I. M PHELPS.

Ore Crusher.

No. 200,336. **Patented Feb. 12, 1878.**

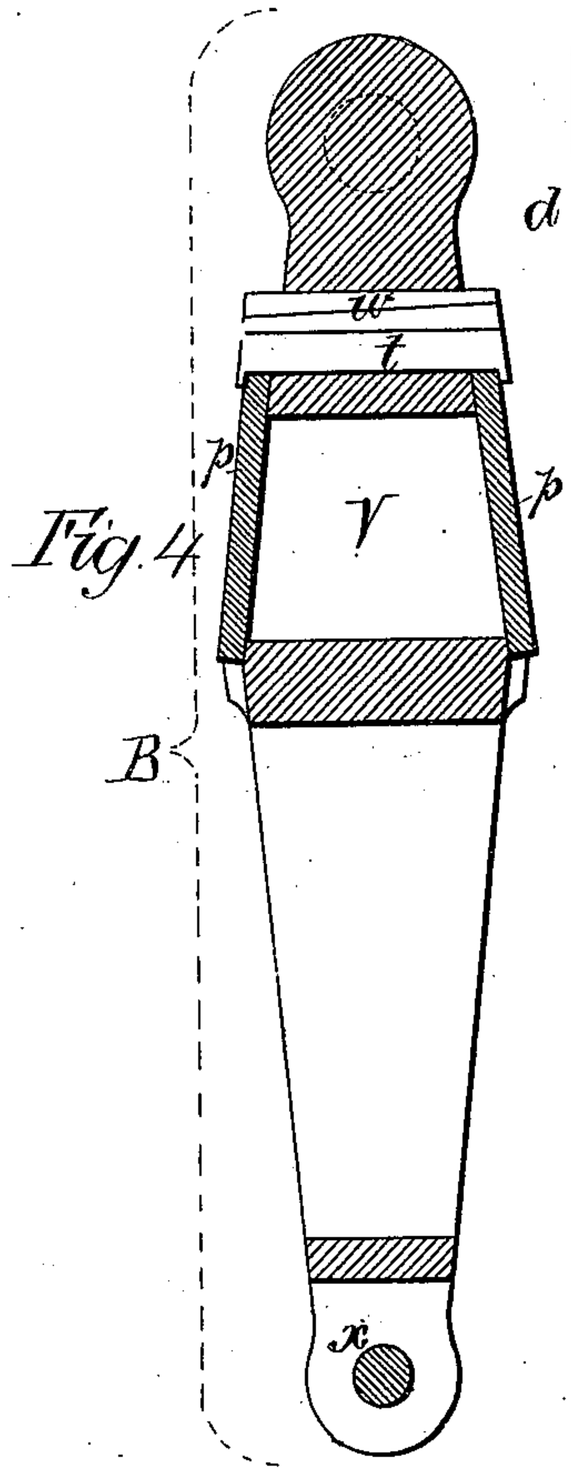

Fig. 4

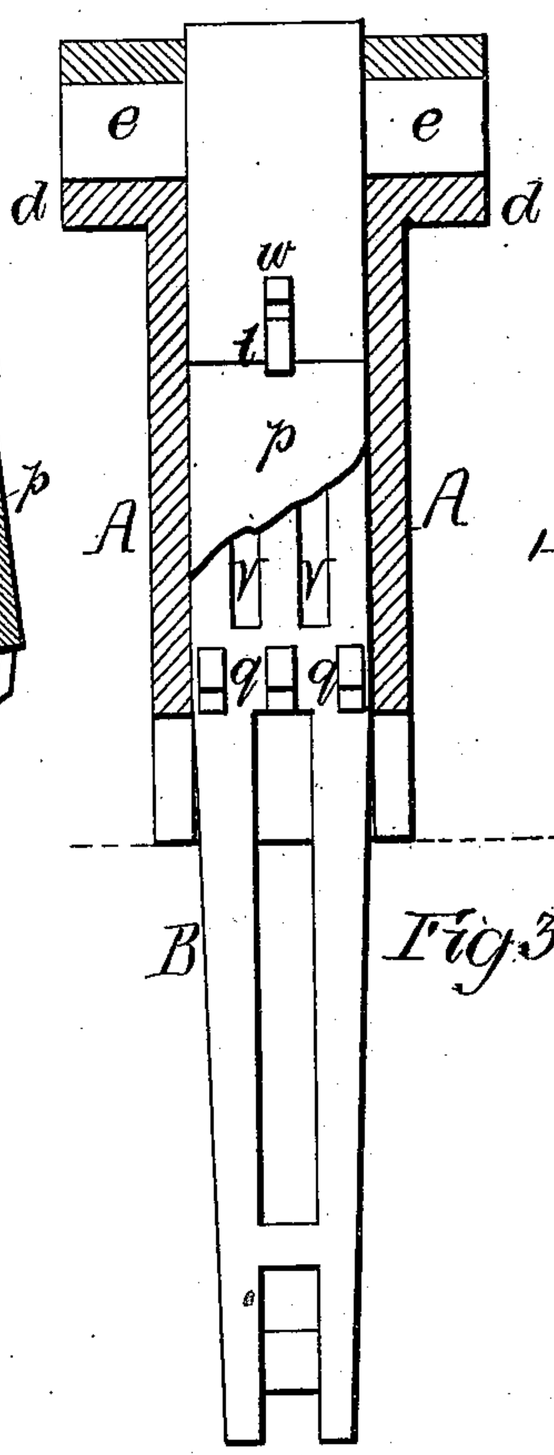

Fig. 3

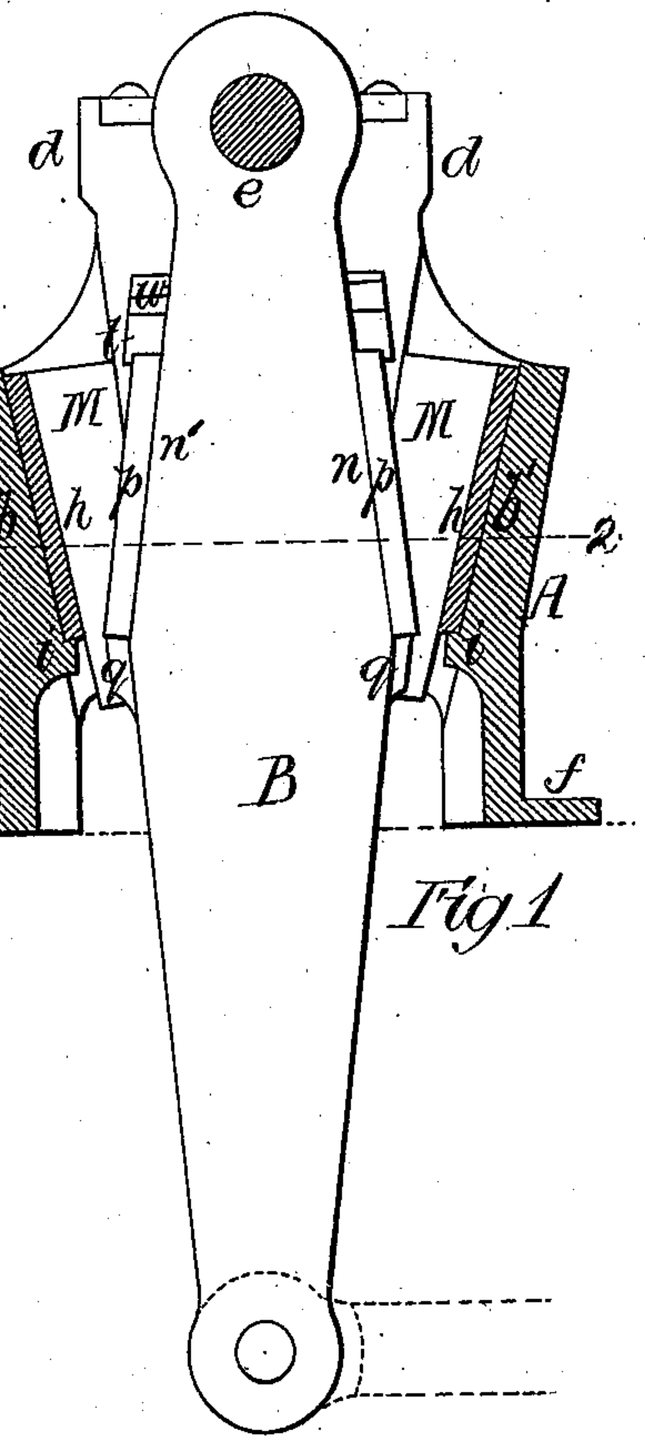

Fig. 1

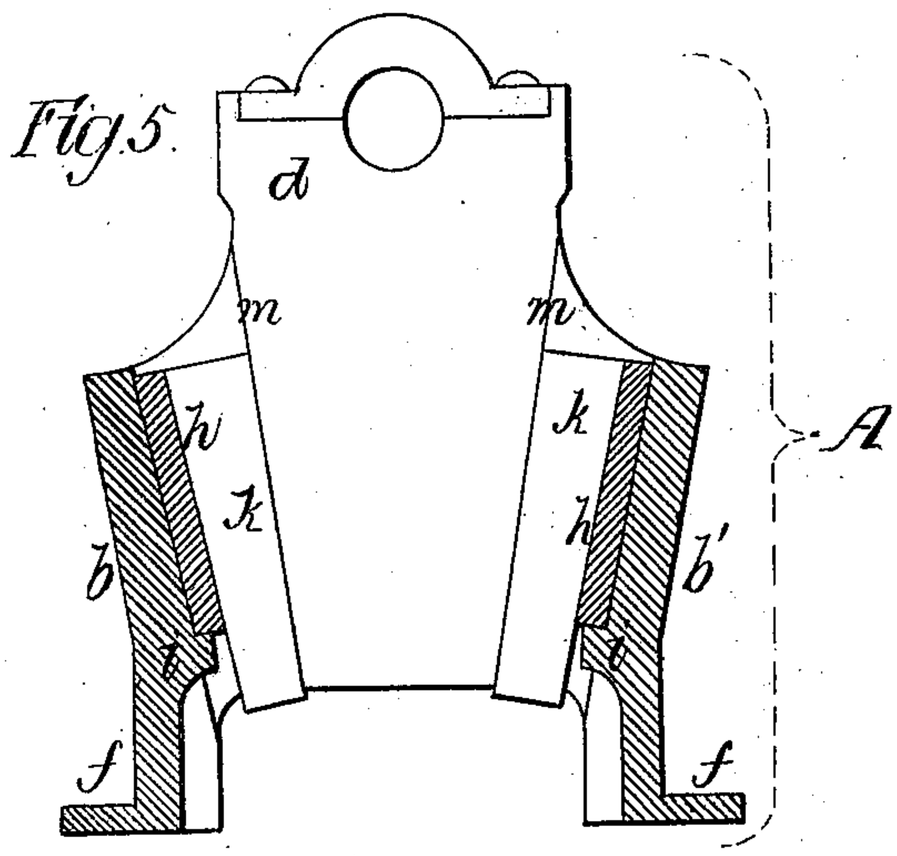

Fig. 5.

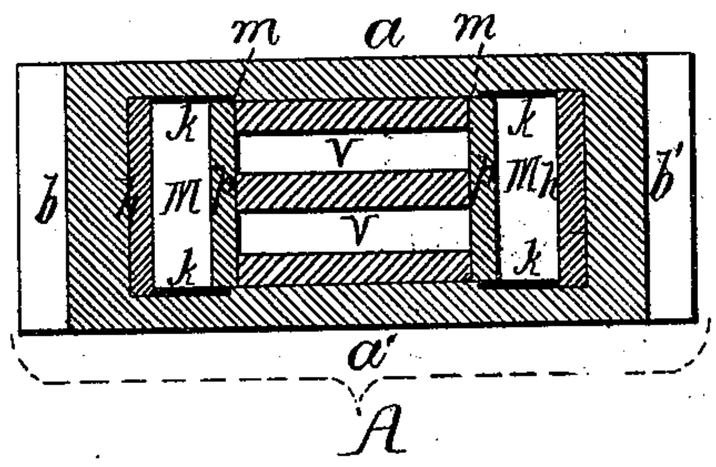

Fig. 2.

Witnesses,

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Inventor

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UNITED STATES PATENT OFFICE.

IRA M. PHELPS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF A PART OF HIS RIGHT TO THEODORE L. CHASE AND H. J. FILLMAN, OF SAME PLACE, AND D. K. ALLEN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN ORE-CRUSHERS.

Specification forming part of Letters Patent No. **200,336,** dated February 12, 1878; application filed October 24, 1877.

To all whom it may concern:

Be it known that I, IRA M. PHELPS, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Stone or Ore Breakers, of which the following is a specification:

My invention relates to an improvement in the stone or ore breaking machine described in the patent of G. A. Rollins, No. 29,197, July 17, 1860; the object of my improvement being to so construct the machine that while the greatest crushing power takes place at the point where it is most needed, the driving appliances shall be beneath the base of the machine, where they cannot interfere with the duties of the attendants.

In the accompanying drawing, Figure 1 is a vertical section of my improved stone-breaking machine; Fig. 2, a sectional plan on the line 1 2, Fig. 1; Fig. 3, an edge view of the breaking-lever and section of the frame; Fig. 4, a vertical section of the breaking-lever, and Fig. 5 a vertical section of the frame without the lever.

The machine consists of two main parts—namely, the fixed frame A and the breaking-lever B. Viewed as shown in the sectional plan, Fig. 2, the frame is quadrangular in shape, having opposite parallel sides *a a'* and opposite ends *b b'*, the upper portions of the latter being inclined outward and upward, as shown in Fig. 5. The opposite sides *a a'* are carried upward, so as to form bearings *d d* for the pivots *e e* of the lever B, and the frame is provided at its lower end with suitable flanges *f f*, for attachment to an appropriate foundation.

To the inner side of each of the inclined ends *b b'* of the frame A is fitted a plate, *h*, preferably of wrought-iron, the lower edge of which rests on a ledge, *i*, in the said frame, the plate being confined by two taper keys, *k k*, one edge of each key bearing against a shoulder, *m*, formed in the frame, and the other edge against the plate, as best observed in Fig. 2. These taper keys can be removed by driving them upward from below, when the plate *h* will be at liberty to be withdrawn to make way for a new one when a change is necessary.

The upper portion of the breaking-lever B has opposite edges, *n n'*, inclined downward and outward, and against each of these inclined edges is fitted a wrought-iron plate, *p*, the lower edge of which rests on lugs *q q*, the two plates being held in place at their upper edges by a gib, *t*, and keys *w*. On loosening these keys and raising the gib, both plates may be removed.

The openings V V in the upper portion of the lever are for the sole purpose of reducing the weight of the casting; and for a like reason, and for the attainment of strength with comparative lightness, the lower portion of the lever consists of two parts, connected together near their ends by a journal, *x*, for the end of a rod, through the medium of which a vibrating motion may be imparted to the lever.

The opposite edges of the plates *p p* are flush with the opposite sides of that part of the lever B to which they are attached, and the faces of the keys *k* are flush with the inner faces of the side pieces *a a'* of the frame, between which the upper portion of the lever fits snugly, so that no particles of mineral can pass between the lever and frame. The fitting of the lever in the frame, however, is not too tight to prevent the free movement of the former.

When the lever is in the vertical position shown in Fig. 1, there are two precisely similar chambers, M M, for receiving the stones to be broken, each chamber being bounded in two directions by the opposite keys *k k*, and in the other directions by an inclined wrought-iron plate, *h*, of the frame, and a similar inclined wrought-iron plate, *p*, of the lever. These plates may be more or less roughened, as the character of the mineral on which they have to operate may suggest, and in place of wrought-iron, the plates may be of other metal, wrought-iron being, however, preferred.

When the desired limited vibrating motion is imparted to the lever B, the mineral placed in the two chambers M M must necessarily be broken, the pieces falling from the chambers into any suitable receptacle. The keys *k* form false side plates for the chambers M, and serve to protect the sides of the frame A.

The most important feature of my invention

is the extension of the lever B down beneath the frame A, for by this arrangement such a long lever is obtained that the driving appliances may be comparatively light and simple, and may be placed below the floor or platform on which the machine stands, so that they are out of the way, the floor being entirely clear, and presenting an unobstructed surface for the convenience of attendants in piling up the quartz, and in feeding the same to both compartments of the machine. At the same time the arrangement of the pivot above the jaws insures the exertion, through the medium of the lever, of the greatest force where it is most needed.

By properly constructing the frame A the chamber M on one side of the lever B may be made larger than that on the other, so that the mineral matter may be broken in one chamber to a convenient size, and then conveyed to the opposite chamber, where it is reduced to the desired degree of fineness.

I claim as my invention—

The combination of the frame A with the lever B, pivoted at a point above the crushing-jaws, and extending beneath the floor or platform on which the frame A rests, all substantially as and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

IRA M. PHELPS.

Witnesses:

RICHARD L. GARDINER,

HARRY SMITH.