

(No Model.)

J. C. WISWELL.

ORE CRUSHER.

No. 296,096.

Patented Apr. 1, 1884.

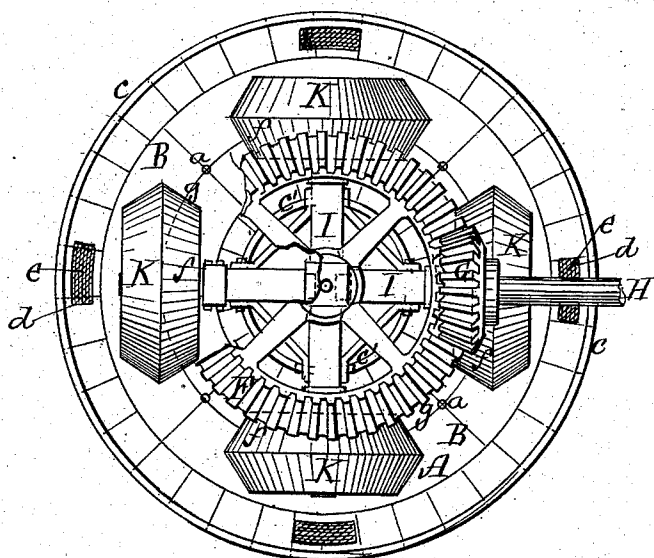


Fig. 1.

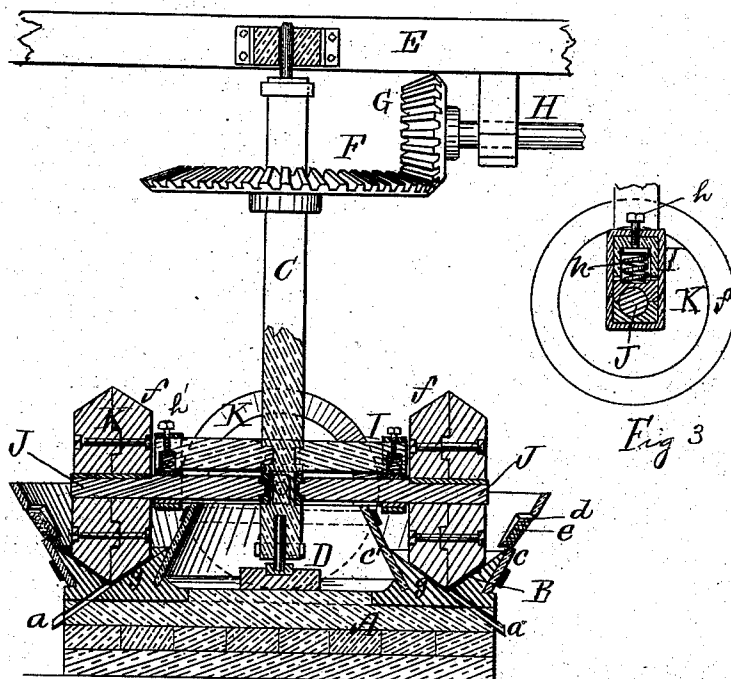


Fig. 2.

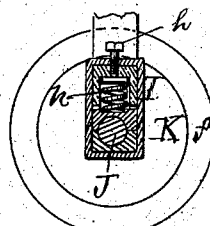


Fig. 3.

Witnesses.  
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# UNITED STATES PATENT OFFICE.

JACOB CHARLES WISWELL, OF MEDFORD, MASSACHUSETTS.

## ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 296,096, dated April 1, 1884.

Application filed November 8, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB CHARLES WISWELL, a citizen of the United States, residing at Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Ore-Crushers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention consists in improvements, hereinafter described and claimed, in a class of mills for crushing ores or other hard substances, in which a series of rollers pivoted to a rotary carriage travel in a circular path about a stationary bed, and operate to reduce the material by crushing action.

The drawings accompanying this specification represent, in Figure 1, a plan, and Fig. 2 a cross-section, of a mill embodying my improvements. Fig. 3 is a detail view, on an enlarged scale, of one of the springs *h* and adjacent devices.

In said drawings, A represents the base or bed of the mill, the same being of cast-iron or stone and circular in form, and preferably in four or more sections, for convenience in construction, handling, and transportation, such sections being bound together by metal hoops, or in any other suitable manner.

B in the drawings represents a circular trough, which is V-shaped in cross-section, this trough being formed in the top of the bed A, near the circumference of the latter. At the bottom of the trough B, I provide at intervals passages *a a*, &c., to permit of taking off the amalgam, and of escape of materials used in cleaning the trough, when the latter operation becomes necessary. The upper portion of the trough is continued by annular curbing *c c*, of wood or other material, and in the outer one, *c*, of such curbing I form apertures *d d*, &c., each of which is covered by a screen, *e*, of suitable material.

C represents a vertical shaft, which at bottom is stepped in a block, D, secured to the top of the bed A, centrally of the latter, the upper end of said shaft being journaled in a bear-

ing supported by a horizontal beam, E, or other object, in such manner as to be capable of a certain amount of vertical slip. The shaft C is rotated by a miter-gear, F, secured to its upper part, which engages with and is driven by a similar gear, G, secured to a counter-shaft H, suitably supported and driven. To the lower part of the shaft C, I secure a horizontal carriage, I, and in this carriage four axles, J J J J, have their outer bearings, the inner end of each axle being stepped in a bearing secured to the shaft. To the extreme outer end of each axle I secure a circular roller, K, which is adapted to revolve in the trough B; hence the periphery of each roller is of a V form in cross-section, corresponding to the trough. The inner half, *f*, of each roller fits closely to the corresponding side, *g*, of the trough B, and is a conic frustum of which the apex is the axis of rotation of the shaft C. Owing to this form of the periphery of the inner half of the roller, and the corresponding shape of the inner side of the trough, such periphery adapts itself naturally to the bed and traverses the latter with ease, free from slip and lost motion, which reduces the friction to the minimum, for which reason the rollers can be run very rapidly; and this, in addition to the comparatively large number of rollers employed, enables me to reduce the material very rapidly and economically. If the outer half of each roller fitted snugly to the trough, a certain slip and abrasive action would ensue between the two, and to avoid this I separate this portion of the rollers slightly from the bottom of the outer side of the trough. A certain amount of preliminary crushing is effected by the outer half of each roller; but the bulk of such crushing is effected by the inner half. The material, as it is reduced to the requisite degree of fineness, is thrown upward and outward by centrifugal force of the revolving rollers and escapes through the apertures *d d*, &c., in the wall of the trough, and is screened in passing the screens *e e*, &c. To relieve the strain on the bearings of shafts J incident to grinding, I make use of springs *h*, which are set into recesses on the under side of the carriage I, and bear against the outer bearings of said shafts. The pressure of said springs may be regulated by means of adjusting-screws *h'*, as illustrated in Figs. 1 and 3.

This mill is designed to operate strictly by crushing the material, which leaves the particles in a normal crystal form. This result is very important in the reduction and preparation of auriferous sulphurets and other classes of ores which are to be concentrated and the precious metal collected by any of the mercurial processes.

Mills which operate to reduce the material by attrition or abrasion leave the particles in a very unfavorable condition for concentrating and amalgamation, as the sharp corners are worn off; hence the importance of a mill which operates strictly to crush the material and preserve the crystal form of the particles.

I am aware that it is not broadly new to employ a series of grinding-rolls having V-shaped peripheries for the purpose of grinding ore, said rolls revolving together and rotating individually in a circular V-shaped groove, which receives the ore to be ground; and therefore I do not claim the same; nor do I claim,

broadly, the use of a curbing to extend such a groove upward, nor outlets for the amalgam, nor openings and screens for allowing the exit of comminuted ore; but

What I do claim is—

The combination of a series of crushing-rollers having V-shaped peripheries, and horizontal shafts on which said rollers are mounted, with a carriage in which said shafts are journaled at their outer bearing-points, a vertical shaft in which the inner ends of said horizontal shafts are journaled, springs which are interposed between said carriage and said horizontal shafts, and a stationary bed having a circular V-shaped groove in which said rollers travel, substantially as set forth.

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

JACOB CHARLES WISWELL.

Witnesses:

F. CURTIS,

A. F. HAYDEN.