

SECTION H — ELECTRICITY

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05B ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR

Note(s) [3]

In this subclass, the following special cases occur:

- a. Among the general applications covered by sections other than section H, it is worth noting that electric heating in general is covered by subclasses F24D or F24H or class F27, and that electric lighting in general is partly covered by class F21, since in section H (see Note I(c) after the title of section H) there are places in H05B which cover the same technical subjects;
- b. In the two cases referred to under (a) above, the subclasses of section F, which deal with the respective subjects, essentially cover in the first place the whole mechanical aspect of the apparatus or devices, whereas the electrical aspect, as such, is covered by subclass H05B;
- c. In the case of lighting, this mechanical aspect should be taken to cover the material arrangement of the various electric elements, i.e. their geometrical or physical position in relation to one another; this aspect is covered by subclasses of class F21, the elements themselves and the primary circuits remaining in section H. The same applies to electric light sources, when combined with light sources of a different kind. These are covered by subclass H05B, whereas the physical arrangement which their combination constitutes is covered by subclasses of class F21;
- d. As regards heating, not only the electric elements and circuitry designs, as such, are covered by subclass H05B, but also the electric aspects of their arrangement, where these concern cases of general application; electric furnaces being considered as such. The physical disposition of the electric elements in furnaces is covered by section F. If a comparison is made with electric welding circuits, which are covered by subclass B23K in connection with welding, it can be seen that electric heating is not covered by the general rule stated in Note II after the title of section H.

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

LIGHTING

Light sources: arc; electro- luminescent.....	31/00, 33/00
Combined types.....	35/00
Circuit arrangements:	
for operating incandescent light sources.....	39/00
for discharge lamps.....	41/00
for operating light emitting diodes [LED].....	45/00
for light sources using a charge of combustible material.....	46/00
for operating light sources in general.....	47/00

Heating

	3/08	• • • having electric connections specially adapted for high temperatures [1, 2006.01]
1/00 Details of electric heating devices [1, 2006.01]	3/10	• Heating elements characterised by the composition or nature of the materials or by the arrangement of the conductor (compositions <i>per se</i> , <i>see</i> the relevant subclasses) [1, 2006.01]
1/02 • Automatic switching arrangements specially adapted to heating apparatus (thermally-actuated switches H01H 37/00) [1, 2006.01]	3/12	• • characterised by the composition or nature of the conductive material [1, 2006.01]
3/00 Ohmic-resistance heating [1, 2006.01]	3/14	• • • the material being non-metallic [1, 2006.01]
3/02 • Details [1, 2006.01]	3/16	• • the conductor being mounted on an insulating base [1, 2006.01]
3/03 • • Electrodes [2, 2006.01]	3/18	• • the conductor being embedded in an insulating material [1, 2006.01]
3/04 • • Waterproof or air-tight seals for heaters [1, 2006.01]		
3/06 • • Heater elements structurally combined with coupling elements or with holders [1, 2006.01]		

H05B

- 3/20 • Heating elements having extended surface area substantially in a two-dimensional plane, e.g. plate-heater (H05B 3/62, H05B 3/68, H05B 3/78, H05B 3/84 take precedence) [1, 5, 2006.01]
- 3/22 • • non-flexible [1, 2006.01]
- 3/24 • • • heating conductor being self-supporting [1, 2006.01]
- 3/26 • • • heating conductor mounted on insulating base [1, 2006.01]
- 3/28 • • • heating conductor embedded in insulating material [1, 2006.01]
- 3/30 • • • • on or between metallic plates [1, 2006.01]
- 3/32 • • • heating conductor mounted on insulators on a metallic frame [1, 2006.01]
- 3/34 • • flexible, e.g. heating nets or webs [1, 2006.01]
- 3/36 • • • heating conductor embedded in insulating material [1, 2006.01]
- 3/38 • • • • Powder conductors [1, 2006.01]
- 3/40 • Heating elements having the shape of rods or tubes (H05B 3/62, H05B 3/68, H05B 3/78 take precedence) [1, 2006.01]
- 3/42 • • non-flexible [1, 2006.01]
- 3/44 • • • heating conductor arranged within rods or tubes of insulating material [1, 2006.01]
- 3/46 • • • heating conductor mounted on insulating base [1, 2006.01]
- 3/48 • • • heating conductor embedded in insulating material [1, 2006.01]
- 3/50 • • • • heating conductor arranged in metal tubes, the radiating surface having heat-conducting fins [1, 2006.01]
- 3/52 • • • • Apparatus or processes for filling or compressing insulating material in tubes [1, 2006.01]
- 3/54 • • flexible [1, 2006.01]
- 3/56 • • • Heating cables [1, 2006.01]
- 3/58 • • • Heating hoses; Heating collars [1, 2006.01]
- 3/60 • Heating arrangements wherein the heating current flows through granular, powdered or fluid material, e.g. for salt-bath furnace, electrolytic heating (H05B 3/38 takes precedence) [1, 2006.01]
- 3/62 • Heating elements specially adapted for furnaces (H05B 3/60 takes precedence; arrangements of elements for electric heating in or on furnaces using ohmic resistance heating F27D 11/02) [1, 2006.01]
- 3/64 • • using ribbon, rod, or wire heater [1, 2006.01]
- 3/66 • • Supports or mountings for heaters on or in the wall or roof [1, 2006.01]
- 3/68 • Heating arrangements specially adapted for cooking plates or analogous hot-plates [1, 2006.01]
- Note(s) [2]**
Group H05B 3/76 takes precedence over groups H05B 3/70-H05B 3/74.
- 3/70 • • Plates of cast metal [1, 2006.01]
- 3/72 • • Plates of sheet metal [1, 2006.01]
- 3/74 • • Non-metallic plates [1, 2006.01]
- 3/76 • • Plates with spirally-wound heating tubes [1, 2006.01]
- 3/78 • Heating arrangements specially adapted for immersion heating [1, 2006.01]
- 3/80 • • Portable immersion heaters [1, 2006.01]
- 3/82 • • Fixedly-mounted immersion heaters [1, 2006.01]
- 3/84 • Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields [5, 2006.01]
- 3/86 • • the heating conductors being embedded in the transparent or reflecting material [5, 2006.01]
- 6/00 Heating by electric, magnetic, or electromagnetic fields** (radiation therapy using microwaves A61N 5/02) [3, 2006.01]
- 6/02 • Induction heating [3, 2006.01]
- 6/04 • • Sources of current [3, 2006.01]
- 6/06 • • Control, e.g. of temperature, of power [3, 2006.01]
- 6/08 • • • using compensating or balancing arrangements [3, 2006.01]
- 6/10 • • Induction heating apparatus, other than furnaces, for specific applications [3, 2006.01]
- 6/12 • • • Cooking devices [3, 2006.01]
- 6/14 • • • Tools, e.g. nozzles, rollers, calenders [3, 2006.01]
- 6/16 • • Furnaces having endless cores (H05B 6/34 takes precedence) [3, 2006.01]
- 6/18 • • • having melting basin [3, 2006.01]
- 6/20 • • • having melting channel only [3, 2006.01]
- 6/22 • • Furnaces without an endless core (H05B 6/34 takes precedence) [3, 2006.01]
- 6/24 • • • Crucible furnaces (H05B 6/30 takes precedence) [3, 2006.01]
- 6/26 • • • using vacuum or particular gas atmosphere [3, 2006.01]
- 6/28 • • • Protective systems [3, 2006.01]
- 6/30 • • • Arrangements for remelting or zone melting [3, 2006.01]
- 6/32 • • • Arrangements for simultaneous levitation and heating [3, 2006.01]
- 6/34 • • Arrangements for circulation of melts [3, 2006.01]
- 6/36 • • Coil arrangements [3, 2006.01]
- 6/38 • • • specially adapted for fitting into hollow spaces of workpieces [3, 2006.01]
- 6/40 • • • Establishing desired heat distribution, e.g. to heat particular parts of workpieces [3, 2006.01]
- 6/42 • • • Cooling of coils [3, 2006.01]
- 6/44 • • • having more than one coil or coil segment [3, 2006.01]
- 6/46 • Dielectric heating (H05B 6/64 take precedence) [3, 2006.01]
- 6/48 • • Circuits [3, 2006.01]
- 6/50 • • • for monitoring or control [3, 2006.01]
- 6/52 • • Feed lines [3, 2006.01]
- 6/54 • • Electrodes [3, 2006.01]
- 6/56 • • • Rolling electrodes [3, 2006.01]
- 6/58 • • • "sewing machine" type [3, 2006.01]
- 6/60 • • Arrangements for continuous movement of material [3, 2006.01]
- 6/62 • • Apparatus for specific applications [3, 2006.01]
- 6/64 • Heating using microwaves [3, 2006.01]
- 6/66 • • Circuits [3, 2006.01]
- 6/68 • • • for monitoring or control [3, 2006.01]
- 6/70 • • Feed lines [3, 2006.01]
- 6/72 • • Radiators or antennas [3, 2006.01]
- 6/74 • • Mode transformers or mode stirrers [3, 2006.01]
- 6/76 • • Prevention of microwave leakage, e.g. door sealings [3, 2006.01]
- 6/78 • • Arrangements for continuous movement of material [3, 2006.01]
- 6/80 • • Apparatus for specific applications (stoves or ranges heated using microwaves F24C 7/02) [3, 2006.01]

- 7/00 Heating by electric discharge** (plasma torches H05H 1/26) [1, 2006.01]
- 7/02 • Details [1, 2006.01]
 - 7/06 • • Electrodes [1, 2006.01]
 - 7/07 • • • designed to melt in use [2, 2006.01]
 - 7/08 • • • non-consumable [1, 2, 2006.01]
 - 7/085 • • • • mainly consisting of carbon [2, 2006.01]
 - 7/09 • • • • • Self-baking electrodes [2, 2006.01]
 - 7/10 • • Mountings, supports, terminals, or arrangements for feeding or guiding electrodes [1, 2, 2006.01]
 - 7/101 • • • Mountings, supports, or terminals at head of electrode, i.e. at the end remote from the arc [2, 2006.01]
 - 7/102 • • • • specially adapted for consumable electrodes [2, 2006.01]
 - 7/103 • • • Mountings, supports, or terminals with jaws (H05B 7/101 takes precedence) [2, 2006.01]
 - 7/105 • • • • comprising more than two jaws equally spaced along circumference, e.g. ring holders [2, 2006.01]
 - 7/107 • • • specially adapted for self-baking electrodes [2, 2006.01]
 - 7/109 • • • Feeding arrangements (H05B 7/107 takes precedence; where the electrode movement is a part of a closed loop for automatic control of power H05B 7/148) [2, 2006.01]
 - 7/11 • • Arrangements for conducting current to the electrode terminals [2, 2006.01]
 - 7/12 • • Arrangements for cooling, sealing, or protecting electrodes [1, 2, 2006.01]
 - 7/14 • • Arrangements or methods for connecting successive electrode sections [1, 2, 2006.01]
 - 7/144 • • Power supplies specially adapted for heating by electric discharge; Automatic control of power, e.g. by positioning of electrodes [2, 2006.01]
 - 7/148 • • • Automatic control of power (electrode feeding arrangements H05B 7/109; automatic feeding or moving of electrodes for spot or seam welding or cutting B23K 9/12; disposition of electrodes in or on furnaces F27D 11/10; regulating electric characteristics of arcs G05F 1/02) [2, 2006.01]
 - 7/152 • • • • by electromechanical means for positioning of electrodes [2, 2006.01]
 - 7/156 • • • • by hydraulic or pneumatic means for positioning of electrodes [2, 2006.01]
 - 7/16 • Heating by glow discharge [1, 2006.01]
 - 7/18 • Heating by arc discharge [1, 2006.01]
 - 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, 2006.01]
 - 7/22 • • Indirect heating by arc discharge [2, 2006.01]
- 11/00 Heating by combined application of processes covered by two or more of groups H05B 3/00-H05B 7/00** (H05B 7/20 takes precedence) [1, 2006.01]
- Lighting**
- 31/00 Electric arc lamps** (regulating electric characteristics of arcs G05F 1/02) [1, 2006.01]
- 31/02 • Details [1, 2006.01]
 - 31/04 • • Housings [1, 2006.01]
 - 31/06 • • Electrodes [1, 2006.01]
- 31/08 • • • Carbon electrodes [1, 2006.01]
 - 31/10 • • • • Cored carbon electrodes [1, 2006.01]
 - 31/12 • • • • Beck-effect electrodes [1, 2006.01]
 - 31/14 • • • Metal electrodes [1, 2006.01]
 - 31/16 • • • Apparatus or processes specially adapted for manufacturing electrodes [1, 2006.01]
 - 31/18 • • Mountings for electrodes; Electrode feeding devices [1, 2006.01]
 - 31/20 • • • Mechanical arrangements for feeding electrodes [1, 2006.01]
 - 31/22 • • • Electromagnetic arrangements for feeding electrodes [1, 2006.01]
 - 31/24 • • Cooling arrangements [1, 2006.01]
 - 31/26 • • Influencing the shape of arc discharge by gas blowing devices [1, 2006.01]
 - 31/28 • • Influencing the shape of arc discharge by magnetic means [1, 2006.01]
 - 31/30 • • Starting; Igniting [1, 2006.01]
 - 31/32 • • Switching-off [1, 2006.01]
 - 31/34 • • Indicating consumption of electrodes [1, 2006.01]
 - 31/36 • • having two electrodes in line [1, 2006.01]
 - 31/38 • • specially adapted for ac [1, 2006.01]
 - 31/40 • • having two electrodes at an angle [1, 2006.01]
 - 31/42 • • specially adapted for ac [1, 2006.01]
 - 31/44 • • having two parallel electrodes [1, 2006.01]
 - 31/46 • • specially adapted for ac [1, 2006.01]
 - 31/48 • • having more than two electrodes [1, 2006.01]
 - 31/50 • • specially adapted for ac [1, 2006.01]
 - 31/52 • • • electrodes energised from different phases of the supply [1, 2006.01]
- 33/00 Electroluminescent light sources** [1, 2006.01]
- 33/02 • Details [1, 2006.01]
 - 33/04 • • Sealing arrangements [1, 2006.01]
 - 33/06 • • Electrode terminals [1, 2006.01]
 - 33/08 • Circuit arrangements for operating electroluminescent light sources (for operating light emitting diodes H05B 45/00) [1, 2006.01, 2020.01]
 - 33/10 • Apparatus or processes specially adapted to the manufacture of electroluminescent light sources [1, 2006.01]
 - 33/12 • Light sources with substantially two-dimensional radiating surfaces [1, 2006.01]
 - 33/14 • • characterised by the chemical or physical composition or the arrangement of the electroluminescent material [1, 2006.01]
 - 33/18 • • characterised by the nature or concentration of the activator [1, 2006.01]
 - 33/20 • • characterised by the chemical or physical composition or the arrangement of the material in which the electroluminescent material is embedded [1, 2006.01]
 - 33/22 • • characterised by the chemical or physical composition or the arrangement of auxiliary dielectric or reflective layers [1, 2006.01]
 - 33/24 • • • of metallic reflective layers (H05B 33/26 takes precedence) [1, 2006.01]
 - 33/26 • • characterised by the composition or arrangement of the conductive material used as an electrode [1, 2006.01]
 - 33/28 • • • of translucent electrodes [1, 2006.01]
- 35/00 Electric light sources using a combination of different types of light generation** [1, 2006.01]
- 39/00 Circuit arrangements or apparatus for operating incandescent light sources** [1, 2006.01]

- 39/02 • Switching-on, e.g. with predetermined rate of increase of lighting current [1, 2006.01]
- 39/04 • Controlling [1, 2006.01]
- 39/06 • • Switching arrangements, e.g. from series operation to parallel operation [1, 2006.01]
- 39/08 • • by shifting phase of trigger voltage applied to gas-filled controlling tubes [1, 2006.01]
- 39/09 • in which the lamp is fed by pulses [1, 2006.01]
- 39/10 • Circuits providing for substitution of the light source in case of its failure [1, 2006.01]
- 41/00 Circuit arrangements or apparatus for igniting or operating discharge lamps [1, 2006.01]**
- 41/02 • Details [1, 2006.01]
- 41/04 • • Starting switches [1, 2006.01]
- 41/06 • • • thermal only [1, 2006.01]
- 41/08 • • • • heated by glow discharge [1, 2006.01]
- 41/10 • • • magnetic only [1, 2006.01]
- 41/12 • • • combined thermal and magnetic [1, 2006.01]
- 41/14 • Circuit arrangements [1, 2006.01]
- 41/16 • • in which the lamp is fed by dc or by low-frequency ac, e.g. by 50 cycles/sec ac (H05B 41/26 takes precedence) [1, 2006.01]
- 41/18 • • • having a starting switch [1, 2006.01]
- 41/19 • • • • for lamps having an auxiliary starting electrode [1, 2006.01]
- 41/20 • • • having no starting switch [1, 2006.01]
- 41/22 • • • • for lamps having an auxiliary starting electrode [1, 2006.01]
- 41/23 • • • • for lamps not having an auxiliary starting electrode [1, 2006.01]
- 41/231 • • • • • for high-pressure lamps [1, 2006.01]
- 41/232 • • • • • for low-pressure lamps [1, 2006.01]
- 41/233 • • • • • using resonance circuitry [1, 2006.01]
- 41/234 • • • • • to eliminate stroboscopic effects, e.g. feeding two lamps with different phases [1, 2006.01]
- 41/24 • • in which the lamp is fed by high-frequency ac (H05B 41/26 takes precedence) [1, 2006.01]
- 41/26 • • in which the lamp is fed by power derived from dc by means of a converter, e.g. by high-voltage dc [1, 2006.01]
- 41/28 • • • using static converters [1, 2006.01]
- 41/282 • • • • with semiconductor devices (H05B 41/288, H05B 41/295 take precedence) [7, 2006.01]
- 41/285 • • • • • Arrangements for protecting lamps or circuits against abnormal operating conditions [7, 2006.01]
- 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, 2006.01]
- 41/292 • • • • • Arrangements for protecting lamps or circuits against abnormal operating conditions [7, 2006.01]
- 41/295 • • • • with semiconductor devices and specially adapted for lamps with preheating electrodes, e.g. for fluorescent lamps [7, 2006.01]
- 41/298 • • • • • Arrangements for protecting lamps or circuits against abnormal operating conditions [7, 2006.01]
- 41/30 • • in which the lamp is fed by pulses, e.g. flash lamp [1, 2006.01]
- 41/32 • • • for single flash operation [1, 2006.01]
- 41/34 • • • to provide a sequence of flashes [1, 2006.01]
- 41/36 • • Controlling [1, 2006.01]
- 41/38 • • • Controlling the intensity of light [1, 2006.01]
- 41/39 • • • • continuously [1, 2006.01]
- 41/391 • • • • • using saturable magnetic devices [1, 2006.01]
- 41/392 • • • • • using semiconductor devices, e.g. thyristor [1, 2006.01]
- 41/40 • • • • discontinuously [1, 2006.01]
- 41/42 • • • • • in two steps only [1, 2006.01]
- 41/44 • • • for providing special optical effects, e.g. progressive motion of light [1, 2006.01]
- 41/46 • • Circuits providing for substitution in case of failure of the lamp [1, 2006.01]
- 45/00 Circuit arrangements for operating light emitting diodes [LED] [2020.01]**
- 45/10 • Controlling the intensity of the light [2020.01]
- 45/12 • • using optical feedback [2020.01]
- 45/14 • • using electrical feedback from LEDs or from LED modules [2020.01]
- 45/18 • • using temperature feedback [2020.01]
- 45/20 • Controlling the colour of the light [2020.01]
- 45/22 • • using optical feedback [2020.01]
- 45/24 • • using electrical feedback from LEDs or from LED modules [2020.01]
- 45/28 • • using temperature feedback [2020.01]
- 45/30 • Driver circuits [2020.01]
- 45/305 • • Frequency-control circuits [2020.01]
- 45/31 • • Phase-control circuits [2020.01]
- 45/315 • • • Reverse phase-control circuits [2020.01]
- 45/32 • • Pulse-control circuits [2020.01]
- 45/325 • • • Pulse-width modulation [PWM] [2020.01]
- 45/327 • • • Burst dimming [2020.01]
- 45/33 • • • Pulse-amplitude modulation [PAM] [2020.01]
- 45/335 • • • Pulse-frequency modulation [PFM] [2020.01]
- 45/34 • • Voltage stabilisation; Maintaining constant voltage [2020.01]
- 45/345 • • Current stabilisation; Maintaining constant current [2020.01]
- 45/347 • • Dynamic headroom control [DHC] [2020.01]
- 45/35 • • Balancing circuits [2020.01]
- 45/355 • • Power factor correction [PFC]; Reactive power compensation [2020.01]
- 45/357 • • specially adapted for retrofit LED light sources [2020.01]
- 45/3574 • • • Emulating the electrical or functional characteristics of incandescent lamps [2020.01]
- 45/3575 • • • • by means of dummy loads or bleeder circuits, e.g. for dimmers [2020.01]
- 45/3577 • • • • Emulating the dimming characteristics, brightness or colour temperature of incandescent lamps [2020.01]
- 45/3578 • • • Emulating the electrical or functional characteristics of discharge lamps [2020.01]
- 45/36 • • Circuits for reducing harmonics, ripples or electromagnetic interferences [EMI] [2020.01]
- 45/37 • • Converter circuits [2020.01]
- 45/3725 • • • Switched mode power supply [SMPS] [2020.01]
- 45/375 • • • using buck topology [2020.01]
- 45/38 • • • using boost topology [2020.01]
- 45/382 • • • • with galvanic isolation between input and output [2020.01]
- 45/385 • • • • using flyback topology [2020.01]

- 45/39 • • • • Circuits containing inverter bridges [2020.01]
- 45/392 • • • • wherein the LEDs are placed as freewheeling diodes at the secondary side of an isolation transformer [2020.01]
- 45/395 • • Linear regulators [2020.01]
- 45/397 • • • Current mirror circuits [2020.01]
- 45/40 • Details of LED load circuits [2020.01]
- 45/42 • • Antiparallel configurations [2020.01]
- 45/44 • • with an active control inside an LED matrix [2020.01]
- 45/46 • • • having LEDs disposed in parallel lines [2020.01]
- 45/48 • • • having LEDs organised in strings and incorporating parallel shunting devices [2020.01]
- 45/50 • responsive to malfunctions of LEDs; responsive to LED life; Protective circuits [2020.01]
- 45/52 • • in a parallel array of LEDs [2020.01]
- 45/54 • • in a series array of LEDs [2020.01]
- 45/56 • • involving measures to prevent abnormal temperature of the LEDs [2020.01]
- 45/58 • • involving end of life detection of LEDs [2020.01]
- 46/00 Circuit arrangements for light sources using a charge of combustible material [2020.01]**
- 47/00 Circuit arrangements for operating light sources in general, i.e. where the type of the light source is not relevant [2020.01]**
- 47/10 • Controlling the light source [2020.01]
- 47/105 • • in response to determined parameters [2020.01]
- 47/11 • • • by determining the brightness or colour temperature of ambient light [2020.01]
- 47/115 • • • by determining the presence or movement of objects or living beings [2020.01]
- 47/12 • • • • by detecting audible sound [2020.01]
- 47/125 • • • • by using cameras [2020.01]
- 47/13 • • • • by using passive infrared detectors [2020.01]
- 47/135 • • • by determining the type of light source being controlled (electrical parameters of light source being controlled H05B 47/14) [2020.01]
- 47/14 • • • by determining electrical parameters of the light source [2020.01]
- 47/155 • • Coordinated control of two or more light sources [2020.01]
- 47/16 • • by timing means [2020.01]
- 47/165 • • following a pre-assigned programmed sequence; Logic control [LC] [2020.01]
- 47/17 • • Operational modes, e.g. switching from manual to automatic mode or prohibiting specific operations [2020.01]
- 47/175 • • by remote control [2020.01]
- 47/18 • • • via data-bus transmission [2020.01]
- 47/185 • • • via power line carrier transmission [2020.01]
- 47/19 • • • via wireless transmission [2020.01]
- 47/195 • • • • the transmission using visible or infrared light [2020.01]
- 47/20 • Responsive to malfunctions or to light source life; for protection [2020.01]
- 47/21 • • of two or more light sources connected in parallel [2020.01]
- 47/23 • • of two or more light sources connected in series [2020.01]
- 47/24 • • Circuit arrangements for protecting against overvoltage [2020.01]
- 47/25 • • Circuit arrangements for protecting against overcurrent [2020.01]
- 47/26 • • Circuit arrangements for protecting against earth faults [2020.01]
- 47/28 • • Circuit arrangements for protecting against abnormal temperature [2020.01]
- 47/29 • • Circuits providing for substitution of the light source in case of its failure [2020.01]

H05C 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 A01M 1/22; apparatus for the destruction of noxious animals, other than insects, by electricity A01M 19/00; electric traps for animals A01M 23/38; slaughtering or stunning by electric current A22B 3/06)

- 1/00 Circuits or apparatus for generating electric shock effects [1, 2006.01]**
- 1/02 • providing continuous feeding of dc or ac voltage [1, 2006.01]
- 1/04 • providing pulse voltages [1, 2006.01]
- 1/06 • • operating only when touched [1, 2006.01]
- 3/00 Other circuits or apparatus [1, 2006.01]**

H05F STATIC ELECTRICITY; NATURALLY-OCCURRING ELECTRICITY

Note(s)

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 B65D 90/46.

- 1/00 Preventing the formation of electrostatic charges [1, 2006.01]**
- 1/02 • by surface treatment [1, 2006.01]
- 3/00 Carrying-off electrostatic charges** (from living beings A61N 1/14) [1, 2006.01]
- 3/02 • by means of earthing connections [1, 2006.01]
- 3/04 • by means of spark gaps or other discharge devices (devices providing for corona discharge H01T 19/00) [1, 2, 2006.01]
- 3/06 • by means of ionising radiation [1, 2006.01]

H05F

7/00 Use of naturally-occurring electricity [1, 2006.01]

H05G X-RAY TECHNIQUE (apparatus for radiation diagnosis A61B 6/00; X-ray therapy A61N; testing by X-rays G01N; apparatus for X-ray photography G03B; filters, conversion screens, microscopes G21K; X-ray tubes H01J 35/00; TV systems having X-ray input H04N 5/321)

- 1/00 X-ray apparatus involving X-ray tubes; Circuits therefor [1, 2006.01] 1/44 in which the switching instant is determined by measuring the amount of radiation directly [1, 2006.01]
- 1/02 • Constructional details [1, 2006.01]
- 1/04 • • Mounting the X-ray tube within a closed housing [1, 2006.01] 1/46 • • • • Combined control of different quantities, e.g. exposure time as well as voltage or current [1, 2006.01]
- 1/06 • • • X-ray tube and at least part of the power supply apparatus being mounted within the same housing [1, 2006.01] 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 G05F) [1, 2006.01]
- 1/08 • Electrical details [1, 2006.01]
- 1/10 • • Power supply arrangements for feeding the X-ray tube [1, 2006.01] 1/50 • • • • Passing the tube current only during a restricted portion of the voltage waveform [1, 2006.01]
- 1/12 • • • with dc or rectified single-phase ac [1, 2006.01] 1/52 • • • • Target size or shape; Direction of electron beam, e.g. in tubes with one anode and more than one cathode [1, 2006.01]
- 1/14 • • • with single-phase low-frequency ac [1, 2006.01] 1/54 • • • Protecting (overload protection combined with control H05G 1/46) [1, 2006.01]
- 1/16 • • • Reducing the peak-inverse voltage [1, 2006.01] 1/56 • • Switching-on; Switching-off [1, 2006.01]
- 1/18 • • • with polyphase ac of low frequency [1, 2006.01] 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, 2006.01]
- 1/20 • • • with high-frequency ac; with pulse trains [1, 2006.01] 1/60 • • Circuit arrangements for obtaining a series of X-ray photographs or for X-ray cinematography [1, 2006.01]
- 1/22 • • • with single pulses [1, 2006.01] 1/61 • • • for obtaining stereoscopic photographs [5, 2006.01]
- 1/24 • • • • Obtaining pulses by using energy storage devices (pulse generators H03K) [1, 2006.01] 1/62 • • Circuit arrangements for obtaining X-ray photography at predetermined instants in the movement of an object, e.g. X-ray stroboscopy [1, 2006.01]
- 1/26 • • Measuring, controlling, protecting (measuring electric values G01R; measuring X-ray intensity G01T) [1, 2006.01] 1/64 • • Circuit arrangements for X-ray apparatus incorporating electronic image converters, e.g. image intensifiers [1, 5, 2006.01]
- 1/28 • • • Measuring or recording actual exposure time; Counting number of exposures; Measuring required exposure time [1, 2006.01] 1/66 • • Circuit arrangements for X-ray tubes with target movable relatively to the anode [1, 2006.01]
- 1/30 • • • Controlling [1, 2006.01] 1/68 • • Circuit arrangements for Lilienfeld tubes; Circuit arrangements for gas-filled X-ray tubes [1, 2006.01]
- 1/32 • • • • Supply voltage of the X-ray apparatus or tube (regulating supply without reference to operating characteristics of the apparatus G05F) [1, 2006.01] 1/70 • • Circuit arrangements for X-ray tubes with more than one anode; Circuit arrangements for apparatus comprising more than one X-ray tube [1, 2006.01]
- 1/34 • • • • Anode current, heater current, heater voltage of X-ray tube (regulating supply without reference to operating characteristics of the apparatus G05F) [1, 2006.01]
- 1/36 • • • • Temperature of anode; Brightness of image [1, 2006.01]
- 1/38 • • • • Exposure time [1, 2006.01]
- 1/40 • • • • • using adjustable time switch [1, 2006.01]
- 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, 2006.01] 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 H01S 4/00; plasma technique in general H05H) [5, 2006.01]

H05H PLASMA TECHNIQUE (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)

Note(s) [3]

1. This subclass covers:
 - a. generating or handling plasma;
 - b. devices not covered by subclass H01J and in which electrons, ion beams, or neutral particles are accelerated to high energies;
 - c. devices for producing neutral particle beams;
 - d. targets for (a), (b), or (c).
2. Attention is drawn to subclass G21K.

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 (application of plasma technique in thermonuclear fusion reactors G21B 1/00) [1, 2006.01]	1/46	• • using applied electromagnetic fields, e.g. high frequency or microwave energy (H05H 1/26 takes precedence) [3, 2006.01]
1/02	• Arrangements for confining plasma by electric or magnetic fields; Arrangements for heating plasma (electron optics H01J) [1, 2006.01]	1/48	• • using an arc (H05H 1/26 takes precedence) [3, 2006.01]
1/03	• • using electrostatic fields [3, 2006.01]	1/50	• • • and using applied magnetic fields, e.g. for focusing or rotating the arc [3, 2006.01]
1/04	• • using magnetic fields substantially generated by the discharge in the plasma [1, 2006.01]	1/52	• • using exploding wires or spark gaps (H05H 1/26 takes precedence; spark gaps in general H01T) [3, 2006.01]
1/06	• • • Longitudinal pinch devices [1, 2006.01]	1/54	• Plasma accelerators [3, 2006.01]
1/08	• • • Theta pinch devices [1, 2006.01]	3/00	Production or acceleration of neutral particle beams, e.g. molecular or atomic beams [3, 2006.01]
1/10	• • using applied magnetic fields only [1, 2006.01]	3/02	• Molecular or atomic-beam generation, e.g. resonant beam generation (gas masers H01S 1/06) [3, 2006.01]
1/11	• • • using cusp configuration (H05H 1/14 takes precedence) [3, 2006.01]	3/04	• Acceleration by electromagnetic wave pressure [3, 2006.01]
1/12	• • • wherein the containment vessel forms a closed loop, e.g. stellarator [1, 2006.01]	3/06	• Generating neutron beams (targets for producing nuclear reactions H05H 6/00; neutron sources G21G 4/02) [5, 2006.01]
1/14	• • • wherein the containment vessel is straight and has magnetic mirrors [1, 2006.01]	5/00	Direct voltage accelerators; Accelerators using single pulses (H05H 3/06 takes precedence) [1, 5, 2006.01]
1/16	• • using applied electric and magnetic fields [1, 2006.01]	5/02	• Details (targets for producing nuclear reactions H05H 6/00) [1, 3, 2006.01]
1/18	• • • wherein the fields oscillate at a very high frequency, e.g. in the microwave range [1, 2006.01]	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) [4, 2006.01]
1/20	• • Ohmic heating [1, 2006.01]	5/04	• energised by electrostatic generators, e.g. by van de Graaff generator [1, 4, 2006.01]
1/22	• • for injection heating [1, 2006.01]	5/06	• Tandem accelerators; Multi-stage accelerators [1, 2006.01]
1/24	• Generating plasma [2, 2006.01]	5/08	• Particle accelerators using step-up transformers, e.g. resonance transformers [4, 2006.01]
1/26	• • Plasma torches [2, 2006.01]	6/00	Targets for producing nuclear reactions (supports for targets or objects to be irradiated G21K 5/08) [3, 2006.01]
1/28	• • • Cooling arrangements [3, 2006.01]	7/00	Details of devices of the types covered by groups H05H 9/00-H05H 13/00 (targets for producing nuclear reactions H05H 6/00) [1, 3, 2006.01]
1/30	• • • using applied electromagnetic fields, e.g. high-frequency or microwave energy (H05H 1/28 takes precedence) [3, 2006.01]		
1/32	• • • using an arc (H05H 1/28 takes precedence) [3, 2006.01]		
1/34	• • • • Details, e.g. electrodes, nozzles [3, 2006.01]		
1/36	• • • • • Circuit arrangements (H05H 1/38, H05H 1/40 take precedence) [3, 2006.01]		
1/38	• • • • • Guiding or centering of electrodes [3, 2006.01]		
1/40	• • • • • using applied magnetic fields, e.g. for focusing or rotating the arc [3, 2006.01]		
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) [3, 2006.01]		
1/44	• • • • using more than one torch [3, 2006.01]		

H05H

- 7/02 • Circuits or systems for supplying or feeding radio-frequency energy (radio-frequency generators H03B) [1, 2006.01]
- 7/04 • Magnet systems; Energisation thereof [1, 2006.01]
- 7/06 • Two-beam arrangements; Multi-beam arrangements [1, 2006.01]
- 7/08 • Arrangements for injecting particles into orbits [1, 2006.01]
- 7/10 • Arrangements for ejecting particles from orbits [1, 2006.01]
- 7/12 • Arrangements for varying final energy of beam [1, 2006.01]
- 7/14 • Vacuum chambers (H05H 5/03 takes precedence) [4, 2006.01]
- 7/16 • • of the waveguide type [4, 2006.01]
- 7/18 • • Cavities; Resonators [4, 2006.01]
- 7/20 • • • with superconductive walls [4, 2006.01]
- 7/22 • Details of linear accelerators, e.g. drift tubes (H05H 7/02-H05H 7/20 take precedence) [4, 2006.01]
- 9/00 **Linear accelerators** (H05H 11/00 takes precedence) [1, 2006.01]
- 9/02 • Travelling-wave linear accelerators [1, 2006.01]
- 9/04 • Standing-wave linear accelerators [1, 2006.01]
- 11/00 **Magnetic induction accelerators, e.g. betatrons** [1, 2006.01]
- 11/02 • Air-cored betatrons [1, 2006.01]
- 11/04 • Biased betatrons [1, 2006.01]
- 13/00 **Magnetic resonance accelerators; Cyclotrons** [1, 2006.01]
- 13/02 • Synchrocyclotrons, i.e. frequency-modulated cyclotrons [1, 2006.01]
- 13/04 • Synchrotrons [1, 2006.01]
- 13/06 • Air-cored magnetic resonance accelerators [1, 2006.01]
- 13/08 • Alternating-gradient magnetic resonance accelerators [1, 2006.01]
- 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, 2006.01]
- 15/00 **Methods or devices for acceleration of charged particles not otherwise provided for** [4, 2006.01]

H05K PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS

Note(s)

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** [1, 2006.01]
- 1/02 • Details [1, 2006.01]
- 1/03 • • Use of materials for the substrate [3, 2006.01]
- 1/05 • • • Insulated metal substrate [3, 2006.01]
- 1/09 • • Use of materials for the metallic pattern [3, 2006.01]
- 1/11 • • Printed elements for providing electric connections to or between printed circuits [3, 2006.01]
- 1/14 • • Structural association of two or more printed circuits (providing electric connection to or between printed circuits H05K 1/11, H01R 12/00) [1, 2006.01]
- 1/16 • incorporating printed electric components, e.g. printed resistor, capacitor, inductor [1, 2006.01]
- 1/18 • Printed circuits structurally associated with non-printed electric components (H05K 1/16 takes precedence) [1, 2006.01]
- 3/00 **Apparatus or processes for manufacturing printed circuits** [1, 3, 2006.01]
- 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 [1, 2006.01]

- 3/04 • • the conductive material being removed mechanically, e.g. by punching [1, 2006.01]
 - 3/06 • • the conductive material being removed chemically or electrolytically, e.g. by photo-etch process [1, 2006.01]
 - 3/07 • • • being removed electrolytically [3, 2006.01]
 - 3/08 • • the conductive material being removed by electric discharge, e.g. by spark erosion [1, 2006.01]
 - 3/10 • in which conductive material is applied to the insulating support in such a manner as to form the desired conductive pattern [1, 2006.01]
 - 3/12 • • using printing techniques to apply the conductive material [1, 2006.01]
 - 3/14 • • using spraying techniques to apply the conductive material [1, 2006.01]
 - 3/16 • • • by cathodic sputtering [1, 2006.01]
 - 3/18 • • using precipitation techniques to apply the conductive material [1, 2006.01]
 - 3/20 • • by affixing prefabricated conductor pattern [1, 2006.01]
 - 3/22 • Secondary treatment of printed circuits [1, 2006.01]
 - 3/24 • • Reinforcing of the conductive pattern [1, 2006.01]
 - 3/26 • • Cleaning or polishing of the conductive pattern [1, 2006.01]
 - 3/28 • • Applying non-metallic protective coatings [1, 2006.01]
 - 3/30 • Assembling printed circuits with electric components, e.g. with resistor [1, 2006.01]
 - 3/32 • • electrically connecting electric components or wires to printed circuits [1, 2006.01]
 - 3/34 • • • by soldering [1, 2006.01]
 - 3/36 • Assembling printed circuits with other printed circuits [1, 2006.01]
 - 3/38 • Improvement of the adhesion between the insulating substrate and the metal [3, 2006.01]
 - 3/40 • Forming printed elements for providing electric connections to or between printed circuits [3, 2006.01]
 - 3/42 • • Plated through-holes [3, 2006.01]
 - 3/44 • Manufacturing insulated metal core circuits [3, 2006.01]
 - 3/46 • Manufacturing multi-layer circuits [3, 2006.01]
- 5/00 **Casings, cabinets or drawers for electric apparatus [1, 2006.01]**
 - 5/02 • Details [1, 2006.01]
 - 5/03 • • Covers [1, 2006.01]
 - 5/04 • Metal casings [1, 2006.01]
 - 5/06 • Hermetically-sealed casings [1, 2006.01]
- 7/00 **Constructional details common to different types of electric apparatus (casings, cabinets, drawers H05K 5/00) [1, 2006.01]**
 - 7/02 • Arrangements of circuit components or wiring on supporting structure [1, 2006.01]
 - 7/04 • • on conductive chassis [1, 2006.01]
 - 7/06 • • on insulating boards [1, 2006.01]
 - 7/08 • • • on perforated boards [1, 2006.01]
 - 7/10 • • Plug-in assemblages of components [1, 2006.01]
 - 7/12 • • Resilient or clamping means for holding component to structure [1, 2006.01]
 - 7/14 • Mounting supporting structure in casing or on frame or rack [1, 2006.01]
 - 7/16 • • on hinges or pivots [1, 2006.01]
 - 7/18 • Construction of rack or frame [1, 2006.01]
 - 7/20 • Modifications to facilitate cooling, ventilating, or heating [1, 2006.01]
- 9/00 **Screening of apparatus or components against electric or magnetic fields (devices for absorbing radiation from an antenna H01Q 17/00) [1, 2006.01]**
- 10/00 **Arrangements for improving the operating reliability of electronic equipment, e.g. by providing a similar stand-by unit [1, 2006.01]**
- 11/00 **Combinations of a radio or television receiver with apparatus having a different main function [1, 2006.01]**
 - 11/02 • with vehicles [1, 2006.01]
- 13/00 **Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components [1, 2006.01]**
 - 13/02 • Feeding of components [1, 2006.01]
 - 13/04 • Mounting of components [1, 2006.01]
 - 13/06 • Wiring by machine [1, 2006.01]
 - 13/08 • Monitoring manufacture of assemblages [1, 2006.01]