Nov. 27, 1923. 1,475,693

J. FERENCZ

ROLLER GRINDING MACHINE

Filed April 30, 1921

Fig. 2.

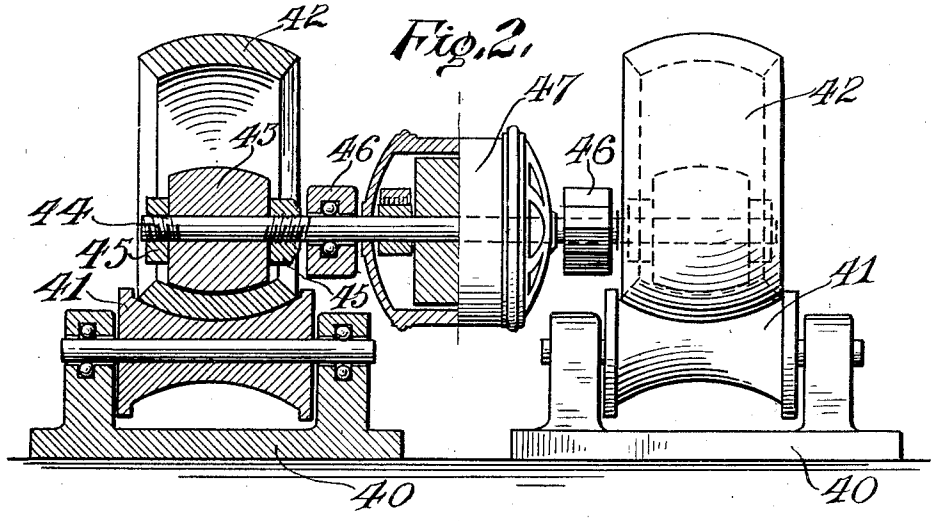


Fig. 3.

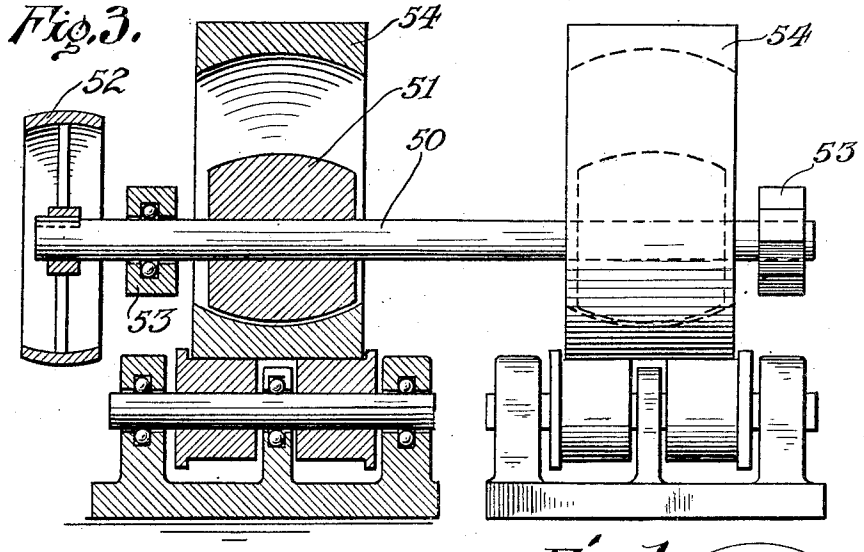
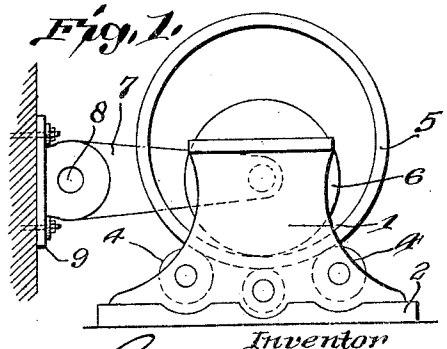


Fig. 1.



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UNITED STATES PATENT OFFICE.

JOSÈ FERENCZ, OF CURITYBA, PARANA, BRAZIL.

ROLLER-GRINDING MACHINE.

Application filed April 30, 1921. Serial No. 465,691.

To all whom it may concern:

Be it known that I, JOSÈ FERENCZ, a citizen of Austria, but having declared my intention to become a citizen of the Republic of Brazil, residing at Curityba, State of Parana, Brazil, have invented certain new and useful Improvements in Roller-Grinding Machines, of which the following is a specification.

This invention relates to grinding machines of the ring and roller type and has for its object the provision of a machine which may be driven at high speed economically and which will be simple, compact and practical in its construction. Various forms of grinding machines have been heretofore produced for finely grinding material as, for instance, to produce powder for the production of cement but these machines have been so constructed as to waste power in the rotation of the moving parts without applying the force to the work of grinding. The said machines have been complicated and costly in construction, depending upon the use of springs or of centrifugal force to hold the grinding members in operative relation. My invention produces a powerful machine in which the driving force is utilized largely in the grinding work and in which the machine is directly driven so as to eliminate complicated trains of gearing or systems of transmitting belts.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional end elevation of one embodiment of the invention;

Fig. 2 is a view partly in front elevation and partly in longitudinal vertical section and

Fig. 3 is a view similar to Fig. 2 but showing another form of the invention.

In Fig. 1, the reference numeral 1 indicates a pedestal rising from a base 2. Supported by the pedestal and the base are a series of sustaining rollers 4 upon which the grinding ring 5 directly rests. This grinding ring may be of any desired diameter and should be of substantial construction, its ends being open to facilitate the entry and withdrawal of the material to be ground such as rock, ores, minerals, or other material. Disposed within the ring 5 is a roller 6 which should be heavy so that it will tend constantly toward the lowest point of the inner periphery of the ring and this roller is rotatably mounted at the front end of a guide arm 7 which is pivoted at its rear end, as shown at 8, to a bracket 9 which is secured to a wall or other fixed support. By this arrangement, power may be applied either directly by motor, as in Figure 2, or through the intermediary of a pulley, as in Figure 3. The weight of the ring is carried by the sustaining rollers 4 and the material to be ground will tend to collect in the space between the inner surface of the ring and the edge or periphery of the roller 6. The roller 6 will be caused to rotate with the material to be ground which will be fed constantly toward the roller by the rotation of the ring. The arm 7, being pivoted in its bracket as at 8 however, holds the roller at the lowest point of the ring 5 so that, instead of the roller being carried around with the ring, it will be caused to roll over the material supported upon the inner surface of the ring and will crush the same to a fine powder.

In Fig. 2, I have shown a form of the invention in which a pair of supporting bases or blocks 40 are provided in spaced relation and the sustaining rollers 41 are mounted in or upon these supporting blocks, it being noted that in this embodiment of the invention the said rollers are dished or provided with concave peripheral surfaces. A grinding ring 42, corresponding to ring 5 in Figure 1 is carried by each set of sustaining rollers 41 and the peripheral surfaces of these rings are transversely curved, as clearly shown. A grinding roller 43, corresponding to roller 6 in Figure 1 is provided within each ring 42 and is carried by a shaft 44 which extends through both grinding rings. Nuts 45 may be provided upon the shaft 44 to securely hold the roller in fixed relation to the shaft and adjacent the inner end of each grinding ring a guide arm 46 is provided to carry the said shaft. Between the guide arms 46, which are similar to arm 7 in Figure 1, an electric motor 47, which may be of any well-known type and is illustrated conventionally, is secured to the shaft 44 so as to rotate the same. It will be noted that in this form of the invention shown in Fig. 2, the rollers are small compared to the rollers shown in Fig. 1, but this reduction in the size of the rollers does not detract from the efficiency of the machine inasmuch as the weight of the motor is carried by the shaft or axle connecting the grinding rollers. In Fig. 3, I have illus-

trated a form of mill very similar to the form illustrated in Fig. 2, but instead of the electric motor 47 power is applied to the shaft 50 carrying the grinding rollers 51 by a belt running upon a band pulley 52 upon one end of said shaft, the guide arms 53 being disposed at the outer sides of the grinding rings 54 these arms being pivoted like arms 7 in Figure 1.

One objection to grinding machines as heretofore operated resided in the fact that the grinding roller was free and if it were attempted to operate the machine at high speed the centrifugal force generated would cause the roller to engage the inner surface of the ring so closely that the roller would travel around with the ring instead of running over the material deposited therein to be ground. This objection is positively overcome in my improved machine in which the grinding roller is held to the center of gravity by the supporting arm and is prevented from traveling with the ring, although it may roll freely upon the material which is carried under it by the ring. The machine may, consequently, be driven at a very high speed so that the grinding operation will be quickly performed and the parts may be made as heavy as desirable so that the material acted upon will be ground to an impalpable powder. It will also be readily noted that complicated trains of gearing and systems of straight and crossed belts are entirely eliminated in my improved machine and the working parts are directly driven.

It will, of course, be understood that the grinding occurs between the inner periphery of the grinding ring and the periphery of the grinding roller so that the ring serves as a grinding surface for the roller and constantly supplies the material to be ground which is held to the periphery of the ring by the centrifugal force due to the rapid rotation and is thereby carried under the roller. The ground material may be discharged either by gravity or by suction. The grinding roller exerts its grinding action through its weight and not through complicated spring-pressure devices nor through the development of centrifugal force. The machine is very compact and able to withstand the hardest use and is adapted to act upon any kind of material, being especially desirable for wet grinding of ore and wood pulp and for use in the manufacture of cement. It is to be understood that I do not confine myself to the specific form of roller nor to the specific form of ring illustrated in the drawings as they may be modified according to the demands to be placed upon them and various changes may be made in the minor details of the apparatus without involving any departure from the spirit or scope of my invention as the same is defined in the following claim.

Having thus described the invention, what is claimed as new is:

A rolling mill comprising drums having open ends mounted for free rotation around a common horizontal axis, a grinding roller in each drum held by gravity in contact with the inner periphery of its respective drum, a shaft extending through said open ends and upon which said grinding rollers are rigidly secured, oscillatory guide arms for said shaft permitting radial displacement of the grinding rollers in relation to said axis, means for rotating said shaft with said grinding rollers; said rotating means including a motor suspended from said shaft, the weight of said motor, shaft, and grinding rollers being sustained upon the inner periphery of said drums; whereby a constant pressure is exerted against said drums independent of the revolving speed of the rollers.

In testimony whereof I affix my signature.

DR. JOSÈ FERENCZ. [L. S.]