(No Model.) 4 Sheets—Sheet 1.

J. H. LANCASTER.

ROCK BREAKER OR ORE CRUSHER.

No. 380,121. Patented Mar. 27, 1888.

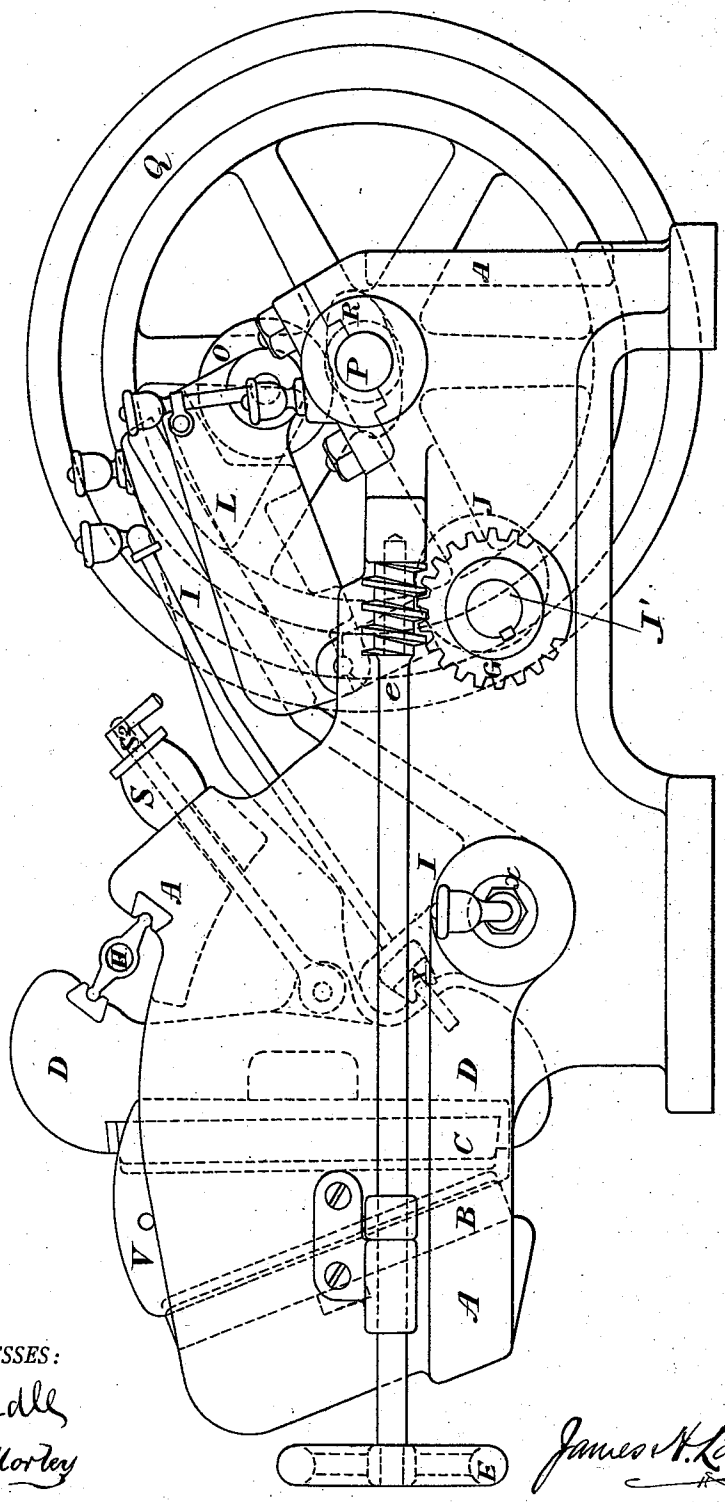


FIG. 1.

WITNESSES:
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N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 2.

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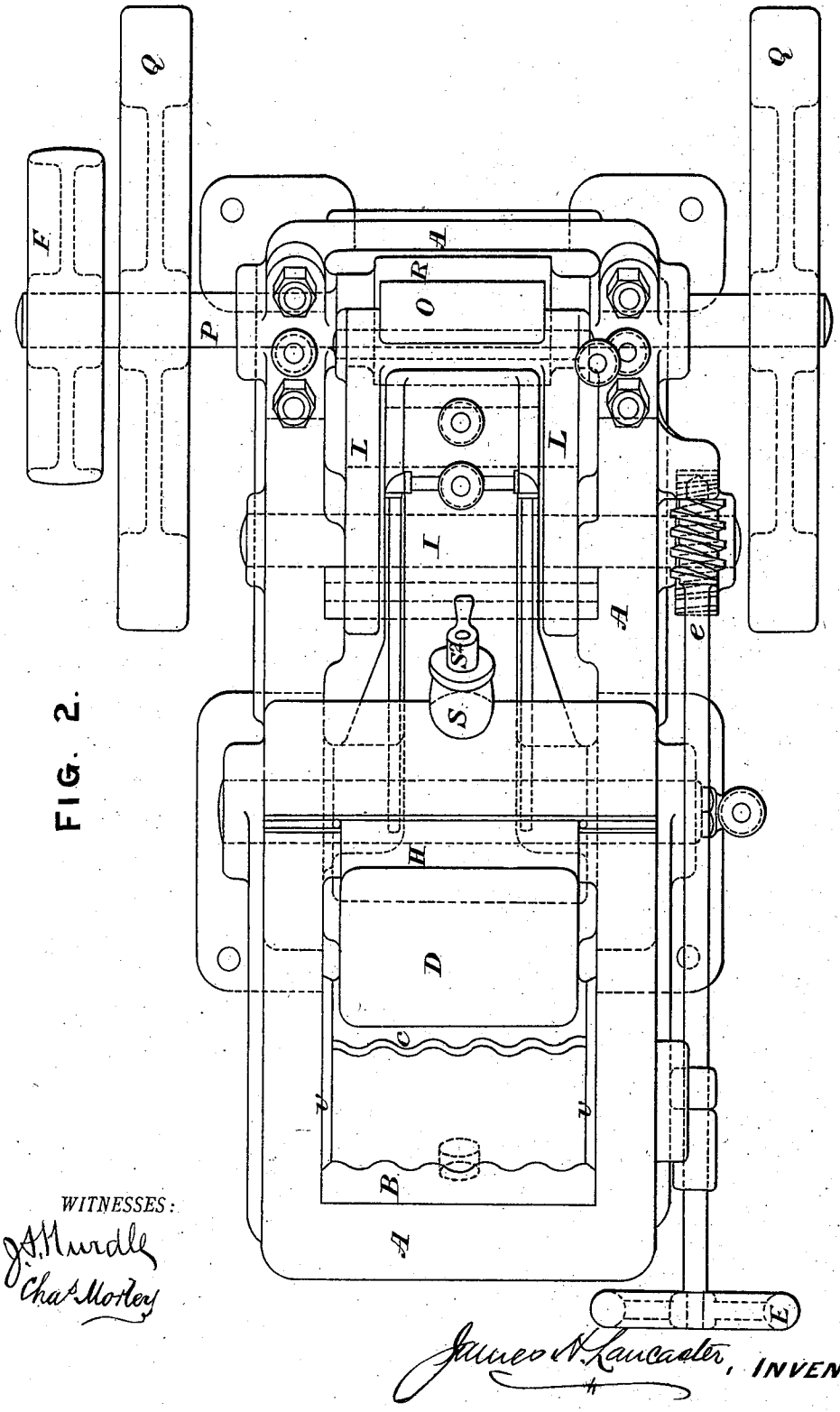


FIG. 2.

WITNESSES:

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(No Model.) 4 Sheets—Sheet 3.

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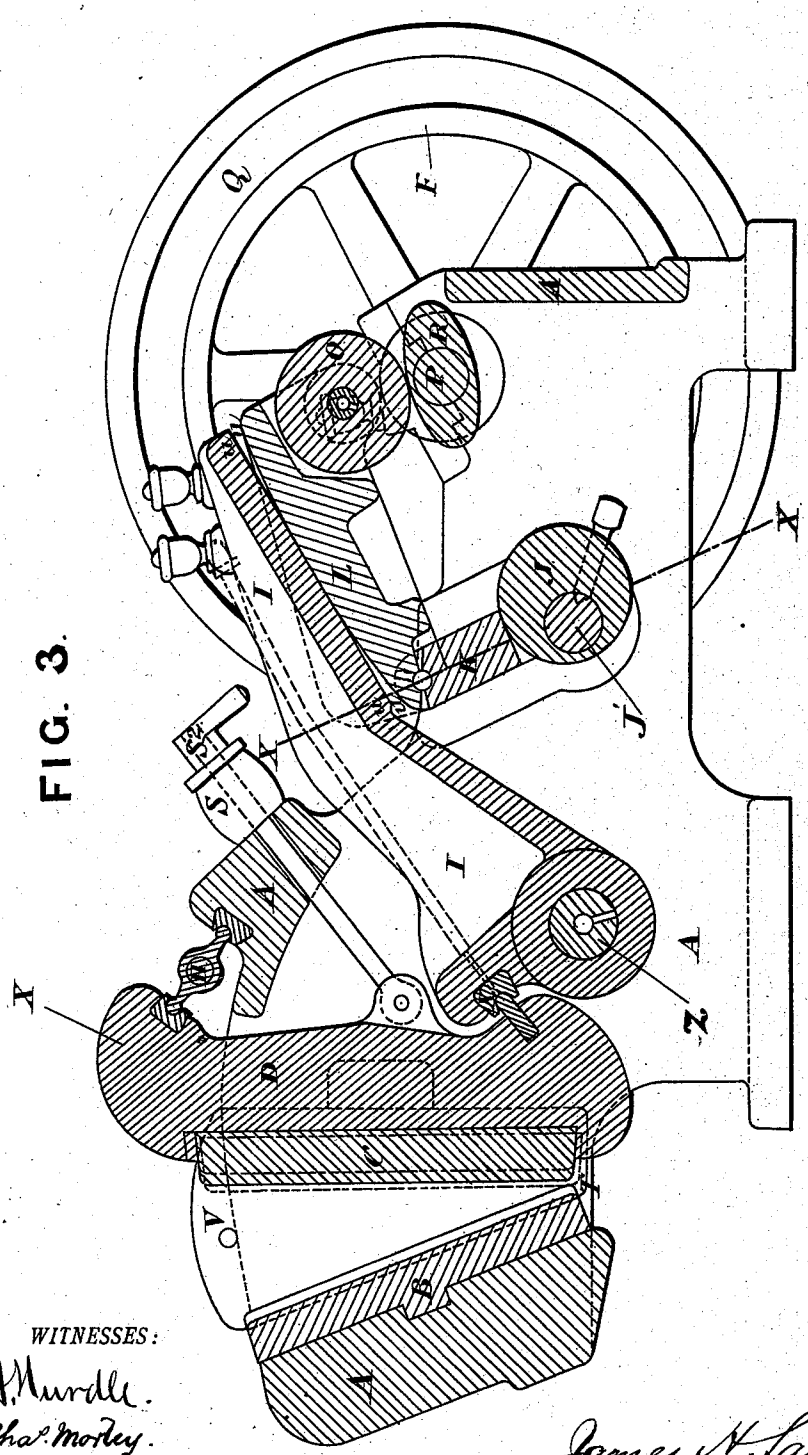


FIG. 3.

WITNESSES:

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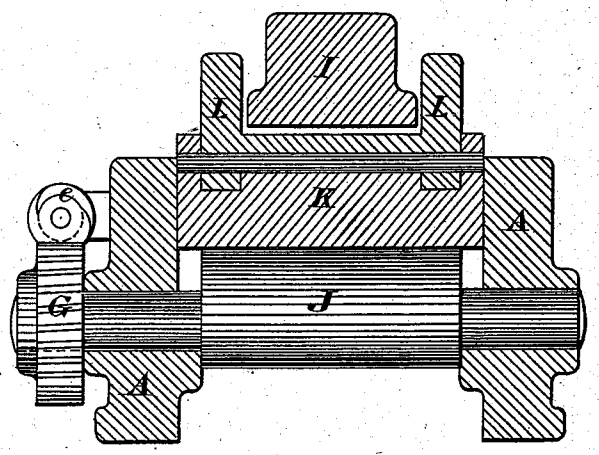
(No Model.) 4 Sheets—Sheet 4.

J. H. LANCASTER.

ROCK BREAKER OR ORE CRUSHER.

No. 380,121. Patented Mar. 27, 1888.

FIG. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES H. LANCASTER, OF NEW YORK, N. Y.

ROCK-BREAKER OR ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 380,121, dated March 27, 1888.

Application filed December 3, 1886. Serial No. 220,552. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. LANCASTER, a citizen of the United States, and a resident of New York city, in the county of New York, State of New York, have invented certain new and useful Improvements in Rock-Breakers or Ore-Crushers, of which the following is a full, clear, and exact specification.

My invention relates to that class of rock or ore crushers in which a movable jaw or jaws vibrate in proximity to a fixed jaw.

My invention consists of improvements in rock-breakers or ore-crushers, all of which will be described and claimed hereinafter.

Referring to the drawings, Figure 1 is a side view of my improved rock and ore crushing machine. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal sectional view. Fig. 4 is a cross-sectional view on the line *x x*, Fig. 3.

Similar letters refer to similar parts throughout the several views.

A represents the frame or main casting of the machine, in which is secured the fixed jaw-plate B. The driving-pulley F on the shaft P revolves the cam R, made on said shaft. Fly-wheels Q Q are also secured on the shaft to insure uniform rotation.

L is a dog having the anti-friction roller O, adapted to work in frictional contact with said cam R. The upper surface, U, of said dog L is slightly curved and is hinged on the block K, which has inclined guides in the frame A and rests on the eccentric J, which is mounted on the shaft J', journaled in the frame A and controlled by the hand-wheel E, worm *e*, and worm-wheel G. The lever I, fulcrumed on the shaft Z, is actuated by contact of the curved surface U of the dog L, and operates the movable jaw by contact of the thrust-pieces X. The idle-toggle H, as located, guides the upper end of the jaw D in a path about parallel with the lower end of the same, and likewise supports the jaw against the strain resulting from crushing the rock or ore. The toggle is preferably very light, crooked or hollow, as shown, to insure it alone breaking in case of any iron or steel accidentally getting in the machine.

D is the movable jaw carrying the reversible jaw-plate C. This jaw is held up against the lever thrust-pieces X and the toggle H by means of the connecting-rod passing through the frame A and having the spring or rubber cushion S and set-nut S^2.

V is the hopper of the machine. The side plates, *v v*, are driven down and keep the jaw-plate B firm by wedging between the same and the projections cast inside the main frame. Holes are made in said side plates for removing the same. The jaw B is reversible, and may be backed up or packed out, in which case the hopper-plates do not drive down so far.

In crushing rock or ore, to insure a uniform product, it is necessary that the stroke of the vibrating jaw shall be the practical minimum in proportion to size of the product desired, and consequently to the width of the opening at the throat T of the machine, the reason for this being that too great a throw for a given opening at T would allow disproportionately large pieces to fall through when the jaw recedes. It will be observed that the revolving cam R raises and lowers the dog L, and this in turn vibrates the lever I. When the block K is raised farther, the dog lifts the lever and narrows the throat of the machine. At the same time it is evident that the contact of the curved surface is nearer the hinged end of the dog L, and consequently less throw is given to the lever and jaw D. The reverse is effected by lowering the block K, and hence the stroke of the jaw increases or decreases as correctly as the throat of the machine is adjusted for any desired product. The vertical movement of the jaw is advantageous over all machines having a jaw swinging from a fixed pivot-shaft at either end of the jaw, which entails an excess of movement either where the rock is first broken by the jaw or at the throat of the machine. The vibrating-jaw movement, being downward as well as forward toward the fixed jaw, gives a twofold benefit, insomuch that it slightly rotates the rock while crushing it. This gives the machine the reducing action of a pair of rolls, while the rolling action feeds the rock positively through the machine without relying upon the action of gravity for effecting the same result. The cam R, having two quick rises, gives the jaw a quick hammer-like or knapping action not obtainable by any eccentric movement.

It must of course be understood that in case

two or more vibrating jaws are used a corresponding number of cams, dogs, and levers are necessary.

I am aware that cams have heretofore been used in connection with ore-crushers for the purpose of operating the movable jaw thereof.

I am also aware that toggles have been used in connection with a movable jaw fulcrumed so as to swing from a common center; but I am not aware that ore-crushers were ever before made with the novel features pointed out in the claims hereinafter described.

Having described my invention, I desire to claim by Letters Patent—

1. In a rock-breaker or ore-crusher, the combination of the frame of the machine, the vibrating jaw, the toggle H, fastened to the main frame supporting said jaw, the thrust-piece X, the rocking lever I, operating said jaw, the cam-shaft P, the dog L, having a convex upper surface, and the cam R, substantially as described.

2. In a rock-breaker or ore-crusher, the combination of the frame of the machine, the connecting-rods passing through a portion of the main frame, having rubber blocks or springs mounted on one end thereof, the vibrating jaw, the toggle H, fastened to the main frame supporting said jaw, the thrust-piece X, the rocking lever I, operating said jaw, the cam-shaft P, the dog L, having a convex upper surface, and the cam R, substantially as described.

3. In a rock-breaker or ore-crusher, the combination, with the frame of the machine, the dog L, lever I, thrust-piece X, and vibrating jaw D, of means for limiting the throw of said jaw, consisting of the rod journaled in the side of the frame and provided with the hand-wheel E and worm *e*, the worm-wheel G, shaft J′, carrying said wheel, the eccentric J on said shaft, and the block K, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of December, 1886.

JAMES H. LANCASTER.

Witnesses:
RUDOLPH SCHNETZLER,
A. A. BLAUVELT.