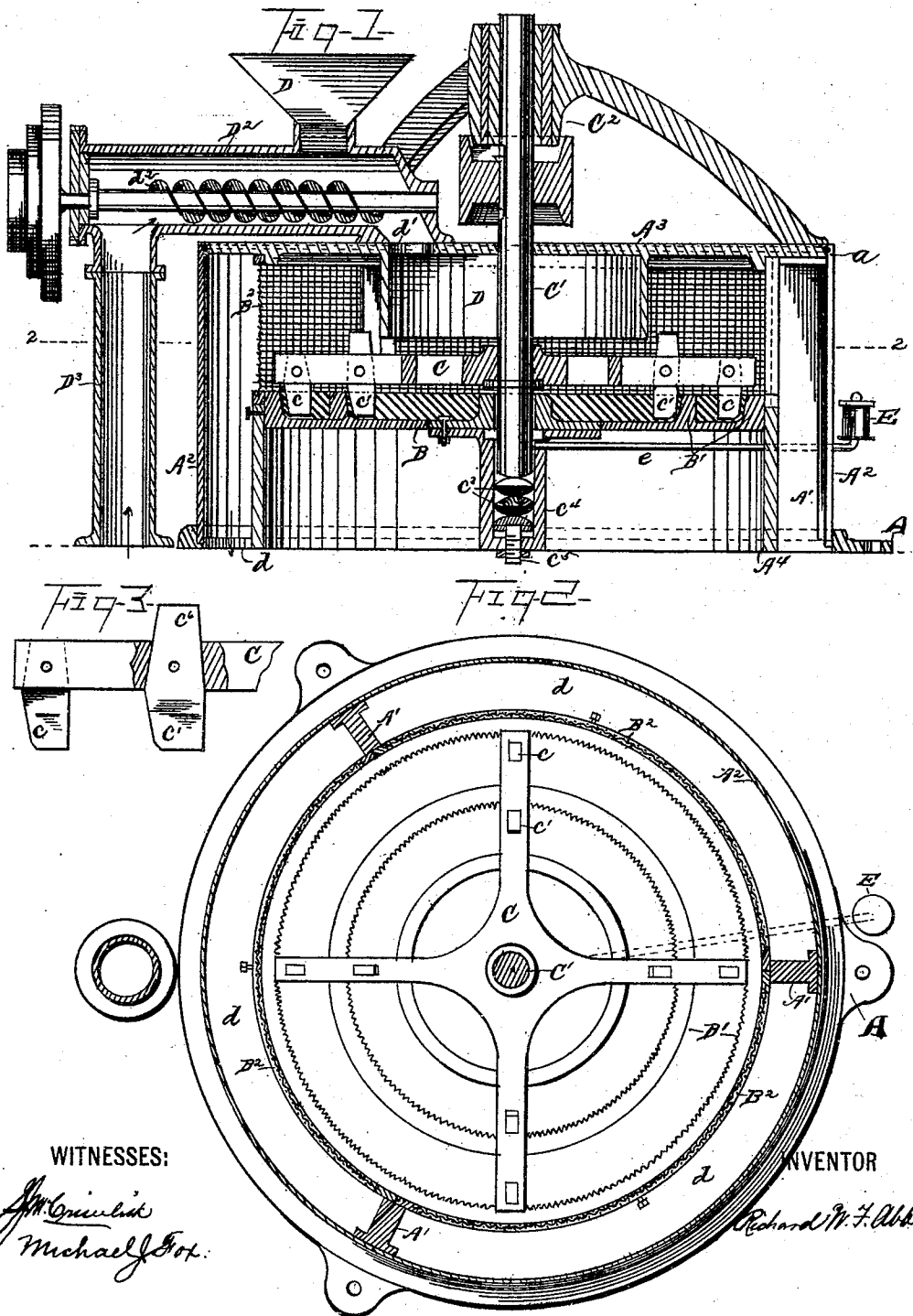


(No Model.)

R. W. F. ABBÉ.
GRINDING MILL.

No. 496,677.

Patented May 2, 1893.



WITNESSES:

Michael Fox
Michael Fox

INVENTOR

Richard W. F. Abbe

UNITED STATES PATENT OFFICE.

RICHARD W. F. ABBÉ, OF BROOKLYN, NEW YORK.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 496,677, dated May 2, 1893.

Application filed January 29, 1892. Serial No. 419,718. (No model.)

To all whom it may concern:

Be it known that I, RICHARD W. F. ABBÉ, of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Grinding-Mills, of which the following is a specification.

This invention relates to grinding or reducing mills in which material may be reduced to a powder of any desired fineness and it consists in the construction and novel arrangement of parts as hereinafter set forth.

In the accompanying drawings Figure 1, is a vertical section of a grinding mill embodying my improvement. Fig. 2, is a horizontal section on the plane of the line 2—2 of Fig. 1. Fig. 3, is an enlarged detail.

Referring by letter to the drawings, A designates a base plate or ring having standards A' extending upward therefrom and to which the outer shell or casing A² is secured preferably by screws. The outer shell or casing as here shown, consists of three segments or sections having the ends secured to the standards.

A³ designates the top plate secured to and supported by the outer shell A² and preferably the top plate has a peripheral groove formed in it in which a rubber gasket *a* is seated so as to insure a tight joint between the top plate and outer shell and prevent the escape of fine powdered material through the joint.

A⁴ is an inner shell or casing having a space between it and the outer shell or casing. This inner shell or casing is shorter vertically than the outer shell or casing and supports a ring shaped plate B upon which two concentric grinding rings B' are formed integral. The inner surfaces of these grinding rings are corrugated as shown. An annular screen B² is supported on the upper edge of the inner shell A⁴ and extends upward to the top plate A³ which on its under side is provided with an annular shoulder against which the upper portion of the screen bears. This screen is preferably made in segmental sections, as clearly shown in Fig. 2, so that a screen can be removed when it is desired to replace it with a screen of finer or coarser mesh to adapt the machine for pulverizing material to the required fineness without bolting.

C designates a carrier for the beaters *c*, *c'*. This carrier consists, as here shown, of four

arms radiating from and secured to a vertical shaft C', which at its upper end is supported in a bearing *c*² and at its lower end is supported on a ball bearing *c*³ arranged within a cup *c*⁴. The ball bearing *c*³ is preferably of iron and hard wood. That is the upper and lower ones are of lignum-vitæ and the central one of steel; an adjusting screw *c*⁵ extends through the bottom of the cup *c*⁴ into a recess formed in the lower side of the lower ball bearing *c*³. By means of this screw vertical adjustment may be made to compensate for the wear of the shaft or bearing balls. By arranging the metal bearing ball between the wooden ones the frictional heat is very much reduced. The upper portion of the shaft C' is provided with a band wheel by means of which power may be applied.

The beaters *c*, *c'*, are designed to rotate close to the grinding rings B'. The beaters are preferably secured to the arms of the carrier C by having their upper portions slightly wedge-shaped and driven tightly into the vertical holes in the arms as shown in Fig. 3, as when the machine is in operation, there is an upward tendency of the beaters, the construction shown will serve to keep the beaters tight, and only one rivet need be used for each beater. One set of beaters, here shown as the inner set, are extended above the carrier C as at *c*⁶. These extended upper ends serve as fans to force material, sufficiently pulverized, through the screen. A feeder ring D extends downward from the top plate A³ within the machine. This ring serves to direct material to the center of the carrier C within the inner line of beaters. The material is carried to the beaters and grinding rings by centrifugal motion. As the material is ground sufficiently fine it is forced out through the screen and falls through openings *d*, at the lower end of the walls A² A⁴ into receptacle or bin upon which the machine is supported.

Material is fed to the machine through a hopper D' which opens into a horizontal chamber D² arranged at the top of the machine as shown. A hole *d'* in the top plate A³ communicates with the chamber D², and a conveyor in the form of a worm *d*² supported on a rotary shaft within the chamber D² serves to carry material to the hole *d'*. The conveyor *d*² extends nearly the whole length of

the chamber D² so as to gather up material that may be forced to the rear portion of the chamber as it is forced from the hopper.

In machines of this character the rapid rotation of the carrier and beaters draws a considerable amount of air through the hopper into the machine and discharges it again through the screen into the receptacle beneath the machine. I provide means for relieving the receptacle of an air pressure and at the same time maintain a circulation of the air from the machine to the receptacle and out of the receptacle back into the machine. For this purpose I employ the air outlet pipe D³ which at its lower end communicates with the interior of the receptacle placed beneath the machine and at the upper end communicates with the chamber D².

An oil cup E has a pipe e leading to the interior of the cup c⁴ and serves to keep the bearing supplied with lubricant. The oil cup is preferably of glass.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pulverizer the combination with the inner and outer shells of the rotary beaters, the two concentric grinding rings, and the annular screen made in removable sections and extending from the top of the inner shell to the top plate of the pulverizer, substantially as specified.

2. In a pulverizer the combination with the shell or casing, of the annular screen, the two concentric grinding rings, a vertical shaft, a

carrier rotated by said shaft and beaters on the carriers, certain of said beaters having a portion extending above the carrier serving as fans, substantially as specified.

3. In combination with the vertical shaft and the bearing cup of the bearing balls in said cup, alternately of wood and metal and a screw for vertically adjusting said bearing balls, substantially as specified.

4. In a pulverizer the combination with the inner and outer shells having an outlet at the bottom, the screen, the grinding rings and rotary beaters, of an air pipe communicating at one end with the interior of the pulverizer and constructed to communicate at the other end with a receptacle placed below the pulverizer for receiving pulverized material, substantially as specified.

5. In a pulverizer the combination of the shells, the annular screen supported by the inner shell, the concentric pulverizing rings, the rotary beaters, the hopper communicating with a chamber at the top of the pulverizer, a worm conveyer in said chamber, the said chamber having communication with the interior of the pulverizer, and the air pipe, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RICHARD W. F. ABBÉ.

Witnesses:

S. J. McCrimlisk,
MICHAEL J. Fox.