

**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 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**

{{floculation 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

- Magnetic separation whereby the particles are suspended in a liquid

B03C 2201/20

- Magnetic separation whereby the particles to be separated are 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