

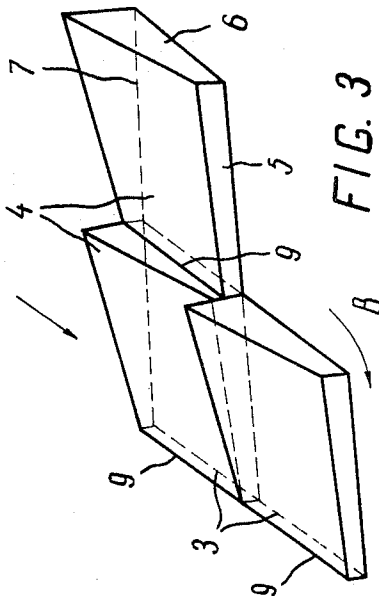
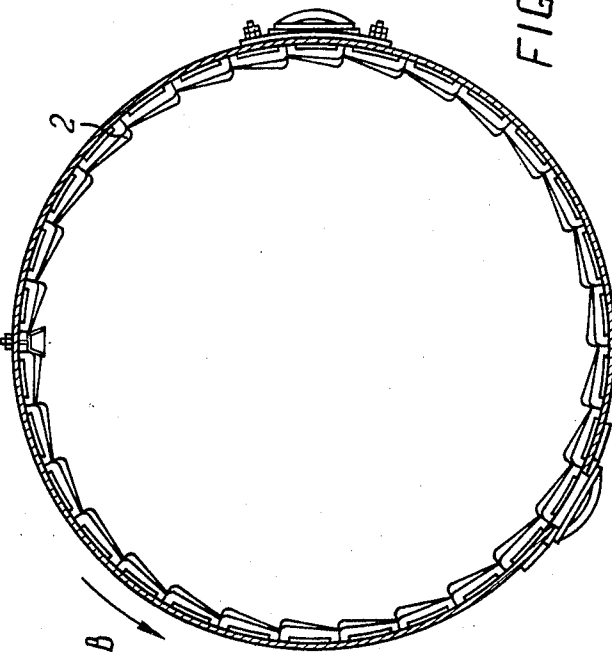
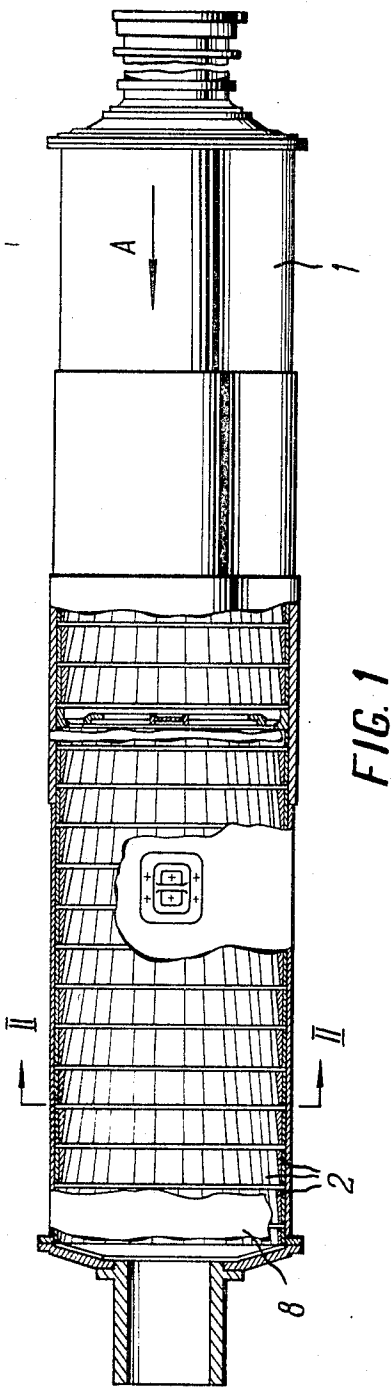
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SORTING ARMORED LININGS FOR TUBE MILLS

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SORTING ARMORED LININGS FOR TUBE MILLS
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5 Claims

ABSTRACT OF THE DISCLOSURE

A sorting armored lining for a tube mill comprising a plurality of hexahedron plates mounted on the inner surface of the mill body in edgewise abutment to define a stepped surface in the longitudinal direction of the mill as well as in the direction of rotation. Each plate has an inwardly facing surface which is inclined relative to the inner surface of the body in the direction of the discharge zone of the mill body and in its direction of rotation.

The present invention relates to sorting armored linings of tube mills and, more particularly, to sorting armored linings with a stepped surface, which ensure a continuous classification of grinding bodies along the length of the mill in accordance with the size of particles of a material being ground.

Until now a cone-stepped armored lining has been used, the working surface of which is made as steps formed by truncated cones whose tops are directed toward the mill discharging section; additionally, the step surfaces have projecting cams designed to avoid sliding of the material charged into mill and to protect the lining from wear.

The energy transferred from the lining to grinding bodies along the mill length toward the discharging end decreases due to the decrease in the mill inner diameter toward the discharging section.

The main disadvantages of this type of lining are its great size which results in a considerable reduction of useful capacity and effective diameter of the mill, and consequently, in its lower productivity. Moreover, such lining is unfit for classifying a small-ball and cylindrical charge, due to the jamming of grinding bodies in the gaps between the cams. There is a known sorting lining made as a cylindrical surface with armored gibs on it, the height of the gibs decreasing towards the mill discharging end. Such lining is unfit for classifying a large-ball charge because of the deformation of bolts fixing the gibs.

The industrially used rack-type sorting armored lining is only capable of sorting cylindrical grinding bodies and is unfit for sorting balls.

Also known are helical sorting armored linings, wherein the classification of grinding bodies takes place as the result of the impact produced on them by helical projections.

The disadvantage of such linings is that it facilitates a faster passage of material being ground through the mill, thus making it more difficult to obtain a product of a required fineness of grinding.

It is an object of the present invention to provide a sorting lining that ensures proper sorting of both ball and cylindrical grinding bodies.

It is another object of the invention to increase the useful capacity and effective diameter of the mill, and consequently, its efficiency.

In the accomplishment of said and other objects of the invention the lining surface has steps not only in the longitudinal, but also in lateral (circular) direction, each

step having a double slope directed towards the discharging zone of the mill and in the direction of mill rotation.

In accordance with above and other objects of the invention, the latter consists of a sorting armored lining with a stepped surface for tube mills, which lining surface has steps both in the longitudinal and lateral (circular) direction, the surface of each step having relative to the inner surface of the mill body a slope directed towards the discharging zone of the mill and in the direction of mill rotation.

Other objects and advantages of the present invention will become apparent upon the consideration of a detailed description thereof, reference being had to the accompanying drawing, wherein:

FIG. 1 is a side view of the mill according to the invention with a partial longitudinal section revealing the lining (arrow A indicates the direction of longitudinal displacement of the material inside the mill).

FIG. 2 is a section taken along lines II—II of FIG. 1 (arrow B indicates the direction of mill rotation);

FIG. 3 is a perspective view of separate armored plates of which the lining is comprised.

The armored lining of a tube mill (FIG. 1) consists of separate elements, i.e. armored plates 2 (FIGS. 2 and 3). Each plate is an irregularly-shaped hexahedron, whose smallest (lateral) face 3 is a rectangle, while the largest (upper) face 4 adjoins the face 3 so that it has a double slope relative to the latter.

Other lateral faces 5, 6 and 7 are of trapezoidal shape, the slope of their lateral sides depending upon the inclinations of the upper face 4.

Each plate is supported inside the mill so that the distance from the mill body to the largest face 4 diminishes in the direction of the mill rotation and towards its discharging section 8.

The plates 2 are abutted against the inner surfaces of the mill, forming steps both in the longitudinal and lateral (circular) direction. The lowest positioned face 9 of each step extends along the longitudinal axis of the mill.

This type of lining surface insures adequate declassification of all grinding bodies, both ball and cylindrical ones, in accordance with the size of particles of the material being ground.

The double slope of the step insures the least variation in its height at an adequate classifying ability; this results in an increase of useful capacity of the mill and, consequently, of its productivity.

We claim:

1. A sorting armored lining for a tube mill having a hollow mill body which is rotatable about a longitudinal axis and has an inlet zone and a discharge zone, said lining comprising a plurality of plates mounted on the inner surface of said mill body and defining a stepped surface in the longitudinal direction as well as in the lateral annular direction, each plate having a surface which is inclined relative to the inner surface of the mill body in the direction of the discharge zone of the mill body and in the direction of its rotation.

2. A lining as claimed in claim 1 wherein the inclination of each step is such that the thickness of the step diminishes in the direction of said discharge zone and in the direction of rotation of the mill body.

3. A lining as claimed in claim 1 wherein each step is an irregularly shaped hexahedron, said steps each being in abutment on all its lateral surfaces with adjacent steps.

4. A lining as claimed in claim 3 wherein each step has a lateral rectangular surface facing in a longitudinal direction and three other lateral surfaces of trapezoidal shape, and an inner surface of rectangular shape abutting the inner surface of the mill body and an outer surface which corresponds to said surface which is inclined rela-

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tive to the inner surface of the mill body in two directions.
5. A lining as claimed in claim 1 wherein each step
is bounded on all its surfaces by planar faces.

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