

**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](#) )

**Guidance heading:****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 SO<sub>3</sub>
- 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**

**Guidance heading:**

**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