

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05H PLASMA TECHNIQUE (fusion reactors [G21B](#); ion-beam tubes [H01J 27/00](#); magnetohydrodynamic generators [H02K 44/08](#); producing X-rays involving plasma generation [H05G 2/00](#)); **PRODUCTION OF ACCELERATED ELECTRICALLY-CHARGED PARTICLES OR OF NEUTRONS** (obtaining neutrons from radioactive sources [G21](#), e.g. [G21B](#), [G21C](#), [G21G](#)); **PRODUCTION OR ACCELERATION OF NEUTRAL MOLECULAR OR ATOMIC BEAMS** (atomic clocks [G04F 5/14](#); devices using stimulated emission [H01S](#); frequency regulation by comparison with a reference frequency determined by energy levels of molecules, atoms, or subatomic particles [H03L 7/26](#))

1/00	Generating plasma; Handling plasma	1/18	. . . wherein the fields oscillate at very high frequency, e.g. in the microwave range {, e.g. using cyclotron resonance}
1/0006	. {Investigating plasma, e.g. degree of ionisation (electron temperature)}		
1/0012	. . {by using radiation}	1/20	. . Ohmic heating
1/0018	. . . {Details}	1/22	. . for injection heating {(G21B 1/15 takes precedence)}
1/0025	. . . {by using photoelectric means (H05H 1/0031 - H05H 1/0043 take precedence)}	1/24	. Generating plasma {(gas-filled discharge reactors H01J 37/32 ; nuclear fusion reactors G21B 1/00 ; ohmic heating H05H 1/20 ; injection heating H05H 1/22)}
1/0031	. . . {by interferometry}		
1/0037	. . . {by spectrometry (see G01N 3/00)}		
1/0043	. . . {by using infra-red or ultra-violet radiation}	1/2406	. . {Dielectric barrier discharges}
1/005	. . . {by using X-rays or alpha rays (see G01N 23/00)}	2001/2412	. . . {the dielectric being interposed between the electrodes}
1/0056	. . . {by using neutrons (see G01N 23/00)}	2001/2418	. . . {the electrodes being embedded in the dielectric}
1/0062	. . . {by using microwaves (see G01N 23/223)}	2001/2425	. . . {the electrodes being flush with the dielectric}
1/0068	. . {by thermal means (see G01N 25/00)}	2001/2431	. . . {Cylindrical electrodes}
1/0075	. . . {Langmuir probes}	2001/2437	. . . {Multilayer systems}
1/0081	. . {by electric means (see G01N 27/00 , G01R)}	2001/2443	. . . {Flow through, i.e. the plasma fluid flowing in a dielectric tube}
1/0087	. . {by magnetic means (see G01N 27/00 , G01R)}	2001/245 {Internal electrodes}
1/0093	. . {by acoustic, e.g. ultrasonic means (see G01N 29/02)}	2001/2456 {External electrodes}
1/02	. Arrangements for confining plasma by electric or magnetic fields; Arrangements for heating plasma {(G21B 1/00 takes precedence;} electron optics H01J)}	2001/2462 {Ring electrodes}
1/03	. . using electrostatic fields	2001/2468 {Spiral electrodes}
1/04	. . using magnetic fields substantially generated by the discharge in the plasma	1/2475	. . {Acoustic pressure discharge}
1/06	. . . Longitudinal pinch devices	2001/2481	. . . {Piezoelectric actuators}
1/08	. . . Theta pinch devices {, e.g. SCYLLA }	2001/2487	. . . {Mechanical actuators}
1/10	. . using externally-applied magnetic fields only {, e.g. Q-machines, Yin-Yang, base-ball}	2001/2493	. . . {Horns}
1/105	. . . {using magnetic pumping}	1/26	. . Plasma torches {(metal working with constricted arc B23K 10/00 , B23K 10/02 ; metal spraying B05B 7/18 , B05B 7/20)}
1/11	. . . using cusp configuration (H05H 1/14 takes precedence)	1/28	. . . Cooling arrangements
1/12	. . . wherein the containment vessel forms a closed or nearly closed loop {(G21B 1/05 takes precedence)}	1/30	. . . using applied electromagnetic fields, e.g. high frequency or microwave energy (H05H 1/28 takes precedence)
1/14	. . . wherein the containment vessel is straight and has magnetic mirrors	1/32	. . . using an arc (H05H 1/28 takes precedence)
1/16	. . using externally-applied electric and magnetic fields	1/34 Details, e.g. electrodes, nozzles {(cf. B23K 9/24)}

H05H

- 1/3405 {Arc stabilising or constricting arrangements, e.g. by an additional gas flow (by externally applied magnetic field [H05H 1/40](#); by using powders or liquids [H05H 1/42](#); using coaxial protecting fluid [H05H 1/341](#))}
- 1/341 {using coaxial protecting fluid (arc stabilising or constricting arrangements [H05H 1/3405](#); introducing materials into the plasma [H05H 1/42](#))}
- 2001/3415 {indexing scheme associated with [H05H 1/34](#)}
- 2001/3421 {transferred arc mode}
- 2001/3426 {pilot arc}
- 2001/3431 {coaxial cylindrical electrodes}
- 2001/3436 {hollow cathode with internal coolant flow}
- 2001/3442 {cathode with inserted tip}
- 2001/3447 {rod-like cathode}
- 2001/3452 {supplementary electrodes between cathode and anode, e.g. cascade}
- 2001/3457 {nozzle protection devices}
- 2001/3463 {oblique nozzle}
- 2001/3468 {vortex generator}
- 2001/3473 {safety means}
- 2001/3478 {geometrical details}
- 2001/3484 {convergent/divergent nozzle}
- 2001/3489 {contact starting}
- 2001/3494 {discharge parameter control}
- 1/36 Circuit arrangements ([H05H 1/38](#), [H05H 1/40](#) take precedence)
- 1/38 Guiding or centering of electrodes
- 1/40 using applied magnetic fields, e.g. for focusing or rotating the arc {(cf. [B23K 9/08](#), [B23K 9/073](#))}
- 1/42 with provisions for introducing materials into the plasma, e.g. powder, liquid (electrostatic spraying, spraying apparatus with means for charging the spray electrically [B05B 5/00](#) {cf. [B23K 9/324](#), [B05B 7/22](#); arc stabilising or constricting arrangements [H05H 1/3405](#); coaxial protecting fluids [H05H 1/341](#))}
- 1/44 using more than one torch
- 1/46 using applied electromagnetic fields, e.g. high frequency or microwave energy ([H05H 1/26](#) takes precedence)
- 2001/4607 {Microwave discharges}
- 2001/4615 {Surface waves}
- 2001/4622 {Waveguides}
- 2001/463 {Antennas or applicators}
- 2001/4637 {Cables}
- 2001/4645 {Radiofrequency discharges}
- 2001/4652 {Inductively coupled}
- 2001/466 {Electrodes}
- 2001/4667 {Coiled antennas}
- 2001/4675 {Capacitively coupled}
- 2001/4682 {Associated power generators, e. G. Circuits, matching networks}
- 2001/469 {Flow through, i.e. the plasma fluid flowing in a non-dielectric vessel}
- 2001/4692 {dielectric barrier discharge ([H05H 1/2406](#) takes precedence)}
- 2001/4695 {Arc discharge}
- 2001/4697 {Glow discharge}
- 1/48 using an arc ([H05H 1/26](#) takes precedence)
- 2001/481 {Corona discharges}
- 2001/483 {Pointed electrodes}
- 2001/485 {Cylindrical electrodes, e.g. Rotary drums electrodes}
- 2001/486 {Filamentary electrodes}
- 2001/488 {Segmented electrodes}
- 1/50 and using applied magnetic fields, e.g. for focusing or rotating the arc
- 1/52 using exploding wires or spark gaps ([H05H 1/26](#) takes precedence; spark gaps in general [H01T](#))
- 1/54 Plasma accelerators
- 3/00 Production or acceleration of neutral particle beams, e.g. molecular or atomic beams**
- 3/02 Molecular or atomic beam generation {(charge exchange devices [G21K 1/14](#); polarising devices [G21K 1/16](#); using resonance or molecular beams for analysing or investigating materials [G01N 24/002](#); atomic clock [G04F 5/14](#); beam masers [H01S 1/06](#))}
- 3/04 Acceleration by electromagnetic wave pressure
- 3/06 Generating neutron beams (targets for producing nuclear reactions [H05H 6/00](#); neutron sources [G21G 4/02](#))
- 5/00 Direct voltage accelerators; Accelerators using single pulses ([H05H 3/06](#) takes precedence)**
- 5/02 Details (targets for producing nuclear reactions [H05H 6/00](#))
- 5/03 Accelerating tubes (vessels or containers of electric discharge tubes with improved potential distribution over surface of vessel [H01J 5/06](#); shields of X-ray tubes associated with vessels or containers [H01J 35/16](#))
- 5/04 energised by electrostatic generators
- 5/042 {of the van de Graaf type}
- 5/045 {High voltage cascades, e.g. Greinacher cascade}
- 5/047 {Pulsed generators}
- 5/06 Multistage accelerators
- 5/063 {Tandems}
- 5/066 {Onion-like structures}
- 5/08 Particle accelerators using step-up transformers, e.g. resonance transformers
- 6/00 Targets for producing nuclear reactions (supports for targets or objects to be irradiated [G21K 5/08](#) {; preparation of tritium [C01B 4/00](#); targets, e.g. pellets for fusion reactions by laser or charged particles beam injection [H05H 1/22](#))}**
- 2006/002 {Windows}
- 6/005 {Polarised targets (polarising devices, e.g. for obtaining a polarised ion beam [G21K 1/16](#))}
- 2006/007 {Radiation protection arrangements, e.g. screens}
- 7/00 Details of devices of the types covered by groups [H05H 9/00](#), [H05H 11/00](#), [H05H 13/00](#)**
- 7/001 {Arrangements for beam delivery or irradiation (irradiation systems *per se* [G21K 5/00](#))}
- 2007/002 {for modifying beam trajectory, e.g. gantries}
- 2007/004 {for modifying beam energy, e.g. spread out Bragg peak devices}
- 2007/005 {for modifying beam emittance, e.g. stochastic cooling devices, stripper foils}
- 2007/007 {for focusing the beam to irradiation target}

H05H

- 2007/008 . . {for measuring beam parameters}
- 7/02 . Circuits or systems for supplying or feeding radio-frequency energy ([radio-frequency generators H03B](#))
- 2007/022 . . {Pulsed systems}
- 2007/025 . . {Radiofrequency systems}
- 2007/027 . . {Microwave systems}
- 7/04 . Magnet systems {, e.g. undulators, wigglers ([free-electron laser H01S 3/0903](#))}; Energisation thereof
- 2007/041 . . {for beam bunching, e.g. undulators}
- 2007/043 . . {for beam focusing}
- 2007/045 . . {for beam bending}
- 2007/046 . . {for beam deflection}
- 2007/048 . . {for modifying beam trajectory, e.g. gantry systems}
- 7/06 . Two-beam arrangements; Multi-beam arrangements {storage rings}; Electron rings
- 2007/065 . . {Multi-beam merging, e.g. funneling}
- 7/08 . Arrangements for injecting particles into orbits
- 2007/081 . . {Sources}
- 2007/082 . . . {Ion sources, e.g. ECR, duoplasmatron, PIG, laser sources}
- 2007/084 . . . {Electron sources}
- 2007/085 . . {by electrostatic means}
- 2007/087 . . {by magnetic means}
- 2007/088 . . {by mechanical means, e.g. stripping foils}
- 7/10 . Arrangements for ejecting particles from orbits
- 7/12 . Arrangements for varying final energy of beam
- 2007/122 . . {by electromagnetic means, e.g. RF cavities}
- 2007/125 . . {by mechanical means, e.g. stripping foils}
- 2007/127 . . {by emittance variation, e.g. stochastic cooling}
- 7/14 . Vacuum chambers ([H05H 5/03](#) takes precedence)
- 7/16 . . of the waveguide type
- 7/18 . . Cavities; Resonators {(travelling-wave tubes [H01J 23/18](#); hyperfrequency cavities in general [H01P 7/04](#), [H01P 7/06](#))}
- 7/20 . . . with superconductive walls
- 7/22 . Details of linear accelerators, e.g. drift tubes ([H05H 7/02](#) - [H05H 7/20](#) take precedence)
- 2007/222 . . {drift tubes}
- 2007/225 . . {coupled cavities arrangements}
- 2007/227 . . {power coupling, e.g. coupling loops}
- 9/00 Linear accelerators**
- 9/005 . {Dielectric wall accelerators}
- 9/02 . Travelling-wave linear accelerators {(travelling-wave tubes [H01J 25/34](#))}
- 9/04 . Standing-wave linear accelerators
- 9/041 . . {Hadron LINACS}
- 9/042 . . . {Drift tube LINACS}
- 9/044 . . . {Coupling cavity LINACS, e.g. side coupled}
- 9/045 . . . {Radio frequency quadrupoles}
- 9/047 . . . {Hybrid systems}
- 9/048 . . {Lepton LINACS}
- 11/00 Magnetic induction accelerators, e.g. betatrons**
- 11/02 . Air-cored betatrons
- 11/04 . Biased betatrons
- 13/00 Magnetic resonance accelerators; Cyclotrons** {strophotrons, turbine tubes [H01J 25/62](#)}
- 13/005 . {Cyclotrons}
- 13/02 . Synchrocyclotrons, i.e. frequency modulated cyclotrons
- 13/04 . Synchrotrons
- 13/06 . Air-cored magnetic resonance accelerators
- 13/08 . Alternating-gradient magnetic resonance accelerators
- 13/085 . . {Fixed-field alternating gradient accelerators [FFAG]}
- 13/10 . Accelerators comprising one or more linear accelerating sections and bending magnets or the like to return the charged particles in a trajectory parallel to the first accelerating section, e.g. microtrons
- 15/00 Methods or devices for acceleration of charged particles not otherwise provided for**
- 2240/00 Test**
- 2240/10 . at atmospheric pressure
- 2240/20 . Non-thermal plasma
- 2242/00 Auxiliary systems**
- 2242/10 . Cooling arrangements
- 2242/1005 . . Power supply other than for plasma torches
- 2245/00 test**
- 2245/104 . spiral electrodes
- 2245/12 . Applications
- 2245/121 . . treatment of exhaust gas, e.g. Ambient air, ozonizers
- 2245/1215 . . . Exhaust gas
- 2245/122 . . medical applications {, e.g. plasma scalpels, blades, bistouri}
- 2245/1225 . . . Sterilization of objects
- 2245/123 . . surface treatments
- 2245/1235 . . . coating of large volume items
- 2245/124 . . production of nanostructures
- 2245/125 . . portable devices
- 2277/00 Applications**
- 2277/10 . Medical devices
- 2277/11 . . Radiotherapy
- 2277/113 . . . Diagnostic systems
- 2277/116 . . . Isotope production
- 2277/12 . Ion implantation
- 2277/13 . High energy applications, e.g. fusion
- 2277/14 . Portable devices
- 2277/1405 . . Detection systems