

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05B ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, [see the relevant places, e.g. A47J, C21, C22, C23, F21, F24, F27](#))

NOTE

Attention is drawn to the Note (paragraph III) following the contents of Section of Section [H](#)

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.

Heating

1/00 Details of electric heating devices

- 1/02 . Automatic switching arrangements specially adapted to apparatus; {Control of heating devices} ([control of temperature in general G05D 23/00; 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](#))}

WARNING

Group [H05B 3/0004](#) is incomplete pending reclassification of documents from group [H05B 3/023](#).

Groups [H05B 3/0004](#) and [H05B 3/023](#) should be considered in order to perform a complete search.

- 3/0009 . . {the material to be heated being in motion}

WARNING

Group [H05B 3/0009](#) is incomplete pending reclassification of documents from group [H05B 3/023](#).

Groups [H05B 3/023](#) and [H05B 3/0009](#) should be considered in order to perform a complete search.

- 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}

WARNING

Group [H05B 3/0047](#) is incomplete pending reclassification of documents from group [H05B 3/143](#).

Groups [H05B 3/0047](#) and [H05B 3/143](#) should be considered in order to perform a complete search.

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

3/023 . . {the current passing through the material to be heated}

(Frozen)

WARNING

Group [H05B 3/023](#) is no longer used for the classification of documents as of August 1, 2018. The content of this group is being reclassified into groups [H05B 3/0004](#) and [H05B 3/0009](#).

Groups [H05B 3/023](#), [H05B 3/0004](#), and [H05B 3/0009](#) should be considered in order to perform a complete search.

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)}

WARNING

Group [H05B 3/143](#) is impacted by reclassification into group [H05B 3/0047](#).

Groups [H05B 3/143](#) and [H05B 3/0047](#) should be considered in order to perform a complete search.

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
 - 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)}
- NOTE**
- Group [H05B 3/76](#) takes precedence over groups [H05B 3/70](#), [H05B 3/72](#), [H05B 3/74](#).
- 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 (for therapeutic purposes [A61N 5/00](#); joining of preformed parts by heating of plastics or substances in a plastic state [B29C 65/02](#))**
- 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 (electron beam or ion beam tubes for localised treatment of objects [H01J 37/30](#); 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 (non-insulated conductors or conductive bodies in general [H01B 5/00](#); insulated conductors or cables in general [H01B 7/00](#))
 - 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 (circuit arrangements for supplying electric power in general [H02J](#))
 - 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)**

Lighting

- 31/00 Electric arc lamps (regulating electric characteristics of arcs [G05F 1/02](#); with non-consumable electrodes [H01J 61/00](#))**
 - 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** (discharge lamps [H01J 61/00](#) - [H01J 65/00](#); semi-conductor devices with at least one particular jump barrier or surface barrier adapted for light emission [H01L 27/15](#), [H01L 33/00](#); organic light emitting devices [H01L 27/32](#), [H01L 51/50](#); lasers [H01S 3/00](#), [H01S 5/00](#); compositions *per se*, see the relevant subclasses; {luminescent scales or hands [G01D 13/20](#), [G01D 13/28](#); luminescent dials [G09F 13/20](#); conductive layers on isolated substrate [H01B 1/00](#); solid state image amplifiers [H01L 31/14](#); electronic gates with electroluminescent elements [H03K 17/78](#); pulse generation with electroluminescent elements [H03K 3/00](#))}
- 33/02 . Details
- 33/04 . . Sealing arrangements {, e.g. against humidity}
- 33/06 . . Electrode terminals
- 33/08 . . Circuit arrangements not adapted to a particular application
- 33/0803 . . . {for light emitting diodes [LEDs] comprising only inorganic semiconductor materials}
- 33/0806 {Structural details of the circuit}
- 33/0809 {in the conversion stage}
- 33/0812 {with a controlled linear regulator}
- 33/0815 {with a controlled switching regulator}
- 33/0818 {wherein HF AC or pulses are generated in the final stage}
- 33/0821 {in the load stage}
- 33/0824 {with an active control inside the LED load configuration}
- 33/0827 {organized essentially in parallel configuration}
- 33/083 {organized essentially in string configuration with shunting switches}
- 33/0842 {with control ([H05B 33/0884](#) takes precedence)}
- 33/0845 {of the light intensity ([H05B 33/0857](#) takes precedence)}
- 33/0848 {involving load characteristic sensing means}
- 33/0851 {with permanent feedback from the light source}
- 33/0854 {involving load external environment sensing means}
- 33/0857 {of the color point of the light}
- 33/086 {involving set point control means}
- 33/0863 {by user interfaces}
- 33/0866 {involving load characteristic sensing means}
- 33/0869 {optical sensing means}
- 33/0872 {involving load external environment sensing means}
- 33/0884 {with monitoring or protection}
- 33/0887 {of the conversion stage}
- 33/089 {of the load stage}
- 33/0893 {involving end of life detection of LEDs}
- 33/0896 . . . {for light emitting diodes [LEDs] comprising organic materials, e.g. polymer LEDs [PLEDs] or organic LEDs [OLEDs]}
- 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 (combinations of dissimilar light sources [F21](#), [H01J 61/96](#))**
- 37/00 Circuit arrangements for electric light sources in general** {(vehicle lights [B60L 1/14](#), [B60Q](#); railways light signals [B61L](#); lighting for photographic purposes [G03B 15/02](#), for advertising purposes [G09F](#))}
- 37/02 . Controlling {(apparatus for performing colour music [A63J 17/00](#); regulating light by electrical means without regulating the light source itself [G05D 25/00](#)); regulating voltage or current [G05F](#); {illuminated switch circuits [G08B](#), [G08C](#), [H02B 15/00](#); traffic signals [G08G 1/00](#))}
- 37/0209 . . {the instant of the ignition or of the extinction ([H05B 37/029](#) takes precedence; light or sound activated electronic switches [H03K 17/94](#))}
- 37/0218 . . . {by the ambient light}
- 37/0227 . . . {by detection only of parameters other than ambient light, e.g. by sound detectors, by passive infra-red detectors}
- 37/0236 {by detection of audible sound}
- 37/0245 . . . {by remote-control involving emission and detection units}
- 37/0254 {linked via data bus transmission}
- 37/0263 {linked via power line carrier transmission}
- 37/0272 {linked via wireless transmission, e.g. IR transmission}
- 37/0281 . . . {by timing means ([H05B 37/0245](#) takes precedence; time-controlled switching in general [G04](#), [H01H](#), [H03K](#))}
- 37/029 . . {a plurality of lamps following a preassigned sequence, e.g. theater lights, diapositive projector}
- 37/03 . Detecting lamp failure {(monitoring vehicle lamps [B60Q 11/00](#); changing to a reserve source of current [H02J 9/00](#))}
- 37/032 . . {of a plurality of lamps connected in parallel}
- 37/034 . . . {with communication between the lamps and a central unit}
- 37/036 . . {of a plurality of lamps connected in series}
- 37/038 . . . {with communication between the lamps and a central unit}
- 37/04 . . Circuits providing for substitution of the light source in case of its failure {, e.g. by switching over to a reserve light source (incandescent lamps with reserve body [H01K](#))}
- 39/00 Circuit arrangements or apparatus for operating incandescent light sources and not adapted to a particular application** {(incandescent lamps per se [H01K](#))}
- 39/02 . Switching on, e.g. with predetermined rate of increase of lighting current
- 39/04 . Controlling (regulating voltage in general [G05F](#))
- 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** {(circuit elements structurally associated with discharge lamps [H01J 7/44](#), [H01J 19/78](#); discharge lamps per se [H01J 61/00](#) - [H01J 65/00](#); arc lamps with consumable electrodes [H05B 31/00](#); transformers or chokes for supplying discharge lamps [H01F 38/08](#))}
- 41/02 . Details
- 41/04 . . Starting switches {(igniting arrangements for discharge lamps [H01J 7/30](#), [H01J 17/30](#), [H01J 61/54](#); switches in general [H01H](#))}
- 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 ([welding with accumulated energy B23K 11/24](#); for gas discharge lasers [H01S 3/097](#); electrical pulse generators with charge and discharge of an accumulating element [H03K 3/53](#))
- 41/32 . . . for single flash operation
- 41/325 . . . {by measuring the incident light}
- 41/34 . . . to provide a sequence of flashes
- 41/36 . . . Controlling ([regulating voltage or current G05F](#))
- 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)}	2203/026	. Heaters specially adapted for floor heating
41/3928	. . . . . {for high-pressure lamps, e.g. high-intensity discharge lamps, high-pressure mercury or sodium lamps}	2203/027	. Heaters specially adapted for glow plug igniters
41/40	. . . . discontinuously	2203/028	. Heaters specially adapted for trays or plates to keep food or liquids hot
41/42	. . . . . in two steps only	2203/029	. Heaters specially adapted for seat warmers
41/44	. . . for providing special optical effects, e.g. progressive motion of light {(advertising using lights G09F)}	2203/03	. Heaters specially adapted for heating hand held tools
41/46	. . Circuits providing for substitution in case of failure of the lamp {(changing to a reserve current source H02J 9/00)}	2203/031	. Heaters specially adapted for heating the windscreen wiper area
43/00	Circuit arrangements for light sources, not otherwise provided for (H05B 37/00 takes precedence)	2203/032	. Heaters specially adapted for heating by radiation heating
43/02	. for light sources using a charge of combustible material {, e.g. magnesium lamps}	2203/033	. Heater including particular mechanical reinforcing means
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2203/00	Aspects relating to Ohmic resistive heating covered by group H05B 3/00	2203/034	. Heater using resistive elements made of short fibbers of conductive material
2203/002	. Heaters using a particular layout for the resistive material or resistive elements	2203/035	. Electrical circuits used in resistive heating apparatus
2203/003	. . using serpentine layout	2203/036	. Heaters specially adapted for garment heating
2203/004	. . using zigzag layout	2203/037	. Heaters with zones of different power density
2203/005	. . using multiple resistive elements or resistive zones isolated from each other	2206/00	Aspects relating to heating by electric, magnetic, or electromagnetic fields covered by group H05B 6/00
2203/006	. . using interdigitated electrodes	2206/02	. Induction heating
2203/007	. . using multiple electrically connected resistive elements or resistive zones	2206/022	. . Special supports for the induction coils
2203/008	. . with layout including a portion free of resistive material, e.g. communication window	2206/023	. . using the curie point of the material in which heating current is being generated to control the heating temperature
2203/009	. Heaters using conductive material in contact with opposing surfaces of the resistive element or resistive layer	2206/024	. . the resistive heat generated in the induction coil is conducted to the load
2203/01	. . Heaters comprising a particular structure with multiple layers	2206/04	. Heating using microwaves
2203/011	. Heaters using laterally extending conductive material as connecting means	2206/042	. . Microwave oven combined with a toaster or including a toaster
2203/012	. Heaters using non- flexible resistive rods or tubes not provided for in H05B 3/42	2206/043	. . Methods or circuits intended to extend the life of the magnetron
2203/013	. Heaters using resistive films or coatings	2206/044	. . Microwave heating devices provided with two or more magnetrons or microwave sources of other kind
2203/014	. Heaters using resistive wires or cables not provided for in H05B 3/54	2206/045	. . Microwave disinfection, sterilization, destruction of waste...
2203/015	. . Heater wherein the heating element is interwoven with the textile	2206/046	. . Microwave drying of wood, ink, food, ceramic, sintering of ceramic, clothes, hair
2203/016	. Heaters using particular connecting means	2213/00	Aspects relating both to resistive heating and to induction heating, covered by H05B 3/00 and H05B 6/00
2203/017	. Manufacturing methods or apparatus for heaters	2213/02	. Stirring of melted material in melting furnaces
2203/018	. Heaters using heating elements comprising mosi2	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
2203/019	. Heaters using heating elements having a negative temperature coefficient	2213/04	. Heating plates with overheat protection means
2203/02	. Heaters using heating elements having a positive temperature coefficient	2213/05	. Heating plates with pan detection means
2203/021	. Heaters specially adapted for heating liquids	2213/06	. Cook-top or cookware capable of communicating with each other
2203/022	. Heaters specially adapted for heating gaseous material	2213/07	. Heating plates with temperature control means
2203/023	. . Heaters of the type used for electrically heating the air blown in a vehicle compartment by the vehicle heating system	2214/00	Aspects relating to resistive heating, induction heating and heating using microwaves, covered by groups H05B 3/00, H05B 6/00
2203/024	. . Heaters using beehive flow through structures	2214/02	. Heaters specially designed for de-icing or protection against icing
2203/025	. Heaters specially adapted for glass melting or glass treatment	2214/03	. Heating of hydrocarbons
		2214/04	. Heating means manufactured by using nanotechnology