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)

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 Generating plasma; Handling plasma

WARNING

Group H05H 1/00 is impacted by reclassification into group H05H 1/01.

Groups H05H 1/00 and H05H 1/01 should be considered in order to perform a complete search.

1/0006 . {Investigating plasma, e.g. measuring the degree of ionisation or the electron temperature}

1/0012 . . {using electromagnetic or particle radiation, e.g. interferometry}

1/0018 . . . {Details}

1/0025 . . . {by using photoelectric means (H05H 1/0031 - H05H 1/0043 take precedence)}

1/0031 . . . {by interferrometry}

1/0037 . . . {by spectrometry}

1/0043 . . . {by using infra-red or ultra-violet radiation}

1/005 . . . {by using X-rays or alpha rays}

1/0056 . . . {by using neutrons}

1/0062 . . . {by using microwaves}

1/0068 . . {by thermal means}

1/0075 . . . {Langmuir probes}

1/0081 . . {by electric means}

1/0087 . . {by magnetic means}

1/0093 . . {by acoustic means, e.g. ultrasonic}

1/01 . {Handling plasma, e.g. of subatomic particles}

WARNING

Group H05H 1/01 is incomplete pending reclassification of documents from group H05H 1/00.

Groups H05H 1/00 and H05H 1/01 should be considered in order to perform a complete search.

1/02 . Arrangements for confining plasma by electric or magnetic fields; Arrangements for heating plasma ({G21B 1/00 takes precedence;} electron optics H01J)

1/03 . . using electrostatic fields

1/04 . . using magnetic fields substantially generated by the discharge in the plasma

1/06 . . . Longitudinal pinch devices

1/08 . . . Theta pinch devices {, e.g. SCYLLA}

1/10 . . using externally-applied magnetic fields only {, e.g. Q-machines, Yin-Yang, base-ball}

1/105 . . . {using magnetic pumping}

1/11 . . . using cusp configuration (H05H 1/14 takes precedence)

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

1/18 . . . wherein the fields oscillate at very high frequency, e.g. in the microwave range {, e.g. using cyclotron resonance}

1/20 . . Ohmic heating

1/22 . . for injection heating {(G21B 1/15 takes precedence)}

1/24 . Generating plasma {(nuclear fusion reactors G21B 1/00; gas-filled discharge reactors H01J 37/32)}

WARNING

Group H05H 1/24 is impacted by reclassification into groups H05H 1/247 and H05H 1/4697.

Groups H05H 1/24, H05H 1/247 and H05H 1/4697 should be considered in order to perform a complete search.

1/2406 . . {using dielectric barrier discharges, i.e. with a dielectric interposed between the electrodes}

WARNING

Group H05H 1/2406 is impacted by reclassification into groups H05H 1/2439 and H05H 1/2441.

Groups H05H 1/2406, H05H 1/2439 and H05H 1/2441 should be considered in order to perform a complete search.

1/2418 . . . {the electrodes being embedded in the dielectric}

1/2425 . . . {the electrodes being flush with the dielectric}

1/2431 . . . {using cylindrical electrodes, e.g. rotary drums}

1/2437 . . . {Multilayer systems}

1/2439 . . . {Surface discharges, e.g. air flow control}

WARNING

Group H05H 1/2439 is incomplete pending reclassification of documents from group H05H 1/2406.

Groups H05H 1/2406 and H05H 1/2439 should be considered in order to perform a complete search.

1/2441 . . . {characterised by the physical-chemical properties of the dielectric, e.g. porous dielectric}

WARNING

Group H05H 1/2441 is incomplete pending reclassification of documents from group H05H 1/2406.

Groups H05H 1/2406 and H05H 1/2441 should be considered in order to perform a complete search.

1/2443 . . . {the plasma fluid flowing through a dielectric tube}

1/245 . . . . {the plasma being activated using internal electrodes}

1/246 . . . . {the plasma being activated using external electrodes (H05H 1/245 takes precedence)}

1/2465 . . . . {the plasma being activated by inductive coupling, e.g. using coiled electrodes}

1/247 . . {using discharges in liquid media}

WARNING

Group H05H 1/247 is incomplete pending reclassification of documents from group H05H 1/24.

Groups H05H 1/24 and H05H 1/247 should be considered in order to perform a complete search.

1/2475 . . {using acoustic pressure discharges}

1/2481 . . . {the plasma being activated using piezoelectric actuators}

1/2487 . . . {the plasma being activated using mechanical actuators}

1/2493 . . . {the plasma being activated using horns}

1/26 . . Plasma torches

1/28 . . . Cooling arrangements

1/30 . . . using applied electromagnetic fields, e.g. high frequency or microwave energy (H05H 1/28 takes precedence)

1/32 . . . using an arc (H05H 1/28 takes precedence)

1/34 . . . . Details, e.g. electrodes, nozzles

WARNING

Group H05H 1/34 is impacted by reclassification into groups H05H 1/3423 and H05H 1/3425.

Groups H05H 1/34, H05H 1/3423 and H05H 1/3425 should be considered in order to perform a complete search.

1/3405 . . . . . {Arrangements for stabilising or constricting the arc, e.g. by an additional gas flow}

1/341 . . . . . {Arrangements for providing coaxial protecting fluids}

1/3421 . . . . . {Transferred arc or pilot arc mode}

1/3423 . . . . . {Connecting means, e.g. electrical connecting means or fluid connections}

WARNING

Group H05H 1/3423 is incomplete pending reclassification of documents from group H05H 1/34.

Groups H05H 1/34 and H05H 1/3423 should be considered in order to perform a complete search.

1/3425 . . . . . {Melting or consuming electrodes}

WARNING

Group H05H 1/3425 is incomplete pending reclassification of documents from group H05H 1/34.

Groups H05H 1/34 and H05H 1/3425 should be considered in order to perform a complete search.

1/3431 . . . . . {Coaxial cylindrical electrodes}

1/3436 . . . . . {Hollow cathodes with internal coolant flow}

1/3442 . . . . . {Cathodes with inserted tip}

1/3447 . . . . . {Rod-like cathodes}

1/3452 . . . . . {Supplementary electrodes between cathode and anode, e.g. cascade}

1/3457 . . . . . {Nozzle protection devices}

1/3463 . . . . . {Oblique nozzles}

1/3468 . . . . . {Vortex generators}

1/3473 . . . . . {Safety means}

1/3478 . . . . . {Geometrical details}

1/3484 . . . . . {Convergent-divergent nozzles}

1/3489 . . . . . {Means for contact starting}

1/3494 . . . . . {Means for controlling discharge parameters}

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)

1/461 . . . {Microwave discharges}

1/4615 . . . . {using surface waves}

1/4622 . . . . {using waveguides}

1/463 . . . . {using antennas or applicators}

1/4637 . . . . {using cables}

1/4645 . . . {Radiofrequency discharges}

1/4652 . . . . {using inductive coupling means, e.g. coils}

1/466 . . . . {using capacitive coupling means, e.g. electrodes}

1/4697 . . {using glow discharges}

WARNING

Group H05H 1/4697 is incomplete pending reclassification of documents from group H05H 1/24.

Groups H05H 1/24 and H05H 1/4697 should be considered in order to perform a complete search.

1/47 . . {using corona discharges}

1/471 . . . {Pointed electrodes}

1/473 . . . {Cylindrical electrodes, e.g. rotary drums}

1/475 . . . {Filamentary electrodes}

1/477 . . . {Segmented electrodes}

1/48 . . using an arc (H05H 1/26 takes precedence)

WARNING

Group H05H 1/48 is impacted by reclassification into groups H05H 1/481, H05H 1/482, H05H 1/484, H05H 1/486 and H05H 1/488.

All groups listed in this Warning should be considered in order to perform a complete search.

1/481 . . . {Hollow cathodes}

WARNING

Group H05H 1/481 is incomplete pending reclassification of documents from group H05H 1/48.

Groups H05H 1/48 and H05H 1/481 should be considered in order to perform a complete search.

1/482 . . . {Arrangements to provide gliding arc discharges}

WARNING

Group H05H 1/482 is incomplete pending reclassification of documents from group H05H 1/48.

Groups H05H 1/48 and H05H 1/482 should be considered in order to perform a complete search.

1/484 . . . {Arrangements to provide plasma curtains or plasma showers}

WARNING

Group H05H 1/484 is incomplete pending reclassification of documents from group H05H 1/48.

Groups H05H 1/48 and H05H 1/484 should be considered in order to perform a complete search.

1/486 . . . {Arrangements to provide capillary discharges}

WARNING

Group H05H 1/486 is incomplete pending reclassification of documents from group H05H 1/48.

Groups H05H 1/48 and H05H 1/486 should be considered in order to perform a complete search.

1/488 . . . {Liquid electrodes}

WARNING

Group H05H 1/488 is incomplete pending reclassification of documents from group H05H 1/48.

Groups H05H 1/48 and H05H 1/488 should be considered in order to perform a complete search.

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}
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 {or rhodotrons}

15/00 Methods or devices for acceleration of charged particles not otherwise provided for {, e.g. wakefield accelerators}

2240/00 Testing
2240/10 . at atmospheric pressure
2240/20 . Non-thermal plasma

2242/00 Auxiliary systems
2242/10 . Cooling arrangements

2242/20 . Power circuits

WARNING

Group H05H 2242/20 is impacted by reclassification into groups H05H 2242/22, H05H 2242/24 and H05H 2242/26.

All groups listed in this Warning should be considered in order to perform a complete search.

2242/22 . . DC, AC or pulsed generators

WARNING

Group H05H 2242/22 is incomplete pending reclassification of documents from group H05H 2242/20.

Groups H05H 2242/20 and H05H 2242/22 should be considered in order to perform a complete search.

2242/24 . . Radiofrequency or microwave generators

WARNING

Group H05H 2242/24 is incomplete pending reclassification of documents from group H05H 2242/20.

Groups H05H 2242/20 and H05H 2242/24 should be considered in order to perform a complete search.

2242/26 . . Matching networks

WARNING

Group H05H 2242/26 is incomplete pending reclassification of documents from group H05H 2242/20.

Groups H05H 2242/20 and H05H 2242/26 should be considered in order to perform a complete search.

2245/00 Applications of plasma devices

2245/10 . Treatment of gases

2245/15 . . Ambient air; Ozonisers

2245/17 . . Exhaust gases

2245/20 . Treatment of liquids

2245/30 . Medical applications

WARNING

Group H05H 2245/30 is impacted by reclassification into groups H05H 2245/32 and H05H 2245/34.

Groups H05H 2245/30, H05H 2245/32 and H05H 2245/34 should be considered in order to perform a complete search.

2245/32 . . Surgery, e.g. scalpels, blades or bistoury; Treatments inside the body

WARNING

Group H05H 2245/32 is incomplete pending reclassification of documents from group H05H 2245/30.

Groups H05H 2245/30 and H05H 2245/32 should be considered in order to perform a complete search.

2245/34 . . Skin treatments, e.g. disinfection or wound treatment

WARNING

Group H05H 2245/34 is incomplete pending reclassification of documents from group H05H 2245/30.

Groups H05H 2245/30 and H05H 2245/34 should be considered in order to perform a complete search.

2245/36 . . Sterilisation of objects, liquids, volumes or surfaces

2245/40 . Surface treatments

2245/42 . . Coating or etching of large items

2245/50 . Production of nanostructures

2245/60 . Portable devices

2245/70 . Automotive applications, e.g. engines

2245/80 . Burners or furnaces for heat generation, for fuel combustion or for incineration of wastes

2277/00 Applications of particle accelerators

2277/10 . Medical devices

2277/11 . . Radiotherapy

2277/113 . . . Diagnostic systems

2277/116 . . . Isotope production

2277/12 . Ion implantation

2277/13 . Nuclear physics, e.g. spallation sources, accelerator driven systems, search or generation of exotic elements

2277/14 . Portable devices

2277/1405 . . Detection systems, e.g. for safety