

J. J. HAYES.
Attrition-Mill.

No. 214,295.

Patented April 15, 1879.

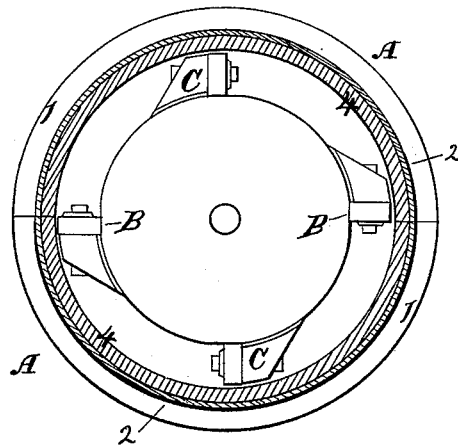


Fig. 1.

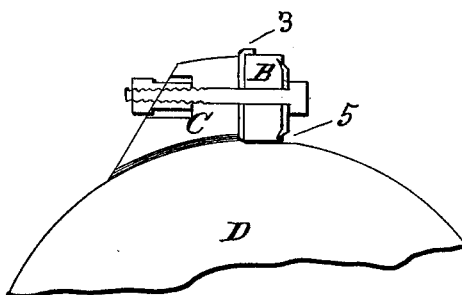


Fig. 2.

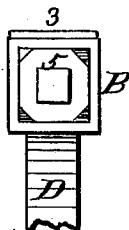


Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

JOHN J. HAYES, OF GREEN POINT, NEW YORK.

IMPROVEMENT IN ATTRITION-MILLS.

Specification forming part of Letters Patent No. **214,295**, dated April 15, 1879; application filed August 5, 1878.

To all whom it may concern:

Be it known that I, JOHN J. HAYES, of Green Point, in the county of Kings and State of New York, have invented certain Improvements in Attrition-Mills, whereof the following is a specification.

This invention relates to machines for pulverizing quartz, minerals, and metallic ores, wherein a number of revolving beaters act upon the material when fed thereto in a suitable case, the comminution being effected by the attrition of the pieces or particles upon each other.

The improvements consist, essentially, of a new beater and means of securing the same in the machine, and these combined with a case having a lining of hard or hardened metal.

In the annexed drawings, Figure 1 shows the beaters as affixed to the usual projections or holders upon the periphery of a revolving disk within its case. Fig. 2 is a side view of one of the beaters, enlarged, showing means for securing the beater in place. Fig. 3 is a face view of parts shown in Fig. 2.

A represents a circular case of the usual form and construction in this class of mills. B B are the beaters, which are made of india-rubber or other elastic material. C C are projections on the periphery of a disk, D, to which the beaters are made fast. The disk D is caused to revolve within the case A by any suitable power at very high speed, usually about twenty-five hundred to three thousand revolutions per minute.

The body of the disk is thinner and smaller than the interior of the case; but the projections C, for carrying the beaters, are broad and high enough nearly to touch the inner surfaces of the case, reaching in a full-sized machine to within, say, one inch from the side surfaces, and half an inch from the lining 4 on the inner periphery thereof.

Hitherto it has been the practice to use beaters of very hard or hardened metal. That, however, fails to answer the purpose, the beaters wearing away so much in a few days' use, particularly at the outer corners or edges thereof, as to render the beaters worthless and necessitate their renewal.

After a long series of costly experiments I

have ascertained that an elastic substance will not so wear away.

My improved beater is, therefore, made of elastic or pliable material, for which I have found india-rubber to answer best, preferring vulcanized rubber, but in a nearly pure state. It consists of a section of the elastic material of about one inch in thickness and about the dimensions otherwise of the projections C on the disk D. Such beaters I secure by any competent means to the said disk D, placing one in front of each of the projections C, which are for the purpose of carrying the beaters around.

The means shown in the drawings for securing the beaters consist of metallic surfaces, between which the beater is placed—that is to say, plates 3 5—through which and the beaters is passed a bolt, which enters the projection C, and is held by a nut at the back. The plate 3 behind each beater rests against and may be esteemed part of the said carrier or projection. It has a lip turned up at its outer edge to sustain the outer edge of the beater and prevent its extension outwardly by centrifugal force; and such plate or surface also sustains or supports the side edges of the beater and enables it to successfully resist the impact of the material being operated upon against the beater as the latter is revolved. The beater may be vulcanized directly on or otherwise secured to the said plate.

The plate 5 in front of each beater is made of smaller dimensions than the beater, so as to expose the surface of the beater for operation upon the material being pulverized, and has points or claws on its under surface—made in this instance by bending down the corners of the plate—which claws hold the beater against the drawing action of the pieces of material in process of comminution as the beaters pass them during the rapid revolution of the latter within the case.

In this mode of securing the beaters the central portion thereof acts as a cushion to the plates 5 and bolt-heads, permitting them to yield, and so enhancing their durability.

It is, however, possible to dispense with the plates 5 and substitute india-rubber, and the faces of the projections C may be shaped like

the plates 3, and thus made to serve the purpose of a backing or support to the elastic beaters.

To obtain the highest efficiency of my improved yielding beater, I prefer to use a lining, 4, cast from a very hard or hardened metal; and for such metal I have found melted tinscrap—*i. e.*, tinsmiths' cuttings—to answer the purpose best; but I have also used franklinite and other metals. The hard lining may also be applied to the sides of the interior of the case.

In practicing the foregoing invention the details may be variously modified, while preserving the essential characteristics thereof.

I claim as my invention—

1. In attrition-mills, the elastic or yielding beaters A, in combination with and sustained upon an unyielding plate, 3, or equivalent supporting-surface.

2. In attrition-mills, the combination, with

the revolving disk D, of elastic or yielding beaters A, and means of securing such beaters to the projections or carriers C of such disk.

3. In attrition-mills, a beater or beaters composed of india-rubber or other elastic material embraced between metallic surfaces, which leave a marginal face of the elastic substance exposed.

4. The combination, with beaters A of elastic material, of the plates 3 and 5 on both sides of the body A of the beaters, and the whole secured to the revolving disk by fastening-bolts passing through the beaters and plates and into the projections C, as set forth.

5. The lining for the inner surface of the case A, consisting of hard or hardened metal, in combination with elastic or yielding beaters.

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Witnesses:

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