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GRINDING RING FOR ATTRITION MILLS.
APPLICATION FILED JULY 24, 1916.

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Patented May 15, 1917.
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2 SHEETS—SHEET 2.
UNITED STATES PATENT OFFICE.

WILLIAM VAN NOSTRAND, OF DALTON, NEW YORK.

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To all whom it may concern:

Be it known that I, WILLIAM VAN NOSTRAND, a citizen of the United States, residing at Dalton, in the county of Livingston and State of New York, have invented certain new and useful Improvements in Grinding-Rings for Attrition-Mills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in grinding mills of the type known to the trade as attrition mills and the object thereof is to provide grinding rings of improved construction by whose use no grain will be discharged until it has been thoroughly ground to predetermined mesh or fineness.

With this general object in view the invention resides in certain novel features of construction and in unique combinations of parts to be hereinafter fully described and claimed, the descriptive matter being supplemented by the accompanying drawings which constitute a part of this application and in which:

Figure 1 is a vertical section of a mill equipped with the improved rings;

Fig. 2 is an enlarged vertical section of said rings showing more particularly the novel arrangement of the grinding ribs;

Fig. 3 is a face view of one of the sections of which the grinding rings are constructed; and,

Fig. 4 is a diagram illustrating the manner in which the grinding ribs of one ring cooperate with those of the other, one section of one of the rings being represented by heavy lines while the light lines represent one section of the other ring.

In specifically describing the structure shown in the drawings above briefly described, similar characters will be placed on corresponding parts throughout the several views and references will be herein made to the numerous elements by their respective indices. To this end M designates broadly an attrition mill comprising briefly a grinding chamber C, a supply hopper H, a passage P for conducting grain from said hopper into the chamber C, and a pair of oppositely driven disks D aligned axially in the chamber C. It is to the inner opposed faces of the disks D that the improved grinding rings 1 are secured by bolts or the like in the usual manner, each of said rings 1 being composed of a plurality of sections 2 disposed end to end, and since all of said sections of both rings are identical, but one is illustrated.

The section 2 has its ends 3 cut on substantially radial lines for contact with the ends of adjacent sections, and the active face of said section is beveled on its inner edge as indicated at 4, this edge being provided with a plurality of radially disposed crushing ribs 5 of suitable construction. At its outer edge, the section 2 is provided with a finishing rib 6 extending from one end thereof to the other, while a number of grinding ribs 7 extend on approximately radial lines from the ribs 6 into spaced relation with most of the crushing ribs 5, one of the latter, however, preferably joining one of the ribs 7 as shown. The ribs 7, although being on approximately radial lines, are strictly speaking disposed on lines tangent to true radial lines.

A plurality of pairs 8 of grading ribs 9 extend from one end of the section 2 to the other end thereof, the ribs 9 of each pair being flush with the grading ribs 7 and being disposed in staggered relation. The ribs 9 and the finishing rib 6 are preferably beveled as illustrated clearly in Fig. 2 in order to prevent them from occupying an unnecessary amount of the cutting area of the grading ribs 7. The ribs 9 of the several pairs 8 are gradually spaced closer together from the inner to the outer edge portion of the section 2 as clearly shown in Figs. 2 and 3.

When the sections 2 are assembled and bolted to the disks D, the finishing ribs 6 and the pairs 8 of ribs on one ring will be directly opposed to those of the other (see Fig. 2). It will thus be seen that as the grain is fed between the two rings at the inner edges thereof, the bevels 4 facilitate this, the ribs 5 will crush said grain and due to the existing space between said ribs and the grading ribs 7, the crushed grain will be distributed equally between said grinding ribs, the latter exerting shearing cuts on the grain due to the tangential disposition of ribs 7 (see Fig. 4). When the grain has been sufficiently ground to pass outwardly through the spaces existing between the innermost rows of ribs 9, it will enter the space between these rows and the outer rows, the latter now retaining said...
grain until it has been ground sufficiently fine to be discharged through the space between the ribs thereof. The grain will now be confined until the ribs 7 have finished the grinding operation after which it will be discharged between the finishing ribs 6.

By constructing the device in the manner shown and described, it will be observed that the grinding will be equally distributed throughout the area of the two rings 1 and the outer portions of such rings will not be overcrowded as usual. Furthermore, the rings are divided into a plurality of annular areas each of which grinds the grain to a predetermined degree of fineness before discharging it to the next area. This construction produces much better results than those heretofore gained by similar devices.

In the foregoing I have described certain specific details for illustrative purposes and in the accompanying drawings have shown the same but it is to be understood that within the scope of the invention as claimed numerous changes may be made.

I claim:

1. A mill of the class described including a pair of axially aligned flat rings each having at its outer edge a continuous finishing rib and having at their inner edges a plurality of crushing ribs, said rings being equipped between said crushing and finishing ribs with grinding ribs extending substantially in radial directions, and a plurality of grading ribs extending between the grading ribs of one ring and those of the other measured in a radial direction decreasing gradually from the inner to the outer edge portions of said rings, whereby to permit only grain which has been ground to predetermined fineness to travel outwardly toward the finishing ribs to be ultimately discharged therethrough.

2. A mill of the class described including a pair of axially aligned flat rings each having at its outer edge a continuous finishing rib and having at their inner edges a plurality of crushing ribs, said rings being equipped between said crushing and finishing ribs with grading ribs extending substantially in radial directions, and a plurality of pairs of circumferential rows of grading ribs extending between and flush with the grading ribs, the ribs of each pair of rows being disposed in staggered relation and the spaces between the ribs of said pairs measured in a radial direction decreasing gradually from the inner toward the outer edge portions of said rings, whereby to permit only grain which has been ground to predetermined fineness to travel outwardly toward the finishing ribs to be ultimately discharged therethrough.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM VAN NOSTRAND.

Witnesses:

ALBERT D. GUTMAN,
LANNES LYON.