

UNITED STATES PATENT OFFICE

2,690,880

RECTILINEAR PULVERIZER

John B. Chatelain, Freeport, Tex., assignor, by
mesne assignments, to Freeport Sulphur Com-
pany, New York, N. Y., a corporation of Dela-
ware

Application April 10, 1951, Serial No. 220,193

5 Claims. (Cl. 241-39)

1

This invention relates to pulverizers and more particularly to the design of the grinding chamber for fluid jet operated pulverizing mills.

Fluid jet operated pulverizing mills of various shapes and designs have been known and used for many years. The present invention is directed to the improvement of the efficiency of this type of pulverizing mill. The basic criteria for determining the efficiency of these mills is the particle size produced, the uniformity of the particle size, the pressure and volume of air required for operation and the rate the material can be passed through the mill. It is not sufficient merely to improve the grinding characteristics of the mill, in addition, the classification must be improved, if a suitable product is to be obtained.

In existing designs of pulverizers, difficulty has been experienced due to the grinding chamber accumulating material between the grinding jets, in its peripheral portions. This material accumulates until it extends into the main circulating stream of grinding fluid. When this occurs, the accumulated material is rapidly entrained into the circulating stream of grinding fluid, much of it entering the classifying vortex and passing to the collector without proper reduction in size. This results in an unsatisfactory product, due to the presence of a high percentage of oversize particles. This accumulation and periodic ejection, of the accumulated material, occurs in the standard, fluid jet, pulverizing mill as a rhythmic cycle.

It is frequently more desirable to produce a product of uniform size than to grind the material as fine as possible. Many materials processed in this type of mill should not be reduced to the smallest particle size possible, but rather they should be reduced to particles of intermediate size. In the case of many of these materials, however, it is critical that the particle size be uniform. An example of such a product is penicillin, wherein the maintaining of an effective level in the blood for therapeutic purposes is largely dependent upon obtaining a product having a uniform particle size falling within a relatively narrow range. My invention is directed to obtaining a product having a high percentage of particles of uniform size while increasing the capacity of the mill.

To obtain this objective, it has heretofore been conventional practice to increase the number of jets of grinding fluid entering the grinding chamber. This, however, decreases the efficiency of the grinding action. Although the particle size

2

of the final product is more uniform, the rate of feed of the material through the pulverizer must be reduced to prevent the final product from being too large.

My invention overcomes this difficulty by reshaping the grinding chamber so that little or no area remains for the accumulation of material. This may be done by placing segment or filler blocks between the jets in the conventional circular grinding chamber or by initially so designing the chamber that its walls are noncircular and eliminate the areas of accumulation.

It is, therefore, a primary object of my invention to redesign the internal shape of the grinding chamber of fluid jet, pulverizing mills whereby the material accumulating, peripheral pockets are eliminated.

It is a further object of my invention to reduce load fluctuations in the grinding chamber.

It is an additional object of my invention to increase the capacity of these mills and at the same time to increase their grinding efficiency.

It is a further, additional object of my invention to provide a pulverizing mill capable of producing a product of more uniform size.

These and other objects and advantages of my invention will be immediately seen by those acquainted with the design and operation of fluid jet, pulverizing mills upon reading the following specification and the accompanying drawings.

In the drawings:

Figure 1 is a central, sectional, elevation view of a mill equipped with my segments.

Figure 2 is a sectional view taken along the plane II—II of Figure 1, not showing the means for anchoring the segments to the mill.

Figure 3 is a fragmentary, enlarged, sectional view of the nozzle installation in the mill shown in Figures 1 and 2.

Figure 4 is a central, sectional, elevation view of a mill equipped with filler segments to provide a substantially square grinding chamber, and taken along the plane IV—IV of Figure 5.

Figure 5 is a sectional view taken along the plane V—V of Figure 4.

Figure 6 is a sectional, elevation view of a mill having a square grinding chamber and no fillers, taken along the plane VI—VI of Figure 7.

Figure 7 is a sectional view taken along the plane VII—VII of Figure 6.

Figure 8 is a central, sectional view of a mill having a triangular grinding chamber.

Figure 9 is an enlarged, sectional, elevation view taken along the plane IX—IX of Figure 8.

Figure 10 is a central, sectional view of a modi-