



S. H. COWLES.  
Quartz-Mills.

No. 156,985.

Patented Nov. 17, 1874.

Fig 3

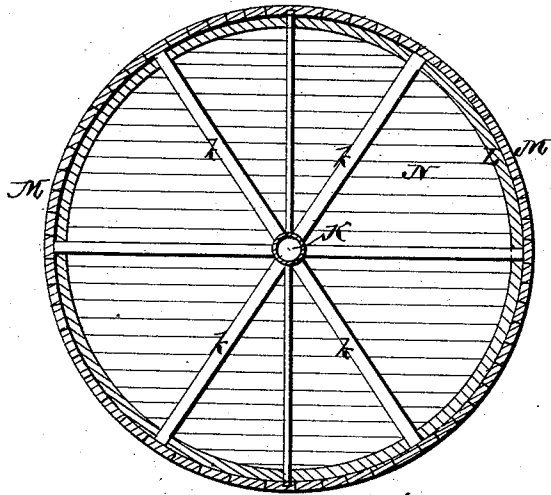


Fig 4

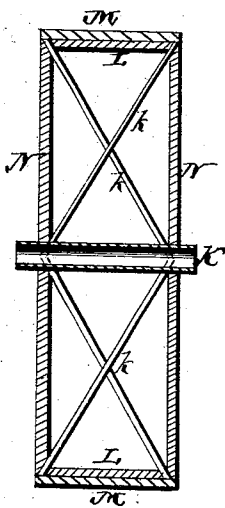
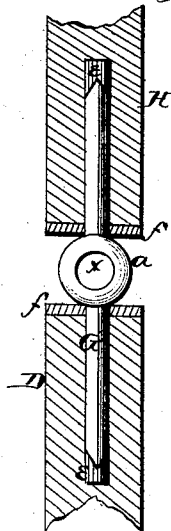


Fig 5



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN QUARTZ-MILLS.

Specification forming part of Letters Patent No. **156,985**, dated November 17, 1874; application filed September 23, 1874.

*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-crusher and mill, 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 drawings, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a plan view of the grinding-bed. Fig. 3 is a longitudinal section of the grinding-wheel. Fig. 4 is a transverse section of the same; and Fig. 5 is a detached section of a part of the running-gear.

A represents a suitable platform, upon which is secured a circular bed, formed of iron plates B B. This bed is formed with a circular opening, O, in the center, and it is also formed with a flange or rim, *b*, around its inner and outer circumference, so as to form, as it were, an annular trough in which the crushing-wheel moves. From the platform A rise two posts, C C, connected by a beam, E, across the center and a suitable distance above the bed. Through the center of the bed B B projects a stationary post, D, and in the same is inserted a shaft, G, provided with a central enlargement, *a*, through which is made a circular hole, *x*, as shown in Fig. 5. On the upper part of the shaft G is placed a hub, H, projecting from the center of a wheel, I, from the upper side of which projects a spindle, *d*, having its bearing in the cross-beam E. Both ends of the shaft G are pointed, and rest in boxes *e e*, inserted in the post D and hub H, as shown in Fig. 5. This shaft has also bearings by the enlargement *a*, resting against plates *f f* on the upper end of the post D, and lower end of the hub H, as shown. On the

upper side of the wheel I, at or near the circumference, are beveled cogs *h*, which gear with a beveled pinion, *i*, on a horizontal shaft, *k'*, having a pulley or band wheel, J, on its outer end to be connected by a belt with the power employed for running the mill. On the under side of the wheel I, at or near the circumference, are also beveled cogs *h*<sup>1</sup>, which gear with similar cogs *h*<sup>2</sup> on the inner side at or near the periphery of the crushing-wheel. This wheel is constructed hollow with a central tubular hub, K, from which suitable braces *k k* extend to support the rim L. To the rim are secured heavy metal or stone plates M, by means of bolts, as shown. The sides of the wheel are planked with two-inch planks N, and the interior of the wheel is filled with concrete and tailings from the mill, or any other suitable heavy substance to give it additional weight. A shaft, *m*, is passed through the central aperture *x* in the enlargement *a*, and one end of said shaft enters the hub K of the crushing-wheel. On the other end of the shaft *m* is hung a scraper, P, for the purpose of scraping the pulp on the sectional iron bed B to the center, where it drops down through the opening O into the receiver or amalgamator, such as are generally used for amalgamation. The whole machinery is to be set upon trestle-work some seven feet high, to enable the amalgamator to work underneath to an advantage. The plank platform A should run out about ten feet around the sectional iron bed to enable the shovelers to stand and spread the quartz evenly on the bed.

In practice, the wheel is intended to crush either wet or dry by having a water pipe inserted into the edge of the bed-plate and provided with a stop-cock to turn off or on a stream of water as the wheel passes around. The wheel is to be made heavy enough to crush the quartz to an impalpable powder the first time around.

The wheels most generally heretofore used have been made of huge stone; but they have never been able to get a stone heavy enough to crush the rock very fast. In making the wheel, in the manner above described, of wood, with iron or stone plates on the rim, and filling the interior with concrete, I am enabled

to overcome this difficulty, and obtain a wheel of any desired weight.

In order to move such a ponderous wheel, it becomes necessary to apply the power to or near the rim of the wheel, which I have done as shown at  $h^2$ , whereby less power is required to drive it than when the power is applied to the shaft or axle, as is generally done in mills of this class.

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

1. A crushing-wheel for quartz-mills, constructed as described, of a hub, K, braces  $k$ , rim L, with iron or stone plates M fastened thereto, plank sides N, and the interior of the wheel filled with concrete and tailings from the mill, or other suitable material, substantially as and for the purposes herein set forth.

2. The combination of the driving-shaft  $k$  with pinion  $i$ , wheel I with cogs  $h$   $h^1$  on its upper and under edges, and the cogs  $h^2$  on the

crushing-wheel, whereby the power is applied to or near the rim of said crushing-wheel, substantially as herein set forth.

3. The vertical shaft G, pointed at both ends, and provided with central perforated enlargement  $a$ , in combination with the post D, hub H, boxes  $e$   $e$ , and bearing-plates  $f$   $f$ , substantially as and for the purposes herein set forth.

4. The combination, with the crushing-wheel, of the horizontal shaft  $m$ , vertical shaft G, with perforated enlargement  $a$ , scraper P, and the sectional bed B, provided with central opening O and rims  $b$   $b$ , all substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 8th day of August, 1874.

SAMUEL H. COWLES.

Witnesses:

C. L. EVERT,

ROBERT STRONG.