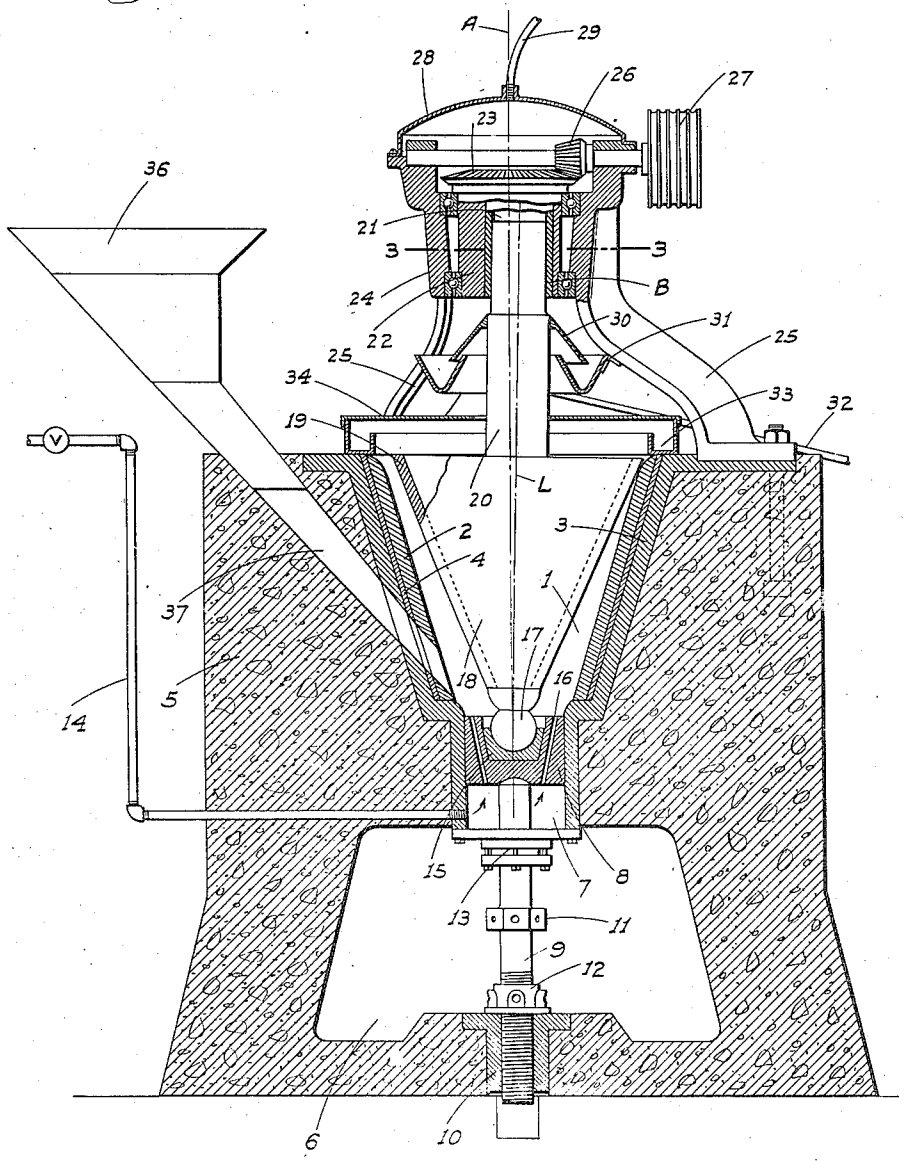
Dec. 26, 1944. A. J. PEAKE 2,365,904

PULVERIZING MILL

Filed Oct. 24, 1942 2 Sheets-Sheet 1

Fig. 1



INVENTOR
A. J. Peake
BY
Webster & Webster
ATTYS

Dec. 26, 1944. A. J. PEAKE 2,365,904

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Fig. 2

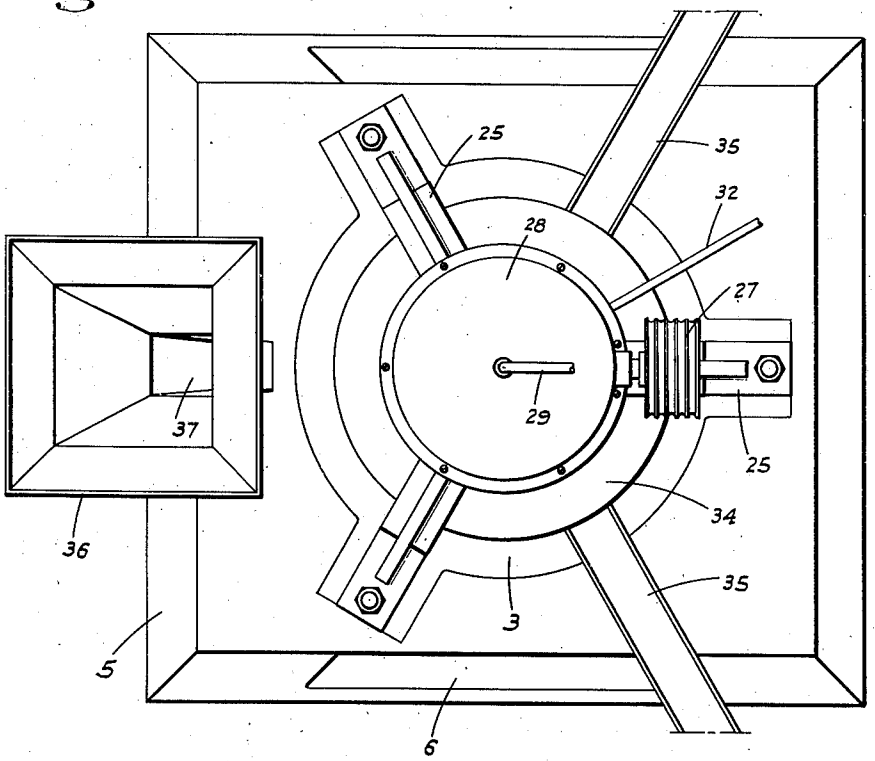


Fig. 3

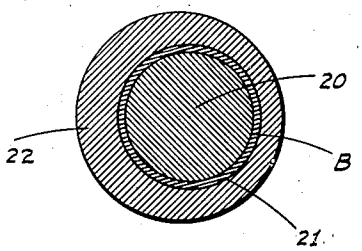
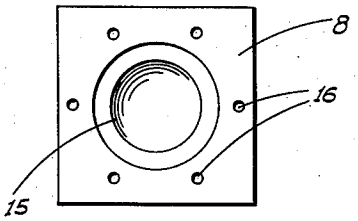


Fig. 4



INVENTOR
A. J. Peake
BY
Webster & Webster
ATTYS

Patented Dec. 26, 1944

2,365,904

UNITED STATES PATENT OFFICE

2,365,904

PULVERIZING MILL

Abner J. Peake, Stockton, Calif.

Application October 24, 1942, Serial No. 463,154

4 Claims. (Cl. 83—10)

This invention relates to pulverizing mills of that type which includes a vertical rotary driven pulverizing roll, and which is particularly designed to pulverize ore and the like from three-eighths inch size downward.

One object is to provide an improved means for adjusting the setting of the roll while in operation, so as to provide for different degrees of fineness of pulverizing, or to compensate for wear as it occurs.

A further object is to provide an improved arrangement whereby fluid under pressure may be supplied to the lower end of the mill chamber, without interfering with the vertical adjustment of the mill rotor from below and clear of the chamber.

A further object of the invention is to provide a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These and other objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a sectional elevation of my improved mill.

Figure 2 is a top plan view of the same.

Figure 3 is a fragmentary enlarged cross section on the line 3—3 of Fig. 1.

Figure 4 is a top plan of the bottom roller-bearing block detached.

Referring now more particularly to the characters of reference on the drawings, the mill includes a vertical pulverizing chamber 1 of inverted frusto-conical shape, defined about its side by a hard liner 2 concentric with the vertical axis A of the mill. The linear is supported in a surrounding base 3, with zinc solder 4 therebetween and securing the liner in place. The base is embedded in a heavy concrete bed 5, which has a relatively large opening 6 some distance below the chamber and base. The base below the liner is of reduced size, and is square or rectangular in form to provide a guide well 7 for a vertically adjustable block 8. This block is adjustably supported by a heavy depending stem 9 which projects across the opening 6 and is threaded at its lower end in a sleeve 10 secured in the bed below said opening. The stem may be rotated to raise or lower the block by an enlarged head 11 or the like on the stem within the opening 6, and is locked against undesired movement by a nut 12 immediately above and engaging the sleeve 10. The stem passes through a packing gland 13 sealing the bottom well 7 and to which, below the block 8, a water pressure pipe 14 is connected.

The block 8 is provided with an upwardly opening substantially semi-spherical bearing seat or socket member, and with water passages 16 from top to bottom about said member. The center line of the seat lies on the axial line A.

Seated in the socket for rotative and gyratory movement is a ball 17 which is formed on the lower end of a roll 18 of inverted frusto-conical form of somewhat smaller diameter and of greater taper or slope than that of the liner 2. This roll may be faced with a removable hard sleeve 19. A stem 20 projects upwardly from the roll axially thereof and is turnable and slidable in a bushing B which is turnably fitted in an eccentric bore 21 in the hub 22 of a bevel gear 23. The bore is concentric with an offset line L which intersects the center of socket 15, while the hub 22 is concentric with the axial line A. The offset of the line L relative to the diameter of the roll at the top is such that said roll at one point at the top and on its offset side will practically engage or be tangential to the liner 2 at the top, as shown in Fig. 1, and as the gear rotates such point will obviously follow around the entire circumference of the liner, thus giving a continuous pulverizing action. The closeness of approach of the roll to the liner may be varied, or maintained substantially constant irrespective of wear, by moving the roll up or down, as the case may be. This of course, is done by rotating the stem 9 which indirectly supports the roll, as will be evident.

The hub 22 is turnably mounted in a surrounding boss 24 supported from radial legs 25 which depend to a rigid connection with the base 3 at the top end with the bed 5, in surrounding relation relative to the upper end of the chamber 1 and roll. The gear 23 is engaged by a bevel pinion 26 journaled on the boss and connected to a pulley 27 or the like, by which said pinion is driven at a suitable operating speed.

The boss is covered by a cap 28 to which an oil feed pipe 29 is connected so that the gears and adjacent parts, including hub 22, will be suitably lubricated. The stem 20 below the boss has an oil shed flange 30 thereabout which overhangs and drains into an endless trough 31 of greater diameter than the hub 22 and which is supported by the legs 25 some distance above the roll. Oil from the trough flows into a pipe 32 from which it may be re-circulated into the cap.

Supported on the base on top thereof is an endless trough 33, whose radially innermost side is close to the liner 2, and is relatively shallow compared with its outer side, as shown. A cover 34, orificed for the stem 20, is supported by said outermost side of the trough, and one or more carry-off chutes 35 projects radially out from the trough 33.

A hopper 36 for the ore to be pulverized is disposed above the bed 5 and communicates with the chamber 1 on one side thereof at the bottom by a passage 37 through the bed, and which of course extends through the base 3 and liner 2 also.

In operation, water under pressure is fed into the well 7 from the pipe 14, while the ore is being fed into the chamber 1 through a passage 37, and the water passes up into the chamber 1 through the passages 16 in the form of jets. These jets force the material upwardly in the chamber 1 and with the rotation of the roll, and due to the constantly decreasing width of the space in the chamber between the roll and liner, the material is gradually subjected to a crushing or pulverizing action, which of course becomes greatest at the rim of the liner 2. The pulverized material and water, as they overflow from the chamber, pass or are thrown into the trough 33, from which they flow into the chutes 35 which carry off the material for further treatment. Since the greatest width of the chamber 1 is at the bottom, and since the ore naturally tends to fall of itself, the mill roll cannot choke or jam even if the water pressure fails while the ore is still being fed.

The particular means employed for supporting and adjusting the roll enables an adjustment to be made while the mill is operating, and the fineness of the pulverizing action can be seen and accordingly controlled without any guesswork or any repeated stopping and starting of the mill being necessary.

The stem 20 being turnable in the driving gear, the roll is not forcefully rotated while it gyrates. However, it is free and will rotate by the frictional contact set up between the roll and the ore as the latter is held in a pulverizing grip.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A pulverizing mill including means forming an upstanding chamber of circular form in plan and having an upwardly flaring side wall, a rotary pulverizing member in said chamber of smaller diameter than the chamber and substantially engaging the chamber wall at one point only at the top of the latter, means to feed material to the chamber adjacent its lower end, and separate means to supply fluid under pressure to the chamber adjacent the bottom thereof.

2. A pulverizing mill including means forming an upstanding chamber of circular form in plan and having a upwardly flaring side wall, a rotary pulverizing member in said chamber of smaller diameter than the chamber and having a taper form of greater vertical angularity than that of the flare of the chamber, means mounting the member so as to be substantially tangent to the chamber wall at one point at the top of the latter, means to feed material to the chamber, means to drive the member from its upper end, a bearing block for the lower end of the member mounted for vertical movement in connection with the chamber below the member, a turnable stem depending from the block and a fixed sleeve below the block in which the lower end of the stem is threaded and spaced from the block to leave a portion of the stem exposed for manipulation.

3. A pulverizing mill including means forming an upstanding chamber of circular form in plan and having an upwardly flaring side wall, a rotary pulverizing member in said chamber of smaller diameter than the chamber and having a taper form of greater vertical angularity than that of the flare of the chamber, means mounting the member so as to be substantially tangent to the chamber wall at one point at the top of the latter, means to feed material to the chamber, means to drive the member from its upper end, a bearing block for the lower end of the member mounted for vertical movement in connection with the chamber below the member, a well in which said block is slideable, a vertically adjustabe stem depending from and supporting the block, a packing gland about the stem forming a closure for the lower end of the well, and a fluid pressure conduit leading to the last named chamber below the block, the latter having fluid passages therethrough.

4. A pulverizing mill comprising means forming a vertical pulverizing chamber, a rotary pulverizing member in the chamber cooperating with the inner wall thereof, means to rotate the member from above the chamber, means to feed material into the chamber, a well below and communicating with the chamber, means to feed fluid under pressure into the well, means supporting the member for vertical adjustment and including a supporting stem depending through the bottom of the well, a fixed support for the lower end of the stem and in which said stem is vertically adjustable and a pressure-tight guide for the stem below the member and sealing the lower end of the well.

ABNER J. PEAKE.