

NEW INVENTIONS

BENEFICIATION OF SALINE MINERALS

Inventors: R. Pruszko, R. Schmidt and D.L. Denham, Jr

Assignee: Environmental Projects, Inc

Field: 20 February 1998

Patent no.: US6173840B1

Date of patent: 16 January 2001

Processes for purification of saline minerals using magnetic separation are disclosed. In particular, saline minerals can include trona, borates, potash, sulphates, nitrates and chlorides. The magnetic separation can include high intensity magnetic separation, which can be conducted at greater than about 20 000 Gauss and up to greater than about 50 000 Gauss. Other embodiments of the invention include calcination of a saline mineral in an inert atmosphere or in an oxygen-containing atmosphere at a high temperature prior to magnetic separation. A further embodiment of the invention includes pre-alignment of particles on a surface to align the particles of high magnetic force during a magnetic separation step. Also disclosed are various embodiments of magnetic separation, which include subjecting an ore to a preliminary magnetic field prior to magnetic separation.

MAGNETIC PURIFYING APPARATUS FOR PURIFYING A FLUID

Inventors: N. Saho, H. Isogami, M. Morita, F. Handa and K. Asano

Assignee: Hitachi Ltd, Tokyo, Japan

Field: 16 June 1999

Patent no.: 6093318

Date of patent: 25 July 2000

An improved apparatus for removing magnetic material from a flowing fluid such as water by magnetic separation has a single set of electromagnets which are used with a plurality of magnetic filters for continuous magnetic separation operation alternately without obstructing the flow of the fluid being processed. A high-gradient magnetic filter arrangement which passes through a magnetic field generated by the magnets is made up of at least two magnetic filters separated by a watertight partition. When the fluid being processed is flowing through one of the magnetic filters, the other filter is removed from the flow of the fluid into a magnetic filter housing.

Backwashing of this other magnetic filter is carried out while purification of the fluid being processed by the former magnetic filter continues uninterrupted. Dummy magnetic filters are provided at the outer ends of the magnetic filter arrangement.

HIGH GRADIENT MAGNETIC SEPARATOR

Inventors: M. Franzreb, W. Holl and C. Hoffmann

Patent no.: US2002074266

Publication data: 20 June 2002

In a high gradient magnetic separator with a separation zone consisting of a matrix of parallel magnetic wires arranged in parallel planes and channels formed by non-magnetic material and extending in each plane between adjacent parallel magnetic wires for conducting a fluid including magnetic particles through the matrix, and a magnetizing structure disposed adjacent the matrix for generating a magnetic field with field lines which extend essentially normal to the parallel planes, separating walls are disposed in parts of the channel in the area ahead of the end of the magnetic field generated in the matrix and adjacent the flow exit end of the matrix so as to extend parallel to the planes and normal to the magnetic field lines and form partial flow channels receiving partial fluid flows of magnetic particle-enriched and, respectively, magnetic particle-depleted flow volumes.

FERROHYDROSTATIC SEPARATION METHOD AND APPARATUS

Inventor: J. Svoboda

Applicant: De Beers Consolidated Mines, South Africa

Patent no.: WO0048740

Publication date: 24 August 2000

The invention concerns, in one aspect, a ferrohydrostatic separation method in which a ferrofluid is used to separate materials of different density. In the method, the apparent density of the ferrofluid is controlled by means of a vertically orientated magnetic field generated by a C-dipole, open dipole (O-dipole) or a split pair electro-magnet or permanent magnet. Other aspects of the invention include an apparatus for use in this method and a process for separating materials of different density using the method.

METHOD OF CONCENTRATION OF RARE EARTH ORES

Inventor: I.M. Petrov

Patent no.: RU2182521

Publication data: 20 May 2002

A rare-earth ore is ground and then subjected to first stage of magnetic separation, thus obtaining heavy magnetic product, medium magnetic middlings and non-magnetic product. Heavy and medium magnetic fractions are classified, then subjected

to additional magnetic separation. Weakly magnetic product from the first stage is combined with weakly magnetic fraction from the second stage of magnetic separation to form rare-earth concentrate. The first stage of magnetic separation is performed at the magnetic separation is performed at the magnetic field of 1.5 T while the second stage at 1.5 to 2 T.

METHOD AND APPARATUS FOR MAGNETIC SEPARATION OF PARTICLES

Inventor: G. Hatch and M. Schilling

Applicant: Dexter Magnetic Technologies

Patent no.: WO02066165

Publication date: 29 August 2002

A method and apparatus for magnetic separation of particles within a container. In one embodiment, a container contains a number of particles and a number of magnetic susceptible particles. A number of magnets are arranged in a plane and is placed close to the container. The magnetic poles of the magnet are arranged in a pattern to apply magnetic fields oriented perpendicular to the plane on the container. The pole pattern provides consistent separation, across the container, of the number of magnetically susceptible particles from the rest of the particles.