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Sheave Iron Separators on Constant Magnets

Sheave iron separators on constant magnets are used to protect technological equipment against tramp ferromagnetic objects within coal streams transported by belt conveyor.

Magnetic system is built in sheave iron separators. Electromagnets and systems of constant magnets are used to create magnetic field within sheave iron separators. Magnetic (electromagnetic) system of iron separator is installed on the axis and they are rotated as a single entity. It differs sheave iron separators from drum separators and iron separators where drum made of unmagnatic material is rotated around fixed magnetic system.

Electromagnetic sheave iron separators where magnetic field is created by electromagnet of constant current are used at a great number of enterprises.

Specialists of Institute “Gipromashugleobogaschenie” developed sheave iron separators where magnetic field is generated by the system of constant magnets. Such magnetic systems have advantages in comparison with electromagnetic ones. Therefore, there is no need to use rectifier unit, distributors and connector cables. It gives an opportunity to save money spent for assembling and maintenance . Iron separators have high degree of reliability and they don’t require constant maintenance support. The absence of electric power supply makes them blast-resistant. Operation life of system on constant magnets is not limited.

On the basis of analysis of possible magnetic systems and calculations it was determined that the most optimal construction are blocks consisting of constant magnets magnetized along rotation axis of magnetize system and within plane of symmetry joined by similar poles. Ferrites can be used as magnet material because their cost is lower than the cost of rare-earth magnets under identical characteristics of magnetic field within the working zone of iron reparator.

Theoretical study of magnetic field was carried out with the help of universal computer system Mathematica 7.0 which includes calculation module of three dimensional magnetic fields made by the method of integral equations.

Possibility of creating sheave iron separators on constant magnets with characteristics lower than electromagnets analogues is shown in this paper.

In the process of calculation and study standard series of sheave iron separators on constant magnets with drum diameter of 315 and 1000 mm intending for installation on conveyors with the belt of width from 500 till 1600 mm was crea ted.