G. E. NOYES.

Ore-Crusher.

No. 162,301. Patented April 20, 1875.

Fig. 1.

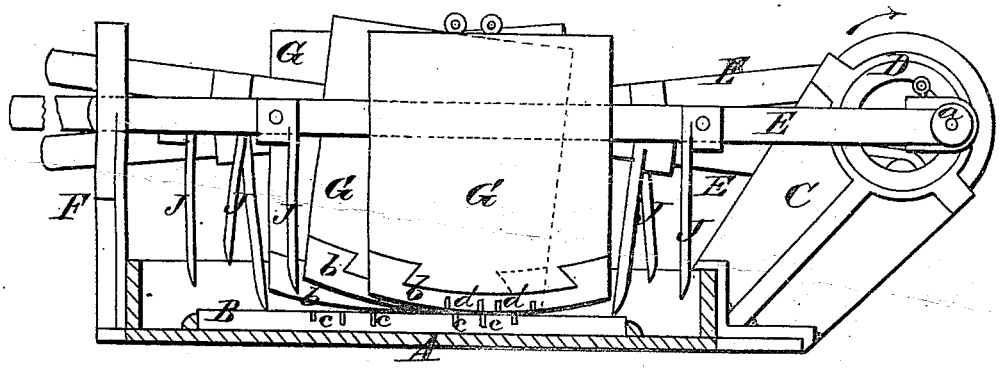

Fig. 2.

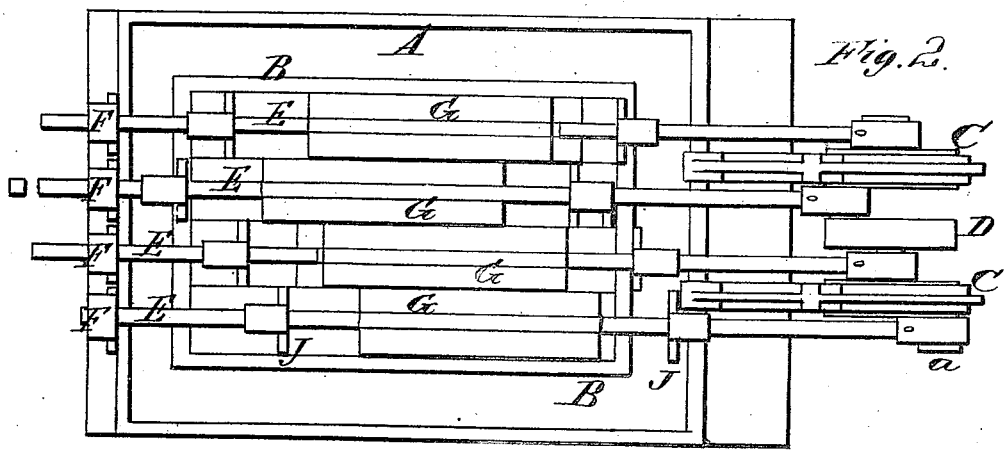

Fig. 3.

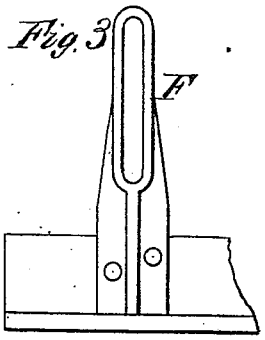

Fig. 4.

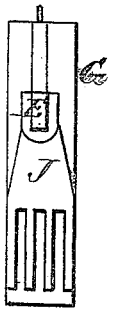

Fig. 5.

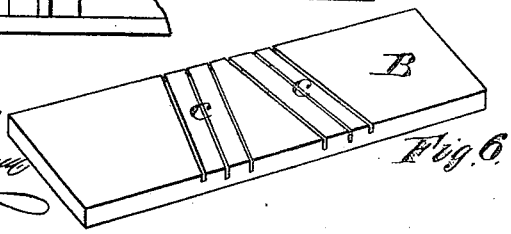

Fig. 6.

WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE E. NOYES, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN ORE-CRUSHERS.

Specification forming part of Letters Patent No. **162,301**, dated April 20, 1875; application filed March 13, 1875.

To all whom it may concern:

Be it known that I, GEORGE E. NOYES, of Washington, in the District of Columbia, have invented a new and valuable Improvement in Crushing and Pulverizing Mills; 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 annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side view, part sectional, of my device. Fig. 2 is a plan view of same; and Figs. 3, 4, 5, and 6 are detail views of the same.

This invention has relation to machinery which is designed for finely pulverizing ores and other substances; and the nature of my invention consists, mainly, in one or a number of crushing and pulverizing heads, to which are given a rectilinear reciprocating motion, and at the same time a rocking motion, the treads or bottoms of which heads being rounded and working over a flat bed, which is applied in a tank, as will be hereinafter explained.

My invention also consists in the employment of rakes or feeders at the ends of one or more of the crushing and pulverizing heads, for the purpose of feeding the material to be crushed upon the ends of the beds, as will be hereinafter explained.

Finally, my invention consists in providing the bed or bottom of the tank, and also the bottoms of the pulverizing-heads, with grooves, for the purpose of feeding the material laterally across the bed, the grooves in the latter converging toward the point of discharge, and the grooves in the heads diverging toward this point, as will be better understood from the following description.

In the annexed drawings, A designates a rectangular tank, of any suitable capacity, having a raised bed, B, composed of chilled-metal plates, which are grooved obliquely, as will be hereinafter further explained. C C designate standard-bearings in which rotate rings D D, having wrist-pins *a a* eccentric to their axles. Between the rings D D is another ring, D′, also provided with wrist-pins, which connect the three rings together, so that motion imparted to the intermediate ring will be transmitted to the two outside rings. These rings communicate crank motions to four rods, E, and the wrist-pins are arranged on quarter-circles, so that the rods E receive alternate reciprocating motions. F F are standards rising from the opposite end of the tank A, and having vertical slots in them, through which slots the rods E play freely, and are thus guided. At suitable points on the rods E are secured my improved crushing and pulverizing heads G. These heads are constructed with removable convex bottoms *b*, formed with chilled wearing-surfaces; and, if desirable, the heads may be cast hollow and afterward filled with lead, to give them the required weight. Any desired degree of curve may be given to the bottoms of the rocking heads; but, in practice, such curve will be made with reference to the strokes of the cranks, so that the entire bottom surfaces of the heads will operate to crush and pulverize during the strokes. In practice I shall employ rakes J J, for the purpose of moving the material upon the end of the bed B at each stroke of the head under which the material is first fed. These rakes I secure on the rod E of such head, a suitable distance from the ends thereof. The grooves *c* in the upper face of the bed B converge toward the point of discharge for the pulverized material, and the grooves *d* in the bottoms of the heads G diverge toward said point. The effect of these grooves is to feed the material by a shearing action from one head to another. In practice I find that it is only necessary to groove the first head and that part of the bed B which is directly beneath it.

It will be seen from the above description that the heads G, which are made very heavy, receive a rectilinear reciprocating motion over the bed B, and they also receive a rocking motion, which latter motion will cause the ore to be fed under them at the ends of their strokes, and at the same time to be crushed by them. The right-line motion combined with the rocking motion of the heads causes the ore to be finely pulverized. In lieu of the use of rings and eccentrically-arranged wrist pins for imparting a rectilinear reciprocating and rocking motion to the crush

ing-heads, as described, cams, or other equivalent mechanism, may be employed for the purpose, as I do not desire to limit my invention to the particular means described for imparting such motions to the crushing and pulverizing heads.

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

1. The rings D, provided with wrist-pins *a* eccentric to their axes, in combination with the rods E, slotted standards F, and crushing-heads G, whereby a rectilinear reciprocating, and also a rocking-motion is given to the heads, substantially as described, and for the purpose set forth.

2. Rakes or feeders J, combined with one or more rocking and rectilinear reciprocating crushing-heads, G, substantially as described.

3. The heads G and beds B, provided with the grooves *c d*, arranged obliquely, substantially as described.

4. A self-feeding crushing-head, G, whose base has the form of a segment of a cylinder, said head having a rectilinear reciprocating motion, and at the same time a rocking motion, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

GEORGE E. NOYES.

Witnesses:
JOHN B. CORLISS,
GEORGE E. UPHAM.