Feb. 17, 1931. E. KRAMER 1,793,097

DISINTEGRATING MILL BEETLE

Filed Jan. 31, 1929

Fig. 1

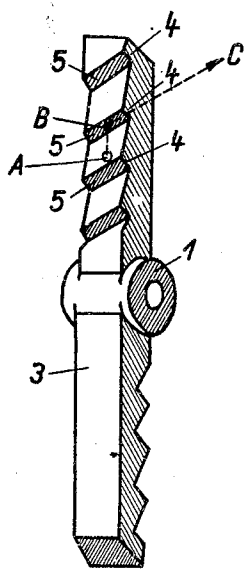
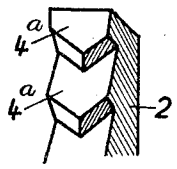


Fig. 2



Inventor:
Erwin Kramer
By Atty.

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UNITED STATES PATENT OFFICE

ERWIN KRAMER, OF BERLIN, GERMANY, ASSIGNOR TO HARTSTOFF-METALL AKTIEN-GESELLSCHAFT, OF BERLIN-KOPENICK, GERMANY

DISINTEGRATING-MILL BEETLE

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This invention relates to a beetle for use in disintegrating beetling mills. The configuration of this beetle has been so changed and improved that either with same expenditure of power as heretofore the output of the mill is considerably increased, or the same output as heretofore is had with a considerably smaller expenditure of power; of course, also both effects can be attained at a time, each in a somewhat lesser degree than otherwise. Besides, the grinding attained with this improved beetle is finer than with beetles of the known type.

With the known disintegrating beetling mills a certain amount of the particles of the material ground accumulates upon the beetles and this amount increases in correspondence with the increase of the fineness of the particles. The accumulated particles slide along the beetles due to the action of the centrifugal force, and their speed increases until they finally fly off the beetles at the free ends thereof, and bounce either upon a portion of the wall of the mill casing or contact with other particles which whirl around in the mill without any purpose and effect. The degree of the disintegration of the material is hardly perceivably promoted so that the accumulation of the kinetic energy in the particles carried around with and by the beetles constitutes a useless expenditure of work which, moreover, is accompanied in most cases with an undesired generation of heat.

Another detrimental effect of the particles carried around with and by the beetles is their cushioning effect by which the intensity of the blow with which the beetles strike the particles of the material undergoing disintegration is reduced and rendered, therefore, less effective.

Finally, the phenomenon is oftentimes met with that when a certain degree of disintegration or fineness has been attained the particles are no longer acted on at all by the beetles, but move in the mill casing with the same speed as the beetles.

All these drawbacks are obviated by my present improved disintegrating mill beetle, the characteristic feature of which resides in the particular configuration of its operating face or faces which is or are so designed that the particles encountered, and acted on, by them are caused to leave the operating face nearly instantly after their contact with it. The particles do no longer uselessly slide along the operating faces, they are no longer uselessly accelerated, less power is consumed, and the temperautre in the mill casing is lowered. Also the cushioning effect is considerably reduced, and the useless circulation of the particles greatly diminished so that the beetles are by far more usefully active and produce a remarkably finer disintegration.

The progress made becomes particularly perceivable when a specifically heavy material is being disintegrated; this is true especially of metals, in that with these the useless acceleration referred to above necessitates a particularly large expenditure of power or labor.

The invention is illustrated diagrammatically and by way of example on the accompanying drawing on which

Figure 1 is a perspective illustration of a disintegrating mill beetle designed according to this invention, and Figure 2 shows a portion of a modified beetle.

On the drawing, 1 (Fig. 1) denotes the common hub of the beetles 2 and 3, each of which is on its operating face provided with a plurality of ledges 4 which are preferably oblique, as shown in the figure. The profile of such a beetle resembles that of a saw for sawing in one direction. 5 denotes the oblique shoulders of the ledges. Supposing, a particle of the material undergoing disintegration is encountered at the point A, it will, instead of sliding along to the end of that operating face, as hitherto, be intercepted after a very short path by the nearest shoulders, at the point B thereof, and thereby will be deviated laterally, out of the path of the beetle, in the direction indicated by the arrow C.

While in Fig. 1 every ledge has only one oblique shoulder, every ledge of the modification shown in Fig. 2 has two such oblique shoulders, the particles being, thus, deviated to either one or the other side of the path or

plane of the beetle, according as whether a particle contacts at the end of its short sliding path with the respective lefthand or righthand oblique shoulder.

Whether the one or the other embodiment of these beetles is used, or, perhaps, both together or, perhaps, similarly designed beetles, depends upon the circumstances, for instance, upon the size and shape of the mill casing, the number of the beetles, and the material to be dealt with.

In every case it is, however, important that there be left sufficient space between the beetles and the wall or other parts of the casing so that the beetles can operate in the proper manner, especially as regards the deviation of the particles, as described.

I wish it to be understood that I do not limit myself to the two embodiments shown in the drawing merely by way of example. These are particularly effective, it is true, but also modifications can be successfully used, if they are so designed that the particles encountered by projections (teeth, ledges, etc.) provided on the operating faces are deviated laterally after having covered a possibly short path upon the respective beetle.

I claim:

1. A bar-shaped beetle for use in beetling mills, having its operating face subdivided into separate ledges substantially vertically disposed to the plane of rotation and each provided with shoulders for deflecting the particles of the material to be disintegrated.

2. A bar-shaped beetle for use in beetling mills, having its operating face subdivided into ledges substantially perpendicular to the direction of rotation of the beetle and provided with shoulders arranged at an angle relative to the longitudinal axis of the beetle, so as to constitute a deflecting surface for the particles of the material to be disintegrated.

In testimony whereof I affix my signature.

ERWIN KRAMER.