

S. H. COWLES.
QUARTZ-MILL.

No. 174,202.

Patented Feb. 29, 1876.

Fig. 1.

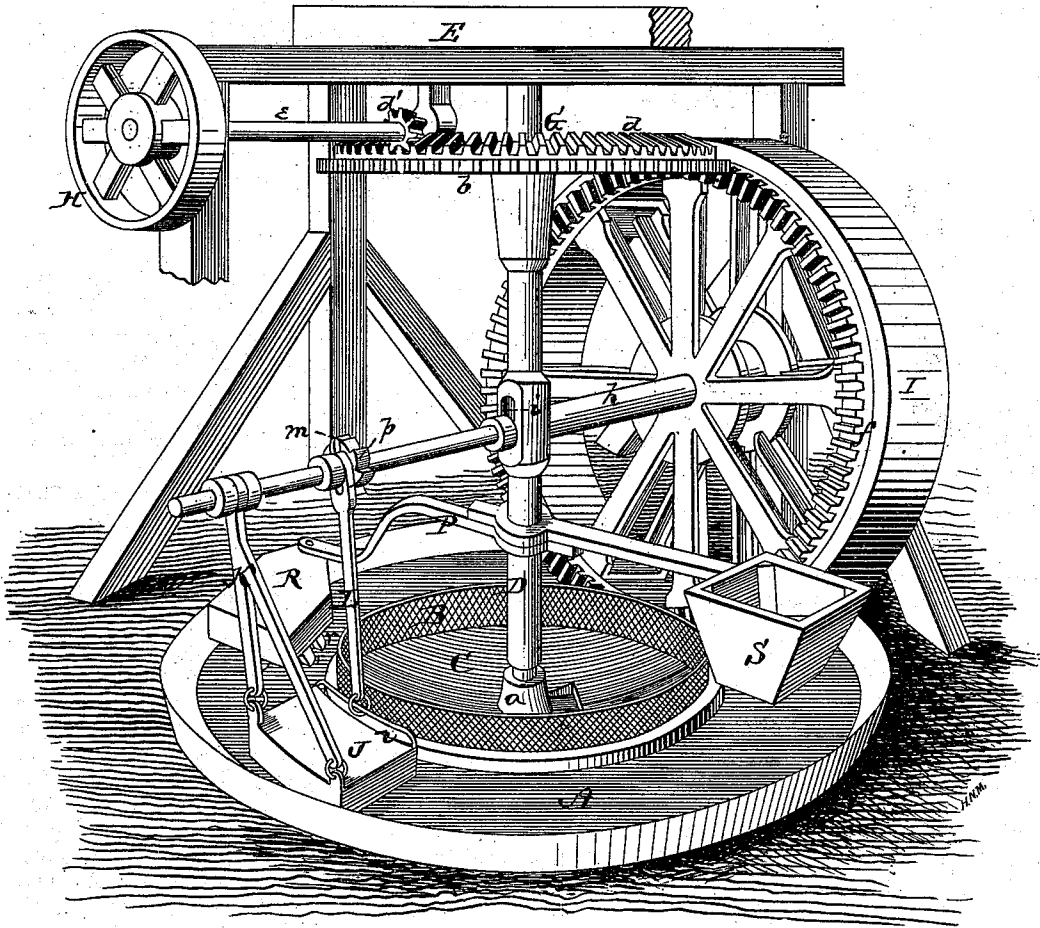
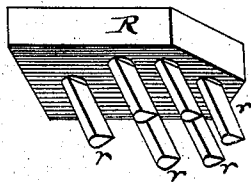


Fig. 2.



WITNESSES

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IMPROVEMENT IN QUARTZ-MILLS.

Specification forming part of Letters Patent No. **174,202**, dated February 29, 1876; application filed November 4, 1875.

To all whom it may concern:

Be it known that I, SAMUEL H. COWLES, of Sacramento, in the county of Sacramento and in the State of California, have invented certain new and useful Improvements in Quartz-Mills; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a quartz-mill for crushing ore, &c., as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a perspective view of my quartz-mill. Fig. 2 is a bottom perspective view of a plow used therein.

A represents the ordinary crushing-pan, with the screen B and amalgamated plates C in the center. In a central step, *a*, an upright shaft, D, has its bearing, the upper bearing for the same being in an elevated frame, E, over the mill. On the shaft D is secured a horizontal gear-wheel, G, which is on its upper side provided with radial beveled cogs *d*, and upon its periphery with straight vertical cogs *b*. This gear-wheel is driven by a beveled pinion, *d'*, upon the inner end of a horizontal shaft, *e*, which has a driving-pulley, H, on its outer end. The vertical cogs *b* of the wheel G mesh with a circle of radial cogs, *f*, on the side of the large crushing-wheel I, which is mounted upon one end of a vertical shaft, *h*, that passes through a vertical slot, *i*, in the center upright shaft D.

Ordinarily, in quartz-mills of this class the wheel G and crushing wheel I are connected by beveled cogs, and hence when any hard substance—such as, for instance, broken picks or pieces of other tools—gets under the crushing-wheel it will bind the cogs, and the mill must be stopped until such hard substance has been removed. This difficulty is entirely obviated by making the cogs *b* of the gear-wheel G vertical, and the cogs *f* of the crush-

ing-wheel straight, and radiating from the center of the wheel, so that if any hard foreign substance gets under the crushing-wheel it will rise as high as the slot *i* in the shaft D will permit without the cogs disengaging or binding on each other, until the crushing-wheel passes over said hard substance, when it settles down again.

On the other end of the shaft *h* is suspended a swash-board, J, which is worked by means hereinafter described to produce a swash of the water and pulp from the pan A through the screens B onto the amalgamated plates C. The swash-block J is at its outer side, at the front and rear corner, hinged to the arms of a forked brace, K, the upper end of which is placed loosely on the shaft *h*. Along the inner edge of the block J is a rod, *i'*, on which is loosely placed an arm, L. This arm is slotted near its upper end, and the shaft *h* passes through said slot. At the extreme upper end of the arm L is a lug, *m*, projecting inward, and resting upon a ratchet-wheel, *p*, secured on the shaft *h*. As the shaft *h* revolves around its own axis, and around the axis of the vertical shaft D, the teeth of the ratchet-wheel *p* will raise the arm L and block J, and as soon as each tooth clears the lug *m* the block drops down, producing the swash desired.

Below the horizontal shaft *h*, to the vertical shaft D, are secured two arms, P P', extending in opposite directions, and at right angles with the shaft *h*. To the end of the arm P is pivoted a block, R, having a series of plows, *r r*, attached to its under side. These work in the pan A, in advance of the swash-block J, to loosen the pulp from the bottom of the pan. To the end of the arm P' is attached a hopper, S, to feed the ore in advance of the crushing-wheel.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the slotted vertical shaft D, having wheel G, with beveled cogs *d* and vertical cogs *b*, the shaft *h*, passed through the slot in the shaft D, and provided with the large crushing-wheel I, having straight radial cogs *f*, all substantially as and for the purposes herein set forth.

2. The combination, with the crushing-wheel shaft *h*, of the swash-block J, brace K, rod *i*, slotted arm L, with lug *m*, and the ratchet-wheel *p*, substantially as and for the purposes herein set forth.

3. The combination of the pan A, swash-block J on the shaft *h*, the circular rim-screen B, and the concave amalgamated plate C, all substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of October, 1875.

SAML. H. COWLES.

Witnesses:

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