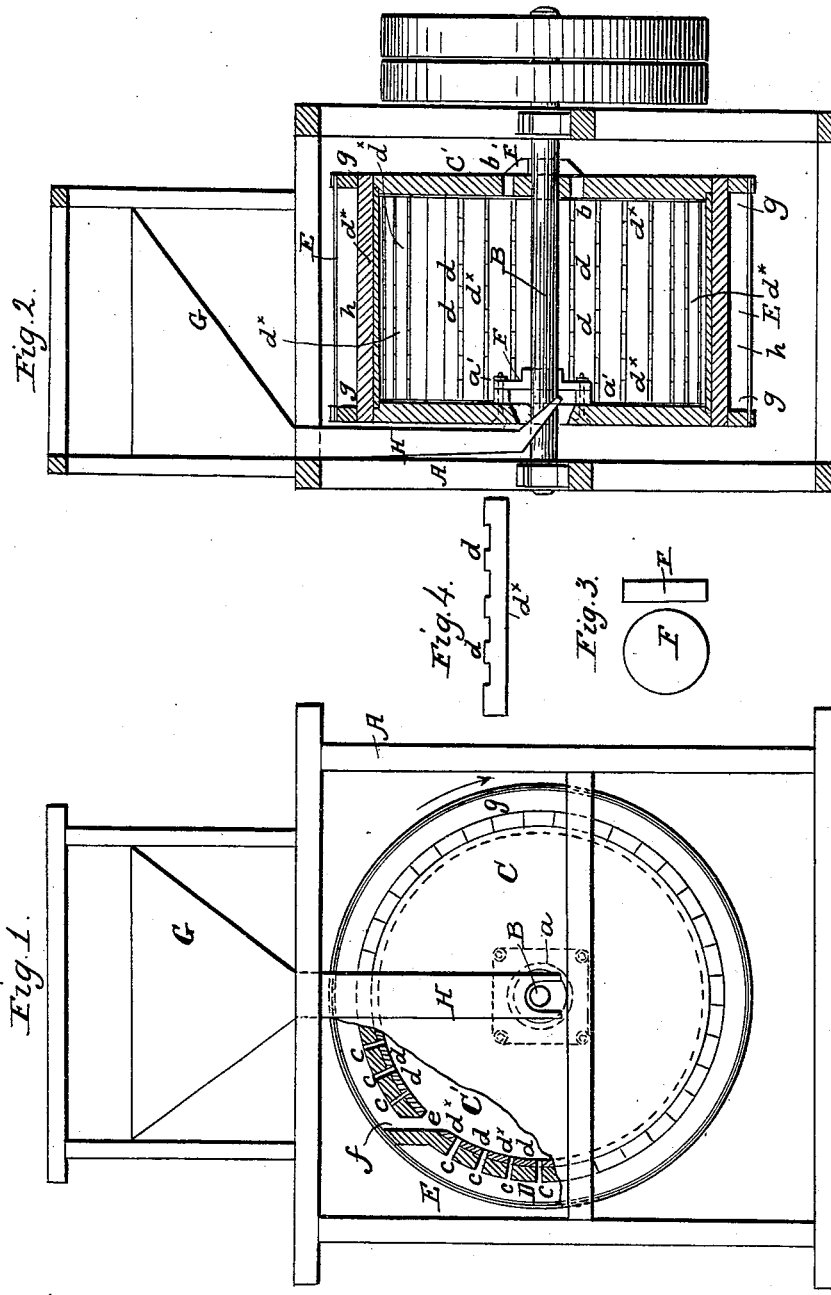


F. SUNDELL.
Quartz Mill.

No. 53,237.

Patented March 13, 1866.



Witnesses:
M. H. Kingston
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UNITED STATES PATENT OFFICE.

F. SUNDELL, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND ANTHONY CHABOT, OF SAME PLACE.

IMPROVEMENT IN QUARTZ-MILLS.

Specification forming part of Letters Patent No. 53,237, dated March 13, 1866.

To all whom it may concern:

Be it known that I, F. SUNDELL, of the city, county, and State of New York, have invented a new and Improved Mill for Grinding Ores, Minerals, and other Substances; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view of my invention, partly in section; Fig. 2, a vertical transverse section of the same, taken through the center; Fig. 3, a detached view of grinding-plates pertaining to the invention; Fig. 4, a detached view of one of the plates or lining of the staves.

Similar letters of reference indicate corresponding parts.

This invention consists in the employment or use of a rotating cylinder, the periphery of which is formed of staves with spaces between them at one or more parts, said cylinder being provided with one or more screens at its exterior and provided internally with grinding-plates, all arranged as hereinafter set forth, whereby the material is ground to the required degree of fineness and screened as it is ground and discharged from the machine through the screen or screens, the material being subjected to the grinding process until it can pass through the latter, so that the material will be ground or reduced to an equal degree of fineness throughout the entire mass.

A represents a rectangular framing, in which a cylinder is supported on a horizontal shaft, B. This cylinder is composed of two ends or heads, C C', and a periphery formed of staves D. The head C has a circular opening, *a*, at its center considerably larger in diameter than the shaft B, and F is a plate at the inner side of said head at some distance from it, said plate being keyed on the shaft and connected to the head by horizontal arms *a'*, four, more or less. (See Fig. 2.) By this means an opening is allowed at the center of head C to admit of the material to be ground being fed into the cylinder.

In lieu of this arrangement the head may be closely fitted to the shaft B, holes *b* made in the head in a circle concentric with the shaft at a

trifling distance therefrom, and a conical receiver, F', attached to the outer side of the head to receive the material to be ground, which passes from F' into the cylinder through the holes *b*. This arrangement is shown applied to the head C'. The material to be ground is fed into the cylinder from a hopper, G, placed on the upper part of the framing A, a spout, H, leading from the hopper down to the opening or receiver.

The staves D at one or more parts of the cylinder, or all around it, have spaces *c* between them, as shown clearly in Fig. 1, and the inner sides of the staves are lined with metal plates *d*^x. Chilled cast-iron may be used to preserve the staves from wear, and the inner sides of the heads C C' may also be lined, and strips *d* of metal may also be secured to the inner sides of the staves with spaces between them, said strips forming, in connection with the spaces *c* between a portion of the staves, a kind of grating.

In the periphery of the cylinder there are allowed at one or more points openings *e*, extending entirely across it, and strips *f* extend outward from said opening to an external screen, E, which is secured to the outer edges of two rims, *g g*, which are fitted on the cylinder, one near each side, the rims *g* being of such a depth as to admit of the screen E being at a requisite distance from the periphery of the cylinder to allow a space, *h*, between of suitable width, the strip or strips *f* forming a partition in said space, as shown clearly in Fig. 1.

The cylinder has a series of circular plates, F², placed within it, the cylinder being from a quarter to one-third full. These plates are of a size commensurate with the size of the mill. For an ordinary mill they would be about equal in dimensions to a silver fifty-cent piece, (half-dollar.) The material to be ground or pulverized is placed in the cylinder so as to fill the interstices between the plates and cover them about half an inch, the material, before being placed in the cylinder, being reduced to the size of common sand. The mill is rotated at such a speed as to keep, by centrifugal force, the mass within it at an angle of about seventy degrees. At this point the upper part of the mass will commence moving by rolling

or sliding downward, and in its course down it will meet with the portion of the mass moving upward, the two portions of the mass moving against each other in opposite directions—a result due to centrifugal force and gravity.

If too much speed be given the cylinder the mass will be carried over or around with it, and hence no work performed. If the cylinder have too slow a speed the whole mass will slide back or in a direction reverse to the movement of the cylinder, and no work will be performed. The right speed therefore is requisite, and a proper amount of material and plates placed within the cylinder in order to insure perfect work being done.

The material is ground or reduced by the attrition caused by the moving plates and the material above described, and as it is ground or reduced fine enough passes between the staves D and strips *d*, and the portion which is reduced as fine as desired passes through the screen E, while the coarser portion, which cannot pass through E, is returned back within the cylinder, for further grinding, through the openings *e*, being caught or arrested by the partition-strips *f* and guided into said openings as the cylinder rotates. Thus

it will be seen that the processes of grinding and screening are simultaneously performed, and consequently a uniform reduction of the material as it leaves the mill insured.

I would remark that I do not confine myself to the use of the circular plates F², as balls, or spheres, cubes, and other forms may be used instead; but I prefer the plates.

A current of air can be blown in at *a* to cause a more rapid discharge of the ground material through the screens or holes *c*.

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

1. The rotating cylinder consisting of the heads C C' and slats D, and provided with the strips or plates *d d*^x, plate F, feed-opening *a*, openings *e*, and strips *f*, all arranged to operate in the manner and for the purpose herein specified.

2. One or more screens, E, applied to the cylinder to operate in connection therewith, substantially as and for the purpose set forth.

F. SUNDELL.

Witnesses:

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