(No Model.)

S. L. MARSDEN.

STONE OR ORE CRUSHER.

No. 264,179. Patented Sept. 12, 1882.

Fig. 1

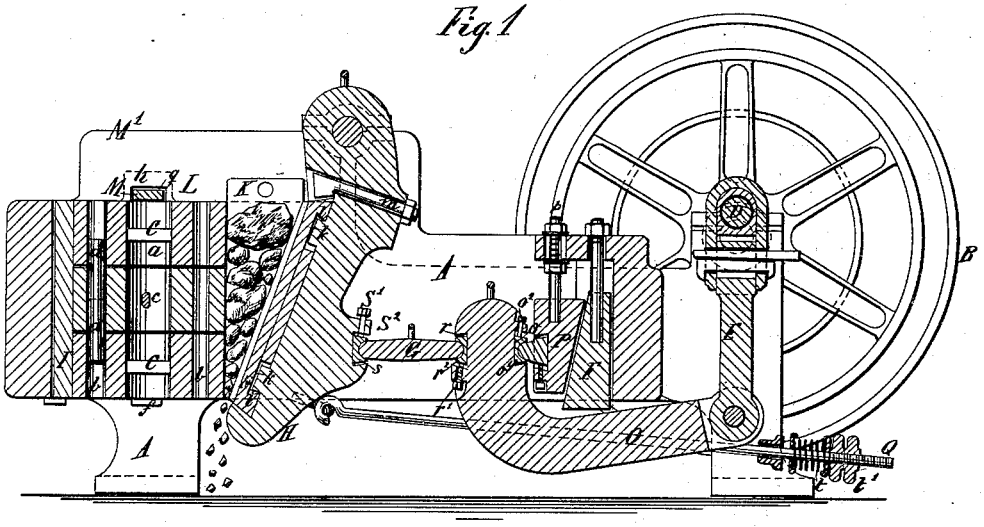


Fig. 2

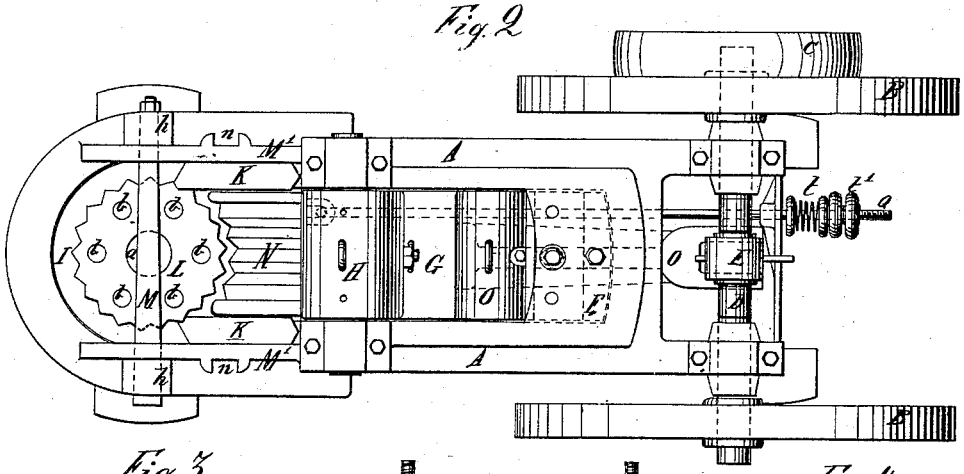


Fig. 3

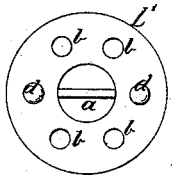


Fig. 5

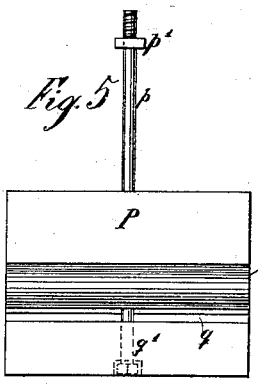
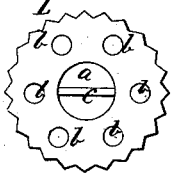


Fig. 6

Fig. 4



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UNITED STATES PATENT OFFICE.

SAMUEL L. MARSDEN, OF NEW HAVEN, CONNECTICUT.

STONE AND ORE CRUSHER.

SPECIFICATION forming part of Letters Patent No. 264,179, dated September 12, 1882.

Application filed April 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. MARSDEN, a citizen of the United States, and a resident of New Haven, county of New Haven, State of Connecticut, have invented a new and useful Improvement in Stone and Ore Crushers, of which the following is a specification.

This invention relates to that class of crushers styled "jaw-crushers;" and its object is to construct a more inexpensive, durable, and effective machine.

The invention consists in the combination of an upright cylindrical jaw with an opposite concave jaw-plate between which the stone is broken; and, further, of adjustable and renewable lever and toggle bearings or fulcrums, all of which will be hereinafter described.

Figure 1 is a sectional side elevation of my improved crusher. Fig. 2 is a plan of the same. Fig. 3 is a plan of a section of a cylindrical sectional jaw with smooth crushing-surface. Fig. 4 is a plan of a section of a cylindrical sectional jaw with corrugated crushing-surface. Fig. 5 is an enlarged rear elevation of an improved adjustable toggle-block carrying an adjustable lever-fulcrum. Fig. 6 is a side elevation of the same.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents the frame of the machine, B B the fly-wheels, C the driving-pulley, D the crank-shaft, E the pitman, F the wedge for adjusting the toggle-block, G the toggle, H the movable or swinging jaw, I the fixed jaw, and K the cheeks, all of which parts are well known and understood, and hence require no further description here.

Instead of the flat fixed jaw-plate in common use in stone and ore crushers of this class, I use a cylindrical jaw, as shown at L, which is preferably constructed in sections, L′, as indicated in the drawings, but may consist of a single casting, and may have a smooth crushing-surface, as shown in Fig. 3, or a corrugated crushing-surface, as shown in Fig. 4; or the surface may be furnished with projecting teeth or studs, if so desired. This cylindrical jaw L has the advantage of presenting a broader wearing-surface than a flat plate in a frame of given width, and said jaw L may, when one face is worn, be turned partly or wholly around to present a fresh or unworn face toward the opposite jaw, and the relative positions of the sections L′ may be changed at will, so that all may be made to sustain an equal amount of wear. Hence it may be seen that this cylindrical jaw L will endure two or three times more wear than will the ordinary flat jaw-plate, which latter also requires to be carefully planed and packed, so that it may fit properly upon its seat, while no labor or expense of this character is requisite for the adjustment of the cylindrical jaw. Thus the advantages of the improved cylindrical jaw over the common flat jaw-plate are clearly manifest. Preferably the plate-sections L′ are cast with a central bore, *a*, and a surrounding ring of holes, *b*. In each bore *a* is fixed a cross-bar, *c*, by which the sections L′ may be raised or lowered in place, and in the holes *b* pins *d* may be inserted for holding the sections L′ joined and fixed together in position, as shown in Fig. 1. This cylindrical jaw L, when in position, rests on lugs *f*, that project inward from the sides of the frame A, and is held down in place by a key, M, that, lying across the top of the upper section, L′, is passed through the slots *g* of the hopper-frame plates M′, and through the lugs *h*, that are formed on said plates M′, especially for the reception of said key M.

The improved swinging or movable jaw-plate N has a corrugated concave face whose curve corresponds with that of the jaw L, being in its general outline equidistant therefrom at every point throughout its width. Hence it will be seen that a wider crushing-surface is afforded by these curved jaws than there would be by straight or flat jaws of the same breadth; and these curved or convex and concave jaws not only present a more extended crushing-surface, but they are also especially adapted—because of their curves—to the crushing of slabs or plates of stone or other substance, which are apt to pass unbroken or but partially reduced out from between the flat jaws of ordinary crushing-machines. The jaw-plate N is adapted to be fixed in place with either end uppermost, and it may have its face beveled off at either or both ends if it be desired to enlarge the opening between the jaws at the

top or bottom thereof. This plate N is held in place partly by the studs *k*, that project from the swinging jaw H and enter the inclined plate-sockets *l*, and partly by the screw-bolt *m*.

On the outer faces of the hopper-frame plates M′ are lugs *n* that form jaws or sockets for securing in place the hopper. (Not shown.)

O represents the toggle-lever, whose long horizontal arm is connected to the crank-shaft D by the pitman E. This lever O is in its general features similar to that shown in my Patent No. 230,304, July 20, 1880; but I have found it desirable to substitute for the ear in that lever a renewable and adjustable concave bearing, *o*, which is set in a corresponding socket, *o′*, made in the back of the head of the lever O, and is made adjustable therein by means of one or more set-screws, o^2.

The toggle-block P is in this machine also made vertically adjustable by means of an attached screw, *p*, that passes up through the frame A, and has a nut, *p′*, on its upper end. This toggle-block P has also a socket, *q*, in its face, in which is adjustably held by a set-screw, *q′*, a fulcrum or bearing, q^2, which projects into the concavity of the lever-bearing *o*. In the face also of the lever O is a socket, *r*, in which is adjustably held by a set-screw, *r′*, a toggle bearing or fulcrum, r^2, and in the back of the swinging jaw H a toggle bearing or fulcrum, *s*, is adjustably held by a set-screw, *s′*, in a socket, s^2. Hence it will be seen that all of the lever and toggle fulcrums or bearings may be adjusted, removed, replaced, and renewed whenever desired or when the parts become worn, whereby the renewal of more expensive parts of the machine may be avoided, and whereby a more accurate adjustment of the parts may be had on the line of the greatest strain or pressure.

The combined rod Q, spring *t*, and nuts *t′* serve to retract the jaw H after each forward motion.

I do not broadly claim adjustable or renewable fulcrums or bearings in a stone-breaker; but,

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a stone and ore crusher, the combination of an upright cylindrical fixed jaw and an opposite concave swinging jaw-plate, substantially as herein shown and described.

2. In a stone and ore crusher, a fixed cylindrical jaw constructed in sections, and provided with suitable devices whereby they may be placed in or lifted from position, and devices whereby they may be united to each other, substantially as herein shown and described.

3. In a stone and ore crusher, as a means for holding the fixed jaw down in place, the combination of the transverse key M, slotted plates M′, and lugs *h*, substantially as set forth.

4. A stone and ore crusher constructed substantially as herein shown and described, containing the following elements in combination: a cylindrical jaw, an opposite concave jaw-plate, a toggle-lever with socketed head, an adjustable socketed toggle-block, an adjustable lever, and toggle fulcrums or bearings, all arranged substantially as herein shown and described.

5. In a stone and ore crusher, the combination, with the toggle-lever O, having rear head-socket, *o′*, of the adjustable bearing *o*, substantially as and for the purpose described.

6. In a stone and ore crusher, the combination, with the toggle lever O, having face-socket *r*, toggle G, and swinging jaw H, having rear socket, s^2, of the adjustable toggle-bearings r^2 *s*, substantially as and for the purpose described.

7. In a stone and ore crusher, the combination, with the toggle-lever O, having a rear head-socket, *o′*, and provided with adjustable bearing *o*, of the toggle-block P, having face-socket *q* and adjustable lever-fulcrum q^2, substantially as herein shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 3d day of April, 1882.

S. L. MARSDEN.

Witnesses:
W. J. MILLS,
S. ARTHUR MARSDEN.