

H 05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H 05 B ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. [A 47 J](#), [B 21 J](#), [K](#), [C 21](#), [C 22](#), [C 23](#), [F 21](#), [F 24](#), [F 27](#))

Note

Attention is drawn to Note III following the Contents of Section of section H. [3]

Subclass Index

HEATING

Produced by: resistance; electric, magnetic, or electromagnetic fields; discharge [3/00](#); [6/00](#); [7/00](#)
 Combined types.....[11/00](#)
 Details[1/00](#)

Combined types[35/00](#)
 Circuit arrangements:
 general.....[37/00](#)
 for incandescent lamps[39/00](#)
 for discharge lamps[41/00](#)
 other[43/00](#)

LIGHTING

Light sources: arc; electro-luminescent[31/00](#); [33/00](#)

Heating

1/00 Details of electric heating devices

1/02 . Automatic switching arrangements specially adapted to heating apparatus (control of temperature in general [G 05 D 23/00](#); thermally-actuated switches [H 01 H 37/00](#))

3/00 Ohmic-resistance heating

3/02 . Details
 3/03 . . Electrodes (electrothermic treatment of ores [C 22 B 4/00](#)) [2]
 3/04 . . Waterproof or air-tight seals for heaters
 3/06 . . Heater elements structurally combined with coupling elements or with holders
 3/08 . . . having electric connections specially adapted for high temperatures
 3/10 . Heating elements characterised by the composition or nature of the materials or by the arrangement of the conductor (compositions per se, see the relevant subclasses)
 3/12 . . characterised by the composition or nature of the conductive material
 3/14 . . . the material being non-metallic
 3/16 . . the conductor being mounted on an insulating base
 3/18 . . the conductor being embedded in an insulating material
 3/20 . Heating elements having extended surface area substantially in a two-dimensional plane, e.g. plate-heater ([3/62](#), [3/68](#), [3/78](#), [3/84](#) take precedence) [5]
 3/22 . . non-flexible
 3/24 . . . heating conductor being self-supporting
 3/26 . . . heating conductor mounted on insulating base
 3/28 . . . heating conductor embedded in insulating material
 3/30 on or between metallic plates
 3/32 . . . heating conductor mounted on insulators on a metallic frame
 3/34 . . flexible, e.g. heating nets or webs

3/36 . . . heating conductor embedded in insulating material
 3/38 . . . Powder conductors
 3/40 . Heating elements having the shape of rods or tubes ([3/62](#), [3/68](#), [3/78](#) take precedence)
 3/42 . . non-flexible
 3/44 . . . heating conductor arranged within rods or tubes of insulating material
 3/46 . . . heating conductor mounted on insulating base
 3/48 . . . heating conductor embedded in insulating material
 3/50 heating conductor arranged in metal tubes, the radiating surface having heat-conducting fins
 3/52 Apparatus or processes for filling or compressing insulating material in tubes
 3/54 . . flexible
 3/56 . . . Heating cables
 3/58 . . . Heating hoses; Heating collars
 3/60 . Heating arrangements wherein the heating current flows through granular, powdered or fluid material, e.g. for salt-bath furnace, electrolytic heating ([3/38](#) takes precedence)
 3/62 . Heating elements specially adapted for furnaces ([3/60](#) takes precedence; arrangements of such elements in furnaces [F 27](#), e.g. [F 27 D 11/00](#))
 3/64 . . using ribbon, rod, or wire heater
 3/66 . . Supports or mountings for heaters on or in the wall or roof
 3/68 . Heating arrangements specially adapted for cooking plates or analogous hot-plates

Note

Group [3/76](#) takes precedence over groups [3/70](#) to [3/74](#). [2]

3/70 . . Plates of cast metal
 3/72 . . Plates of sheet metal
 3/74 . . Non-metallic plates

- 3/76 . . . Plates with spirally-wound heating tubes
- 3/78 . . . Heating arrangements specially adapted for immersion heating
- 3/80 . . . Portable immersion heaters
- 3/82 . . . Fixedly-mounted immersion heaters
- 3/84 . . . Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields [5]
- 3/86 . . . the heating conductors being embedded in the transparent or reflecting material [5]
- 6/00 Heating by electric, magnetic, or electromagnetic fields** (for therapeutic purposes [A 61 N 5/00](#); joining of preformed parts by heating of plastics or substances in a plastic state [B 29 C 65/02](#)) [3]
 - 6/02 . . . Induction heating [3]
 - 6/04 . . . Sources of current [3]
 - 6/06 . . . Control, e.g. of temperature, of power [3]
 - 6/08 using compensating or balancing arrangements [3]
 - 6/10 . . . Induction heating apparatus, other than furnaces, for specific applications [3]
 - 6/12 Cooking devices [3]
 - 6/14 Tools, e.g. nozzles, rollers, calenders [3]
 - 6/16 . . . Furnaces having endless cores ([6/34](#) takes precedence) [3]
 - 6/18 having melting basin [3]
 - 6/20 having melting channel only [3]
 - 6/22 . . . Furnaces without an endless core ([6/34](#) takes precedence) [3]
 - 6/24 Crucible furnaces ([6/30](#) takes precedence) [3]
 - 6/26 using vacuum or particular gas atmosphere [3]
 - 6/28 Protective systems [3]
 - 6/30 . . . Arrangements for remelting or zone melting [3]
 - 6/32 . . . Arrangements for simultaneous levitation and heating [3]
 - 6/34 . . . Arrangements for circulation of melts [3]
 - 6/36 . . . Coil arrangements [3]
 - 6/38 specially adapted for fitting into hollow spaces of workpieces [3]
 - 6/40 Establishing desired heat distribution, e.g. to heat particular parts of workpieces [3]
 - 6/42 Cooling of coils [3]
 - 6/44 having more than one coil or coil segment [3]
 - 6/46 . . . Dielectric heating ([6/64](#) take precedence) [3]
 - 6/48 . . . Circuits [3]
 - 6/50 for monitoring or control [3]
 - 6/52 . . . Feed lines [3]
 - 6/54 . . . Electrodes [3]
 - 6/56 Rolling electrodes [3]
 - 6/58 “sewing machine” type [3]
 - 6/60 . . . Arrangements for continuous movement of material [3]
 - 6/62 Apparatus for specific applications [3]
 - 6/64 Heating using microwaves [3]
 - 6/66 Circuits [3]
 - 6/68 for monitoring or control [3]
 - 6/70 Feed lines [3]
- 6/72 . . . Radiators or aerials [3]
- 6/74 . . . Mode transformers or mode stirrers [3]
- 6/76 . . . Prevention of microwave leakage, e.g. door sealings [3]
- 6/78 . . . Arrangements for continuous movement of material [3]
- 6/80 . . . Apparatus for specific applications (stoves or ranges [F 24 C 7/02](#)) [3]
- 7/00 Heating by electric discharge** (electron beam or ion beam tubes for localised treatment of objects [H 01 J 37/30](#); plasma torches [H 05 H 1/26](#))
 - 7/02 . . . Details
 - 7/06 . . . Electrodes
 - 7/07 designed to melt in use [2]
 - 7/08 non-consumable [2]
 - 7/085 mainly consisting of carbon [2]
 - 7/09 Self-baking electrodes [2]
 - 7/10 . . . Mountings, supports, terminals, or arrangements for feeding or guiding electrodes [2]
 - 7/101 Mountings, supports, or terminals at head of electrode, i.e. at the end remote from the arc [2]
 - 7/102 specially adapted for consumable electrodes [2]
 - 7/103 Mountings, supports, or terminals with jaws ([7/101](#) takes precedence) [2]
 - 7/105 comprising more than two jaws equally spaced along circumference, e.g. ring holders [2]
 - 7/107 specially adapted for self-baking electrodes [2]
 - 7/109 Feeding arrangements ([7/107](#) takes precedence; where the electrode movement is a part of a closed loop for automatic control of power [7/148](#)) [2]
 - 7/11 . . . Arrangements for conducting current to the electrode terminals (non-insulated conductors or conductive bodies in general [H 01 B 5/00](#); insulated conductors or cables in general [H 01 B 7/00](#)) [2]
 - 7/12 . . . Arrangements for cooling, sealing, or protecting electrodes [2]
 - 7/14 . . . Arrangements or methods for connecting successive electrode sections [2]
 - 7/144 . . . Power supplies specially adapted for heating by electric discharge; Automatic control of power, e.g. by positioning of electrodes (circuit arrangements for supplying electric power in general [H 02 J](#)) [2]
 - 7/148 Automatic control of power (electrode feeding arrangements [7/109](#); automatic feeding or moving of electrodes for spot or seam welding or cutting [B 23 K 9/12](#); disposition of electrodes in or on furnaces [F 27 D 11/10](#); control of position in general [G 05 D 3/00](#); regulating electric characteristics of arcs in general [G 05 F 1/02](#); regulating electric power in general [G 05 F 1/66](#)) [2]
 - 7/152 by electromechanical means for positioning of electrodes [2]

- 7/156 by hydraulic or pneumatic means for positioning of electrodes [2]
- 7/16 . Heating by glow discharge
- 7/18 . Heating by arc discharge
- 7/20 . . Direct heating by arc discharge, i.e. where at least one end of the arc directly acts on the material to be heated, including additional resistance heating by arc current flowing through the material to be heated [2]
- 7/22 . . Indirect heating by arc discharge [2]
- 11/00 Heating by combined application of processes covered by two or more of groups 3/00 to 7/00 (7/20 takes precedence)**

Lighting

31/00 Electric arc lamps (regulating electric characteristics of arcs **G 05 F 1/02**; with non-consumable electrodes **H 01 J 61/00**)

- 31/02 . Details
- 31/04 . . Housings
- 31/06 . . Electrodes
- 31/08 . . . Carbon electrodes
- 31/10 Cored carbon electrodes
- 31/12 Beck-effect electrodes
- 31/14 . . . Metal electrodes
- 31/16 . . . Apparatus or processes specially adapted for manufacturing electrodes
- 31/18 . . Mountings for electrodes; Electrode feeding devices
- 31/20 . . . Mechanical arrangements for feeding electrodes
- 31/22 . . . Electromagnetic arrangements for feeding electrodes
- 31/24 . . Cooling arrangements
- 31/26 . . Influencing the shape of arc discharge by gas blowing devices
- 31/28 . . Influencing the shape of arc discharge by magnetic means
- 31/30 . . Starting; Igniting
- 31/32 . . Switching-off
- 31/34 . . Indicating consumption of electrodes
- 31/36 . having two electrodes in line
- 31/38 . . specially adapted for ac
- 31/40 . having two electrodes at an angle
- 31/42 . . specially adapted for ac
- 31/44 . having two parallel electrodes
- 31/46 . . specially adapted for ac
- 31/48 . having more than two electrodes
- 31/50 . . specially adapted for ac
- 31/52 . . . electrodes energised from different phases of the supply

33/00 Electroluminescent light sources (discharge lamps **H 01 J 61/00 to 65/00**; semi-conductor devices with at least one particular jump barrier or surface barrier adapted for light emission **H 01 L 33/00**; compositions per se, see the relevant subclasses)

- 33/02 . Details
- 33/04 . . Sealing arrangements
- 33/06 . . Electrode terminals
- 33/08 . . Circuit arrangements not adapted to a particular application

- 33/10 . Apparatus or processes specially adapted to the manufacture of electroluminescent light sources
- 33/12 . Light sources with substantially two-dimensional radiating surfaces
- 33/14 . . characterised by the chemical or physical composition or the arrangement of the electroluminescent material
- 33/18 . . characterised by the nature or concentration of the activator
- 33/20 . . characterised by the chemical or physical composition or the arrangement of the material in which the electroluminescent material is embedded
- 33/22 . . characterised by the chemical or physical composition or the arrangement of auxiliary dielectric or reflective layers
- 33/24 . . . of metallic reflective layers (**33/26** takes precedence)
- 33/26 . . characterised by the composition or arrangement of the conductive material used as an electrode
- 33/28 . . . of translucent electrodes

35/00 Electric light sources using a combination of different types of light generation

37/00 Circuit arrangements for electric light sources in general

- 37/02 . Controlling
- 37/03 . Detecting lamp failure
- 37/04 . . Circuits providing for substitution of the light source in case of its failure

39/00 Circuit arrangements or apparatus for operating incandescent light sources and not adapted to a particular application

- 39/02 . Switching-on, e.g. with predetermined rate of increase of lighting current
- 39/04 . Controlling
- 39/06 . . Switching arrangements, e.g. from series operation to parallel operation
- 39/08 . . by shifting phase of trigger voltage applied to gas-filled controlling tubes
- 39/09 . in which the lamp is fed by pulses
- 39/10 . Circuits providing for substitution of the light source in case of its failure

41/00 Circuit arrangements or apparatus for igniting or operating discharge lamps

- 41/02 . Details
- 41/04 . . Starting switches
- 41/06 . . . thermal only
- 41/08 heated by glow discharge
- 41/10 . . . magnetic only
- 41/12 . . . combined thermal and magnetic
- 41/14 . Circuit arrangements
- 41/16 . . in which the lamp is fed by dc or by low-frequency ac, e.g. by 50 cycles/sec ac (**41/26** takes precedence)
- 41/18 . . . having a starting switch
- 41/19 for lamps having an auxiliary starting electrode
- 41/20 . . . having no starting switch
- 41/22 for lamps having an auxiliary starting electrode

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- 41/23 for lamps not having an auxiliary starting electrode
- 41/231 for high-pressure lamps
- 41/232 for low-pressure lamps
- 41/233 using resonance circuitry
- 41/234 to eliminate stroboscopic effects, e.g. feeding two lamps with different phases
- 41/24 in which the lamp is fed by high-frequency ac ([41/26](#) takes precedence)
- 41/26 in which the lamp is fed by power derived from dc by means of a converter, e.g. by high-voltage dc
- 41/28 using static converters
- 41/282 with semiconductor devices ([41/288](#), [41/295](#) take precedence) [7]
- 41/285 Arrangements for protecting lamps or circuits against abnormal operating conditions [7]
- 41/288 with semiconductor devices and specially adapted for lamps without preheating electrodes, e.g. for high-intensity discharge lamps, high-pressure mercury or sodium lamps or low-pressure sodium lamps [7]
- 41/29 (transferred to [41/282](#) to [41/295](#))
- 41/292 Arrangements for protecting lamps or circuits against abnormal operating conditions [7]
- 41/295 with semiconductor devices and specially adapted for lamps with preheating electrodes, e.g. for fluorescent lamps [7]
- 41/298 Arrangements for protecting lamps or circuits against abnormal operating conditions [7]
- 41/30 in which the lamp is fed by pulses, e.g. flash lamp
- 41/32 for single flash operation
- 41/34 to provide a sequence of flashes
- 41/36 Controlling
- 41/38 Controlling the intensity of light
- 41/39 continuously
- 41/391 using saturable magnetic devices
- 41/392 using semiconductor devices, e.g. thyristor
- 41/40 discontinuously
- 41/42 in two steps only
- 41/44 for providing special optical effects, e.g. progressive motion of light
- 41/46 Circuits providing for substitution in case of failure of the lamp
- 43/00** **Circuit arrangements for light sources, not otherwise provided for** ([37/00](#) takes precedence)
- 43/02 for light sources using a charge of combustible material
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H 05 C ELECTRIC CIRCUITS OR APPARATUS SPECIALLY DESIGNED FOR USE IN EQUIPMENT FOR KILLING, STUNNING, ENCLOSING OR GUIDING LIVING BEINGS (stationary means for catching or killing insects by electric means [A 01 M 1/22](#); apparatus for the destruction of noxious animals, other than insects, by electricity [A 01 M 19/00](#); electric traps for animals [A 01 M 23/38](#); scaring devices for animals [A 01 M 29/00](#); slaughtering or stunning by electric current [A 22 B 3/06](#))

- 1/00** **Circuits or apparatus for generating electric shock effects**
- 1/02 providing continuous feeding of dc or ac voltage
- 1/04 providing pulse voltages (mechanical self-interrupters [H 01 H](#); electronic pulse-generators [H 03 K](#))
- 1/06 operating only when touched
- 3/00** **Other circuits**
-

H 05 F STATIC ELECTRICITY; NATURALLY-OCCURRING ELECTRICITY (electrostatic machines [H 02 N](#); uses of electricity in performing operations, e.g. precipitation, see the relevant subclasses for the operations)

Notes

- (1) This subclass covers methods or arrangements for preventing the formation of electrostatic charges on bodies or for carrying-off these charges after their formation.
- (2) This subclass does not cover specific applications of the above-mentioned methods or arrangements. Such arrangements are covered by the relevant subclasses, e.g. arrangements in large containers [B 65 D 90/46](#).

<p>1/00 Preventing the formation of electrostatic charges 1/02 . by surface treatment</p> <p>3/00 Carrying-off electrostatic charges (from living beings A 61 N 1/14) 3/02 . by means of earthing connections</p>	<p>3/04 . by means of spark gaps or other discharge devices (devices providing for corona discharge H 01 T 19/00) [2]</p> <p>3/06 . by means of ionising radiation</p> <p>7/00 Use of naturally-occurring electricity</p>
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H 05 G X-RAY TECHNIQUE (apparatus for radiation diagnosis A 61 B 6/00; X-ray therapy A 61 N; testing by X-rays G 01 N; apparatus for X-ray photography G 03 B; filters, conversion screens, microscopes G 21 K; X-ray tubes H 01 J 35/00; TV systems having X-ray input H 04 N 5/321)

<p>1/00 X-ray apparatus involving X-ray tubes; Circuits therefor 1/02 . Constructional details 1/04 . . Mounting the X-ray tube within a closed housing 1/06 . . . X-ray tube and at least part of the power supply apparatus being mounted within the same housing 1/08 . Electrical details 1/10 . . Power supply arrangements for feeding the X-ray tube 1/12 . . . with dc or rectified single-phase ac 1/14 . . . with single-phase low-frequency ac 1/16 Reducing the peak-inverse voltage 1/18 . . . with polyphase ac of low frequency 1/20 . . . with high-frequency ac; with pulse trains 1/22 . . . with single pulses 1/24 Obtaining pulses by using energy storage devices (pulse generators H 03 K) 1/26 . . Measuring, controlling, protecting (measuring electric values G 01 R; measuring X-ray intensity G 01 T) 1/28 . . . Measuring or recording actual exposure time; Counting number of exposures; Measuring required exposure time 1/30 . . . Controlling 1/32 Supply voltage of the X-ray apparatus or tube (regulating supply without reference to operating characteristics of the apparatus G 05 F) 1/34 Anode current, heater current, heater voltage of X-ray tube (regulating supply without reference to operating characteristics of the apparatus G 05 F) 1/36 Temperature of anode; Brightness of image 1/38 Exposure time 1/40 using adjustable time switch</p>	<p>1/42 using arrangements for switching when a predetermined dose of radiation has been applied, e.g. in which the switching instant is determined by measuring the electrical energy supplied to the tube 1/44 in which the switching instant is determined by measuring the amount of radiation directly 1/46 Combined control of different quantities, e.g. exposure time as well as voltage or current 1/48 Compensating the voltage drop occurring at the instant of switching-on of the apparatus (regulating supply without reference to operating characteristics of the apparatus G 05 F) 1/50 Passing the tube current only during a restricted portion of the voltage waveform 1/52 Target size or shape; Direction of electron beam, e.g. in tubes with one anode and more than one cathode 1/54 . . . Protecting (overload protection combined with control 1/46) 1/56 . . Switching-on; Switching-off 1/58 . . Switching arrangements for changing-over from one mode of operation to another, e.g. from radioscopy to radiography, from radioscopy to irradiation 1/60 . . Circuit arrangements for obtaining a series of X-ray photographs or for X-ray cinematography 1/61 . . . for obtaining stereoscopic photographs [5] 1/62 . . Circuit arrangements for obtaining X-ray photography at predetermined instants in the movement of an object, e.g. X-ray stroboscopy 1/64 . . Circuit arrangements for X-ray apparatus incorporating electronic image converters, e.g. image intensifiers [5] 1/66 . . Circuit arrangements for X-ray tubes with target movable relatively to the anode</p>
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- 1/68 . . . Circuit arrangements for Lilienfeld tubes; Circuit arrangements for gas-filled X-ray tubes
- 1/70 . . . Circuit arrangements for X-ray tubes with more than one anode; Circuit arrangements for apparatus comprising more than one X-ray tube

2/00 Apparatus or processes specially adapted for producing X-rays, not involving X-ray tubes, e.g. involving generation of a plasma (X-ray lasers [H 01 S 4/00](#); plasma technique in general [H 05 H](#)) [5]

H 05 H PLASMA TECHNIQUE (fusion reactors [G 21 B](#); ion-beam tubes [H 01 J 27/00](#); magnetohydrodynamic generators [H 02 K 44/08](#); producing X-rays involving plasma generation [H 05 G 2/00](#)); **PRODUCTION OF ACCELERATED ELECTRICALLY-CHARGED PARTICLES OR OF NEUTRONS** (obtaining neutrons from radioactive sources [G 21](#), e.g. [G 21 B, C, G](#)); **PRODUCTION OR ACCELERATION OF NEUTRAL MOLECULAR OR ATOMIC BEAMS** (atomic clocks [G 04 F 5/14](#); devices using stimulated emission [H 01 S](#); frequency regulation by comparison with a reference frequency determined by energy levels of molecules, atoms, or subatomic particles [H 03 L 7/26](#))

Notes

- (1) This subclass covers:
 - (a) generating or handling plasma;
 - (b) devices not covered by subclass [H 01 J](#) and in which electrons, ion beams, or neutral particles are accelerated to high energies;
 - (c) devices for producing neutral particle beams; [3]
 - (d) targets for (a), (b), or (c). [3]
- (2) Attention is drawn to subclass [G 21 K](#). [3]

Subclass Index

PLASMA TECHNIQUE	1/00
PRODUCTION OR ACCELERATION OF NEUTRAL PARTICLE BEAMS.....	3/00
TARGETS FOR NUCLEAR REACTIONS.....	6/00

PARTICLE ACCELERATORS	
Direct voltage accelerators, accelerators using single pulses.....	5/00
Linear; magnetic induction; magnetic resonance	9/00; 11/00; 13/00
Others.....	15/00
Details	7/00

- 1/00 Generating plasma; Handling plasma**
- 1/02 . . . Arrangements for confining plasma by electric or magnetic fields; Arrangements for heating plasma (electron optics [H 01 J](#))
- 1/03 . . . using electrostatic fields [3]
- 1/04 . . . using magnetic fields substantially generated by the discharge in the plasma
- 1/06 . . . Longitudinal pinch devices
- 1/08 . . . Theta pinch devices
- 1/10 . . . using applied magnetic fields only
- 1/11 . . . using cusp configuration ([1/14](#) takes precedence) [3]
- 1/12 . . . wherein the containment vessel forms a closed loop, e.g. stellarator
- 1/14 . . . wherein the containment vessel is straight and has magnetic mirrors
- 1/16 . . . using applied electric and magnetic fields
- 1/18 . . . wherein the fields oscillate at a very high frequency, e.g. in the microwave range
- 1/20 . . . Ohmic heating
- 1/22 . . . for injection heating
- 1/24 . . . Generating plasma [2]
- 1/26 . . . Plasma torches [2]
- 1/28 . . . Cooling arrangements [3]
- 1/30 . . . using applied electromagnetic fields, e.g. high-frequency or microwave energy ([1/28](#) takes precedence) [3]

- 1/32 . . . using an arc ([1/28](#) takes precedence) [3]
- 1/34 Details, e.g. electrodes, nozzles [3]
- 1/36 Circuit arrangements ([1/38](#), [1/40](#) take precedence) [3]
- 1/38 Guiding or centering of electrodes [3]
- 1/40 using applied magnetic fields, e.g. for focusing or rotating the arc [3]
- 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 [B 05 B 5/00](#)) [3]
- 1/44 using more than one torch [3]
- 1/46 . . . using applied electromagnetic fields, e.g. high frequency or microwave energy ([1/26](#) takes precedence) [3]
- 1/48 . . . using an arc ([1/26](#) takes precedence) [3]
- 1/50 . . . and using applied magnetic fields, e.g. for focusing or rotating the arc [3]
- 1/52 . . . using exploding wires or spark gaps ([1/26](#) takes precedence; spark gaps in general [H 01 T](#)) [3]
- 1/54 . . . Plasma accelerators [3]

- 3/00 Production or acceleration of neutral particle beams, e.g. molecular or atomic beams [3]**
- 3/02 . Molecular or atomic-beam generation, e.g. resonant beam generation (gas masers [H 01 S 1/06](#)) [3]
 - 3/04 . Acceleration by electromagnetic wave pressure [3]
 - 3/06 . Generating neutron beams (targets for producing nuclear reactions [6/00](#); neutron sources [G 21 G 4/02](#)) [5]
- 5/00 Direct voltage accelerators; Accelerators using single pulses (3/06 takes precedence) [5]**
- 5/02 . Details (targets for producing nuclear reactions [6/00](#)) [3]
 - 5/03 . . Accelerating tubes (vessels or containers of electric discharge tubes with improved potential distribution over surface of vessel [H 01 J 5/06](#); shields of X-ray tubes associated with vessels or containers [H 01 J 35/16](#)) [4]
 - 5/04 . energised by electrostatic generators, e.g. by van de Graaff generator [4]
 - 5/06 . Tandem accelerators; Multi-stage accelerators
 - 5/08 . Particle accelerators using step-up transformers, e.g. resonance transformers [4]
- 6/00 Targets for producing nuclear reactions (supports for targets or objects to be irradiated [G 21 K 5/08](#)) [3]**
- 7/00 Details of devices of the types covered by groups 9/00 to 13/00 (targets for producing nuclear reactions [6/00](#)) [3]**
- 7/02 . Circuits or systems for supplying or feeding radio-frequency energy (radio-frequency generators [H 03 B](#))
 - 7/04 . Magnet systems; Energisation thereof
- 7/06 . Two-beam arrangements; Multi-beam arrangements
 - 7/08 . Arrangements for injecting particles into orbits
 - 7/10 . Arrangements for ejecting particles from orbits
 - 7/12 . Arrangements for varying final energy of beam
 - 7/14 . Vacuum chambers ([5/03](#) takes precedence) [4]
 - 7/16 . . of the waveguide type [4]
 - 7/18 . . Cavities; Resonators [4]
 - 7/20 . . . with superconductive walls [4]
 - 7/22 . Details of linear accelerators, e.g. drift tubes ([7/02](#) to [7/20](#) take precedence) [4]
- 9/00 Linear accelerators (11/00 takes precedence)**
- 9/02 . Travelling-wave linear accelerators
 - 9/04 . Standing-wave linear accelerators
- 11/00 Magnetic induction accelerators, e.g. betatrons**
- 11/02 . Air-cored betatrons
 - 11/04 . Biased betatrons
- 13/00 Magnetic resonance accelerators; 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
 - 13/10 . 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 [4]
- 15/00 Methods or devices for acceleration of charged particles not otherwise provided for [4]**

H 05 K PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS (details of instruments or comparable details of other apparatus not otherwise provided for [G 12 B](#); thin-film or thick-film circuits [H 01 L 27/01](#), [27/13](#); non-printed means for electric connections to or between printed circuits [H 01 R](#); casings for, or constructional details of, particular types of apparatus, see the relevant subclasses; processes involving only a single technical art, e.g. heating, spraying, for which provision exists elsewhere, see the relevant classes)

Notes

- (1) This subclass covers:
- combinations of a radio or television receiver with apparatus having a different main function;
 - printed circuits structurally associated with non-printed electric components.
- (2) In this subclass, the following expression is used with the meaning indicated:
- “printed circuits” covers all kinds of mechanical constructions of circuits that consist of an insulating base or support carrying the conductor and are combined structurally with the conductor throughout their length, especially in a two-dimensional plane, the conductors of which are secured to the base in a non-dismountable manner, and also covers the processes or apparatus for manufacturing such constructions, e.g. forming the circuit by mechanical or chemical treatment of a conductive foil, paste, or film on an insulating support.

Subclass Index

PRINTED CIRCUITS ASSOCIATED OR
NOT ASSOCIATED WITH NON-PRINTED
ELECTRIC COMPONENTS

Types; manufacture 1/00; 3/00

CASINGS, CABINETS OR DRAWERS;

CONSTRUCTIONAL DETAILS 5/00; 7/00

SCREENING 9/00

COMBINATIONS OF A RADIO OR
TELEVISION RECEIVER WITH OTHER
APPARATUS 11/00

MANUFACTURE OF ELECTRONIC
ASSEMBLAGES 13/00
ARRANGEMENTS FOR IMPROVING THE
OPERATING RELIABILITY 10/00

1/00 Printed circuits (assemblies of a plurality of individual semiconductor or solid state devices [H 01 L 25/00](#); devices consisting of a plurality of solid state components formed in or on a common substrate, e.g. integrated circuits, thin-film or thick-film circuits, [H 01 L 27/00](#))

1/02 . Details

1/03 . . Use of materials for the substrate [3]

1/05 . . . Insulated metal substrate [3]

1/09 . . Use of materials for the metallic pattern [3]

1/11 . . Printed elements for providing electric connections to or between printed circuits [3]

1/14 . . Structural association of two or more printed circuits (providing electric connection to or between printed circuits [1/11](#), [H 01 R 12/00](#))

1/16 . incorporating printed electric components, e.g. printed resistor, capacitor, inductor

1/18 . Printed circuits structurally associated with non-printed electric components ([1/16](#) takes precedence)

3/00 Apparatus or processes for manufacturing printed circuits (photomechanical production of textured or patterned surfaces, materials or originals therefor, apparatus specially adapted therefor, in general [G 03 F](#); involving the manufacture of semiconductor devices [H 01 L](#)) [3]

3/02 . in which the conductive material is applied to the surface of the insulating support and is thereafter removed from such areas of the surface which are not intended for current conducting or shielding

3/04 . . the conductive material being removed mechanically, e.g. by punching

3/06 . . the conductive material being removed chemically or electrolytically, e.g. by photo-etch process

3/07 . . . being removed electrolytically [3]

3/08 . . the conductive material being removed by electric discharge, e.g. by spark erosion

3/10 . in which conductive material is applied to the insulating support in such a manner as to form the desired conductive pattern

3/12 . . using printing techniques to apply the conductive material

3/14 . . using spraying techniques to apply the conductive material

3/16 . . . by cathodic sputtering

3/18 . . using precipitation techniques to apply the conductive material

3/20 . . by affixing prefabricated conductor pattern

3/22 . Secondary treatment of printed circuits

3/24 . . Reinforcing of the conductive pattern

3/26 . . Cleaning or polishing of the conductive pattern

3/28 . . Applying non-metallic protective coatings

3/30 . Assembling printed circuits with electric components, e.g. with resistor

3/32 . . electrically connecting electric components or wires to printed circuits

3/34 . . . by soldering

3/36 . Assembling printed circuits with other printed circuits

3/38 . Improvement of the adhesion between the insulating substrate and the metal [3]

3/40 . Forming printed elements for providing electric connections to or between printed circuits [3]

3/42 . . Plated through-holes [3]

3/44 . Manufacturing insulated metal core circuits [3]

3/46 . Manufacturing multi-layer circuits [3]

5/00 Casings, cabinets or drawers for electric apparatus (in general [A 47 B](#); radio receiver cabinets [H 04 B 1/08](#); television receiver cabinets [H 04 N 5/64](#))

5/02 . Details

5/03 . . Covers

5/04 . Metal casings

5/06 . Hermetically-sealed casings

7/00 Constructional details common to different types of electric apparatus (casings, cabinets, drawers [5/00](#))

7/02 . Arrangements of circuit components or wiring on supporting structure

7/04 . . on conductive chassis

7/06 . . on insulating boards

7/08 . . . on perforated boards

7/10 . . Plug-in assemblages of components

7/12 . . Resilient or clamping means for holding component to structure (holding two-part couplings together [H 01 R 13/00](#))

7/14 . Mounting supporting structure in casing or on frame or rack

7/16 . . on hinges or pivots

7/18 . Construction of rack or frame

7/20 . Modifications to facilitate cooling, ventilating, or heating

9/00 Screening of apparatus or components against electric or magnetic fields (devices for absorbing radiation from an aerial [H 01 Q 17/00](#))

10/00 Arrangements for improving the operating reliability of electronic equipment, e.g. by providing a similar stand-by unit

Note

Attention is drawn to the following appropriate places: [6]

G 05 B 9/03	Electric redundant control systems [6]
G 06 F 11/16	Error detection or correction of data by redundancy in digital computer hardware [6]
G 08 B 29/16	Security signalling or alarm systems [6]
H 02 H 3/05	Redundant emergency protective circuit arrangements [6]
H 02 J 3/38	Arrangements for parallelly feeding a single network [6]
H 02 J 9/04	Circuit arrangements with stand-by power supply [6]
H 03 K 19/003	Modifications for increasing the reliability of logic circuits or inverting circuits [6]
H 03 K 19/007	Fail-safe logic circuits or inverting circuits [6]

H 03 L 7/07	Redundant clock signal generation in generators of electronic oscillations or pulses [6]
H 04 B 1/74	Transmission systems using redundant channels or apparatus [6]
H 04 L 1/22	Redundant apparatus for increasing reliability of arrangements used for the transmission of digital information. [6]

11/00	Combinations of a radio or television receiver with apparatus having a different main function
11/02	. with vehicles
13/00	Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components
13/02	. Feeding of components (in general B 65 G)
13/04	. Mounting of components
13/06	. Wiring by machine
13/08	. Monitoring manufacture of assemblages