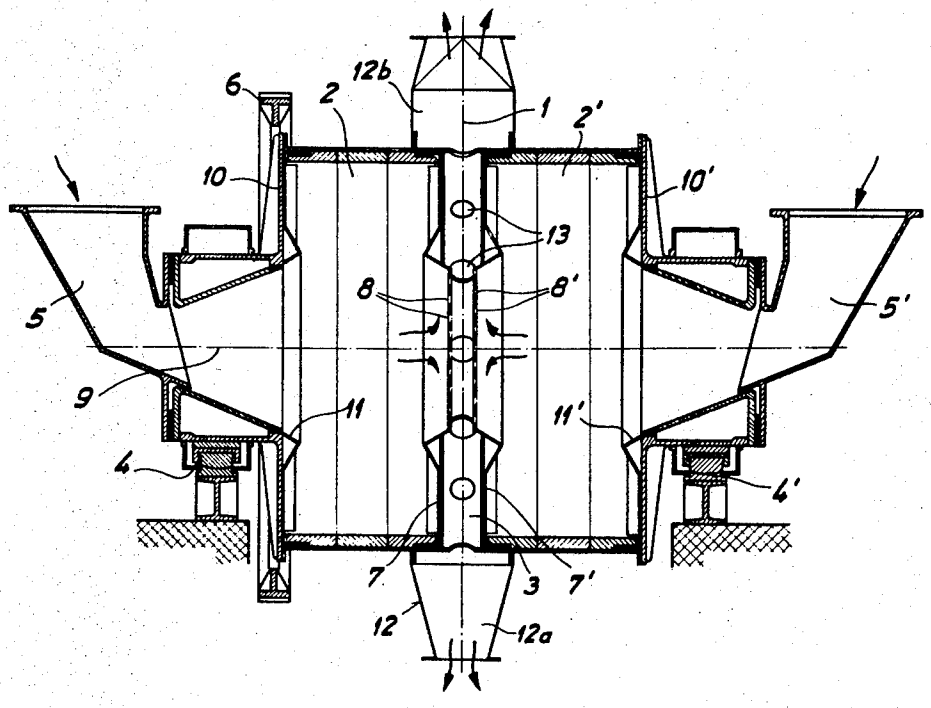
Nov. 3, 1970 H. JURGENJANICH 3,537,658

AUTOGENOUS AIRSWEPT MILL

Filed Dec. 10, 1968



United States Patent Office

3,537,658

Patented Nov. 3, 1970

3,537,658

AUTOGENOUS AIRSWEPT MILL

Hans Jurgenjanich, Neubeckum, Germany, assignor to Polysius G.m.b.H., Neubeckum, Germany

Filed Dec. 10, 1968, Ser. No. 782,698

Int. Cl. B07b 3/00

U.S. Cl. 241—44 2 Claims

ABSTRACT OF THE DISCLOSURE

In this mill, from which the autogenously ground material is extracted by a gas stream, two substantially cylindrical coaxial grinding chambers are mounted to rotate as a unit about their common axis, and are separated by a common extraction chamber. Each of the remote end walls of the grinding chambers is provided with a central inlet aperture for the introduction of gas and material to be ground, and the walls which separate the grinding chambers from the extraction chamber are provided with apertures which extend no farther from the common axis than the inlet apertures and which discharge gas laden with ground material into the extraction chamber.

BACKGROUND OF THE INVENTION

This invention relates to an autogenous airswept mill, wherein the grinding chamber diameter is at least twice the chamber length and the autogenously ground material is extracted from the grinding chamber by an air stream.

Previously known autogenous airswept mills only have one grinding chamber. The length of the mill thus corresponds to one grinding chamber length. Since a relatively large ratio of diameter to length is needed in such autogenous airswept mills to provide good reduction, sieving and drying properties, these known mills have a relatively large diameter and a small length. Since with known constructions the entire amounts of fresh material and air have to be introduced through one bearing journal, and all the air laden with fine material has to be extracted through the other bearing journal, the bearings are also undesirably large.

SUMMARY OF THE INVENTION

The object of the invention is therefore to provide improved autogenous airswept mills of the kind described, which eliminate disadvantages of the known constructions, so that while the specific advantages in regard to reduction, sieving and drying are maintained, the manufacturing costs are lowered for the same output.

According to the invention this object is achieved in that the mill comprises two similarly shaped grinding chambers disposed in mirror-image fashion about a central plane, between which is a common central extraction chamber connected to the two grinding chambers by apertures whose distance from the mill axis does not exceed the radius of the two inlet apertures provided in the two end walls of the mill for the introduction of air and material to be ground.

Mills with two grinding chambers and an intermediate central extraction chamber are already known in another connection. With these mills, however, the grinding chambers, which are filled with grinding bodies, have in general a diameter which is substantially less than twice the length of each grinding chamber. Therefore it is necessary to use one grinding chamber as a coarse grinding chamber and the other as a fine grinding chamber. Also the apertures provided between the two grinding chambers and the central extraction chamber are mainly disposed in the outer area of the extraction wall, so that the ground material is moved into the central extraction chamber by the rotary movement of the mill.

With the autogenous airswept mills of the invention, in contrast, it is a characteristic feature that in both grinding chambers the chamber diameter is at least twice as great as the grinding chamber length; that they are constructed completely alike; and that because of the form of the apertures provided between the two grinding chambers and the central extraction chamber, the autogenously ground material is exclusively extracted by the flowing air.

As compared with previously known autogenous airswept mills, the constructional combination, as provided by the invention, of two similarly operating grinding chambers fed in parallel produces an appreciable reduction in manufacturing costs for the same output. By this construction there is achieved a smaller mill diameter and a larger mill length, for the same output, while maintaining the required large ratio of diameter to length in the grinding chambers. Since the price per kilogram for the end walls, made of steel castings, is higher than for the mill casing, this alone gives a reduction in manufacturing costs. With the device provided by the invention, the diameter of the bearings may also be reduced, since the quantity of raw material and air to be fed into the mill is distributed between the two journals of the mill. Cost studies thus show that in spite of the constructional expense involved in central extraction, the total manufacturing costs can be appreciably reduced.

While the replacement of even a single autogenous airswept mill of known design in a grinding plant by a mill in accordance with the invention represents a considerable technical advance, there is even more advantage if two autogenous airswept mills are needed in a plant, which is frequently the case. While separate mills have hitherto been provided for this purpose, the invention provides constructional union of two similar autogenous airswept mills, which reduces by half the number of mill end faces and mill bearings required.

BRIEF DESCRIPTION OF THE DRAWING

The drawing shows in longitudinal section one form of mill embodying the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The mill contains two substantially cylindrical coaxial grinding chambers **2**, **2'** disposed in mirror-image fashion on both sides of a central plane **1**, between which is disposed a common central extraction chamber **3**.

The mill is supported in two journals **4**, **4'**, and adjacent each bearing is provided with an inlet **5**, **5'** for raw material and air (or hot gas). Mill drive is effected by a toothed wheel **6**.

Between the grinding chambers **2**, **2'** and the central extraction chamber **3** are provided two walls **7**, **7'** which have apertures **8**, **8'** in their central areas only. The distance of these apertures **8**, **8'** from the mill axis **9** does not exceed the radius of the inlet apertures **11**, **11'** which are provided in the two end faces **10**, **10'** of the mill and are used for introducing air and material to be ground.

The fixed extractor housing **12** is provided with a lower outlet pipe **12***a* into which coarse material falls, and an upper outlet pipe **12***b* for air charged with ground material. The central extraction chamber **3** communicates with the extractor housing **12** via apertures **13** provided in the periphery of the extraction chamber **3**.

For both grinding chambers **2**, **2'** the chamber diameter is more than twice the chamber length. Neither grinding chamber contains any filling of grinding elements; instead

autogenous grinding takes place therein through the material shattering and comminuting itself.

Both grinding chambers **2**, **2'** are supplied in identical manner with fresh raw material and air (or hot gas) via the inlets **5**, **5'**. The air streams passing axially through both grinding chambers **2**, **2'** towards the centre have a drying and sieving effect in each chamber and entrain material which has been sufficiently reduced into the central extraction chamber **3**. Here any coarse particles which may have been taken up by the air stream fall out, and are removed through the lower pipe **12***a* via the extractor housing, to be subjected to fine grinding in another mill, possibly after initial air sifting. The air current, charged with the rest of the ground material, is discharged through the upper pipe **12***b* of the extractor housing **12**, preferably to an air classifier.

I claim:

1. An autogenous rotary mill from which the autogenously ground material is extracted by a gas stream, wherein the improvement comprises two substantially cylindrical coaxial grinding chambers which are mounted to rotate as a unit about their common axis and are separated by a common extraction chamber, the remote end walls of the grinding chambers each being provided with a central inlet aperture for the introduction of gas and of material to be ground, and the walls which separate the grinding chambers from the extraction chamber being provided with apertures which extend no farther from the common axis than the inlet apertures and which discharges gas laden with ground material into the extraction chamber, the diameter of each grinding chamber being at least twice its axial length.

2. An autogenous rotary mill according to claim **1** wherein the extraction chamber is provided with peripheral discharge apertures and is surrounded by a fixed extractor housing for collecting the discharged gas and ground material.

References Cited

UNITED STATES PATENTS

1,627,488	5/1927	Crowe	241—44
2,351,870	6/1944	Newhouse	241—49 X

TRAVIS S. McGEHEE, Primary Examiner

U.S. Cl. X.R.

241—49, 54