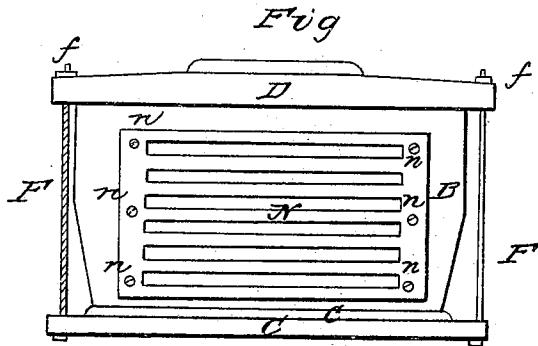
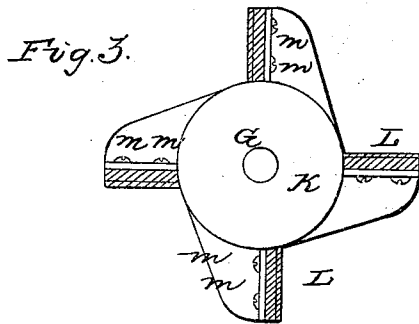
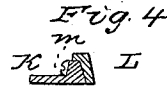
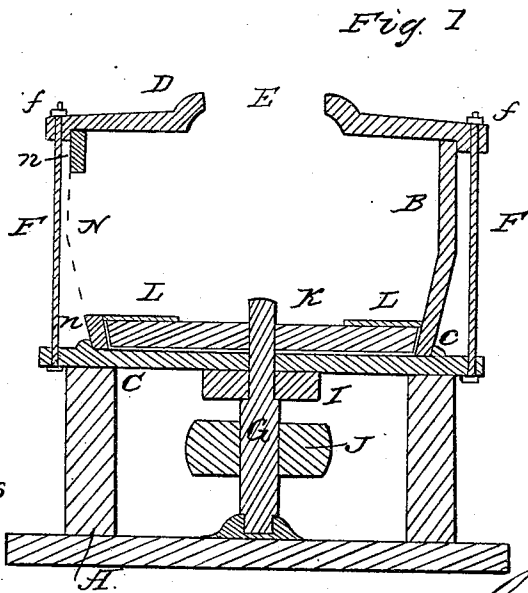


J. D. WHELPLEY.

Quartz Crusher.

No. 40,072.

Patented Sept. 22, 1863.



witnesses
J. W. Loren.
John J. Conn.

Inventor
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UNITED STATES PATENT OFFICE.

JOHN D. WHELPLEY, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN QUARTZ-CRUSHERS.

Specification forming part of Letters Patent No. 40,072, dated September 22, 1863.

To all whom it may concern:

Be it known that I, JAMES D. WHELPLEY, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Mineral-Breakers; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical section through the center of the machine; Fig. 2, a front view of the tub; Fig. 3, a top view of the revolving arms carrying the blades or cutters, and Fig. 4 an end view of one of the cutters and its currying-arm.

Like parts are indicated by the same letters in all the drawings.

The nature of my invention consists, first, in causing radial blades or cutters attached to rotating arms to revolve with great rapidity close to the bottom and side of a suitable tub or cylinder, so that the material to be broken shall, by its own gravity, fall upon said blades, and, by the rapid blows of the latter, without touching the bottom of the cylinder, and held entirely by its own inertia in a free and open space, be effectually broken or shivered to pieces; and, second, in driving the comminuted substance by centrifugal force through a grating or suitable perforations in the circular side of the horizontal tub or cylinder, above the radial blades, without the aid of any air-blast, either generated for that purpose by the machine itself or introduced from a blower.

To enable others skilled in the art to make and use my improvement, I will now proceed to describe its construction and operation.

A is a stand or frame for supporting the machine.

B is a cylindrical tub, of thick cast-iron or other suitable material, about three and a half feet in diameter and two feet and a half in depth. This cylinder rests on a flat cast-iron bottom, C, being kept from moving laterally by means of the annular cleat *c*.

D is the removable top of the tub, of wood or iron, shaped as shown in Fig. 1, and provided with a central opening, E, through which the material to be broken is thrown.

The bottom C and the side B of the tub are securely held together by means of bolts F and

nuts *f*, the top D being used as a washer for that purpose, as shown in Figs. 1 and 2.

In the side or periphery of the tub, as shown in Figs. 1 and 2, is an opening extending about one-quarter round, (more or less,) and over this opening and confined to the tub by means of screws *n* is a grate, N, the distance between the bars of which may vary from one-eighth of an inch to two inches or more, according to the size to which the substance is to be broken. This grate may be furnished with cross-bars, or a perforated plate may be substituted therefor.

G is a vertical shaft resting in the step H and passing up through a suitable box, I, attached to the bottom of the tub and through a central hole in the same, as shown in Fig. 1.

J is a pulley fast to the shaft G, by means of which and suitable belting said shaft and its appendages may be made to revolve with any required velocity.

K is a cast-iron wheel provided with radial arms, as shown in Fig. 3, and through its center is passed and confined the shaft G.

L L L are the blades or cutters, of hardened steel or chilled cast-iron, attached by means of screws *m* to the radial arms of K, as seen in Fig. 3, and at an angle of about fifteen degrees, as shown in Fig. 4, so that in striking the substance to be broken they will have a tendency to throw it up. I do not, however, confine myself to the employment of any particular number of blades, nor to any particular shape or method of attaching them, as all these may be obviously varied without affecting the principle of my invention.

As represented in Fig. 1, the under sides of the blades or cutters are made to revolve as near to the bottom C of the tub as possible, without touching it. The outer ends of the blades are also carried as near as possible to the side B of the tub.

My machine is applicable to the purpose of comminuting any hard substances that can be broken or cut with a blunt edge, as of a cold-chisel, which it does by a hammer-like, shivering edge-blow upon the falling substance the latter being held to receive the blow solely by its own inertia in a free and open space, whereas in all other machines the object has been accomplished either by crushing between rollers or by grinding—i. e., pass-

ing the material between two hard or corrugated surfaces, either near together or in contact. Such machines, however, are comparatively slow in their operation, liable to clog, and require a great amount of power to drive them, whereas my machine, with the same expenditure of power, will accomplish many times the amount of work that can be done by any other machine extant for a similar purpose, and, as the substances to be broken are neither wedged in nor forced between two rigid surfaces, nor in any way confined, but are, on the contrary, constantly falling or suspended in the air in a free and open space, it is impossible for the machine ever to be clogged or ruptured by its contents. Hence the friction and consumption of power must be comparatively small, and pieces of any size that can enter the tub can be broken without rupturing or injuring the machine, which is not the case with any other breaking-engine, except the stamp.

By means of a belt on the driving-pulley J, the blades or cutters L are made to revolve with great rapidity, (about fifteen hundred times a minute,) so that a blow from one of them has the same shattering effect as a bullet discharged from a gun, or the quick percussion of a hammer, and comminution of the substance to be broken is much more rapidly and easily accomplished than it could be either by crushing, grinding, or trituration in a close iron case.

The material to be broken is thrown into the tub through the opening E, and falls until its lowest point receives a shivering blow from

the edge of the cutters L, by which it is constantly tossed forward and upward, again to fall upon the cutters, until it is broken into pieces sufficiently small to be driven through the grate or perforations N by centrifugal force.

Large bones—such as ox-heads—or masses of stone are sufficiently comminuted to pass through flouring-mills as rapidly as two attendants can toss them in, or at the rate of five or six tons per hour of bones, and double that amount of rocky material. The degree of comminution will depend upon the distance between the gratings or the size of the perforations N, and, as these may be varied, the same machine can be made to do different sizes of work.

Having thus described the construction and operation of my improvement, what I claim as new, and desire to secure by Letters Patent, is—

1. Revolving the radial cutters L, or their equivalents, close to the bottom and side of a suitable tub or cylinder, and causing the material which is to be broken to fall by its own weight upon said cutters, whereby, while falling in a free and open space and held by inertia alone, it is sufficiently broken or shivered to pieces, substantially as described.

2. In combination with the horizontally-revolving cutters L, the grate or perforations N in the periphery of the tub, substantially as and for the purpose described.

JAMES D. WHELPLEY.

Witnesses:

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