

(No Model.)

E. R. GALE.
ORE CRUSHER.

No. 478,588.

Patented July 12, 1892.

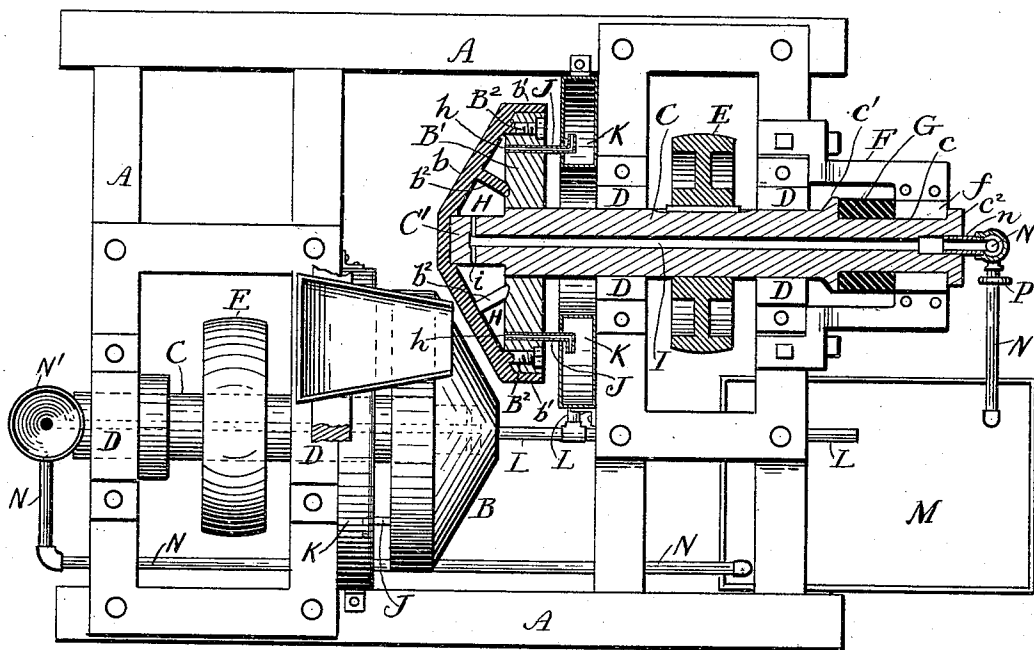


FIG. 1.

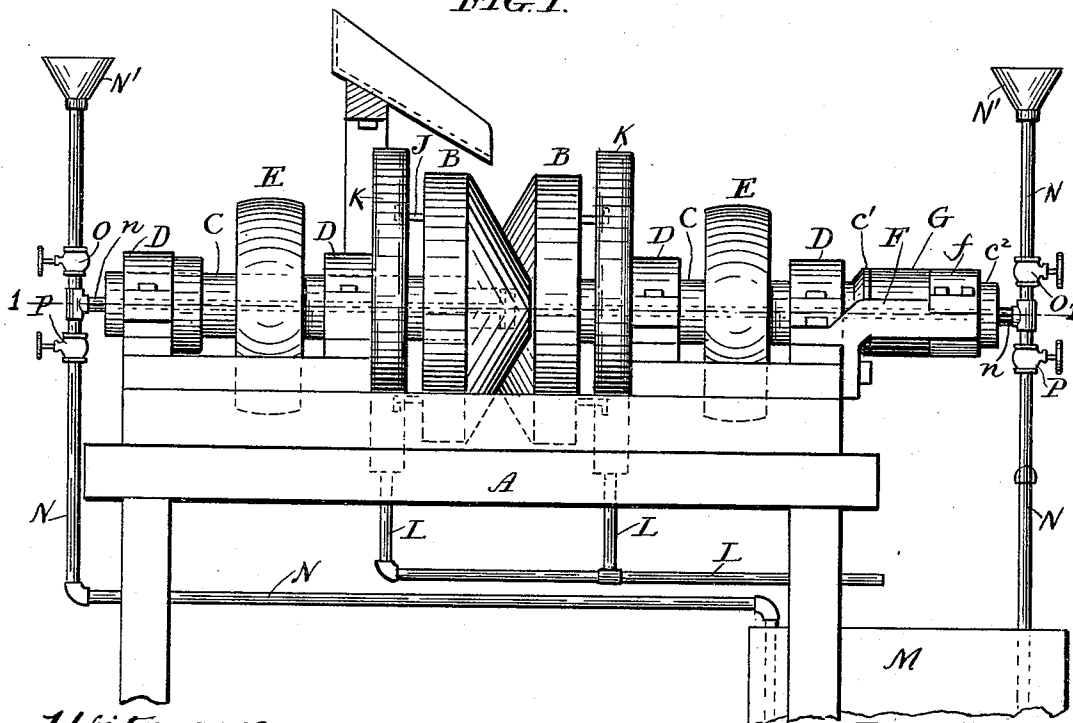


FIG. 2.

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UNITED STATES PATENT OFFICE.

EDWARD R. GALE, OF CHICAGO, ILLINOIS.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 478,588, dated July 12, 1892.

Application filed December 12, 1891. Serial No. 414,786. (No model.)

To all whom it may concern:

Be it known that I, EDWARD R. GALE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ore-Crushers, of which the following is a specification.

The object of my present invention is to provide means for preventing the rolls of ore-crushers from heating; and to this end said invention consists in certain features of novelty, that are particularly pointed out in the claims.

In the accompanying drawings, which are made a part of this specification, Figure 1 is a view of an ore-crusher embodying my invention, some of the parts being shown in plan and others in horizontal section on the line 1 1, Fig. 2. Fig. 2 is an elevation of said machine.

A represents the frame of the machine; B B, the crushing-rolls; C C, the shafts to which they are secured; D D, the boxes in which the shafts are journaled, and E E the pulleys on said shafts by which they are driven, preferably at different speeds. The rolls shown in the drawings are of conical shape, the angles of their working surfaces being such that they are in effect a pair of overlapping disks.

I desire to have it understood that in its generic sense my invention is not limited to rolls of this or any other particular form.

The term "roll" as used in this specification is intended to comprehend any grinding or crushing device, whatever may be its construction or position, which revolves while in operation.

F is an extension of the frame, having at its outer end a two-part box *f*, in which is journaled a reduced portion *c* of one of the shafts. A cylindrical block of rubber G, surrounding the shaft between the said box and a shoulder *c'*, holds the rolls in working position and at the same time permits them to separate to relieve chokes. The object of the reduced portion *c* is to form a shoulder *c'*, which comes against the outer end of the frame extension F and limits the approach of the rolls. Each roll consists of a steel face-plate *b*, having an annular flange *b'*, which embraces the periphery of a heavy disk B', which is fixed to the shaft C. The non-circular end C' of the shaft fits a corresponding socket in the under side

of the face-plate, so as to support the crown of said plate and at the same time prevent it from turning relatively to the shaft, this turning being further prevented by heavy bolts B², by which the face-plate and disk are bolted together. At intermediate points the face-plate is supported by posts or struts *b*², which bear against the disk.

It will be seen that the roll thus constructed has an internal chamber H, to which water or other cooling-fluid may be admitted through a bore I, formed longitudinally through the shaft C, and lateral openings *i*. The fluid admitted to the chamber escapes through openings *h*, which are situated, preferably, near the periphery of the roll. In order to prevent the water escaping from these openings from being thrown off by centrifugal force and sprinkled over everything in the vicinity of the machine, I prefer to provide each of the openings *h* with a discharge-tube J, which projects through an annular opening in the side of an annular shield K, which catches the water and delivers it to a pipe L, by which it may be carried to any desired place. Where water is plentiful, it may be supplied by inserting the end of a hose in the bore of the shaft C and the water passing through the pipe L may go to waste; but where economy is necessary the same water may be used over and over again by catching it in a tank M, from which it can be drawn into the chamber H by centrifugal force by simply connecting the hollow shaft with the tank. This may be done by inserting in the end of the shaft the branch *n* of a pipe N, the lower end of which communicates with the tank, while the upper end is provided with a funnel N' for a purpose that will appear presently. Two valves O and P are placed in the pipe N—one above and the other below the branch *n*.

In order to start the machine so as to cause a flow of water upward through the pipe N, thence through branch *n* into bore I, thence through openings *i* into chamber H, thence through outlets *h* J into shield K, and thence through pipe L back to tank M, the rolls are put in revolution, the valve P closed, the valve O opened, and water poured into the funnel N' until the chamber H is filled. The valve O is then closed and the valve P opened, after which the centrifugal force of the water passing from

the center of motion of the roll will create sufficient suction to draw the water up through the pipe N and through the hollow shaft into the chamber, it being understood that the
 5 branch *n* and shaft C are packed so as to make a water-tight joint.

Instead of a solid disk B', an open spider or straddle may be used, in which case the water will be thrown from the openings *i*, strike
 10 against the under side of the face-plate, and escape through the openings of the spider, the shield K being arranged to overlap the margin of the roll, if need be.

If the roll is cylindrical, one or both of its
 15 ends may be left open save for a spider such as last described; or they may be closed by a disk, such as B', having suitable discharge-openings, such as *h*, with or without the tubes J and shield K.

20 What I claim as new, and desire to secure by Letters Patent, is—

1. In an ore-crusher, the combination, with a hollow horizontal roll having a water-outlet, of a horizontal shaft having an internal con-
 25 duit communicating with the interior of the roll, a water-supply pipe, and an air-tight slip-joint between said pipe and shaft, permitting the latter to revolve, substantially as set forth.

2. In an ore-crusher, the combination, with
 30 a hollow roll having a water-outlet located some distance from its center and a water-tank, of an air-tight conduit connecting the tank with the center of the roll, whereby the

centrifugal impulse imparted by the rotation of the roll draws the water from the tank into 35 the roll and discharges it again, substantially as set forth.

3. In an ore-crusher, the combination of a hollow roll having a water-outlet located some distance from its center, a tank located below 40 the level of the roll, and an air-tight conduit connecting the tank with the interior of the roll, substantially as set forth.

4. In an ore-crusher, the combination, with the roll and a hollow shaft opening inside 45 thereof, of the tank M, the pipe N, having branch *n*, communicating with the bore of the shaft, and the valves O and P, located in said pipe above and below the branch *n*, substan- 50 tially as set forth.

5. In an ore-crusher, the combination of a hollow roll, a hollow shaft, said shaft and roll having internal communication, a tank situ- 55 ated at a lower level than said roll, a pipe communicating therewith and with the bore of the shaft, an air-tight joint between said shaft and pipe, an outlet for water situated some distance from the center of the roll, an annular shield for catching water dis- 60 charged from said outlet, and a pipe for conveying the water from said shield back to the tank, substantially as set forth.

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Witnesses:

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