

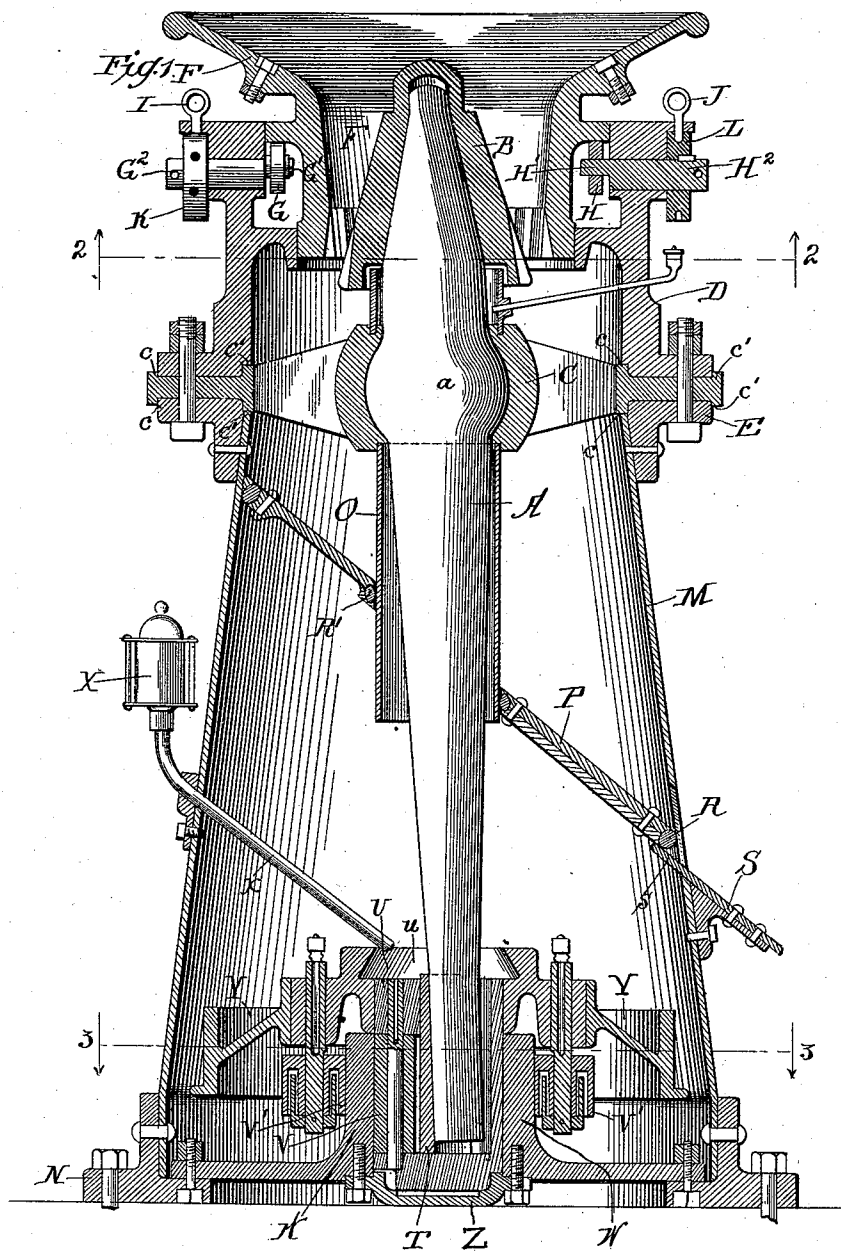
(No Model.)

2 Sheets—Sheet 1.

G. LOWRY.
STONE BREAKER.

No. 532,329.

Patented Jan. 8, 1895.



Witnesses;
Wm. J. Fleming
O. R. Barnett.

George Lowry, Inventor,
By Raymond & Needer Attys

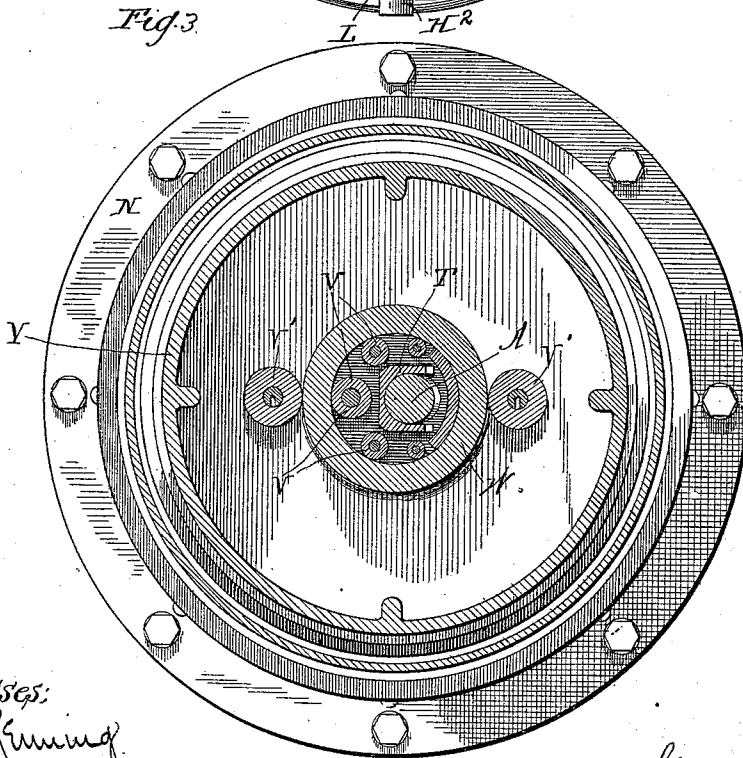
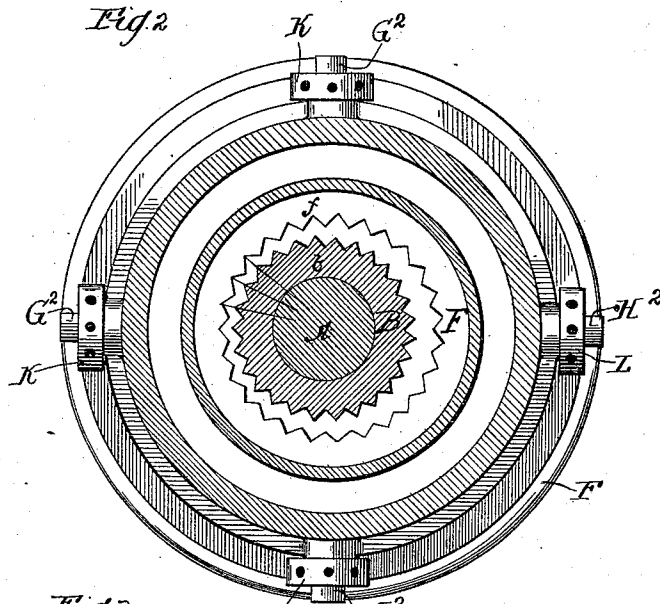
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UNITED STATES PATENT OFFICE.

GEORGE LOWRY, OF TIFFIN, OHIO, ASSIGNOR TO THE GATES IRON WORKS,
OF ILLINOIS.

STONE-BREAKER.

SPECIFICATION forming part of Letters Patent No. 532,329, dated January 8, 1895.

Application filed November 14, 1892. Serial No. 451,965. (No model.)

To all whom it may concern:

Be it known that I, GEORGE LOWRY, a subject of the Queen of Great Britain, residing in Tiffin, in the county of Seneca and State of Ohio, have invented certain new and useful Improvements in Stone-Breakers, of which the following is a specification, reference being had to the accompanying drawings.

My improvements relate to breakers for stone, ore and the like of that class in which a gyratory movement is given to the movable crusher jaw which is itself of circular or of approximately circular cross section and among the objects of my invention may be named, provision of means for reducing the friction of the apparatus for strengthening its construction by the formation and arrangement of parts which permits of the use of wrought metal either steel or iron, and further, to facilitate the adjustment of the parts and to enable them to be easily assembled and taken apart for repairs.

In the accompanying drawings: Figure 1 is a vertical section through the crusher showing the general construction and arrangement of the parts. Fig. 2 is a horizontal section on line 2—2 Fig. 1 showing the crushing face. Fig. 3 is a horizontal section on line 3—3 Fig. 1 showing the construction of the bearing at the lower end of the crusher frame, the upper end of which bears the crushing cone.

A (Fig. 1) is the vibrating shaft which actuates the movable crusher head or cone B at its upper end. It is journaled in the ball joint bearing C which has a spherical socket at its center corresponding to the spherical enlargement *a* on the shaft A. Said ball-joint socket plate C is flanged at *c c'* both within and without its point of junction with the upper and lower rings D, E of the frame. The upper ring D carries the outer crushing shell F which is shaped like a hopper. Said shell or hopper F is turned on its exterior to fit within the ring D so as to fit closely, but not so tight as to prevent its movement within the ring D. It is supported within the ring D upon rollers G, H which are carried by studs G' H' respectively formed eccentrically upon the shafts G² H². Said shafts G² H² may be

revolved in bearings in the ring D by using a lever or bar, and are held in any desired position by means of pins I, J, which register with holes in the edge of wheels or disks K, L keyed or otherwise securely fastened to the shafts G² H². The lower part of the frame of the crusher is formed by a wrought metal jacket preferably of the shape of the frustum of a cone. The upper end of the jacket M is riveted or otherwise firmly secured to the ring E and its lower end is in like manner secured to the base ring N which is adapted to be secured to the foundation of the machine. Extending from within a recess in the lower side of the bearing ring C is a tubular guard O which surrounds the shaft A. In the annular space between the guard O and jacket M is fitted the chute P. Said chute corresponds in shape to an oblique section of the jacket M and is provided at its edge with a groove in which a fibrous packing R is placed which may be of rope or any other suitable material, or it may be made dust proof by running it up with molten lead. A like fibrous packing is placed around the interior opening of the chute P. The chute is held in position by a lip *s* upon the spout S, so that upon the removal of the spout S the chute can be detached.

The construction of the bearing which carries the lower end of the shaft A will be understood by reference to Figs. 1 and 3. The end of the shaft A works in a bearing box T which is set eccentrically in the circular bearing block U. Journaled in said bearing block are a series of friction rollers V V which bear upon the inner surface of the circular flange W, or the rollers may be journaled in this ring and the eccentric box made solid as before, the socket formed by the base ring N of the frame. In addition thereto, I prefer to employ also rollers V' V' which are carried by the overhanging flange of the bearing block U. Said rollers V' V' bear upon the outer surface of the flange W. A pulley Y adapted to receive a belt or cable is fitted to the bearing block U and furnishes the power by which the crusher is driven. As is seen by reference to Fig. 2, the corrugation *f* at the

lower edge of the shell F and *b* at the bottom of the head B, correspond in number though not in size. I have found that a material improvement in the quantity and quality of the product is produced by such an arrangement of corrugations over that produced by an arrangement in which the number of corrugations in the shell and head do not correspond. Said Fig. 2 also shows that more than two supporting rollers G, H may be used for the shell F but I have found in practice that two served all ordinary purposes sufficiently well.

The operation of the apparatus is as follows: A rotary motion, imparted to the bearing block U by means of the belt pulley Y, causes the lower end of the shaft A to revolve in a circle whose diameter is determined by the eccentricity of its bearing in the block U. The upper end of the shaft A thus receives a corresponding gyratory motion which causes each point of the circular circumference of the crushing head B to alternately approach to, and recede from, the surrounding shell F. The shell or hopper F being free to turn in the ring D, rotates slowly therein under the action of the crushing head B. The corrugations on the shell F will, however, maintain such position relative to the corrugations on the head B that at the point where the crushing is taking place from moment to moment, the depressions of one series of corrugations corresponds to the projections of the other series and the corrugations being equal in number, the space between them will be practically equal. The crushing takes place with greater ease and the size of the pieces of crushed stone is more uniform than where the corrugations are equally spaced on both shell and cone but unequal in number. The guard O on the chute P conducts the crushed material to the discharge spout S, the fibrous packing R and R' around the chute P excluding the dust from the working parts below. To provide for readily oiling the bearings below, an oil cup X is placed outside of the shell and a pipe *x* leads therefrom to a recess *u* in the top of the bearing block U. This recess has inwardly inclined sides so that the oil will not fly out when the block rotates. The size of the crushed material is regulated by raising or lowering the hopper F by means of the eccentrically supported pulleys G, H.

The amount of movement imparted to the crushing head may be regulated by altering the eccentricity of the bearing for the lower end of the shaft A. This may be done by substituting for the bearing piece T a bearing piece having a thicker or thinner bottom than the one shown, or shims may be placed behind the bottom of the bearing piece for the same purpose. In order to afford ready access to the bearing box T and also to the block U and rollers V V, a cap Z is provided at the base of the machine immediately beneath the block

U. By taking off this cap the box T can be removed and a new one inserted or shims can be placed behind it.

I claim—

1. The combination in a crusher of the class described, of a crushing head and hopper, each provided with an equal number of corrugations at their outer ends, said head being mounted upon an eccentrically arranged shaft, an eccentric bearing block, and friction rollers at the lower end of said shaft, substantially as described. 75

2. The combination, in a crusher of the class described, of a bearing block at the lower end of the crusher shaft; an eccentric bearing for said shaft formed in said block; and frictional rollers journaled in said block and bearing against the inner surface of a socket formed in the frame-work of the machine, substantially as described. 85

3. The combination, in a crusher of the class described, of a bearing block at the lower end of the crusher shaft; an eccentric bearing for said shaft formed in said block; and friction rollers journaled in said block and bearing against both the inner and outer surfaces of a circular flange formed upon the frame-work of the machine, substantially as described. 90

4. The combination, in a crusher having a conical crushing head and appliances for imparting movement thereto; an outer crushing shell surrounding said conical crushing head; and supports for said shell by which its height relative to the movable crushing head may be altered, said supports consisting of rollers carried by studs eccentrically placed upon rotatable shafts journaled in the frame-work of the machine, substantially as described. 95

5. The combination, in a crusher of the class described, of a jacket M; a guard O; a movable chute plate P; packings R and R' of fibrous material around its edges; and a spout S provided with a lip *s* adapted to support the lower edge of said chute, substantially as described. 100

6. The combination with the circular jacket, of a chute placed obliquely therein, and a spout provided with an inwardly-projecting lip to support the lower end of said chute, substantially as described. 105

7. The combination with the circular jacket, of a chute placed obliquely therein and grooved or recessed to receive a packing, and a spout having an inwardly projecting lip to support the chute, substantially as described. 110

8. The combination in a crusher of the class described, of the shaft A; a bearing block U at the bottom of said shaft; the bearing piece T forming a bearing for said shaft eccentric to the block U, the flange W upon the frame forming a socket for said block rollers V, V, journaled in said block and the pulley Y secured to said block, substantially as and for the purpose described. 115

9. The combination, with the frame of a crusher having in its base a bearing block and eccentrically placed box for the lower end of the crusher shaft, of a plate having a flange
5 W forming a socket for said bearing block rollers V, V, journaled in said block and bearing against said flange and a detachable plate Z forming the bottom of said socket, substantially as and for the purpose set forth.

GEORGE LOWRY.

Witnesses:

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