May 24, 1938. H. J. M. VON GERNET 2,118,628

GRAVITY IMPACT ROLLER MILL

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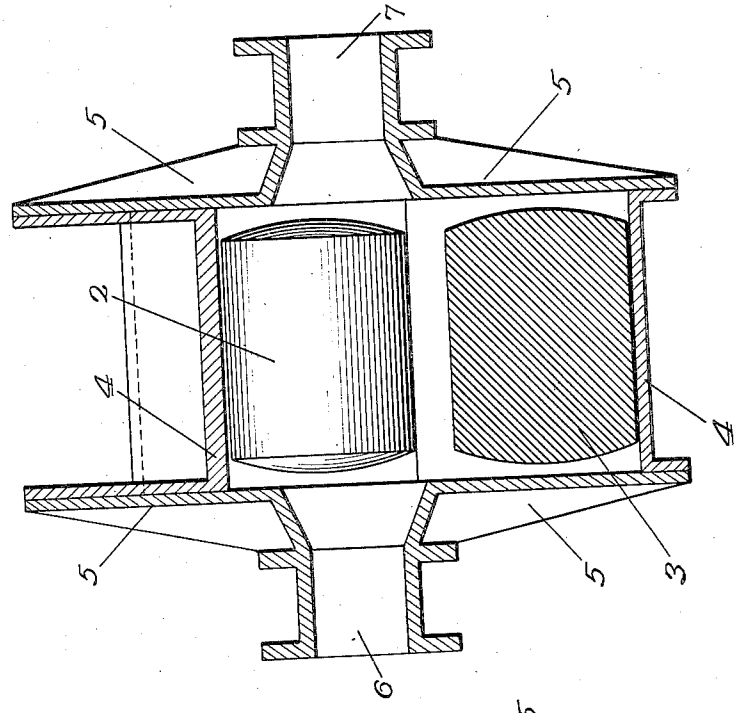


Fig. 2

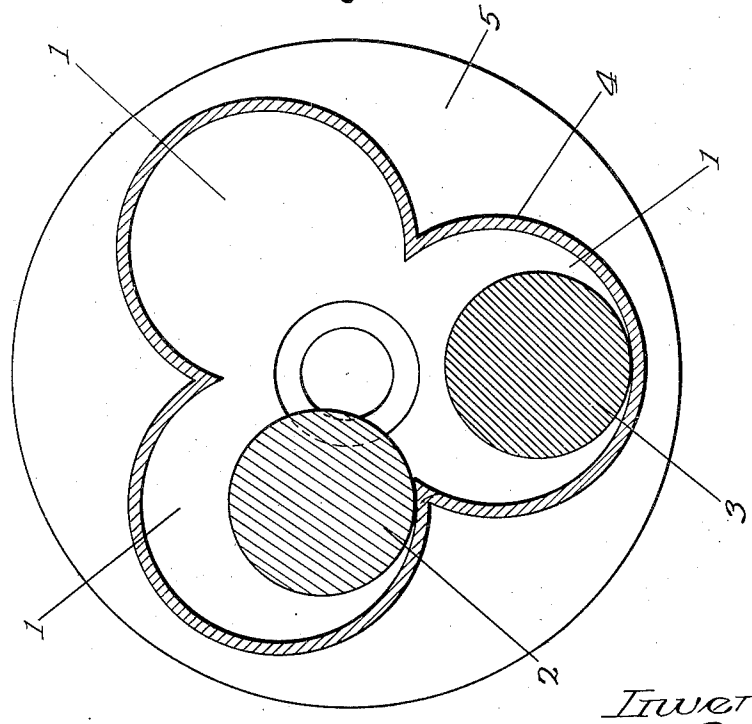


Fig. 1

Inventor:
Hans Jurgen Magnus Von Gernet
By Fisher, Clapp, Sears & Pond, Attys.

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GRAVITY IMPACT ROLLER MILL

Hans Jürgen Magnus von Gernet, Pretoria,
Union of South Africa

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3 Claims. (Cl. 83—9)

The invention relates to improvements in machines for converting into sand or powder, frangible materials such as ores, and may be considered as an improvement upon or substitute for stamp mills, tube mills or ball mills.

The principal object of the invention is to provide a machine which will possess the advantages of an impact mill such as a stamp mill, coupled with the advantages of a grinding mill such as a tube mill or ball mill.

The particular or preferred embodiment of the invention is illustrated in the drawing attached to this application, in which—

Fig. 1 is a section taken through a mill constructed in accordance with my invention, the section being taken perpendicular to the axis of rotation, and

Fig. 2 is a section of said mill taken through the axis of the mill.

Referring to the drawing, it will be observed that the machine is of the rotary type and its principal parts comprise a crusher housing or compartment 1, which is composed of a plurality of pockets or hollow lobes communicating with each other at a central point, said compartment containing two or more pestles of such size and shape that as the structure revolves, the pestles may fall or roll out of one of the lobes into an adjacent lobe of the structure. Preferably, these pestles are also of such size that each lobe which is preferably in the shape of a part of a circle, cannot contain more than one pestle at a time. Hence, in practice, it is found desirable to employ a greater number of lobes than pestles, in the present instance, the structure comprises three lobes and two pestles. Also, in the present instance, the pestles take the form of solid metal cylinders having their axes disposed parallel to the axis of rotation of the structure, and the inside wall surface of each lobe forms part of a hollow cylinder in which a cylindrical pestle may roll.

Preferably the grinding or crushing compartment is made of a single casting 4 and its rotation is effected by mounting it rigidly between a pair of disk-like side plates 5 which are provided with axial extensions 6 and 7 in the form of hollow trunnions mounted upon any suitable type of bearing which will permit the structure as a whole to rotate and through which power may be applied to effect such rotation.

The hollow trunnions 6 and 7 are enlarged at their inner ends so as to communicate with the interior of the structure so that one of them may be used for admitting the material to be crushed, and the other may be utilized as a discharge for the crushed and pulverized material.

In operation the structure is revolved around its axis with such speed that as a pestle is elevated in one of the lobes it will finally reach a point where it will drop from the edge of the lobe onto the pestle in the lobe following and thereby exert a hammering or stamping action upon any other material which happens to be located in the zone of impact at that time. As the structure continues to revolve, the upper roller will then roll off the lower pestle into the next succeeding lobe which at that time is empty and will then roll around the interior of said last named lobe until it has completed the full cycle of operation.

Each of the pestles operates successively as above described, and as the rollers roll around the interior cylindrical surface of the crushing compartments, they will thoroughly grind and pulverize the ore or other material to the requisite degree of fineness.

Depending upon the character of the ore or other material, the arrangement may be utilized with or without water.

It will be understood that the scope of the invention is to be determined by reference to the appended claims which should be construed as broadly as possible consistent with the state of the art.

I claim as my invention:

1. In a crusher of the class described, a rotatable housing having a central passageway extending longitudinally therethrough, the walls of said housing defining three cylindrical pestle chambers, each approximating in general outline a circular section, arranged symmetrically around said central passageway and opening thereinto through an opening extending longitudinally along one side of each of said chambers, two generally cylindrical pestle rolls each having a transverse dimension which is substantially less than the transverse dimension of said pestle chambers, such that only one pestle can occupy one of said pestle chambers at any one time, the proportioning of the several elements of said crusher being such that during the operation of said crusher each pestle upon entering one of said pestle chambers rolls around within that chamber, thence out of that chamber and over the pestle in the adjoining chamber into the succeeding open chamber.

2. In a crusher of the class described, a rotatable housing having a central passageway extending longitudinally therethrough, the walls

of said housing defining three generally cylindrical pestle chambers, each approximating a circular section in general outline, arranged symmetrically about said central passageway and opening thereinto through a restricted opening extending longitudinally along one side of each of said chambers, and two generally cylindrical pestle members, each having a diameter greater than one-half the diameter of said pestle chambers in order that only one pestle can occupy one of said pestle chambers at any time, the walls of each of said pestle chambers extending a distance equal to more than one-half of a circle, thereby assuring that each pestle shall enter alternate chambers during the operation of said crusher.

3. In an apparatus of the class described, a housing the walls of which are so formed that they define a plurality of symmetrically arranged pestle chambers, each chamber substantially cylindrical in outline, and a plurality of generally cylindrical pestles of substantially equal diameters, each of such size that only one pestle may be completely housed within one pestle chamber at any time, there being a lesser number of pestles than of pestle chambers, the terminal edges of the walls of adjacent chambers meeting to form a series of cusps, the distance between centers of adjacent cusps being less than the diameter of a chamber, the diameter of a pestle being greater than the radius of a chamber but less than the depth of that chamber, whereby the uppermost one of a series of ascending pestles shall roll around the wall of its enclosing chamber and then out of that chamber to impact and roll over the pestles in the adjacent ascending chambers and thereafter fall into the next following open chamber.

HANS JÜRGEN MAGNUS VON GERNET.