(No Model.)

D. BRENNAN, Jr.

STONE AND ORE CRUSHER.

No. 357,568. Patented Feb. 15, 1887.

Fig: 1.

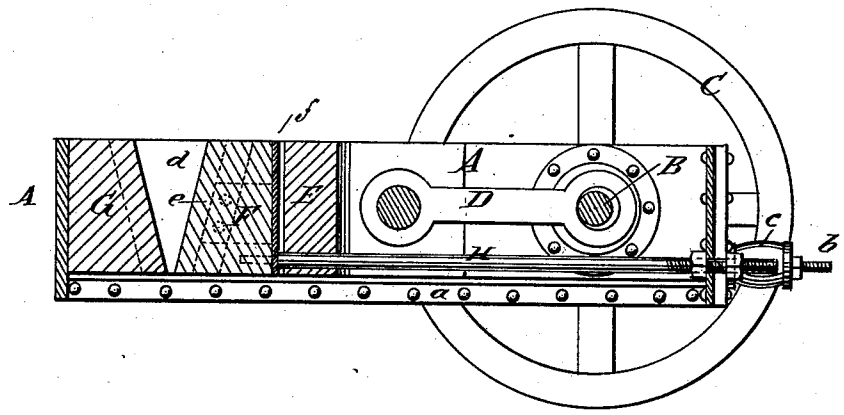
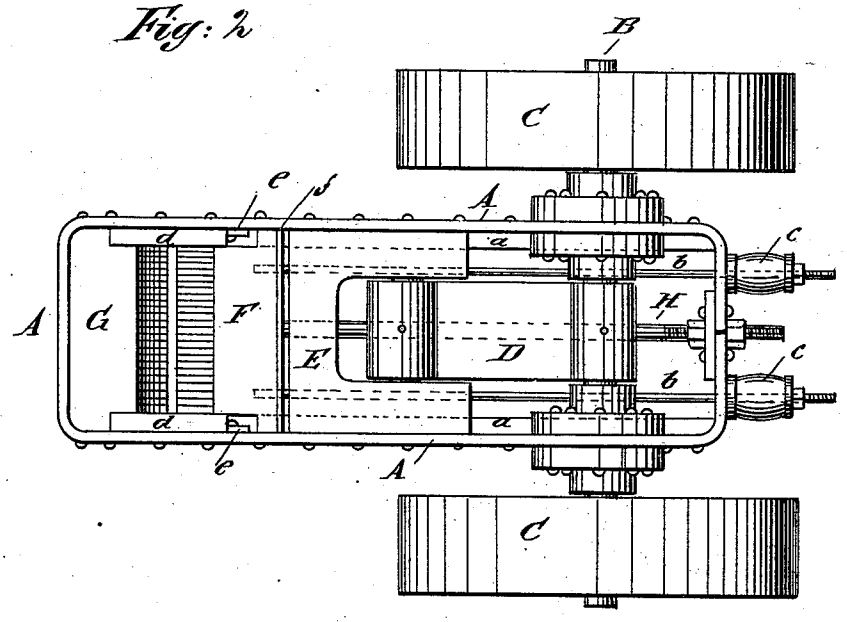


Fig: 2.



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UNITED STATES PATENT OFFICE.

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STONE AND ORE CRUSHER.

SPECIFICATION forming part of Letters Patent No. 357,568, dated February 15, 1887.

Application filed March 5, 1886. Serial No. 194,133. (No model.)

To all whom it may concern:

Be it known that I, DANIEL BRENNAN, Jr., of Saltersville, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Stone and Ore Crushers, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a sectional side elevation of my improved stone and ore crusher. Fig. 2 is a plan view of the same.

The object of this invention is to provide stone and ore crushers of that class in which the material is crushed between upright converging dies and the discharge effected by the gravitation of the crushed material, constructed in such a manner as to make the crushing and discharging action more effective, and to make the machines lighter for a given strength and capacity, less expensive in manufacture, and more easily transported from place to place than machines heretofore constructed.

The invention consists in the construction and combination of various parts of the stone and ore crusher, as will be hereinafter fully described and claimed.

In stone and ore crushers it is desirable that the movable jaw or die should make a quick stroke, as thereby the material will be broken into a greater number of pieces of more nearly uniform size and with a less expenditure of power than by a slow stroke.

The speed of the crushing movement has heretofore been greatly restricted by the necessity for allowing sufficient time between strokes for the escape of the crushed material, the movable die having a simple reciprocating movement and beginning to close the discharge-aperture as soon as its limit of opening has been reached, so that the fragments will be nipped against each other and between the dies, and the escape of many pieces already reduced to the required size will be prevented.

The velocity of movement of the reciprocating crushing-die varies directly with the length of the said movement, so that when the machine is required to crush the material into small pieces of uniform size the want of speed in the stroke and the tendency to choke are increased by the small amount of movement to which the said crushing-die is necessarily limited.

The frame A is made of a single plate of wrought-iron or steel, of suitable weight and thickness, and bent into the form of an oblong rectangle. With this construction of frame the weight of the machine will be greatly lessened without reducing its strength, so that the machine will be less expensive in manufacture and more easily taken from place to place. B is a shaft which revolves in bearings at the rear part of the frame A, and to the ends of the said shaft are attached pulleys C, which are made heavy to adapt them to serve also as fly-wheels. Upon the center of the shaft B is formed a crank, upon which is pivoted the rear end of the connecting-rod D. The forward end of the connecting-rod D is pivoted in and to the slotted rear end of the ram E, so that the said ram will be forced forward and drawn back by the revolution of the crank-shaft B. The ram E rests and slides on bars *a*, of angle-iron, riveted to the lower part of the wrought-iron frame A, and upon which also rest the movable die F and the stationary die G.

To the lower end parts of the rear side of the movable die F are attached, by a screw-thread or any other suitable means, the forward ends of two rods, *b*, which pass through perforations in the ram E and in the rear end of the frame A. Upon the rear parts of the rods *b* are placed springs *c*, of rubber or other suitable material, which are kept in place by washers and nuts placed upon the rear ends of the said rods *b*. The forward ends of the springs C rest against the rear end of the frame A, or against washers placed upon the rods *b*, between the said springs and frame. With this construction, when the movable die F is forced forward by the forward movement of the ram E, the springs *c* are put under tension, so that the said die will be drawn back by the elasticity of the said springs *c*. The rearward movement of the movable die F is limited by the said die coming in contact with the forward end of a rod, H, which passes through an aperture in the lower middle part of the ram E. The rear end of the rod H passes through a perforation in the rear

end of the frame A, and has nuts screwed upon it upon the opposite sides of the said end of the frame, so that by adjusting the said nuts the said rod H can be adjusted to allow the movable die to move back more or less, as the required size of the crushed material may require. When the ram strikes the die, the latter is driven forward with the speed and force acquired by said ram at the moment of contact therewith minus what may be due to inertia and the resistance offered by the springs *c c*. The intermissions between the rearward and forward movements of the die F occur when the discharge-aperture between the dies F G is open to its greatest extent, so that the crushed material will have ample time to escape, and this machine can be run at a higher and more effective speed than is possible for machines constructed in the ordinary manner.

d are wearing-plates placed in recesses in the ends of the dies F G and against the sides of the frame A, and they are kept in place by lugs *e* riveted to the said frame.

f are two lining-plates placed against the rear side of the movable die F, so that by changing the said lining-plates *f* for thicker or thinner ones the opening between the dies F G can be readily regulated.

I do not claim, broadly, a frame for a stone and ore crusher constructed of wrought-iron or steel.

What I claim is—

1. The stone and ore crusher frame A, constructed of a single plate of steel bent into rectangular form, as shown and described.

2. In a stone and ore crusher, the combination, substantially as described, with a suitable supporting-frame, of a fixed die, G, and a movable die, F, a reciprocating ram, E, and suitable mechanism for driving it, whereby said ram is made to strike suddenly against the movable die and with great force.

3. In a stone and ore crusher, the combination, with the frame having guide-bars and the fixed and movable dies, of the reciprocating ram, connecting-rod D, crank-shaft B, and driving-pulleys C, as shown and described.

4. In a stone and ore crusher, the combination, with the frame A, of the fixed and movable dies, the rods *b b* and springs *c c* applied thereto, the reciprocating ram E, connecting-rod D, and crank-shaft B, all as shown and described.

5. In a stone and ore crusher, the combination, with the frame A, the perforated ram E, and the movable die F, of the adjustable rod H, substantially as herein shown and described, whereby the rearward movement of the said movable die can be stopped at any desired point, as set forth.

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Witnesses:

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