

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](#))

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

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}

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