(No Model.) 2 Sheets—Sheet 1.

W. L. MORRIS.

ORE CRUSHER.

No. 450,890. Patented Apr. 21, 1891.

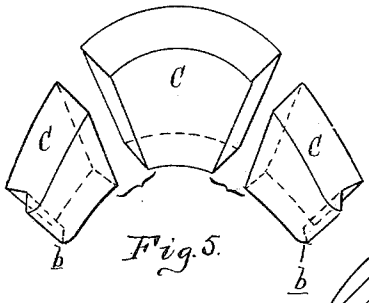


Fig. 5.

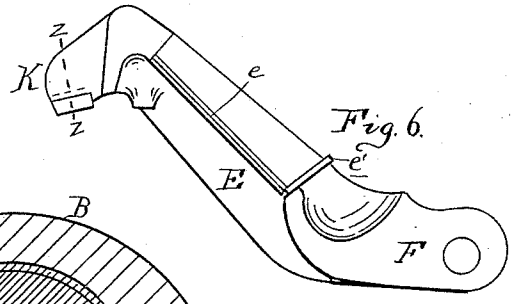


Fig. 6.

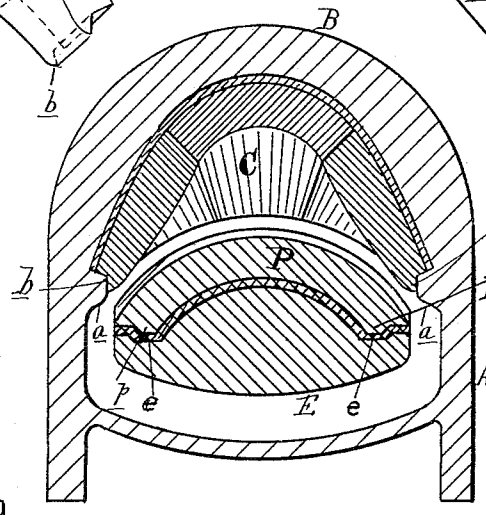


Fig. 1

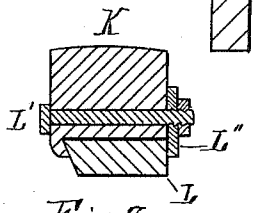


Fig. 7

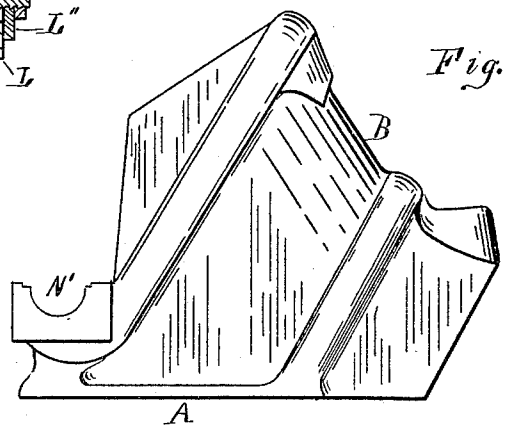


Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. L. MORRIS.

ORE CRUSHER.

No. 450,890. Patented Apr. 21, 1891.

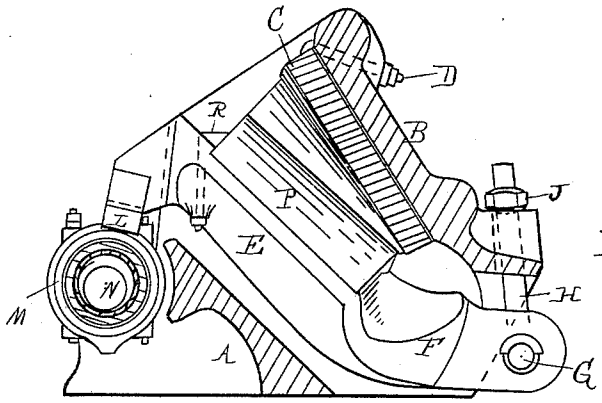


Fig. 3.

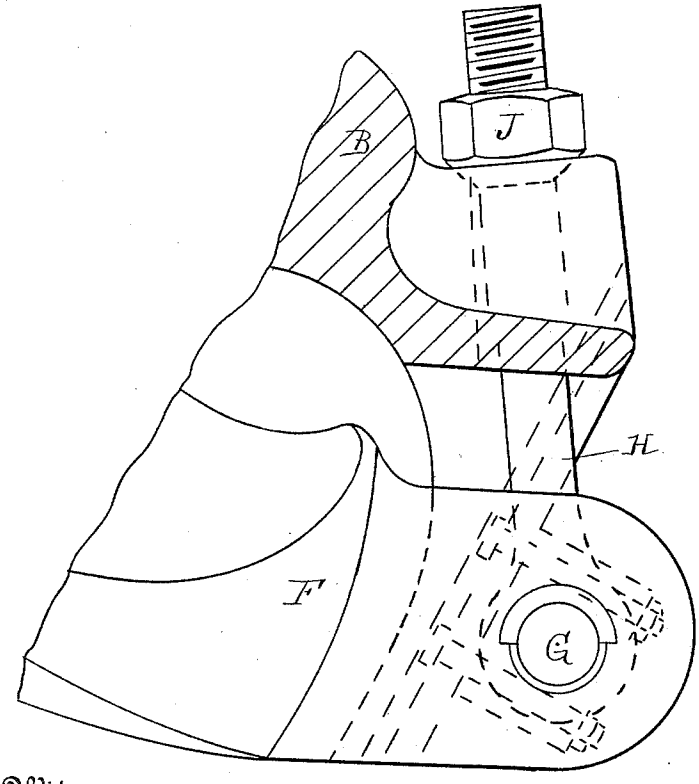


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM L. MORRIS, OF CLEVELAND, OHIO.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 450,890, dated April 21, 1891.

Application filed July 23, 1890. Serial No. 359,707. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. MORRIS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Ore-Crushers, of which the following, with the accompanying drawings, is a specification.

This invention relates to certain new and useful improvements in ore-crushers.

The object of the invention is to construct a device especially designed for crushing ore, rocks, &c., and wherein are combined strength and simplicity, and that provides for a side discharge for the crushed material.

The invention consists in the peculiar construction and conformation of the removable crushing-dies and their arrangement in relation to each other, and in the peculiar construction, arrangement, and combination of the various parts, all as more fully hereinafter described and claimed.

Figure 1, Sheet 1, is an enlarged cross-section on lines *x x* of Fig. 3. Fig. 2, Sheet 1, is a side elevation of the bed and rigid jaw with movable jaw and actuating mechanism removed. Fig. 3, Sheet 2, is a vertical section of the bed and rigid jaw, showing movable jaw and die in elevation. Fig. 4, Sheet 2, is an enlarged view of rear end of machine, showing manner of hanging movable jaw. Fig. 5, Sheet 1, is a perspective view of upper or stationary die detached. Fig. 6, Sheet 1, is a side elevation of the movable jaw detached. Fig. 7, Sheet 1, is an enlarged section on the line *z z* of Fig. 6, showing manner of securing the wearing-plate in position.

In the accompanying drawings, which form a part of this specification, A represents the bed of the machine, which I preferably cast integrally with the stationary jaw B, as seen in Figs. 1 and 2. This jaw is recessed to receive the removable crushing and wearing die C, which is constructed in three sections, as shown in Fig. 5. These dies are secured in the stationary jaw in any convenient manner, though I prefer to form shoulders, as at *a*, to receive the edges of the two outer dies, while the central section serves as a "key" to retain them in place, the central section being secured to place by means of a hook-bolt D, which passes through the head of the stationary jaw B and is provided with suitable nuts upon its outer end. The hook end of the bolt overlaps the upper edge of the central section of the die C. The shoulders *a* engage with offsets *b* upon the outer edges of the outer dies C, and as these shoulders converge the dies cannot slip downwardly and close the throat of the machine.

E represents the movable or oscillating jaw, and it is provided with an elongated heel F. This heel is fulcrumed upon a fulcrum-shaft G, the ends of which are properly secured in eyebolts H, which latter pass through the rear end of the machine and receive upon their upper ends adjusting-nuts J, and by means of which the heel of the movable jaw may be raised or lowered, as circumstances may require. The upper end of this movable jaw E is provided with a laterally-projecting lug K, which is designed to receive the removable wearing-plate L, and which latter is retained in place by a bolt L′ and clamp-plate L″, as shown in Fig. 7. This bearing-plate L is designed to rest upon the sleeve M, which is secured upon the eccentric shaft N, the latter being journaled in suitable bearings N′ in the two sides of the machine, and it is provided with suitable fly-wheel and a pulley designed to be driven from any convenient power and by means of which the eccentric shaft may be rotated.

In the upper portion of the movable jaw E, I secure the crescent-shaped crushing and wearing die P, the movable jaw E being provided with channels *e* near each side edge, designed to receive the ribs *p* upon the back of the die P, the lower end of said die resting upon a flange or rib *e′*. This die is held against accidental displacement by means of two or more hook-bolts R, which pass through the head of the jaw and overlap the upper edge of the die.

It will be observed on reference to Fig. 1 that the outer edges of the crushing-faces of the stationary upper die are wider than the distance between the edges of the movable die, and that they diverge from a central line sufficient to form a discharge upon both sides of the machine. It is well known that a crusher that will not allow the finished product to escape as soon as it is made is not only using part of the jaw space for no pur-

pose, but is exercising continually a force that should be utilized in crushing. Instead of doing this it is simply pressing material that has already been crushed and cannot escape through the ordinary throat-opening at the bottom, providing the side discharges, as shown in Fig. 2 and as above described, admit of the discharge of all material that has been crushed without destroying the capacity of the machine, and all clogging is therefore obviated. It is evident that in this construction the wearing parts—to wit, the crushing-dies and the bearing-plate, which rests upon the eccentric sleeve—can readily be removed when worn or when repairs are necessary. It will further be observed that the enlarged mouth admits larger material than can be introduced in crushers as heretofore constructed.

The construction and operation of this device can be so readily understood from the description and drawings by those skilled in the art to which it appertains that a further description thereof is here deemed unnecessary.

Again referring to Fig. 1, it will be seen that the wearing-face of the lower movable crushing-die is convex in cross-section, while the wearing-face of the upper crushing-die is formed at its central part upon the segment of a circle terminating upon each side upon substantially straight diverging lines. The dies gradually decrease in width toward their lower ends.

There are various forms that the device may take on and still be within the spirit of my invention, though the construction, relative positions, and curvatures of the crushing-dies herein described are the more preferable.

What I claim as my invention is—

1. In an ore-crusher, the combination of a stationary jaw carrying a removable die the crushing-face of which is formed in cross-section upon the arc of a circle terminating at the sides in diverging and substantially straight lines with an oscillating jaw carrying a removable die the crushing-face of which is convex in cross-section, substantially as and for the purposes described.

2. In an ore-crusher, a stationary jaw carrying a removable die the crushing-face of which is formed in cross-section upon the arc of a circle terminating at the sides in diverging and substantially straight lines, in combination with an oscillating jaw carrying a removable die the crushing-face of which is convex in cross-section, the lower or convex die being narrower than the upper die, whereby lateral side discharges are formed at the sides of the crusher, substantially in the manner and for the purposes described.

3. The combination of the base formed integrally with a rigid jaw, a concave sectional crushing-die adapted to be retained in said jaw, an oscillating jaw provided with an elongated heel through which said jaw is fulcrumed upon a fulcrum-shaft, and a convex crushing-die removably secured in said jaw, the free end of the latter being adapted to be oscillated by means of an eccentric shaft or sleeve, substantially as and for the purposes set forth.

4. In an ore-crusher, the combination of the base A, formed integrally with the jaw B, a crushing-die C, removably secured in said jaw B, an oscillating jaw E, the elongated heel F of which is fulcrumed upon the fulcrum-shaft G, supported in eyebolts H, and the crushing-die P, removably secured in the jaw E, said jaw being adapted to be oscillated upon its fulcrum, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 19th day of July, 1890.

WM. L. MORRIS.

Witnesses:
H. S. SPRAGUE,
O. J. DERSNEL.