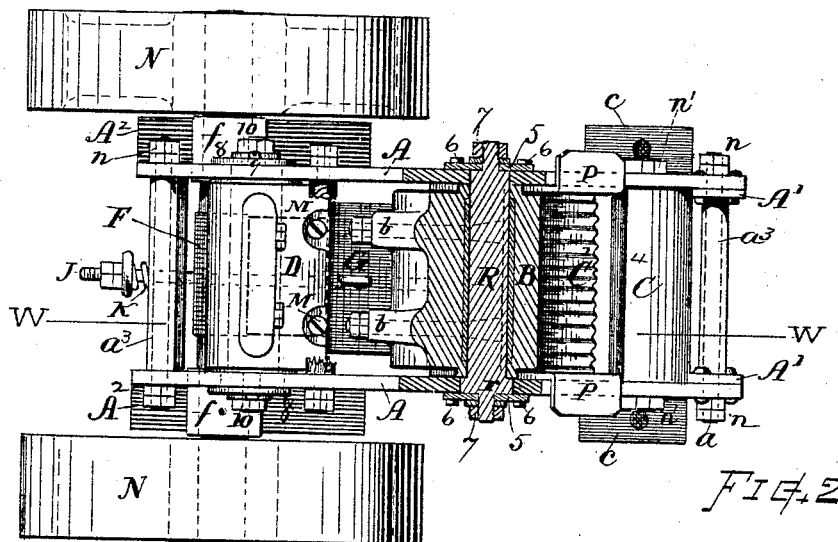
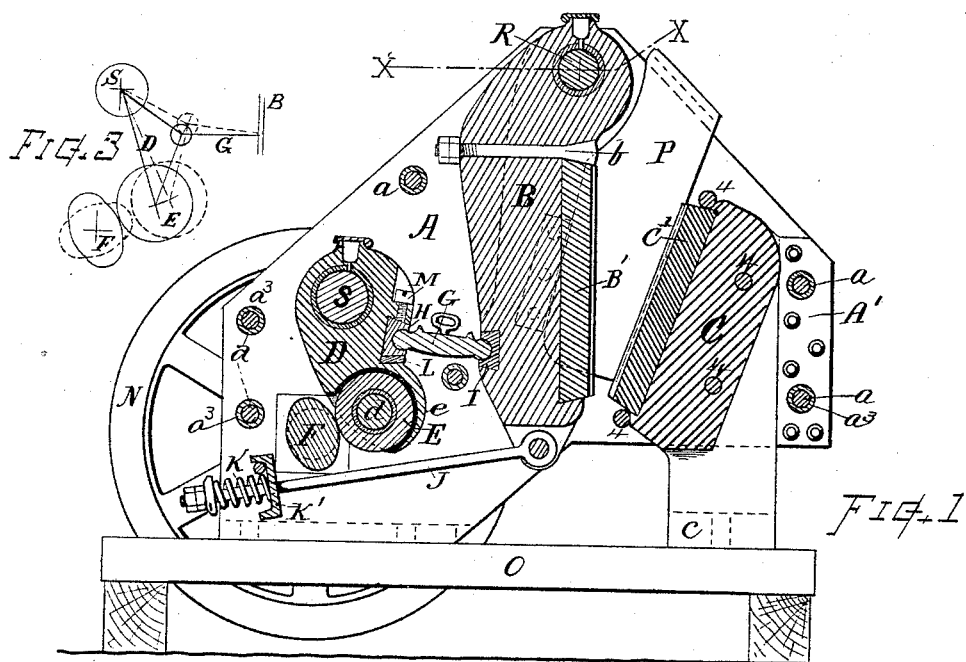


G. W. TAFT.
ROCK OR ORE CRUSHER.

No. 458,740.

Patented Sept. 1, 1891.



Witnesses.

Geo M. Rice
Simon E. King

Inventor

George W. Taft
By Chas. H. Dunleigh
Attorney

(No Model.)

2 Sheets—Sheet 2.

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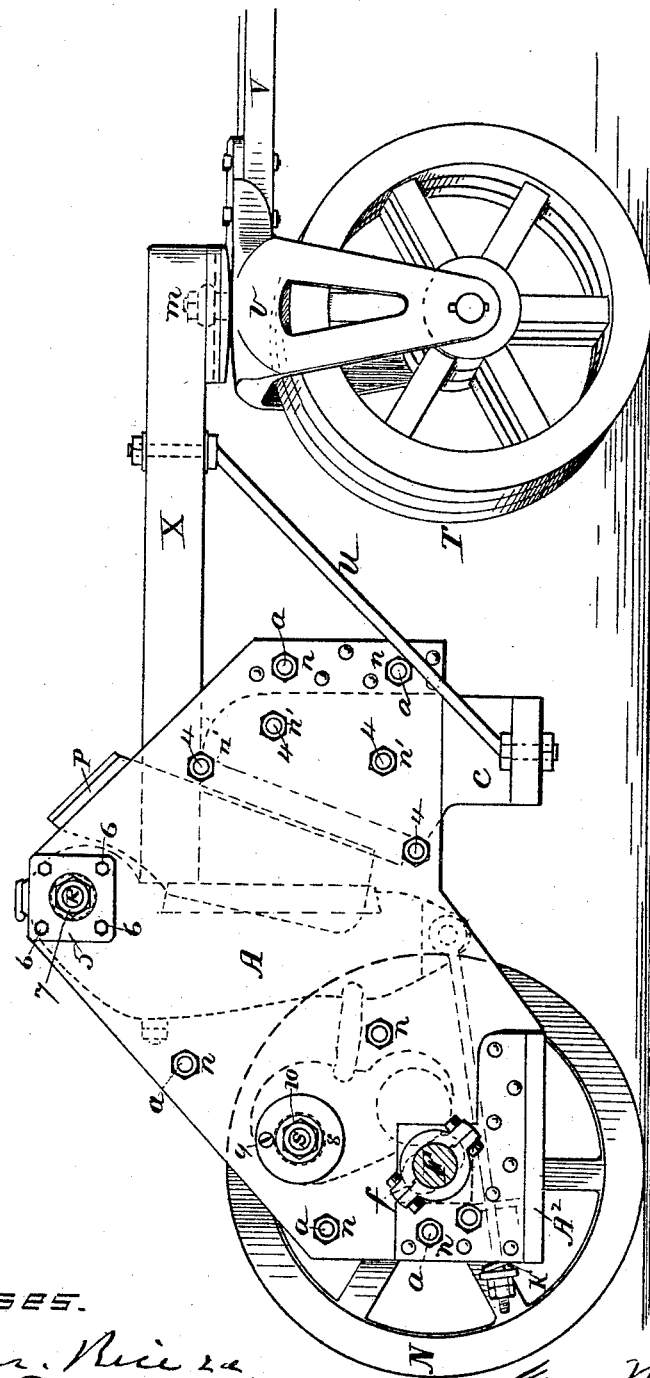


FIG. 4

Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE WARNER TAFT, OF KENNETT SQUARE, PENNSYLVANIA.

ROCK OR ORE CRUSHER.

SPECIFICATION forming part of Letters Patent No. 458,740, dated September 1, 1891.

Application filed April 23, 1891. Serial No. 390,137. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WARNER TAFT, a citizen of the United States, residing at Kennett Square, in the county of Chester and State of Pennsylvania, have invented a new and useful Rock or Ore Crusher, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of this invention is to improve the construction of the mechanism in the particulars hereinafter described, to render the machine efficient and desirable for service, of a structure combining great strength and comparative lightness of weight, and which is convenient for portability, transportation, or shipment; also, to afford an organization of mechanism that can be manufactured with economy and facility, so that the machines can be produced at a comparatively moderate expense. These objects I attain by the mechanism illustrated in the drawings, wherein—

Figure 1 is a vertical sectional view of my improved rock-crusher at line *w w*, Fig. 2, showing the machine as set up for use. Fig. 2 is a plan or horizontal section of the same at line *x x*, Fig. 1. Fig. 3 is a diagram illustrating the movement of the operating-cam and knuckle-joint; and Fig. 4 is a side view, with one wheel omitted, showing the manner of mounting the machine for travel or use as a road-roller.

The frame of my improved crusher is composed of side plates *A*, formed of rolled sheet-steel about three-fourths to one inch in thickness, more or less, each of said plates having at one end an upright re-enforce strip *A'*, rigidly attached thereto by rivets, welding, or other suitable means, and at the other end a journal-box *f* and a foot-flange *A²*, attached thereto. The journal-boxes *f* in which the shaft runs are riveted to the outside of the side plates, and a square part of the box extends through a hole cut in the side plate *A*, said hole or opening being formed of sufficient dimension to permit the taking out of the shaft when the journal-box caps are removed. The two side plates are secured to each other by a series of bolts or threaded rods *a*, that pass through tubular columns or braces *a³* and have nuts *n*

on their ends, whereby the plates are drawn firmly against the ends of the tubular braces, which latter are cut off square and abut against the inner surface of the plates, thus forming a very strong, light, and rigid frame that can be taken apart for transportation in small bulk or by pack transit.

B indicates the movable jaw; *C*, the stationary jaw; *D*, the tumbler or knuckle-lever; *E*, the tumbler-roll; *F*, the double-cam shaft for operating the tumbler, and *G* the toggle-bar for working the movable jaw from the tumbler-knuckle. Said toggle *G* is re-movable and can be interchanged with other similar toggles of different lengths for varying the size of crushed product.

The stationary jaw *C* is best provided with feet *c*, formed integral therewith for supporting the machine on a bed or timber. Said jaw is fitted between the two side plates and secured by bolts or threaded rods *4*, that extend through from side to side and have nuts *n'* thereon at the outside of the plates for clamping the plates firmly against the sides of the jaw. The outer angles of the jaw rest against the re-enforce strips *A'*, and the working strain on said jaw is thus sustained by the side plate irrespective of the bolts.

The movable jaw *B* is fulcrumed at its upper end on a shaft *R*, arranged in the upper part of the frame. Its lower end swings to and from the jaw *C*, and a rod *J* and spring *K* are provided for drawing the jaw backward in well-known manner. A bar *K'* is arranged across the frame near the lower angle to form a seat for the spring *K*, as indicated. The jaws are respectively provided with removable chilled facings *B'* and *C'*, as indicated. That facing for the jaw *B* is retained in connection therewith by means of bolts *b*, that pass through the jaw and have wedge-shaped heads that engage between inclined surfaces on the jaw and edge of the facing, and thereby bind and force the facing-plate into its dovetailed seat.

The tumbler *D* is pendulous from a shaft *S* above the operating cam-shaft *F* and has a cavity in its lower end for containing the roller *E*, which roller runs loosely on a supporting-axle *d*, having its ends fixed in the tumbler-lever, which extends down at either side past the end of the roller. The front shell at

e forms a guard for keeping the rock fragments from the roller and cam.

A steel step or bearing-plate *I* is fitted in the back of the jaw *B* for receiving the end of the toggle *G*, and a movable steel step or bearing-plate *H* is arranged on the tumbler for receiving the rear end of said toggle. Said bearing-plate *H* is fitted in a dovetailed or undercut recess in conjunction with a removable steel block or plate *L*, and is retained by binding-screws *M*, threaded to a flange on said tumbler, in the manner indicated. The block *I* can be taken out and replaced at the opposite side or introduced above the bearing-plate *H*, thereby shifting the position of the knuckle-joint bearing *H* and giving increase of throw, when desired, for crushing the softer kinds of stone.

The operating-shaft *F* is arranged in the bearings *f*, which are located near the lower angle of the frame, and on each end of the shaft is mounted a broad-rimmed wheel *N*, that is adapted to serve as a belt-wheel for driving the machine, also as a traveling wheel when transporting the machine from one place to another, the rims of said wheels being below the level of the foot *A*², so as to rest on the ground when the bed-timber *O* is removed. The central part of the shaft is provided with a double cam, and the tumbler-roller *E* rests against said cam, so that revolution of the cam-shaft forces forward the tumbler and works the toggle or knuckle-joint for closing the jaw. This movement is illustrated in Fig. 3, the full line indicating the open position and the dotted line the position after the knuckle-joint has lifted and straightened the toggle. In the arrangement of the knuckle-joint the distance from the fulcrum of the tumbler to the knuckle-joint is about two-thirds as great as the distance from the fulcrum *S* of the tumbler to the center of the tumbler-roll, and the knuckle-joint is disposed about one and one-half inches (more or less) from a straight line drawn from the center of the tumbler-fulcrum to the center of the toggle-bearing *L* when the jaw is open. The tumbler movement lifts the knuckle-joint toward such straight line about three-fourths of an inch, more or less, thereby giving about five-sixteenths-inch movement to the bottom of the jaw *B*. The disposition of the knuckle-joint is such that it gives pressure in the direction of the line from the center of the shaft *S* to the bearing-plate *I* of the jaw *B*, thereby exerting by an easy movement the crushing force on the jaw and effecting two strokes at each revolution of the cam-shaft. The interior of the jaw, the tumbler, and the tumbler-roller where they take bearing on their supporting shaft or axle are fitted with a lining of hard Babbitt metal, as indicated.

The shaft *R* is made as shown in Fig. 2, preferably with a head *r*, and fitted into openings in the side plates *A*. Said shaft has re-

duced screw-threaded ends, over which are arranged broad washers or plates *5*, that are attached to the side plates *A* by bolts or screws *6*, thereby confining the shaft securely in position. Screw-nuts *7* are arranged on the threaded ends of the shaft and screw down upon the plates *5*, as indicated. The shaft thus holds the frame from crowding inward against the jaw while it is held in the frame and the jaw swings freely on said shaft.

The shaft *S* for the tumbler *D* is made in substantially similar form to the shaft *R*, and is secured by large washers or plates *8*, screw-bolts *9*, and nuts *10*. This construction of the shafts affords a very secure and rigid connection, while it admits of the shaft being readily taken out and replaced when desired.

P P indicate sheet-metal cheek-plates arranged at the side of the jaws for taking the wear and pressure of the rock as it passes through the jaws. Said cheeks are fitted between the ends of the jaw *C* and lug-pieces fixed to the side plates *A*, their top ends being turned outward at an angle overhanging the sides of the frame.

T denotes a traveling truck or roller provided with a draft-tongue *V* and bearing-frame *v*, on which the machine may be mounted by means of the beam, perch, or goose-neck *X* and brace-rods *u*, substantially as illustrated, for drawing the machine from place to place or for adapting it for use as a road-roller. The forward end of the perch-beam is pivoted to the tongue, as at *m*, and its rear end held against the jaw between the side plates. The rear of the machine is let down, so that the wheels *N* serve as rollers or traveling wheels when transporting it from place to place. The front roller *T*, which is best made of cast-iron in one, two, or more sections, has a width about the same or somewhat in excess of the distance between the two wheels *N*, so that as the machine is drawn forward it will cover or roll down a track equal to the width of both the roller *T* and the wheels *N*. When used as a roller, the toggle *G* can be removed, thereby avoiding movement of the jaw. The tumbler, being disposed in its relation to the cam and toggle in the manner shown, avoids all up-and-down jumping motion of the mechanism, and the machine therefore runs very still and smooth when running without stone in the jaws.

Oil-wells are preferably formed in the upper part of the tumbler *D* and movable jaw *B*, from which suitable pipes or tubes extend into different bearings for supplying them with lubricating-oil.

I am aware that stone-crushers have heretofore been made wherein the motion is imparted to the movable jaw from a shaft. Hence it will be understood that I do not broadly claim such feature as of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. The side plates A, made of flat rolled steel, having the re-enforce strip A' for sustaining the stationary jaw, and the foot-flange A², with journal-bearing box rigidly attached to said side plates, the transverse connecting-bolts, and brace-collars, in combination with the stationary jaw C, its holding-bolts 4, the movable jaw B, pendulous operating-tumbler D, cam-shaft F, and toggle G, all substantially as set forth.

2. The combination, substantially as described, of the rolled-steel side plates A and swinging jaw B, the fulcrum-shaft R, fitted to openings in said side plates and having the projecting threaded ends, the broad bearing-plates 5, the screw-bolts 6, attaching the same to said side plates, and the nuts 7 on the threaded ends of said shaft, for the purpose set forth.

3. The shaft S, having its ends reduced and provided with plates or disks 8, secured thereon by nuts 10, and the screw-bolts 9 for attaching said disks to the frame, in combination with the rolled-metal side plates composing the frame, the pendent tumbler supported on said shaft, and the crushing-jaws and operating mechanism, as set forth.

4. The adjustable knuckle-bearing step H and the removable plate or block L, adapted to be used either above or below said bearing-step, thereby affording solid structure and adjustment of the tumbler leverage corresponding to such positions, the tumbler D, having the dovetailed recess for containing said step and block, and the binding-screws M, as described, in combination with the mov-

able jaw B, the toggle-bar G, and cam-shaft F, disposed substantially as set forth.

5. The operating-shaft disposed near the lower part of the frame and the two wheels N mounted thereon and projecting below said frame and adapted for use as fly-wheels or as traveling wheels or rollers, in combination with the roller-truck having a pivoting-plate and draft-tongue, the pivoting-perch or goose-neck, and attaching-braces, substantially as described, whereby said crusher-frame is supported in connection with the roller-truck, for the purpose set forth.

6. The combination, substantially as described, of the steel side plates having the re-enforce strip *a* and the journal-bearing boxes *f* attached thereto, the stationary jaw C, fitted between the side plates contiguous to said re-enforce and retained by transverse bolts 4, the movable jaw B, suspended on shaft R, the pendent tumbler D, swinging from its upper end and having the roll E mounted on axis *d* at its lower end, its shaft S, the toggle G, the knuckle-joint bearing-step H, adjustably supported on the front of said tumbler, the adjusting-plate L adjacent to said step, the double-cam shaft F, disposed at the lower part of the frame, the wheels N, adapted for traveling and driving belt-wheels, and the rod J and spring K, for the purposes set forth.

Witness my hand this 16th day of April, A. D. 1891.

GEORGE WARNER TAFT.

Witnesses:

W. E. VOORHEES,
S. JONES PHILIPS.