D. TRUMBULL, Jr.

Ore-Crusher.

No. 161,456. Patented March 30, 1875.

Fig. 1.

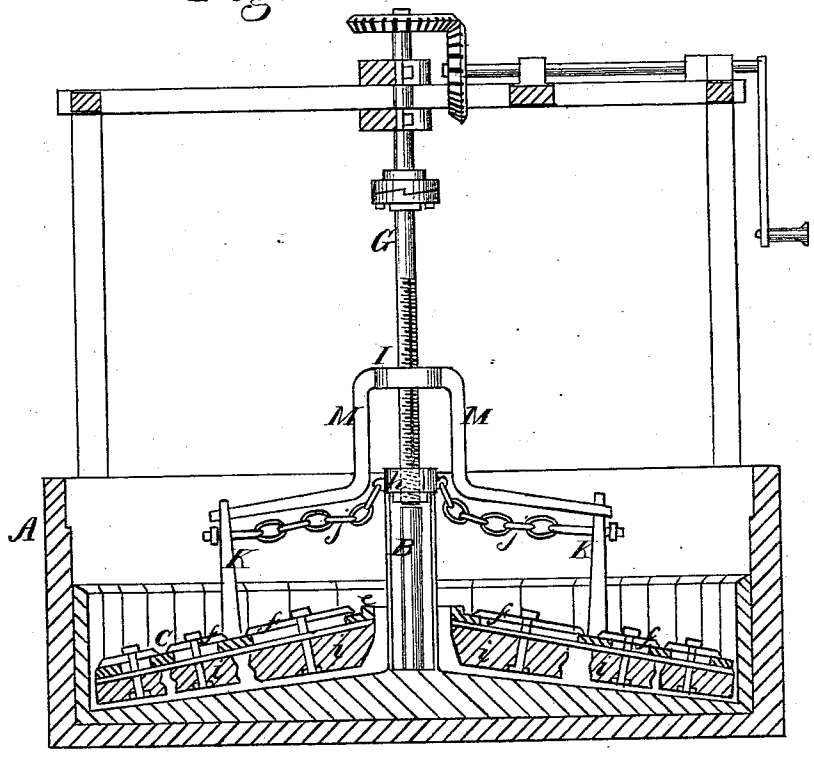


Fig. 3.

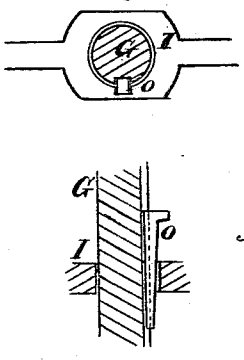


Fig. 2.

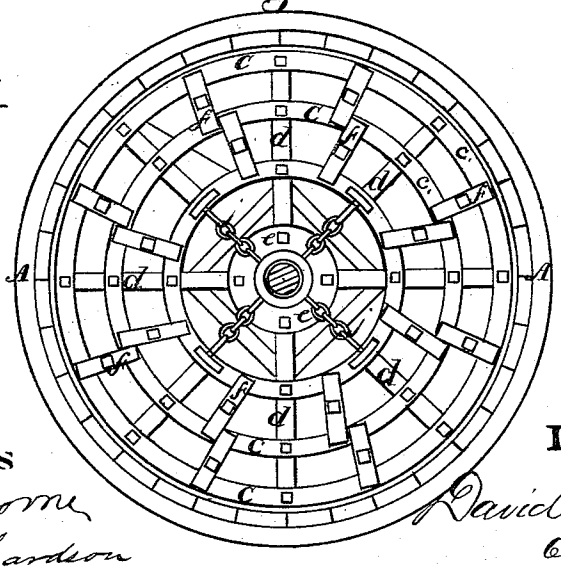
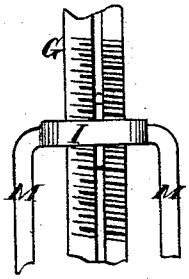


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

DAVID TRUMBULL, JR., OF COULTERVILLE, CALIFORNIA.

IMPROVEMENT IN ORE-CRUSHERS.

Specification forming part of Letters Patent No. **161,456**, dated March 30, 1875; application filed January 23, 1875.

To all whom it may concern:

Be it known that I, DAVID TRUMBULL, Jr., of Coulterville, Mariposa county, State of California, have invented an Improved Quartz Crusher and Grinder; 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 or improvements without further invention or experiment.

My invention relates to an improved machine for crushing and grinding quartz; and it consists, first, in a peculiar construction and arrangement of the grinding-surfaces; and, secondly, in a novel construction of the upright shaft that drives the muller.

For an exact description of my quartz-crusher reference is had to the following description and accompanying drawings, in which—

Figure 1 is an elevation in section of my machine. Fig. 2 is a plan. Figs. 3 and 4 are detailed views.

A is a pan or tub, which is similar to the ordinary grinding-pan, and which may be made of wood or metal. In the bottom of this pan or tub I place a layer of stones, the upper surfaces of which are made smooth, so as to provide as even a surface as possible. I also line the sides of the tub inside of it with a thickness of stone, the edges of which are cemented together, so as to form in effect a stone pan. A standard, B, extends upward in the center of the pan to about the height of the sides, and the muller C has a hole in its center, so that it will fit down over the standard in the usual way. The muller consists of a skeleton frame, in which stones *i i* of various sizes are firmly bolted, so as to provide a solid stone grinding-surface. The skeleton frame consists of two or more concentric rings, *c c*, which are connected together at intervals by radial bars *d*. These bars extend in every direction from the central hub *e*, and the stones are clamped in place beneath them by being bolted to short bars *f*, the ends of which rest on the rings *c*, a hole being made through each stone, and the bolt passing upward through the stones and through the bars *f*, where their upper ends are secured by nuts.

I thus provide a solid stone muller, which can be operated inside of the stone pan in the same manner as in the ordinary iron muller.

The vertical driving-shaft G steps in the upper end of the standard B. A collar, *h*, fits around the lower end of the shaft, so as to rest upon top of the standard, and is held in place by four chains, *j*, which connect with the upper ends of four standards, K. These standards are secured to the first ring of the muller at the four quarters, and stand somewhat higher than the standard B.

The lower half of the driving-shaft is provided with screw-threads, and a key-seat is cut on one side. A nut, I, with an arm, M, depending from opposite sides, moves on this threaded portion of the shaft, and can be fixed at any point desired by means of a key, *o*, which fits in the key-seat.

The arms M of the nut extend downward, and are then bent outward, so that their extremities will strike two of the standards K when the nut has been fixed near the lower end of the screw or driving-shaft, and thus serve to drive the muller when the screw is rotated.

My object in thus constructing the shaft and driving mechanism is to permit the muller to be removed, as, by removing the key *o*, and turning the shaft G to the left, the nut will be run up to the screw on the shaft, so that its arms M will clear the upper ends of the standards K. The chains *j* can then be cast off of the standards, so as to free the collar *h*, and thus allow the shaft G to be lifted from its bearing. The muller can then be lifted out of the pan.

I am aware that loose stones have been used to form a grinding-muller, in combination with a lower stone grinding-surface. This, therefore, I do not claim; but

What I do claim, and desire to secure by Letters Patent, is—

1. The pan A, with its stone bottom and stone sides, in combination with a skeleton muller, consisting of the hub *e*, with its radial arms *d*, rings *c c*, having stones *i i*

bolted firmly thereto, substantially as and for the purpose above described.

2. The vertical driving-shaft G, having its lower end formed into a screw, and stepping in the standards B, in combination with the collar *h*, chains *j*, standard K, and nut I, with its arms M, all combined and arranged to operate substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand and seal.

DAVID TRUMBULL, JR. [L. S.]

Witnesses:
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F. CUNEO.