

W. GOWAN.
 ROTARY GRINDING MACHINE.
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1,062,094.

Patented May 20, 1913.

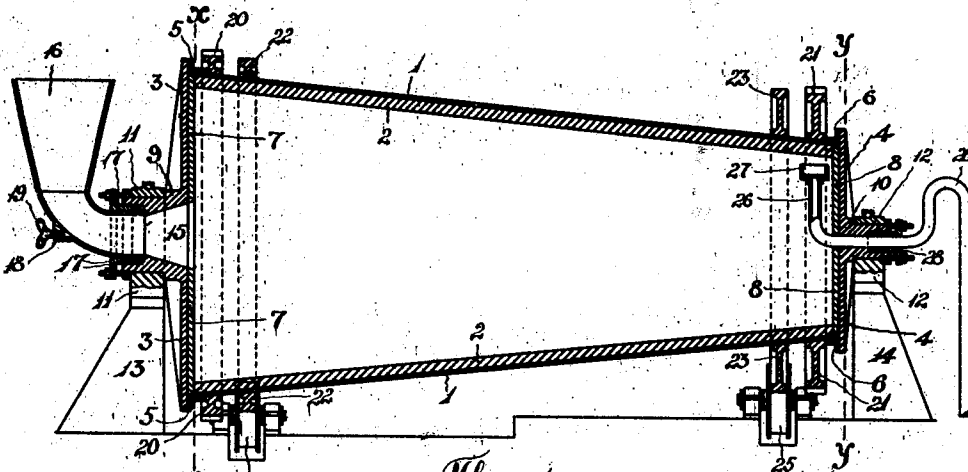


Fig. 1.

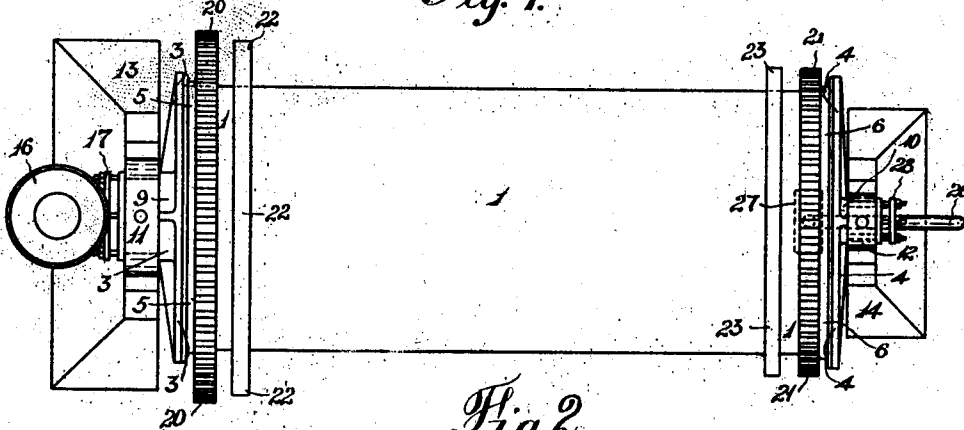


Fig. 2.

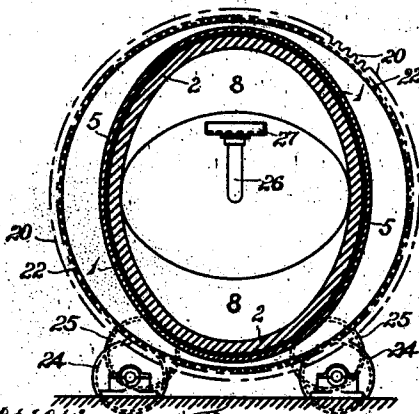


Fig. 3.

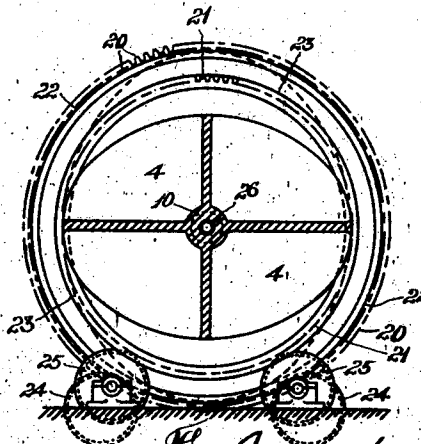


Fig. 4.

Witnesses:

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ROTARY GRINDING-MACHINE.

1,062,094.

Specification of Letters Patent.

Patented May 20, 1913.

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To all whom it may concern.

Be it known that I, WILLIAM GOWAN, a subject of the King of Great Britain, and resident of Johannesburg, Province of Transvaal, Union of South Africa, have invented certain new and useful Improvements in Rotary Grinding-Machines, of which the following is a specification.

This invention has reference to rotary grinding machines and more especially to that type in which a tubular or like shell or barrel receives the grinding charge and has a rotatory motion imparted to it.

The object of my invention is to improve the efficiency of grinding machines of this kind, and to that end consists essentially in constructing the tubular or like shell or barrel of oval or elliptical shape in cross-section preferably with one end smaller than the other and with the major axis of the smaller end at right angles to the major axis of the larger end. The longitudinal taper of the shell or barrel portion of the machine is in the direction of the delivery or outlet end. The invention will be more fully described by aid of the accompanying drawing wherein—

Figure 1 represents the machine in longitudinal section, Fig. 2 being a plan of the machine. Fig. 3 is a section of Fig. 1 on line $x-x$, and Fig. 4 is a section of Fig. 1 on line $y-y$.

1 is the shell or barrel of my improved rotary grinding machine, and 2 the lining therefor. The shell or barrel 1 as shown—see more particularly Figs. 3 and 4—is of oval or elliptical shape in cross-section, the major axis of the ellipse representing the larger and inlet end thereof being at right angles to the major axis of the ellipse representing the smaller and outlet end of the same as shown more particularly in Fig. 3.

3, 4 represent the covers or end plates for the barrel or shell 1 to which they are fixed by the L pieces 5, 6, and 7, 8 represent the lining plates for said covers 3, 4.

9, 10 are the trunnions on the covers or end plates 3, 4, by which the shell or barrel 1 is revolvably supported in the bearings 11, 12, which latter are carried on suitable supports or foundations 13, 14. The opening 15 through the trunnion 9 constitutes the inlet into the machine and through it the charge of grinding material and the material to be ground are introduced into the larger end of the shell or barrel 1.

16 is a feed hopper which projects into the hollow trunnion 9, and 17 is a gland and stuffing box for making a joint between said parts.

18 is an aperture closed by a wing-bolt 19 for removing any obstruction in the hopper 16 or opening 15 or for cleaning out the same when desired. Said inlet 18 may be used for introducing the pulp or liquid conveying the material to be ground if such material is introduced into the mill in that form. In that case the hopper 16 will be used as the means for introducing the pebbles, fragmentary rock or other grinding material.

20, 21 are toothed wheels fixed around the larger and smaller ends of the shell or barrel 1 for imparting rotatory motion thereto, and 22, 23 are rings or rails fixed around the shell or barrel 1 near the ends, which rings or rails run on rollers 24, 25 which thereby revolvably support the barrel or shell 1.

26 is the outlet or delivery pipe for the ground product. It is located at the smaller end of the shell or barrel 1, and projects to a suitable height inside the same as shown in Figs. 1 and 3. At its upper end inside the shell or barrel 1 the pipe 26 is fitted with a launder or box 27 in which the outflowing pulp is received and from which it enters said pipe 26. The pipe 26 projects through the hollow trunnion 10.

28 is a gland and stuffing box for making a joint between the pipe 26 and the trunnion 10.

The pipe 26 at the outside of the trunnion may be bent upward to a height not exceeding the launder or box 27 so as to obtain a fall for the outflowing ground product or pulp.

If the apparatus is used for grinding ores then the pipe 26 may be arranged to deliver the product or pulp into a mercury web 1 so as to amalgamate the metallic particles contained therein.

In the operation of the machine the material to be ground if in the form of a pulp may be introduced either along with the grinding material through the hopper 16, or said grinding material may be introduced through hopper 16 and the pulp introduced through the aperture 18. If the material to be ground is introduced in the form of pieces of a size suitable to pass through the opening 15 then the water or other liquid can be introduced either with the same

through the hopper 16 or through the aperture 18 as preferred. The elliptical configuration of the barrel or shell 1 insures efficient grinding or reduction of the material until the finely ground product, conveyed by the liquid component of the charge, enters the box or launder 27 and flows out through the pipe 26.

What I claim as my invention and desire to protect by Letters Patent is:—

1. A rotary grinding machine comprising a single barrel or shell of elliptical shape in cross-section, the barrel or shell having a continuous and uniform twist from end to end, as set forth.

2. A rotary grinding machine comprising a barrel or shell of elliptical shape in cross-section, the major axis of the ellipse at one end being at right angles to the major axis of the ellipse at the other end and tapered from end to end.

3. A rotary grinding machine comprising a barrel or shell, end covers therefor, means for supporting said barrel or shell, means for rotating the same, means for introducing the material into the barrel or shell, the barrel or shell being of elliptical shape in cross-section from end to end, the major axis of the larger ellipse representing the receiving end of the barrel or shell being

at right angles to the major axis of the smaller ellipse representing the delivery end of the barrel or shell, and means for withdrawing the ground product from the delivery end of the barrel or shell.

4. A rotary grinding machine comprising a barrel or shell, end covers therefor, means for supporting said barrel or shell, means for rotating the same, means for introducing the material into the barrel or shell, the barrel or shell being of elliptical shape in cross-section from end to end, the major axis of the larger ellipse representing the receiving end of the barrel or shell being at right angles to the major axis of the smaller ellipse representing the delivery end of the barrel or shell, and a pipe for withdrawing the ground product, said pipe projecting through the delivery end of the shell or barrel and being carried up to a suitable height and fitted with a box or launder, as set forth.

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

WILLIAM GOWAN.

Witnesses:

CHAS. OVENDALE,
MAUD POPE.