A. W. HALL.

Ore Crusher.

No. 50,467. Patented Oct. 17, 1865.

Fig. 1

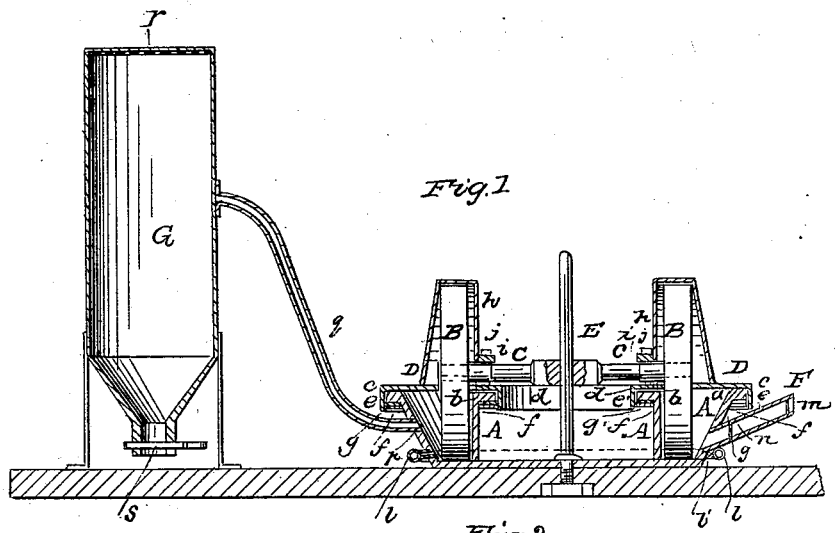


Fig. 2

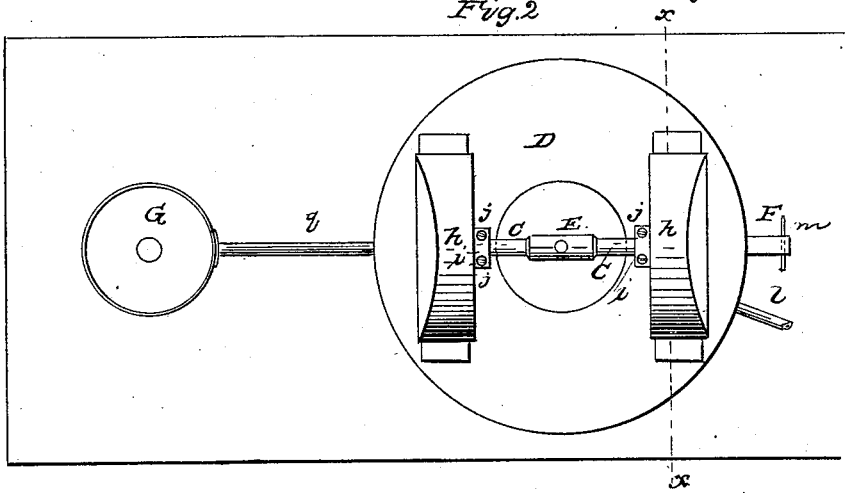
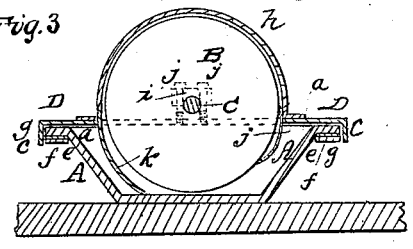


Fig. 3



WITNESSES

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ALEXANDER W. HALL, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR CRUSHING ORE.

Specification forming part of Letters Patent No. **50,467**, dated October 17, 1865; antedated October 1, 1865.

To all whom it may concern:

Be it known that I, ALEXR. W. HALL, of the city, county, and State of New York, have invented certain new and useful Improvements in Machinery for Crushing and Pulverizing Ores and other Substances; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central vertical section of the machine. Fig. 2 is a plan of the same. Fig. 3 is a vertical section in the plane indicated by the line *x x* in Fig. 2.

Similar letters of reference indicate corresponding parts in the several figures.

The leading feature of this invention consists in covering the crushing and pulverizing wheels of a machine for crushing and pulverizing ore or other material and the pan or mortar in which they operate with an air-tight or nearly air-tight cover, forming, with the pan or mortar, an air-tight or nearly air-tight chamber, into which a blast of air is forced through one or more openings among the ore or other material which is being crushed, for carrying off the finely-pulverized articles through one or more outlets to a suitable receiver.

To enable others to make and use my invention, I will proceed to describe it with reference to the drawings.

A is the annular pan, within which the crushing-wheels B B revolve, having an outwardly-projecting flange, *a*, around its outer margin, and an inwardly-projecting flange, *b*, around its inner margin.

D is the air-tight cover, of annular form corresponding with the pan, its outer rim, *c*, covering the outer flange, *a*, of the pan, and its inner rim, *d*, covering the inner flange, *b*, thereof.

e is a packing-ring, of india-rubber or other compressible material, secured to the under side of the flange *a* by means of a metal ring, *f*, and screws *g g*; and *e'* is a similar packing-ring, secured to the under side of the flange *b* by means of a metal ring, *f'*, and screws *g' g'*. The rings *e e'* and *f f'* may be placed above instead of below the flanges. By screwing up the screws *g g* and *g' g'* the rings *f f'* are made to press the packing-rings *e e'* outward against the rims *c* and *d* of the cover, and form between the cover and the pan an air-tight joint, which permits the revolution of the cover with the crushing-wheels, and also permits the cover to rise and fall with the said wheel without breakage.

Apertures are provided in the cover for the crushing-wheels, and these apertures are covered by air-tight hoods *h h*, which inclose the upper parts of the crushing-wheels, and may be considered as parts of the air-tight cover.

The crushing-wheels are fitted to turn loosely upon an axle or axles, C, which are radial to the central shaft, E, of the machine, and which may be driven in any suitable manner to produce the revolution of the wheels in the pan.

The cover D is supported upon the axle or axles C by means of saddles *i i*, which rest upon the axle or axles, and from which the cover is suspended by means of screws *j j*, of which there are two to each saddle, one on each side of the shaft, as shown in Fig. 3, the said screws passing freely through holes in the saddles and being screwed into tapped holes in the cover, and their heads resting on the tops of the saddles. This mode of suspending the cover permits it to rise and fall with the wheels as they pass over the lumps of ore or other material which is being crushed, and the screws provide for the raising up of the cover to keep it out of contact with the top of the pan when the wheels sink down, owing to their own wear and the wear of the bottom of the pan.

The openings provided in the hoods *h h* for the passage of the axles must be vertically elongated to provide for the vertical adjustment of the pan by means of the saddles and screws, and these openings should be covered with a suitable air-tight packing which fits around the axles.

Attached to the cover D there are two scrapers, *j*, Fig. 3, one applied in contact with the front part of the periphery of each of the crushing-wheels, to scrape off the pulverized ore which might pack and accumulate on the periphery of the wheel and interfere with its operation. Two other scrapers, *k*, are also attached to the cover, one behind each of the crushing-rollers and working in contact or nearly so with the bottom of the pan, for the

purpose of scraping up the pulverized material which might pack thereon, and of constantly stirring up the ore to enable the fine particles to be carried off by the blast.

F is the hopper or feeding-spout, through which the ore is supplied to the pan. This hopper or spout is furnished with two air-tight slides or shutters, *m* and *n*, only one of which is opened at a time. The charge is first introduced through the outer slide, *m*, by opening the said slide while the inner one, *n*, is closed, and the outer slide is then closed before the inner one is opened to permit the charge to descend by gravitation into the pan. In this way the charges can be introduced while the machine is in operation without permitting any of the pulverized ore to be blown out by the pressure of air within.

l is the blast-pipe encircling the pan, and provided with branch pipes *l'*, which connect with and admit the blast of air to the pan at several points near the bottom thereof and below the surface of the ore or other material to be crushed. The blast of air may be supplied by a rotary fan or other blowing apparatus.

In the upper part of the pan, above the level to which the ore or other material to be crushed is supplied, there is an outlet, *p*, Fig. 1, connected by a pipe, *q*, with a high upright receiver, G, about midway between the top and bottom thereof. This receiver is covered at the top with a bolting-cloth, *r*, or finely-reticulated diaphragm, through which the air escapes, but its capacity is so much greater than that of the chamber formed within the pan by the air-tight cover as to allow the finely-pulverized material to subside to the bottom while the air passes upward, and only carries out with it such fine dust as contains no metallic particles.

As the crushing and pulverizing operations proceed in this machine the finely-pulverized particles are blown out through the outlet *p* by the pressure of the air received within the pan through the pipes *l l'*, leaving the lumps and larger particles to be crushed and pulverized by the operation of the wheels B B. The pulverized particles thus blown out are collected in the bottom of the receiver G, whence on the stoppage of the blast they may be drawn off by opening a slide, *s*, at the bottom.

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

Inclosing the crushing-wheels of a machine for crushing and pulverizing ore or other materials by an air-tight cover so combined with the pan in which the said wheels work as to form therewith an air-tight chamber in which the crushed or pulverized material is subjected to the action of a blast or blasts of air, substantially as herein specified.

A. W. HALL.

Witnesses:
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G. W. REED.