STEEN, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO HIMSELF, AND B. S. NICHOLS, OF SACRAMENTO, CALIFORNIA.

QUARTZ-MILL.

Specification of Letters Patent No. 25,234, dated August 23, 1859.

To all whom it may concern:

Be it known that I, EDWARD T. STEEN, of San Francisco, in the county of San Francisco and State of California, have invented a new and useful Quartz-Stamping Mill; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my mill. Fig. 2 is a transverse section through the middle of the steam chest, the other parts being represented in elevation.

Similar letters of reference in both views indicate corresponding parts.

This invention relates to that class of mills in which the stampers are operated by steam; and it consists in arranging two stampers in a double cylinder in such a manner that by the action of the upper ends of the stems of the stampers—which at the same time form the steam pistons—as they strike against two valve pistons, the steam is charged, and it is conducted to the two cylinders by means of cross passages arranged in such a manner that when the steam is admitted to one cylinder on the top, and it exhausts from the bottom; it is admitted to the bottom of the other cylinder and exhausts from the top, and vice versa; and the change of steam is effected by means of two valve pistons, which are connected by a rocking lever, from which an arm extends down to the valve so that when one of the main pistons rises and strikes against the valve piston so as to raise it, the valve is thrown the full distance, and the full power of the steam is admitted to the cylinders at once.

To enable those skilled in the art to make and use my invention I will proceed to describe its construction and operation.

A represents the bed which supports the dies, B, and the mortar, C. The bottom of the mortar rests on a bed of india-rubber, D, and it does not come up to the sides of the mortar, but leaves a space, *a*, which is also packed with india rubber so that the shock caused by the blows of the stampers is dissipated and its injurious effect on the machinery considerably diminished if not entirely done away with. The mortar, C, is constructed in the usual manner, and it may be supplied with a feed spout on one side, screens at each end and front and a conductor for the water, &c.

E are the stampers, the rods, *b*, of which are guided in a plate, F, which is supported by four columns, *c*; and attached to the upper end of these rods are the steam, or main pistons, G G′, which work in the steam cylinders, H H′. These cylinders are supported by a platform, I, which rests on the top of the columns, *c*, and those parts of the platform, I, through which the rods, *b*, pass, are provided with stuffing boxes, *d*. The pistons are constructed of two rings filled in with soft expansion metal, and a hole is bored in the tops which is filled with highly vulcanized india rubber to prevent a shock when the pistons strike against the lower ends of the valve pistons, J J′, which extend through the covers of the cylinders.

The two cylinders are cast out of one piece and steam is admitted to, and exhausted from, then by ports, *e*, *e′* and *e**, the port, *e**, communicating with the exhaust pipe, *f*. The steam ports, *e e′*, cross each other, as clearly represented in the drawing, one passing below the other, and they communicate with the cylinders by means of openings, *g*, *g**, *g′ g′**, in the sides of the cylinders. The ports, *e*, *e′* and *e**, lead into the valve chest, K, which communicates, by means of a suitable pipe, with a steam boiler, and arranged in this steam chest is a common B-valve, M, which is operated by means of a rocking beam, L, which is fulcrated on a pin or axle, *i*, and from which the valve carrier, *h*, extends down to the valve. The ends of the rocking beam, L, are pivoted to the upper ends of the valve pistons, J J′, which latter work in stuffing boxes, *j*, and which, when in their highest position, strike against the cover of the valve chest. These valve pistons are thrown up alternately by the actions of the main pistons and india-rubber cushions, *k*, are inserted in the cover of the valve chest in order to dissipate the shock which otherwise would be very injurious to the machinery, if the valve pistons should strike against the bare metal. The axle, *i*, of the rocking beam extends through the sides of the steam chest, and a handle, N, is attached to it, whereby the slide valve, M, can be operated by hand.

The operation is as follows: When the valve, M, is brought into a position, as rep-

resented in Fig. 1, with the stamper, E, raised, the steam enters through the port, *e*, into the upper part of the cylinder, H, and into the lower part of the cylinder, H′, and it exhausts from the bottom part of the cylinder, H, and from the top part of the cylinder H′. The piston, G, is depressed, and the piston, G′, together with the stamper, E′, is raised. As the piston G′, strikes against the lower end of the valve piston, J′, the position of the rocking beam, L, and with it the position of the slide valve, M, is changed, and steam is now admitted through the port, *e′*, to the bottom part of the cylinder, H, and to the top part of the cylinder, H′, and the port, *e*, is brought in communication with the exhaust pipe, *e**, so that the steam exhausts from the upper portion of the cylinder, H, and from the lower portion of the cylinder, H′. By this arrangement the stampers can be operated very rapidly and the power of the blows may be increased at pleasure as it mainly depends on the pressure of the steam. And by the arrangement of the india-rubber cushions under the bottom of the mortar and in the top of the pistons, G G′, and also in the respective spots of the cover of the valve chest, the shock of the blows is dissipated in such a degree that the machinery sustains no injury even when operated at a very high rate of speed.

What I claim as new and desire to secure by Letters Patent is:

The employment of stampers, E E′, when the same are operated by means of steam cylinders, H H′, which communicate by the cross passages, *e e′*, the change of steam being effected by valve pistons, J J′, operating on a working beam, L, and operated by the pistons, G G′, the whole being arranged and combined, substantially in the manner herein described.

EDWARD T. STEEN.

Witnesses:
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