

CPC**COOPERATIVE PATENT CLASSIFICATION****B03C**

MAGNETIC OR ELECTROSTATIC SEPARATION OF SOLID MATERIALS FROM SOLID MATERIALS OR FLUIDS; SEPARATION BY HIGH-VOLTAGE ELECTRIC FIELDS (filters making use of electricity or magnetism [B01D 35/06](#); separating isotopes [B01D 59/00](#); combinations of magnetic or electrostatic separation with separation of solids by other means [B03B](#), [B07B](#); separating sheets from piles [B65H 3/00](#); magnets or magnet coils per se [H01F](#))

B03C 1/00**Magnetic separation****B03C 1/002**

- . { [High gradient magnetic separation](#) }

B03C 1/005

- . Pretreatment specially adapted for magnetic separation

B03C 1/01

- .. by addition of magnetic adjuvants

B03C 1/015

- .. by chemical treatment imparting magnetic properties to the material to be separated, e.g. roasting, reduction, oxidation

B03C 1/02

- . acting directly on the substance being separated

B03C 1/021

- .. Separation using Meissner effect, i.e. deflection of superconductive particles in a magnetic field

B03C 1/023

- .. Separation using Lorentz force, i.e. deflection of electrically charged particles in a magnetic field

B03C 1/025

- .. High gradient magnetic separators

B03C 1/027

- ... with reciprocating canisters

B03C 1/029

- ... with circulating matrix or matrix elements ([matrix elements B03C 1/034](#))

B03C 1/03

- rotating, e.g. of the carousel type

B03C 1/031

- ... Component parts; Auxiliary operations

B03C 1/032

- Matrix cleaning systems

B03C 1/033

- characterised by the magnetic circuit

B03C 1/0332

- { [using permanent magnets](#) }

B03C 1/0335

- { [using coils](#) }

B03C 1/0337

- { [superconductive](#) }

B03C 1/034

- characterised by the matrix elements

B03C 1/035

- .. Open gradient magnetic separators, i.e. separators in which the gap is unobstructed, characterised by the configuration of the gap

B03C 1/0355

- ... using superconductive coils

B03C 1/04

- .. with the material carriers in the form of trays or with tables

B03C 1/06

- ... with magnets moving during operation

B03C 1/08

- ... with non-movable magnets

B03C 1/10

- .. with cylindrical material carriers ([B03C 1/247 takes precedence](#))

B03C 1/12

- ... with magnets moving during operation; with movable pole pieces

- B03C 1/14 . . . with non-movable magnets
- B03C 1/145 { with rotating annular or disc-shaped material carriers }
- B03C 1/16 . . with material carriers in the form of belts
- B03C 1/18 . . . with magnets moving during operation
- B03C 1/20 in the form of belts, e.g. cross-belt type
- B03C 1/22 . . . with non-movable magnets
- B03C 1/23 . . with material carried by oscillating fields; with material carried by travelling fields, e.g. generated by stationary magnetic coils; Eddy-current separators, e.g. sliding ramp
- B03C 1/24 . . . with material carried by travelling fields
- B03C 1/247 obtained by a rotating magnetic drum
- B03C 1/253 obtained by a linear motor
- B03C 1/26 . . with free falling material (B03C 1/035 takes precedence)
- B03C 1/28 . . Magnetic plugs and dipsticks
- B03C 1/282 . . . { with associated accumulation indicator, e.g. Hall sensor }
- B03C 1/284 . . . { with associated cleaning means, e.g. retractable non-magnetic sleeve }
- B03C 1/286 . . . { disposed at the inner circumference of a recipient, e.g. magnetic drain bolt }
- B03C 1/288 . . . { disposed at the outer circumference of a recipient }
- B03C 1/30 . . Combinations with other devices, not otherwise provided for
- B03C 1/32 . acting on the medium containing the substance being separated, e.g. magnetogravimetric-, magnetohydrostatic-, or magnetohydrodynamic separation {(sink-float separation using heavy liquids or suspensions B03B 5/30)}
- B03C 3/00** **Separating dispersed particles from gases or vapour, e.g. air, by electrostatic effect**
{(use of electrostatic separators in combination with exhausts of machines or internal combustion machines F01N 3/01)}
- B03C 3/01 . Pretreatment of the gases prior to electrostatic precipitation
- B03C 3/011 . . Prefiltering; Flow controlling
- B03C 3/013 . . Conditioning by chemical additives, e.g. with SO₃
- B03C 3/014 . . Addition of water; Heat exchange, e.g. by condensation
- B03C 3/016 . . by acoustic or electromagnetic energy, e.g. ultra-violet light
- B03C 3/017 . Combinations of electrostatic separation with other processes, not otherwise provided for
- B03C 3/0175 . . { Amassing particles by electric fields, e.g. agglomeration }
- B03C 3/019 . Post-treatment of gases
- B03C 3/02 . Plant or installations having external electricity supply (electrode constructions B03C 3/40)
- B03C 3/025 . . { Combinations of electrostatic separators, e.g. in parallel or in series, stacked separators, dry-wet separator combinations }

- B03C 3/04 .. dry type
- B03C 3/06 ... characterised by presence of stationary tube electrodes
- B03C 3/08 ... characterised by presence of stationary flat electrodes arranged with their flat surfaces parallel to the gas stream
- B03C 3/09 ... characterised by presence of stationary flat electrodes arranged with their flat surfaces at right angles to the gas stream
- B03C 3/10 ... characterised by presence of electrodes moving during separating action
- B03C 3/12 ... characterised by separation of ionising and collecting stations
- B03C 3/14 ... characterised by the additional use of mechanical effects, e.g. gravity ([B03C 3/32 takes precedence](#))
- B03C 3/145 Inertia
- B03C 3/15 Centrifugal forces
- B03C 3/155 Filtration
- B03C 3/16 .. wet type
- B03C 3/28 . Plant or installations without electricity supply, e.g. using electrets
- B03C 3/30 .. in which electrostatic charge is generated by passage of the gases, i.e. tribo-electricity
- B03C 3/32 . Transportable units, e.g. for cleaning room air ([room air-conditioners having an electrostatic separating stage F24F](#))
- B03C 3/34 . Constructional details or accessories or operation thereof
- B03C 3/36 .. Controlling flow of gases or vapour
- B03C 3/361 ... { by static mechanical means, e.g. deflector }
- B03C 3/363 { located before the filter }
- B03C 3/365 { located after the filter }
- B03C 3/366 { located in the filter, e.g. special shape of the electrodes }
- B03C 3/368 ... { by other than static mechanical means, e.g. internal ventilator or recycler }
- B03C 3/38 .. Particle charging or ionising stations, e.g. using electric discharge, radioactive radiation, flames ([electrode constructions B03C 3/40; ionising gases H05H](#))
- B03C 3/383 ... { using radiation }
- B03C 3/386 ... { using flames }
- B03C 3/40 .. Electrode constructions
- B03C 3/41 ... Ionising-electrodes
- B03C 3/43 radioactive
- B03C 3/45 ... Collecting-electrodes
- B03C 3/455 { specially adapted for heat exchange with the gas stream ([B03C 3/53 takes precedence](#)) }
- B03C 3/47 flat, e.g. plates, discs, gratings
- B03C 3/49 tubular { ([B03C 3/455 takes precedence](#)) }
- B03C 3/51 Catch- space electrodes, e.g. slotted-box form
- B03C 3/53 Liquid, or liquid-film, electrodes

- B03C 3/60 . . . Use of special materials other than liquids
- B03C 3/62 ceramics
- B03C 3/64 synthetic resins
- B03C 3/66 . . Applications of electricity supply techniques
- B03C 3/68 . . . Control systems therefor
- B03C 3/70 . . . insulating in electric separators ([B03C 3/53 takes precedence](#))
- B03C 3/72 . . Emergency control systems
- B03C 3/74 . . Cleaning the electrodes
- B03C 3/743 . . . { by using friction, e.g. by brushes or sliding elements }
- B03C 3/746 { Electricity supply or control systems therefor }
- B03C 3/76 . . . by using a mechanical vibrator, e.g. rapping gear; { by using impact }
- B03C 3/761 { Drive-transmitting devices therefor, e.g. insulated shafts }
- B03C 3/763 { Electricity supply or control systems therefor }
- B03C 3/765 { with electromagnetic rappers }
- B03C 3/766 { with pneumatic rappers }
- B03C 3/768 { with free falling masses, e.g. dropped metal balls }
- B03C 3/78 . . . by washing
- B03C 3/80 . . . by gas or solid particle blasting
- B03C 3/82 . . Housings
- B03C 3/84 . . . Protective coatings
- B03C 3/86 . . Electrode-carrying means ([B03C 3/40 takes precedence](#))
- B03C 3/88 . . Cleaning-out collected particles
- B03C 3/885 . . . { by travelling or oscillating electric fields, e.g. electric field curtains
([electrostatic non-mechanical conveyers in general B65G 54/02](#)) }

B03C 5/00 **Separating dispersed particles from liquids by electrostatic effect** ({ flocculation or agglomeration of electric particles induced by electric field [B01D 21/0009](#); microreactors [B01J 19/0093](#) }; combined with centrifuges [B04B 5/10](#); { treatment of microorganisms and apparatus therefor [C12M 1/42](#), [C12N 13/00](#), [C12Q 1/24](#); analysis of biomaterial by electrical means [G01N 33/48707](#) })

NOTE

In this group, the following term is used with the meaning indicated:

- "separating" means dimensional modifications of particle-liquid distributions, e.g. particle immobilisation, caging, translational or rotational motion

- B03C 5/005 . { Dielectrophoresis, i.e. dielectric particles migrating towards the region of highest field strength ([B03C 5/02 takes precedence](#); electrophoresis [B01D 57/02](#)) }
- B03C 5/02 . Separators
- B03C 5/022 . . { Non-uniform field separators }

- B03C 5/024 . . . { using high-gradient differential dielectric separation, i.e. using a dielectric matrix polarised by an external field }
- B03C 5/026 . . . { using open-gradient differential dielectric separation, i.e. using electrodes of special shapes for non-uniform field creation, e.g. Fluid Integrated Circuit (FIC) }
- B03C 5/028 . . . { using travelling electric fields, i.e. travelling wave dielectrophoresis (TWD) }

B03C 7/00 Separating solids from solids by electrostatic effect

- B03C 7/003 . { Pretreatment of the solids prior to electrostatic separation }
- B03C 7/006 . { Charging without electricity supply, e.g. by tribo-electricity, pyroelectricity }
- B03C 7/02 . Separators
- B03C 7/023 . . { Non-uniform field separators }
- B03C 7/026 . . . { using travelling or oscillating electric fields }
- B03C 7/04 . . with material carriers in the form of trays, troughs, or tables
- B03C 7/06 . . with cylindrical material carriers
- B03C 7/08 . . with material carriers in the form of belts
- B03C 7/10 . . with material falling in cascades
- B03C 7/12 . . with material falling free

B03C 9/00 Electrostatic separation not provided for in a single preceding main group

B03C 11/00 Separation by high-voltage electrical fields, not provided for in other groups of this subclass

B03C 2201/00 Details of magnetic or electrostatic separation

- B03C 2201/02 . Electro-statically separating liquids from liquids
- B03C 2201/04 . Ionising electrode being a wire
- B03C 2201/06 . Ionising electrode being a needle
- B03C 2201/08 . Ionising electrode being a rod
- B03C 2201/10 . Ionising electrode has multiple serrated ends or parts
- B03C 2201/12 . Cleaning the device by burning the trapped particles
- B03C 2201/14 . the gas being moved electro-kinetically
- B03C 2201/16 . Magnetic separating gases from gases e.g. oxygen from air
- B03C 2201/18 . the particles being suspended in a liquid

- B03C 2201/20 . the particles to be separated being in solid form
- B03C 2201/22 . characterised by the magnetical field, special shape or generation
- B03C 2201/24 . for measuring or calculating parameters, efficiency, etc.
- B03C 2201/26 . for use in medical applications
- B03C 2201/28 . Parts being easily removable for cleaning purposes
- B03C 2201/30 . for use in or with vehicles
- B03C 2201/32 . Checking the quality of the result or the well-functioning of the device