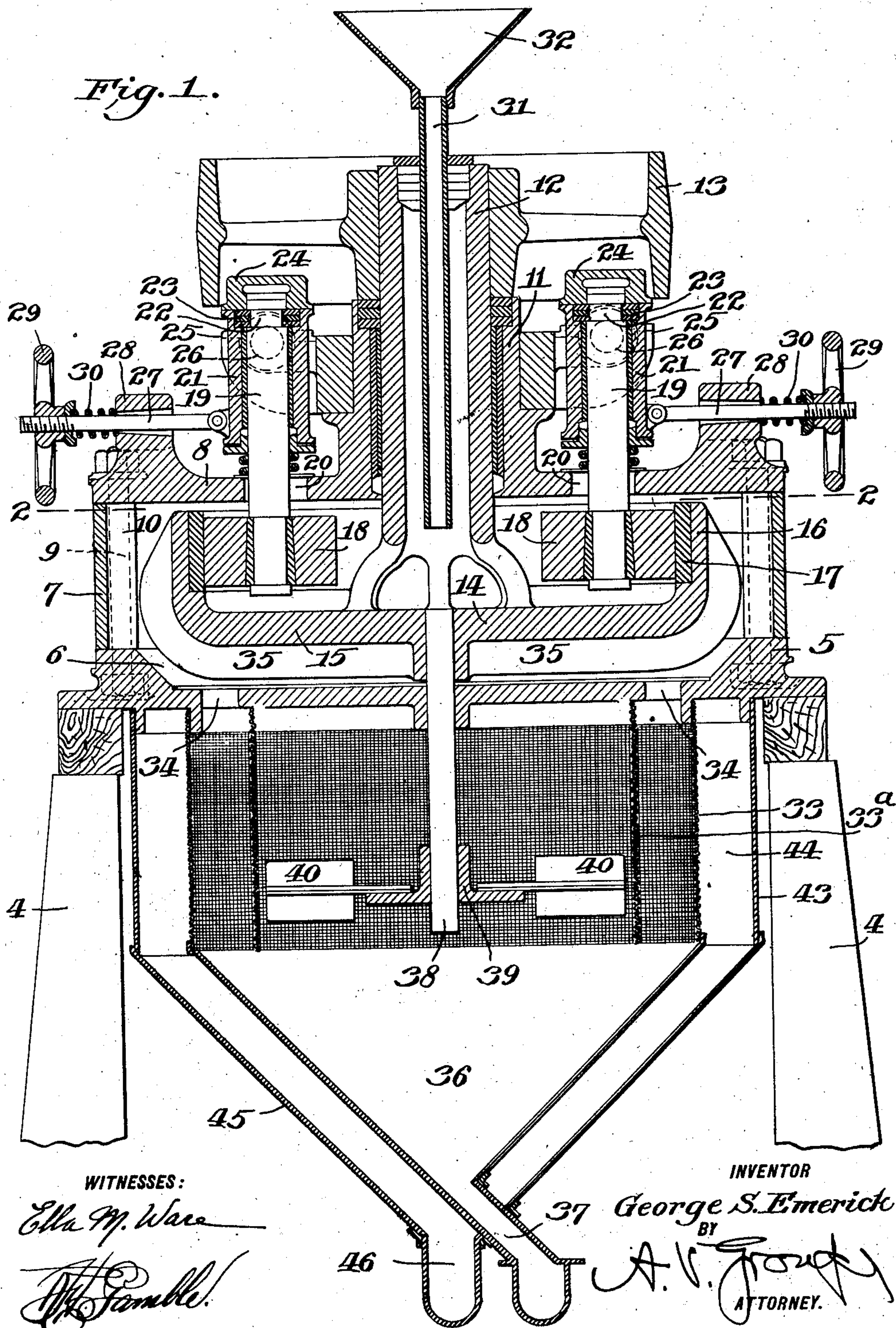


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APPLICATION FILED OCT. 18, 1907.

944,670.

Patented Dec. 28, 1909.

2 SHEETS—SHEET 1.

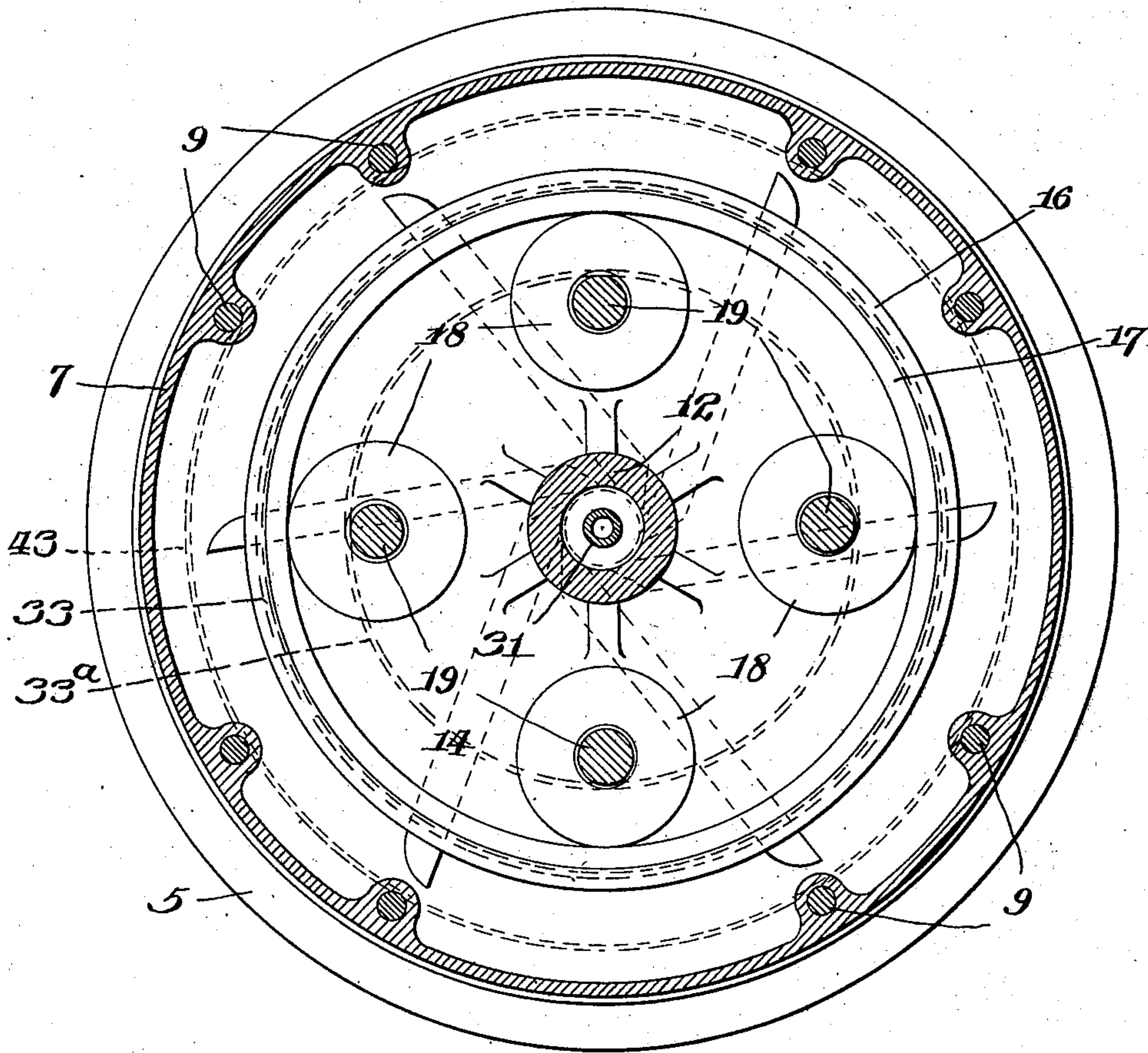


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Fig. 2.



WITNESSES:

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GEORGE STOCKHAM EMERICK, OF NAZARETH, PENNSYLVANIA.

GRINDING-MILL.

944,670.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed October 18, 1907. Serial No. 398,045.

To all whom it may concern:

Be it known that I, GEORGE S. EMERICK, a citizen of the United States, residing at Nazareth, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification.

The object of my invention is to provide a simple and efficient machine for grinding and screening coal, limestone, cement clinker, &c.

Having this object in view, the invention consists in the novel construction and combinations of parts which will be hereinafter fully described and particularly pointed out in the claim.

Figure 1 is a vertical section of a grinding and screening machine embodying my invention. Fig. 2 is a sectional plan view thereof, as on the line 2—2, of Fig. 1.

4 designates the frame work, the upper portion of which supports a casting 5 having a circular depression 6 therein for the reception of the ground material. Resting upon the top of the casting 5 and surrounding the depression 6 therein, is a circular frame 7, provided with a cover 8. The casting 5, frame 7, and cover 8 are secured together by suitable bolts 9, and they inclose a chamber 10, in which the material is ground.

The cover 8 is provided with a central bearing 11, in which is rotatably mounted a vertically arranged hollow shaft 12, the upper end of which is provided with a driving pulley 13, which rests upon the bearing 11, and supports the shaft 12. The lower end of the shaft 12 extends into the chamber 10, and has formed thereon or secured thereto a rotatable grinding member 14, provided with a horizontal portion 15, and a vertical flange 16. The inner face of the vertical flange 16 is provided with a hard metal ring 17, forming a grinding surface.

Resting normally in contact with the grinding surface of the ring 17, is a series of grinding rollers 18 which are carried by vertical shafts 19, the axes of which are normally parallel to the grinding face of the ring 17. The shafts 19 extend upwardly through openings 20 in the cover 8, and are supported in bearings 21. The upper ends of the shafts 19 are provided with grooves 22, into which extend rings 23, which are secured between the bearings 21 and caps 24 thereon. These rings 23, engaging the

grooves 22, prevent longitudinal movement of the shafts 19.

Each bearing 21 is arranged between two arms 25 which project from a fixed collar 60 on the bearing 11, and each bearing 21 is provided with projecting pivot studs 26 which extend into openings in the arms 25, thus pivotally supporting the bearings 21, shafts 19, and rollers 18, in a manner to permit the rollers 18 to move toward and from the grinding surface of the ring 17, the openings 20 being large enough to permit such movement.

Pivotally connected to each bearing 21 below the pivot stud 26, is the inner end of a rod 27 which extends outwardly through an opening in a lug 28 projecting from the frame 7. The outer end of each rod 27 is screw-threaded for the reception of the internally threaded hub of a hand wheel 29, between which and the lug 28 is interposed a spring 30, surrounding the rod 27. The springs 30, bearing against the lugs 28 and the hubs of the hand wheel 29, tend to force the rods 27, and therewith the bearings 21, outwardly, and thus hold the rollers 18 yieldingly in contact with the grinding surface of the ring 17, from which they may be moved on the pivot studs 26 in opposition to the springs 30. By adjusting the hand wheels 29, the pressure of the rollers 18 against the ring 17 may be nicely regulated.

The lower end of the shaft 12 is provided with lateral openings therein to permit material to pass from the hollow shaft to the horizontal portion 15 of the grinding member 14. Arranged within the hollow shaft 12 is a feed tube 31, which is supported in the upper end of the shaft. The lower end of the tube 31 terminates above the grinding member 14, and the upper end of the tube is provided with a flaring mouth 32 for the reception of the material to be ground as it is introduced to the grinding member 14 through the tube 31.

Arranged below the chamber 10 and surrounding the shaft 12, is a circular screen 33^a which is supported at its upper end by a flange on the casting 5; and surrounding the screen 33^a is a circular screen 33, which is also supported at its upper end by a flange on the casting 5, thus forming an annular space between the screens 33 and 33^a through which the ground material may descend.

The casting 5, or floor of the depression 6, is provided with openings 34 therein, to

afford communication between the chamber 10 and the space between the screens 33 and 33^a, suitable blades 35 being provided on the bottom of the member 15 for delivering 5 the ground material within the depression 6 to the openings or passageways 34.

Extending downwardly from the bottom of the screen 33 is a conical receptacle 36 from the bottom of which extends a passage- 10 way 37 which may lead to a conveyer or any suitable point of discharge.

Secured at its upper end to the grinding member 14, and extending down through a central bearing in the casting 5, is a vertical 15 shaft 38. This shaft 38 extends into the screen 33^a, and is provided with a collar 39, from which project fan blades 40, the purpose of which is to blow the ground material through the screen 33 as it falls from the 20 openings 34 during the rotation of the shaft 12.

Surrounding the screen 33 is a cylindrical casing 43, which is supported by a flange projecting from the casting 5, and which 25 provides a chamber 44 surrounding the screen 33. The bottom of the casing 43 is provided with a conical extension 45, which surrounds the conical receptacle 36, and extends the chamber 44 down the outside of 30 said receptacle. Leading from the lower end of the extension 45 or chamber 44, is a passageway 46, which may lead to a conveyer or any suitable point of discharge.

The operation may be briefly described 35 as follows:—The material to be ground is introduced to the grinding member 14 through the tube 31, and power is applied to the pulley 13 to rapidly rotate the shaft 12 and therewith the grinding member 14. 40 The material to be ground passes from the horizontal portion of the member 14 by centrifugal action to and between the grinding surface of the ring 17, and the rollers 18. During the rapid rotation of the member 45 14, the rollers 18 are turned with or upon the shafts 19 by contact with the ring 17, and the material to be ground, and thus

effect the crushing or grinding operation. After the material has been ground, it passes by centrifugal force over the top of the in- 50 clined portion 16 of the member 14, and falls by gravity into the depression 6, from which it is discharged through the openings 34 into and through the space between the screens 33 and 33^a. As the ground material 55 falls through the screen 33, it is blown by the blades 42 against the screen and the finer particles of the ground material pass through the screen into the chamber 44, while the coarser particles fall into the conical 60 receptacle 36, and are discharged therefrom by gravity through the passageway 37. The finer particles, after passing through the screen 33 into the chamber 44, descend by gravity through the extension 45, and 65 are discharged through the passageway 46.

The purpose of providing the screen 33^a between the fan blades 40 and the screen 33, is to prevent any lumps of hard substances or pieces of iron, &c. that may descend from 70 the openings 34 with the ground material, from being struck by the fans 40 and knocked through the screen 33.

I claim:—

In a grinding mill, walls forming the 75 grinding chamber, grinding members within said chamber, means for actuating said members, a pair of vertically arranged circular screens located one within the other in spaced relation to each other, the wall 80 of said chamber having an opening therein affording communication between said chamber and the space between said screens, a fan located adjacent one of said screens away from the space formed between said 85 screens for blowing the ground material through one of said screens, and means for actuating said fan.

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

GEORGE STOCKHAM EMERICK.

Witnesses:

A. V. GROUPE,
E. M. WARE.