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RODMILL WITH MATERIAL RECIRCULATION MEANS

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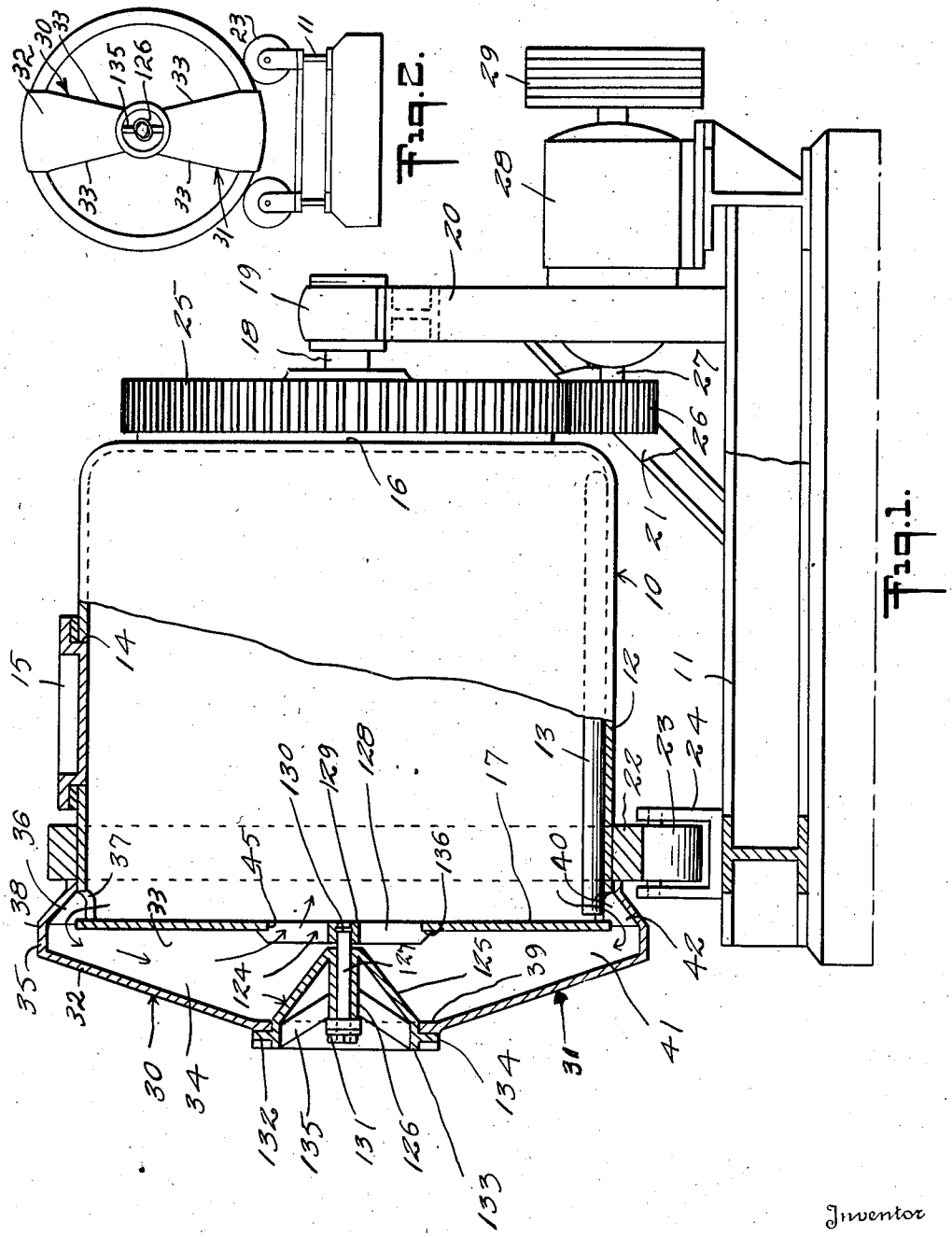


Fig. 2.

Fig. 1.

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ROD MILL WITH MATERIAL RECIRCULATION MEANS

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Original application December 29, 1941, Serial No. 424,839. Divided and this application November 13, 1944, Serial No. 563,242

3 Claims. (Cl. 241—97)

1

This invention relates to a rodmill for crushing, pulverizing or mixing materials, such as dye, face powder, or the like, and is a diversion of my co-pending application, Serial No. 424,839, filed December 29, 1941, for Rodmill, now Patent Number 2,367,585, dated January 16, 1945.

An object of this invention is to provide an improved comminuting or crushing mill including means at one end of the mill whereby the ground material is discharged from the mill into a mixing means rotatable with the mill, so that the already ground material may be initially withdrawn from the mill, and subsequently returned thereto during the rotation of the mill.

Another object of this invention is to provide in a pulverizing or grinding mill an improved means whereby the ground material is taken from the mill at one end thereof and returned to the center of the mill, so that the ground material will mix with the material in the mill.

A further object of this invention is to provide in a pulverizing mill an improved means whereby the ground material may be returned to the mill in such a manner that the force of the return of the material to the mill will act as a mixing means for mixing the ground material with the material which is being ground within the mill.

To the foregoing objects and others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawings, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 shows a side elevation partly in longitudinal section of a pulverizing mill constructed according to an embodiment of this invention.

Figure 2 is an end elevation of this rodmill.

Referring to the drawing, the numeral 10 designates generally a pulverizing mill member which is rotatably supported on a base structure 11. The mill member 10 includes a cylindrical body 12 containing a number of pulverizing units or bars 13. The cylindrical body 12 is formed with an opening 14 through which the material is charged for filling the mill. The closure member 15 is adapted to be removably secured to the cylindrical wall 12 for closing the filling opening 14.

A forward end wall 16 is secured to one end of the cylindrical body 12 and a rear end wall 17 is secured to the opposite end of the cylindrical wall 12. A trunnion 18 is secured to the end wall 16

2

and is rotatably supported in a bearing 19 carried by an upstanding bearing support 20 which is fixed to the base 11 and braced by means of one or more bracing members 21. The cylindrical body 12 adjacent the end wall 17 thereof has secured to the outer peripheral surface thereof a circular track or rail 22, which engages a pair of spaced apart rollers 23 carried by bearing members 24 which are fixed to the base 11.

A ring gear 25 is fixed to the outer side of the end wall 16 and is adapted to mesh with a driving pinion 26 carried by a shaft 27. The shaft 27 is connected to a reduction gearing 28 of conventional construction which has connected therewith a driving wheel 29. The driving wheel 29 may be operated in any suitable manner from a power member (not shown).

The end wall 17 has secured thereto a pair of diametrically opposed and outwardly extending or offset housings 30 and 31. The housing 30 is formed of an outer end wall 32 and opposite side walls 33, thereby forming a pulverized material receiving chamber 34. The outer end of the housing 30 has an outer end wall 35 which is connected with the walls 33 and with the wall 32, and is outwardly offset from the outer marginal edge of the end wall 17. An inwardly extending wall 36 is connected at one end to the forward end of the outer wall 35, and at the other end is fixed to the peripheral surface of the cylindrical body 12 forwardly of the end wall 17.

The cylindrical wall or body 12 is formed with an opening 37 communicating with the passage 38 formed by the wall 36, so that when the housing 30 is in a lowermost position, the pulverized material will flow downwardly through the opening 37 and the passage 38 into the lower portion of the housing 30. The inner portion of the housing 30 is connected to the inner portion of the housing 31 by means of an annular connecting wall 39 which, as shown in Figure 1, is inwardly offset from the outer walls of the two housings 30 and 31.

The housing 31 is similar in every detail to the construction of the housing 30, the cylindrical wall 12 being formed with a discharge opening 40 adjacent the end wall 17 which communicates with the chamber 41 through a passage 42 similar to the passage 38.

When it is desired to return the initially pulverized material from the end housings 30 and 31 to the interior mill, the structure shown in the drawing is adapted to be mounted in the housings 30 and 31 and in the opening 45. The material from the uppermost one of the housings 30 or 31

is guided back to the mill 10 by means of a conical guide member generally designated as 124. The guide member 124 includes a conical body 125 which has fixed axially thereof a tubular sleeve 126. The sleeve 126 engages about a rearwardly extending stub shaft 127 which is secured to a supporting bar 128 removably mounted in opening 45 of end wall 17 being friction tight in opening 45.

The bar 128 is provided with a cylindrical bearing 129, and a pin or fastening device 130 engages through the bearing 129 and through the inner end portion of the shaft 127. A nut or fastening member 131 is mounted on the outer end of the shaft 127 and bears against the sleeve 126, so as to tightly hold the guide member 124 in the opening 132 formed between the housings 30 and 31. A cylindrical base 133 is fixed to the base or outer end of the conical guide member 125 and an annular flange 134 is fixed to the cylindrical base 133 intermediate the ends thereof and bears against the outer side of the annular connecting member 39 which connects the two housings 30 and 31 together.

A plurality of radially disposed and inwardly extending bracing webs 135 are fixed to the inner side of the annular base 133 and to the outer end portion of the sleeve 126. The bar 128 at the opposite end portions thereof is formed with cutouts or notches 136 which form seats for the outer end portions of the bar 128, so as to hold this bar 128 radially of the opening 45 and permit the bar 128 to be removed from the housing 10.

The force of the inwardly moving initially pulverized material is sufficient to cause this material to commingle to a thorough degree with the material within the mill 10. While I have shown two radially disposed housings or guide members designated 30 and 31, it will be understood that there may be one, two, or more of these guide members or housings, so as to effect the discharge of a greater amount of material from these housings back to the mill.

What I claim is:

1. In combination a pulverizing mill including a rotatable body formed with a cylindrical side wall and opposite end walls, a pair of radially disposed housings carried by one of said end walls, each housing comprising a rear wall and opposite side walls fixed to said one end wall, said cylindrical wall having opposed openings, passage forming means fixed to said housings and extending outwardly therefrom, said passage forming means communicating with said housings and encompassing said openings, means forming an annular valve seat between the adjacent ends of said rear walls, said one end wall having an axial opening, a conical guide member engaging between and interiorly of said housings, a cylindrical base carried by the base of said guide member engaging in said valve seat, a tubular member fixed to the apex of said guide member and extending axially outwardly thereof, a stub shaft engaging in said tubular member, means removably engaging in said axial opening supporting the inner end of said stub shaft, means securing said tubular member on said stub shaft and an annular flange carried by said cylindrical base and engaging against the outer side of said valve seat, said guide member directing the material from an uppermost housing inwardly through said axial opening whereby to return the material to said rotatable body.

2. In combination, a pulverizing mill including a rotatable body formed with a cylindrical side wall and opposite end walls, a pair of radially disposed housings carried by one of said end walls, means communicating the outer ends of said housings with said body, said one end wall having an axial opening, and means returning the pulverized material from said housings to the center of said body, said means including a conical member carried at its large end by said housings, a supporting bar extending across said wall opening and means carried axially by said conical member engaging said bar for supporting the inner small end of said conical member.

3. In combination, a pulverizing mill including a rotatable body formed with a cylindrical side wall and opposite end walls, a pair of radially disposed housings carried by one of said end walls, means communicating said housings with said body, said body having an axial opening in said one end wall, a conical member supported between the inner ends of said housings and disposed with the apex thereof confronting said opening, a bar extending across said axial opening and means extending from the apex of said conical member engaging said bar for supporting said apex coaxial with said axial opening, said conical member providing means for returning the material to the center of said body.

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