J. T. DAVIS.

Grinding and Pulverizing Mill.

No. 212,664. Patented Feb. 25, 1879.

Fig. 1.

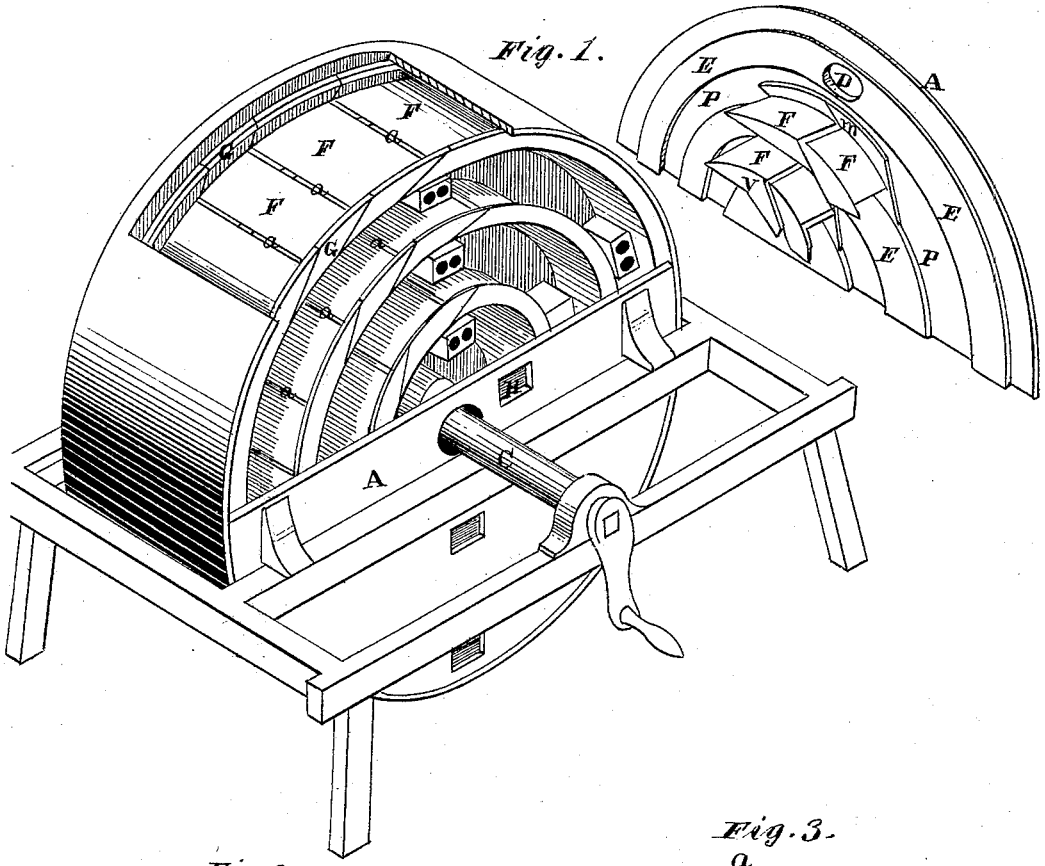


Fig. 2.

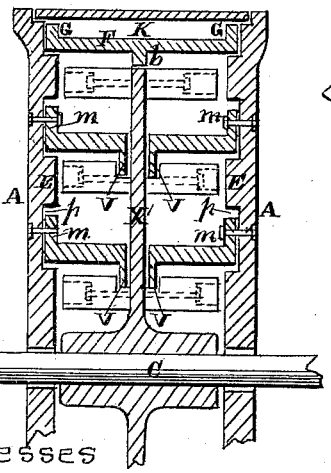


Fig. 3.

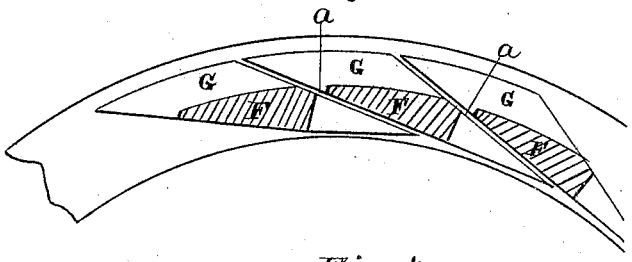
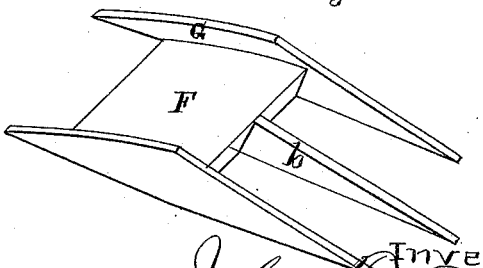


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN T. DAVIS, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN GRINDING AND PULVERIZING MILLS.

Specification forming part of Letters Patent No. **212,664**, dated February 25, 1879; application filed November 22, 1878.

To all whom it may concern:

Be it known that I, JOHN T. DAVIS, of the city and county of San Francisco, and State of California, have invented a Crushing and Grinding Mill; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to an improved mechanism for pulverizing quartz, rock, grain, or other hard substances; and my improvements refer more particularly to an apparatus of similar character for which I have applied for Letters Patent.

My improvements in this instance consist in inclosing within the case or cylinder three or more sets of dies, against which the material to be crushed is thrown by the corresponding number of sets of shoes on the disk rotating in said cylinder until it is crushed to the required degree of fineness.

It further consists in regulating the discharge-openings between the dies, so that while large openings are possible where the bulk of the ore is crushed at the center of the device the openings are smaller at the outer circle of dies, so that the material is discharged of more uniform size than was possible in my previous invention.

It also consists in the details of construction, which are more fully described in the accompanying drawings, in which—

Figure 1 is a view of my device with one-half of the side removed. Fig. 2 is a transverse section. Figs. 3 and 4 are details of construction.

A A are the sides of the case, to which lugs are attached for mounting the cylinder or case on the frame, as shown. Through the center of the sides is an open space, through which passes the shaft C, on which the centrally-revolving disk X′ is secured. On each side of this disk is mounted three or more sets of shoes, secured to the disk by means of bolts or screws, hand-holes D being provided in the sides of the case for their removal, as shown, and for keeping the machine cool. These shoes are set at suitable distances apart, and are set in three or more circles on the disk, according to the number of sets of dies which are used. The bolts holding them in position may be removed by means of the hand-holes, so that the shoes may be removed or changed whenever necessary.

Offsets E are formed in the sides of the case, so that the shoes pass close to said offsets in their revolutions, in order to more effectually force the ore against the dies, as hereinafter described.

The dies F are made in short sections, for convenience of replacement, and in order that spaces *a* may be left between them for the purposes of discharge. The dies F are arranged, as shown, in three or more circles inside the case, those of the outer circle being made wide enough so that their flanges G rest on the outer offset on the sides of the case. At the center of these outer-circle dies is a beveled extension, *b*, which the next die overlaps, so that when all the dies are in position these extensions form a continuous diaphragm in close contact with the centrally-revolving disk. These extensions, combined with the disk, divide the case or cylinder into two longitudinal compartments, so that the material being crushed cannot pass from one compartment to the other until it is fine enough to pass through the small space left between the edge of the disk and the extensions. I do not, however, claim these extensions, broadly, as they are shown and described in a previous application of my own.

The dies are beveled off from one edge to the other, so as to fit in the circle in which they are placed, and also in order that that portion subject to the greatest wear shall be thicker than the remainder. The inner surfaces of these dies are corrugated, so that a greater crushing effect is possible. These outer-circle dies F have flanges G on each side, which rest on the offset formed on the sides of the case, and that part of the flanges projecting above bears against the rim or cover of the cylinder joining the sides together, and thus keeps the dies in position.

The dies which are used for the sets nearer the center of the cylinder are secured in the case in a different manner from those on the outer circle.

Flanges *m* are formed in one side, which fit in the space *p* left between the offsets, and bolts or screws passing through the sides of

the case enter the flanges and hold the dies in position. The flanges V on the other sides of said dies come close up to the disk, and project downward from the dies to prevent the particles of ore from passing from one circular compartment to the other.

The discharge from the circular compartments is accomplished by the particles passing through the spaces *a* left between the dies. At the circle nearest the center these spaces are comparatively large, and at the next circle smaller, and at the outer circle smaller still. By this means the ore is finally discharged more uniform in size than where it passes through discharge-openings which are all the same size.

By having three or more sets of shoes and dies in the same cylinder, instead of only one, as heretofore, the crushing capacity of the machine is very greatly enlarged with no appreciable increase of expenditure of power. The crushing-surface is greatly increased, as there are substantially three machines in one.

The ore is fed into the case through the opening H at the center of the side of the case, where the first set of beaters breaks it up fine enough to pass through the spaces between the dies, when the next set of beaters and dies reduces it still further. From thence it passes to the third set, and when passing through the spaces of that set slides down the passage K between the cover of the case and the outside of the dies to the discharge-opening at the bottom of the cylinder.

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

1. The centrally-located rotating disk X′, with its concentric series of shoes, in combination with the concentric dies F F within the case A, said dies having the discharge-openings *a* graduated and regulated, substantially as and for the purpose herein described.

2. The dies F, made in sections, and provided with the beveled extensions *b*, said extensions overlapping to form a continuous projecting flange or rim in the same plane with the disk, substantially as herein described.

3. The rotating disk X′, with its shoes, as shown, and the dies F, with their discharge-openings *a*, fitted within the case A, graduated and regulated as described, said case being provided with openings D, to admit air to keep the machine cool and assist in the discharge of material, substantially as herein described.

In witness whereof I have hereunto set my hand.

JNO. T. DAVIS.

Witnesses:
CHAS. G. YALE,
FRANK A. BROOKS.