United States Patent

Schauer

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[54] ROLLER MILL DRIVE

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **241/121,** 310/66, 310/157

[51] **Int. Cl.** **B02c 15/00**

[58] **Field of Search** 310/66, 157, 96, 91; 241/176, 241/178, 103, 121, 117

[56] **References Cited**

UNITED STATES PATENTS

2,909,330	10/1959	Hardinge	241/121
3,083,920	4/1963	Schauer	241/121
2,635,198	4/1953	Wieseman	310/157
2,722,612	11/1955	Danel	310/157
3,549,922	11/1970	Kostin	310/157

FOREIGN PATENTS OR APPLICATIONS

771,185	3/1957	Great Britain	241/121
561,582	8/1958	Canada	241/121

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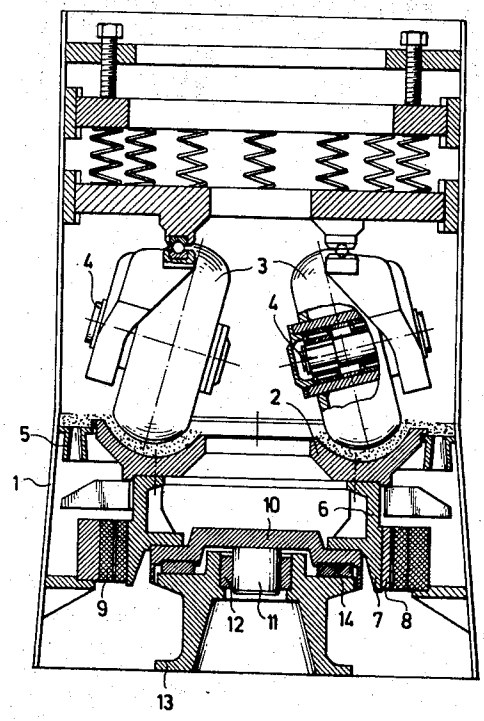
[57] **ABSTRACT**

Drive for roller mills having a horizontally disposed grinding vessel rotatable about a vertical axis and rollers rolling in the vessel that rotate about stationary axles which are under pressure, where one part of the support of the outer periphery of the grinding vessel constitutes the rotor of the electromotor which drives the vessel and which carries the rotor winding is encompassed by a horizontally disposed stationary stator supported directly in the housing of the mill.

2 Claims, 1 Drawing Figure



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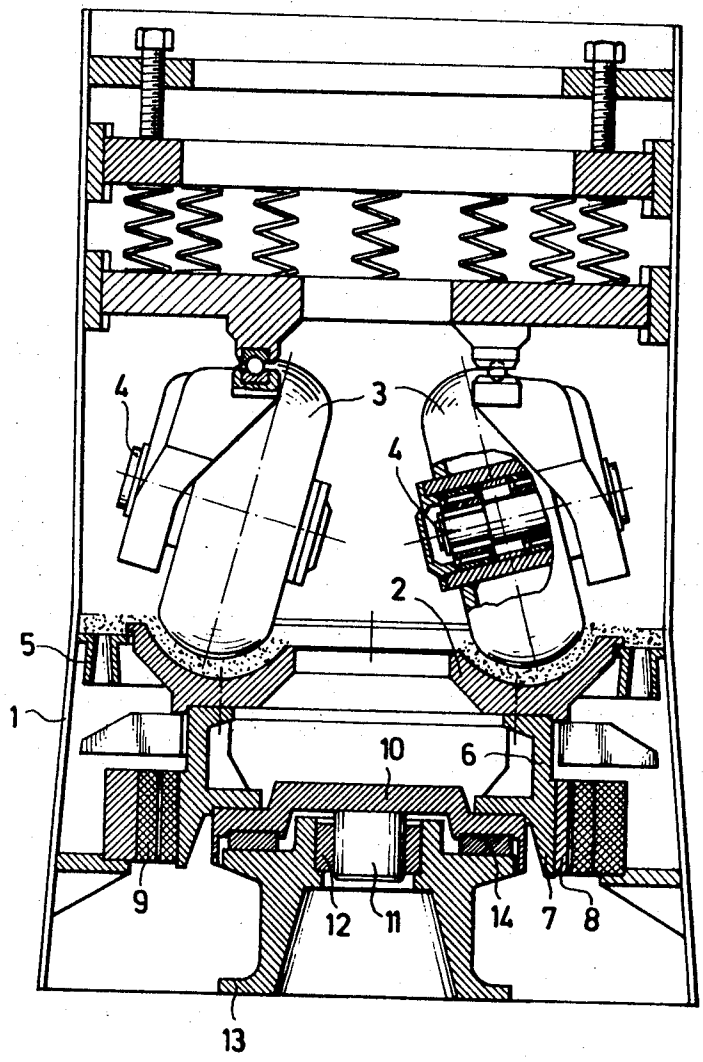

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ROLLER MILL DRIVE

BACKGROUND OF THE INVENTION

The present invention relates to roller mills and is particularly concerned with drive means for vertically disposed roller mills. More particularly, the invention relates to drive means for roller mills having a vertical axis, of the type known as resilient rollers and/or resilient force mills. These mills are equipped with a grinding container or vessel or a grinding bed, and rollers that roll on this bed which rotate about a stationary axis and are spring biased. The grinding rollers thus are pressed against the grinding vessel and the material to be processed is crushed and ground between them.

The grinding vessel or bed is driven in a conventional manner by an electromotor with an intermediate special transmission and rotated, and the rollers that are pressed downwardly from the top are carried along by friction.

Depending on the qualities of the material being ground which is supplied in gritty or irregular particle form, there develop during the process of the material being ground, correspondingly large shocks which are transferred to the special transmission. These shocks express themselves on the one hand in axial thrusts against the transmission, while on the other hand torsional or rotary oscillations develop, i.e. loads on the transmission in tangential direction whereby the gears of the transmission are subjected to excessive wear.

In extreme cases there is the possibility of a rocking movement due to these oscillations in which connection parts of the transmission can be completely destroyed.

The special transmissions which are in question here with their relatively high reduction ratios and the problem of transmitting large forces are very expensive. This applies not only to the gears themselves, but also to repair parts. Besides, extremely high costs can result, especially secondary damage when a mill of this type is out of order due to damage to the transmission.

The invention is based on the problem of eliminating this danger point of the aforementioned mills and to find ways and means how to adapt the drive to the severe operating conditions and to improve the construction.

SUMMARY OF THE INVENTION

In accordance with the invention this object is obtained with a drive for roller mills having a vertical axis, in that an area of the outer periphery of the grinding vessel is constructed in the form of the rotor of an electromotor which is surrounded by a stator fixedly mounted in horizontal position in the housing.

By means of this form of construction, the expensive transmission that was formerly necessary and which is subject to break downs requiring repairs becomes entirely superfluous. Furthermore, this form of construction permits an advantageous journalling of the grinding vessel to absorb the axial forces that arise. Thus, torsional oscillations and the forces connected therewith can no longer be transferred in tangential direction onto components of the transmission and also axial forces become ineffective with respect to the drive.

DESCRIPTION OF THE DRAWING

Further features and details of the invention and advantages obtained thereby will become apparent from the following description with reference to the embodiment of the subject of the application shown schematically in the accompanying drawing.

The drawing shows the lower part of a grinding mill having a vertical axis with the grinding bed and its drive represented in axial section.

DESCRIPTION OF THE INVENTION

A grinding bed or grinding vessel **2** is horizontally disposed in the housing **1** of a mill. This grinding vessel **2** is set in motion about the vertical central axis by a drive means. On the grinding vessel **2** several grinding rollers **3** roll about their stationary axles **4**, while these axles are under pressure from the top. The relative details are known per se.

Furthermore, the grinding bed **2** is surrounded by a nozzle ring **5**.

Heretofore, the grinding vessels of such mills were driven by electromotors with intermediary expensive special transmissions which were sensitive to break down owing to the heavy load. In order to make it possible to eliminate the transmissions and the shortcomings connected therewith, a part of the periphery of the grinding vessel **2** is itself constituted as a rotor of an electromotor. In the embodiment illustrated, the grinding bed **2** is mounted upon a grinding vessel support **6** having a circular periphery which carries the rotor winding **8** in its lower periphery area **7**.

The stator winding **9** of this motor is rigidly disposed in housing **1** and surrounds rotor **8** in a horizontally extending area.

The grinding vessel support **6** in its turn is journalled in a radial bearing **12** that is mounted in a pedestal **13** of the machine with a plate **10** and an axle stud **11** interposed. Furthermore an axial bearing **14** is disposed between plate **10** and machine pedestal **13**.

Due to the direct drive without interposing a transmission, the necessary space is provided for the aforementioned bearings so that above all the axial bearing **14** can be displaced outwardly. The bearings **12** and **14** may be constructed in any desired and known manner to meet the requirements of the heavy loads.

Having now described my invention with reference to the embodiment illustrated in the drawing, what I desire to protect by letters patent is set forth in the appended claims.

I claim:

1. Roller mill drive for roller mill of the type having a grinding vessel disposed in horizontal position in a housing for rotation about a vertical axis and grinding rollers disposed above said vessel operative in response to rotation of said vessel to roll and grind material, said rollers being supported on stationary axles under downward pressure, a support extending downwardly from said vessel, a pedestal disposed below said support, said vessel and support defining the rotor of a motor, a rotor winding extending peripherally about said rotor, and a stator winding fixedly supported in said housing and extending around said rotor winding.

2. Rotor mill drive in accordance with claim **1**, including a base below said rotor having a stud extending downwardly therefrom into said base, an axial bearing between said base and said pedestal, and a radial bearing disposed intermediate said stud and said pedestal.

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