(No Model.)

J. W. FAIRFIELD.

QUARTZ MILL.

No. 422,581. Patented Mar. 4, 1890.

Fig. 2.

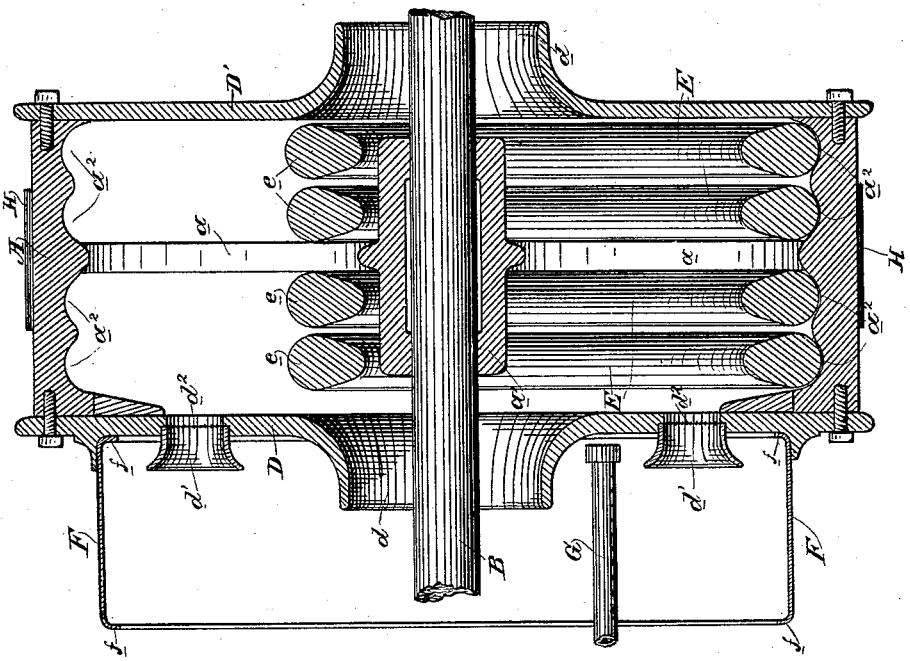
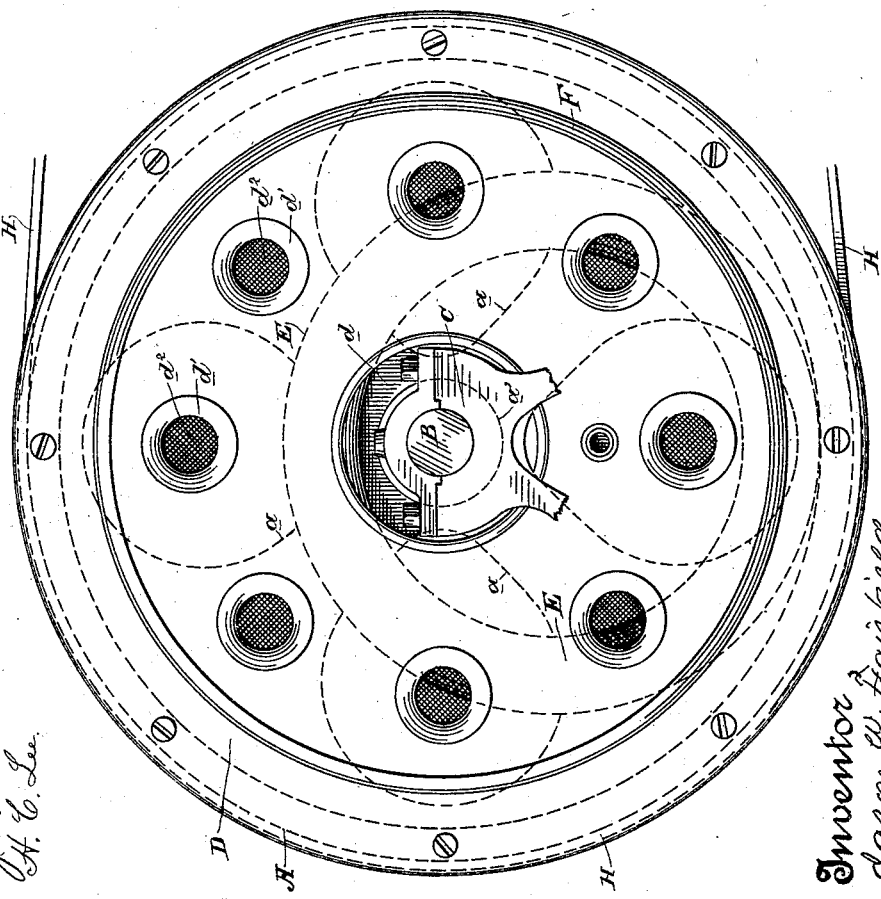


Fig. 1.



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UNITED STATES PATENT OFFICE.

JASON W. FAIRFIELD, OF PACIFIC BEACH, CALIFORNIA.

QUARTZ-MILL.

SPECIFICATION forming part of Letters Patent No. 422,581, dated March 4, 1890.

Application filed July 23, 1889. Serial No. 318,420. (No model.)

To all whom it may concern:

Be it known that I, JASON W. FAIRFIELD, of Pacific Beach, San Diego county, State of California, have invented an Improvement in Quartz-Mills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of mills for crushing quartz and other substances in which the material is crushed or pulverized within a cylinder or casing by the action of a crushing muller or weight; and my invention consists in the novel construction and arrangement of parts hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to provide a simple, easily-operated, and effective crusher.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of my quartz-crusher, showing the supporting-bearing C for the shaft B. Fig. 2 is a vertical section of my crusher.

A is the cylinder or casing, having internal radial arms *a*, connected with a hub *a'*, which is carried upon the shaft or axis B, mounted in suitable bearings C, whereby the cylinder or casing is supported and adapted to be rotated. The ends of the cylinder and casing are fitted with cap-plates D D', having open centers *d*, the cap-plate D being also provided with an annular series of discharge-openings *d'*, fitted with screens d^2.

Within the cylinder or casing A are a number of independent annular mullers or crushing-rings E. These are made with enlarged peripheries *e*, having in cross-section, as shown, a shape like that of a pestle, and these peripheries rest in correspondingly-shaped grooves a^2, formed in the inner surface of the cylinder or casing. The mullers or rings E encircle freely the shaft B, but are supported wholly by bearing in the base of the cylinder or casing.

Secured to the end of the cap-plate D of the cylinder or casing in any well-known manner is the annular or ring-shaped plate F, to be made of copper, said plate having at its inner and outer edge an upturned flange *f*. A stationary water-sprinkler G enters this ring and is adapted to discharge water upon its surface below.

H is a driving-belt fitted to the periphery of the cylinder or casing.

In operation the material may be fed to the crusher by hand or by an automatic feeder, as may be desirable, and passes in through the central openings *d* of the cap-plate D'. A rotary motion is imparted to the cylinder or casing, and the crushing-rings or mullers thereby roll in the grooves a^2, in which they bear. The ore passing down between the beveled or wedge-shaped sides of the peripheries *e* of the crushing-rings or mullers is preliminarily crushed, and is finally crushed to the desired degree of fineness between the peripheries of said rings or mullers and the seats or grooves *a*, in which they bear. The crushed ore or pulp is delivered from cylinder or casing through the screened openings *d'* upon the copper plate F, which is intended to be coated with quicksilver to effect amalgamation. The flanges *f* at the edges of the copper plate regulate the depth of the ore pulp upon it.

It will be seen that the entire machine revolves on a single shaft, and therefore requires but two bearings. The application of the belt directly to the outer cylinder or casing dispenses with all pulleys and gears. The arrangement of the cylinder or casing and the internal mullers or rings dispenses with all bolts or springs to keep the two together, as the weight of the mullers or rings accomplishes the result.

The shape of the mullers or rings, the outer surface being wider than the inner surface, makes a V or wedge shaped opening between them, thus providing for first crushing the ore between the peripheries before it gets under the rings or mullers. The revolving copper plate F, having the same motion as the cylinder, carries its load on the lower third of its surface, leaving two-thirds of it in view all the time, and a new surface constantly coming in contact with the pulp gives the attendant an opportunity to examine his plate at all times.

The flanges *f* on the edges of the plate determine the amount of the load, prevent the escape of any amalgam, and admit of clean-

ing the plate by a spray of clean water in front of the load, as from the water-distributer G.

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

1. In a quartz-mill, the combination of the axially-rotary cylinder or casing, the crushing-rings or mullers therein, and the supporting shaft or axis carrying the cylinder or casing and passing freely through the rings or mullers, substantially as described.

2. In a quartz-crusher, the combination of the axially-rotary cylinder or casing, the cap-plate on its end having the series of screen-protected discharge-openings, the independent crushing-rings or mullers within the cylinder or casing, and the supporting shaft or axis carrying the cylinder or casing and passing freely through the rings or mullers, substantially as described.

3. In a quartz-crusher, the combination of the axially-rotary cylinder or casing, the open centered cap-plate on one end of the cylinder or casing, the open centered cap-plate on the other end and having the series of screen-protected discharge-openings, the independent crushing-rings or mullers within the cylinder or casing, and the supporting shaft or axis carrying the cylinder or casing and passing freely through the rings or mullers and cap-plates, substantially as described.

4. In a quartz-crusher, the combination of the axially-rotary cylinder or casing, the independent crushing-rings or mullers therein, the annular plate F, connected with the cylinder or casing and rotating with it, and the supporting shaft or axis carrying the cylinder or casing and passing freely through the rings or mullers and the plate F, substantially as described.

5. In a quartz-crusher, the combination of the axially-rotary cylinder or casing, the independent crushing-rings or mullers therein, the annular plate F, connected with the cylinder or casing and having the flanges *f* for determining the amount of the material thereon and preventing the escape of amalgam, and the supporting shaft or axis carrying the cylinder or casing and passing freely through the rings or mullers and the plate F, substantially as described.

6. In a quartz-crusher, the combination of the axially-rotary cylinder or casing, the independent crushing-rings or mullers therein, the open centered cap-plate D on the end of the cylinder or casing and having the series of screen-controlled discharge-openings, the annular flanged plate F, secured to said cap-plate and rotating with the cylinder or casing, and the shaft or axis carrying said cylinder or casing and passing freely through the rings or mullers, cap-plate, and plate F, substantially as described.

7. In a quartz-mill, the combination of the axially-rotary cylinder or casing, the independent crushing-rings or mullers therein, the open centered cap-plate on one end of the cylinder or casing, the open centered cap-plate D on the other end and provided with the series of screen-controlled discharge-openings, the annular plate F, secured to the cap-plate D and having flanges *f*, the carrying shaft or axis B, and the fixed water-distributer projecting into the said annular plate, substantially as described.

8. In a quartz-crusher, the combination of the axially-rotary cylinder or casing, the independent crushing-rings or mullers therein, the supporting shaft or axis carrying the cylinder or casing and passing freely through the rings or mullers, and the driving-belt fitted to the periphery of the cylinder or casing, substantially as described.

In witness whereof I have hereunto set my hand.

JASON W. FAIRFIELD.

Witnesses:

H. C. AIRHART,

W. H. AIRHART.