CPC  COOPERATIVE PATENT CLASSIFICATION

H  ELECTRICITY
   (NOTE omitted)

H01  BASIC ELECTRIC ELEMENTS
   (NOTE omitted)

H01J  ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)

NOTES
1. This subclass covers only devices for producing, influencing, or using a flow of electrons or ions, e.g. for controlling, indicating, or switching of electric current, counting electric pulses, producing light or other electromagnetic oscillations, such as X-rays, or for separating or analysing radiation or particles, and having a closed or substantially closed casing containing a chosen gas, vapour, or vacuum, upon the pressure and nature of which the characteristics of the device depend. Light sources using a combination (other than covered by group H01J 61/96 of this subclass) of discharge and other kinds of light generation are dealt with in H05B 35/00.

2. In this subclass, groups H01J 1/00 - H01J 7/00 relate only to:
   i. details of an unspecified kind of discharge tube or lamp, or
   ii. details mentioned in a specification as applicable to two or more kinds of tubes or lamps as defined by groups H01J 11/00, H01J 13/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds. A detail only described with reference to, or clearly only applicable to, tubes or lamps of a single basic kind is classified in the detail group appropriate to tubes or lamps of that basic kind, e.g. H01J 17/04.

3. In this subclass, the following term is used with the meaning indicated:
   • "lamp" includes tubes emitting ultra-violet or infra-red light.

4. Attention is drawn to the definition of the expression "spark gaps" given in the Note following the title of subclass H01T.

5. Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof are classified in group H01J 9/00.

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

1/00 Details of electrodes, of magnetic control means, of screens, or of the mounting or spacing thereof, common to two or more basic types of discharge tubes or lamps (details of electron-optical arrangements or of ion traps H01J 3/00)
1/02 . . . . Main electrodes
1/025 . . [Hollow cathodes]
1/04 . . Liquid electrodes, e.g. liquid cathode
1/05 . . . . characterised by material
1/06 . . . . Containers for liquid-pool electrodes; Arrangement or mounting thereof
1/08 . . . . Positioning or moving the cathode spot on the surface of a liquid-pool cathode
1/10 . . . . Cooling, heating, circulating, filtering, or controlling level of liquid in a liquid-pool electrode
1/12 . . . . Cathodes having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube
1/13 . . . . Solid thermionic cathodes
1/135 . . . [Circuit arrangements therefor, e.g. for temperature control]
1/14 . . . . characterised by the material
1/142 . . . . with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material
1/144 . . . . with other metal oxides as an emissive material
1/146 . . . . with metals or alloys as an emissive material
1/148 . . . . with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material
1/15 . . . . Cathodes heated directly by an electric current
1/16 . . . . characterised by the shape
1/18 . . . . Supports; Vibration-damping arrangements
1/20 . . . . Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment
1/22 . . . . Heaters (filaments for incandescent lamps H01K 1/02)
1/24 . . . . Insulating layer or body located between heater and emissive material
1/26 . . . . Supports for the emissive material
1/28 . . . . Dispenser-type cathodes, e.g. L-cathode
1/30 . . . . Cold cathodes, e.g. field-emissive cathode
1/304 . . . . Field-emissive cathodes
1/3042 . . . . [microengineered, e.g. Spindt-type]
1/3044 . . . . [Point emitters]
1/3046 . . . . [Edge emitters]
1/3048 . . . . [Distributed particle emitters]
1/308 . . . Semiconductor cathodes, e.g. cathodes with PN junction layers
1/312 . . . having an electric field perpendicular to the surface, e.g. tunnel-effect cathodes of Metal-Insulator-Metal [MIM] type {(H01J 1/304 - H01J 1/308 take precedence)}
1/316 . . . having an electric field parallel to the surface, e.g. thin film cathodes
1/32 . . . Secondary-electron-emitting electrodes (H01J 1/35 takes precedence; luminescent screens H01J 1/62; charge storage screens in general H01J 1/78; charge storage screens using secondary emission for image tubes H01J 29/41; dynodes for secondary emission tubes H01J 43/10; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)
1/34 . . . Photo-emissive cathodes (H01J 1/35 takes precedence; photoelectric screens H01J 1/78)
1/35 . . . Electrodes exhibiting both secondary emission and photo-emission
1/36 . . . Solid anodes; Solid auxiliary anodes for maintaining a discharge
1/38 . . . characterised by the material
1/40 . . . forming part of the envelope of the tube or lamp
1/42 . . . Cooling of anodes (cooling rotary anodes H01J 1/44; Heating of anodes
1/44 . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes
1/46 . . . Control electrodes, e.g. grid (for igniting arrangements H01J 7/30); Auxiliary electrodes (auxiliary anodes for maintaining a discharge H01J 1/36)
1/48 . . . characterised by the material
1/50 . . . Magnetic means for controlling the discharge
1/52 . . . Screens for shielding (screens acting as control electrodes H01J 1/46; Guides for influencing the discharge; Masks interposed in the electron stream
1/53 . . . Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked up, converted, or stored {(see provisionally also H01J 29/08 - H01J 29/36)
1/54 . . . Screens on or from which an image or pattern is formed, picked up, converted, or stored; Luminescent coatings on vessels {(see provisionally also H01J 29/08 - H01J 29/36)
1/56 . . . acting as light valves by shutter operation, e.g. for eidophor {(see provisionally also H01J 29/08 - H01J 29/36)
1/58 . . . acting by discolouration, e.g. halide screen {(see provisionally also H01J 29/08 - H01J 29/36)
1/60 . . . Incandescent screens {(see provisionally also H01J 29/08 - H01J 29/36)
1/62 . . . Luminescent screens; Selection of materials for luminescent coatings on vessels {(see provisionally also H01J 29/08 - H01J 29/36)
1/63 . . . characterised by the luminescent material (luminescent materials or compositions C08K 11/00 (see provisionally also H01J 29/08 - H01J 29/36)
1/64 . . . characterised by the binder or adhesive for securing the luminescent material to its supports {(see provisionally also H01J 29/08 - H01J 29/36)
1/66 . . . Supports for luminescent material (vessels H01J 5/02 (see provisionally also H01J 29/08 - H01J 29/36)
1/68 . . . with superimposed luminescent layers {(see provisionally also H01J 29/08 - H01J 29/36)
1/70 . . . with protective, conductive, or reflective layers {(see provisionally also H01J 29/08 - H01J 29/36)
1/72 . . . with luminescent material discontinuously arranged, e.g. in dots or lines {(see provisionally also H01J 29/08 - H01J 29/36)
1/74 . . . with adjacent dots or lines of different luminescent material {(see provisionally also H01J 29/08 - H01J 29/36)
1/76 . . . provided with permanent marks or references {(see provisionally also H01J 29/08 - H01J 29/36)
1/78 . . . Photoelectric screens; Charge-storage screens {(see provisionally also H01J 29/08 - H01J 29/36)
1/88 . . . Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
1/90 . . . Insulation between electrodes or supports within the vacuum space (leading-in conductors H01J 5/46)
1/92 . . . Mountings for the electrode assembly as a whole
1/94 . . . Mountings for individual electrodes (for directly-heated cathodes H01J 1/15)
1/96 . . . without fixed connection between spacing member and envelope
1/98 . . . Details of electron-optical or ion-optical arrangements or of ion traps common to two or more basic types of discharge tubes or lamps
3/00 . . . Electron guns (electron guns for discharge tubes with provision for introducing objects or material to be exposed to the discharge H01J 37/06; for cathode ray tubes H01J 29/48)
3/021 . . . Electron guns using a field emission, photo emission, or secondary emission electron source
3/022 . . . (with microengineered cathode, e.g. Spindt-type)
3/023 . . . Electron guns using electron multiplication
3/024 . . . Electron guns using thermionic emission of cathode heated by electron or ion bombardment or by irradiation by other energetic beams, e.g. by laser
3/025 . . . Electron guns using a discharge in a gas or a vapour as electron source (gas-filled discharge tubes with gaseous cathodes H01J 15/00)
3/026 . . . Eliminating deleterious effects due to thermal effects, electric or magnetic field (H01J 3/021 - H01J 3/023 take precedence)
3/027 . . . Construction of the gun or parts thereof (H01J 3/021 - H01J 3/025, H01J 3/026 and H01J 3/028 take precedence)
3/028 . . . Replacing parts of the gun; Relative adjustment (H01J 3/021 - H01J 3/025 take precedence)
3/029 . . . Schematic arrangements for beam forming
3/04 . . . Ion guns {(see provisionally also H01J 27/00)
3/06 . . . two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 3/07 takes precedence {(see provisionally also H01J 29/46 - H01J 29/84))

Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps

5/00

5/02 . Vessels; Containers; Shields associated therewith; Vacuum locks

5/03 . Arrangements for preventing or mitigating effects of implosion of vessels or containers

5/04 . Vessels or containers characterised by the material thereof (selection of the material of the coating H01J 5/08)

5/06 . Vessels or containers specially adapted for operation at high tension, e.g. by improved potential distribution over surface of vessel

5/08 . provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent coatings H01J 1/62)

5/10 . . on internal surfaces

5/12 . . Double-wall vessels or containers

5/125 . . [with a gas tight space between both walls]

5/14 . . Dismountable vessels or containers, e.g. for replacing cathode heater

5/16 . . Optical or photographic arrangements structurally combined with the vessel (luminescent coatings H01J 1/62 (see provisionally H01J 29/84))

5/18 . . Windows permeable to X-rays, gamma-rays, or particles

5/20 . . Seals between parts of vessels

5/22 . . Vacuum-tight joints between parts of vessel

5/24 . . between insulating parts of vessel

5/26 . . between insulating and conductive parts of vessel

5/28 . . between conductive parts of vessel

5/30 . . using packing-material, e.g. sealing-liquid or elastic insert

5/32 . . Seals for leading-in conductors

5/34 . . for an individual conductor (pinched-stem seals H01J 5/38; end-disc seals H01J 5/40; annular seals H01J 5/44)

5/36 . . using intermediate part

5/38 . . Pinched-stem or analogous seals

5/40 . . End-disc seals, e.g. flat header

5/42 . . using intermediate part

5/44 . . Annular seals disposed between the ends of the vessel

5/46 . . Leading-in conductors

5/48 . . Means forming part of the tube or lamp for the purpose of supporting it (associated with electrical connecting means H01J 5/50)

5/50 . . Means forming part of the tube or lamps for the purpose of providing electrical connection to it (construction of connectors H01R)

5/52 . . directly applied to or forming part of the vessel

5/54 . . supported by a separate part, e.g. base

5/56 . . . Shape of the separate part

5/565 . . . [Bases for circular lamps]

5/58 . . Means for fastening the separate part to the vessel, e.g. by cement

5/60 . . . for fastening by mechanical means

5/62 . . . Connection of wires protruding from the vessel to connectors carried by the separate part

7/00 Details not provided for in the preceding groups and common to two or more basic types of discharge tubes or lamps

7/02 . Selection of substances for gas fillings; Specified operating pressure or temperature (radioactive fillings H01J 7/40)

7/04 . . having one or more carbon compounds as the principal constituent
Lamps

Recovery of material from discharge tubes or parts thereof of electric discharge tubes, discharge lamps, or manufacture, installation, removal, maintenance from glass {Composition or manufacture of getters} {Getter supports}

Manufacture of electrodes or electrode systems discharge tubes or lamps {Auxiliary devices for installing or removing with the tube or lamp one or more circuit elements structurally associated for indicating defects or previous use} Means structurally associated with the tube or lamp

Igniting arrangements (circuit arrangements H02M 1/02, H05B) {of electron emission flat panels, e.g. gate electrodes, focusing electrodes or anode electrodes}

Apparatus or processes specially adapted for the manufacture, installation, removal, maintenance of electric discharge tubes, discharge lamps, or parts thereof {manufacture of vessels or containers from metal B21, e.g. B21D 51/00, from glass C03B}; Recovery of material from discharge tubes or lamps

Manufacture of heaters for indirectly-heated cathodes {Manufacture or joining of vessels, leading-in transformers, inductances, reactors or choke coils for cathode-ray tubes (manufacturing coils for storage screens)}

Machines for making wire grids

Applying luminescent coatings

[continuous layers]

[constituted by coated granules emitting light of different colour]

[by uniformly dispersing of liquid]

[by precipitation]

[by electrostatic or electrophoretic processes]

With luminescent material discontinuously arranged, e.g. in dots or lines

[by photographic processes (final treatment of shadow-mask prior to or after dot deposition H01J 9/144)]

[Devices for carrying out the processes, e.g. light houses]

[Auxiliary lenses and filters]

[Light sources particularly adapted thereto]

[including the exposition of a substance responsive to a particular radiation]

[Development of latent electrostatic images (per se G03G 15/06)]

[by other processes, e.g. serigraphy, decalcomania]

[Application of light absorbing material, e.g. between the luminescent areas]

Manufacture of photoelectric screens or charge-storage screens

Manufacture of magnetic deflecting devices for cathode-ray tubes (manufacturing coils for transformers, inductances, reactors or choke coils H01F 41/04)

Manufacture or joining of vessels, leading-in conductors or bases
1. When classifying in this group, classification is made in all appropriate places.

2. In this group, the following term is used with the meaning indicated:
   - "main electrode" means any of a sustain electrode, scan electrode or address electrode.

   - AC-PDPs with at least one main electrode being out of contact with the plasma
   - with main electrodes provided on both sides of the discharge space
   - with main electrodes provided only on one side of the discharge space
   - with main electrodes provided inside or on the side face of the spacers
   - containing a plurality of independent closed structures for containing the gas, e.g. plasma tube array [PTA] display panels
   - Constructional details
   - Electrodes, e.g. special shape, material or configuration
   - Sustain electrodes or scan electrodes
   - Address electrodes
   - Auxiliary electrodes, e.g. priming electrodes or trigger electrodes
   - Floating electrodes
   - Disposition of the electrodes
   - Vessels, containers or parts thereof, e.g. substrates
   - Spacers, barriers, ribs, partitions or the like
   - Dielectric or insulating layers
   - Layers for protecting or enhancing the electron emission, e.g. MgO layers
   - Fluorescent layers
   - Optical arrangements or shielding arrangements, e.g. filters, black matrices, light reflecting means or electromagnetic shielding means
   - Connecting or feeding means, e.g. leading-in conductors
   - Sealing, e.g. seals specially adapted for leading-in conductors
   - Filling, e.g. selection of gas mixture
   - Means for absorbing or adsorbing the gas mixture, e.g. by gettering
   - Means for exhausting the gas

13/00 Discharge tubes with liquid-pool cathodes, e.g. metal-vapour rectifying tubes (lamps H01J 61/00)

13/02 Details
13/04 Main electrodes; Auxiliary anodes
13/06 Cathodes
13/08 characterised by the material
13/10 Containers for the liquid pool; Arrangements or mounting thereof
13/12 Positioning or moving the cathode spot on the surface of the pool
13/14 Cooling, heating, circulating, filtering, or controlling level of the liquid
13/16 Anodes; Auxiliary anodes for maintaining the discharge (screens H01J 13/22)
13/18 Cooling or heating of anodes
13/20 Control electrodes, e.g. grid (for igniting arrangements H01J 13/34)
13/22 Screens, e.g. for preventing or eliminating arcing-back
13/24 . . . Vessels; Containers
13/242 . . . [characterised by the material]
13/244 . . . [characterised by the shape]
13/246 . . . [Treatment of, or coating on interior parts of vessel]
13/248 . . . [Envelope means outside vessel, i.e. screens, reflectors, filters]
13/26 . . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
13/263 . . . [Leading-in conductors to the liquid electrode]
13/266 . . . [Leading-in conductors to the anode]
13/28 . . . Selection of substances for gas filling; Means for obtaining the desired pressure within the tube
13/30 . . . Means for permitting pumping during operation of the tube
13/32 . . . Cooling arrangements; Heating arrangements (for cathodes H01J 13/14; for anodes H01J 13/18)
13/34 . . . Igniting arrangements (circuits arrangements H02M 1/02)
13/36 . . . having resistive or capacitative igniter
13/38 . . . having resistive igniter only
13/40 . . . Igniting by movement of a solid electrode
13/405 . . . [Interrupting contact with liquid cathode]
13/42 . . . Igniting by movement of vessel as a whole, e.g. tilting
13/44 . . . Devices for preventing or eliminating arcing-back (screens therefor H01J 13/22)
13/46 . . . One or more circuit elements structurally associated with the tube
13/48 . . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
13/50 . . . Tubes having a single main anode
13/52 . . . with control by one or more intermediate control electrodes
13/54 . . . with control by igniter, e.g. single-anode ignitron
13/56 . . . Tubes having two or more main anodes
13/58 . . . with control by one or more intermediate control electrodes

15/00 Gas-filled discharge tubes with gaseous cathodes, e.g. plasma cathode (lamps H01J 61/62)
15/02 . . . Details, e.g. electrode, gas filling, shape of vessel
15/04 . . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

17/00 Gas-filled discharge tubes with solid cathode (H01J 25/00; H01J 27/00; H01J 31/00 - H01J 41/00) (H01J 11/00) take precedence; gas or vapour discharge lamps H01J 61/00; gas filled spark gaps H01T; Marx converters H02M 7/26; tubes for generating potential differences by charges carried in a gas stream H02N)

17/005 . . . [specially adapted as noise generators (electronic circuits for generation of noise currents or voltages H03B 29/00)]
17/02 . . . Details
17/04 . . . Electrodes; Screens
17/06 . . . Cathodes
17/063 . . . . . [Indirectly heated cathodes, e.g. by the discharge itself]
17/066 . . . . . [Cold cathodes]
17/08 . . . . . having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube
17/10 . . . . . Anodes
17/12 . . . . . Control electrodes
17/14 . . . . . Magnetic means for controlling the discharge
17/16 . . . . . Vessels; Containers
17/18 . . . . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
17/183 . . . . . [Seals between parts of vessel]
17/186 . . . . . [Seals between leading-in conductors and vessel]
17/20 . . . . . Selection of substances for gas fillings; Specified operating pressures or temperature (radioactive fillings H01J 17/32)
17/22 . . . . . Means for obtaining or maintaining the desired pressure within the tube
17/24 . . . . . Means for absorbing or adsorbing gas, e.g. by gettering
17/26 . . . . . Means for producing, introducing, or replenishing gas or vapour during operation of the tube
17/28 . . . . . Cooling arrangements
17/30 . . . . . Igniting arrangements
17/32 . . . . . Igniting by associated radioactive materials or fillings
17/325 . . . . . . [Current stabilising tubes, e.g. curpistors]
17/34 . . . . . One or more circuit elements structurally associated with the tube
17/36 . . . . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
17/38 . . . Cold-cathode tubes (TR boxes H01J 17/64)
17/40 . . . with one cathode and one anode, e.g. glow tubes, tuning-indicator glow tubes, voltage-stabiliser tubes, voltage-indicator tubes, (cathode-glow lamps H01J 61/04)
17/42 . . . having one or more probe electrodes, e.g. for potential dividing
17/44 . . . having one or more control electrodes
17/46 . . . . . for preventing and then permitting ignition but thereafter having no control
17/48 . . . . . with more than one cathode or anode, e.g. sequence-discharge tube, counting tube, dekatron
17/485 . . . . . [Plasma addressed liquid crystal displays (PALC)]
17/49 . . . . . Display panels, e.g. with crossed electrodes [e.g. making use of direct current] (gas discharge type indicating arrangements effected by the combination of a number of individual lamps G09F 9/313 (display panels making use of alternating current H01J 11/00))
17/491 . . . . . [with electrodes arranged side by side and substantially in the same plane, e.g. for displaying alphanumeric characters]
17/492 . . . . . [with crossed electrodes]
17/494 . . . . . . using sequential transfer of the discharges, e.g. of the self-scan type (addressing circuits therefor G09G 3/29)
17/495 . . . . . . display panels using sequential transfer of the discharge along dielectric storage elements
17/497 . . . . . . [for several colours]
Details of vacuum tubes of the types covered by group H01J 21/00

Electron-emitting electrodes; Cathodes
Thermionic cathodes
characterised by the material
with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material
with other metal oxides as an emissive material
with metals or alloys as an emissive material
with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material
Cathodes heated directly by an electric current
characterised by the shape
Supports; Vibration-damping arrangements
Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment
Heaters (filaments for incandescent lamps)
Insulating layer or body located between heater and emissive material
Supports for the emissive material
Dispenser-type cathodes, e.g. L-cathode
Cold cathodes, e.g. field-emissive cathode
Non-electron-emitting electrodes; Screens
caracterised by the material
Anodes
forming part of the envelope
Cooling of anodes
Control electrodes, e.g. grid
Screens for shielding (screens acting as control electrodes)
Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
Insulation between electrodes or supports within the vacuum space
Mountings for the electrode assembly as a whole
Mountings for individual electrodes (for directly-heated cathodes)
Spacing members extending to the envelope
without fixed connection between spacing member and envelope
Vessels; Containers; Shields associated therewith
caracterised by the material of the vessel or container

Tubes specially designed for switching or modulating in a waveguide, e.g. TR box

Tubes with a single discharge path
without control means, i.e. diodes
having electrostatic control means only
Devices for short wave tubes
with movable electrode or electrodes
with one or more immovable internal control electrodes, e.g. triode, pentode, octode
(with microengineered cathode and control electrodes, e.g. Spindt-type)
Tubes with variable amplification factor
Tubes with means for concentrating the electron stream, e.g. beam tetrode
with external electrostatic control means and with or without internal control electrodes
having magnetic control means; having both magnetic and electrostatic control means
Tubes with more than one discharge path; Multiple tubes, e.g. double diode, triode-hexode (secondary-emission tubes, electron-multiplier tubes
Tubes with flat electrodes, e.g. disc electrode

Vacuum tubes (H01J 25/00,
H01J 31/00 - H01J 37/00; H01J 43/00 take precedence; details of vacuum tubes H01J 19/00; cathode ray or electron stream lamps H01J 63/00)
Tubes with a single discharge path
without control means, i.e. diodes
having electrostatic control means only
Devices for short wave tubes
with movable electrode or electrodes
with one or more immovable internal control electrodes, e.g. triode, pentode, octode
(with microengineered cathode and control electrodes, e.g. Spindt-type)
Tubes with variable amplification factor
Tubes with means for concentrating the electron stream, e.g. beam tetrode
with external electrostatic control means and with or without internal control electrodes
having magnetic control means; having both magnetic and electrostatic control means
Tubes with more than one discharge path; Multiple tubes, e.g. double diode, triode-hexode (secondary-emission tubes, electron-multiplier tubes
Tubes with flat electrodes, e.g. disc electrode

Details of transit-time tubes of the types covered by group H01J 25/00
Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy

to or from the discharge
to or from the interaction circuit

the interaction circuit being a helix or a helix-derived slow-wave structure

Rod-type coupling devices

Loop coupling devices

for linking interaction circuit with coaxial lines; Devices of the coupled helices type

the interaction circuit being a helix or derived from a helix

coupled helices being disposed coaxially around one another

Filtering devices preventing unwanted frequencies or modes to be coupled to, or out of, the interaction circuit; Prevention of high frequency leakage in the environment

Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons (details of transit-time tubes H01J 23/00; particle accelerators H05H)

Gas-filled transit-time tubes

Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving up energy in an inducing zone, the zones being associated with one or more resonators (tubes in which a travelling-wave is simulated at spaced gaps H01J 23/34)

with an electron stream following a helical path

Tubes having one or more resonators, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly density modulation, e.g. Heaff tube

Tubes having only one resonator, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly velocity modulation, e.g. Lüdi-Klystron

with electron stream perpendicular to the axis of the resonator

Klystrons, i.e. tubes having two or more resonators, without reflection of the electron stream, and in which the stream is modulated mainly by velocity in the zone of the input resonator

Extended interaction klystrons

with pencil-like electron stream in the axis of the resonators

with tube-like electron stream coaxial with the axis of the resonators

with pencil-like electron stream perpendicular to the axis of the resonators

with radial or disc-like electron stream perpendicular to the axis of the resonators
. . . having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube

. . . Reflex klystrons, i.e. tubes having one or more resonators, with a single reflection of the electron stream, and in which the stream is modulated mainly by velocity in the modulator zone

. . . in which the electron stream is in the axis of the resonator or resonators and is tube-like before reflection

. . . in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection

. . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection

. . . in which the electron stream is in the axis of the resonator or resonators and is tube-like before reflection

. . . in which the electron stream is in the axis of the resonator or resonators and is tube-like before reflection

. . . Tubes with plural reflection, e.g. Coeterier tube

. Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps

. . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without magnet system producing an H-field crossing the E-field

. . . the forward travelling wave being utilised

. . . the backward travelling wave being utilised

. . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and with a magnet system producing an H-field crossing the E-field (with travelling wave moving completely around the electron space H01J 25/50)

. . . the forward travelling wave being utilised

. . . the backward travelling wave being utilised

. . . Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube

. . . Tubes using the parametric principle, e.g. for parametric amplification

. . . Magnets, i.e. tubes with a magnet system producing an H-field crossing the E-field (with travelling wave not moving completely around the electron space H01J 25/42; functioning with plural reflection or with reversed cyclotron action H01J 25/62, H01J 25/64)

. . . with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode

. . . having only one cavity or other resonator, e.g. neutrode tube (having a composite resonator H01J 25/58)

. . . Coaxial cavity magnetrons

. . . with interdigital arrangements of anodes, e.g. turbator tube

. . . having a number of resonators; having a composite resonator, e.g. a helix

. . . Multi-cavity magnetrons

. . . Rising-sun magnetrons

. . . with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons

. . . Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section

. . . Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection

. . . Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action

. . . Tubes with electron stream crossing itself and thereby interacting or interfering with itself

. . . Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators (with secondary emission H01J 25/76)

. . . with resonator having distributed inductance with capacitance, e.g. Pintsch tube

. . . in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube (with resonator having distributed inductance and capacitance H01J 25/76)

. . . Tubes specially designed to act as transit-time diode oscillators, e.g. monotron (with secondary emission H01J 25/76)

. . . Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor

. . . Tubes with electron stream modulated by deflection in a resonator

27/00 Ion beam tubes (H01J 25/00, H01J 33/00, H01J 37/00 take precedence; particle accelerators H05H)

27/02 . Ion sources; Ion guns ([for examination or processing discharge tubes H01J 37/08; ion sources, ion guns for particle spectrometer or separator tubes H01J 49/10; ion propulsion F03H 1/00]; arrangements for handling particles, e.g. focusing, {charge exchanging, polarising} ; G21K 1/00; generating ions to be introduced into non-enclosed gases H01T 23/00; generating plasma H05H 1/24)

27/022 . [Details]

27/024 . . . [Extraction optics, e.g. grids]

27/026 . . . [Cluster ion sources]

27/028 . . . [Negative ion sources]

27/04 . . . using reflex discharge, e.g. Penning ion sources ([electron bombardment ion sources H01J 27/08])

27/06 . . . without applied magnetic field

27/08 . . . using arc discharge

27/10 . . . Duoplasmatrons; [Duopigatrons]

27/12 . . . provided with an expansion cup

27/14 . . . Other arc discharge ion sources using an applied magnetic field

27/143 . . . . . . [Hall-effect ion sources with closed electron drift]

27/146 . . . . . . [End-Hall type ion sources, wherein the magnetic field confines the electrons in a central cylinder]

27/16 . . . using high-frequency excitation, e.g. microwave excitation

27/18 . . . with an applied axial magnetic field

27/20 . . . using particle {beam} bombardment, e.g. ionisers

27/205 . . . [with electrons, e.g. electron impact ionisation, electron attachment]
Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00

29/003 . . . . . . Arrangements for eliminating unwanted electromagnetic effects, e.g. demagnetisation arrangements, shielding coils (H01J 29/06, H01J 29/867 take precedence; demagnetisation in general H01F 13/00; circuit arrangements therefor H04N 9/29; screening of apparatus against electric or magnetic fields H05K 9/00)

29/006 . . . . . . Arrangements for eliminating unwanted temperature effects

29/02 . . . . . . Electrodes; Screens; Mounting, supporting, spacing or insulating thereof

29/021 . . . . . . (arrangements for eliminating interferences in the tube (H01J 29/484 takes precedence))

29/023 . . . . . . (secondary-electron emitting electrode arrangements (secondary-emission tubes H01J 43/00))

29/025 . . . . . . (Mounting or supporting arrangements for grids (H01J 29/028 takes precedence))

29/026 . . . . . . (Mounting or supporting arrangements for charge storage screens not deposited on the frontplate)

29/028 . . . . . . (Mounting or supporting arrangements for flat panel cathode ray tubes, e.g. spacers particularly relating to electrodes)

29/04 . . . . . . Cathodes (electron guns H01J 29/48)

29/06 . . . . . . Screens for shielding; Masks interposed in the electron stream

29/07 . . . . . . Shadow masks for colour television tubes

29/073 . . . . . . (Mounting arrangements associated with shadow masks)

29/076 . . . . . . (characterised by the shape or distribution of beam-passing apertures)

29/08 . . . . . . Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked up, converted, or stored, e.g. backing-plates for storage tube, for collecting secondary electrons (arrangements for colour switching H01J 29/80)

29/085 . . . . . . (Anode plates, e.g. for screens of flat panel displays)

29/10 . . . . . . Screens on or from which an image or pattern is formed, picked up, converted or stored

29/12 . . . . . . (acting as light valves by shutter operation, e.g. for eidoscop)

29/14 . . . . . . (acting by discoloration, e.g. halide screen)

29/16 . . . . . . Incandescent screens

29/18 . . . . . . Luminescent screens

29/182 . . . . . . (acting upon the lighting-up of the luminescent material other than by the composition of the luminescent material, e.g. by infra red or UV radiation, heating or electric fields)

29/185 . . . . . . (measures against halo-phenomena)

29/187 . . . . . . (screens with more than one luminescent material (as mixtures for the treatment of the screens) (for several superimposed luminescent layers H01J 29/26; for adjacent dots or lines of different luminescent material H01J 29/32))

29/20 . . . . . . characterised by the luminescent material (for luminescent screens for X-ray purposes G21K 4/00)

29/22 . . . . . . (characterised by the binder or adhesive for securing the luminescent material to its support, e.g. vessel

29/225 . . . . . . (photosensitive adhesive)

29/24 . . . . . . Supports for luminescent material

29/26 . . . . . . with superimposed luminescent layers

29/28 . . . . . . with protective, conductive or reflective layers

29/30 . . . . . . with luminescent material discontinuously arranged, e.g. in dots, in lines

29/32 . . . . . . with adjacent dots or lines of different luminescent material, e.g. for colour television

29/322 . . . . . . (with adjacent dots)

29/325 . . . . . . (with adjacent lines)

29/327 . . . . . . (Black matrix materials)

29/34 . . . . . . provided with permanent marks or references

29/36 . . . . . . Photoelectric screens; Charge-storage screens

29/38 . . . . . . not using charge storage, e.g. photo-emissive screen, extended cathode (electrodes using photo-emission in general H01J 1/34)

29/385 . . . . . . (Photocathodes comprising a layer which modified the wave length of impinging radiation (luminescent layers sensitive to UV and X-rays C09K 11/00, G21K 4/00))

29/39 . . . . . . Charge-storage screens (H01J 29/395 takes precedence)

29/395 . . . . . . (charge-storage grids exhibiting triode effect)

29/41 . . . . . . using secondary emission, e.g. for supericonoscope (electrodes using secondary emission in general H01J 1/32; secondary emission tubes H01J 43/00)

29/413 . . . . . . (for writing and reading of charge pattern on opposite sides of the target, e.g. for superorthicon)

29/416 . . . . . . (with a matrix of electrical conductors traversing the target)

29/43 . . . . . . using photo-emissive mosaic, e.g. for orthicon, for iconoscope

29/435 . . . . . . (with a matrix of conductors traversing the target)

29/44 . . . . . . exhibiting internal electric effects caused by particle radiation, e.g. bombardment-induced conductivity (particle detectors exhibiting internal electric effects G01T 1/26)

29/45 . . . . . . exhibiting internal electric effects caused by electromagnetic radiation, e.g. photoconductive screen, photodetector screen, photovoltaic screen (photoconductive layers for electrography G03G 5/00)

29/451 . . . . . . (with photosensitive junctions)

29/453 . . . . . . (provided with diode arrays)
Arrangements of electrodes and associated parts for generating or controlling the ray or beam, e.g. electron-optical arrangement ([transit time tubes H01J 23/00, H01J 25/00; X-ray tubes H01J 35/00; beam tubes for examining ions, e.g. electron or ion microscopes, or processing of objects or materials, e.g. electron or ion beam tubes H01J 37/04; electron multipliers H01J 43/04; handling of radiation or particles, e.g. focusing, deflecting, not otherwise provided for (G21K 1/00))

Electron guns

[Electron guns using field-emission, photo-emission, or secondary-emission electron source]

Electron guns using electron multiplication

Eliminating deleterious effects due to thermal effects, electrical or magnetic fields; Preventing unwanted emission (H01J 29/481 and H01J 29/482 take precedence)

Construction of the gun or of parts thereof (H01J 29/481, H01J 29/482, H01J 29/484 and H01J 29/487 take precedence)

Replacing parts of the gun; Relative adjustment of the electrodes (H01J 29/481 and H01J 29/482 take precedence; vacuum locks H01J 29/865)

Schematic arrangements of the electrodes for beam forming; Place and form of the electrodes

two or more guns in a single vacuum space, e.g. for plural-ray tube (H01J 29/51 takes precedence)

Three or more guns, the axes of which lay in a common plane

guns in delta or circular configuration

Arrangements for controlling convergence of a plurality of beams [by means of electric field only]

Arrangements for controlling intensity of ray or beam, e.g. for modulation ([H01J 29/467 takes precedence])

Digitally controlled systems, e.g. Digisplay

Arrangements for centring ray or beam ([H01J 29/467 takes precedence])

Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses ([H01J 29/467 takes precedence])

for controlling cross-section
29/81 . . . using shadow masks (shadow masks per se H01J 29/07)
29/82 . . . Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements
29/823 . . . [around the neck of the tube]
29/826 . . . [Deflection arrangements]
29/84 . . . Traps for removing or diverting unwanted particles, e.g. negative ions, fringing electrons; Arrangements for velocity or mass selection (particle spectrometer or separator tubes H01J 49/00)
29/845 . . . [by means of magnetic systems]
29/86 . Vessels; Containers; Vacuum locks
29/861 . . . [Vessels or containers characterised by the form or the structure thereof]
29/862 . . . [of flat panel cathode ray tubes]
29/863 . . . [Vessels or containers characterised by the material thereof]
29/864 . . . [Spacers between faceplate and backplate of flat panel cathode ray tubes]
29/865 . . . [Vacuum locks (for tubes for examining or processing of objects or materials, e.g. electron microscopes H01J 37/18)]
29/866 . . . [Devices for introducing a recording support into the vessel]
29/867 . . . [Means associated with the outside of the vessel for shielding, e.g. magnetic shields (screens for shielding inside the vessel H01J 29/06; magnetic shielding in general H05K 9/00)]
29/868 . . . [Screens covering the input or output face of the vessel, e.g. transparent anti-static coatings, X-ray absorbing layers]
29/87 . . . Arrangements for preventing or limiting effects of implosion of vessels or containers
29/88 . . . provided with coatings on the walls thereof; Selection of materials for the coatings ({H01J 29/868 and H01J 29/89 take precedence} ; luminescent screens H01J 29/18)
29/89 . . . Optical or photographic arrangements structurally combined [or co-operating] with the vessel ({H01J 29/866 and H01J 29/868 take precedence})
29/892 . . . [using fibre optics]
29/894 . . . [Arrangements combined with the vessel for the purpose of image projection on a screen (projection arrangements for image reproduction, e.g. using eidophor H04N 5/74)]
29/896 . . . [Anti-reflection means, e.g. eliminating glare due to ambient light]
29/898 . . . [Spectral filters]
29/90 . Leading-in arrangements; Seals therefor
29/92 . Means forming part of the tube for the purpose of providing electrical connection to it (construction of connectors H01R)
29/925 . . . [High voltage anode feedthrough connectors for display tubes]
29/94 . Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering (exhausting, degassing, gettering of electric discharge tubes in general H01J 9/38)
29/96 . One or more circuit elements structurally associated with the tube
29/98 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
30/00 Cathode ray tubes; Electron beam tubes (H01J 25/00; H01J 35/00; H01J 37/00 take precedence; cathode ray or electron stream lamps H01J 63/00; details of cathode ray tubes or of electron beam tubes H01J 29/00)
31/02 . having one or more output electrodes which may be impacted selectively by the ray or beam, and onto, from, or over which the ray or beam may be deflected or de-focused ([pulse counting circuits therewith H03K 29/06])
31/04 . with only one or two output electrodes {with only two electrically independant groups or electrodes]
31/06 . with more than two output electrodes, e.g. for multiple switching or counting
31/065 . . . [for electrography or electrophotography, for transferring a charge pattern through the faceplate (leading-in arrangements H01J 29/00; Lenard tubes H01J 33/00; electrography or electrophotography per se G03C)]
31/08 . having a screen on or from which an image or pattern is formed, picked up, converted, or stored
31/10 . Image or pattern display tubes, i.e. having electrical input and optical output; Flying-spot tubes for scanning purposes
31/12 . . . with luminescent screen
31/121 . . . [tubes for oscillography (colour display tubes H01J 31/20; cathode ray oscillography G01K 13/20)]
31/122 . . . [Direct viewing storage tubes without storage grid (with storage grid H01J 31/18)]
31/123 . . . . [Flat display tubes]
31/124 . . . . [using electron beam scanning]
31/125 . . . . [provided with control means permitting the electron beam to reach selected parts of the screen, e.g. digital selection]
31/126 . . . . . [using line sources]
31/127 . . . . . [using large area or array sources, i.e. essentially a source for each pixel group]
31/128 . . . . . [provided with control means permitting the electron beam to reach selected parts of the screen, e.g. digitally controlled display tubes (H01J 31/123 takes precedence)]
31/14 . . . . Magic-eye or analogous tuning indicators ([mounting of visual indicators in a radio set H03J 11/04; circuits for timing indicators H03J 3/14])
31/15 . . . . with ray or beam selectively directed to luminescent anode segments ([printing by application of radiation B41J 24/47])
31/16 . . . . with mask carrying a number of selectively displayable signs, e.g. charactron, numeroscope ([tubes with a mask carrying a matrix of openings, a selection of which permits a sign to be displayed H01J 31/128])
H01J

31/18 . . . with image written by a ray or beam on a
grid-like charge-accumulating screen, and
with a ray or beam passing through and
influenced by this screen before striking the
luminescent screen, e.g. direct-view storage
tube (charge storage grids exhibiting triode
effect H01J 29/395)

31/20 . . for displaying images or patterns in two or
more colours (circuits for colour television
H04N 9/16 - H04N 9/28)

31/201 . . [using a colour-selection electrode]

31/203 . . . . . [with more than one electron beam]

31/205 . . . . . . . . [with three electron beams in delta
configuration]

31/206 . . . . . . . . . [with three coplanar electron beams]

31/208 . . . . . . . . . . [using variable penetration depth of
the electron beam in the luminescent layer, e.g.
penetrators]

31/22 . . for stereoscopic displays

31/24 . . with screen acting as light valve by shutter
operation, e.g. eidoophor (projection
arrangements for image reproduction, e.g.
using eidoophor H04N 8/74)

31/26 . . Image pick-up tubes having an input of visible
light and electric output (tubes without defined
electron beams and having a light ray scanning
photo-emissive screen H01J 40/20)

31/265 . . . . . [with light spot scanning]

31/28 . . . . with electron ray scanning the image screen
(H01J 31/283, H01J 31/286 take precedence)

31/283 . . . . . [with a target comprising semiconductor
junctions]

31/286 . . . . . [correlater tubes]

31/30 . . . . having regulation of screen potential at
anode potential, e.g. iconoscope

31/32 . . . . . . Tubes with image amplification section,
e.g. image-iconoscope, supericonoscope

31/34 . . . . . . having regulation of screen potential at
cathode potential, e.g. orthicon

31/36 . . . . . . Tubes with image amplification section,
e.g. orthiconoscope

31/38 . . . . . . Tubes with photoconductive screen, e.g.
vidicon

31/40 . . . . having grid-like image screen through which
the electron ray passes and by which the
ray is influenced before striking the output
electrode, i.e. having "triode action"

31/42 . . . with image screen generating a composite
electron beam which is deflected as a whole
past a stationary probe to simulate a scanning
effect, e.g. Farnsworth pick-up tube

31/44 . . . . . Tubes with image amplification section

31/46 . . . . Tubes in which electrical output represents
both intensity and colour of image (colour
television cameras with only one tube
H04N 9/071)

31/48 . . . . Tubes with amplification of output effected
by electron multiplier arrangements within the
vacuum space

31/49 . . . Pick-up adapted for an input of electromagnetic
radiation other than visible light and having an
electric output, e.g. for an input of X-rays, for an
input of infra-red radiation

31/495 . . . Pick-up tubes adapted for an input of sonic,
ultrasonic, or mechanical vibrations and having
an electric output

31/50 . . Image-conversion or image-amplification tubes,
i.e. having optical, X-ray, or analogous input, and
optical output

31/501 . . . . [with an electrostatic electron optic system
(H01J 31/52 - H01J 31/56 take precedence)]

31/502 . . . . [with means to interrupt the beam, e.g.
shutter for high speed photography (circuits
using electron-beam shutters G03B 27/725)]

31/503 . . . . [with an electromagnetic electron-optic system
(H01J 31/52 - H01J 31/56 take precedence)]

31/505 . . . . [flat tubes, e.g. proximity focusing tubes]

31/506 . . . . [tubes using secondary emission effect]

31/507 . . . . . [using a large number of channels, e.g.
microchannel plates]

31/508 . . . . [Multistage converters]

31/52 . . . having grid-like image screen through which
the electron ray or beam passes and by which
the ray or beam is influenced before striking
the luminescent output screen, i.e. having
"triode action"

31/54 . . . . in which the electron ray or beam is reflected
by the image input screen on to the image
output screen

31/56 . . . . for converting or amplifying images in two or
more colours

31/58 . . . . Tubes for storage of image or information pattern
or for conversion of definition of television
or like images, i.e. having electrical input and
electrical output (electrostatic memories using
electron beam tubes G11C 11/23)

31/585 . . . . . [Monoskopes (H01J 31/60 takes precedence)]

31/60 . . . . . . [having means for deflecting, either selectively
or sequentially, an electron ray on to separate
surface elements of the screen (by circuitry
alone H01J 29/08)]

31/62 . . . . . . with separate reading and writing rays

31/64 . . . . . . . on opposite sides of screen, e.g. for
conversion of definition

31/66 . . . . . . . having means for allowing all but selected
cross-section elements of a homogeneous
electron beam to reach corresponding elements
of the screen, e.g. selectron

31/68 . . . . . . . . in which the information pattern represents two
or more colours

33/00 Discharge tubes with provision for emergence
of electrons or ions from the vessel (irradiation
devices G21K) ; particle accelerators H05H; Lenard
tubes

33/02 . . . . . . . Details (vessels for operation at high
tension H01J 5/06)

33/04 . . . . Windows

35/00 X-ray tubes

35/02 . . . . Details

35/025 . . . . . [X-ray tubes with structurally associated circuit
elements]

35/04 . . . . . [Electrodes ( Mutual position thereof;
Constructional adaptations therefor)]

35/045 . . . . . [Electrodes for controlling the current of the
cathode ray, e.g. control grids]
CPC - 2020.01

35/06 . . . Cathodes

**WARNING**

Group H01J 35/06 is impacted by reclassification into groups H01J 35/064 and H01J 35/066.

Groups H01J 35/06 and H01J 35/064 and H01J 35/066 should be considered in order to perform a complete search.

35/064 . . . {Details of the emitter, e.g. material or structure (H01J 35/065 takes precedence)}

**WARNING**

Group H01J 35/064 is incomplete pending reclassification of documents from group H01J 35/06.

Groups H01J 35/06 and H01J 35/064 should be considered in order to perform a complete search.

35/065 . . . {Field emission, photo emission or secondary emission cathodes}

35/066 . . . {Details of electron optical components, e.g. cathode cups}

**WARNING**

Group H01J 35/066 is incomplete pending reclassification of documents from group H01J 35/06.

Groups H01J 35/06 and H01J 35/064 should be considered in order to perform a complete search.

35/08 . . . Anodes; Anti cathodes

**WARNING**

Group H01J 35/08 is impacted by reclassification into groups H01J 35/112 and H01J 35/116.

Groups H01J 35/08 and H01J 35/112 and H01J 35/116 should be considered in order to perform a complete search.

35/10 . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes

35/101 . . . . {Arrangements for rotating anodes, e.g. supporting means, means for greasing, means for sealing the axle or means for shielding or protecting the driving}

**WARNING**

Group H01J 35/101 is impacted by reclassification into groups H01J 35/1017, H01J 35/1024 and H01J 35/104.

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

35/102 . . . . {Bearings for rotating anodes}

**WARNING**

Groups H01J 35/1017, H01J 35/1024 and H01J 35/104 are incomplete pending reclassification of documents from group H01J 35/101.

Groups H01J 35/101, H01J 35/1017, H01J 35/1024 and H01J 35/104 should be considered in order to perform a complete search.

35/103 . . . . . {Rolling bearings}

35/104 . . . . . . {Magnetic bearings}

35/105 . . . . . . {Fluid bearings}

35/106 . . . . . {Cooling of rotating anodes, e.g. heat emitting layers or structures}

**WARNING**

Group H01J 35/106 is impacted by reclassification into group H01J 35/107.

Groups H01J 35/105 and H01J 35/107 should be considered in order to perform a complete search.

35/107 . . . . . {Cooling of the bearing assemblies}

**WARNING**

Group H01J 35/107 is incomplete pending reclassification of documents from groups H01J 35/105 and H01J 35/106.

Groups H01J 35/105, H01J 35/106 and H01J 35/107 should be considered in order to perform a complete search.

35/108 . . . . . {Substrates for and bonding of emissive target, e.g. composite structures}

35/112 . . . . . {Non-rotating anodes (H01J 35/12 takes precedence)}

**WARNING**

Group H01J 35/112 is incomplete pending reclassification of documents from group H01J 35/08.

Groups H01J 35/08 and H01J 35/112 should be considered in order to perform a complete search.
35/116 . . . . (Transmissive anodes (acting as a window {Transmissive anodes (acting as a window
H01J 35/186)}

**WARNING**

Group H01J 35/116 is incomplete pending reclassification of documents from group H01J 35/08.
Groups H01J 35/08 and H01J 35/116 should be considered in order to perform a complete search.

35/12 . . . . Cooling non-rotary anodes

**WARNING**

Group H01J 35/12 is impacted by reclassification into group H01J 35/13.
Groups H01J 35/12 and H01J 35/13 should be considered in order to perform a complete search.

35/13 . . . . (Active cooling, e.g. fluid flow, heat pipes)

**WARNING**

Group H01J 35/13 is incomplete pending reclassification of documents from group H01J 35/12.
Groups H01J 35/12 and H01J 35/13 should be considered in order to perform a complete search.

35/14 . . . Arrangements for concentrating, focusing, or directing the cathode ray

**WARNING**

Group H01J 35/14 is impacted by reclassification into groups H01J 35/147 and H01J 35/153.
Groups H01J 35/14 and H01J 35/147 and H01J 35/153 should be considered in order to perform a complete search.

35/147 . . . {Spot size control}

**WARNING**

Group H01J 35/147 is incomplete pending reclassification of documents from group H01J 35/14.
Groups H01J 35/14 and H01J 35/147 should be considered in order to perform a complete search.

35/153 . . . {Spot position control}

**WARNING**

Group H01J 35/153 is incomplete pending reclassification of documents from group H01J 35/14.
Groups H01J 35/14 and H01J 35/153 should be considered in order to perform a complete search.

35/16 . . . Vessels; Containers; Shields associated therewith

35/165 . . . {joining connectors to the tube}

35/18 . . . Windows

**WARNING**

Group H01J 35/18 is impacted by reclassification into group H01J 35/186.
Groups H01J 35/18 and H01J 35/186 should be considered in order to perform a complete search.

35/186 . . . . {used as targets or X-ray converters}

**WARNING**

Group H01J 35/186 is incomplete pending reclassification of documents from group H01J 35/18.
Groups H01J 35/18 and H01J 35/186 should be considered in order to perform a complete search.

35/20 . . Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering

35/22 . . specially designed for passing a very high current for a very short time, e.g. for flash operation

35/24 . . Tubes wherein the point of impact of the cathode ray on the anode or anticathode is movable relative to the surface thereof

35/26 . . by rotation of the anode or anticathode

35/28 . . by vibration, oscillation, reciprocation, or swash-plate motion of the anode or anticathode

35/30 . . by deflection of the cathode ray

35/305 . . . {by using a rotating X-ray tube in conjunction therewith}

35/32 . . Tubes wherein the X-rays are produced at or near the end of the tube or a part thereof which tube or part has a small cross-section to facilitate introduction into a small hole or cavity

37/00 Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof (H01J 33/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00 take precedence; { scanning-probe techniques or apparatus G01Q ; contactless testing of electronic circuits using electron beams G01R 31/305; { particle accelerators H05H})

37/02 . . Details

37/023 . . . {Means for mechanically adjusting components not otherwise provided for (mechanically adjusting from the outside of electron or ion-optical components H01J 37/067; positioning the object or material H01J 37/20; vacuum locks, means for obtaining or maintaining the desired pressure within the tube H01J 37/18; other manipulating devices H01L 21/48, G21F)}

37/026 . . . {Means for avoiding or neutralising unwanted electrical charges on tube components}

37/04 . . Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement, ion-optical arrangement {electron or ion-optical systems for localised treatment of materials H01J 37/307; discharge control means in gas filled discharge tubes H01J 37/32099)
the correction of image defects, e.g. stigmators
Electron-optical or ion-optical arrangements for discharge along a desired path (H01J 37/045)

Lenses or ion-optical arrangements; Compensation of diaphragms; Shields associated with electron ion sources; Ion guns (H01J 37/045)

Electron guns in general H01J 19/02; electron guns in general H01J 37/02)

Construction of guns or parts thereof (H01J 37/067 - H01J 37/077 take precedence)

Replacing parts of guns; Mutual adjustment of electrodes (H01J 37/073 - H01J 37/077 take precedence; vacuum locks H01J 37/18)

Eliminating deleterious effects due to thermal effects or electric or magnetic fields (H01J 37/073 - H01J 37/077 take precedence)

Electron guns using field emission, photo emission, or secondary emission electron sources

Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser vapours as electron sources

Electron guns using discharge in gases or vapours as electron sources

Ion sources; Ion guns

Diaphragms; Shields associated with electron or ion-optical arrangements; Compensation of disturbing fields

Lenses

electrostatic

magnetic

Electromagnetic lenses

Means for interchanging parts of the lens, e.g. pole pieces, within the tube (mechanically adjusting electron (ion) optical components H01J 37/15)

with superconducting coils

Permanent magnetic lenses

Combinations of electrostatic and magnetic lenses

Arrangements for directing or deflecting the discharge along a desired path (H01J 37/045 takes precedence); lenses H01J 37/10)

(for centering, aligning or positioning of ray or beam)

Deflecting along given lines)

(Scanning means)

(magnetic)

(electrostatic)

(beam tilting means, i.e. for stereoscopy or for beam channelling)

External mechanical adjustment of electron or ion optical components (H01J 37/067, H01J 37/20 take precedence)

Electron-optical or ion-optical arrangements for the correction of image defects, e.g. stigmators

Vessels; Containers

Means associated with the vessel for preventing the generation of or for shielding unwanted radiation, e.g. X-rays

Vacuum locks; Means for obtaining or maintaining the desired pressure within the vessel (vacuum locks for electron-beam tubes in general H01J 29/865)

Means for transferring objects between different enclosures of different pressure or atmosphere

Means for supporting or positioning the objects or the material; Means for adjusting diaphragms or lenses associated with the support ((introducing the objects H01J 37/18; preparing specimens for investigation G01N 1/06, G01N 1/28))

Means for adjusting the focus (adjusting the focus while observing the image by photographic or optical means H01J 37/22; means for observing the object or the point of impact on the object in tubes for the localised treatment of materials H01J 37/3005)

Optical or photographic arrangements associated with the tube (using a CRT for the display of the image in a scanning electron microscope H01J 37/28; observing the object or the point of impact on the object in tubes for the localised treatment of materials H01J 37/3007)

Image processing arrangements associated with the tube (image data processing or generation, in general G06T)

Luminescent screens or photographic plates for imaging (photosensitive materials for photographic purposes G03C); Apparatus specially adapted therefor, e.g. cameras, TV-cameras, photographic equipment, exposure control; Optical subsystems specially adapted therefor, e.g. microscopes for observing image on luminescent screen

Optical arrangements for illuminating the object; optical arrangements for collecting light from the object

Whereby illumination and light collection take place in the same area of the discharge

Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

High voltage power supply or regulation circuits (components H01J 37/248)

Filament heating power supply or regulation circuits (H01J 37/241 takes precedence)

Beam current control or regulation circuits (H01J 37/241 takes precedence)

Detectors; Associated components or circuits therefor (detectors per se G01T)

Components associated with high voltage supply (Means for measuring the high voltage per se G01R 15/00); high voltage supply per se H02J, H02M)

Tubes for spot-analysing by electron or ion beams; Microanalysers (investigating or analysing thereby G01N 23/22)

using scanning beams

Electron or ion microscopes; Electron or ion diffraction tubes

(details)
Electron-beam or ion-beam tubes for localised implantation (H01J 37/36 takes precedence) electron beams B23K 15/00 for welding (methods for welding metals with drilling metals with electron beams B23K 15/00)

for cutting or drilling (methods for cutting or drilling metals with electron beams B23K 15/00)

for welding (methods for welding metals with electron beams B23K 15/00)

for changing properties of the objects or for taking precedence)

for evaporating or etching (methods for evaporating or etching)

for microwaving, e.g. etching of gratings, trimming of electrical components (trimming of resistors H01C 17/22)

for cutting or drilling (methods for cutting or drilling metals with electron beams B23K 15/00)

for applying thin layers on objects

for applying thin layers on objects

for ion implantation (H01J 37/36 takes precedence)

for ion implantation (plasma immersion ion implantation H01J 37/32412))

for maskless patterned ion implantation

for projection methods, i.e. transfer substantially complete pattern to substrate

for multi-beam, e.g. fly’s eye, comb probe

for applying thin layers on objects

Gas-filled discharge tubes, [e.g. for surface treatment of objects such as coating, plating, etching, sterilising or bringing about chemical reactions] (general methods or devices for heat treatments of ferrous or non-ferrous metals or alloys by cathodic discharges C21D 1/38; methods of carburising or nitriding of metals in general C23C 8/00; methods for coating, plating or surface treating of or with metallic material C23C 8/36, C23C 14/32, C23C 16/50; methods for coating, plating or surface treating of or with semiconductors H01L 21/00) heating by discharge H05B1

Arrangements for generation of plasma specially adapted for examination or treatment of objects, e.g. plasma sources (plasma generation in general H05H 1/24)

(Glow discharge)

[DC powered]

[AC powered]

[circuits specially adapted for controlling the glow discharge]

[Arc discharge]

[circuits specially adapted for controlling the arc discharge (for plasma torches H01H 1/36)]

[Corona discharge]

(Radio frequency generated discharge (H01J 37/32357, H01J 37/32366, H01J 37/32394 and H01J 37/32403 take precedence))

(the radio frequency energy being capacitively coupled to the plasma)

(the radio frequency energy being inductively coupled to the plasma)

[Antennas, e.g. particular shapes of coils]

[Windows]

[Using particular waveforms, e.g. polarised waves]

[Controlling of the discharge by modulation of energy]

[Amplitude modulation, includes pulsing]

[Frequency modulation]

[Plural frequencies]

[Circuits specially adapted for controlling the RF discharge]

[Matching circuits, impedance matching circuits per se H03H 7/38 and H03H 7/40]

[Microwave generated discharge (H01J 37/32357, H01J 37/32366, H01J 37/32394, H01J 37/32403 take precedence)]

[Generating means]

[Means for coupling power to the plasma]

[Antennas]

[Waveguides]

[Windows]

[Resonators]

[Tuning means]

[Means for controlling power transmitted to the plasma]

[Microwave reflectors]

[Means for controlling or selecting resonance mode]
{ Electrostatic control }

{ Magnetic control means }

{ Mechanical discharge control means }

{ Vessel }

{ Gas supply means }

{ Treating multiple sides of workpieces, e.g. 3D }

{ Treating interior parts of workpieces }

{ Treating multiple sides of workpieces, e.g. 3D workpieces }

{ Plasma immersion ion implantation }

{ Arrangement for selecting ions or species in the plasma }

{ Constructional details of the reactor }

{ Gas supply means }

{ Gas control, e.g. control of the gas flow }

{ Vessel }

{ Material }

{ characterised by the means for protecting vessels or internal parts, e.g. coatings }

{ Means for reducing recombination coefficient }

{ Means for protecting the vessel against plasma }

{ Means for preventing sputtering of the vessel }

{ Sealing means, e.g. sealing between different parts of the vessel }

{ Temperature }

{ Electrodes }

{ Shape }

{ Material }

{ Protection means, e.g. coatings }

{ Relative arrangement or disposition of electrodes; moving means }

{ Electrical connecting means }

{ Triode systems }

{ Hollow cathodes }

{ Removable or replaceable electrodes or electrode systems }

{ Consumable cathodes for arc discharge }

{ Mechanical discharge control means }

{ Baffles }

{ Focus rings }

{ Shields, e.g. dark space shields, Faraday shields }

{ Magnetic control means }

{ Particular magnets or magnet arrangements for controlling the discharge }

{ Electron cyclotron resonance }

{ Multi-cusp fields }

{ Electrostatic control }

{ Polarising the substrate }

{ Workpiece holder }

{ Temperature }

{ Means for moving the material to be treated }

{ for introducing the material into processing chamber }

{ for moving the material across the discharge }

{ Continuous moving }

{ [of continuous material] }

{ [of batches of workpieces] }

{ for extracting the material from the process chamber }

{ [Further details of plasma apparatus not provided for in groups
H01J 37/3244 - H01J 37/3278; special provisions for cleaning or maintenance of the apparatus] }

{ Construction (includes replacing parts of the apparatus) }

{ Pressure }

{ Working under atmospheric pressure or higher }

{ Exhausting }

{ [Treating effluent gases] }

{ [Hygiene] }

{ [In situ cleaning of vessels and/or internal parts] }

{ Means for trapping or directing unwanted particles }

{ Maintenance }

{ Connection or combination with other apparatus }

{ Multiple chambers, e.g. cluster tools }

{ [Utilities] }

{ [Gas analysis] }

{ Feedback systems }

{ operating with cathodic sputtering (H01J 37/36 takes precedence ; methods of cathodic sputtering C23C 14/34) }

{ using supplementary magnetic fields }

{ Magnetron sputtering }

{ Planar magnetron sputtering }

{ Constructional aspects of the reactor }

{ Targets }

{ Arrangements }

{ [Hollow targets] }

{ [Shape] }

{ [Material] }

{ [Plural materials] }

{ [Target-material dispenser] }

{ [Target holders (includes backing plates and endblocks)] }

{ [Electrodes other than cathode] }

{ [Dark space shields] }
Discharge tubes for evacuation by diffusion of ions

Discharge tubes for measuring pressure of introduced gas (or for detecting presence of gas); Discharge tubes for evacuation by diffusion of ions

Discharge tubes for measuring pressure of introduced gas (or for detecting presence of gas) with ionisation by means of thermionic cathodes

Discharge tubes for measuring pressure of introduced gas (or for detecting presence of gas) with ionisation by means of cold cathodes

Discharge tubes for measuring pressure of introduced gas (or for detecting presence of gas) with ionisation by means of radioactive substances, e.g. alpha-trons

Discharge tubes for measuring pressure of introduced gas (or for detecting presence of gas) of particle spectrometer type (particle spectrometers per se)

Discharge tubes for evacuating by diffusion of ions, e.g. ion pumps, getter ion pumps

Discharge tubes for measuring pressure of introduced gas using thermionic cathodes

Discharge tubes for measuring pressure of introduced gas using gettering substances

Secondary-emission tubes; Electron-multiplier tubes (dynamic electron-multiplier tubes H01J 25/76; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)

Tubes in which one or a few electrodes are secondary-electron emitting electrodes

Electrode arrangements

Cathode arrangements (photo-emissive electrodes H01J 1/34, H01J 1/35; construction of photo cathodes H01J 40/06, H01J 40/16, H01J 47/00, H01J 49/08)

Dyodes (H01J 43/24, H01J 43/26 take precedence; secondary-electron-emitting electrodes in general H01J 1/32)

Anode arrangements

Control of electron beam by magnetic field

Electrode arrangements using essentially one dynode

Electrode arrangements using essentially more than one dynode

Dyodes consisting of sheet material, e.g. plane, bent

Dyodes consisting of electron-permeable material, e.g. foil, grid, tube, venetian blind

Dyodes having potential gradient along their surfaces

Dyodes consisting of a piling-up of channel-type dynode plates

Microchannel plates [MCP] (image amplification tubes using MCP H01J 31/507)

Box dyodes

Vessels [wall of the tube]; Windows; Screens; Suppressing undesired discharges or currents

Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

Discharge tubes functioning as thermionic generators [structural combination of fuel element with thermodielectric element G21C 3/40; nuclear power plants using thermodielectric converters G21D 7/04; structural combination of a radioactive source with a thermionic converter, e.g. radioisotope batteries G21H 1/10; generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom H02N 3/00]
47/00  Tubes for determining the presence, intensity, density or energy of radiation or particles
((discharge tubes using igniting by associated radioactive materials or fillings, e.g. current stabilising tubes H01J 17/52); photoelectric discharge tubes not involving the ionisation of a gas H01J 40/00; discharge tubes for measuring the pressure, partial pressure of introduced gas or for detecting presence of gas H01J 41/02; ionisation chambers using a solid dielectric G01T 3/008))

47/001  [Details]
47/002  . . . (Vessels or containers)
47/003  . . . (using tissue-equivalent materials)
47/004  . . . (Windows permeable to X-rays, gamma-rays, or particles (windows for discharge tubes with provision for emergence of electrons or ions from the vessel H01J 33/04; windows for X-ray tubes H01J 35/18))
47/005  . . . (Gas fillings (H01J 47/12 takes precedence); Maintaining the desired pressure within the tube)
47/006  . . . (Tissue equivalent gas fillings)
47/007  . . . (Flash detectors)
47/008  . . . (Drift detectors)
47/009  . . . (Ionisation chambers)
47/010  . . . (Calibration thereof)
47/012  . . . (Well-type ionisation chambers)
47/014  . . . (Gas flow ionisation chambers)
47/016  . . . (using a liquid dielectric)
47/017  . . . (Capacitive ionisation chambers, e.g. the electrodes of which are used as electrometers)
47/018  . . . (Proportional counter tubes)
47/020  . . . (Well-type counter tubes)
47/022  . . . (Well-type proportional counter tubes)
47/023  . . . (Gas flow proportional counter tubes)
47/025  . . . (Geiger-Müller counter tubes (gas filling with very short deionisation times H01J 17/64, H01T))
47/027  . . (Spark counters (H01J 47/14 takes precedence; spark gaps H01T))
47/12  . . . (Neutron detector tubes, e.g. BF₃ tubes)
47/1205  . . . (using nuclear reactions of the type (n, alpha)
in solid materials, e.g. Boron-10 (n, alpha) Hydrogen-3)
47/1211  . . . (Ionisation chambers)
47/1216  . . . (Gamma compensated)
47/1222  . . . (Proportional counters)
47/1227  . . . (Fission detectors)
47/1233  . . . (Ionisation chambers)
47/1238  . . . (Counters)
47/1244  . . . (Multiwire counters)
47/125  . . . (Helium ionisation detectors)
47/1255  . . . (Ionisation chambers)
47/1261  . . . (Counters)
47/1266  . . . (Multi-wire counters)
47/1272  . . . (BF₃ tubes)
47/1277  . . . (Light-nuclei-recoil ionisation detectors, e.g. using protons, alpha-particles)
47/1283  . . . (Ionisation chambers)
47/1288  . . . (Counters)
47/1294  . . . (Multi-wire counters)

47/14  . Parallel electrode spark or streamer chambers; Wire spark or streamer chambers (circuit arrangements with multi-wire or parallel-plate chambers for recording of movements or tracks of particles G01T 5/12)
47/16  . characterised by readout of each individual wire
47/18  . the readout being electrical (H01J 47/20 takes precedence)
47/20  . the readout employing electrical or mechanical delay lines, e.g. magnetostriuctive delay lines
47/22  . characterised by another type of readout
47/24  . the readout being acoustical
47/26  . the readout being optical

49/00  Particle spectrometers or separator tubes

NOTE
In classifying particle separators, no distinction is made between spectrometry and spectrography, the difference being only in the manner of detection which in the first case is electrical and in the second case is by means of a photographic film.

49/0004  . (Imaging particle spectrometry)
49/0009  . (Calibration of the apparatus)
49/0013  . (Miniaturised spectrometers, e.g. having smaller than usual scale, integrated conventional components)
49/0018  . (Microminiaturised spectrometers, e.g. chip-integrated devices, MicroElectro-Mechanical Systems [MEMS])
49/0022  . (Portable spectrometers, e.g. devices comprising independent power supply, constructional details relating to portability (small scale devices per se H01J 49/0013 and H01J 49/0018))
49/0027  . (Methods for using particle spectrometers)
49/0031  . (Step by step routines describing the use of the apparatus (H01J 49/0081 takes precedence)
49/0036  . (Step by step routines describing the handling of the data generated during a measurement (recongising patterns in signals G06K 9/00496)
49/0004  . (Combinations of spectrometers, tandem spectrometers, e.g. MS/MS, MSn)
49/0045  . (characterised by the fragmentation or tandem of other specific reaction)
49/0005  . (by collision with gas, e.g. by introducing gas or by accelerating ions with an electric field)
49/0054  . (by an electron beam, e.g. electron impact dissociation, electron capture dissociation)
49/0059  . (by a photon beam, photo-dissociation)
49/0063  . (by applying a resonant excitation voltage)
49/0068  . (by collision with a surface, e.g. surface induced dissociation)
49/0072  . (by ion/ion reaction, e.g. electron transfer dissociation, proton transfer dissociation)
49/0077  . (specific reactions other than fragmentation)
49/0081  . [Tandem in time, i.e. using a single spectrometer]
49/0086  . (Accelerator mass spectrometers)
49/0099  . (Spectrometers having multiple channels, parallel analysis)
49/0095  . (Particular arrangements for generating, introducing or analyzing both positive and negative analyte ions (ion/ion reactions H01J 49/0072))
49/02  . Details
Electron- or ion-optical arrangements
or ion-optical components

Arrangements for external adjustment of electron-samples to be analysed, e.g. vacuum locks;
Arrangements for introducing or extracting spectrometers (data acquisition H01J 49/0036; detectors per se G01T, e.g. G01T 1/28, G01T 1/29)
[detected image current induced by the movement of charged particles (H01J 49/38 takes precedence)]

Arrangements for introducing or extracting samples to be analysed, e.g. vacuum locks;
Arrangements for external adjustment of electron-
or ion-optical components

[Capillaries used for transferring samples or ions (electrospray nozzles H01J 49/167)]

[Sample holders or containers (containers for retaining a material to be analyzed, B01L 1/30, for DNA, C12Q 1/68, for biological materials, G01N 33/54)]

(for automated handling)

(for laser desorption, e.g. matrix-assisted laser desorption/ionisation [MALDI], surface enhanced laser desorption/ionisation [SELDI] plates)

(gaseous samples (interfaces to gas chromatographs G01N 30/7206))

(using a membrane permeable to gases)

(for liquid samples (interfaces to liquid chromatographs G01N 30/7233))

(using a membrane permeable to liquids)

(with means for preventing droplets from entering the analyzer; Desolvation of droplets)

(with means for introducing as a spray, a jet or an aerosol (electrospray ion sources H01J 49/165))

(with means for using a nebulising gas, i.e. pneumatically assisted)

(with means for vaporising using mechanical energy, e.g. by ultrasonic vibrations)

(for solid samples)

(Desorption by laser or particle beam, followed by ionisation as a separate step (sample holder per se H01J 49/0418))

(with means for heating or cooling the sample)

(with means for pyrolysis)

(using a hot fluid)

(with means for collisional cooling)

(with means for monitoring the sample temperature)

(with means for applying heat to desorb the sample; Evaporation)

(Vacuum locks; Valves (valves per se F16K))

(Electron- or ion-optical arrangements)

(Ion deflecting means, e.g. ion gates)

(Ion guides (linear ion traps performing mass selection H01J 49/4225, mass filters H01J 49/421))

(Multipole ion guides, e.g. quadrupoles, hexapoles)

(having stacked electrodes, e.g. ring stack, plate stack)

(Ion lenses, apertures, skimmers)

([Mounting, supporting, spacing, or insulating electrodes]

(Electron sources, e.g. for generating photo-electrons, secondary electrons or Auger electrons)

(Ion sources; Ion guns)

(using reflex discharge, e.g. Penning ion sources)

(using high-frequency excitation, e.g. microwave excitation, Inductively Coupled Plasma [ICP])

{Arrangements for using several ion sources}

(using an arc discharge, e.g. of the duoplasmatron type)

(Duoplasmatrons)

(Other arc discharge ion sources using an applied magnetic field)

(using particle bombardment, e.g. ionisation chambers)

(using a solid target which is not previously vapourised)

(using chemical ionisation)

(with electrons, e.g. electron impact ionisation, electron attachment (H01J 49/145 takes precedence))

(using surface ionisation, e.g. field-, thermionic- or photo-emission)

(using photoionisation, e.g. by laser)

(Direct photo-ionisation, e.g. single photon or multi-photon ionisation)

(Laser desorption/ionisation, e.g. matrix-assisted laser desorption/ionisation [MALDI] (sample holders H01J 49/0418))

(Electrospray ionisation)

(Capillaries and nozzles specially adapted therefor; (electrostatic spraying per se B05B 5/00))

(field ionisation, e.g. corona discharge (atmospheric pressure corona discharge per se H01T 19/00))

(using spark ionisation)

(Magnetic deflection)

(Electrostatic deflection)

(Vacuum systems, e.g. maintaining desired pressures)

(Mass spectrometers or separator tubes (isotope separation using these tubes B01D 59/44)

(Static spectrometers)

(using electrostatic and magnetic sectors with simple focusing, e.g. with parallel fields such as Aston spectrometer)

(with energy analysis, e.g. Castaing filter (in cathode-ray or electron-beam tubes H01J 29/84; electron-or ion-optical arrangements for separating electrons or ions from an analysing or processing beam H01J 37/05; micro- or spot-analysing tubes H01J 37/252))
Discharge lamps

61/00 Gas- or vapour-discharge lamps (use for sterilising milk products A23C; use for medical purposes A61N 5/00; use for disinfecting water C02F; use for lighting P21; [use for advertising G09F]; circuits therefor H05B; arc lamps with consumable electrodes H05B; electroluminescent lamps H05B)

61/02 Details
61/025 [Associated optical elements]
61/04 Electrodes (for igniting H01J 61/54); Screens; Shields
61/045 [Thermic screens or reflectors (heat-reflecting coatings on the wall of the vessel H01J 61/35)]
61/06 Main electrodes
61/067 . . . for low-pressure discharge lamps
61/0672 . . . [characterised by the construction of the electrode]
61/0675 . . . [characterised by the material of the electrode]
61/0677 . . . [characterised by the electron emissive material]
61/073 . . . for high-pressure discharge lamps
61/0732 . . . [characterised by the construction of the electrode]
61/0735 . . . [characterised by the material of the electrode]
61/0737 . . . [characterised by the electron emissive material]
61/09 . . . Hollow cathodes
61/10 . . . Shields, screens, or guides for influencing the discharge
61/103 . . . (Shields, screens or guides arranged to extend the discharge path H01J 61/106 takes precedence)
61/106 . . . [using magnetic means]
Discharge lamps

61/12 . . . Selection of substances for gas fillings; Specified operating pressure or temperature
61/125 . . . [having an halogenide as principal component]
61/14 . . . having one or more carbon compounds as the principal constituents
61/16 . . . having helium, argon, neon, krypton, or xenon as the principle constituent
61/18 . . . mercury vapour
61/20 . . . vapour of an alkali metal
61/22 . . . Vessels; Containers
61/24 . . . Means for obtaining or maintaining the desired pressure within the vessel
61/26 . . . Means for absorbing or adsorbing gas, e.g. by gettering; Means for preventing blackening of the envelope
61/28 . . . Means for producing, introducing, or replenishing gas or vapour during operation of the lamp
61/30 . . . {Seals for leading-in conductors; Sealing-in conductors}
61/302 . . . [characterised by the material of the vessel]
61/305 . . . [Flat vessels or containers]
61/307 . . . [with folded elongated discharge path]
61/32 . . . Special longitudinal shape, e.g. for advertising purposes ([H01J 61/305 takes precedence])
61/322 . . . [Circular lamps]
61/325 . . . [U-shaped lamps]
61/327 . . . ["Compact"-lamps, i.e. lamps having a folded discharge path]
61/33 . . . Special shape of cross-section, e.g. for producing cool spot
61/34 . . . Double-wall vessels or containers
61/35 . . . provided with coatings on the walls thereof; Selection of materials for the coatings (using coloured coatings H01J 61/40; using luminescent coatings H01J 61/42)
61/36 . . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
61/361 . . . [Seals between parts of vessel]
61/363 . . . [End-disc seals or plug seals]
61/365 . . . [Annular seals disposed between the ends of the vessel (H01J 61/363 takes precedence)]
61/366 . . . [Seals for leading-in conductors]
61/368 . . . [Pinched seals or analogous seals]
61/38 . . . Devices for influencing the colour or wavelength of the light
61/40 . . . by light filters; by coloured coatings in or on the envelope
61/42 . . . by transforming the wavelength of the light by luminescence
61/44 . . . Devices characterised by the luminescent material (luminescent materials C09K 11/00)
61/46 . . . Devices characterised by the binder or other non-luminescent constituent of the luminescent material, e.g. for obtaining desired pouring or drying properties
61/48 . . . Separate coatings of different luminous materials
61/50 . . . Auxiliary parts or solid material within the envelope for reducing risk of explosion upon breakage of the envelope, e.g. for use in mines
61/52 . . . Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space ([having an halogenide as principal component] H01J 61/541)
61/523 . . . [having an auxiliary electrode outside the vessel] (H01J 61/542 takes precedence)
61/526 . . . [having an auxiliary electrode inside the vessel] (H01J 61/544 takes precedence)
61/54 . . . Igniting arrangements, e.g. promoting ionisation for starting (circuit arrangements H05B)
61/541 . . . [using a bimetal switch]
61/542 . . . [using radioactive means to promote ionisation]
61/544 . . . [using an auxiliary electrode inside the vessel (H01J 61/542 takes precedence)]
61/545 . . . [using an auxiliary electrode outside the vessel (H01J 61/544 takes precedence)]
61/547 . . . [using an auxiliary electrode outside the vessel (H01J 61/542 takes precedence)]
61/548 . . . [using radioactive means to promote ionisation]
61/56 . . . One or more circuit elements structurally associated with the lamp
61/58 . . . Lamps with both liquid anode and liquid cathode
61/60 . . . Lamps in which the discharge space is substantially filled with mercury before ignition
61/62 . . . Lamps with gaseous cathode, e.g. plasma cathode
61/64 . . . Cathode glow lamps (designed as tuning or voltage indicators H01J 17/40)
61/66 . . . having one or more specially shaped cathodes, e.g. for advertising purposes [alphabetumeric]
61/68 . . . Lamps in which the main discharge is between parts of a current-carrying guide, e.g. halo lamp
61/70 . . . Lamps with low-pressure unconstricted discharge [having a cold pressure < 400 Torr]
61/72 . . . having a main light-emitting filling of easily vapourisable metal vapour, e.g. mercury
61/74 . . . having a main light-emitting filling of difficult vapourisable metal vapour, e.g. sodium
61/76 . . . having a filling of permanent gas or gases only
61/78 . . . with cold cathode; with cathode heated only by discharge, e.g. high-tension lamp for advertising
61/80 . . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/82 . . . Lamps with high-pressure unconstricted discharge [having a cold pressure > 400 Torr]
61/822 . . . [High-pressure mercury lamps]
61/825 . . . [High-pressure sodium lamps]
61/827 . . . [Metal halide arc lamps]
61/84 . . . Lamps with discharge constricted by high pressure
61/86 . . . with discharge additionally constricted by close spacing of electrodes, e.g. for optical projection
61/88 . . . with discharge additionally constricted by envelope
61/90 . . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/92 . . . Lamps with more than one main discharge path
61/94 . . . Paths producing light of different wavelengths, e.g. for simulating daylight
61/95 . . . Lamps with control electrode for varying intensity or wavelength of the light, e.g. for producing modulated light
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Discharge lamps

61/96  Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope, e.g. for simulating daylight
61/98  Lamps with closely spaced electrodes heated to incandescence by light-emitting discharge, e.g. tungsten arc lamp

63/00  Cathode-ray or electron-stream lamps (flying-spot tubes H01J 31/10; magic-eye tuning indicators H01J 31/14; lamps with incandescent body heated by the ray or stream H01K  see also H01J 29/00)

63/02  Details, e.g. electrode, gas filling, shape of vessel
63/04  Vessels provided with luminescent coatings; Selection of materials for the coatings
63/06  Lamps with luminescent screen excited by the ray or stream
63/08  Lamps with gas plasma excited by the ray or stream

65/00  Lamps without any electrode inside the vessel; Lamps with at least one main electrode outside the vessel

65/04  Lamps in which a gas filling is excited to luminesce by an external electromagnetic field or by external corpuscular radiation, e.g. for indicating plasma display panels

65/06  Lamps in which a gas filling is excited to luminesce by radioactive material structurally associated with the lamp, e.g. inside the vessel
65/08  Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel (direct conversion of radiation energy from radioactive sources into light G21H 3002)

99/00  Subject matter not provided for in other groups of this subclass

2201/00  Electrodes common to discharge tubes

2201/02  Arrangements for eliminating deleterious effects
2201/025  charging
2201/19  Thermionic cathodes
2201/193  Thin film cathodes
2201/196  Emission assisted by other physical processes, e.g. field- or photo emission
2201/28  Heaters for thermionic cathodes
2201/2803  Characterised by the shape or size
2201/2807  Block
2201/281  Cage-like construction
2201/2814  being a mesh-like network
2201/2817  Rods
2201/2821  Envelope or cross-section
2201/2825  being oval or elliptic
2201/2828  being rectangular or square
2201/2832  being circular
2201/2835  Folded
2201/2839  Hair-pin or simple bend
2201/2842  Conic

2201/2864  Ribbon or bar
2201/2867  Spiral or helix
2201/2871  being flattened
2201/2875  being double, reverse helix or interwoven
2201/2878  Thin film or film-like
2201/2882  Variable winding density
2201/2885  Twisted
2201/2889  Characterised by material
2201/2892  Coatings
2201/2896  Insulating layers
2201/30  Cold cathodes
2201/304  Field emission cathodes
2201/30403  Characterised by the emitter shape
2201/30407  Microengineered point emitters
2201/30411  Conical shaped, e.g. Spindt type
2201/30415  Needle shaped
2201/30419  Pillar shaped emitters
2201/30423  Microengineered edge emitters
2201/30426  Coatings on the emitter surface, e.g. with low work function materials
2201/3043  Fibres
2201/30434  Nanotubes
2201/30438  Particles
2201/30442  Whiskers
2201/30446  Characterised by the emitter material
2201/30449  Metals and metal alloys
2201/30453  Carbon types
2201/30457  Diamond
2201/30461  Graphite
2201/30465  Fullerences
2201/30469  Carbon nanotubes (CNTs)
2201/30473  Amorphous carbon
2201/30476  Diamond-like carbon [DLC]
2201/3048  Semiconductor materials
2201/30484  Carbides
2201/30488  Nitrides
2201/30492  Borides
2201/30496  Oxides
2201/3056  Ferroelectric cathodes
2201/3058  Semiconductor cathodes, e.g. having PN junction layers
2201/312  Having an electric field perpendicular to the surface thereof
2201/3125  Metal-insulator-Metal [MIM] emission type cathodes
2201/316  Having an electric field parallel to the surface thereof, e.g. thin film cathodes
2201/3165  Surface conduction emission type cathodes
2201/317  Combined with other synergetic effects, e.g. secondary, photo- or thermal emission
2201/319  Circuit elements associated with the emitters by direct integration
2201/3195  Resistive members, e.g. resistive layers
2201/32  Secondary emission electrodes
2201/34  Photoemissive electrodes
2201/342  Cathodes
2201/3421  Composition of the emitting surface
2209/00 Electron or ion optical arrangements common to discharge tubes or lamps

2209/02 Electron guns
2209/0204 using cold cathodes, e.g. field emission cathodes
2209/0208 Control electrodes
2209/0212 Gate electrodes
2209/0216 characterised by the form or structure
2209/022 Shapes or dimensions of gate openings
2209/0224 Arrangement of gate openings
2209/0228 Curved/extending upwardly
2209/0232 characterised by the material
2209/0236 Relative position to the emitters, cathodes or substrates
2209/024 Focusing electrodes
2209/0244 characterised by the form or structure
2209/0248 Shapes or dimensions of focusing electrode openings
2209/0252 Arrangement of focusing electrode openings
2209/0256 characterised by the material
2209/026 Relative position to the gate electrodes, emitters, cathodes or substrates
2209/0264 In the same plane as the gate electrodes or cathodes
2209/0268 Insulation layer
2209/0272 for gate electrodes
2209/0276 for focusing electrodes
2209/028 characterised by the shape
2209/0284 Dimensions of openings
2209/0288 characterised by the material
2209/0292 Potentials applied to the electrodes
2209/0296 Spin-polarised beams
2209/034 Ion guns

2209/00 Apparatus and processes for manufacture of discharge tubes

2209/01 Generalised techniques
2209/012 Coating
2209/015 Machines therefor
2209/017 Cleaning
2209/02 Manufacture of cathodes
2209/022 Cold cathodes
2209/0223 Field emission cathodes
2209/0226 Sharpening or resharpening of emitting point or edge
2209/018 Assembling together the component parts of the discharge tube
2209/0185 Machines therefor, e.g. electron gun assembling devices
2209/0236 Manufacture of magnetic deflecting devices
2209/02363 Coils
2209/02366 Machines therefor, e.g. winding, forming, welding, or the like
2209/026 Sealing parts of the vessel to provide a vacuum enclosure
2209/0261 Apparatus used for sealing vessels, e.g. furnaces, machines or the like
2209/0262 means for applying sealing materials, e.g. frit paste dispensers
2209/0264 Materials for sealing vessels, e.g. frit glass compounds, resins or structures
2209/0265 Surfaces for sealing vessels
2209/0267 shaped surfaces or flanges
2209/0268 treated surfaces and surface preparations, e.g. to improve adhesion
2209/0269 Control of maintenance of pressure in the vessel
2209/0283 Vacuum pumps
2209/0285 Gettering
2209/02855 Getter materials
2209/0287 Gas filling
2209/0289 Degasting
2209/02893 by a discharge
2209/02896 by heating
2209/0296 Handling of tube components during manufacture
2209/02963 Identifying or selecting component pieces
2209/02966 Marking, e.g. bar-codes

2211/00 Plasma display panels with alternate current induction of the discharge, e.g. AC-PDPs

2211/00 Plasma display panels with alternating current induction of the discharge, e.g. AC-PDPs

2211/10 AC-PDPs with at least one main electrode being out of contact with the plasma
2211/12 with main electrodes provided on both sides of the discharge space
2211/14 with main electrodes provided only on one side of the discharge space
2211/16 with main electrodes provided inside or on the side face of the spacers
2211/18 containing a plurality of independent closed structures for containing the gas, e.g. plasma tube array (PFA) display panels
2211/20 Constructional details
2211/22 Electrodes
2211/225 Material of electrodes
2211/24 Sustain electrodes or scan electrodes
2211/245 Shape, e.g. cross section or pattern
2211/26 Address electrodes
2211/265 Shape, e.g. cross section or pattern
2211/28 Auxiliary electrodes, e.g. priming electrodes or trigger electrodes
2211/30 Floating electrodes
2211/32 Disposition of the electrodes
2211/323 Mutual disposition of electrodes
2211/326 Disposition of electrodes with respect to cell parameters (H011 2211/323 takes precedence), e.g. electrodes within the ribs
2211/34 Vessels, containers or parts thereof, e.g. substrates
2211/36 Spacers, barriers, ribs, partitions or the like
2211/361 characterized by the shape
2211/363 Cross section of the spacers
2211/365 Pattern of the spacers
2211/366 characterized by the material
2211/368 Dummy spacers, e.g. in a non display region
2211/38 Dielectric or insulating layers
2211/40 Layers for protecting or enhancing the electron emission, e.g. MgO layers
2211/42 Fluorescent layers
2217/44 . . . Optical arrangements or shielding arrangements, e.g. filters or lenses
2217/442 . . . Light reflecting means; Anti-reflection means
2217/444 . . . Means for improving contrast or colour purity, e.g. black matrix or light shielding means
2217/446 . . . Electromagnetic shielding means; Antistatic means
2217/448 . . . Near infrared shielding means
2217/46 . . . Connecting or feeding means, e.g. leading-in conductors
2217/48 . . . Sealing, e.g. seals specially adapted for leading-in conductors
2217/50 . . . Filling, e.g. selection of gas mixture
2217/52 . . . Means for absorbing or adsorbing the gas mixture, e.g. by gettering
2217/54 . . . Means for exhausting the gas
2217/62 . . . Circuit arrangements (circuits or methods for driving PDP's G09G 3/28)
2217/66 . . . Cooling arrangements (cooling or supporting means not being part of the tube H05K)

2217/00 Gas-filled discharge tubes (H01J 2211/00 takes precedence)
2217/04 . . . Electrodes (for display panels not making use of alternating current H01J 2217/492; for discharge tubes in general H01J 2201/00)
2217/06 . . . Cathodes
2217/062 . . . thermionic
2217/065 . . . heated by the discharge
2217/067 . . . Cold cathodes
2217/10 . . . Anodes
2217/12 . . . Control electrodes
2217/38 . . . Cold-cathode tubes
2217/40 . . . Gas discharge switches
2217/402 . . . Multiple switches
2217/4025 . . . for addressing electro-optical devices, i.e. LCD's
2217/409 . . . Display panels, e.g. not making use of alternating current (H01J 2217/10 takes precedence)
2217/4091 . . . characterised by problems peculiar to plasma displays
2217/415 . . . Luminosity
2217/492 . . . Details
2217/49207 . . . Electrodes
2217/49214 . . . Shape
2217/49221 . . . Mutual disposition
2217/49228 . . . Crossed electrodes
2217/49235 . . . Side-by-side electrodes
2217/49242 . . . Auxiliary electrodes
2217/4925 . . . Mounting, supporting, spacing
2217/49257 . . . Means for isolating electrodes from the discharge, e.g. dielectric layers
2217/49264 . . . Vessels
2217/49271 . . . Spacers between front and back panels
2217/49278 . . . Coatings (H01J 2217/49292 takes precedence)
2217/49285 . . . Associated optical means (combined with electromagnetic screens H01J 2217/49292)
2217/49292 . . . Filters
2217/494 . . . A.C. panels
2217/498 . . . Hybrid panels (AC and DC)

2217/05 . . . LCD's for addressing electro-optical devices, i.e. matrices
2217/065 . . . Means for preventing wave energy leakage
2217/067 . . . Means for isolating electrodes from the discharge
2217/069 . . . Mounting, supporting, spacing
2217/075 . . . Spacers between front and back panels
2217/08 . . . Means for isolating electrodes from the discharge
2217/087 . . . Vessels
2217/0873 . . . Means for preventing wave energy leakage
2217/0876 . . . Means for isolating electrodes from the discharge
2217/09 . . . Details of transit-time tubes of the types covered by group H01J 2225/00
2217/095 . . . Details of transit-time tubes of the types covered by group H01J 2225/00
2217/10 . . . Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path
2217/105 . . . Means for preventing wave energy leakage
2217/11 . . . Means for reducing noise
2217/12 . . . Vessels; Containers
2217/14 . . . Leading-in arrangements; Seals therefor
2217/15 . . . Means for preventing wave energy leakage
2217/16 . . . Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge
2217/165 . . . Manufacturing processes or apparatus therefore
2217/18 . . . Resonators
2217/20 . . . Cavity resonators; Adjustment or tuning thereof
2217/207 . . . Tuning of single resonator
2217/213 . . . Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron
2217/22 . . . Connections between resonators, e.g. strapping for connecting resonators of a magnetron
2217/24 . . . Slow-wave structures, e.g. delay systems
2217/26 . . . Helical slow-wave structures; Adjustment thereof
2217/27 . . . Helix-derived slow-wave structures
2217/28 . . . Interdigital slow-wave structures; Adjustment thereof
2217/30 . . . Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations
2217/34 . . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
2217/36 . . . Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy
2217/38 . . . to or from the discharge
Transit-time tubes, e.g. Klystrons, travelling-wave tubes, magnetrons

- Gas-filled transit-time tubes
- Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving up energy in an inducing zone, the zones being associated with one or more resonators
- with an electron stream following a helical path
- Tubes having one or more resonators, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly density modulation, e.g. Heaff tube
- Tubes having only one resonator, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly velocity modulation, e.g. Lüdi-Klystron
- with electron stream perpendicular to the axis of the resonator
- Klystrons, i.e. tubes having two or more resonators, without reflection of the electron stream, and in which the stream is modulated mainly by velocity in the zone of the input resonator
- Extended interaction Klystrons
- with pencil-like electron stream in the axis of the resonators
- with tube-like electron stream coaxial with the axis of the resonators
- with pencil-like electron stream perpendicular to the axis of the resonators
- with radial or disc-like electron stream perpendicular to the axis of the resonators
- having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube
- Reflex Klystrons, i.e. tubes having one or more resonators, with a single reflection of the electron stream, and in which the stream is modulated mainly by velocity in the modulator zone
- in which the electron stream is in the axis of the resonator or resonators and is pencil-like before reflection
- in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection
- in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection
- . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is radial or disc-like before reflection
- Tubes with plural reflection, e.g. Coeterier tube
- Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps
- Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without magnet system producing an H-field crossing the E-field
- the forward travelling wave being utilised
- the backward travelling wave being utilised
- Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and with a magnet system producing an H-field crossing the E-field
- . . . the forward travelling wave being utilised
- . . . the backward travelling wave being utilised
- Tubes using the parametric principle, e.g. for parametric amplification
- Magnetrons, i.e. tubes with a magnet system producing an H-field crossing the E-field
- with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode
- having only one cavity or other resonator, e.g. neutrode tube
- Coaxial cavity magnetrons
- with interdigital arrangements of anodes, e.g. turbator tube
- having a number of resonators; having a composite resonator, e.g. a helix
- Multi-cavity magnetrons
- Rising-sun magnetrons
- with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons
- Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section
- Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection
- Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action
- Tubes with electron stream crossing itself and field and functioning with reversed cyclotron action
- the backward travelling wave being utilised
- the forward travelling wave being utilised
- Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators
- with resonator having distributed inductance with capacitance, e.g. Pintsch tube
- in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube
- Tubes specially designed to act as transit-time diode oscillators, e.g. monotron
- Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor
Tubes with electron stream modulated by deflection in a resonator

Elimination of unwanted or stray electromagnetic effects

Preventing or cancelling fields leaving the enclosure

Passive means

Preventing or cancelling fields entering the enclosure

Active means

Preventing or cancelling fields within the enclosure

Demagnetisation

Cooling arrangements

Active means, e.g. fluid flow

applied to the faceplate

Translucent coolant, e.g. flowing across faceplate

Passive means, e.g. fins, heat conductors

Shadow masks

Mounting arrangement of assembly to vessel

Spring and plate (clip) type

Mounting arrangements of aperture plate to frame or vessel

Frame

Aperture plate

characterised by the material

Mitigating undesirable mechanical effects

Vibrations

Beam passing apertures, e.g. geometrical arrangements

characterised by aperture shape

Uniaxial masks having parallel slit apertures, i.e. Trinitron type

Details of skirt or border

Apertures, cut-outs, depressions, or the like

Coatings

improving thermal radiation properties

Parameterised dimensions of aperture plate, e.g. relationships, polynomial expressions

Geometrical arrangements, e.g. curvature

Phosphor screens

multi-layer

Geometrical arrangement of phosphors

Electron guns

Electrodes

Shield centering cups

Focusing electrodes

Pre-focusing

Accelerating electrodes

Extraction grids

Constructional arrangements of electrodes

Electrodes formed on surface of common cylindrical support

Electrode supports

Electrical arrangements coupled to electrodes, e.g. potentials

characterised by the potentials applied

Dynamic potentials

characterised by beam passing apertures or combinations

Aperture shape as viewed along beam axis

trapezoidal

with rounded end or ends

parallellogram

square

rectangle

with rounded end or ends

circular

oval

non-symmetric about field scanning axis

non-symmetric about line scanning axis

polygonal

cross shaped

Interconnected apertures

complex and not provided for

Three beam guns, e.g. for colour CRTs

Arrays

Multi-beam groups, e.g. number of beams greater than number of cathodes

Correction of beam optics

Aberrations by type

Spherical

Astigmatism

Colour purity

using supplementary correction devices

magnetic

Permanently magnetised materials, e.g. permanent magnets

Magnetic materials, e.g. soft iron

Cross-arms field shaper

Auxiliary coils

Velocity modulation

Electron beam control inside the vessel

by magnetic means

by electrostatic means

at the source

cooperating with the electron gun

at the screen

between the source and the screen

Electron beam control outside the vessel

by magnetic fields

Cores for field producing elements, e.g. ferrite

Conductor design and distribution

Winding

Wires and conductors

Form of conductor

flat, e.g. foil, or ribbon type

Coil separators and formers

Vessels and containers

Neck or cone portions of the CRT vessel

characterised by the shape

Non circular cross-sections

Faceplates

characterised by shape

Parameterised shape, e.g. expression, relationship or equation

Substrates

Frames

Passive shielding means associated with the vessel
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2231/2020

Coatings

2231/2020.01

characterised by the material

2231/2020.02

Meshes and patterns

2231/2020.03

Magnetic shielding

2231/2020.04

Antistatic shielding

2231/2020.05

Electromagnetic shielding

2231/2020.06

Mechanical shielding, e.g. against water or abrasion

2231/2020.07

Ionising radiation shielding, e.g. X-rays

2231/2020.08

Means for avoiding vessel implosion

2231/2020.09

Means substantially covering the output face, e.g. resin layers, protective panels

2231/2020.10

Coatings

2231/2020.11

having particular electrical resistive or conductive properties

2231/2020.12

having particular electrical insulation properties

2231/2020.13

having particular X-ray shielding properties

2231/2020.14

Optical components associated with the vessel

2231/2020.15

Fixing of optical components to the vessel

2231/2020.16

Fibre optic components

2231/2020.17

Direction sensitive devices for controlled viewing angle

2231/2020.18

Image projection devices

2231/2020.19

Baffles, shutters, apertures or the like against external light

2231/2020.20

Large-scale devices, e.g. foldable screens

2231/2020.21

Anti-reflection, anti-glare, viewing angle and contrast improving treatments or devices

2231/2020.22

Surface treatment of vessel or device, e.g. controlled surface roughness

2231/2020.23

inside the vessel

2231/2020.24

by using interference effects

2231/2020.25

Effect varying over surface

2231/2020.26

Apparatus attached to vessel and not integral therewith

2231/2020.27

having particular properties for protecting the vessel, e.g. against abrasion, water or shock

2231/2020.28

Active components, e.g. LCD's, indicators, illuminators and moving devices

2231/2020.29

Laser CRTs

2231/2020.30

using lenses

2231/2020.31

Photographic devices (permanent recording of images)

2231/2020.32

Means providing or assisting electrical connection with or within the tube

2231/2020.33

within the tube

2231/2020.34

associated with the high tension [HT], e.g. anode potentials

2231/2020.35

associated with digital scanning

2231/2020.36

Means for obtaining or maintaining the desired pressure within the tube

2231/2020.37

Circuit elements other than coils, reactors or the like, associated with the tube

2231/2020.38

associated with the HT

2231/2020.39

associated with the deflection system

2231/2020.40

associated with the gun structure

2231/2020.41

Resistors

2231/2020.42

Cathode ray tubes or electron beam tubes

(239J 2229/00 takes precedence)

2231/2020.43

CRTs having luminescent screens

2231/2020.44

Means for indicating the position of the beam, e.g. beam indexing
2237/0435 . . . Means (motors) for driving the target (anode)
2237/0432 . . . mounted within the vacuum vessel
2237/043 . . . characterised by the shape
2237/041 . . . Bearings and bearing contact surfaces
2237/04 . . . Retainers or races
2237/006 . . . Dynamic pressure bearings, e.g. helical groove type
2237/0048 . . . Treated contact surfaces, e.g. coatings
2237/0047 . . . Magnetic bearings
2237/0045 . . . Lubricants
2237/0044 . . . liquid metals
2237/0042 . . . Measures for preventing vibration
2237/004 . . . Coolings
2237/003 . . . of the anode
2237/002 . . . of the bearing assembly
2237/001 . . . of the cathode
2237/00 . . . of the vessel
2237/0006 . . . of the window
2237/0004 . . . characterised by method
2237/0003 . . . employing layers with high emissivity
2237/0002 . . . characterised by the material
2237/0001 . . . Oxides
2237/0000 . . . Bonding layer to substrate
2237/0009 . . . Increasing emissive surface area
2237/0008 . . . with interdigitated fins or slots
2237/0007 . . . with microscopic surface features
2237/0006 . . . Placing objects in close proximity
2237/0005 . . . Circulating fluids
2237/0004 . . . flow being via moving conduit or shaft
2237/0003 . . . Control of flow
2237/0002 . . . characterised by the fluid
2237/0001 . . . Liquid metals
2237/00 . . . in conjunction with extended surfaces (e.g. fins or ridges)
2237/0009 . . . Heat pipes
2237/0008 . . . Thermal conductivity
2237/0007 . . . Contact between conducting bodies
2237/0006 . . . Vessels
2237/0005 . . . Non-stationary vessels
2237/0004 . . . Rotation
2237/0003 . . . shaped for a particular application
2237/0002 . . . Small cross-section, e.g. for entering in a body cavity
2237/0001 . . . Shielding arrangements
2237/00 . . . against electromagnetic radiation
2237/0009 . . . against thermal (heat) energy
2237/0008 . . . against charged particles
2237/0007 . . . Windows, e.g. for X-ray transmission
2237/0006 . . . Multi-layer structures
2237/0005 . . . Arrangements for controlling gases within the X-ray tube
2237/0004 . . . Gettering

**2237/00** Discharge tubes exposing object to beam, e.g. for analysis treatment, etching, imaging

**NOTES**

1. For features of general interest which may be found in other types of discharge tubes, an indexing code corresponding to general schemes H01J 2201/00 - H01J 2203/00 is given, e.g. for cathodes, vessels, cooling means or the like

2. Same rules apply for manufacturing procedures (H01J 2209/00), unless really specific to the tube concerned.

3. The codes in this main group are grouped according to the following principle:
   - details common to gas or plasma discharge of the above mentioned tubes: H01J 2237/00 - H01J 2237/2487
   - Imaging or analysing: H01J 2237/25 - H01J 2237/2857
   - particle beam processing: H01J 2237/30 - H01J 2237/31798
   - plasma processing: H01J 2237/32 - H01J 2237/339

2237/0002 . . . Cooling arrangements (of objects being observed or treated H01J 2237/2001)
2237/0004 . . . Charge control of objects or beams
2237/0001 . . . Neutralising arrangements
2237/0000 . . . Deflection of neutralising particles
2237/0009 . . . of objects being observed or treated
2237/0008 . . . using secondary electrons
2237/0007 . . . using electromagnetic radiations, e.g. UV, X-rays, light
2237/0006 . . . Details of gas supplies, e.g. in an ion source, to a beam line, to a specimen or to a workpiece, (H01J 37/3244 takes precedence; environmental cells for electron microscopes H01J 2237/2003; microscopes with environmental specimen chamber H011 2237/2608)
2237/0005 . . . Details
2237/0004 . . . Protection arrangements
2237/0003 . . . Extinguishing, preventing or controlling unwanted discharges
2237/0002 . . . Avoiding or diminishing effects of eddy currents
2237/0001 . . . Avoiding deleterious effects due to interactions between particles and tube elements
2237/0000 . . . Means for avoiding or correcting vibration effects
2237/0009 . . . Avoiding or removing foreign or contaminating particles, debris or deposits on sample or tube
2237/0008 . . . Detecting or monitoring foreign particles
2237/0007 . . . Moving components not otherwise provided for (diaphragms H01J 2237/0458; objects H01J 2237/202)
2237/0006 . . . Moving whole optical system relatively to object
2237/0005 . . . Shields
2237/0004 . . . electrostatic
2237/0003 . . . magnetic
2237/0002 . . . electromagnetic
2237/0001 . . . Liner tubes
2237/0000 . . . Particle traps
2237/0009 . . . Mounting, supporting, spacing or insulating electrodes
2237/0008 . . . Mounting or supporting
2237/0007 . . . Spacing
2237/0006 . . . Insulating
2237/0005 . . . Means for controlling the discharge
2237/0004 . . . Beam polarising means
2237/0003 . . . Beam blanking
2237/0002 . . . High speed and short duration
2237/0001 . . . Multi-aperture
H01J

2237/0437 . . . Semiconductor substrate
2237/045 . . . Diaphragms
2237/0451 . . . with fixed aperture
2237/0453 . . . multiple apertures
2237/0455 . . . with variable aperture
2237/0456 . . . Supports
2237/0458 . . . movable, i.e. for changing between differently sized apertures
2237/047 . . . Changing particle velocity
2237/0473 . . . accelerating
2237/04732 . . . with magnetic means
2237/04735 . . . with electrostatic means
2237/04737 . . . radio-frequency quadrupole [RFQ]
2237/0475 . . . decelerating
2237/04753 . . . with magnetic means
2237/04756 . . . with electrostatic means
2237/049 . . . Focusing means
2237/0492 . . . Lens systems (individual lenses H01J 2237/10)
2237/04922 . . . electromagnetic
2237/04924 . . . electrostatic
2237/04926 . . . combined
2237/04928 . . . Telecentric systems
2237/05 . . . Arrangements for energy or mass analysis
2237/053 . . . electrostatic
2237/0535 . . . Mirror analyser
2237/055 . . . magnetic
2237/057 . . . Energy or mass filtering
2237/06 . . . Sources
2237/061 . . . Construction
2237/062 . . . Reducing size of gun
2237/063 . . . Electron sources
2237/06308 . . . Thermionic sources
2237/06316 . . . Schottky emission
2237/06325 . . . Cold-cathode sources
2237/06333 . . . Photo emission
2237/06341 . . . Field emission
2237/0635 . . . Multiple source, e.g. comb or array
2237/06358 . . . Secondary emission
2237/06366 . . . Gas discharge electron sources
2237/06375 . . . Arrangement of electrodes
2237/06383 . . . Spin polarised electron sources
2237/06391 . . . Positron sources
2237/065 . . . Source emittance characteristics
2237/0653 . . . Intensity
2237/0656 . . . Density
2237/08 . . . Ion sources
2237/0802 . . . Field ionization sources
2237/0805 . . . Liquid metal sources
2237/0807 . . . Gas field ion sources [GFIS]
2237/081 . . . Sputtering sources
2237/0812 . . . Ionized cluster beam [ICB] sources
2237/0815 . . . Methods of ionisation
2237/0817 . . . Microwaves
2237/082 . . . Electron beam
2237/0822 . . . Multiple sources
2237/0825 . . . for producing different ions simultaneously
2237/0827 . . . for producing different ions sequentially
2237/083 . . . Beam forming
2237/0835 . . . Variable cross-section or shape
2237/10 . . . Lenses
2237/103 . . . characterised by lens type
2237/1035 . . . Immersion lens
2237/12 . . . electrostatic
2237/1202 . . . Associated circuits
2237/1205 . . . Microlenses
2237/1207 . . . Einzel lenses
2237/121 . . . characterised by shape
2237/1215 . . . Annular electrodes
2237/14 . . . magnetic
2237/1405 . . . Constructional details
2237/141 . . . Coils (superconducting H01J 2237/142)
2237/1415 . . . Bores or yokes, i.e. magnetic circuit in general
2237/142 . . . with superconducting coils
2237/15 . . . Means for deflecting or directing discharge
2237/1501 . . . Beam alignment means or procedures
2237/1502 . . . Mechanical adjustments
2237/1503 . . . Mechanical scanning
2237/1504 . . . Associated circuits
2237/1505 . . . Rotating beam around optical axis
2237/1506 . . . Tilting or rocking beam around an axis substantially at an angle to optical axis
2237/1507 . . . dynamically, e.g. to obtain same impinging angle on whole area
2237/1508 . . . Combined electrostatic-electromagnetic means
2237/151 . . . Electrostatic means
2237/1512 . . . Travelling wave deflectors
2237/1514 . . . Prisms
2237/1516 . . . Multipoles
2237/1518 . . . for X-Y scanning
2237/152 . . . Magnetic means
2237/1523 . . . Prisms
2237/1526 . . . For X-Y scanning
2237/153 . . . Correcting image defects, e.g. stigmators
2237/1532 . . . Astigmatism
2237/1534 . . . Aberrations
2237/1536 . . . Image distortions due to scanning
2237/1538 . . . Space charge (Boersch) effect compensation (neutralising means H01J 2237/0041)
2237/16 . . . Vessels (liner tubes H01J 2237/0268)
2237/162 . . . Open vessel, i.e. one end sealed by object or workpiece
2237/164 . . . Particle-permeable windows
2237/166 . . . Sealing means
2237/18 . . . Vacuum control means
2237/182 . . . Obtaining or maintaining desired pressure
2237/1825 . . . Evacuating means
2237/184 . . . Vacuum locks
2237/186 . . . Valves
2237/188 . . . Differential pressure
2237/20 . . . Positioning, supporting, modifying or maintaining the physical state of objects being observed or treated
2237/201 . . . Maintaining constant desired temperature
2237/202 . . . Controlling environment of sample
2237/203 . . . Environmental cells
2237/204 . . . Biological samples
2237/205 . . . Seal mechanisms
2237/206 . . . Vacuum seals
2237/207 . . . Holding mechanisms
2237/208 . . . specially adapted for studying electrical or magnetic properties of objects
2237/208 . . . for mounting multiple objects
2237/202 . Movement
2237/20207 . Tilt
2237/20214 . Rotation
2237/20221 . Translation
2237/20228 . Mechanical X-Y scanning
2237/20235 . Z movement or adjustment
2237/20242 . Eucentric movement
2237/2025 . Sensing velocity of translation or rotation
2237/20257 . Magnetic coupling
2237/20264 . Piezoelectric devices
2237/20271 . Temperature responsive devices
2237/20278 . Motorised movement
2237/20285 . Computer-controlled
2237/20292 . Means for position and/or orientation registration
2237/204 . Means for introducing and/or outputting objects (locks H01J 2237/184)
2237/206 . Modifying objects while observing
2237/2062 . Mechanical constraints
2237/2065 . Temperature variations (maintaining constant desired temperature H01J 2237/2001)
2237/2067 . Surface alteration
2237/208 . Elements or methods for movement independent of sample stage for influencing or moving or contacting or transferring the sample or parts thereof, e.g. prober needles or transfer needles in FIB/SEM systems
2237/21 . Focus adjustment (lenses H01J 2237/10)
2237/213 . During electron or ion beam welding or cutting
2237/216 . Automatic focusing methods
2237/22 . Treatment of data (mixing signals H01J 2237/24495)
2237/221 . Image processing
2237/223 . Fourier techniques
2237/225 . Displaying image using synthesised colours
2237/226 . Image reconstruction
2237/228 . Charged particle holography
2237/244 . Detection characterised by the detecting means
2237/2405 . Faraday cages
2237/2441 . Semiconductor detectors, e.g. diodes
2237/24415 . X-ray
2237/2442 . Energy-dispersive (Si-Li type) spectrometer
2237/24425 . Wavelength-dispersive spectrometer
2237/2443 . Scintillation detectors
2237/24435 . Microchannel plates
2237/2444 . Electron Multiplier
2237/24445 . Using avalanche in a gas
2237/2445 . Photon detectors for X-rays, light, e.g. photomultipliers
2237/24455 . Transmitted particle detectors
2237/2446 . Position sensitive detectors
2237/24465 . Sectored detectors, e.g. quadrants
2237/2447 . Imaging plates
2237/24475 . Scattered electron detectors
2237/2448 . Secondary particle detectors
2237/24485 . Energy spectrometers
2237/2449 . Detector devices with moving charges in electric or magnetic fields
2237/24495 . Signal processing, e.g. mixing of two or more signals
2237/245 . Detection characterised by the variable being measured
2237/24507 . Intensity, dose or other characteristics of particle beams or electromagnetic radiation
2237/24514 . Beam diagnostics including control of the parameter or property diagnosed (H01J 2237/30472 takes precedence)
2237/24521 . Beam diameter
2237/24528 . Direction of beam or parts thereof in view of the optical axis, e.g. beam angle, angular distribution, beam divergence, beam convergence or beam landing angle on sample or workpiece (means for deflecting or directing discharge H01J 2237/15)
2237/24535 . Beam current
2237/24542 . Beam profile
2237/2455 . Polarisation (electromagnetic beams)
2237/24557 . Spin polarisation (particles)
2237/24564 . Measurements of electric or magnetic variables, e.g. voltage, current, frequency
2237/24571 . Measurements of non-electric or non-magnetic variables
2237/24578 . Spatial variables, e.g. position, distance
2237/24585 . Other variables, e.g. energy, mass, velocity, time, temperature
2237/24592 . Inspection and quality control of devices
2237/248 . Components associated with the control of the tube
2237/2482 . Optical means
2237/2485 . Electric or electronic means
2237/2487 . Using digital signal processors
2237/25 . Tubes for localised analysis using electron or ion beams
2237/2505 . Characterised by their application
2237/251 . Auger spectrometers
2237/2516 . Secondary particles mass or energy spectrometry
2237/2522 . Of electrons (ESCA, XPS)
2237/2527 . Ions [SIMS]
2237/2533 . Neutrals [SNMS]
2237/2538 . Low energy electron microscopy [LEEM]
2237/2544 . Diffraction [LEED]
2237/255 . Reflection diffraction [RHEED]
2237/2555 . Microprobes, i.e. particle-induced X-ray spectrometry
2237/2566 . Electron
2237/257 . Ion
2237/2572 . Proton
2237/2577 . Atomic
2237/2583 . Using tunnel effects, e.g. STM, AFM
2237/2588 . Lorenz microscopy (magnetic field measurement)
2237/2594 . Measuring electric fields or potentials
2237/26 . Electron or ion microscopes
2237/2602 . Details
2237/2605 . Operating at elevated pressures, e.g. atmosphere
2237/2608 . With environmental specimen chamber (environmental cells H01J 2237/2003)
2237/2611 . Stereoscopic measurements and/or imaging
2237/2614 . Holography or phase contrast, phase related imaging in general, e.g. phase plates
2237/2617 . Comparison or superposition of transmission images; Moiré
2237/262 . Non-scanning techniques
2237/2623 . Field-emission microscopes
2237/2626 . Pulsed source
Processing objects on a macro-scale

- Controlling tubes
- Electron or ion optical systems
- Determination of microscope properties
- Evaporating
- Melting
- Cathodoluminescence
- characterised by the imaging problems involved
- Bottom of trenches or holes
- Large objects
- Emission microscopes
- characterised by the application
- Measurement of surface topography
- Depth profile
- Length
- Pattern inspection
- Scanning tunnelling microscopes
- characterised by the imaging method
- Transmission microscopes
- Large objects
- Etching microareas
- for preparing specimen to be viewed in microscopes or analyzed in microanalysers
- introducing gas in vicinity of workpiece
- for preparing specimen to be viewed in microscopes or analyzed in microanalysers
- hybrid, i.e. charged particles and light, X-rays, plasma
- using near-field effects, e.g. STM
- Patterning strategy
- Computer and memory organisation
- Dividing into sub-patterns
- Continuous moving of wafer
- Step and repeat
- Proximity effect correction
- using multiple exposure
- Flood beam
- Multi-beam
- Shaped beam
- by projection
- from patterned photocathode
- from patterned cold cathode
- M-I-M cathode
- Semiconductor cathode
- Field-emitting cathode
- through mask
- Reflection mask
- Scattering mask
- Problems associated with lithography
- affecting masks
- affecting resists
- detecting pattern defects (with SEM H01J 2237/2817; correcting H01J 2237/3175, H01J 2237/3174)
H01J

2237/32 . . . Processing objects by plasma generation
2237/327 . . . Arrangements for generating the plasma
2237/33 . . . characterised by the type of processing
2237/332 . . . Coating
2237/3321 . . . CVD [Chemical Vapor Deposition]
2237/3322 . . . Problems associated with coating
2237/3323 . . . uniformity
2237/3325 . . . large area
2237/3326 . . . high speed
2237/3327 . . . Coating high aspect ratio workpieces
2237/3328 . . . adhesion, stress, lift-off of deposited films
2237/334 . . . Etching
2237/3341 . . . Reactive etching
2237/3342 . . . Resist stripping
2237/3343 . . . Problems associated with etching
2237/3344 . . . isotropy
2237/3345 . . . anisotropy
2237/3346 . . . Selectivity
2237/3347 . . . bottom of holes or trenches
2237/3348 . . . control of ion bombardment energy
2237/335 . . . Cleaning
2237/3355 . . . Holes or apertures, i.e. inprinted circuit boards
2237/336 . . . Changing physical properties of treated surfaces
2237/3365 . . . Plasma source implantation
2237/338 . . . Changing chemical properties of treated surfaces
2237/3382 . . . Polymerising
2237/3385 . . . Carburising
2237/3387 . . . Nitriding
2237/339 . . . Synthesising components

Details

2261/00 Gas- or vapour-discharge lamps
2261/02 . Details
2261/38 . . Devices for influencing the colour or wavelength of the light
2261/385 . . . Non-chemical aspects of luminescent layers, e.g. thickness profile, shape and distribution of luminescent coatings

2329/00 Electron emission display panels, e.g. field emission display panels
2329/002 . . . Cooling means
2329/005 . . . Multi-directional displaying, i.e. with multiple display faces facing in different directions
2329/007 . . . Vacuumless display panels, i.e. with phosphor directly applied to emitter without intermediate vacuum space
2329/02 . . . Electrodes other than control electrodes
2329/04 . . . Cathode electrodes
2329/0402 . . . Thermionic cathodes
2329/0405 . . . Cold cathodes other than those covered by H01J 2329/0407 - H01J 2329/0492
2329/0407 . . . Field emission cathodes
2329/041 . . . characterised by the emitter shape
2329/0413 . . . Microengineered point emitters
2329/0415 . . . conical shaped, e.g. Spindt type
2329/0418 . . . needle shaped
2329/0421 . . . Pillar shaped emitters
2329/0423 . . . Microengineered edge emitters
2329/0426 . . . Coatings on the emitter surface, e.g. with low work function materials
2329/0428 . . . Fibres
2329/0431 . . . Nanotubes
2329/0434 . . . Particles
2329/0436 . . . Whiskers
2329/0439 . . . characterised by the emitter material
2329/0442 . . . Metals or metal alloys
2329/0444 . . . Carbon types
2329/0447 . . . Diamond
2329/0449 . . . Graphite
2329/0452 . . . Fullerenes
2329/0455 . . . Carbon nanotubes (CNTs)
2329/0457 . . . Amorphous carbon
2329/046 . . . Diamond-like carbon [DLC]
2329/0463 . . . Semiconductor materials
2329/0465 . . . Carbies
2329/0468 . . . Nitrides
2329/0471 . . . Borides
2329/0473 . . . Oxides
2329/0476 . . . Ferroelectric cathodes
2329/0478 . . . Semiconductor cathodes, e.g. having PN junction layers
2329/048 . . . Cold cathodes having an electric field perpendicular to the surface thereof (H01J 2329/0407 - H01J 2329/0478 take precedence)
2329/0484 . . . Metal-Insulator-Metal [MIM] emission type cathodes
2329/0486 . . . Cold cathodes having an electric field parallel to the surface thereof, e.g. thin film cathodes
2329/0489 . . . Surface conduction emission type cathodes
2329/0492 . . . Cold cathodes combined with other synergetic effects, e.g. secondary, photo- or thermal emission
2329/0494 . . . Circuit elements associated with the emitters by direct integration
2329/0497 . . . Resistive members, e.g. resistive layers
2329/0498 . . . Anode electrodes
2329/18 . . . Luminescent screens
2329/20 . . . characterised by the luminescent material
2329/22 . . . characterised by the binder or adhesive for securing the luminescent material to its support, e.g. substrate
2329/28 . . . with protective, conductive or reflective layers
2329/30 . . . Shape or geometrical arrangement of the luminescent material
2329/32 . . . Means associated with discontinuous arrangements of the luminescent material
2329/323 . . . Black matrix
2329/326 . . . Color filters structurally combined with the luminescent material
2329/46 . . . Arrangements of electrodes and associated parts for generating or controlling the electron beams
2329/4604 . . . Control electrodes
2329/4608 . . . Gate electrodes
2329/4613 . . . characterised by the form or structure
2329/4617 . . . Shapes or dimensions of gate openings
2329/4621 . . . Arrangement of gate openings
2329/4626 . . . Curved or extending upwards
2329/463 . . . characterised by the material
2329/4634 . . . Relative position to the emitters, cathodes or substrates
Circuit elements structurally associated with the Means for exhausting the vessel or maintaining the purpose of providing electrical connection to it

Circuit elements structurally associated with the Means for exhausting the vessel or maintaining the purpose of providing electrical connection to it

Details

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2329/4639 . . . Focusing electrodes
2329/4643 . . . characterised by the form or structure
2329/4647 . . . Shapes or dimensions of focusing electrode openings
2329/4652 . . . Arrangement of focusing electrode openings
2329/4656 . . . characterised by the material
2329/466 . . . Relative position to the gate electrodes, emitters, cathodes or substrates
2329/4665 . . . In the same plane as the gate electrodes or cathodes
2329/4669 . . . Insulation layers
2329/4673 . . . for gate electrodes
2329/4678 . . . for focusing electrodes
2329/4682 . . . characterised by the shape
2329/4686 . . . Dimensions of openings
2329/4691 . . . characterised by the material
2329/4695 . . . Potentials applied to the electrodes
2329/86 . . . Vessels
2329/8605 . . . Front or back plates
2329/861 . . . characterised by the shape
2329/8615 . . . characterised by the material
2329/862 . . . Frames
2329/8625 . . . Spacing members
2329/863 . . . characterised by the form or structure
2329/8635 . . . having a corrugated lateral surface
2329/864 . . . characterised by the material
2329/8645 . . . with coatings on the lateral surfaces thereof
2329/865 . . . Connection of the spacing members to the substrates or electrodes
2329/8655 . . . Conductive or resistive layers
2329/866 . . . Adhesives
2329/8665 . . . Spacer holding means
2329/867 . . . Seals between parts of vessels
2329/8675 . . . Seals between the frame and the front and/or back plate
2329/868 . . . Passive shielding means of vessels
2329/8685 . . . Antistatic shielding
2329/869 . . . Electromagnetic shielding
2329/8695 . . . Mechanical shielding, e.g. against water or abrasion
2329/88 . . . Coatings on walls of the vessels (H01J 2329/18, H01J 2329/86, H01J 2329/89 take precedence)
2329/89 . . . Optical components structurally combined with the vessel
2329/892 . . . Anti-reflection, anti-glare, viewing angle and contrast improving means
2329/895 . . . Spectral filters
2329/897 . . . Lenses
2329/90 . . Leading-in arrangements; seals therefor
2329/92 . . Means forming part of the display panel for the purpose of providing electrical connection to it
2329/94 . . Means for exhausting the vessel or maintaining vacuum within the vessel
2329/941 . . Means for exhausting the vessel
2329/943 . . Means for maintaining vacuum within the vessel
2329/945 . . by gettering
2329/946 . . characterised by the position or form of the getter
2329/948 . . . characterised by the material of the getter
2329/96 . . Circuit elements structurally associated with the display panels (H01J 2329/0494 takes precedence)

2893/00 Discharge tubes and lamps
2893/0001 . . . Electrodes and electrode systems suitable for discharge tubes or lamps
2893/0002 . . . Construction arrangements of electrode systems
2893/0003 . . . Anodes forming part of vessel walls
2893/0004 . . . Anodes formed in central part
2893/0005 . . . Fixing of electrodes
2893/0006 . . . Mounting
2893/0007 . . . Machines for assembly
2893/0008 . . . Supply leads; Electrode supports via rigid connection to vessel
2893/0009 . . . Electrode system pressing against vessel wall
2893/001 . . . Non-constructive schematic arrangements
2893/0011 . . . Non-emitting electrodes
2893/0012 . . . Constructional arrangements
2893/0013 . . . Sealed electrodes
2893/0015 . . . Non-sealed electrodes
2893/0016 . . . Planar grids
2893/0017 . . . Cylindrical, helical or annular grids
2893/0018 . . . Bar or cage-like grids
2893/0019 . . . Chemical composition and manufacture
2893/002 . . . chemical
2893/0021 . . . carbon
2893/0022 . . . Manufacture
2893/0023 . . . carbonising and other surface treatments
2893/0024 . . . Planar grids
2893/0025 . . . by winding wire upon a support
2893/0026 . . . Machines for manufacture of grids or anodes
2893/0027 . . . Mitigation of temperature effects
2893/0029 . . . Electron beam tubes
2893/003 . . . Tubes with plural electrode systems
2893/0031 . . . Tubes with material luminescing under electron bombardment
2893/0032 . . . Tubes with variable amplification factor
2893/0033 . . . Vacuum connection techniques applicable to discharge tubes and lamps
2893/0034 . . . Lamp bases
2893/0035 . . . shaped as flat plates, in particular metallic
2893/0036 . . . having wires, ribbons or tubes placed between two vessel walls and being perpendicular to at least one of said walls
2893/0037 . . . Solid sealing members other than lamp bases
2893/0038 . . . Direct connection between two insulating elements, in particular via glass material
2893/0039 . . . Glass-to-glass connection, e.g. by soldering
2893/004 . . . Quartz-to-quartz connection
2893/0041 . . . Direct connection between insulating and metal elements, in particular via glass material
2893/0043 . . . Glass-to-metal or quartz-to-metal, e.g. by soldering
2893/0044 . . . Direct connection between two metal elements, in particular via material a connecting material
2893/0045 . . . Non-solid connections, e.g. liquid or rubber
2893/0046 . . . Lamp base with closure
2893/0047 . . . Closure other than lamp base
2893/0048 . . . Tubes with a main cathode
2893/0049 . . . Internal parts
2893/005 . . . Cathodes
2893/0051 . . . Anode assemblies; screens for influencing the discharge
2893/0052 . . . Anode supporting means
Leading in for anodes; Protecting means for anode supports
Cooling means
Movable screens
Parts inside tubes brought to incandescence by the discharge
Grids; Auxiliary internal or external electrodes
Arc discharge tubes
Tubes with electron bombarded gas (e.g. with plasma filter)
Tubes with discharge used as electron source
Tubes with temperature ionized gas as electron source
Plasma light sources
Tubes with cold main electrodes (including cold cathodes)
Electrode systems
Construction, material, support, protection and temperature regulation of electrodes; Electrode cups
Electrode assembly without control electrodes, e.g. including a screen
electrode assembly with control electrodes, e.g. including a screen
Tubes for displaying characters
Sequential discharge tubes
Disassembly or repair of discharge tubes
Discharge tubes with liquid poolcathodes; constructional details
Cathodic cups; Screens; Reflectors; Filters; Windows; Protection against mercury deposition; Returning condensed electrode material to the cathodic cup; Liquid electrode level control
Cathodic cups
Liquid electrode materials
Cathodic cup construction; Cathodic spot control
Mounting cathodic cups in the discharge tube
Means for limiting the cathodic spot movement
Means for stabilising the cathodic spot
Cooling means
Returning condensed electrode material to the cathodic cup, e.g. including cleaning
Liquid electrode level control
Protection against mercury deposition
Gas fill; Maintaining or maintaining desired pressure; Producing, introducing or replenishing gas or vapour during operation of the tube; Getters; Gas cleaning; Electrode cleaning
Igniting means; Cathode spot maintaining or extinguishing means
Tubes with at least a solid principal cathode and solid anodes
Electrode systems
Anode systems; Screens
Anode supporting means
Anodic screens or grids
Anodic arms
Electrode arrangements; Auxiliary electrodes
Tubes with exclusively liquid main electrodes
Transport of discharge tube components during manufacture, e.g. wires, coils, lamps, contacts, etc.
Incandescent wires of coils
Vessels