(No Model.)

W. G. DODD.

ORE CRUSHER OR PULVERIZER.

No. 535,683. Patented Mar. 12, 1895.

Fig. 1.

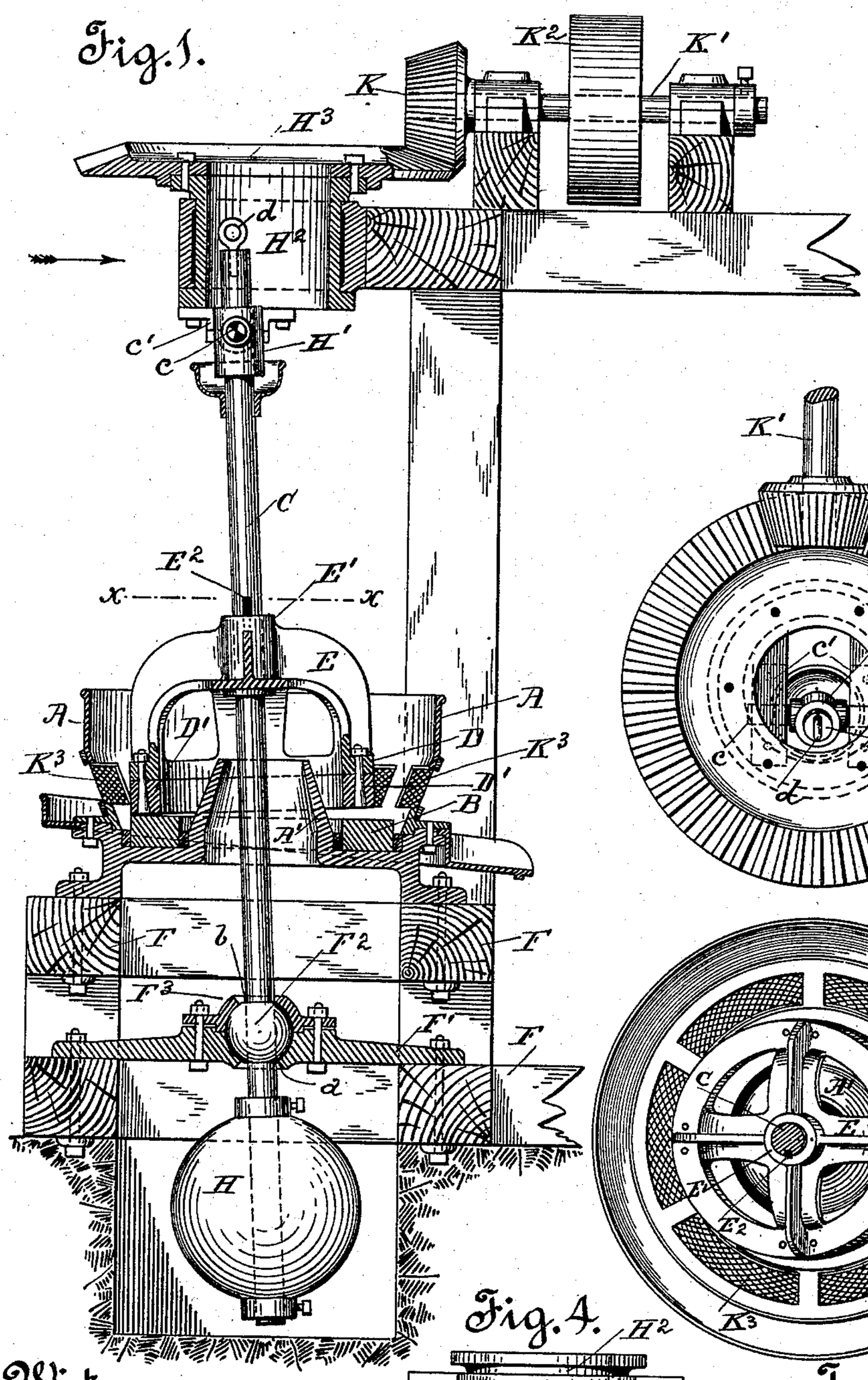
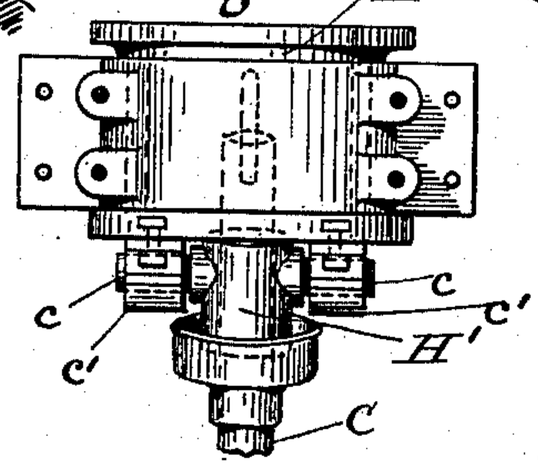


Fig. 3.

Fig. 2.

Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIS G. DODD, OF SAN FRANCISCO, CALIFORNIA.

ORE CRUSHER OR PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 535,683, dated March 12, 1895.

Application filed October 4, 1894. Serial No. 524,888. (No model.)

To all whom it may concern:

Be it known that I, WILLIS G. DODD, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Ore Crushers or Pulverizers; and I do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to certain new and useful improvements in quartz crushing machinery, more especially to that class of machines known as gyrating crushers, which consist in the arrangement of parts and details of construction as will be hereinafter more fully set forth in the drawings, described and pointed out in the specification.

The objects of my invention are to provide a crusher or pulverizer for quartz wherein the weight of the machinery will fall directly upon the muller, thus giving greater pressure thereto than would be obtained by the weight of the muller; in providing mechanism for imparting an oscillatory movement to the muller; and to provide a crusher or pulverizer wherein shall be combined simplicity and durability.

Referring to the drawings forming a part of this specification—Figure 1 is a vertical sectional view, in elevation, of the entire machine. Fig. 2 is a cross sectional top plan view, taken on line *x*—*x*, Fig. 1. Fig. 3 is a top plan view of the machine illustrated by Fig. 1; and Fig. 4 is a detail view, in elevation, of the swivel box, for imparting motion to the crusher shaft, and the sleeve to which the swivel box is eccentrically secured.

The letter A is used to indicate the mortar or circular box, into which the ore to be crushed or pulverized is fed in any suitable manner. Within this mortar is fitted the annular die ring B, upon which the crushing or pulverization of the ore takes place. The mortar or quartz box is provided with a central hub A′, preferably cone shaped, through which extends and works the shaft C, which shaft has a gyrating movement given thereto through the medium of the hereinafter described mechanism. Within the mortar works the muller D, to the face of which I bolt or otherwise secure the shoe D′. From the muller upwardly extend the arms E, which unite in the hub E′; the hub, arms and muller being preferably made in one casting. The central shaft C projects through the hub E′, said hub being connected to the shaft by the key E^2. Consequently as movement is imparted to said shaft the muller is likewise moved.

The mortar A is supported by the frame F, and below the muller is secured the plate F′, through the center of which is cut an opening *a*, the wall surrounding the opening being cut away so as to form a seat for the ball F^2, which is held in its seat by the plate F^3. This ball is provided with a central opening *b*, through which extends the shaft C, to the lower projecting end of which is adjustably secured the weight H. The ball F^2 gives a universal bearing for the central shaft and forms the fulcrum point thereof.

Inasmuch as the shaft C is keyed to the hub E′ of the muller arms, it is obvious that the entire weight of the shaft and adjustable weight falls directly upon the muller, and inasmuch as the shaft has free movement within its ball bearing, the weight thereof will cause the muller to automatically lower as wear takes place or the ore or quartz located between the face of the muller shoe and mortar ring is pulverized.

The upper end of the shaft C projects through the swivel box H′, which box is cast with the trunnions *c*, said trunnions working in bearing boxes *c*′. These bearing boxes are secured to the under face of the hollow sleeve H^2 eccentrically. The upper end of this hollow sleeve is bolted to the crown wheel H^3, the teeth of which wheel are engaged by the teeth of the crown pinion K, secured to the shaft K′, which is driven by the belt wheel K^2 from a belt not shown. As the shaft K′ is rotated, the motion thereof is imparted to crown wheel H^3, through the medium of crown pinion K.

The rotary movement of the crown wheel is imparted to the swivel box H′, through the connecting sleeve H^2. Inasmuch as the swivel box is connected eccentrically to the sleeve H^2, it is obvious that as the same is carried around by the rotary movement of the hollow sleeve, the shaft C will be given a gyrating

movement, which imparts a similar movement to the muller.

As the ore or quartz is fed into the mortar with the water, it is carried under the muller and is crushed or pulverized during the gyratory movement thereof, and after it has been pulverized to a sufficient degree of fineness, it passes out through the openings of the screens K^3.

It will be noticed that while the muller gyrates with the shaft C, it likewise has imparted thereto an oscillatory movement, due to the upper portion of the shaft being held at one side of the center of the hollow sleeve.

By simply releasing the adjustable weight secured to the lower end of the vertical shaft, the shaft may be raised vertically, which, carrying the muller therewith, permits an old and worn muller shoe to be easily replaced, or a new ring to be supplied to the mortar. In order to raise the shaft C after the weight has been removed therefrom, it is only necessary that a hoist chain be connected to the hook *d*, secured within the upper end of the said shaft.

This manner of constructing a machine provides a crusher or pulverizer for quartz which is simpler, more durable, and less expensive than any machine now known to me, the parts being so arranged that the entire weight of the machine is brought to bear upon the crushing face of the muller.

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

The combination of a mortar, a muller resting therein, a spherical bearing guide below the mortar, a shaft playing freely in said guide and extending through the mortar and muller and secured to the muller, mechanism for imparting a gyratory motion to the shaft, and an adjustable weight secured to the lower end of the shaft below the spherical guide.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS G. DODD.

Witnesses:

N. A. ACKER,

LEE D. CRAIG.