

Feb. 24, 1925.

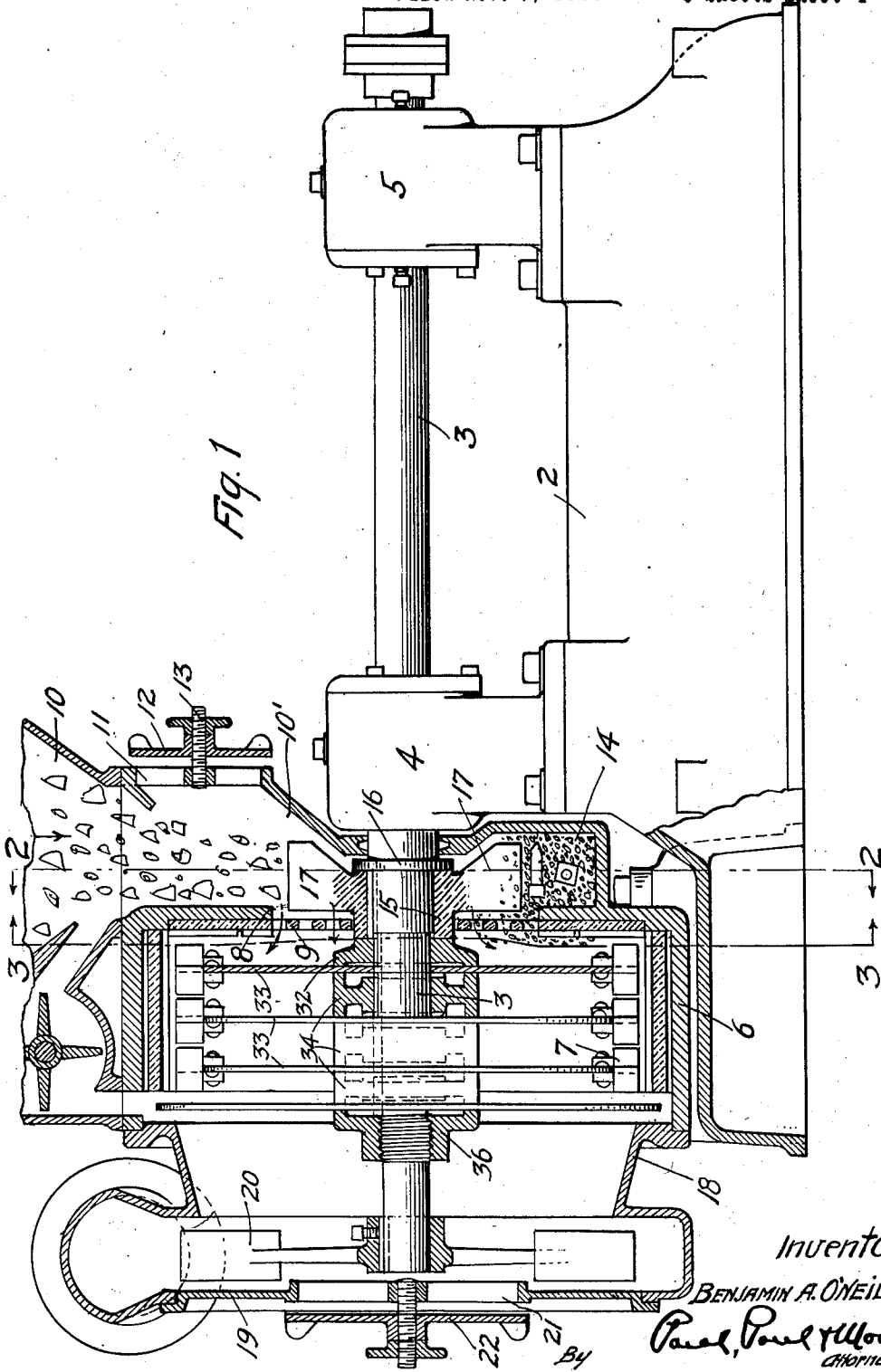
1,527,818

B. A. O'NEILL

GRINDING MILL

Filed Nov. 7, 1924

3 Sheets-Sheet 1



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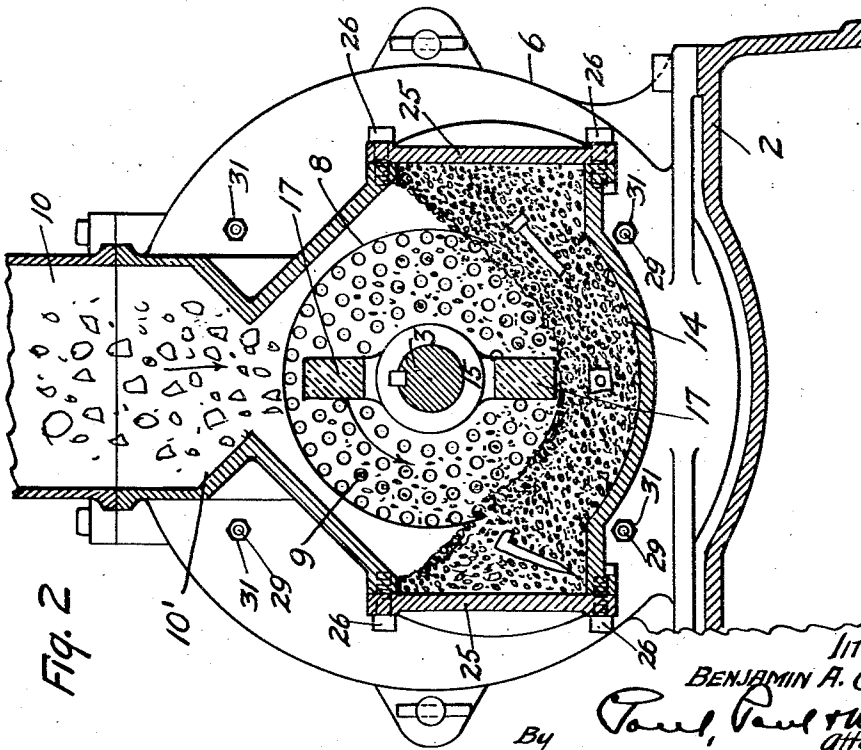
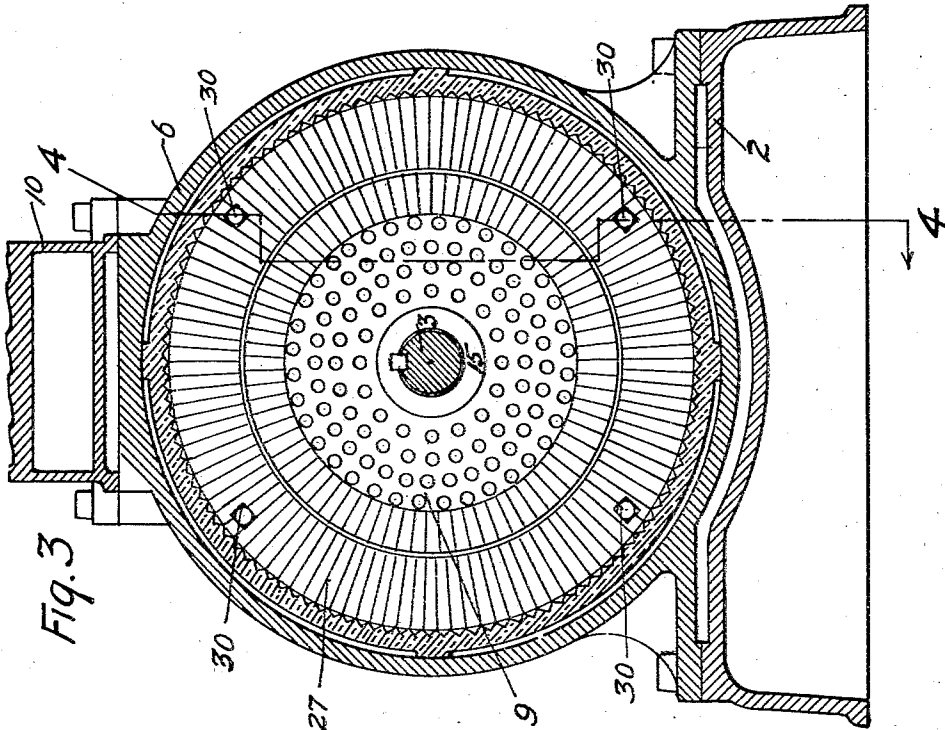
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

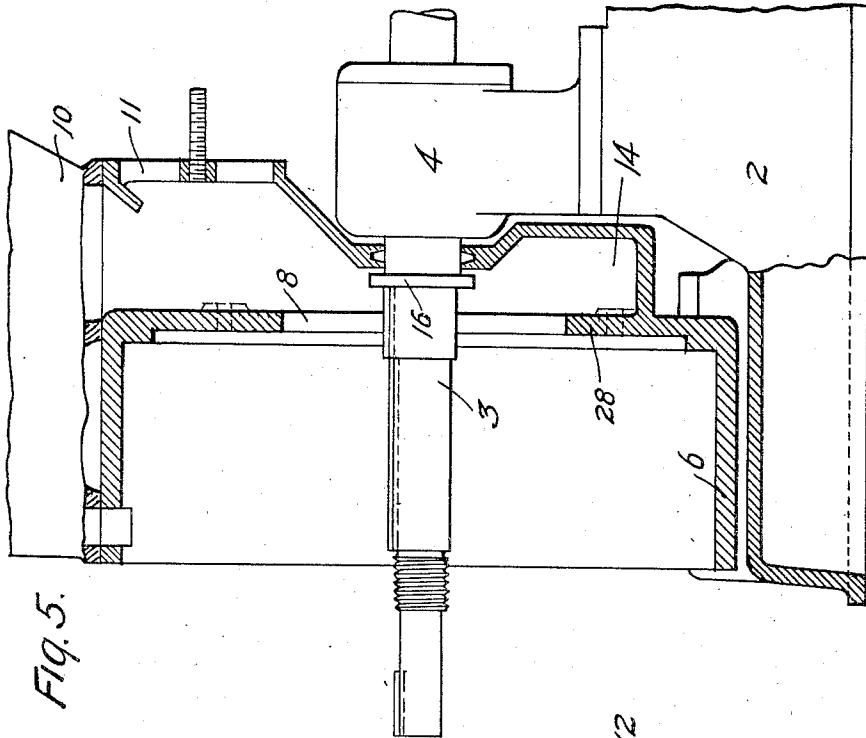


Fig. 5.

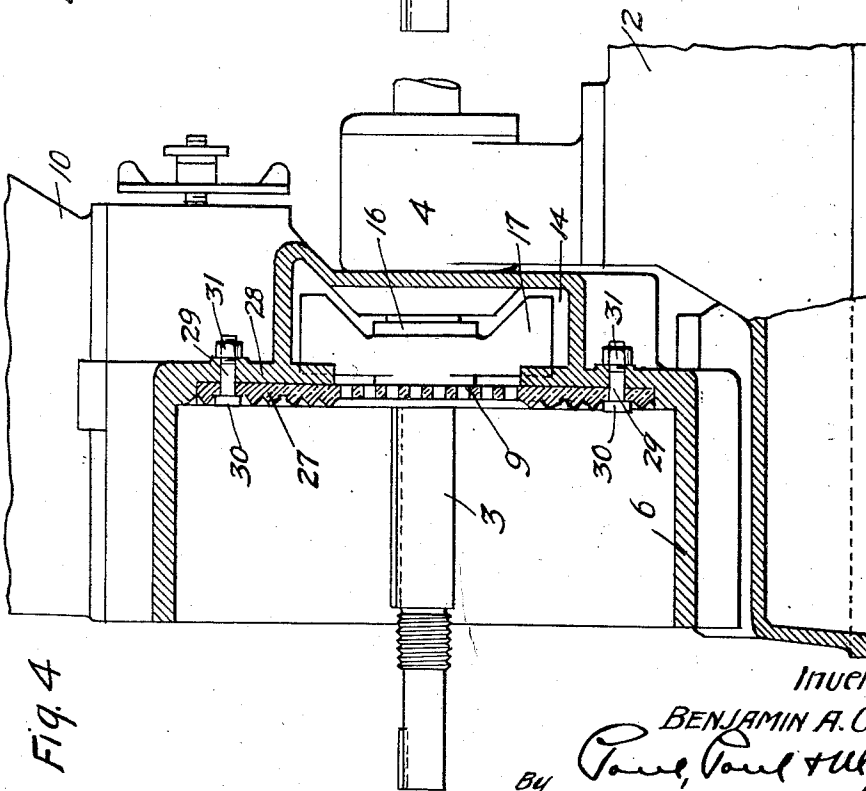


Fig. 4

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# UNITED STATES PATENT OFFICE.

BENJAMIN A. O'NEILL, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO SCHUTZ-O'NEILL COMPANY, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

GRINDING MILL.

Application filed November 7, 1924. Serial No. 748,437.

*To all whom it may concern:*

Be it known that I, BENJAMIN A. O'NEILL, a citizen of the United States, resident of Minneapolis, county of Hennepin, and State of Minnesota, have invented certain new and useful Improvements in Grinding Mills, of which the following is a specification.

My invention relates to mills adapted particularly for grinding or pulverizing such material as coal in various forms for the purpose of reducing it to a finely comminuted condition suitable for use as a fuel for furnaces and boilers.

A further and particular object of the invention is to provide a grinding mill having means for preventing the entrance of such foreign material as nails, bolts, or pieces of metal, into the grinders with the material to be comminuted.

Other objects of the invention will appear from the following detailed description, and the accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a view partially in section of my improved grinding mill;

Figure 2 is a transverse sectional view on the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view on the line 3—3 of Figure 1;

Figure 4 is a vertical section on the line 4—4 of Figure 3, with main grinding parts removed;

Figure 5 is a central vertical section of the mill with all the operating parts removed except the main shaft.

In the drawings, 2 represents the base of the mill. 3 is a shaft having bearings 4 and 5, one end of the shaft projecting outwardly beyond the bearing 4 as shown plainly in Figure 1 and overhanging the end of the base and on this projecting end the mill proper is mounted. 6 represents a suitable housing encircling the grinders 7. This housing has a central opening 8 and a perforated plate section 9 concentric to the shaft 3 fits within the housing and extends across this opening forming a series of passages through which the fuel in a crushed condition is delivered to the grinders. A feeder 10 is provided from which the material to be crushed and ground is fed

through a hopper 10' to the grinders. An air intake opening 11 is provided in the wall of the conduit with a disk 12 adapted for adjustment on a threaded stud 13 so that the volume of air entering the opening 11 can be increased or decreased at will. The hopper 10' extends down below the shaft 3 opposite the plate 9 where it is enlarged to form a chamber 14 into which some material accumulates, the bottom of this chamber being below the opening in the housing. A hub 15 is mounted on the shaft 3 and seated against a collar 16 and breaker blades 17 project from said hub and revolve in the chamber 14 adjacent to the plate section 9. These blades have the function of agitating and stirring up the material in the chamber 14 and breaking it to the required degree of fineness to pass through the plate section while allowing foreign unbreakable material, such as nails, bolts and nuts which frequently are found in the material, to be imbedded in the material in the bottom of the chamber 14 instead of passing into the grinder as they usually would when the discharge of the hopper leads directly thereto. The breaker blades 17 as indicated in Figure 2 are very substantial in construction and may sweep through the material in the chamber 14 and crush the lumps therein without danger of becoming broken. Access is had to the chamber 14 for the removal of any metallic substance imbedded in the material, through the doors 25 provided at each end of the chamber 14 and removably secured thereto by suitable screws 26. When the material has been delivered by the blades 17 through the openings into the grinders it will be sufficiently broken down so that the grinders can easily and quickly reduce it to the final pulverized condition.

Upon the opposite side of the grinders from the hopper 10, I prefer to provide a ring 18 supporting a housing 19 in which a fan 20 is arranged upon the end of the shaft 3, the housing having an air intake 21 and a disk 22 for regulating the volume of air. It will be noted that the bearings of the shaft 3 are all on one side of the grinding chambers, the projecting end of the shaft allowing all the grinding parts to be entirely removed from the shaft and the chambers without disturbing the shaft in its bearings, thus permitting the renewal

or replacement of a part of the mill without the necessity of dismantling the entire machine. For the purpose of the removal of any of the grinding and pulverizing parts including the breaker blades, I arrange the plate section 9 as an integral section of a corrugated grinding plate 27 (see particularly Figure 4) arranged against the rear wall 28 of the grinding chamber housing 6. The plate 27 is secured to the wall 28 preferably by means of bolts 29 having heads 30 countersunk in the plate 27 and provided with clamping nuts 31 upon the outside of the wall 28, at points where they are easily accessible. The hub 15 of the breaker blades 17 is splined to the shaft 3 and passing through the plate section 9 abuts a collar 32, (see Figure 1) engaging the rear of the grinding disks 33. Spacing collars 34, splined on the shaft 3, are arranged between the disks 33 and the whole assembly on the shaft, as described, is clamped tightly against the shoulder or collar 16 of the shaft 3, by means of the threaded nut 36. When it is desired to remove any of the working parts for repair or renewal the nut 36 is unscrewed and the disks 33 and spacing collars slid off the shaft 3, after which the plate 27 may be unbolted, and removed and the breaker blades 17 also removed from the shaft 3 through the opening 8 as indicated in Figure 5.

I claim as my invention:

1. A grinding mill comprising a suitable base, a shaft journaled thereon and having one end projecting outwardly beyond its bearing, a grinder supported on said projecting end, and provided with an intake opening and perforated means fitting therein, a feed hopper having a chamber adjacent said opening and adapted to collect foreign material such as nuts and bolts, and a breaker operating in said chamber to crush the material and feed it to the openings in said perforated means, said grinder and breaker being removable from said shaft without disturbing the shaft in its bearings.

2. A grinding mill comprising a grinder having a housing and an opening therein, a hopper adapted to deliver the material to be crushed to said opening and having a chamber in its lower portion to collect

foreign material such as nuts and bolts, and means operating in said chamber opposite said opening for crushing the material therein and feeding it to said opening, and said opening having means preventing the foreign material in said chamber from passing therethrough.

3. A grinding mill comprising a grinder having a housing and an opening therein, a hopper adapted to deliver material to be crushed to said opening and provided with a chamber in its lower portion, a breaker operating in said chamber to crush the material therein, and perforated means mounted in said opening to prevent refuse and foreign material from passing to the grinders from said hopper through the operation of said breaker.

4. A grinding mill comprising a grinder having a housing and an opening therein, a hopper adapted to deliver material to be crushed to said opening and provided with a chamber in its lower portion, a breaker operating in said chamber to crush the material therein, and perforated means mounted in said opening to prevent refuse and foreign material from passing to the grinders from said hopper through the operation of said breaker, said perforated means comprising a plate secured to the walls of said housing and extending across said opening.

5. A mill comprising a grinder having an intake opening and a chamber adjacent said opening whereto the material to be crushed is delivered, a breaker operating in said chamber to crush the material therein, and means preventing foreign articles such as bolts and nuts accumulating in said chamber from passing with the crushed material to said grinder.

6. A mill comprising a grinder having an intake opening and a chamber adjacent said opening whereto the material to be ground is delivered, a feeder operative in said chamber to feed the material to said grinder, and means preventing foreign articles such as bolts and nuts accumulating in said chamber from passing with the material to said grinder.

In witness whereof, I have hereunto set my hand this 3rd day of November, 1924.

BENJAMIN A. O'NEILL.