

—Equipment and Products—

A NEW ROTARY GRATE MAGNETIC SEPARATOR

Dings Co. has introduced a new rotary magnetic separator for purifying materials that do not flow easily and tend to clog conventional grate magnets. The rotary grate removes ferrous contaminants from fine cohesive materials, fibrous substances and pulverised minerals and ceramics. Applications include magnesium oxide, zircon powder, fly ash, alumina, gypsum and lime. The motorised separator has magnetic tubes in a circular arrangement held in place by two stainless end-plates. The separator is available in 305, 405 and 560 mm diameter sizes. It can be installed in duct or pipe systems.

A SEPARATOR TO EXTRACT STEEL FROM CRUSHED CONCRETE

Master Magnets (UK) have introduced a magnetic separator capable of extracting steel reinforcing rods and general iron scrap from crushed concrete under site conditions. The separator, known as Mastermagnet K used a permanent magnet system and is available with a hydraulic drive, thereby eliminating the need for an electrical supply in order to operate. The unit can be installed onto existing crushers and can be left in place during transportation.

A MAGNETIC MILL FROM THE UK

Glen Creston Ltd. (UK) has recently introduced a new ball mill that is designed specifically for alloying applications. It allows easy low-temperature synthesis of traditional milled alloys and it can also be used for materials that previously required high-temperature processing. The motion of the balls in the mill is controlled by magnets which vary the intensity and location of the milling.

SUPERCONDUCTING HGMS FOR KAOLIN PROCESSING

Carpco Ltd. has received an order from Thiele Kaolin Co., Sandersville, Georgia, USA, for a superconducting Cryofilter high-gradient magnetic separator. The unit is being installed as part of a plant expansion. The magnet operates in the persistent mode and the energy requirements were reportedly reduced to less than 10 kW. The reciprocating-canister separator operates at the magnetic field of 5 Tesla and the throughput is said to range from 20 to 45 tonnes of kaolin per hour.

AN IMPROVED PERMANENT ROLL MAGNETIC SEPARATOR

International Process Systems Inc. (USA) have introduced two new models of rare-earth permanent magnet roll separators. By employing a new belt-tracking system the roll width was extended to 1500 mm while maintaining the diameter of the roll at 100 mm. It is claimed that in most applications these modifications will double the throughput compared to previous standard 72 to 76 mm diameter rolls. The other product is the large-diameter (300 mm) rare-earth magnetic roll separator. This unit is designed with up to 2000 mm width. Reportedly, the tests have shown that the capacity can be increased by a factor 5 to 6. The machine is said to have a throughput up to 200 t/h for weakly magnetic iron ores.

SUPERCONDUCTING SHIELDING DEVICE

National Research Institute for Metals (Japan) has developed a superconducting magnetism-shielding device which is prepared by plasma spraying. It is a nickel-based cylindrical device on which $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$ (Bi-2212) was sprayed. Thickness of the Bi superconductor is 700 μm .

A SEPARATOR FOR CUTTING CHIP REMOVAL

Bunri Co. Ltd. (Japan) has developed a new type of a magnetic separator that is suitable for a full-scale cutting chip disposal. All magnets other than those at the chip-collecting region are in a fixed position, and only the outside drum is revolving. The chips are thus attached on the the drum surface in a uniform thickness, the flow of the machining fluid is stabilised and the filtration efficiency is very high. The filter replacement is said to be almost unnecessary. It is claimed that the separator removes weakly magnetic cutting chips of superhard materials and sludge particles of micrometer sizes, prolongs the service the life of filters and machining fluids and reduces the tank-cleaning frequency.

VIBRATING MAGNETIC FILTER

Eriez Magnetics Inc. (USA) have introduced a dry vibrating magnetic filter which is designed to remove fine iron bearing contaminants from fine powders. To enhance the fluidity of the powder as it passes through the matrix, the canister is attached to a pair of low-frequency, high-amplitude vibratory drives. The filter generates the background magnetic field of 0.5 Tesla with a capacity based on fine powder flow range up to 7 kg/cm^2 of cross-sectional area of the matrix. A 150 mm diameter is capable of treating up to 1200 kg/h . The dry vibrating magnetic filter can be applied to the processing of fine sand, glass powder, talc, clays and other fine industrial minerals, as well as chemicals and pharmaceuticals.

2 T SUPERCONDUCTING BISMUTH MAGNET

Sumitomo Metal Industries Ltd. has used Bi superconducting magnet to generate the magnetic field of 2 Tesla, the highest magnetic field created by oxide

superconductors, at 4.2 K. The superconductor is of the bismuth-based 2212 phase, in which the atomic ratios of Bi, Sr, Ca and Cu are 2:2:1:2. The magnet is produced by first filling powdered raw material in a silver pipe, passing the pipe through a die and drawing into wire form by the silver sheath process, by which a tape conductor 3 mm wide and 0.15 mm thick is obtained. The wire is then wound into a pancake, then laminated to produce a magnet with o.d. of 68 mm, i.d. 17 mm and 78 mm high.

ANOTHER RECORD FOR JAPAN'S NIRM

The National Research Institute for Metals has developed a superconducting magnet of 50 mm internal bore which can generate 21.1 Tesla at 1.8 K. This new superconducting magnet consists of 4 coaxial coils; two outermost are separated from the other two by a heat-insulating vacuum layer. The Institute has already succeeded in generating 20.5 Tesla with a superconducting magnet with inner coils made of conventional (Nb,Ti)₃Sn wires (*See Mag. Electr. Sep. 5, No. 4*). To achieve a higher magnetic field, the Institute improved the superconducting properties of the wire. By adding tantalum the core material becomes harder and the filaments retain a more regular shape. For these reasons, the innermost coil was made of an (Nb,Ti,Ta)₃Sn wire using Ti-added bronze and Ta-added Nb. The addition of Ta increased the critical current density by 20%. In the new wire, the Cu portion is 0.48, much lower than 0.8 in the conventional wire. The cross-sectional area of the wire is thus reduced and the current density increased.

SUPERCONDUCTING MAGNETIC BEARING

Nippon Seiko (NTN) Ltd., with cooperation with the Superconductivity Research Laboratory of ISTEEL have developed a superconducting magnetic bearing which has a rotational vibration accuracy of 1 μm . The bearing was manufactured from an yttrium-based superconductor which was prepared by the melt-powder-metal growth process. The bearing is an improvement over the previous bearing by NTN which had the rotary vibration accuracy of 130 μm at 12 000 rpm.

A NEW NEOMAX FROM SUMITOMO

Sumitomo Special Metals America Inc. is commercially mass-producing one of the highest energy product NdFeB permanent magnet materials. The material has an energy product $(BH)_{\text{max}}$ that surpasses their previous material (Neomax-46) by 18%. This new high-energy Neomax exhibits an energy product of 54.2 MGOe, has a remanence of 14.95 kGauss and a coercivity of 10.57 kOe ($bH_c = 10.57$ kOe and $iH_c = 10.62$ kOe). This new material is available from April 1994.