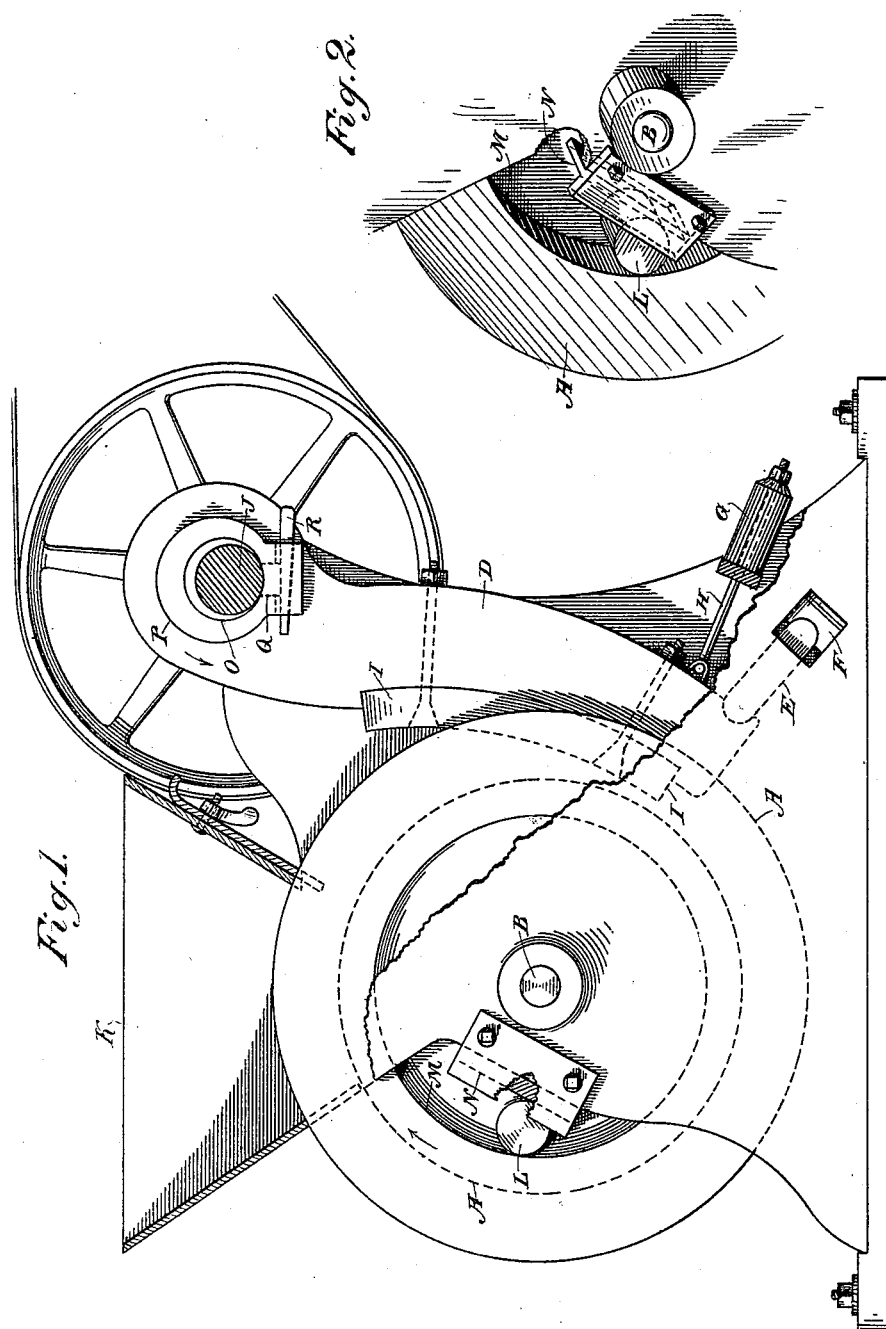


(No Model.)

F. A. HUNTINGTON.
CRUSHING MILL.

No. 419,256.

Patented Jan. 14, 1890.



Witnesses,
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UNITED STATES PATENT OFFICE.

FRANK A. HUNTINGTON, OF SAN FRANCISCO, CALIFORNIA.

CRUSHING-MILL.

SPECIFICATION forming part of Letters Patent No. 419,256, dated January 14, 1890.

Application filed April 14, 1888. Serial No. 270,649. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. HUNTINGTON, of the city and county of San Francisco, State of California, have invented an Improvement in Crushing-Mills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in that class of crushing-mills in which a vibrating or oscillating jaw operates in conjunction with a cylinder, between which and the jaw the rock is crushed or broken; and my invention consists in the constructions and combinations of devices which I shall hereinafter fully describe and claim.

Figure 1 is a side elevation of the machine with a part of the casing broken away, and showing the hopper and driving-shaft in section. Fig. 2 is a detail showing a part of the cylinder and casing, and showing also the short cylinder L and inclined block N.

A is a cylinder, mounted so as to turn upon a stout shaft B. This cylinder is preferably constructed with a heavy exterior periphery of rolled steel, which serves as a wearing-surface, and which may be replaced when worn out. At one side of this cylinder and opposite its periphery is suspended the oscillating jaw D, the lower end of which rests against a toggle E, which is supported in the box or step F, as shown, and serves as an oscillating thrust-bearing for the lower end of the jaw.

G is an elastic rubber or other spring connected with the jaw by the rod H, so as to keep the lower end of the jaw in contact with the toggle E without the necessity of making a cap or box to hold the latter in place. The face of the jaw which is adjacent to the periphery of the roller is curved, as shown, into an arc of much larger radius than that of the cylinder, and is also provided with a heavy removable wearing-die I. The upper end of the oscillating jaw is supported upon an adjustable eccentric upon the driving-shaft J, so that when this shaft is rotated the action of the eccentric will cause a rotary motion of the upper part of the jaw in the direction shown by the arrow, and thus cause the jaw to alternately advance toward and recede from the face of the cylinder. The lower end of the jaw is ad-

justed to or from the roller or cylinder by inserting thin steel plates behind the box F, so that said jaw may stand as near to the cylinder as is desirable, and the space at this point regulates the fineness of the material which passes out. By this adjustment I am enabled to feed the broken rock directly into the subsequent crusher without any intermediate feeder. The rotary movement of the upper end of this jaw causes the crushing-face to advance toward the cylinder and to move downward at the same time.

The rock to be crushed is contained in the hopper K above the cylinder, so that the rock falls into the space between the cylinder and the oscillating jaw, this space being widest at the upper end, as shown in the drawings, and the peculiar rotary and downward movement of the jaw causes the rock to be carried downward between the cylinder and the jaw, the cylinder rotating toward the jaw with each oscillating movement of the latter, so that the rock is gradually carried downward and reduced by degrees to a fineness which will allow it to fall out at the bottom. In order to prevent the cylinder from rotating backward with each upward movement of the jaw on its return-stroke, I have fitted short cylinders L into the spaces between the edges M of the cylinder and the inclined block N, which is fitted between the cylinder-shaft and these edges, so that the rollers lying in these spaces will allow the cylinder to rotate freely in the direction of the arrow; but any movement backward, caused by the friction or lifting action of the rock between the jaw and the cylinder, will be checked by the rollers L, which bind in the channel in which they lie and act as a clutch mechanism to prevent this backward rotation. That portion of the driving-shaft J which passes through the upper end of the oscillating jaw is turned eccentric, as shown at O, and upon the outside of this is fitted another eccentric P, having the same throw as the eccentric O. When the larger portion of these two eccentrics lies upon the same side of the shaft J, it is manifest that the throw will be equal to the sum of the eccentricities of the two, but when the outer eccentric is turned around so that its larger portion is diametric-

ally opposite to the larger portion of the eccentric O the two will exactly neutralize each other. The movement of the oscillating jaw may then be regulated to any desired degree
5 between these two points by simply turning the outer eccentric around upon the inner one. In order to secure the outer eccentric at any desired point, I employ a gib Q, the
10 inner face of which fits the curve of the eccentric O, and the key R, being driven in behind it, causes it to bind and hold the eccentric at any desired position.

When the rapidity of feeding and crushing any particular kind of rock has been determined upon, the eccentrics are adjusted
15 to give the proper amount of oscillation to the jaw and are then keyed in place. The machine thus forms a self-feeder, which may be adjusted to any degree of nicety to feed
20 ore or other material to stamps or other crushing devices when regularity of supply is required, and it performs the double office of a rock-breaker and an ore-feeder.

The cylinder has flanges S projecting upon
25 each side of the oscillating jaw, and these serve to retain the rock in place between the

two faces and prevent its escaping at the sides.

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

The vertically-disposed concave jaw having its bottom supported by an exterior toggle and its upper end mounted upon an eccentric with adjustable throw, in combination with a flanged roller opposed to the concavity of the jaw, and a stop mechanism to prevent the roller from turning backward, said mechanism consisting of the short cylinders M and flanged block N, and an open-bottomed feed-hopper fixed over the vertical center of the roller, so that its contents are supported upon the top of the roller and the latter acts as carrier and feeder and crushing-jaw, substantially as described.

In witness whereof I have hereunto set my hand.

FRANK A. HUNTINGTON.

Witnesses:

S. H. NOURSE,
H. C. LEE.