Mar. 27, 1923.

1,449,592.

W. E. EGGERT.

GRINDING MILL.

FILED NOV. 10, 1920.

2 SHEETS—SHEET 1.

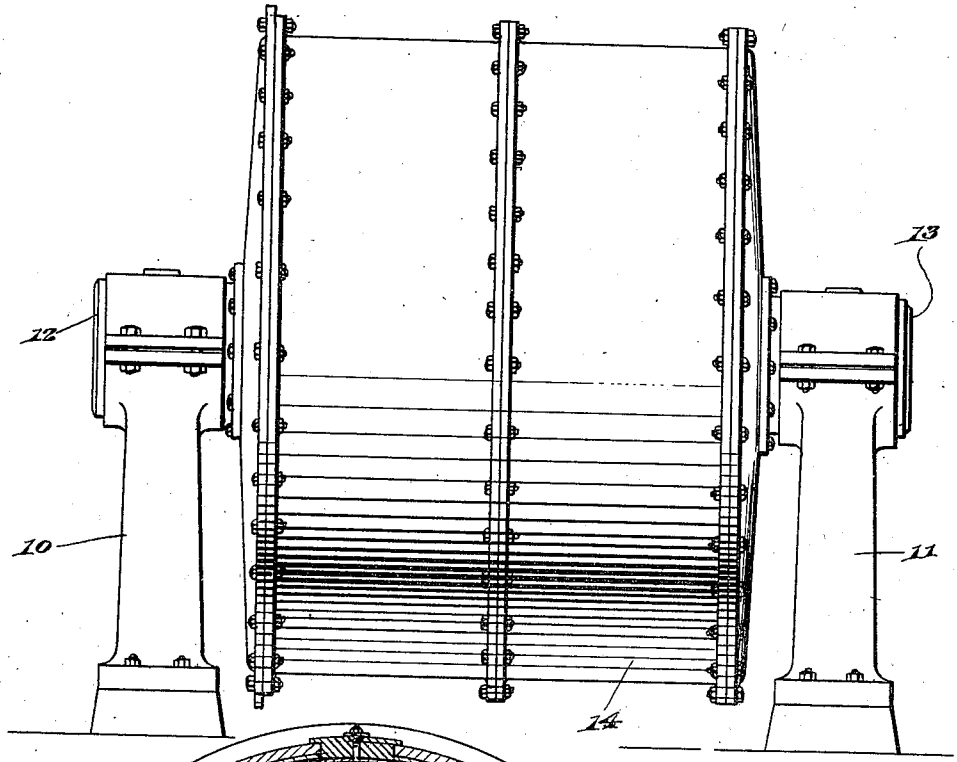


Fig. 1.

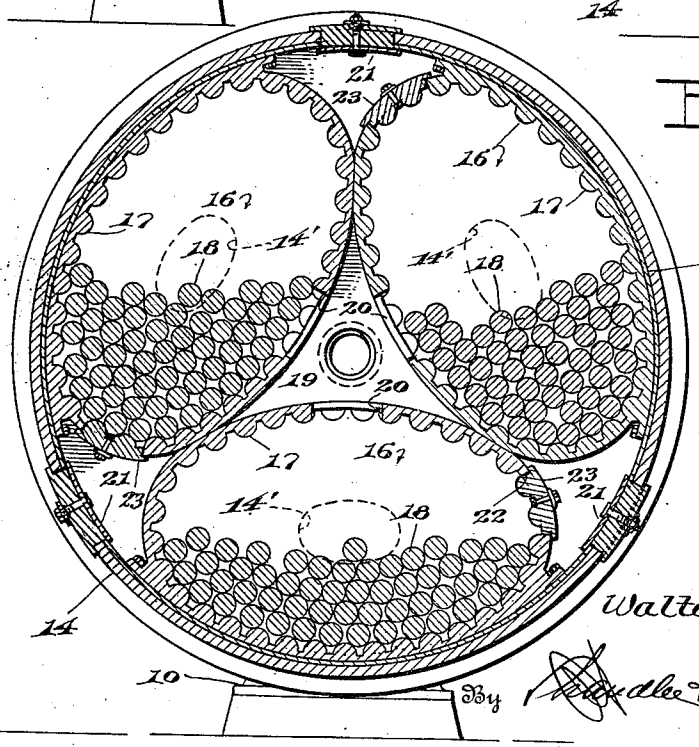


Fig. 3

Inventor

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By

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2 SHEETS—SHEET 2.

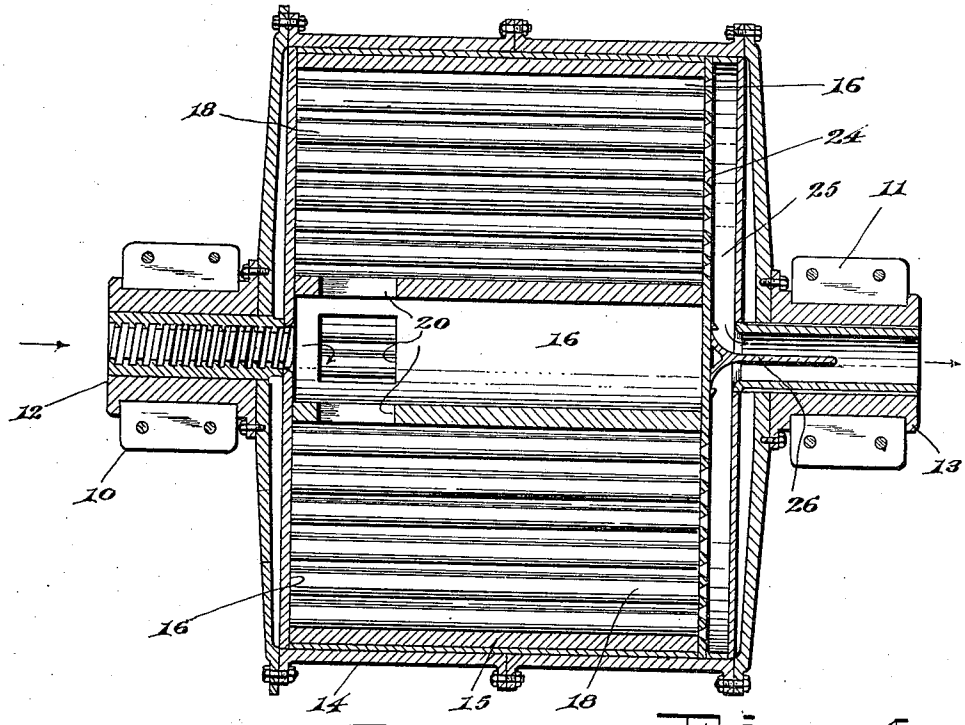


Fig. 4.

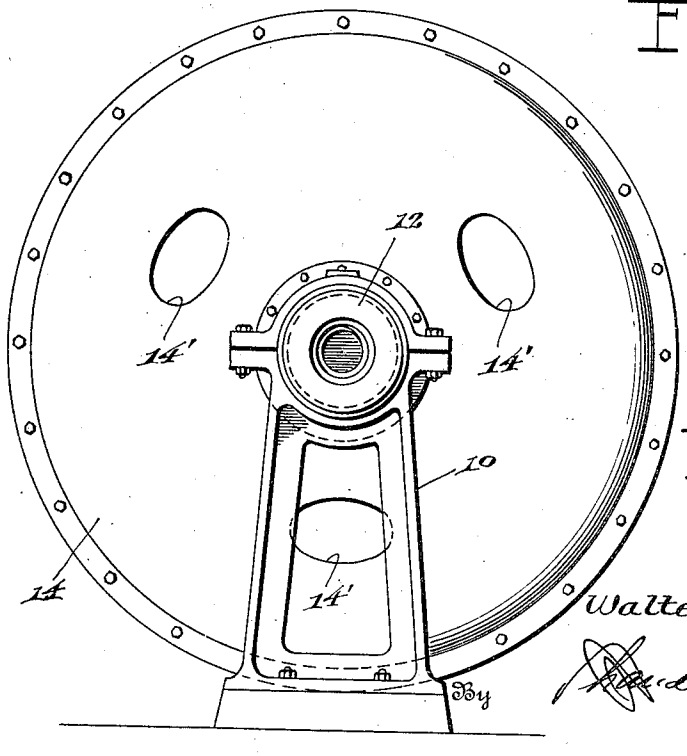


Fig. 2.

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Patented Mar. 27, 1923. 1,449,592

UNITED STATES PATENT OFFICE.

WALTER C. EGGERT, OF SEATTLE, WASHINGTON.

GRINDING MILL.

Application filed November 10, 1920. Serial No. 423,167.

To all whom it may concern:

Be it known that I, WALTER C. EGGERT, a citizen of the United States, residing at Seattle, in the county of King, State of Washington, have invented certain new and useful Improvements in Grinding Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains, to make and use the same.

This invention relates to new and useful improvements in grinding mills, and particularly to rotary grinding mills.

One object of the invention is to provide a liner for a grinding mill by means of which a more efficient grinding of the material is produced, and a more constant action on the material by the grinding rods provided.

Another object is to provide a liner for a grinding mill which is so shaped that the grinding rods will more effectively roll around each other and around the inner walls of the compartments thereof.

A still further object is to provide a liner for a grinding machine by means of which the machine will be more evenly balanced without dead centers, and which will require less power to drive the mill.

A still further object is to provide a liner for a grinding mill wherein the degree of fineness of the resultant ground material is regulated by the amount of material fed into the machine.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawings.

In the drawings:

Figure 1 is a side elevation of a grinding mill in which is disposed my improved liner.

Figure 2 is an elevation looking toward the feed end of the mill.

Figure 3 is a vertical transverse central sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a vertical longitudinal central sectional view through the machine.

Referring particularly to the accompanying drawings, 10 and 11 represents the uprights or supports on which are journaled the trunnions 12 and 13 of the rotary drum 14. Within this drum is secured the liner which forms the subject-matter of this application. The trunnion 12 is hollow to permit feeding the material through it into the interior of the drum for action of the grinding mechanism therein which will now be described.

The liner 15 carries a plurality of brackets (three being shown) of preferably elliptical shells forming chambers 16 having inwardly beaded walls 17, the minor diameters of the chambers being disposed on radial lines of the cylinder and approximating the same in length. The grinding rods 18 of a length approximating the chambers and adapted to roll freely therein.

At the center of the cylinder, and extending longitudinally thereof, is a passage 19 which is in the form of outline of a spherical triangle in cross section defined by the walls of the chambers 16, and in each of said wall members is provided an opening 20 at the end of a minor diameter of the chamber through which the materials feed into the chambers as they successively reach the lowermost position. Three similarly shaped passages extend longitudinally between the chambers and the wall of the drum, as shown at 21, and in the wall of each chamber, communicating with said passages and at the end of a major diameter of the chamber is an opening 22 through which access may be had to the chambers to remove and replace worn or broken rods.

In the discharge end of the drum, and spaced inwardly from the adjacent end wall is a perforated disk 24 through which the ground material passes into the space 25 outwardly of said disk. Secured centrally to the disk 24, and extending part way into the trunnion 13, is a conical member 26 onto which the ground material falls from the adjacent ends of the compartments as said compartments reach their uppermost positions in the drum.

Attention is also called to the fact that by reason of the elliptical shape of the compartments, the grinding rods will take a gyratory motion, with the result that the rods will not only roll around against the ribs of the compartments, but will more properly roll over and against each other, thus more effectively grinding the material to the desired degree of fineness.

Again, this elliptical formation of the compartments gives a greater grinding surface within the compartments than would

be the case were the compartments circular in cross section.

It will be readily seen, from an inspection of the drawings, that the material to be ground is fed into the central passage 19 through the hollow trunnion 12, and such material falls through the openings 20, successively, as the drum rotates, into the different compartments, where it is immediately attacked and broken up by the grinding action of the rods 18 against each other, and the grinding action of the rods and the ribs 17. The material is prevented, to a great extent, from falling back through the openings 20 into the other compartments, by reason of the rods 17, which pass or roll over these openings and serve to seal such openings. The resultant finely ground material is discharged from each compartment, through the openings of the disk 24 and from the drum through the hollow trunnion 13. Should the material discharged through the openings of the disk 24 be too coarse, the feed through the trunnion 12 is reduced in volume, or should the resultant discharge be too fine, the feed is increased in volume. Thus the degree of fineness of the resultant material can be regulated by the volume fed through the trunnion 12, into the central passage 19.

The major portions of the wall of each chamber may as indicated consist of a casting secured by bolts or otherwise to the liner plate 15, which is cylindrical in form.

What is claimed is:

A grinding mill having a rotary cylinder of compartmental interior construction forming a plurality of chambers containing loose, gravitally controlled grinding elements, the chambers being of elliptical form with their minor diameters coincident with radii of the cylinder, and combining to form a central common feed passage to the several chambers and by which said chambers communicate by openings formed in the inner walls thereof.

In testimony whereof, I affix my signature, in the presence of two witnesses.

WALTER C. EGGERT.

Witnesses:

R. E. JOHNS,

F. A. APPLETON.