INTENSIFICATION OF THE PROCESS OF GRINDING CLAY RAW

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The choice of apparatus for obtaining finely dispersed powders with maximum grinding efficiency is the most important problem. As a rule, for this purpose, installations are used, which are a complex of grinding units. When designing grinding units, in addition to dispersion, size of pieces and mechanical properties of the initial material, it is necessary to take into account the requirements for the final product. A prerequisite for the implementation of developments in the industry are: the minimum possible cost of electricity and the duration of the technological process, the simplicity of design and operational reliability of the units.

Such a variety of requirements for particulate materials and the way they are obtained has led to the creation of a wide variety of grinding machines.

At the same time, the process of grinding materials has always been associated with significant energy and material costs, primarily associated not so much with large volumes of processed material, but with the very type of grinding units used. The set grinding size also has a significant impact on the cost.

The currently existing grinding units can be conditionally divided into several groups. [1,2,3] The main sign of belonging to a certain group should be considered the main grinding method characteristic of this type of equipment.-

- splitting action installations;
- installations of crushing action;
- installations of abrasive-crushing action;
- percussion installations.

Work is underway to improve the design as a result of the devices used [4-16].

Fine grinding of raw materials is a crucial moment in the technological process of production of ceramic building materials, since the degree of grinding strongly depends on the maintenance of the thermal mode of firing products [17].

Improvements in the design of existing grinding units are important from the point of view of intensifying the process of grinding clay raw materials [18, 19].

The aim of the work is to intensify the grinding of clay raw materials.

Before the start of the experiments, static and dynamic balancing of the upper and lower baskets of the disintegrator was performed.

The unit is equipped with a set of replaceable pulleys for the shafts of electric motors and a set of plates (impact elements) of different lengths.

Disintegrator body 1-upper horizontal disc; 2.5-impact elements;

3-scattering nozzles; 4-lower horizontal disk The disintegrator consists of a stationary frame 1, on which a cylindrical body 2 and electric motors 3 are installed. ogo housing 2 in bearing support 5, fixed on a cylindrical body 2 with the help of a bolted connection, an axial loading nozzle 6 is installed with the possibility of rotation. The axial loading pipe receives rotation from the electric motor 3 through a V-belt drive.

In the case of the disintegrator, to the lower end of the axial loading pipe, the upper horizontal disk 1 is rigidly fixed, on which two rows of impact elements 2 are located along concentric circles. At the outlet of the axial loading pipe under the upper horizon spreading nozzles 3, bent in the direction , opposite to the direction of rotation of the upper horizontal disc 1. The angle of inclination of the spreading nozzles 3 to the upper horizontal disc 1 is greater than the angle of repose of the crushed material. This facilitates the supply of material from the axial feed nozzle to the impact elements.

In the lower part of the cylindrical body, a lower horizontal disk 4 is installed, with the possibility of rotation. Rotation comes from the electric motor through a V-belt transmission. Impact elements 5 are fixed on the lower horizontal disk, located along concentric circles, and the impact elements 2 of the upper horizontal disk 1 are located between the impact elements 5 of the lower horizontal disk. The outer row of percussion elements has the form of plates that can change the angle of "attack" by rotating around its own axis.

On the upper surface of the lower horizontal disk, a device is fixed for even distribution of the material.

The disintegrator works as follows. The material enters the axial loading nozzle, after which it passes through the spreading nozzles, heading into the impact zone of the impact elements. Where is its grinding.

Since the upper and lower horizontal discs rotate in opposite directions, describing concentric circles with impact elements, the finished product is thrown to the periphery, from where it is removed through a tangential discharge pipe.

When determining the particle size distribution of the starting material, the following equipment was used. To determine the residues on the control sieves, a vibroshaking device of the SMM type was used with a set of sieves No. 10, 7, 5, 3, 2, 1, 05, 025, 008 according to GOST 3584-80; measurement of material weights was carried out on electronic scales EK-200I, VLE-1100; drying cabinet with heating temperature up to 110C; porcelain cups with a diameter of 15...20 cm. The grinding time of the material under study was measured using a stopwatch.

S-11-16, II class of accuracy, with a measurement error of ± 0.1 s.

During the experiments, with the help of replaceable pulleys on the motor shafts, the frequency of rotation of the disintegrator baskets was changed stepwise from 500 to 2500 min. On the outer row of impact elements of the lower horizontal disk, plates (impact elements) of different lengths from 19 to 31 mm were installed, with the possibility of rotation around their own axis.

The fineness of grinding on the installation of the developed design was 0.5-1 mm. The existing analogues, according to the principle of action, provide the production of material with dimensions of 1≤3 mm [20].

The developed design of a laboratory plant for intensifying the grinding of clay raw materials is characterized by energy efficiency, lightness and the possibility of easy repair of the structure, as well as the economy of the working volume.

References

1. Bashkirtsev A.A., A.V.Bogorodskiy, V.N.Blinichev, V.B.Lapshin, Linch A.D., Sergo Y.Y., A.Tyumanok,Pronin V.P., Taneyev E.A. Semikopenko I. A. «Dezintegratory s ekstsentrichnym raspolozheniyem ryadov rabochikh elementov»
2. Maslovskaya A. N. «Sovershenstvovaniye protsessa izmel'cheniya i konstruktsii dezintegratora s gorizontal'nymi diskami»
3. Sladkov A.S. «Melnitsa dlya razloma mela, gliny i tomu podobnykh materialov maloy tvordost». byulliten' №20. Gosudarstvennyy komitet po delam izobreteniy i otkrytiy 09.10.1966y.
4. Kachayev A. Y. “Analiticheskoye issledovaniye novykh vidov tortsovo-zubchatykh zatsepleniy dezintegratorov dlya izmel'cheniya mnogokomponentnykh materialov”. 2001y.
5. Smirnov D. V. «Sovershenstvovaniye konstruktsii i protsessa pomola v dezintegratore s retsiklom izmel'chayemogo materiala» 2019 y.
6. Amanov O.O., Yusupova M.N., Abdusattarov SH.M. «Sovershenstvovaniye konstruktsiy drobil'no-pomol'nykh agregatov v tselyakh povysheniya effektivnsti ikh raboty» publikovano adti.uz 2019 y.
7. Bogdanov V.S. “Dezintegrator s povyshennymi nagruzkami na izmel'chayemyy material” 2009 y.
8. «Dezintegratornaya tekhnologiya» Tezisy dokladov VI Vsesoyuznogo seminar Tallin, 1989 y
9. «Dezintegratornaya tekhnologiya» Tezisy dokladov VIII Vsesoyuznogo seminara Kiyev, 1991 y.
10. «Dezintegratornaya tekhnologiya» Tezisy dokladov V Vsesoyuznogo. Tallin, 1987 y.