

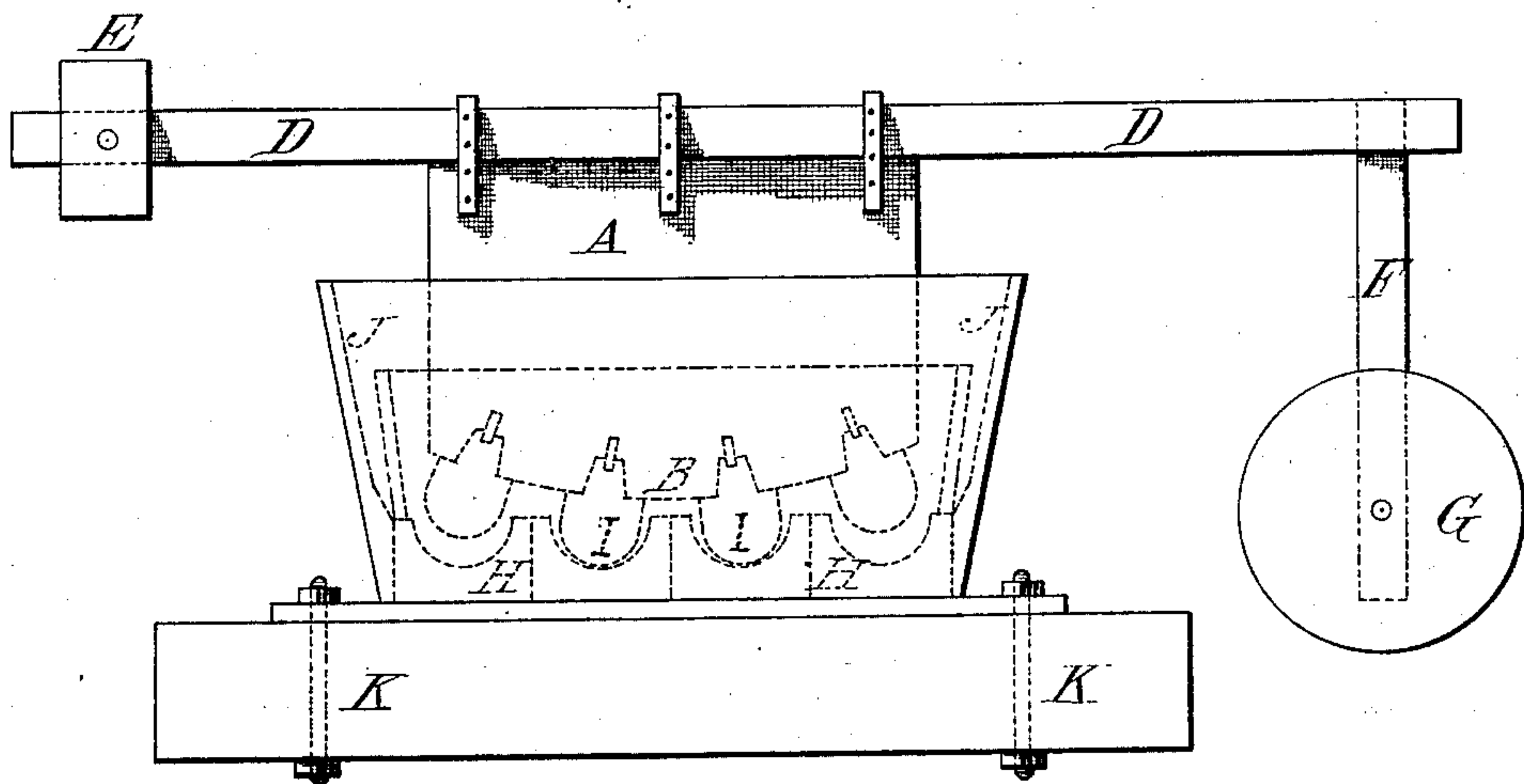
(No Model.)

D. B. JAMES.

ORE CRUSHER.

No. 245,724.

Patented Aug. 16, 1881.



Witnesses:  
J. N. How  
G. F. Euler.

Inventor:  
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# UNITED STATES PATENT OFFICE.

DAVID B. JAMES, OF VISALIA, CALIFORNIA.

## ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 245,724, dated August 16, 1881.

Application filed September 18, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID BICE JAMES, a citizen of the United States, residing at Visalia, in the county of Tulare, in the State of California, have invented a new and useful Ore and Quartz Crushing Machine, of which the following is a specification:

My invention relates to improvements in quartz crushing and grinding mills for the reduction and amalgamation of mineral-bearing ores in mortars, and the extraction of the precious metals therefrom by the action of shoes of iron or steel set in a heavy block of iron that can either be solid or hollow to receive weight, the lower part of the block of iron or shoe-stock that holds the shoes being in the arc of a circle, and the line of the shoes conforming to the same curve and pointing to the center of the top of the shoe-stock. The shoes are convex and received into concave dies. The shoe-holder, with the shoes and dies, are set in a mortar, and by applying power to a horizontal lever that is secured to the top of the shoe-stock or shoe-holder a rocking or vibrating motion is obtained that pulverizes the ores or quartz that is fed into the mortar, and by the introduction of a constant stream of water into the mortar and the rocking action of the stamps sufficient agitation is secured to expel the finely-pulverized ore and quartz through a screen that may be placed in the mortar front and leave the gold or precious metals amalgamated with quicksilver in the mortar. The shoe-stock, with the shoes, is set lengthwise of the mortar, with sufficient room for the shoes and holder to rock back and forth without touching the ends of the mortar. The said shoe-stock may weigh one and a half ton, more or less, and the number of the shoes can be three, four, or five, as desired, working in the arc of a circle of the proper radius to give sufficient clearance for the ores and quartz to be fed under all the shoes. The shoe-holder is guided in the mortar from moving out of place by the shoes dropping into the concave dies and sidewise by iron guides on the mortar. The lever imparts a movement or rocking motion, raising the shoes from the dies alternately back and forth, and as each shoe is relieved from the concave dies alternately, hav-

ing a circular motion, the action produces a sufficient agitation to discharge the crushed quartz with the water that is fed into the mortar.

In wet crushing, in practice it is found necessary to produce agitation to raise the fine particles of quartz and allow them to pass away with the overflow of water through the screen, and the action of the shoe-holder rocking back and forth produces the desired effect and creates a perfect discharge, and circulates the uncrushed quartz uniformly under the shoes and between the shoes and dies; also, there may be a circulating channel hollowed out of the middle of the dies lengthwise of the mortar to allow the uncrushed quartz to pass from between one set of shoes and dies to another.

The shoe-holder can be rocked at any desired speed, as the shoes are all connected to the holder. The uncrushed quartz returns immediately under the dies, ready for the next stroke, and there is no dead-point where the shoe-holder is in motion but what there is crushing being done.

The crushing force is obtained by the weight of the shoe-holder, alternating its whole weight from one shoe to the other. For instance, if the shoe-holder weighs three thousand pounds and there are four shoes on the holder, in one revolution of the crank the weight imparted to the combined number of shoes to crush is twenty-four thousand pounds, and if the machine makes sixty revolutions per minute, it is equal to a force used in the mortar of seven hundred and twenty tons in one minute.

The annexed drawing represents a side view of my improved ore-crusher.

A is the shoe-block, seated for the stems of four shoes, with key-holes to drive off the shoes. The shoe-holder, at the part marked B, conforms to the arc of a circle, the upper part of the shoe-holder, where the lever is fastened, being a straightline. D is the lever. E is a balance-bob. F is the pitman or connecting-rod, connecting with the wheel G. H are the concave dies. I are the convex shoes. J is the mortar. K is the mortar-block.

I am aware that rolling weights operated by a direct or reciprocating motion have been

heretofore employed in quartz-mills, and that such crushers have been provided with curved rocking faces and located in a series of parallel batteries. This, however, I do not broadly claim; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the shoe-block A, having a curved under-surface provided with con-

vex shoes I, arranged in the arc of a circle, rotating mortar J, having concave dies H, lever D, having balance-bob E, connecting-rod F, and wheel G, all constructed and arranged as and for the purpose specified.

DAVID BICE JAMES.

Witnesses:

I. N. HAIR,

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