

(No Model.)

2 Sheets—Sheet 1.

F. A. HILL.  
QUARTZ MILL.

No. 342,093.

Patented May 18, 1886.

FIG. 1.

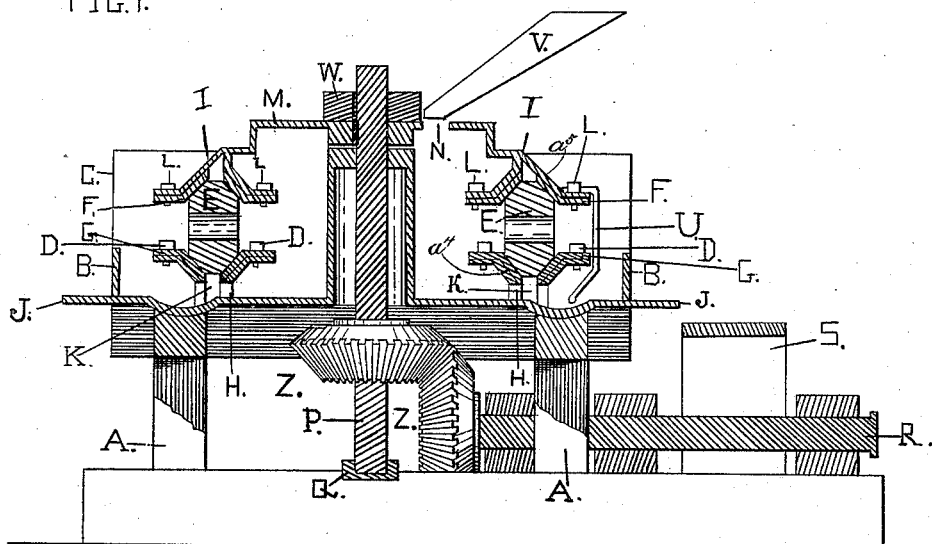
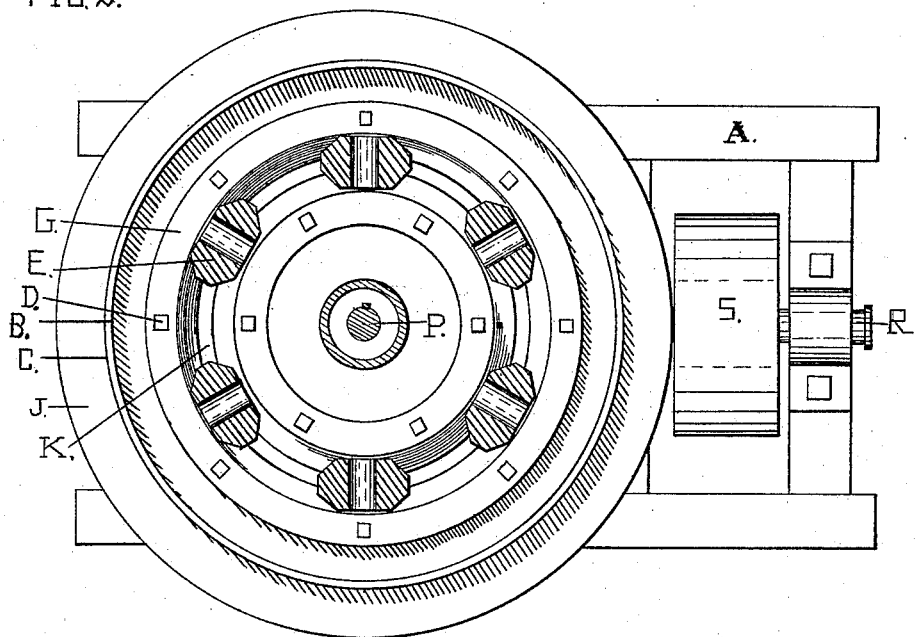


FIG. 2.



ATTEST.  
*Albert E. Redstone*  
*L. E. Redstone*

INVENTOR.  
*Frank A. Hill*  
*By J. H. Redstone*  
*Atty in fact.*

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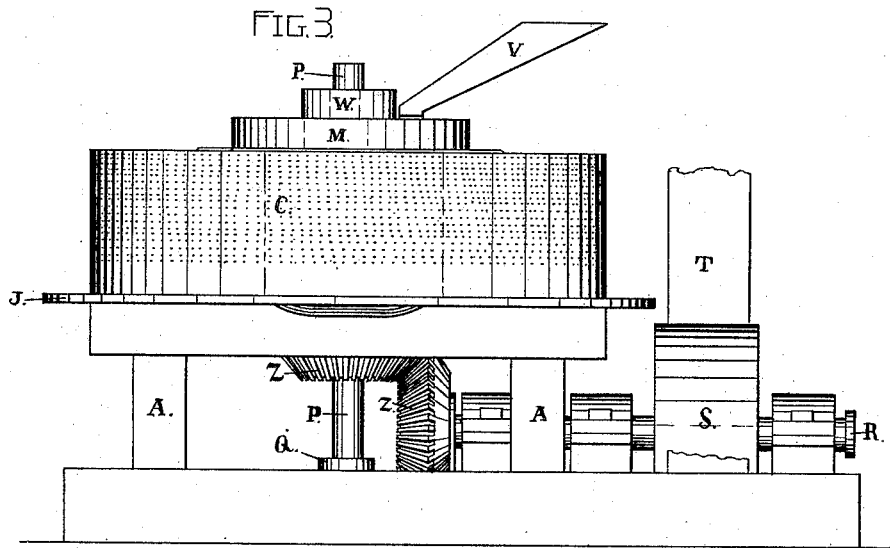
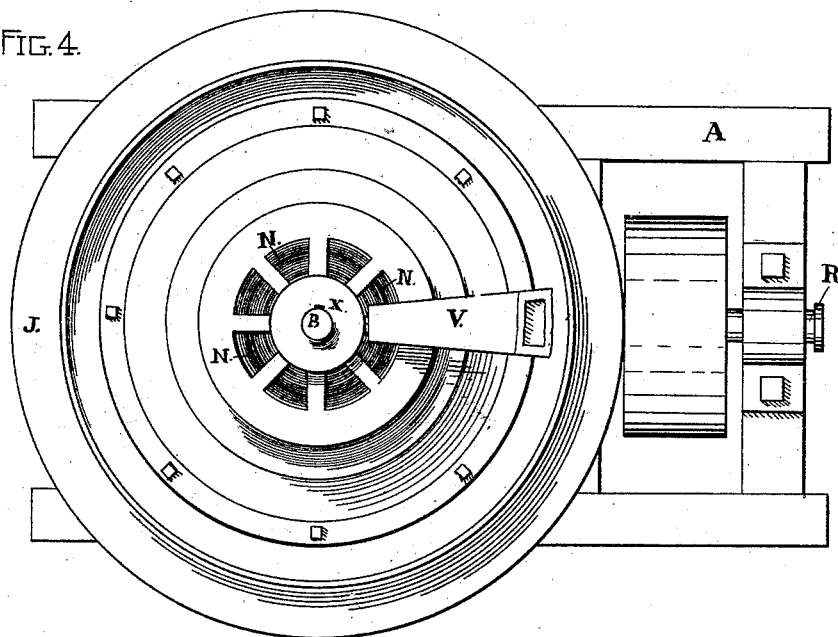


FIG. 4.



ATTEST.

*Albert C. Redstone*  
*L. E. Redstone*

INVENTOR.

*Frank A. Hill*  
*By John H. Redstone*  
*Atty in Fact*

# UNITED STATES PATENT OFFICE.

FRANK A. HILL, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO JOSHUA HENDY, OF SAME PLACE.

## QUARTZ-MILL.

SPECIFICATION forming part of Letters Patent No. 342,093, dated May 18, 1886.

Application filed March 27, 1885. Serial No. 160,168. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK A. HILL, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented a new and useful Quartz-Mill, of which the following is a specification.

My invention relates to improvements in quartz-mills in which the ore is reduced by steel rolls having V-shaped peripheries, which operate in combination with upper and lower shoes having V-shaped grooves conforming to the peripheries of the rolls.

The nature of my invention will be more readily understood by reference to the accompanying description and drawings and the letters marked thereon.

Figure 1 is a side sectional elevation of the body of the machine, cut through the center for the purpose of showing the interior construction of the same. Fig. 2 is a horizontal section on a plane passing through the centers of the rolls of the same. Fig. 3 is a side elevation, and Fig. 4 is a plan view, of the same.

The same letters represent the same parts in each of the figures.

A represents the frame upon which the machine rests; B, the mortar or pan in which the quartz is crushed and amalgamated; C, the screen. D represents bolts; E, the crushing-rolls; F, the upper shoe; G, the lower shoe; H, the supporting hangers or brackets for the lower shoe; I, the supporting hangers or brackets for the upper shoe; K, the continuous lower slot or discharge-opening; L, the bolts by which the upper shoes are attached to the troughs; M, the driving-cover and upper groove-holder; N, the annular feed-opening; O, the weight by which the crushing force is regulated; P, the main upright shaft; Q, the step; R, the horizontal shaft; S, the driving-pulley; T, the driving-belt; U, the stirrer; V, the feed-trough, Z the miter-gear for driving the machine.

I construct the pan or mortar of metal, and secure the lower shoe, G, with bolts D in the V-shaped concentric trough  $a^1$ , formed in the brackets or supporting-posts H. The rolls E operate in this V-shaped trough. The upper brackets, I, which are attached to the cover M, are formed with V-shaped troughs  $a^2$ , in which are fitted shoes F, secured in place by

bolts L. The cover M is operated by the feathered shaft P, which allows it to slide up and down. The weight W is designed to increase the bearing or crushing weight upon the rolls E. The feed-openings N are formed to receive the quartz and water as they are passed through the feed-spout V from the rock-breaker. The screen C passes entirely around the mortar B, for the purpose of discharging upon all sides. The apron J also surrounds the entire mortar and forms a broad amalgamating-surface, and discharges into any suitable troughs.

The following is the operation of my improved quartz-mill: The ore being fed with water from the rock-breaker through the feed-spout V, passes into the central portion of the mill through the openings N. The weighted driving-cover M is revolved by means of the belt T, pulley S, miter-gear Z, and the shaft P. The friction of the upper shoe, F, revolves the rolls E. The stirrer U, which is attached to the cover M, is revolved therewith and extends nearly to the bottom of the pan, and keeps the ore constantly stirred up, and it is pulverized by the rolls E. The supply of water being kept up, the pulp is washed down through the opening or groove K. The stirrer U assists in amalgamation by keeping the ore in the bottom of the pan B constantly stirred up, and allows contact with the mercury in said pan. The slot K in the bottom of the lower groove allows the free passage of the ore, and the action of the water, impelled by the rapid motion of the rolls E, keeps the same constantly stirred up and loosened, while the stirrer U aids in freeing and preventing the possibility of the packing of the ore.

The upper shoe, F, is of the exact form of the lower shoe, G, and conforms to the rolls E, and as the broken quartz is thrown up over the rolls E by the revolution of the latter, it is crushed between the same and the upper shoe, F. The central openings through the rolls E aid in throwing the water out to the screen, thus causing a rapid discharge of the pulp fine enough to pass through the same.

The necessary supply of water passes in through the openings N.

Having thus described my invention, what

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

1. In a quartz and ore pulverizer, the crushing and grinding rolls provided with V-shaped peripheries, in combination with the cover, the standards having the V-shaped troughs, the shoes secured therein and conforming to the peripheries of the rolls, the lower of said standards having a continuous slot, K, substantially as and for the purpose set forth.
2. In a quartz and ore pulverizer, the com-

bination, with the pan or mortar B, provided with the concentric apron J and screen C, of the cover M, the rolls E, having V-shaped peripheries and central openings, the shoes conforming to the rolls, and the stirrer U, substantially as set forth.

FRANK A. HILL.

Witnesses:

JOHN H. REDSTONE,  
L. E. REDSTONE.