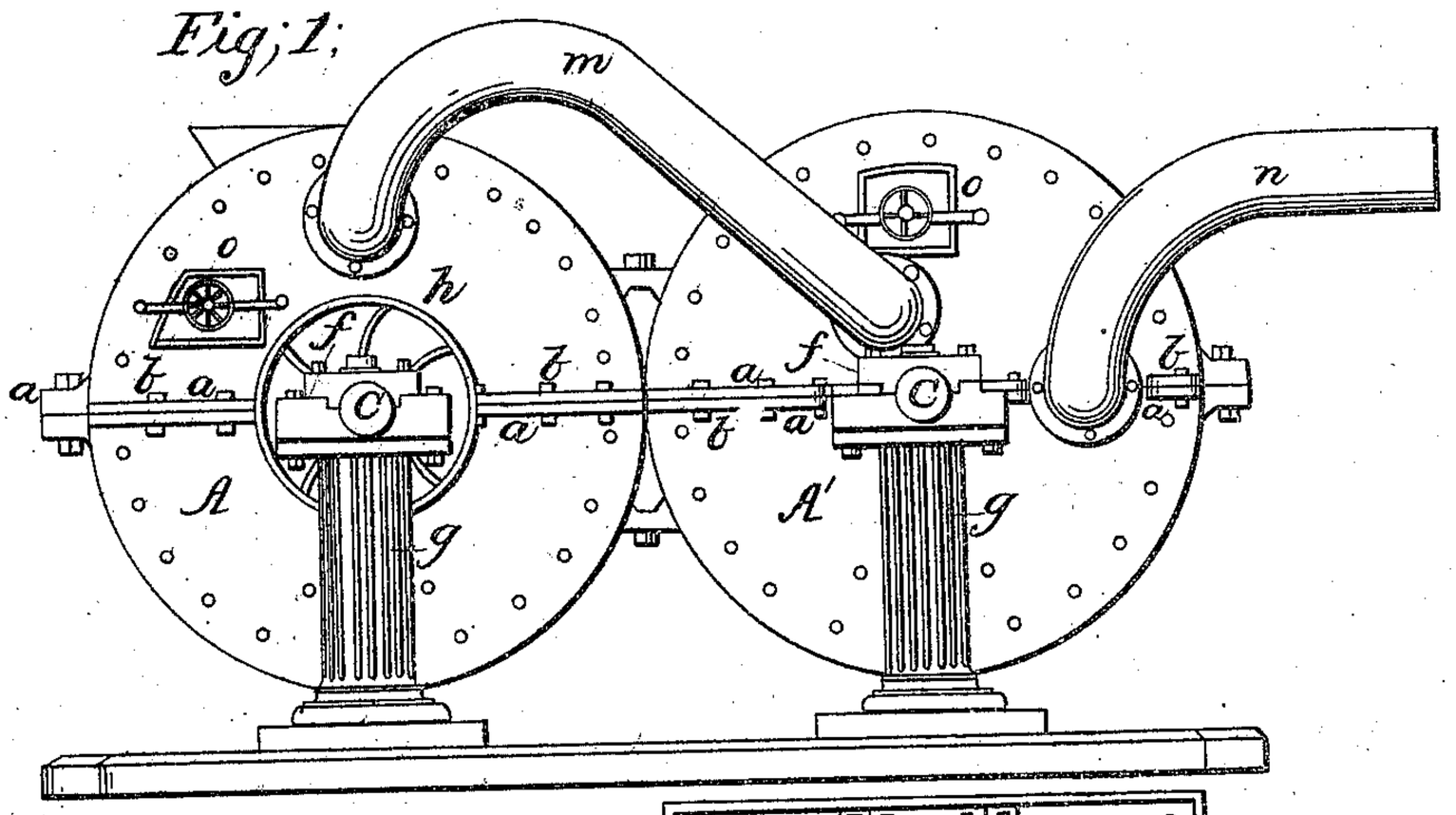
V. B. Ryerson. Sheet. 1. 2 Sheets.

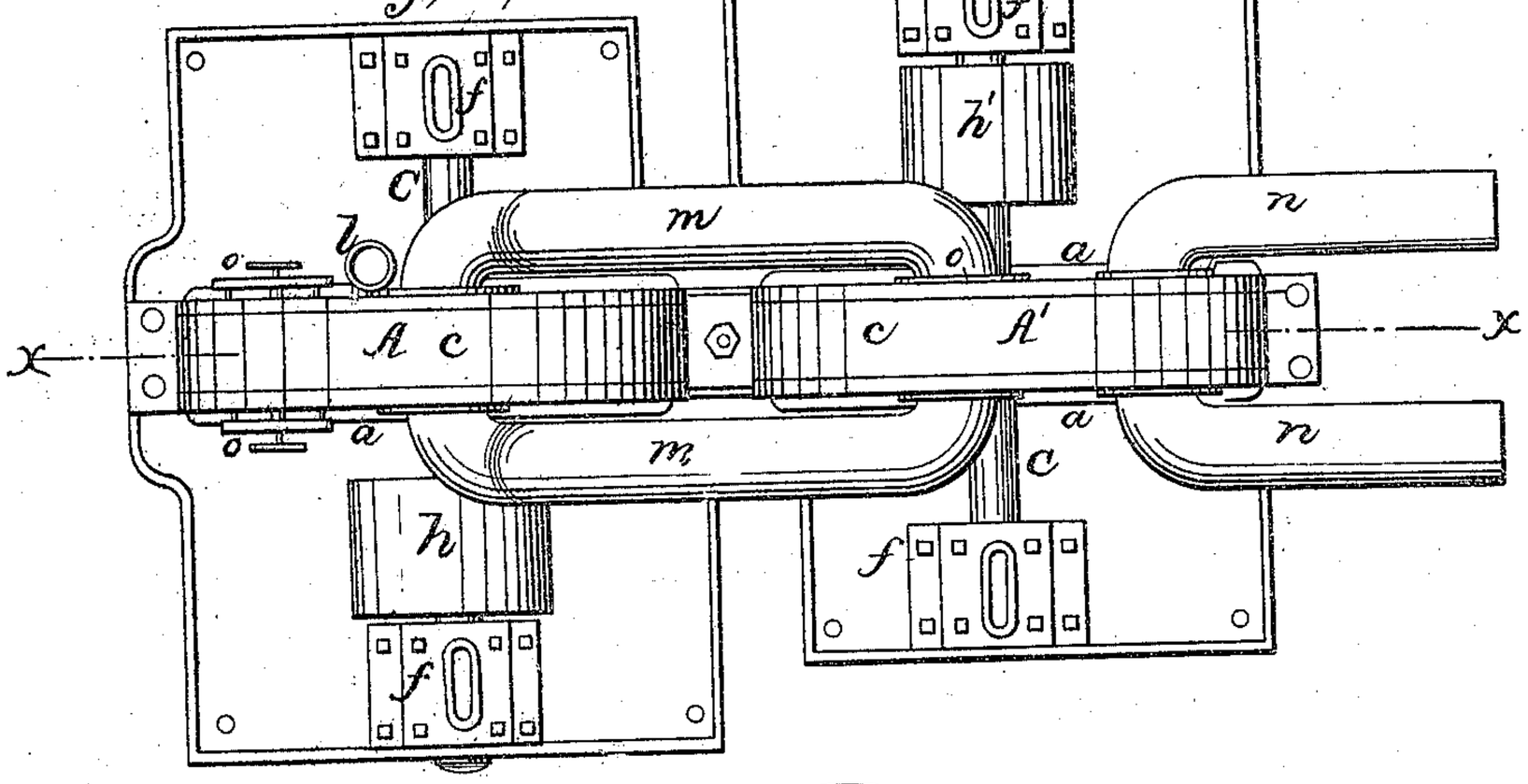
Ore Crusher.

No. 97,445. Patented Nov. 30, 1869.

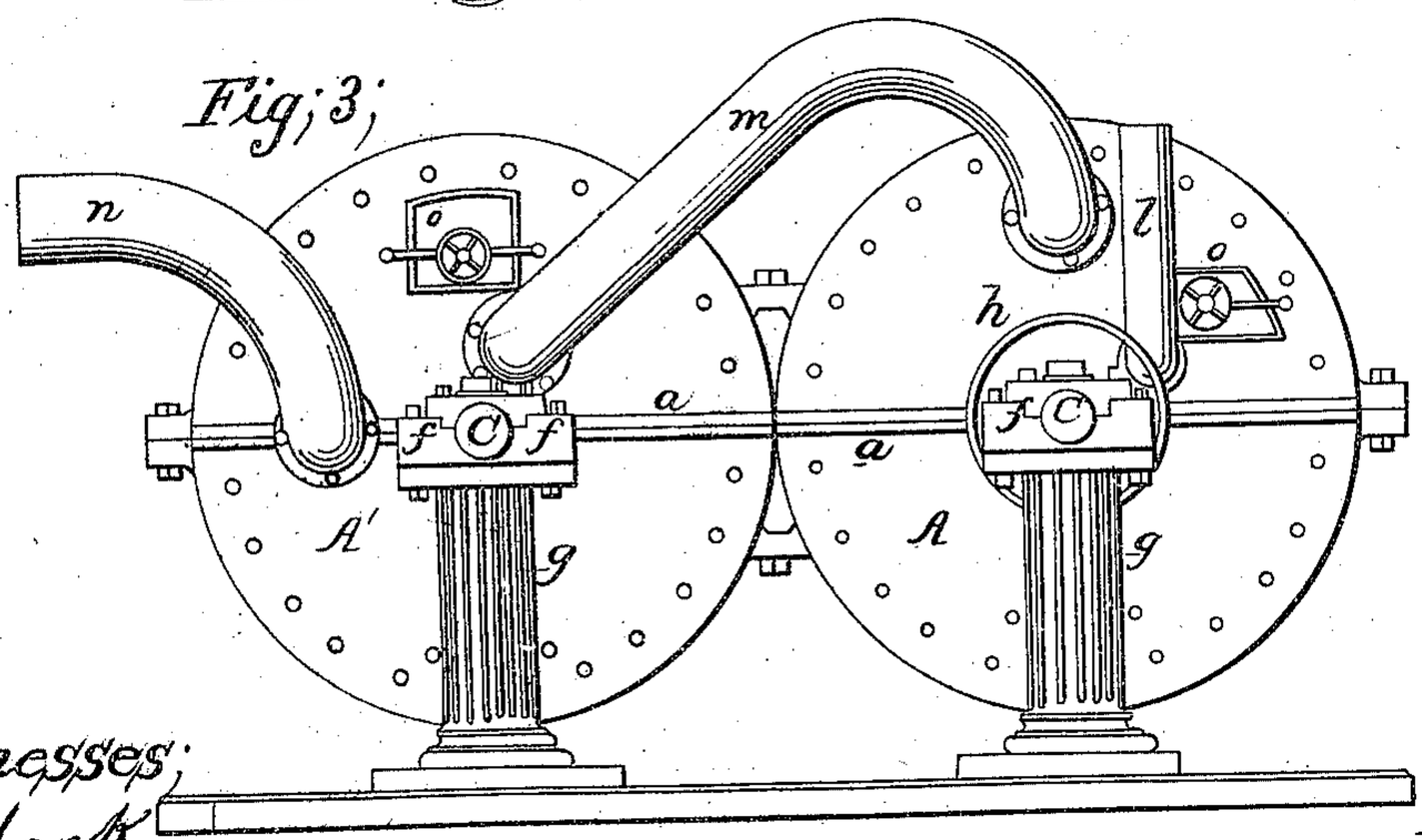
Fig; 1;



Fig; 2;



Fig; 3;



Witnesses;
E. Mack
Andrew J. DeLacy

Inventor;
V. B. Ryerson

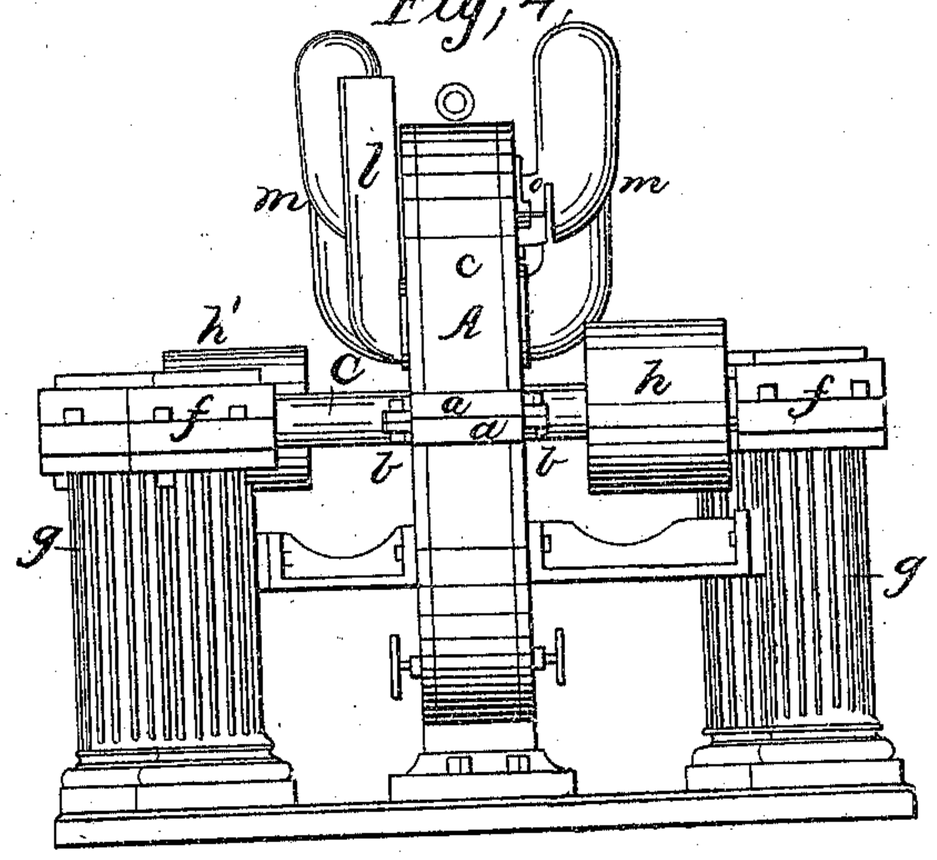
Sheet 2. 2 Sheets

V. B. Ryerson.

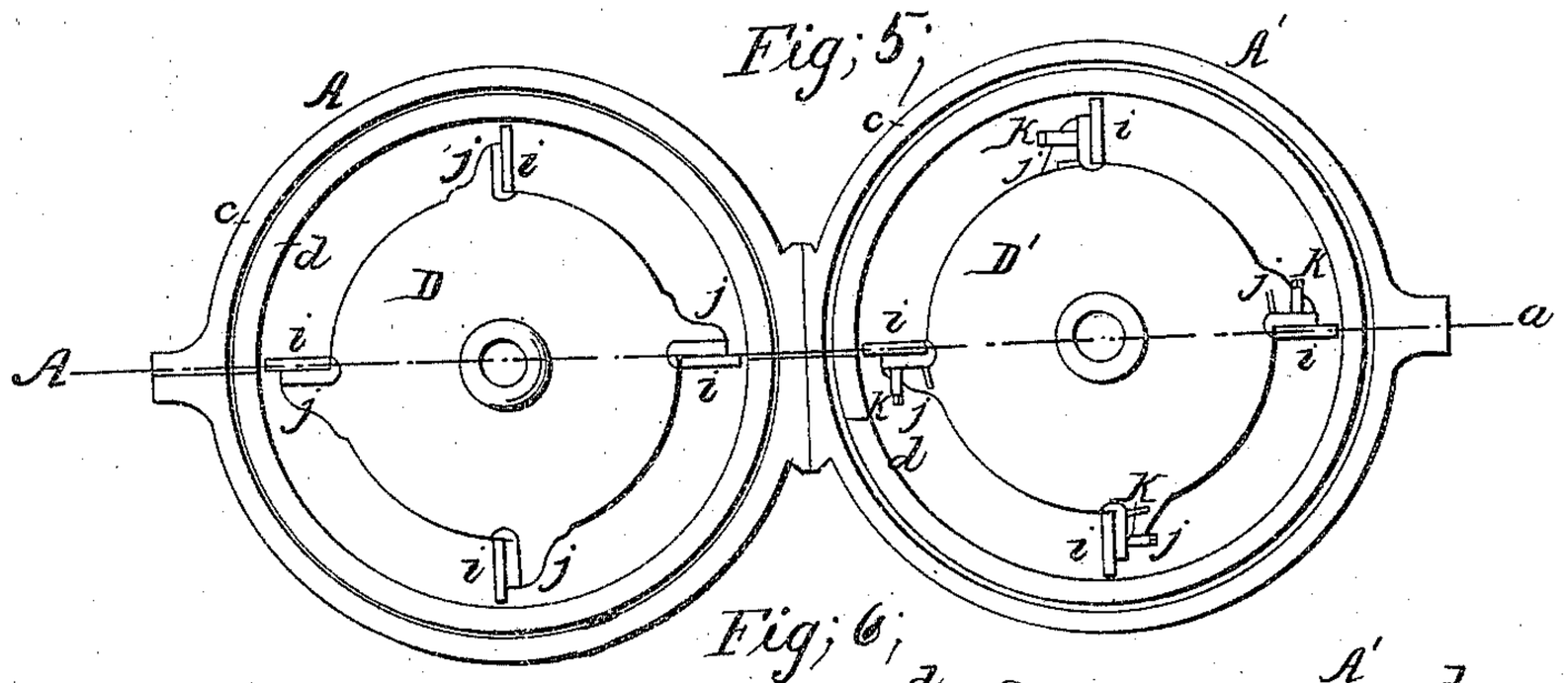
Ore Crusher.

No. 97,445. Patented Nov. 30, 1869.

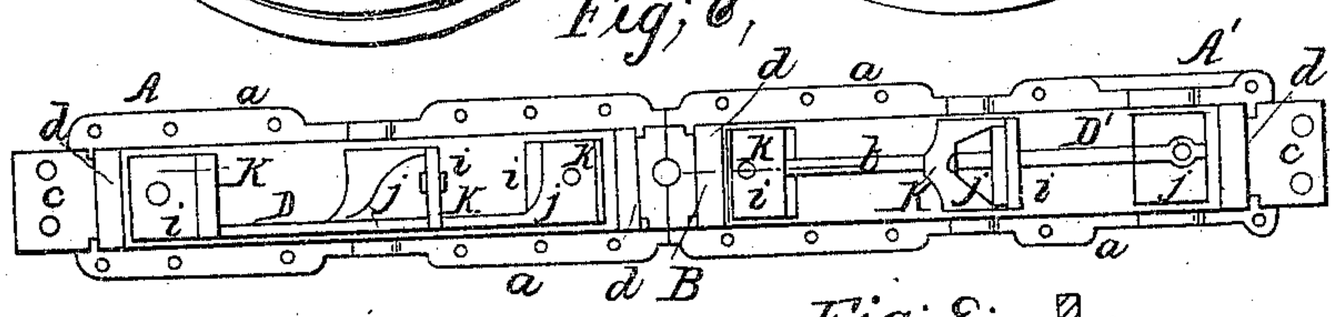
Fig; 4;



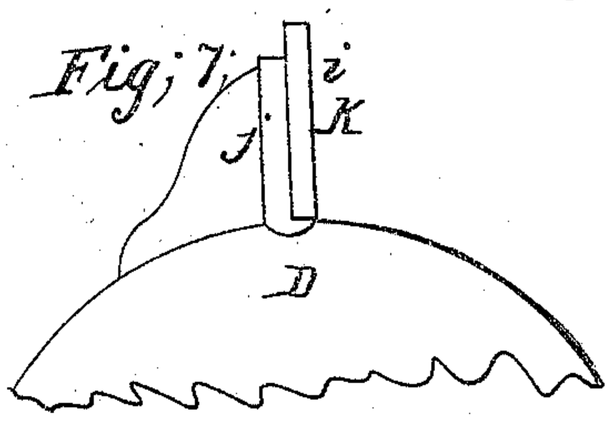
Fig; 5;



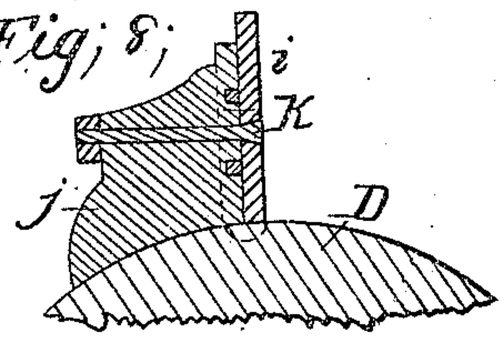
Fig; 6;



Fig; 7;



Fig; 8;



Witnesses;
E. Mack
Andrew J. Dodge.

Inventor;
V. B. Ryerson

UNITED STATES PATENT OFFICE.

VAN BUREN RYERSON, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR PULVERIZING ORES AND ROCK.

Specification forming part of Letters Patent No. **97,445**, dated November 30, 1869.

To all whom it may concern:

Be it known that I, VAN BUREN RYERSON, of the city and county of New York, in the State of New York, have invented certain new and useful Improvements in Machinery for Pulverizing Ores, or Rock Containing Ores; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation; Fig. 2, a top view; Fig. 3, an elevation of the side opposite to the one represented in Fig. 1; Fig. 4, an end elevation; Fig. 5, a longitudinal section, taken in the vertical plane of the line X *x* of Fig. 2; Fig. 6, another longitudinal section, taken in the horizontal plane of the line A *a* of Fig. 5; Fig. 7, an enlarged view of one of the beaters, and Fig. 8 a section of the same on the same scale, taken in the vertical plane of the line B *b* of Fig. 6.

The same letters indicate like parts in all the figures.

In the accompanying drawings, A and A′ represent two circular cases, whose inner peripheries are cylindrical, and sides parallel, and placed by preference one forward of the other, and firmly connected with each other and to a suitable bed-plate. I prefer to make each case in two parts, coming together in a horizontal plane of the axis, and provided with flanges *a a*, so that the two parts can be firmly connected by bolts *b*. Within the rim *c* of each of the said cases is firmly secured an inner rim, *d*, made in two parts like the case. These inner rims, there being one for each case, I prefer to make of chilled cast-iron, the better to resist the abrasion of the material to be operated on, and this inner rim should be secured to the outer case by means of screws, so that it can be taken out and renewed when worn. The cases have each a concentric shaft, C, extending through and having their bearings in suitable boxes *f f*, mounted on standards *g g*. And the two shafts are provided with pulleys *h h′*, to receive belts from some suitable motor to drive them at high velocities, preferring to drive the shaft C′ at about one-third greater velocity than the first one C. Each shaft carries a wheel, D D′, from the periphery of which project four radial beaters *i*, the edges of which just clear the sides of the case and the inner periphery of the inner rim *d*. Each wheel is a disk, and the one D is located in the case A, and at that side of it farthest from the feeding-tube, so as to leave ample room for the passage of the ore or rock, but it should not be placed so near the side opposite to the feeding-tube as to rub against it. And on the periphery of this disk, and projecting from one side, are four projections or flanges, *j*, to the faces of which are secured, by bolts *k*, plates *i*, which are the beaters. And, in the case A′, the wheel D′ is a disk like the other, but placed in the middle of the case, so as to leave a passage on each side for the passage of the partially-broken ore or rock which enters into the case on both sides from the case A. The projections or flanges *j* on this wheel, to which the beaters *i* are bolted, project on each side of the wheel. The plates *i*, or faces of the beaters, I prefer to make of chilled cast-iron. The case A is provided with a feeding-spout, *l*, which communicates with the inside of the case at a short distance from the shaft, and the lumps of ore or rock to be operated upon are fed in through this tube, which, for convenience, may be surmounted by a suitable hopper. And the inside of the case A, near the inner periphery, communicates with the inside of the other case A′, near the shaft, by means of two pipes *m m*, one on each side. The apertures leading into these pipes must be near the top of the case A, and the pipes be curved upward, so that the particles of partially-broken ore or rock may be carried into the pipes by momentum as well as by the pressure of the air induced by the rotation of the beaters. And the case A′ is provided near the inner periphery with two discharge-pipes *n n*, one on each side, and the apertures for the said discharges must be made through the sides of the said case at or about the level of the axis of the shaft, and they must be curved upward as represented in the drawings, so that some portion of their length shall be about on a level with the upper part of the case, so that the discharge shall be effected only by the pressure of the air, to prevent any escape of the ore or rock before being thoroughly pulverized. The ore or lumps of rock are reduced in the first case A by the beaters, and when partially reduced are gradually carried toward and out through

the two pipes *m m* by centrifugal force, and the pressure of the air induced by centrifugal force, aided by the exhaust induced near the shaft in the case A′ by the rotation of the beaters within the case A′; and when the material so partially reduced enters the case A′, it is forced toward and against the inner periphery of the case, and there reduced to a fine powder, which is forced out through the discharge-pipes by the pressure of the air. For the convenience of repairs, the sides of the cases are provided with man-holes and covers O.

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

1. The combination of the two cases with their rotating beaters by means of connecting-pipes from or near the center of the first, and delivering to the second between the center and the periphery, substantially as described, the first case being provided with a feeding-tube, and the last with discharge-pipes, when all these parts are constructed and arranged as described.

2. The arrangement of the two beater-wheels D D′ in combination with the arrangement of the feeding-tube *l* and the two pipes *m m* for the passage of the material from the inside of the first to the inside of the second case, when constructed and arranged substantially as shown, and for the purpose specified.

3. Making the faces of the beaters each of a separate plate, secured by a bolt or equivalent means to projecting flanges on the rotating disks D D′, when constructed and arranged substantially as described, so that they can be readily replaced when worn.

V. B. RYERSON.

Witnesses:

ANDREW DE LACY,

E. MACK.