(No Model.) 2 Sheets—Sheet 1.

C. G. BUCHANAN.

ORE OR ROCK BREAKER.

No. 446,658. Patented Feb. 17, 1891.

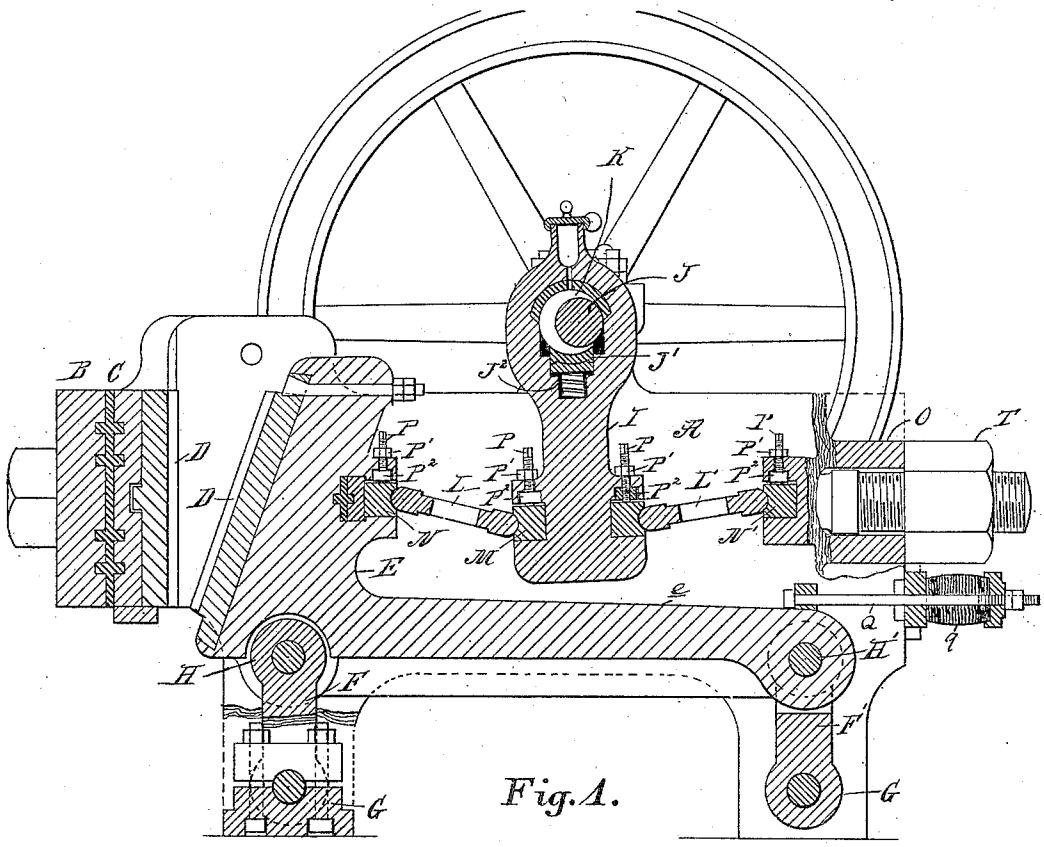


Fig. 1.

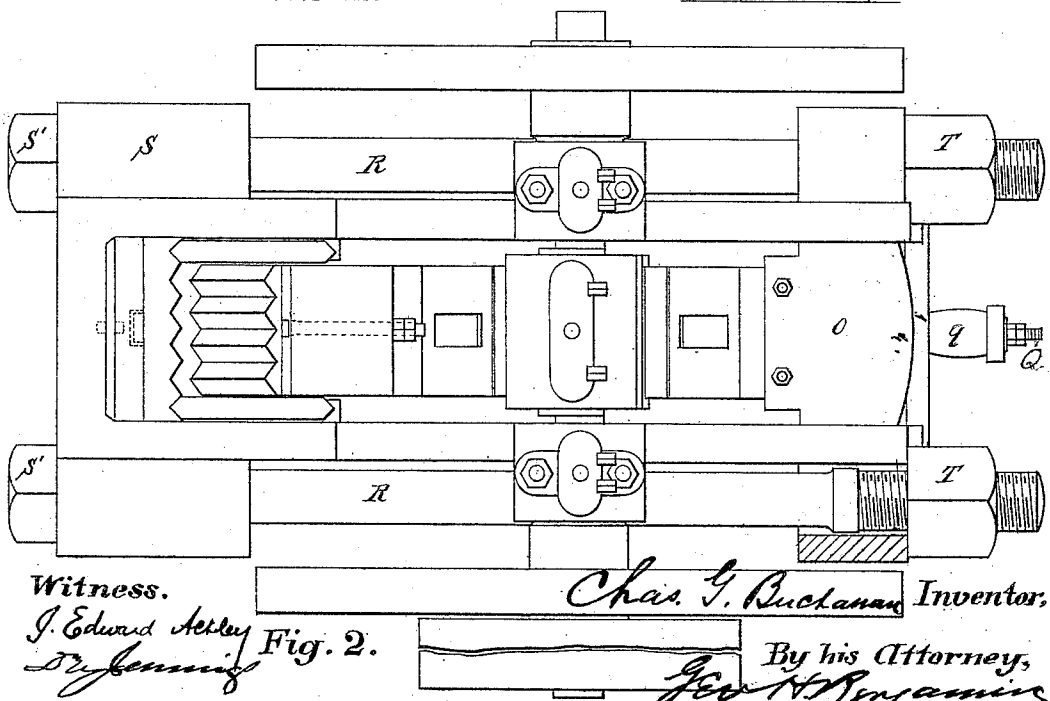


Fig. 2.

Witness.
J. Edward Astley
By Jenning

Chas. G. Buchanan Inventor,

By his Attorney,
Geo. H. Benjamin

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

(No Model.) 2 Sheets—Sheet 2.

C. G. BUCHANAN.

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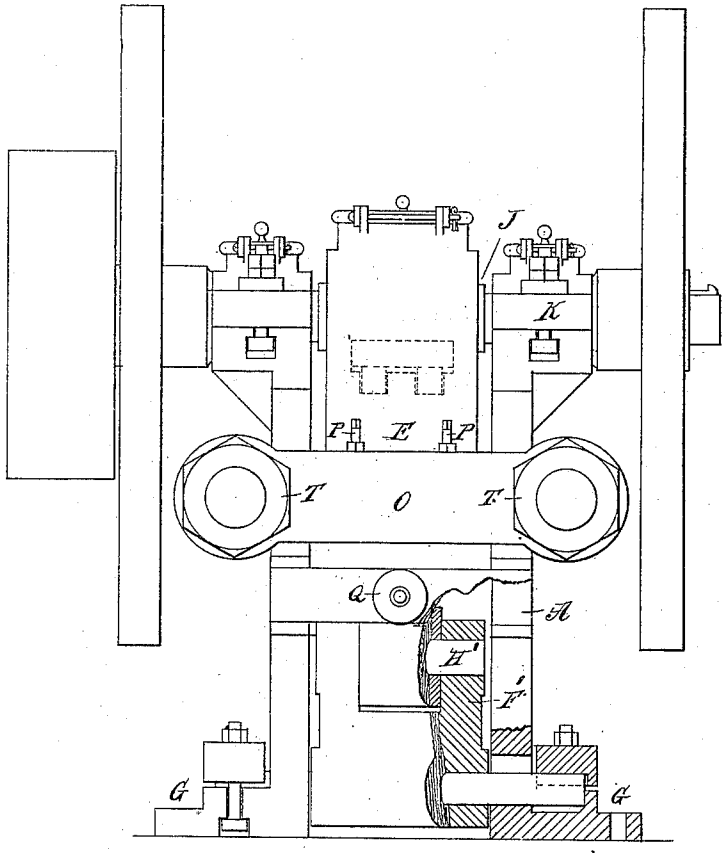


Fig. 3.

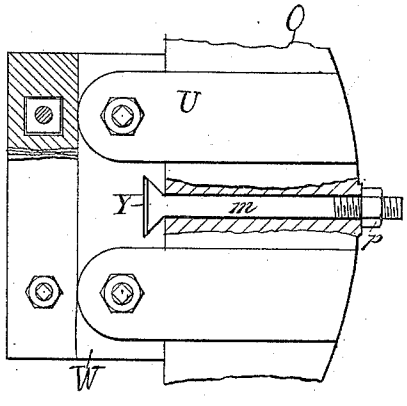


Fig. 4.

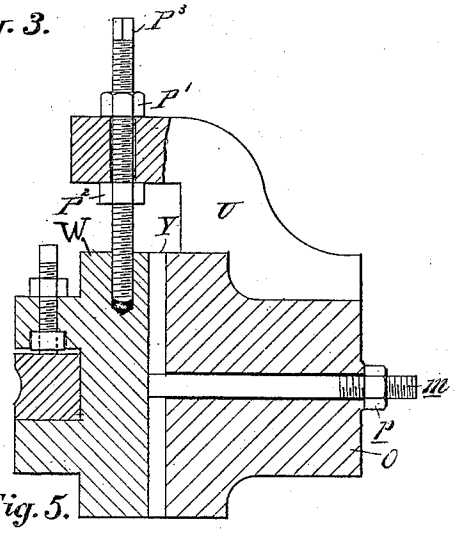


Fig. 5.

Witness,
I. Edward Ackley
D. Y. Jennings

Charles G. Buchanan Inventor,
By his Attorney,
Geo. H. Benjamin

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

UNITED STATES PATENT OFFICE.

CHARLES GORDON BUCHANAN, OF ROCKAWAY, NEW JERSEY.

ORE OR ROCK BREAKER.

SPECIFICATION forming part of Letters Patent No. 446,658, dated February 17, 1891.

Application filed October 26, 1886. Serial No. 217,284. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GORDON BUCHANAN, a resident of Rockaway, in the county of Morris, State of New Jersey, have invented a new and Improved Ore or Rock Breaker, of which the following is a specification.

My invention relates to ore or rock breakers of that class in which the crushing is effected between a stationary jaw and a movable jaw, the latter having an inclined face toward the stationary jaw from above downward.

My invention has for its object to so arrange the movable jaw of the crusher that its direction of motion shall be horizontally to and from the fixed jaw, so that the top and bottom of the jaw will move at the same rate of speed.

A further object of my invention is to so arrange the fixed parts of the machine that all strains shall be in straight lines from power to resistance and sustained by steel tie-rods, rather than by the iron castings of the machine-frame itself, as is usually the case. I am thus enabled to build a machine with few working parts, large capacity, substantial in character, and susceptible to a wide range of adjustment.

In the accompanying drawings, which illustrate my invention, similar letters of reference indicate like parts.

Figure 1 is a longitudinal vertical section, mainly central, but varied at each end to show the tie-rods and the link-bearings. Fig. 2 is a plan view. Fig. 3 is a rear end view, broken away at the lower part to show the link-bearings and their connection to the rear end of the movable jaw. Fig. 4 is a plan view of a modified adjustable toggle-bearing and connections. Fig. 5 is a vertical section of the same.

In the drawings, A indicates the frame of the machine, which is preferably a solid casting in shape somewhat resembling a U laid on the flat, the opening being to the right, or what is the rear part of the machine.

B is the fixed jaw bedded in Babbitt metal C, and D D are chilled iron plates on the faces of the fixed and movable jaws.

E is the movable jaw having an extension *e*, supported on the links F and F′, pivoted at their lower ends in bearings G G on the inner sides of the legs of the main frame. The upper ends of the links are pivoted at H H′ to the movable jaw.

I is the pitman, in which works the eccentric K on the main shaft J.

The toggle L is connected through the toggle-bearing M with the pitman I and through the toggle-bearing N with the rear side of the movable jaw E, a bushing or bed of Babbitt metal being located between the toggle-bearing and the movable jaw. The toggle L′ is connected to the pitman I in a manner similar to the toggle L. The other end of this toggle is connected to a toggle-bearing N′, which is located on the front side of the tie-block O. The toggle-bearings are secured in their proper positions by means of the threaded bolts P, provided with the nuts P′ P^2. The lower part of the bushing J′ in the pitman I is supported by the heavy helical spring J^2, which takes up any lost motion and prevents any wabbling or shaking in the bushing.

R R are the tie-rods, preferably of steel, located on either side of the frame, and each passing at one end through the head-block S and at its rear end through a tie-block O, and are provided with heavy nuts S′ on their threaded ends.

In order to adjust the machine to the size of rocks to be crushed, the tie-block O can be moved longitudinally forward and backward and secured in the required position by means of the nuts T on the rear ends of the tie-rods. When this adjustment is effected, the axes of the links F F′ will be thrown more or less out of the vertical, depending upon the degree of movement given the block O, but not sufficiently so to practically effect the horizontal movement of the crushing-jaw.

It will be observed by reason of the arrangement of the tie-rods that all strains are from power to resistance and are taken up solely by the rods.

In Figs. 4 and 5 I have shown a modification of the toggle-bearings N N′, by means of which these bearings are made adjustable. This arrangement is for the purpose of changing the stroke of the movable jaw by altering the position of the toggle-bearings, and there-

fore the angle of the toggles with reference to the horizontal axis of the machine. Thus the movable jaw may be arranged to give a long or short stroke, as may be desired, and without the necessity of altering the clearance between the two jaws.

In the modification shown the tie-block O is provided with upwardly-projecting arms U, each bored to receive the threaded bolt P^3, provided, as in case of the bolts P, with the nuts P′ and P^2. The end of the bolt P^3 is screwed into the upper part of the block W, carrying the toggle-bearing, and by adjusting the nuts P′ P^2 the block is thus made adjustable up and down. At the back of the block is arranged a vertical dovetailed groove Y, within which is located the head of the bolt *m*. This bolt is carried through the tie-block O and secured by the nut *p*. Thus when said nut *p* is screwed home the toggle-bearing block and the block O are brought into close relation and the toggle-bearing prevented from moving. Thus by altering the inclination of the toggles the motion communicated to them from the eccentric through the pitman may be amplified or decreased in accordance with the requirements.

The operation of the device will be readily understood. By means of the motion of the eccentric on the main shaft the pitman and through it the toggles are lifted and the movable jaw moved horizontally forward, being supported by its bearings on the links, which in turn are supported by the bearings on the inner sides of the legs of the main frame. It will thus be seen that the top of the movable jaw has relatively to the fixed jaw the same rate of motion as the bottom of the jaw. In order to retract the jaw, the tension-rod Q and rubber spring *q* are provided, which, however, do not present any point of novelty.

I wish it understood that I do not limit myself to the specific means described of supporting the movable jaw by the links, as shown.

Various mechanical modifications can be made without changing the spirit of my invention.

I claim as my invention—

1. The combination, with a supporting-frame having a fixed jaw, of a movable jaw provided with a horizontal extension, vertical links beneath the same, having their lower ends pivoted to the frame and their upper ends to the lower side of said movable jaw and extension, and mechanism for horizontally reciprocating said jaw, substantially as described.

2. The combination, with a supporting-frame having a fixed jaw, of a movable jaw having a horizontal extension, a vertical link F, pivoted at one end to the under side of the jaw and at its other end to the legs of the frame, a link F′, also pivoted to the legs of the frame and to the extension of the movable jaw, and mechanism for reciprocating said movable jaw, substantially as described.

3. The combination, with a supporting-frame having a fixed jaw, of the movable jaw E, having an extension *e*, the vertical links F F, one pivoted immediately beneath the jaw, the other to the extension *e*, and both to the legs of the frame, and mechanism for giving horizontal motion to said movable jaw, substantially as described.

In witness whereof I have hereunto set my hand this 30th day of August, A. D. 1886.

CHARLES GORDON BUCHANAN.

Witnesses:
GEO. H. BENJAMIN,
A. E. SEXTON.