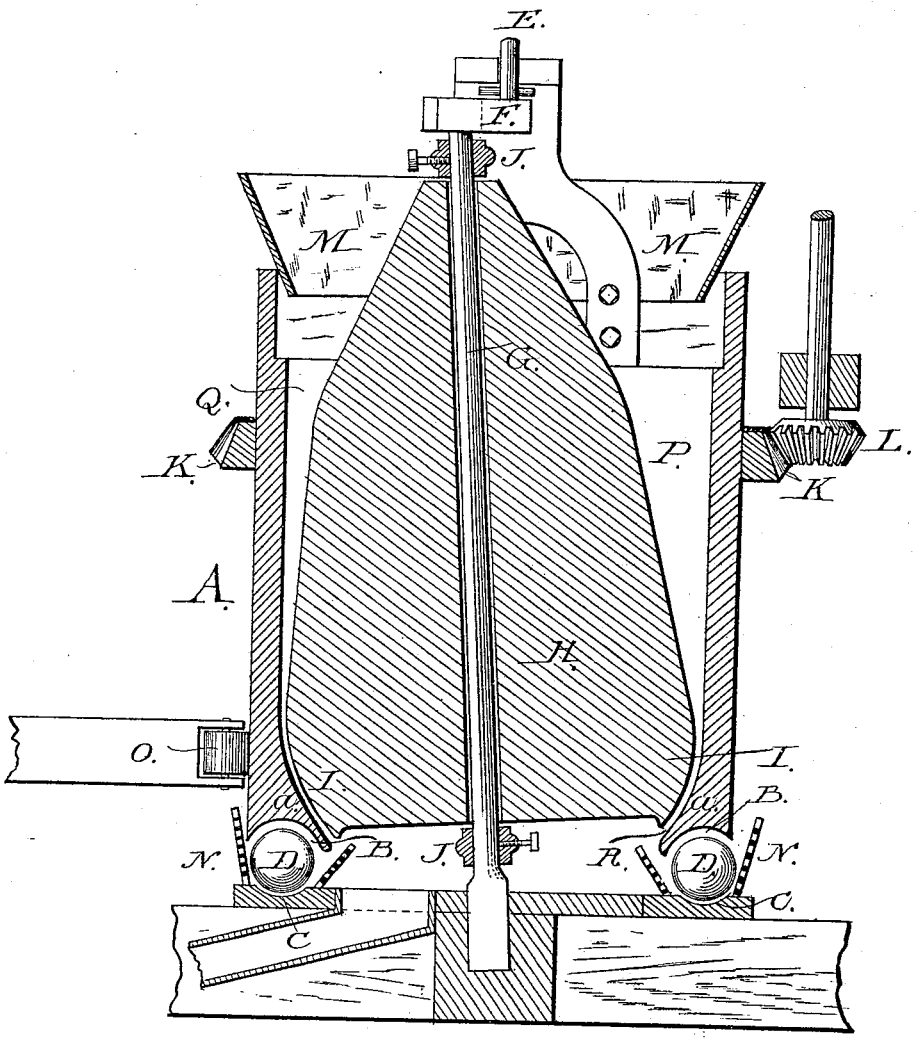
(No Model.)

A. G. & J. M. DYER.

ROCK CRUSHER.

No. 265,490. Patented Oct. 3, 1882.



Witnesses;

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UNITED STATES PATENT OFFICE.

AARON G. DYER AND JAMES M. DYER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNORS OF ONE THIRD TO A. A. VAN WORMER, OF SAME PLACE.

ROCK-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 265,490, dated October 3, 1882.

Application filed February 18, 1882. (No model.)

To all whom it may concern:

Be it known that we, AARON G. DYER and JAMES M. DYER, of San Francisco, county of San Francisco, State of California, have invented a Rock-Crushing Apparatus; and we hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to certain improvements in apparatus for crushing rocks.

Referring to the accompanying drawing for a more complete explanation of our invention, the figure is a vertical section of the apparatus.

A is an outer cylindrically-shaped vessel of sufficient thickness to resist any strain which may be brought upon it. The inside of this cylinder is straight, or nearly so, to a point near the bottom, where it curves inward at *a*, and thus contracts the opening at the bottom, and at the same time makes the sides thicken at that point. The bottom of the cylinder thus thickened has a groove, B, formed in it, and the base-plate C has a corresponding circular groove, so that a series of balls, D, fitting into these grooves, support the cylinder so that it may turn freely upon them.

E is the journal at the top in line with the axis of the cylinder, and it has an arm, F, projecting a little to one side. Through this arm and into the center of the base-plate an axis, G, extends at an angle, as shown, and is fixed firmly in place. Upon this axis is a conically-shaped block of metal, H, fitted to turn loosely. The bottom of this block is curved at I to correspond with the curve *a*, and it is of such diameter that when it is upon its axis one side of the curve I will fit closely in its corresponding curve, *a*, while the opposite side will, on account of the angle, stand a little higher and away from the side of the cylinder, so as to leave a space for the escape of the crushed rock. Collars J are secured to the axis above and below the block H to hold it in place or to allow its adjustment.

Upon the exterior of the cylinder A is formed a gear, K, and a pinion, L, serves to drive it; or, if preferred, a belt or other device might be used.

A hopper, M, serves to introduce the ore or rock to the upper end of the cylinder, and a screen, N, allows the escape of the pulverized rock when it has become fine enough.

A roller or rollers, O, are fixed to the frame outside the cylinder, and press against it at the point where the inner cone comes most closely in contact with it, so as to prevent the strain of the passing rock from forcing it out of place.

The operation is as follows: The outer cylinder, being set in motion, rotates without moving the inner cone, which is, however, free to turn upon its shaft or axis. When rock is fed into the space between the two it will seek the widest portion, as at P, where it becomes wedged, and will thus carry the inner cone around with the outer cylinder. While thus acting to bind the two together the rock is carried around with them, and as the space becomes narrower to the part Q the rock will be crushed and fall lower, the operation being repeated until the rock finally falls out through the discharge-space R. From this point it passes beneath the balls D and is further crushed by the weight of the cylinder until it will pass through the screens.

It will be seen that the two parts may be reversed in position and work the same—that is, the interior solid portion may be cylindrical in shape, and the exterior hollow portion may be cone-shaped or tapering, so that the sides will approach in the same manner as before described and the crushing be done in the same manner.

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

1. In a crushing apparatus, the combination of an exterior rotating vertical cylinder having a contracted bottom, *a*, an inclined shaft, G, and an inner cone supported so as to turn loosely upon said inclined shaft within the cylinder, said cone having a curved base, I, corresponding with and fitting the curve *a*, substantially as herein described.

2. In a crushing apparatus, the combination of an exterior rotating vertical cylinder having a groove, B, an interior cone rotating at an

angle with said cylinder, the balls D, and the grooved base-plate C, substantially as described.

3. In a rock breaking and crushing apparatus, the combination, with the hollow vertical rotating cylinder A, the cone H, inclined shaft G, said cone turning loosely upon said shaft within the cylinder, and grooved base-plate C, with the balls D and the screens N, substantially as herein described.

In witness whereof we have hereunto set our hands.

AARON G. DYER.
JAMES M. DYER.

Witnesses:
S. H. NOURSE,
G. W. EMERSON.