

## NEW INVENTIONS

### **Method and Apparatus for Processing Waste Water,**

Inventor: D. Gurevitz. Application number: US1996000604741.

Filed: February 23, 1996. Issued: June 2, 1998.

Patent no.: US5759407.

A method and apparatus for wastewater treatment based on a unique combination of high gradient magnetic separation and magnetically stabilised fluidised bed technology. The method includes adding the auxiliary magnetic material to the wastewater and mixing it therewith, flowing the mixture through a passage, disposed within the ferromagnetic matrix, and then through the matrix. A magnetic field is generated within the matrix and passage, providing the creation within the passage a magnetically stabilised fluidised bed of auxiliary magnetic material and high gradient magnetic separation within the matrix. The magnetic field is switched off for flushing the ferromagnetic matrix.

### **Method for Separation of Solids from Drilling Fluids by Magnetic Separation and Centrifugation**

Inventors: Pin Y. Huang, Yuh-Hwang Tsao and J. Davalath.

Applicant: Exxon Production Research Co., Houston, TX, USA

Application no: US1996000675470. Filed: July 3, 1996.

Issued: August 31, 1999. Patent no.: US5944195.

A method is disclosed for treating drilling mud discharged from a well wherein the mud contains drill cuttings and paramagnetic materials such as hematite. The drilling mud is first passed through a high-gradient magnetic separator to separate the paramagnetic materials

from the drilling mud. The drilling mud is then passed through a centrifuge separator to remove the drill cuttings from the drilling mud.

**Alternating Current Magnetic Separator,**

Inventors: J.R. McGaa. Filed: September 3, 1996.

Issued: February 9, 1999. Application no.: US1996000707124.

Patent no.: US5868255.

A magnetic ore purification system for enriching magnetic ore concentration in a feed material. The system includes an elutriator, an alternating current magnet and an ultrasonic separator. The elutriator has a feed port for introducing the feed material into the elutriator and an enriched material port for collecting an enriched material having a magnetic ore concentration that is greater than the feed material. The alternating current magnet generates a uniform low strength magnetic field within the elutriator. The ultrasonic transducers introduce ultrasonic energy into the elutriator.

**Liquid Purification Apparatus,**

Inventors: Saho Nirihide *et al.* Applicant: Hitachi Ltd., Japan.

Issued: August 31, 1999. Patent no.: US5944986.

A magnetic separation apparatus which coagulates substances to be removed in liquid by adding magnetic substances and a flocculant to liquid to be treated and adsorbs and captures the thus obtained magnetic aggregates by utilising magnetic field of magnetic substances which move relative to the liquid to be treated, and other magnetic separation apparatus comprising a magnetic filter which contains charging magnetic metallic elements placed in a magnetic field and which magnetically adsorbs and captures the magnetic aggregates.

**Methods and Materials for High Gradient Magnetic Separation of Biological Materials,**

Inventor: S. Miltenyi. Applicant: Miltenyi Biotech GmbH, Germany. Issued: February 1, 2000. Patent no.: US6020210.

Improvements in the existing procedures and materials for conduct of high gradient magnetic separation are disclosed. The use of plastic coated matrices especially small spheres or balls which form superior magnetic gradient intensifying supports are disclosed, along with improved methods and apparatus to conduct HGMS. The selection of small spheres in combination with the coating provides for uniform matrices of high stability.

**Method for Upgrading Iron Ore Utilising Multiple Magnetic Separators,**

Inventor: L.J. Lehtinen. Applicant: Iron Dynamics Inc.,

Butler, Ind., USA. Issued: October 5, 1999.

Patent no.: 5961055.

The present invention relates to upgrading iron ore to decrease the amount of non-ferrous materials therein, and to thereby increase the iron content thereof. More particularly, the invention relates to a process utilising magnetic fields to separate a significant amount of non-magnetic material, such as silica or pyrolusite, from valuable iron oxide in an iron ore or iron ore concentrate. The invention therefore finds advantageous use to provide an improved source of iron oxides for high purity uses such as, for example, direct reduction processes and heavy media coal beneficiation processes.

**Method and Apparatus for Separating Particles,**

Inventors: V.N. Abrarov *et al.*

Applicant: Anglo American Research Laboratories Ltd.

Application no.: 99/1587. Date of acceptance: August 28, 2000.

Patent no.: ZA 97/10731.

The invention concerns a method and apparatus for separating mineral particles according to their dielectric and/or electrophysical properties. On one practical example, rutile particles can be separated from zircon particles. In the method, the mineral particles which are to be separated are passed through a sharply non-homogeneous electric field. Particles with different dielectric and/or electrophysical

properties are subjected to different forces, which separate them spatially. The spatially separate particles are collected in discrete fractions.

