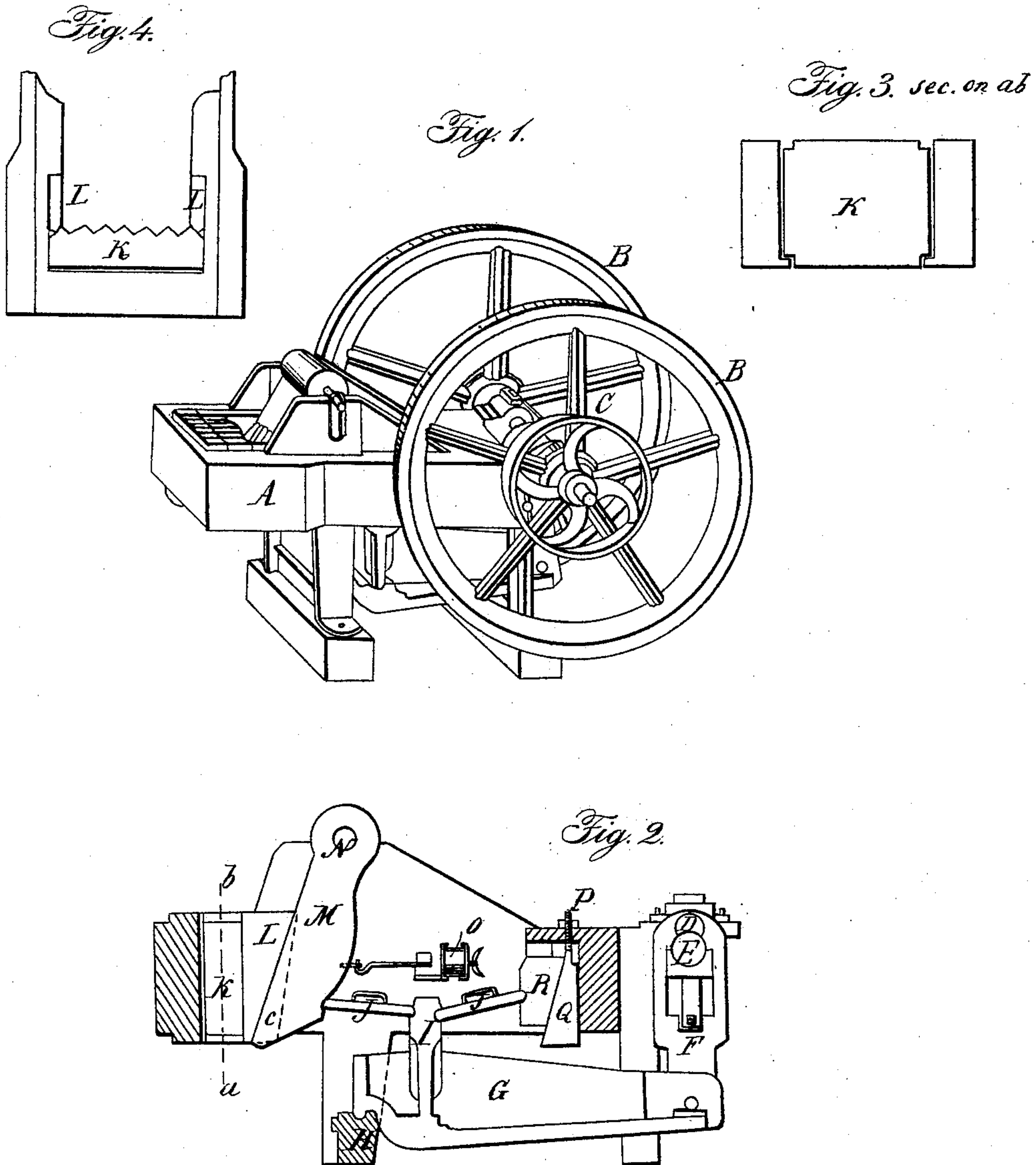


E. W. BLAKE.
Ore Crusher.

No. 27,882.

Patented Apr. 17, 1860.



Witnesses:

John A. Decker
Philos. Blake.

Inventor:

E. W. Blake

UNITED STATES PATENT OFFICE.

ELI W. BLAKE, OF NEW HAVEN, CONNECTICUT.

MACHINE FOR BREAKING STONES.

Specification of Letters Patent No. 27,882, dated April 17, 1860.

To all whom it may concern:

Be it known that I, ELI W. BLAKE, of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements on the Machine for Breaking Stones for which Letters Patent of the United States were granted to me bearing date the 15th day of June 1858; and I do hereby declare that the following is a full, clear, and exact description of said improvements, reference being had to the annexed drawings, making part of this specification.

I will first give a general description of the construction and operation of the improved machine, and afterward show in what my improvements consist.

In the annexed drawings, Figure 1, is a perspective view of the improved machine entire. A is the main frame or casting which receives and supports all the other parts. B, B, are fly wheels on a shaft which has its bearings on the main frame, and which between these bearings is formed into a short crank. C is a pulley on the same shaft to receive a belt from a steam engine or other driver.

Fig. 2, is an elevation or orthographic view of the interior parts of the improved machine, as they would appear upon removing one side of the main frame. The parts of this figure which are diagonally shaded are sections of the transverse parts of the main frame where divided to remove one side. K is the fixed jaw and M the movable jaw between which the stones are crushed. The fixed jaw rests at its lower corners on studs projecting inward from the sides of the frame as shown in section Fig. 3, the lower corners of the jaw being notched out to receive these studs. The upper side of the jaw is made in the same form as the lower side as shown in the same figure in order that it may be put in either side up. By this means when the face of the jaw is worn at its lower side, where the wear chiefly comes, it may be inverted and thus made to do double service. The fixed jaw is set against the front bar of the main frame with a small space between them into which melted zinc is poured to insure a perfect bearing over the whole surface. In order to hold the jaw firmly back against the zinc it is made wider horizontally than the movable jaw, and recesses are formed in the

sides of the frame to admit of this extra width. These recesses extend backward beyond the face of the jaw and receive on each side a tapered cheek piece L^c which fits and fills that portion of the recess which is not occupied by the end of the jaw. These tapered cheek pieces being driven down hold the jaw firmly back against the zinc. In order that the cheek itself may also be firmly held in its place the part of the jaw on which it bears is beveled, and a corresponding bevel is formed on the edge of the cheek pin, as shown in Fig. 4; which figure is a top view of the jaw and cheek pieces and adjacent parts of the frame. The cheek pin, as shown in the figure, has the same bevel both ways from the center of its thickness, in order that the same cheek piece may go in on either side of the frame; by which means when one side is worn concave the other side may be presented to the work. The movable jaw M is supported by a round bar of iron N which passes freely through it, and upon which it turns when made to vibrate as hereinafter described. This round bar rests in semicircular notches in the top of the frame, and is firmly held down by a band of iron at each end passing around it and around a stud which projects from the side of the frame beneath it, as shown in Fig. 1, a key being driven in between the band and the bar at the top.

The dotted circle D is a section of the fly wheel shaft and the circle E is a section of the crank. A pitman F connects the crank with the lever G. This lever has its fulcrum on the transverse bar of the frame, H. A vertical piece I stands upon this lever, and two toggle bars J, J, are footed into it, forming an elbow or toggle joint. One of these toggles foots at its other end in the toggle block R, and the other into the movable jaw. By means of this arrangement when the crank revolves the lower end of the movable jaw is made to vibrate about a quarter of an inch. O, is a cylindrical spring of india rubber which is compressed by the forward movement of the jaw and aids its return.

It will now be seen that when the machine is in motion, if a stone be dropped in between the convergent faces of the jaws it will be crushed; and the fragments falling lower down will be crushed again and so on until all are sufficiently reduced in size to pass out from between the jaws at the bot-

tom. It will also be seen that the distance between the jaws at the bottom determines the size of the fragments.

The toggle block R rests upon studs projecting under it from each side of the frame; and it is prevented from rising by similar studs above it; but between these studs it is free to move forward or back. Behind the toggle block and between it and the back cross bar of the frame is the wedge Q, which is provided with a screw and nut P by means of which it may be raised or lowered, and the toggle block thrown forward or back, thus diminishing or increasing the distance between the jaws at the bottom, and regulating at pleasure the size of the fragments.

Having thus described the construction and operation of my improved machine I will now proceed to show in what my improvements consist.

First. In the machine as described in the specification of my former patent and shown in the drawings annexed thereto, the mode of supporting and securing the fixed jaw was such as made it unlike in form at the top and bottom, and therefore incapable of being inverted when worn. By making it similar in form at the top and bottom and supporting and confining it as herein described it is made capable of being inverted when worn, and thus of doing double service.

Second. In the machine as described and shown in the specification and drawings of my former patent, neither the movable jaw nor any part of the frame extended upward above the top of the fixed jaw; but the movable jaw extended downward, and had its point of support and motion at the bottom of the frame in front of the lever fulcrum. In that construction and arrangement, the small fragments falling from the jaws find their way into the point of support and motion and cause rapid and injurious wear. Moreover, when the point of motion is below the acting face of the jaw, there is more motion at the top than at the bottom of the

acting face; whereas the best performance of the machine requires that the reverse should be the case. By extending the frame and jaw upward and establishing the point of support and motion above the acting face, as in the improved machine herein described, both these objections are obviated; and it is found that by this change the same machine is made capable of performing more than double the work in a given time.

Third. In the machine as described in my former specification the toggle block R and the wedge Q were not employed; but the back toggle had its footing directly in the back bar of the frame. In that construction the only means of adjusting the size of the opening between the jaws to regulate the size of the fragments, was by changing one or both of the toggles for others longer or shorter. By the use of the toggle block and wedge as in the improved machine herein described, that adjustment is made with much greater facility and with a degree of precision not attainable by the former method.

What I claim as my invention and desire to secure by Letters Patent as improvements on my before patented stone breaker are:

1. Constructing and supporting the fixed jaw of the said machine for breaking stones in such manner that it can be inverted when worn; and confining it to its place by the cheek pieces as herein described.

2. Transferring the point of support and motion of the movable jaw from below to above its acting face as herein described.

3. The employment of the toggle block and wedge as herein described for the more convenient and precise adjustment of the size of the opening which determines the size of the fragments.

ELI W. BLAKE.

Witnesses:

JOHN A. BLAKE,
PHILOS BLAKE.