

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05B ELECTRIC HEATING; ELECTRIC LIGHT SOURCES NOT OTHERWISE PROVIDED FOR; CIRCUIT ARRANGEMENTS FOR ELECTRIC LIGHT SOURCES, IN GENERAL

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.

Electric heating

1/00 Details of electric heating devices

- 1/02 . Automatic switching arrangements specially adapted to apparatus {; Control of heating devices} (thermally-actuated switches [H01H 37/00](#))
- 1/0202 . . {Switches}
- 1/0205 . . . {using a fusible material}
- 1/0208 . . . {actuated by the expansion or evaporation of a gas or liquid}
- 1/0211 . . . {using the expansion of an electric conductive liquid}
- 1/0213 . . . {using bimetallic elements}
- 1/0216 . . . {actuated by the expansion of a solid element, e.g. wire or rod}
- 1/0219 . . . {actuated by modification of the magnetic properties of a material}
- 1/0222 . . . {actuated by changing weight, level or centre of gravity}
- 1/0225 . . . {actuated by timers}
- 1/0227 . . {Applications}
- 1/023 . . . {Industrial applications}
- 1/0233 {for semiconductors manufacturing}
- 1/0236 {for vehicles}
- 1/0238 {For seats}
- 1/0241 {For photocopiers}
- 1/0244 {Heating of fluids ([H05B 1/0247](#) takes precedence)}
- 1/0247 {For chemical processes}
- 1/025 {For medical applications}
- 1/0252 . . . {Domestic applications}
- 1/0255 {Irons}
- 1/0258 {For cooking}
- 1/0261 {of food}
- 1/0263 {Ovens}
- 1/0266 {Cooktops}
- 1/0269 {For heating of fluids}
- 1/0272 {For heating of fabrics}
- 1/0275 {Heating of spaces, e.g. rooms, wardrobes}
- 1/0277 {Electric radiators}
- 1/028 {Airconditioning}
- 1/0283 {For heating of fluids, e.g. water heaters}
- 1/0286 {Heat storages}
- 1/0288 . . . {for non specified applications}

- 1/0291 {Tubular elements}
- 1/0294 {Planar elements}
- 1/0297 . . . {Heating of fluids for non specified applications}

3/00 Ohmic-resistance heating

- 3/0004 . {Devices wherein the heating current flows through the material to be heated ([Circuit arrangements for heating by passing the current directly across the material to be heated H05B 3/0023](#); granular, powdered or fluid material [H05B 3/60](#))}
- 3/0009 . . {the material to be heated being in motion}
- 3/0014 . {Devices wherein the heating current flows through particular resistances}
- 3/0019 . {Circuit arrangements}
- 3/0023 . . {for heating by passing the current directly across the material to be heated}
- 3/0033 . {Heating devices using lamps}
- 3/0038 . . {for industrial applications}
- 3/0042 . . . {used in motor vehicles}
- 3/0047 . . . {for semiconductor manufacture}
- 3/0052 . . . {for fluid treatments}
- 3/0057 . . . {for plastic handling and treatment ([including molds B29C](#))}
- 3/0061 . . . {for metal treatment}
- 3/0066 . . . {for photocopying}
- 3/0071 . . {for domestic applications}
- 3/0076 . . . {for cooking, e.g. in ovens ([lamps specially adapted for non-metallic cooking plates H05B 3/742](#), [H05B 3/744](#))}
- 3/008 . . . {for heating of inner spaces}
- 3/0085 . . {for medical applications}
- 3/009 . . {heating devices not specially adapted for a particular application}
- 3/0095 . {Heating devices in the form of rollers ([heated by induction H05B 6/145](#))}
- 3/02 . Details
- 3/03 . . Electrodes
- 3/04 . . Waterproof or air-tight seals for heaters
- 3/06 . . Heater elements structurally combined with coupling elements or holders
- 3/08 . . . having electric connections specially adapted for high temperatures

- 3/10 . Heater 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
 - 3/141 {Conductive ceramics, e.g. metal oxides, metal carbides, barium titanate, ferrites, zirconia, vitreous compounds}
 - 3/143 {applied to semiconductors, e.g. wafers heating ([H05B 3/0047 takes precedence](#))}
 - 3/145 {Carbon only, e.g. carbon black, graphite}
 - 3/146 {Conductive polymers, e.g. polyethylene, thermoplastics}
 - 3/148 {Silicon, e.g. silicon carbide, magnesium silicide, heating transistors or diodes}
 - 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 ([H05B 3/62](#), [H05B 3/68](#), [H05B 3/78](#), [H05B 3/84 take precedence](#))
 - 3/22 . . non-flexible
 - 3/24 . . . heating conductor being self-supporting
 - 3/26 . . . heating conductor mounted on insulating base { ([for transparent areas H05B 3/84](#), [H05B 3/86](#)) }
 - 3/262 {the insulating base being an insulated metal plate}
 - 3/265 {the insulating base being an inorganic material, e.g. ceramic ([H05B 3/262 takes precedence](#))}
 - 3/267 {the insulating base being an organic material, e.g. plastic ([H05B 3/262 takes precedence](#))}
 - 3/28 . . . heating conductor embedded in insulating material
 - 3/283 {the insulating material being an inorganic material, e.g. ceramic}
 - 3/286 {the insulating material being an organic material, e.g. plastic}
 - 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
 - 3/342 . . . {heaters used in textiles}
 - 3/345 {knitted fabrics}
 - 3/347 {woven fabrics}
 - 3/36 . . . heating conductor embedded in insulating material
 - 3/38 Powder conductors
 - 3/40 . Heating elements having the shape of rods or tubes ([H05B 3/62](#), [H05B 3/68](#), [H05B 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
 - 3/565 {flat 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 ([H05B 3/38 takes precedence](#))
 - 3/62 . Heating elements specially adapted for furnaces ([H05B 3/60 takes precedence](#); [arrangements of such elements in furnaces F27](#), e.g. [F27D 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 [H05B 3/76](#) takes precedence over groups [H05B 3/70](#) - [H05B 3/74](#).
- { This Note corresponds to IPC Note (1) relating to [H05B 3/70](#) - [H05B 3/76](#). }
- 3/681 . . {Plates having mobile parts coming into contact with the bottom of the kettles, pans, or the like}
 - 3/683 . . {Plates having their feeding circuit closed as the kettles, pans or the like are put on ([H05B 3/74 takes precedence](#))}
 - 3/685 . . {Plates having magnetic means attracting the kettles, pans, or the like}
 - 3/686 . . {Heat-storage plates}
 - 3/688 . . {Fabrication of the plates ([for single-step processes see the appropriate subclass, e.g. in B23C](#), sub-section metallurgy)}
 - 3/70 . . Plates of cast metal
 - 3/72 . . Plates of sheet metal
 - 3/74 . . Non-metallic plates {, e.g. vitroc ceramic, ceramic or glassceramic hobs, also including power or control circuits}
 - 3/742 . . . {Plates having both lamps and resistive heating elements}
 - 3/744 . . . {Lamps as heat source, i.e. heating elements with protective gas envelope, e.g. halogen lamps}
 - 3/746 . . . {Protection, e.g. overheat cutoff, hot plate indicator}
 - 3/748 . . . {Resistive heating elements, i.e. heating elements exposed to the air, e.g. coil wire heater ([H05B 3/742 takes precedence](#))}
 - 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
 - 3/845 . . {specially adapted for reflecting surfaces, e.g. bathroom - or rearview mirrors}

- 3/86 . . the heating conductors being embedded in the transparent or reflecting material { [\(H05B 3/845 takes precedence\)](#) }
- 6/00 Heating by electric, magnetic or electromagnetic fields**
- 6/02 . Induction heating
- 6/04 . . Sources of current
- 6/06 . . Control, e.g. of temperature, of power
- 6/062 . . . {for cooking plates or the like}
- 6/065 {using coordinated control of multiple induction coils}
- 6/067 {for melting furnaces}
- 6/08 . . . using compensating or balancing arrangements
- 6/10 . . Induction heating apparatus, other than furnaces, for specific applications
- 6/101 . . . {for local heating of metal pieces}
- 6/102 {the metal pieces being rotated while induction heated}
- 6/103 {multiple metal pieces successively being moved close to the inductor}
- 6/104 {metal pieces being elongated like wires or bands}
- 6/105 . . . {using a susceptor}
- 6/106 {in the form of fillings}
- 6/107 {for continuous movement of material}
- 6/108 {for heating a fluid}
- 6/109 {using magnets rotating with respect to a susceptor}
- 6/12 . . . Cooking devices
- 6/1209 {induction cooking plates or the like and devices to be used in combination with them}
- 6/1218 {with arrangements using lights for heating zone state indication}
- 6/1227 {for wok pans and wok pans supports for induction cooking plates}
- 6/1236 {adapted to induce current in a coil to supply power to a device and electrical heating devices powered in this way}
- 6/1245 {with special coil arrangements}
- 6/1254 {using conductive pieces to direct the induced magnetic field}
- 6/1263 {using coil cooling arrangements}
- 6/1272 {with more than one coil or coil segment per heating zone}
- 6/1281 {with flat coils}
- 6/129 {induction ovens}
- 6/14 . . . Tools, e.g. nozzles, rollers, calenders
- 6/145 {Heated rollers}
- 6/16 . . Furnaces having endless cores [\(H05B 6/34 takes precedence\)](#)
- 6/18 . . . having melting basin
- 6/20 . . . having melting channel only
- 6/22 . . Furnaces without an endless core [\(H05B 6/34 takes precedence\)](#)
- 6/24 . . . Crucible furnaces [\(H05B 6/30 takes precedence\)](#)
- 6/26 using vacuum or particular gas atmosphere
- 6/28 Protective systems
- 6/30 . . . Arrangements for remelting or zone melting
- 6/32 . . . Arrangements for simultaneous levitation and heating
- 6/34 . . Arrangements for circulation of melts
- 6/36 . . Coil arrangements
- 6/362 . . . {with flat coil conductors}
- 6/365 . . . {using supplementary conductive or ferromagnetic pieces}
- 6/367 . . . {for melting furnaces}
- 6/38 . . . specially adapted for fitting into hollow spaces of workpieces
- 6/40 . . . Establishing desired heat distribution, e.g. to heat particular parts of workpieces
- 6/405 {for heating gear-wheels}
- 6/42 . . . Cooling of coils
- 6/44 . . . having more than one coil or coil segment
- 6/46 . Dielectric heating [\(H05B 6/64 takes precedence\)](#)
- 6/48 . . Circuits
- 6/50 . . . for monitoring or control
- 6/52 . . Feed lines
- 6/54 . . Electrodes
- 6/56 . . . Rolling electrodes
- 6/58 . . . "sewing machine" type
- 6/60 . . Arrangements for continuous movement of material
- 6/62 . . Apparatus for specific applications
- 6/64 . Heating using microwaves {[\(containers, packaging elements or packages specially adapted to be heated by microwaves B65D 81/3446\)](#)}
- 6/6402 . . {Aspects relating to the microwave cavity}
- 6/6405 . . . {Self-cleaning cavity}
- 6/6408 . . {Supports or covers specially adapted for use in microwave heating apparatus}
- 6/6411 . . . {the supports being rotated}
- 6/6414 . . {Aspects relating to the door of the microwave heating apparatus}
- 6/6417 . . . {Door interlocks of the microwave heating apparatus and related circuits}
- 6/642 . . {Cooling of the microwave components and related air circulation systems [\(H05B 6/6473 takes precedence\)](#)}
- 6/6423 . . . {wherein the microwave oven air circulation system is also used as air extracting hood}
- 6/6426 . . {Aspects relating to the exterior of the microwave heating apparatus, e.g. metal casing, power cord}
- 6/6429 . . . {Aspects relating to mounting assemblies of wall-mounted microwave ovens}
- 6/6432 . . {Aspects relating to testing or detecting leakage in a microwave heating apparatus}
- 6/6435 . . {Aspects relating to the user interface of the microwave heating apparatus}
- 6/6438 . . . {allowing the recording of a program of operation of the microwave heating apparatus}
- 6/6441 . . . {allowing the input of coded operation instructions, e.g. bar code reader}
- 6/6444 . . {Aspects relating to lighting devices in the microwave cavity}
- 6/6447 . . {Method of operation or details of the microwave heating apparatus related to the use of detectors or sensors}
- 6/645 . . . {using temperature sensors}
- 6/6452 {the sensors being in contact with the heated product}
- 6/6455 {the sensors being infra-red detectors}
- 6/6458 . . . {using humidity or vapor sensors}
- 6/6461 . . . {using fire or fume sensors}
- 6/6464 . . . {using weight sensors}

- 6/6467 . . . {using detectors with R.F. transmitters}
- 6/647 . . {Aspects related to microwave heating combined with other heating techniques}
- 6/6473 . . . {combined with convection heating ([H05B 6/6485 takes precedence](#))}
- 6/6476 {the refrigerating air being used for convection}
- 6/6479 {using steam}
- 6/6482 . . . {combined with radiant heating, e.g. infra-red heating}
- 6/6485 {further combined with convection heating}
- 6/6488 . . . {combined with induction heating}
- 6/6491 . . . {combined with the use of susceptors ([H05B 6/80 and subgroups takes precedence](#))}
- 6/6494 {for cooking}
- 6/6497 {the susceptors being liquids}
- 6/66 . . Circuits
- 6/662 . . . {Aspects related to the boost transformer of the microwave heating apparatus}
- 6/664 . . . {Aspects related to the power supply of the microwave heating apparatus}
- 6/666 . . . {Safety circuits ([emergency protective circuits in general H02H](#))}
- 6/668 . . . {Microwave heating devices connected to a telecommunication network}
- 6/68 . . . for monitoring or control
- 6/681 {Circuits comprising an inverter, a boost transformer and a magnetron}
- 6/682 {wherein the switching control is based on measurements of electrical values of the circuit}
- 6/683 {the measurements being made at the high voltage side of the circuit}
- 6/685 {the measurements being made at the low voltage side of the circuit}
- 6/686 {Circuits comprising a signal generator and power amplifier, e.g. using solid state oscillators}
- 6/687 {for cooking}
- 6/688 {for thawing}
- 6/70 . . Feed lines
- 6/701 . . . {using microwave applicators}
- 6/702 . . . {using coaxial cables}
- 6/704 . . . {using microwave polarisers}
- 6/705 . . . {using microwave tuning}
- 6/707 . . . {using waveguides}
- 6/708 {in particular slotted waveguides}
- 6/72 . . Radiators or antennas
- 6/725 . . . {Rotatable antennas}
- 6/74 . . Mode transformers or mode stirrers
- 6/745 . . . {Rotatable stirrers}
- 6/76 . . Prevention of microwave leakage, e.g. door sealings
- 6/763 . . . {Microwave radiation seals for doors}
- 6/766 . . . {Microwave radiation screens for windows}
- 6/78 . . Arrangements for continuous movement of material
- 6/782 . . . {wherein the material moved is food}
- 6/784 . . . {wherein the material is moved using a tubular transport line, e.g. screw transport systems}
- 6/786 . . . {wherein the material is moved using mechanical vibrations of plates}
- 6/788 . . . {wherein an elongated material is moved by applying a mechanical tension to it}
- 6/80 . . Apparatus for specific applications ([stoves or ranges F24C 7/02](#))
- 6/802 . . . {for heating fluids (methods of heating fluids in conventional microwave ovens [H05B 6/687](#))}
- 6/804 {Water heaters, water boilers}
- 6/806 . . . {for laboratory use}
- 6/808 . . . {Microwave heating adapted for vending machines}
- 7/00 Heating by electric discharge ([plasma torches H05H 1/26](#))**
 - 7/005 . {Electrical diagrams}
 - 7/02 . Details
 - 7/06 . . Electrodes
 - 7/07 . . . designed to melt in use
 - 7/08 . . . non-consumable
 - 7/085 mainly consisting of carbon
 - 7/09 Self-baking electrodes, e.g. Söderberg type electrodes
 - 7/10 . . Mountings, supports, terminals or arrangements for feeding or guiding electrodes
 - 7/101 . . . Mountings, supports or terminals at head of electrode, i.e. at the end remote from the arc
 - 7/102 specially adapted for consumable electrodes
 - 7/103 . . . Mountings, supports or terminals with jaws ([H05B 7/101 takes precedence](#))
 - 7/105 comprising more than two jaws equally spaced along circumference, e.g. ring holders
 - 7/107 . . . specially adapted for self-baking electrodes
 - 7/109 . . . Feeding arrangements ([H05B 7/107 takes precedence; where the electrode movement is part of a closed loop for automatic control of power H05B 7/148](#))
 - 7/11 . . Arrangements for conducting current to the electrode terminals
 - 7/12 . . Arrangements for cooling, sealing or protecting electrodes
 - 7/14 . . Arrangements or methods for connecting successive electrode sections
 - 7/144 . . Power supplies specially adapted for heating by electric discharge; Automatic control of power, e.g. by positioning of electrodes
 - 7/148 . . . Automatic control of power ([electrode feeding arrangements H05B 7/109; automatic feeding of electrodes for spot or seam welding or cutting B23K 9/12; disposition of electrodes in or on furnaces F27D 11/10; control of position in general G05D 3/00; regulating electric characteristics of arcs in general G05F 1/02; regulating electric power in general G05F 1/66](#))
 - 7/152 by electromechanical means for positioning of electrodes
 - 7/156 by hydraulic or pneumatic means for positioning of electrodes
 - 7/16 . Heating by glow discharge
 - 7/18 . Heating by arc discharge
 - 7/185 . . {Heating gases for arc discharge ([gas-filled discharge tubes H01J 37/32](#))}

- 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
- 7/22 . . Indirect heating by arc discharge
- 7/225 . . . {by arc image}
- 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)**

Electric light sources

- 31/00 Electric arc lamps (regulating electric characteristics of arcs G05F 1/02)**
- 31/0003 . {the arc being outside, in the open}
- 31/0006 . . {with superimposed electrodes}
- 31/0009 . . {with parallel or oblique disposition of the electrodes; Special form of the electrodes}
- 31/0012 . . {with a plurality of electrode pairs}
- 31/0015 . . {with spare electrodes}
- 31/0018 . {in a closed vessel}
- 31/0021 . . {Construction, in particular closure, of the vessel}
- 31/0024 . . {Outlet valves}
- 31/0027 . . {with special gasfilling}
- 31/003 . {of a special type}
- 31/0033 . . {with glowrod and candle}
- 31/0036 . . {for projection, copying or stage lighting}
- 31/0039 . . {Projectors, the construction of which depends upon the presence of the arc}
- 31/0042 . {Mounting; Connecting}
- 31/0045 . . {of individual lamps; Associated impedances}
- 31/0048 . . {of plural lamps}
- 31/0051 . . {Bypassing circuit devices for arc lamps}
- 31/0054 . . {Short circuit devices for arc lamps}
- 31/0057 . {Accessories for arc lamps}
- 31/006 . . {Electromagnets or armatures; Arc blowing electromagnets}
- 31/0063 . . {Damping devices}
- 31/0066 . . {Saving arrangements; Ventilation devices}
- 31/0069 . . {Vessels; Closing of vessels}
- 31/0072 . . {Reflectors for arc lamps}
- 31/0075 . . {Incandescent mantles}
- 31/0078 . . {Devices for starting or extinguishing}
- 31/0081 . {Controlling of arc lamps}
- 31/0084 . . {with stirrups or levers}
- 31/0087 . . {with a thread or chain}
- 31/009 . . {with tightening devices}
- 31/0093 . . {with a threaded rod}
- 31/0096 . . {with hydraulic or pneumatic means}
- 31/02 . Details
- 31/04 . . Housings
- 31/06 . . Electrodes
- 31/065 . . . {for flame arc lamps}
- 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 {(for controlling arc lamps H05B 31/0081)}
- 31/22 . . . Electromagnetic arrangements for feeding electrodes {(using electromagnets H05B 31/006)}
- 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 {(using electromagnets H05B 31/006)}
- 31/30 . . Starting; Igniting {(devices therefor H05B 31/0078)}
- 31/305 . . . {Ignition devices}
- 31/32 . . Switching-off
- 31/34 . . Indicating consumption of electrodes
- 31/36 . having two electrodes in line {(electrodes in the open H05B 31/0006)}
- 31/38 . . specially adapted for ac
- 31/40 . having two electrodes at an angle {(electrodes in the open H05B 31/0009)}
- 31/42 . . specially adapted for ac
- 31/44 . having two parallel electrodes {(electrodes in the open H05B 31/0009)}
- 31/46 . . specially adapted for ac
- 31/48 . having more than two electrodes {(electrodes in the open H05B 31/0012)}
- 31/50 . . specially adapted for ac
- 31/52 . . . electrodes energised from different phases of the supply

33/00 Electroluminescent light sources

- 33/02 . Details
- 33/04 . . Sealing arrangements {, e.g. against humidity}
- 33/06 . . Electrode terminals
- 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 {, or by the simultaneous addition of the electroluminescent material in or onto the light source}
- NOTE**
- When classifying in this group, the chemical composition of the electroluminescent material is also classified in the appropriate subgroup of C09K 11/00
- 33/145 . . . {Arrangements 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 (H05B 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**

Circuit arrangements

- 39/00 Circuit arrangements or apparatus for operating incandescent light sources (structurally associated with the incandescent lamps H01K 1/62)**
- 39/02 . Switching on, e.g. with predetermined rate of increase of lighting current
- 39/04 . Controlling
- 39/041 . . {the light-intensity of the source (H05B 39/08 takes precedence)}
- 39/042 . . . {by measuring the incident light}
- 39/044 . . . {continuously (H05B 39/042 takes precedence)}
- 39/045 {with high-frequency bridge converters (H05B 39/048 takes precedence)}
- 39/047 {with pulse width modulation from a DC power source}
- 39/048 {with reverse phase control}
- 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 {also in controlled semiconductor devices (in converters H02M 5/00; with regulation G05F 1/44)}
- 39/081 . . . {by measuring the incident light (H05B 39/083 takes precedence)}
- 39/083 . . . {by the variation-rate of light intensity}
- 39/085 {by touch control}
- 39/086 {with possibility of remote control}
- 39/088 {by wireless means, e.g. infra-red transmitting means}
- 39/09 . in which the lamp is fed by pulses {(automatic circuit devices built into or on the incandescent lamp H01K 1/625; vehicle winking devices B60Q 1/38)}
- 39/10 . Circuits providing for substitution of the light source in case of its failure {(changing to a reserve current source H02J 9/00)}
- 39/105 . . {with a spare lamp in the circuit, and a possibility of shunting a failed lamp (lamp changing devices H01R 33/00, H01R 43/00; incandescent lamps with a reserve body H01K)}
- 41/00 Circuit arrangements or apparatus for igniting or operating discharge lamps (structurally associated with the discharge lamps H01J 61/54, H01J 61/56)**
- 41/02 . Details
- 41/04 . . Starting switches
- 41/042 . . . {using semiconductor devices}
- 41/044 {for lamp provided with pre-heating electrodes}
- 41/046 {using controlled semiconductor devices}
- 41/048 . . . {using electromagnetic relays}
- 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, {or with network frequencies}
- 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
- 41/23 for lamps not having an auxiliary starting electrode
- 41/231 for high-pressure lamps
- 41/232 for low-pressure lamps
- 41/2325 {provided with pre-heating electrodes}
- 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, {or with separate oscillator frequency} (H05B 41/26 takes precedence)
- 41/245 . . . {for a plurality of lamps}
- 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
- 41/2806 {with semiconductor devices and specially adapted for lamps without electrodes in the vessel, e.g. surface discharge lamps, electrodeless discharge lamps}
- 41/2813 {Arrangements for protecting lamps or circuits against abnormal operating conditions}
- 41/282 with semiconductor devices (H05B 41/2806, H05B 41/288, H05B 41/295 take precedence)
- 41/2821 {by means of a single-switch converter or a parallel push-pull converter in the final stage (H05B 41/285 takes precedence)}
- 41/2822 {using specially adapted components in the load circuit, e.g. feed-back transformers, piezo-electric transformers; using specially adapted load circuit configurations}
- 41/2824 {using control circuits for the switching element (H05B 41/2822 takes precedence)}
- 41/2825 {by means of a bridge converter in the final stage (H05B 41/285 takes precedence)}
- 41/2827 {using specially adapted components in the load circuit, e.g. feed-back transformers, piezo-electric transformers; using specially adapted load circuit configurations}
- 41/2828 {using control circuits for the switching elements (H05B 41/2827 takes precedence)}
- 41/285 Arrangements for protecting lamps or circuits against abnormal operating conditions
- 41/2851 {for protecting the circuit against abnormal operating conditions}
- 41/2853 {against abnormal power supply conditions}

- 41/2855 {against abnormal lamp operating conditions}
- 41/2856 {against internal abnormal circuit conditions}
- 41/2858 {for protecting the lamp against abnormal operating conditions}
- 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 {[\(H05B 41/2806 takes precedence\)](#)}
- 41/2881 {Load circuits; Control thereof}
- 41/2882 {the control resulting from an action on the static converter}
- 41/2883 {the controlled element being a DC/AC converter in the final stage, e.g. by harmonic mode starting}
- 41/2885 {Static converters especially adapted therefor; Control thereof [\(H05B 41/2882 takes precedence\)](#)}
- 41/2886 {comprising a controllable preconditioner, e.g. a booster}
- 41/2887 {characterised by a controllable bridge in the final stage}
- 41/2888 {the bridge being commutated at low frequency, e.g. 1kHz}
- 41/292 Arrangements for protecting lamps or circuits against abnormal operating conditions
- 41/2921 {for protecting the circuit against abnormal operating conditions}
- 41/2923 {against abnormal power supply conditions}
- 41/2925 {against abnormal lamp operating conditions}
- 41/2926 {against internal abnormal circuit conditions}
- 41/2928 {for protecting the lamp against abnormal operating conditions}
- 41/295 with semiconductor devices and specially adapted for lamps with preheating electrodes, e.g. for fluorescent lamps
- 41/298 Arrangements for protecting lamps or circuits against abnormal operating conditions
- 41/2981 {for protecting the circuit against abnormal operating conditions}
- 41/2983 {against abnormal power supply conditions}
- 41/2985 {against abnormal lamp operating conditions}
- 41/2986 {against internal abnormal circuit conditions}
- 41/2988 {for protecting the lamp against abnormal operating conditions}
- 41/30 in which the lamp is fed by pulses, e.g. flash lamp
- 41/32 for single flash operation
- 41/325 {by measuring the incident light}
- 41/34 to provide a sequence of flashes
- 41/36 Controlling
- 41/38 Controlling the intensity of light
- 41/382 {during the transitional start-up phase}
- 41/384 {in case of hot-restriking}
- 41/386 {for speeding-up the lighting-up}
- 41/388 {for a transition from glow to arc}
- 41/39 continuously
- 41/391 using saturable magnetic devices
- 41/392 using semiconductor devices, e.g. thyristor
- 41/3921 {with possibility of light intensity variations}
- 41/3922 {and measurement of the incident light}
- 41/3924 {by phase control, e.g. using a triac [\(H05B 41/3922 takes precedence\)](#)}
- 41/3925 {by frequency variation [\(H05B 41/3922 takes precedence\)](#)}
- 41/3927 {by pulse width modulation [\(H05B 41/3922 takes precedence\)](#)}
- 41/3928 {for high-pressure lamps, e.g. high-intensity discharge lamps, high-pressure mercury or sodium lamps}
- 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
- 44/00** **Circuit arrangements for operating electroluminescent light sources (for operating light emitting diodes [H05B 45/00](#))**
- 45/00** **Circuit arrangements for operating light emitting diodes [LEDs]**
- 45/10 Controlling the intensity of the light
- 45/12 using optical feedback
- 45/14 using electrical feedback from LEDs or from LED modules
- 45/18 using temperature feedback
- 45/20 Controlling the colour of the light
- 45/22 using optical feedback
- 45/24 using electrical feedback from LEDs or from LED modules
- 45/28 using temperature feedback
- 45/30 Driver circuits
- 45/305 Frequency-control circuits
- 45/31 Phase-control circuits
- 45/315 Reverse phase-control circuits
- 45/32 Pulse-control circuits
- 45/325 Pulse-width modulation [PWM]
- 45/327 Burst dimming
- 45/33 Pulse-amplitude modulation [PAM]
- 45/335 Pulse-frequency modulation [PFM]
- 45/34 Voltage stabilisation; Maintaining constant voltage
- 45/345 Current stabilisation; Maintaining constant current
- 45/347 Dynamic headroom control [DHC]
- 45/35 Balancing circuits
- 45/355 Power factor correction [PFC]; Reactive power compensation
- 45/357 specially adapted for retrofit LED light sources
- 45/3574 Emulating the electrical or functional characteristics of incandescent lamps
- 45/3575 by means of dummy loads or bleeder circuits, e.g. for dimmers

- 45/3577 Emulating the dimming characteristics, brightness or colour temperature of incandescent lamps
- 45/3578 Emulating the electrical or functional characteristics of discharge lamps
- 45/36 . . Circuits for reducing or suppressing harmonics, ripples or electromagnetic interferences [EMI]
- 45/37 . . Converter circuits
- 45/3725 Switched mode power supply [SMPS]
- 45/375 using buck topology
- 45/38 using boost topology
- 45/382 with galvanic isolation between input and output
- 45/385 using flyback topology
- 45/39 Circuits containing inverter bridges
- 45/392 wherein the LEDs are placed as freewheeling diodes at the secondary side of an isolation transformer
- 45/395 . . Linear regulators
- 45/397 Current mirror circuits
- 45/40 . . Details of LED load circuits
- 45/42 . . Antiparallel configurations
- 45/44 . . with an active control inside an LED matrix
- 45/46 having LEDs disposed in parallel lines
- 45/48 having LEDs organised in strings and incorporating parallel shunting devices
- 45/50 . responsive to malfunctions or undesirable behaviour of LEDs; responsive to LED life; Protective circuits
- WARNING**
- Group [H05B 45/50](#) is impacted by reclassification into group [H05B 45/59](#).
- Groups [H05B 45/50](#) and [H05B 45/59](#) should be considered in order to perform a complete search.
- 45/52 . . in a parallel array of LEDs
- 45/54 . . in a series array of LEDs
- 45/56 . . involving measures to prevent abnormal temperature of the LEDs
- 45/58 . . involving end of life detection of LEDs
- 45/59 . . for reducing or suppressing flicker or glow effects
- WARNING**
- Group [H05B 45/59](#) is incomplete pending reclassification of documents from groups [H05B 45/00](#) and [H05B 45/50](#).
- Groups [H05B 45/00](#), [H05B 45/50](#) and [H05B 45/59](#) should be considered in order to perform a complete search.
- 45/60 . . Circuit arrangements for operating LEDs comprising organic material, e.g. for operating organic light-emitting diodes [OLEDs] or polymer light-emitting diodes [PLEDs]
- 46/00 Circuit arrangements for operating light sources using a charge of combustible material**
- 47/00 Circuit arrangements for operating light sources in general, i.e. where the type of light source is not relevant**
- 47/10 . . Controlling the light source
- 47/105 . . in response to determined parameters
- 47/11 by determining the brightness or colour temperature of ambient light
- 47/115 by determining the presence or movement of objects or living beings
- 47/12 by detecting audible sound
- 47/125 by using cameras
- 47/13 by using passive infrared detectors
- 47/135 by determining the type of light source being controlled ([electrical parameters of light source being controlled H05B 47/14](#))
- 47/14 by determining electrical parameters of the light source
- 47/155 . . Coordinated control of two or more light sources
- 47/16 . . by timing means
- 47/165 . . following a pre-assigned programmed sequence; Logic control [LC]
- 47/17 . . Operational modes, e.g. switching from manual to automatic mode or prohibiting specific operations
- 47/175 . . by remote control
- 47/18 via data-bus transmission
- 47/185 via power line carrier transmission
- 47/19 via wireless transmission
- 47/195 the transmission using visible or infrared light
- 47/20 . . Responsive to malfunctions or to light source life; for protection
- 47/21 of two or more light sources connected in parallel
- 47/22 {with communication between the lamps and a central unit}
- 47/23 of two or more light sources connected in series
- 47/235 {with communication between the lamps and a central unit}
- 47/24 . . Circuit arrangements for protecting against overvoltage
- 47/25 . . Circuit arrangements for protecting against overcurrent
- 47/26 . . Circuit arrangements for protecting against earth faults
- 47/28 . . Circuit arrangements for protecting against abnormal temperature
- 47/29 . . Circuits providing for substitution of the light source in case of its failure
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- 2203/00 Aspects relating to Ohmic resistive heating covered by group H05B 3/00**
- 2203/002 . . Heaters using a particular layout for the resistive material or resistive elements
- 2203/003 using serpentine layout
- 2203/004 using zigzag layout
- 2203/005 using multiple resistive elements or resistive zones isolated from each other
- 2203/006 using interdigitated electrodes
- 2203/007 using multiple electrically connected resistive elements or resistive zones
- 2203/008 with layout including a portion free of resistive material, e.g. communication window
- 2203/009 . . Heaters using conductive material in contact with opposing surfaces of the resistive element or resistive layer
- 2203/01 . . Heaters comprising a particular structure with multiple layers

- 2203/011 . Heaters using laterally extending conductive material as connecting means
- 2203/012 . Heaters using non- flexible resistive rods or tubes not provided for in [H05B 3/42](#)
- 2203/013 . Heaters using resistive films or coatings
- 2203/014 . Heaters using resistive wires or cables not provided for in [H05B 3/54](#)
- 2203/015 . . Heater wherein the heating element is interwoven with the textile
- 2203/016 . Heaters using particular connecting means
- 2203/017 . Manufacturing methods or apparatus for heaters
- 2203/018 . Heaters using heating elements comprising mosi2
- 2203/019 . Heaters using heating elements having a negative temperature coefficient
- 2203/02 . Heaters using heating elements having a positive temperature coefficient
- 2203/021 . Heaters specially adapted for heating liquids
- 2203/022 . Heaters specially adapted for heating gaseous material
- 2203/023 . . Heaters of the type used for electrically heating the air blown in a vehicle compartment by the vehicle heating system
- 2203/024 . . Heaters using beehive flow through structures
- 2203/025 . Heaters specially adapted for glass melting or glass treatment
- 2203/026 . Heaters specially adapted for floor heating
- 2203/027 . Heaters specially adapted for glow plug igniters
- 2203/028 . Heaters specially adapted for trays or plates to keep food or liquids hot
- 2203/029 . Heaters specially adapted for seat warmers
- 2203/03 . Heaters specially adapted for heating hand held tools
- 2203/031 . Heaters specially adapted for heating the windscreen wiper area
- 2203/032 . Heaters specially adapted for heating by radiation heating
- 2203/033 . Heater including particular mechanical reinforcing means
- 2203/034 . Heater using resistive elements made of short fibbers of conductive material
- 2203/035 . Electrical circuits used in resistive heating apparatus
- 2203/036 . Heaters specially adapted for garment heating
- 2203/037 . Heaters with zones of different power density
- 2206/00 Aspects relating to heating by electric, magnetic, or electromagnetic fields covered by group [H05B 6/00](#)**
- 2206/02 . Induction heating
- 2206/022 . . Special supports for the induction coils
- 2206/023 . . using the curie point of the material in which heating current is being generated to control the heating temperature
- 2206/024 . . the resistive heat generated in the induction coil is conducted to the load
- 2206/04 . Heating using microwaves
- 2206/042 . . Microwave oven combined with a toaster or including a toaster
- 2206/043 . . Methods or circuits intended to extend the life of the magnetron
- 2206/044 . . Microwave heating devices provided with two or more magnetrons or microwave sources of other kind
- 2206/045 . . Microwave disinfection, sterilization, destruction of waste...
- 2206/046 . . Microwave drying of wood, ink, food, ceramic, sintering of ceramic, clothes, hair
- 2213/00 Aspects relating both to resistive heating and to induction heating, covered by [H05B 3/00](#) and [H05B 6/00](#)**
- 2213/02 . Stirring of melted material in melting furnaces
- 2213/03 . Heating plates made out of a matrix of heating elements that can define heating areas adapted to cookware randomly placed on the heating plate
- 2213/04 . Heating plates with overheat protection means
- 2213/05 . Heating plates with pan detection means
- 2213/06 . Cook-top or cookware capable of communicating with each other
- 2213/07 . Heating plates with temperature control means
- 2214/00 Aspects relating to resistive heating, induction heating and heating using microwaves, covered by groups [H05B 3/00](#), [H05B 6/00](#)**
- 2214/02 . Heaters specially designed for de-icing or protection against icing
- 2214/03 . Heating of hydrocarbons
- 2214/04 . Heating means manufactured by using nanotechnology