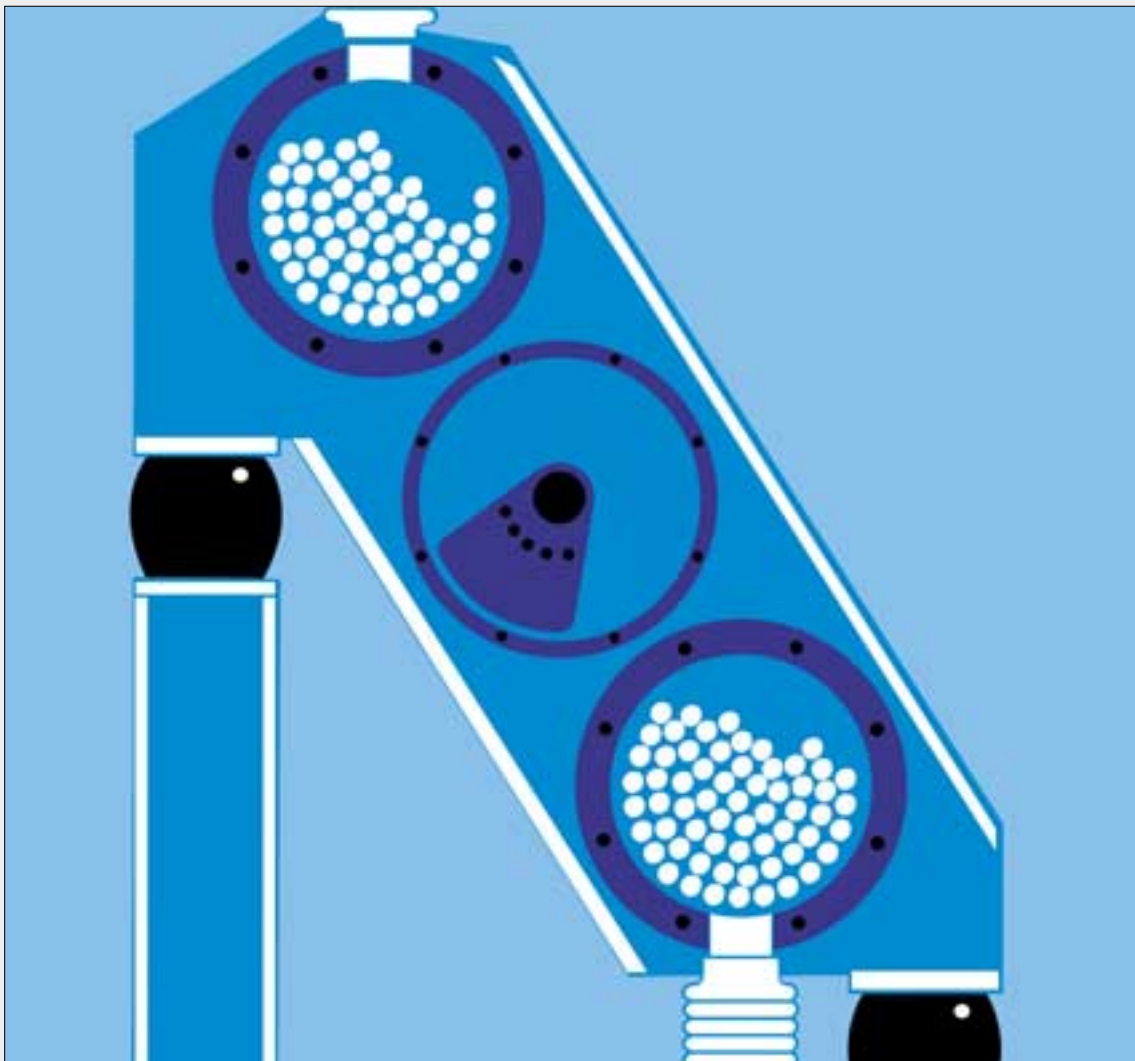


FINE AND EXTRA-FINE

VIBRATING MILL

GRINDING



A ♦ U ♦ B ♦ E ♦ M ♦ A
M A S C H I N E N M I T B I S S

◆ THE FIELDS OF APPLICATION

AUBEMA vibrating mills are used for grinding of almost all materials concerning processing industry, from medium-sized lumps up to extra-fine final grains. Their particular fields of application are coal, chemicals, ceramics and pit and quarry industries, including their subgroups.

◆ THE FEED MATERIALS

Lignite, hard coal, ash, coke, charcoal, dolomite, marble, silica sand, limestone, bentonite, lime, gypsum, puzzolan, bauxite, copper granules, iron oxide, ferrosilicon, magnesium oxide, arsenide, aluminium oxide, silicon carbonate, zirconium, fireclay, corundum and similar products.



Twin-tube vibrating mill with drive and counter-vibration frame, type 4210, size 4210/04-25.

◆ THE MODE OF OPERATION

Twin- and three-tube vibrating mills are driven by an unbalanced drive. The entire filling of the grinding cylinders, which comprises the grinding bodies and the material intended for grinding, constantly receives impulses from the circular vibrations in the body of the mill. The grinding action itself is produced by the rotation of the grinding bodies in opposite direction towards the driving rotation and by continuous head-on collisions of the grinding bodies. The residence time of the material being inside the grinding cylinders is determined by the quantity of the flowing material. The residence time can also be influenced by using damming devices. The material being ground runs through the grinding cylinders in a helical curve and slides down from the inflow to the outflow. The high degree of fineness achieved is the result of this long grinding procedure.

Continuous charging is carried out by means of a vibrating feeder, rotary valves or conveyor screw. Afterwards the product is then conveyed either pneumatically or mechanically.

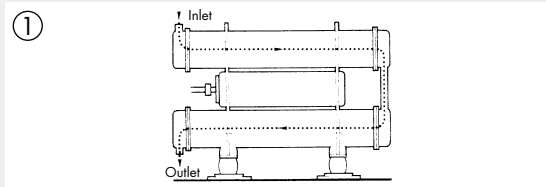
◆ THE SPECIAL CHARACTERISTICS

The driving motor is connected to the primary shaft of the mill via a propeller shaft. The centrifugal weights on the primary shaft are set in such a way, that the vibration circuit diameter necessary for optimum grinding results is achieved. The lubricated anti-friction bearings are protected by a special labyrinth sealing. Thus easy maintenance is given. The complete vibration system is positioned on spring elements, or alternatively on rubber buffers. If the transfer of vibrating power to the base of the mill has to be reduced, the entire vibrating mill and its drive will be put on an additional counter-vibration frame.

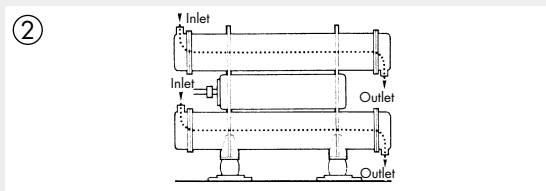
The grinding cylinders are filled to about 60-70 %. Balls, cylpebs and grinding rods are used as grinding bodies. If the grinding is iron-free, balls or cypes of aluminium oxide are used. The grinding bodies are held up at the outflow heads by separating discs, so that only the ground material can flow out. Upon request the grinding tubes are used in a welded or a bolted design. To protect the grinding tubes, easily-replaceable cylinders made of highly wear-resistant special steel are inserted. Owing to the location of the grinding tubes, one above the other in a slanting position, the material flow can be done in a number of different ways. The three-tube vibrating mill was especially developed for obtaining even higher capacities. It is distinguished by an extraordinarily good payload-actualload ratio. Consequently low power consumption is demanded.

THE OPERATING ALTERNATIVES

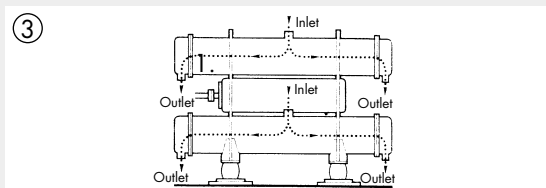
Twin-tube vibrating mill



In the conventional model, the grinding cylinders are connected in series. The feeding material passes through both grinding cylinders and receives intensive treatment during this long grinding process. This method is required if the feeding material is particularly hard or coarse, or if very fine grinding results are required. The process is distinguished by the high degree of homogeneity achieved.



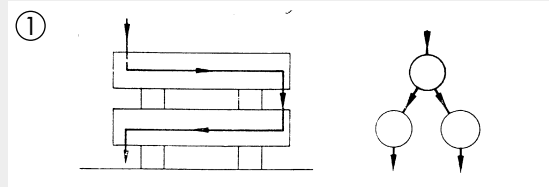
If the cylinders are set parallel to each other, each grinding cylinder is charged separately, therefore only half of the residence time is necessary. The treatment of the material is not so intensive and the output of the mill is correspondingly higher. This is advantageous if the feeding material is either soft or of low grain size, or if a lower degree of fineness is required. The grinding cylinders can be operated independently of each other, to allow different chemical reactions to take place.



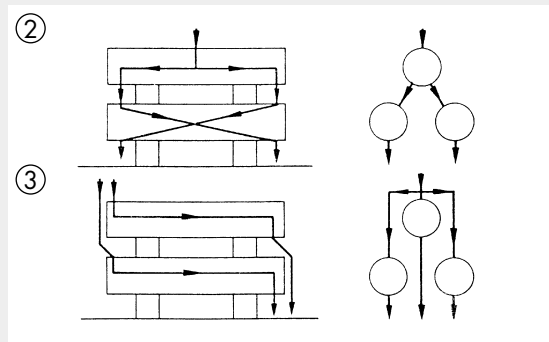
With centre feeding, the highest capacity volumes are achieved because four routes are available. The residence time is correspondingly short. This method of operation can be used if the feeding material is soft, if a gentle grinding process is required and if the ultimate degree of fineness is not so high. Inevitably, the mixed process is less intensive.

With all methods of operation, additional materials can also be fed into the mill.

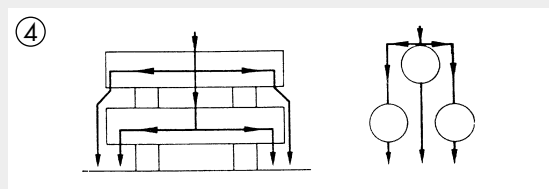
Three-tube vibrating mills



The highest degree of fineness is achieved by a connected in series operation (1). At the same time, the mill can be run with comparatively coarse lumps - both lower cylinders are available to carry out the extremely fine grinding work, while the upper cylinder performs the primary grinding function with larger balls or rods.



Depending on the applicational conditions, high capacity at a high level of fineness is obtained with two operating methods, (2) and (3). The method (2) produces a higher degree of fineness than method (3), with a larger permitted feeding material size - although the capacity is lower. With parallel operation, as in (3), the capacity is 50 % higher than of a twin-tube vibration mill with the same tube diameter.



The highest capacity, with a lower degree of fineness, is achieved by medium size feeding material in three cylinders (4) (e.g. for the production of sand during grinding). This operating method involves short grinding procedures, resulting a high capacity of up to 18 t/h, depending on the type of material used.



◆ THE ADVANTAGES

- high and constant capacity
- low susceptibility to breakdowns
- long lifetime
- easy replacement of wear and spare parts
- wide range of application
- high reduction ratio

◆ THE SCOPE OF APPLICATION

- Capacity: up to 12 m³/h
- Feeding size: up to approx. 16 mm
- Size of final grain: up to < 25 µm
depending on the feed
material and its size
- Reduction ratio: up to 1 : 30
- Required power: up to 132 kW

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