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BEATER WHEEL MILL

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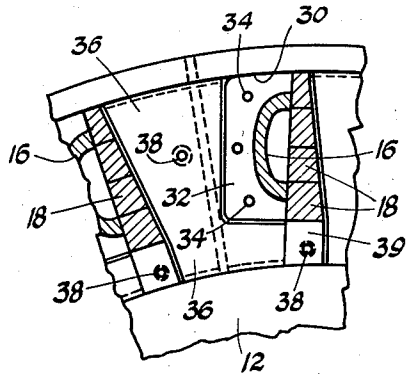


Fig. 2

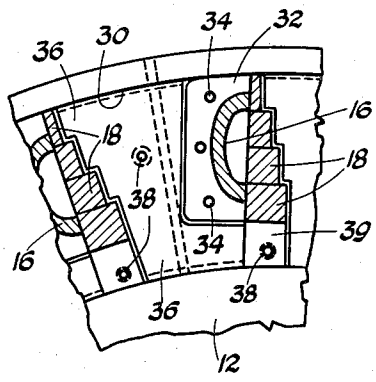


Fig. 3

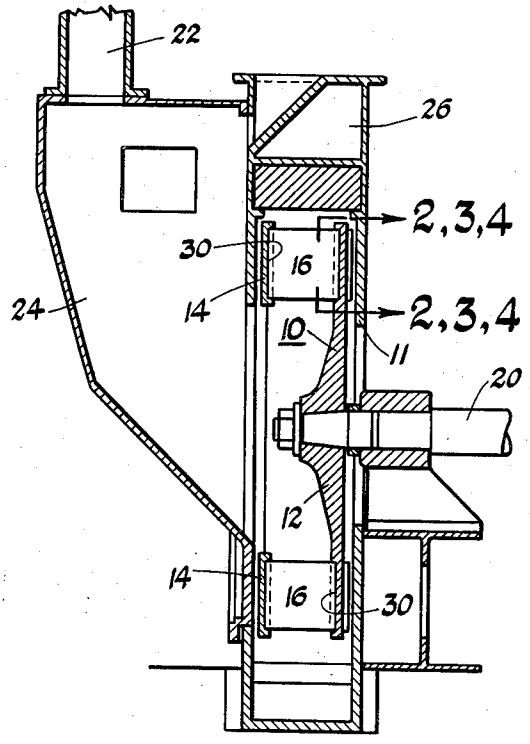


Fig. 1

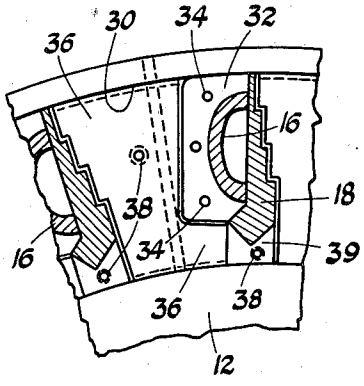


Fig. 4

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BEATER WHEEL MILL

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3 Claims. (Cl. 241—188)

The invention relates to a beater wheel mill having an axial inlet for receiving the carrier gas and the raw material to be ground therein, and being provided with means for passing the material and carrier gas through the beater wheel in radial directions. More specifically the invention relates to a beater wheel mill having lateral bars connecting the wheel disc of the beater wheel with the ring disc spaced therefrom and in which these bars are lined with heavy liner plates.

In beater wheel mills as presently known and in which the beater plates or liner plates possess the shape of a parallelepiped, unusual heavy demands as to abrasion are made on the material inflow portion of the beater plates, that portion which is facing the axis of the wheel, whereas the material outflow portion is subjected to relatively light demand of wear. This results in a wearing through of the inflow portion of the beater plates while at the same time the outflow portion retains nearly the same thickness as the original thickness of the plates. The extensive wear of the inflow portion of the beater plates necessitates early replacement thereof since a continuation of operation of the mill would otherwise lead to abrasion of the beater bars which must be prevented at all costs. Accordingly only approximately 50% of the weight of the beater plates can be made use of before replacement thereof must be considered. This results in high abrasion costs and considerable reduction of the operating availability of the mill.

In accordance with the invention a considerable improvement of these conditions is secured by reducing the thickness of the beater or liner plates in the direction of material flow. In this connection the thickness of the liner plates can, in accordance with the invention, be either reduced by following the line of a gradual slope or by steps. In this way it is possible to operate the beater wheel continuously for a longer time per pound of liner plate since up to 80% of the weight of the plates can now be made use of. Accordingly not only the availability rate of the mill, i. e. operating time per pound of liner plate replaced, is thereby considerably increased but operation costs due to abrasion are also substantially reduced.

In accordance with the invention the operating costs due to wear are further diminished by sub-dividing the beater plates into several portions along planes parallel to the wheel axis. In this manner those beater plate portions which are located near the wheel axis and which have not been completely used up can be utilized as liner plates at locations more distant from the axis of the beater wheel. In addition the total weight of the individual beater plate is distributed over several beater plate sections so that these beater plates can be handled easier when replacement becomes necessary.

Furthermore the invention provides that the beater plates are bent near the end facing the wheel axis in a direction opposing the direction of rotation. In this manner a shock free entrance of the material and carrier gas into the beater wheel is effected whereby additional abrasion of the inflow side portion of the beater plates due to turbulence is substantially reduced.

Further details and objects of the invention will become apparent from the drawing and from the following description thereof.

In the drawings—

Fig. 1 shows an elevational partial section of a beater wheel mill, said section being taken in a plane parallel to the axis of the mill.

Figs. 2, 3 and 4 show parallel sections taken respectively on lines 2—2, 3—3 and 4—4 of Fig. 1, illustrating in an enlarged scale beater plates of different forms.

Referring to Fig. 1 the beater wheel mill comprises a beater wheel assembly **10** rotating in a housing **11** and having a solid wheel disc **12**, a ring disc **14** and lateral bars **16** connecting wheel disc **12** and ring disc **14**. Bars **16** are protected by liner plates or beater plates **18** (see Figs. 2, 3 and 4). The beater wheel assembly **10** is supported by a shaft **20** journalled at one end only and driven by an electric motor or the like, not shown. Coal and carrier gas is introduced by way of duct **22** into the entrance chamber **24** of the mill from where the coal and gas enter the beater wheel assembly **10** in an axial direction. The coal and carrier gas thereupon pass through the beater wheel assembly **10** in radial directions while the coal is being ground, and are evacuated through outlet duct **26** to pass into a classifier, not shown. The fines suspended in carrier gas having been separated from the coarser material in the classifier are delivered to a point of use, for instance to the burners of a pulverized coal firing furnace. The coarse and oversized particles expelled by the classifier are returned for further grinding to the beater wheel **10** by way of duct **28** and mill entrance chamber **24**.

The beater wheel assembly **10** is constructed as follows: The wheel disc **12** and the ring disc **14** are provided with a slot like annular depression **30** extending around the discs. Side end flanges **32** of connecting bars **16** are adapted to fit into these recesses and are secured to the discs **12** and **14** by means of rivets **34**. The space left vacant between one beater plate assembly **18** and the flange of the preceeding connecting bar **16** is closed up by a filler piece **36**. The filler piece **36** as well as another filler piece **39** provided underneath each beater bar assembly **18**, are secured by screws **38**. Into the thus remaining unoccupied space of the slot like annular recess are inserted beater or liner plates **18**. These beater plates accordingly are secured on all sides without requiring special shop drilling or other workings for the purpose of providing means for adequate support of these liner plates **18** on the bars **16** or on wheel disc **12** and ring disc **14**.

Although the invention has hereinabove been described in connection with a coal pulverizer the inventive improvement can obviously also be applied with equally beneficial results to the pulverizing of material other than coal such as chalk, for instance.

I claim:

1. A beater wheel mill having a beater wheel adapted for axially receiving material and carrier gas and for radially passing said material and carrier gas through the beater wheel, comprising a wheel disk, a ring disk arranged in laterally spaced relation to said wheel disk, circumferentially spaced lateral bars connecting said wheel disk and said ring disk, and beater plates protectively lining said connecting bars, said beater plates having a circumferential thickness which is reduced in a radial direction away from the axis of said beater wheel, and said beater plates being subdivided into portions along planes substantially parallel to the wheel axis.

2. A beater wheel mill in accordance with claim 1 in which the thickness of said beater plates is reduced in steps.

3. A beater wheel mill in accordance with claim 1 in which the beater plates are bent in a direction opposite to that of wheel rotation and adjacent the ends thereof facing the wheel axis.

References Cited in the file of this patent

UNITED STATES PATENTS

1,228,338	Marks	May 29, 1917
2,103,374	Mikan	Dec. 28, 1937
2,155,150	Schacht	Apr. 18, 1939
2,211,570	Kennedy	Aug. 13, 1940
2,291,043	Kennedy	July 28, 1942

FOREIGN PATENTS

913,731	Germany	June 18, 1954
935,225	Germany	Nov. 17, 1955