

## SECTION H — ELECTRICITY

## H01 BASIC ELECTRIC ELEMENTS

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

**Note(s)**

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 covered by group 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 15/00, 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.

**Subclass index**

## GAS-FILLED TUBES

Without electrode inside; liquid cathode; gaseous cathode; solid cathode.....11/00, 13/00, 15/00, 17/00

## VACUUM TUBES

Classical tubes: tubes; details.....21/00, 19/00

Transit-time tubes: tubes; details.....25/00, 23/00

Ion beam tubes.....27/00

Cathode ray tubes: tubes; details.....31/00, 29/00

X-ray tubes.....35/00

TUBES FOR PROCESSING OR EXAMINATION OF MATERIALS OR OBJECTS.....37/00

## SPECIAL TUBES

For emergence of electrons or ions; particle spectrometers or separator tubes.....33/00, 49/00

Vacuum gauges, evacuation by ion diffusion; secondary-emission tubes, electron multipliers; thermionic generators.....41/00, 43/00, 45/00

Photoelectric; radiation and particle detectors.....40/00, 47/00

## DISCHARGE LAMPS

Gas discharge lamps; cathode ray or electron stream lamps; without electrode inside.....61/00, 63/00, 65/00

## DETAILS

Electrodes; electron optics; vessels; other details.....1/00, 3/00, 5/00, 7/00

MANUFACTURE; REPAIR; REGENERATION; RECOVERY OF MATERIAL.....9/00

SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS.....99/00

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| <p><b>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</b> (details of electron-optical arrangements or of ion traps H01J 3/00)</p> <p>1/02 • Main electrodes</p> <p>1/04 • • Liquid electrodes, e.g. liquid cathode</p> <p>1/05 • • • characterised by material</p> | <p>1/06 • • • Containers for liquid-pool electrodes; Arrangement or mounting thereof</p> <p>1/08 • • • Positioning or moving the cathode spot on the surface of a liquid-pool cathode</p> <p>1/10 • • • Cooling, heating, circulating, filtering, or controlling level of liquid in a liquid-pool electrode</p> |
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## H01J

- 1/12 • • Cathodes having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube
- 1/13 • • Solid thermionic cathodes
- 1/14 • • • characterised by the material
- 1/142 • • • • with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material [6]
- 1/144 • • • • with other metal oxides as an emissive material [6]
- 1/146 • • • • with metals or alloys as an emissive material [6]
- 1/148 • • • • with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material [6]
- 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
- 1/304 • • • Field-emissive cathodes [7]
- 1/308 • • • Semiconductor cathodes, e.g. cathodes with PN junction layers [7]
- 1/312 • • • having an electric field perpendicular to the surface, e.g. tunnel-effect cathodes of Metal-Insulator-Metal (MIM) type [7]
- 1/316 • • • having an electric field parallel to the surface, e.g. thin film cathodes [7]
- 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
- 1/54 • Screens on or from which an image or pattern is formed, picked-up, converted, or stored; Luminescent coatings on vessels
- 1/56 • • acting as light valves by shutter operation, e.g. for eidophor
- 1/58 • • acting by discolouration, e.g. halide screen
- 1/60 • • Incandescent screens
- 1/62 • • Luminescent screens; Selection of materials for luminescent coatings on vessels
- 1/63 • • • characterised by the luminescent material (luminescent materials C09K 11/00)
- 1/64 • • • characterised by the binder or adhesive for securing the luminescent material to its support
- 1/66 • • • Supports for luminescent material (vessels H01J 5/02)
- 1/68 • • • with superimposed luminescent layers
- 1/70 • • • with protective, conductive, or reflective layers
- 1/72 • • • with luminescent material discontinuously arranged, e.g. in dots or lines
- 1/74 • • • • with adjacent dots or lines of different luminescent material
- 1/76 • • • provided with permanent marks or references
- 1/78 • • Photoelectric screens; Charge-storage screens
- 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 • • Spacing members extending to the envelope
- 1/98 • • • without fixed connection between spacing member and envelope
- 3/00 Details of electron-optical or ion-optical arrangements or of ion traps common to two or more basic types of discharge tubes or lamps**
- 3/02 • Electron guns
- 3/04 • Ion guns
- 3/06 • two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 3/07 takes precedence) [2]
- 3/07 • Arrangements for controlling convergence of a plurality of beams [2]
- 3/08 • Arrangements for controlling intensity of ray or beam (H01J 3/02, H01J 3/04 take precedence)
- 3/10 • Arrangements for centering ray or beam (H01J 3/02, H01J 3/04 take precedence)
- 3/12 • Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses (H01J 3/02, H01J 3/04 take precedence)
- 3/14 • Arrangements for focusing or reflecting ray or beam (H01J 3/02, H01J 3/04 take precedence)
- 3/16 • • Mirrors
- 3/18 • • Electrostatic lenses
- 3/20 • • Magnetic lenses
- 3/22 • • • using electromagnetic means only
- 3/24 • • • using permanent magnets only
- 3/26 • Arrangements for deflecting ray or beam (circuit arrangements for producing sawtooth pulses or other deflecting voltages or currents H03K)

- 3/28 • • along one straight line or along two perpendicular straight lines
- 3/30 • • • by electric fields only
- 3/32 • • • by magnetic fields only
- 3/34 • • along a circle, spiral, or rotating radial line
- 3/36 • Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration
- 3/38 • Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements
- 3/40 • Traps for removing or diverting unwanted particles, e.g. negative ions, fringing electrons; Arrangements for velocity or mass selection
- 5/00 Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps**
- 5/02 • Vessels; Containers; Shields associated therewith; Vacuum locks
- 5/03 • • Arrangements for preventing or mitigating effects of implosion of vessels or containers [2]
- 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
- 5/14 • • 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)
- 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 lamp for the purpose of providing electrical connection to it (electric coupling devices comprising a holder adapted for supporting a tube or lamp and not forming part of the tube or lamp H01R 33/00)
- 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
- 5/58 • • • 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 groups H01J 1/00-H01J 5/00 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
- 7/06 • • having helium, argon, neon, krypton, or xenon as the principal constituent
- 7/08 • • having a metallic vapour as the principal constituent
- 7/10 • • • mercury vapour
- 7/12 • • • vapour of an alkali metal
- 7/14 • Means for obtaining or maintaining the desired pressure within the vessel
- 7/16 • • Means for permitting pumping during operation of the tube or lamp
- 7/18 • • Means for absorbing or adsorbing gas, e.g. by gettering
- 7/20 • • Means for producing, introducing, or replenishing gas or vapour during operation of the tube or lamp
- 7/22 • • Tubulations therefor, e.g. for exhausting; Closures therefor
- 7/24 • Cooling arrangements (for main electrodes H01J 1/02); Heating arrangements (for main electrodes H01J 1/02); Means for circulating gas or vapour within the discharge space
- 7/26 • • by flow of fluid through passages associated with tube or lamp
- 7/28 • • by latent heat or evaporation of cooling liquid
- 7/30 • Igniting arrangements (circuit arrangements H02M 1/02, H05B)
- 7/32 • • having resistive or capacitive igniter
- 7/34 • • • having resistive igniter only
- 7/36 • • Igniting by movement of a solid electrode
- 7/38 • • Igniting by movement of vessel as a whole, e.g. tilting
- 7/40 • • Igniting by associated radioactive materials or fillings
- 7/42 • Means structurally associated with the tube or lamp for indicating defects or previous use
- 7/44 • One or more circuit elements structurally associated with the tube or lamp
- 7/46 • • Structurally associated resonator having distributed inductance and capacitance
- 9/00 Apparatus or processes specially adapted for the manufacture 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 [1, 7]**
- 9/02 • Manufacture of electrodes or electrode systems
- 9/04 • • of thermionic cathodes
- 9/06 • • • Machines therefor
- 9/08 • • Manufacture of heaters for indirectly-heated cathodes
- 9/10 • • • Machines therefor

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- 9/12 • • of photo-emissive cathodes; of secondary-emission electrodes
- 9/14 • • of non-emitting electrodes
- 9/16 • • • Machines for making wire grids
- 9/18 • • Assembling together the component parts of electrode systems
- 9/20 • Manufacture of screens on or from which an image or pattern is formed, picked-up, converted or stored; Applying coatings to the vessel
- 9/22 • • Applying luminescent coatings
- 9/227 • • • with luminescent material discontinuously arranged, e.g. in dots or lines [2]
- 9/233 • • Manufacture of photoelectric screens or charge-storage screens [2]
- 9/236 • Manufacture of magnetic deflecting devices for cathode-ray tubes (manufacturing coils for transformers, inductances, reactors or choke coils H01F 41/04) [3]
- 9/24 • Manufacture or joining of vessels, leading-in conductors, or bases
- 9/26 • • Sealing together parts of vessels
- 9/28 • • Manufacture of leading-in conductors
- 9/30 • • Manufacture of bases
- 9/32 • • Sealing leading-in conductors
- 9/34 • • Joining base to vessel
- 9/36 • • Joining connectors to internal electrode system
- 9/38 • Exhausting, degassing, filling, or cleaning vessels
- 9/385 • • Exhausting vessels [2]
- 9/39 • • Degassing vessels [2]
- 9/395 • • Filling vessels [2]
- 9/40 • Closing vessels
- 9/42 • Measurement or testing during manufacture
- 9/44 • Factory adjustment of completed discharge tubes or lamps to comply with desired tolerances
- 9/46 • Machines having sequentially-arranged operating stations
- 9/48 • • with automatic transfer of workpieces between operating stations
- 9/50 • Repairing or regenerating used or defective discharge tubes, lamps or their salvageable components
- 9/52 • Recovery of material from discharge tubes or lamps (H01J 9/50 takes precedence) [7]
- 11/00 Gas-filled discharge tubes without any main electrode inside the vessel; Gas-filled discharge tubes with at least one main electrode outside the vessel (lamps H01J 65/00)**
- 11/02 • Details, e.g. gas filling, shape of vessel
- 11/04 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
- 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; Arrangement 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
- 13/26 • • Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
- 13/28 • • Selection of substances for gas filling; Means for obtaining or maintaining the desired pressure within the tube [2]
- 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 (circuit arrangements H02M 1/02)
- 13/36 • • • having resistive or capacitive igniter
- 13/38 • • • • having resistive igniter only
- 13/40 • • • Igniting by movement of a solid electrode
- 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 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)**
- 17/02 • Details
- 17/04 • • Electrodes; Screens
- 17/06 • • • 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
- 17/20 • • Selection of substances for gas fillings; Specified operating pressure 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
- 17/34 • • 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 tube, tuning-indicator glow tube, voltage-stabiliser tube, voltage-indicator tube (cathode-glow lamps H01J 61/64)
- 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
- 17/49 • • • Display panels, e.g. with crossed electrodes (gas-discharge-type indicating arrangements effected by the combination of a number of individual lamps G09F 9/313) [3]
- 17/50 • Thermionic-cathode tubes (TR boxes H01J 17/64)
- 17/52 • • with one cathode and one anode
- 17/54 • • • having one or more control electrodes
- 17/56 • • • for preventing and then permitting ignition, but thereafter having no control
- 17/58 • • with more than one cathode or anode
- 17/60 • • • the discharge paths priming each other in a predetermined sequence, e.g. counting tube
- 17/62 • • • with independent discharge paths controlled by intermediate electrodes, e.g. polyphase rectifier
- 17/64 • Tubes specially designed for switching or modulating in a waveguide, e.g. TR box
- 19/00 Details of vacuum tubes of the types covered by group H01J 21/00**
- 19/02 • Electron-emitting electrodes; Cathodes
- 19/04 • • Thermionic cathodes
- 19/06 • • • characterised by the material
- 19/062 • • • with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material [6]
- 19/064 • • • with other metal oxides as an emissive material [6]
- 19/066 • • • with metals or alloys as an emissive material [6]
- 19/068 • • • with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material [6]
- 19/08 • • • Cathodes heated directly by an electric current
- 19/10 • • • characterised by the shape
- 19/12 • • • Supports; Vibration-damping arrangements
- 19/14 • • • Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment
- 19/16 • • • Heaters (filaments for incandescent lamps H01K 1/02)
- 19/18 • • • Insulating layer or body located between heater and emissive material
- 19/20 • • • Supports for the emissive material
- 19/22 • • • Dispenser-type cathodes, e.g. L-cathode
- 19/24 • • Cold cathodes, e.g. field-emissive cathode
- 19/28 • Non-electron-emitting electrodes; Screens
- 19/30 • • characterised by the material
- 19/32 • • Anodes
- 19/34 • • • forming part of the envelope
- 19/36 • • • Cooling of anodes
- 19/38 • • Control electrodes, e.g. grid
- 19/40 • • Screens for shielding (screens acting as control electrodes H01J 19/38)
- 19/42 • Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
- 19/44 • • Insulation between electrodes or supports within the vacuum space (leading-in conductors H01J 19/62)
- 19/46 • • Mountings for the electrode assembly as a whole
- 19/48 • • Mountings for individual electrodes (for directly-heated cathodes H01J 19/12)
- 19/50 • • Spacing members extending to the envelope
- 19/52 • • • without fixed connection between spacing member and envelope
- 19/54 • Vessels; Containers; Shields associated therewith
- 19/56 • • characterised by the material of the vessel or container
- 19/57 • • provided with coatings on the walls thereof; Selection of materials for the coatings
- 19/58 • Seals between parts of vessels
- 19/60 • Seals for leading-in conductors
- 19/62 • Leading-in conductors
- 19/64 • Means forming part of the tube for the purpose of supporting it (associated with electrical connecting means H01J 19/66)
- 19/66 • Means forming part of the tube for the purpose of providing electrical connection to it (construction of connectors H01R)
- 19/68 • Specified gas introduced into the tube at low pressure, e.g. for reducing or influencing space charge
- 19/70 • Means for obtaining or maintaining the vacuum, e.g. by gettering
- 19/72 • • Tubulations therefor, e.g. for exhausting; Closures therefor
- 19/74 • Cooling arrangements (cooling of anodes H01J 19/36)
- 19/76 • Means structurally associated with the tube for indicating defects or previous use
- 19/78 • One or more circuit elements structurally associated with the tube
- 19/80 • • Structurally associated resonator having distributed inductance and capacitance
- 19/82 • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
- 21/00 Vacuum tubes (H01J 25/00, H01J 31/00-H01J 40/00, H01J 43/00, H01J 47/00, H01J 49/00 take precedence; details of vacuum tubes H01J 19/00; cathode-ray or electron-stream lamps H01J 63/00)**
- 21/02 • Tubes with a single discharge path
- 21/04 • • without control means, i.e. diodes
- 21/06 • • having electrostatic control means only
- 21/08 • • • with movable electrode or electrodes
- 21/10 • • • with one or more immovable internal control electrodes, e.g. triode, pentode, octode

## H01J

- 21/12 • • • Tubes with variable amplification factor
- 21/14 • • • Tubes with means for concentrating the electron stream, e.g. beam tetrode
- 21/16 • • • with external electrostatic control means and with or without internal control electrodes
- 21/18 • • having magnetic control means; having both magnetic and electrostatic control means
- 21/20 • Tubes with more than one discharge path; Multiple tubes, e.g. double diode, triode-hexode (secondary-emission tubes, electron-multiplier tubes H01J 43/00)
- 21/22 • • with movable electrode or electrodes
- 21/24 • • with variable amplification factor
- 21/26 • • with means for concentrating the electron stream
- 21/34 • Tubes with electrode system arranged or dimensioned so as to eliminate transit-time effect (with flat electrodes H01J 21/36)
- 21/36 • Tubes with flat electrodes, e.g. disc electrode
- 23/00 Details of transit-time tubes of the types covered by group H01J 25/00**
- 23/02 • Electrodes; Magnetic control means; Screens (associated with resonator or delay system H01J 23/16)
- 23/027 • • Collectors [2]
- 23/033 • • • Collector cooling devices [2]
- 23/04 • • Cathodes
- 23/05 • • • having a cylindrical emissive surface, e.g. cathodes for magnetrons [3]
- 23/06 • • Electron or ion guns
- 23/065 • • • producing a solid cylindrical beam (H01J 23/075 takes precedence) [3]
- 23/07 • • • producing a hollow cylindrical beam (H01J 23/075 takes precedence) [3]
- 23/075 • • • Magnetron injection guns [3]
- 23/08 • • Focusing arrangements, e.g. for concentrating stream of electrons, for preventing spreading of stream
- 23/083 • • • Electrostatic focusing arrangements [3]
- 23/087 • • • Magnetic focusing arrangements [3]
- 23/09 • • Electric systems for directing or deflecting the discharge along a desired path, e.g. E-type (focusing arrangements H01J 23/08)
- 23/10 • • Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path (magnetic focusing arrangements H01J 23/08)
- 23/11 • • Means for reducing noise (in electron or ion gun H01J 23/06)
- 23/12 • Vessels; Containers
- 23/14 • Leading-in arrangements; Seals therefor
- 23/15 • • Means for preventing wave energy leakage structurally associated with tube leading-in arrangements, e.g. filters, chokes, attenuating devices [4]
- 23/16 • Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge (circuit elements, having distributed capacitance and inductance, in general H01P)
- 23/18 • • Resonators
- 23/20 • • • Cavity resonators; Adjustment or tuning thereof
- 23/207 • • • • Tuning of single resonator [2]
- 23/213 • • • • Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron [2]
- 23/22 • • • Connections between resonators, e.g. strapping for connecting resonators of a magnetron
- 23/24 • • Slow-wave structures
- 23/26 • • • Helical slow-wave structures; Adjustment therefor
- 23/27 • • • • Helix-derived slow-wave structures [3]
- 23/28 • • • Interdigital slow-wave structures; Adjustment therefor
- 23/30 • • • Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations
- 23/34 • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
- 23/36 • Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy [4]
- 23/38 • • to or from the discharge [4]
- 23/40 • • to or from the interaction circuit [4]
- 23/42 • • • the interaction circuit being a helix or a helix-derived slow-wave structure (H01J 23/44-H01J 23/48 take precedence) [4]
- 23/44 • • • Rod-type coupling devices (H01J 23/46, H01J 23/48, H01J 23/54 take precedence) [4]
- 23/46 • • • Loop coupling devices [4]
- 23/48 • • • for linking interaction circuit with coaxial lines; Devices of the coupled helices type (H01J 23/46 takes precedence) [4]
- 23/50 • • • • the interaction circuit being a helix or derived from a helix (H01J 23/52 takes precedence) [4]
- 23/52 • • • • the coupled helices being disposed coaxially around one another [4]
- 23/54 • • 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 [4]
- 25/00 Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons (details of transit-time tubes H01J 23/00; particle accelerators H05H)**
- 25/02 • 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 25/34)
- 25/04 • • 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. Haeff tube
- 25/06 • • 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
- 25/08 • • • with electron stream perpendicular to the axis of the resonator
- 25/10 • • 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
- 25/11 • • • Extended interaction klystrons [2]
- 25/12 • • • with pencil-like electron stream in the axis of the resonators
- 25/14 • • • with tube-like electron stream coaxial with the axis of the resonators
- 25/16 • • • with pencil-like electron stream perpendicular to the axis of the resonators
- 25/18 • • • with radial or disc-like electron stream perpendicular to the axis of the resonators

- 25/20 • • • having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube
- 25/22 • • 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
- 25/24 • • • in which the electron stream is in the axis of the resonator or resonators and is pencil-like before reflection
- 25/26 • • • in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection
- 25/28 • • • in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection
- 25/30 • • • in which the electron stream is perpendicular to the axis of the resonator or resonators and is radial or disc-like before reflection
- 25/32 • • Tubes with plural reflection, e.g. Coeterier tube
- 25/34 • Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps
- 25/36 • • 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
- 25/38 • • • the forward-travelling wave being utilised
- 25/40 • • • the backward-travelling wave being utilised
- 25/42 • • 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)
- 25/44 • • • the forward-travelling wave being utilised
- 25/46 • • • the backward-travelling wave being utilised
- 25/48 • • Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube
- 25/49 • • Tubes using the parametric principle, e.g. for parametric amplification
- 25/50 • Magnetrons, 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)
- 25/52 • • with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode
- 25/54 • • • having only one cavity or other resonator, e.g. neutrode tube (having a composite resonator H01J 25/58)
- 25/55 • • • • Coaxial-cavity magnetrons [2]
- 25/56 • • • • with interdigital arrangement of anodes, e.g. turbator tube
- 25/58 • • • having a number of resonators; having a composite resonator, e.g. a helix
- 25/587 • • • • Multi-cavity magnetrons [2]
- 25/593 • • • • Rising-sun magnetrons [2]
- 25/60 • • with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons
- 25/61 • Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section [2]
- 25/62 • Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection
- 25/64 • Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action
- 25/66 • Tubes with electron stream crossing itself and thereby interrupting, or interfering with, itself
- 25/68 • 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)
- 25/70 • • with resonator having distributed inductance and capacitance, e.g. Pintsch tube
- 25/72 • • 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 25/70)
- 25/74 • Tubes specially designed to act as transit-time diode oscillators, e.g. monotron (with secondary emission H01J 25/76)
- 25/76 • Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor
- 25/78 • 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 (arrangements for handling particles, e.g. focusing, G21K 1/00; generating ions to be introduced into non-enclosed gases H01T 23/00; generating plasma H05H 1/24) [3]
- 27/04 • • using reflex discharge, e.g. Penning ion sources [3]
- 27/06 • • • without applied magnetic field [3]
- 27/08 • • using arc discharge [3]
- 27/10 • • • Duoplasmatrons (for use in particle accelerators H05H 7/00) [3]
- 27/12 • • • • provided with an expansion cup [3]
- 27/14 • • • Other arc discharge ion sources using an applied magnetic field [3]
- 27/16 • • using high-frequency excitation, e.g. microwave excitation [3]
- 27/18 • • • with an applied axial magnetic field [3]
- 27/20 • • using particle bombardment, e.g. ionisers [3]
- 27/22 • • • Metal ion sources [3]
- 27/24 • • using photo-ionisation, e.g. using laser beam [3]
- 27/26 • • using surface ionisation, e.g. field effect ion sources, thermionic ion sources (H01J 27/20, H01J 27/24 take precedence) [3]
- 29/00 Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00**
- 29/02 • Electrodes; Screens; Mounting, supporting, spacing, or insulating thereof
- 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 [2]
- 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-plate for storage tube, for collecting secondary electrons (arrangements for colour switching H01J 29/80)
- 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 eidophor
- 29/14 • • • acting by discolouration, e.g. halide screen

## H01J

- 29/16 • • • Incandescent screens
  - 29/18 • • • Luminescent screens
  - 29/20 • • • • characterised by the luminescent material
  - 29/22 • • • • characterised by the binder or adhesive for securing the luminescent material to its support, e.g. vessel
  - 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 or lines
  - 29/32 • • • • • with adjacent dots or lines of different luminescent material, e.g. for colour television
  - 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
  - 29/39 • • • • Charge-storage screens
  - 29/41 • • • • • using secondary emission, e.g. for supericonoscope
  - 29/43 • • • • • using photo-emissive mosaic, e.g. for orthicon, for iconoscope
  - 29/44 • • • • • exhibiting internal electric effects caused by particle radiation, e.g. bombardment-induced conductivity
  - 29/45 • • • • • exhibiting internal electric effects caused by electromagnetic radiation, e.g. photoconductive screen, photodielectric screen, photovoltaic screen
  - 29/46 • Arrangements of electrodes and associated parts for generating or controlling the ray or beam, e.g. electron-optical arrangement
  - 29/48 • • Electron guns
  - 29/50 • • • two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 29/51 takes precedence) [2]
  - 29/51 • • • Arrangements for controlling convergence of a plurality of beams [2]
- Note(s)**  
Group H01J 29/48 takes precedence over groups H01J 29/52-H01J 29/58.
- 29/52 • • Arrangements for controlling intensity of ray or beam, e.g. for modulation
  - 29/54 • • Arrangements for centring ray or beam
  - 29/56 • • Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses
  - 29/58 • • Arrangements for focusing or reflecting ray or beam
  - 29/60 • • • Mirrors
  - 29/62 • • • Electrostatic lenses
  - 29/64 • • • Magnetic lenses
  - 29/66 • • • • using electromagnetic means only
  - 29/68 • • • • using permanent magnets only
  - 29/70 • • Arrangements for deflecting ray or beam (circuit arrangements for producing sawtooth pulses or other deflecting voltages or currents H03K)
  - 29/72 • • • along one straight line or along two perpendicular straight lines
  - 29/74 • • • • Deflecting by electric fields only
  - 29/76 • • • • Deflecting by magnetic fields only
  - 29/78 • • • along a circle, spiral, or rotating radial line, e.g. for radar display
  - 29/80 • • Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration, for colour switching
  - 29/81 • • • using shadow masks (shadow masks per se H01J 29/07) [3]
  - 29/82 • • Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements
  - 29/84 • Traps for removing or diverting unwanted particles, e.g. negative ions, fringing electrons; Arrangements for velocity or mass selection (particle spectrometers or separator tubes H01J 49/00)
  - 29/86 • Vessels; Containers; Vacuum locks
  - 29/87 • • Arrangements for preventing or mitigating effects of implosion of vessels or containers [2]
  - 29/88 • • provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent screens H01J 29/18)
  - 29/89 • • Optical or photographic arrangements structurally combined with the vessel
  - 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)
  - 29/94 • Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering
  - 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
- 31/00 Cathode-ray tubes; Electron-beam tubes**  
(H01J 25/00, H01J 33/00, H01J 35/00, H01J 37/00 take precedence; details of cathode-ray tubes or of electron-beam tubes H01J 29/00; cathode-ray or electron-stream lamps H01J 63/00)
- 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
  - 31/04 • • with only one or two output electrodes
  - 31/06 • • with more than two output electrodes, e.g. for multiple switching or counting
  - 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
  - 31/14 • • • • Magic-eye or analogous tuning indicators
  - 31/15 • • • • with ray or beam selectively directed to luminescent anode segments [3]
  - 31/16 • • • • with mask carrying a number of selectively displayable signs, e.g. numeroscope
  - 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
  - 31/20 • • • for displaying images or patterns in two or more colours
  - 31/22 • • • for stereoscopic displays
  - 31/24 • • • with screen acting as light valve by shutter operation, e.g. eidophor

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 a photo-emissive screen H01J 40/20)	<b>33/00</b>	<b>Discharge tubes with provision for emergence of electrons or ions from the vessel (particle accelerators H05H); Lenard tubes</b>
31/28	• • • with electron ray scanning the image screen	33/02	• Details
31/30	• • • • having regulation of screen potential at anode potential, e.g. iconoscope	33/04	• • Windows
31/32	• • • • • Tubes with image-amplification section, e.g. image-iconoscope, supericonoscope	<b>35/00</b>	<b>X-ray tubes (X-ray lasers H01S 4/00; X-ray technique in general H05G)</b>
31/34	• • • • having regulation of screen potential at cathode potential, e.g. orthicon	35/02	• Details
31/36	• • • • • Tubes with image-amplification section, e.g. image-orthicon	35/04	• • Electrodes
31/38	• • • • • Tubes with photoconductive screen, e.g. vidicon	35/06	• • • Cathodes
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"	35/08	• • • Anodes; Anticathodes
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	35/10	• • • • Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes
31/44	• • • • Tubes with image-amplification section	35/12	• • • • Cooling non-rotary anodes
31/46	• • • Tubes in which electrical output represents both intensity and colour of image	35/14	• • Arrangements for concentrating, focusing, or directing the cathode ray
31/48	• • • Tubes with amplification of output effected by electron-multiplier arrangements within the vacuum space	35/16	• • Vessels; Containers; Shields associated therewith
31/49	• • Pick-up tubes 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	35/18	• • • Windows
31/495	• • Pick-up tubes adapted for an input of sonic, ultrasonic, or mechanical vibrations and having an electric output	35/20	• • Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering
31/50	• • Image-conversion or image-amplification tubes, i.e. having optical, X-ray, or analogous input, and optical output	35/22	• specially designed for passing a very high current for a very short time, e.g. for flash operation
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"	35/24	• Tubes wherein the point of impact of the cathode ray on the anode or anticathode is movable relative to the surface thereof
31/54	• • • in which the electron ray or beam is reflected by the image input screen on to the image output screen	35/26	• • by rotation of the anode or anticathode
31/56	• • • for converting or amplifying images in two or more colours	35/28	• • by vibration, oscillation, reciprocation, or swash-plate motion of the anode or anticathode
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	35/30	• • by deflection of the cathode ray
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 29/98)	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
31/62	• • • • with separate reading and writing rays	<b>37/00</b>	<b>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) [2, 5]</b>
31/64	• • • • • on opposite sides of screen, e.g. for conversion of definition	37/02	• Details
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	37/04	• • Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement, ion-optical arrangement
31/68	• • • in which the information pattern represents two or more colours	37/05	• • • Electron- or ion-optical arrangements for separating electrons or ions according to their energy (particle separator tubes H01J 49/00) [3]
		37/06	• • • Electron sources; Electron guns
		37/063	• • • • Geometrical arrangement of electrodes for beam-forming [3]
		37/065	• • • • Construction of guns or parts thereof (H01J 37/067-H01J 37/077 take precedence) [3]
		37/067	• • • • Replacing parts of guns; Mutual adjustment of electrodes (H01J 37/073-H01J 37/077 take precedence; vacuum locks H01J 37/18) [3]
		37/07	• • • • Eliminating deleterious effects due to thermal effects or electric or magnetic fields (H01J 37/073-H01J 37/077 take precedence) [3]

## H01J

- 37/073 • • • • Electron guns using field emission, photo emission, or secondary emission electron sources [3]
- 37/075 • • • • Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser [3]
- 37/077 • • • • Electron guns using discharge in gases or vapours as electron sources [3]
- 37/08 • • • • Ion sources; Ion guns
- 37/09 • • • • Diaphragms; Shields associated with electron- or ion-optical arrangements; Compensation of disturbing fields [3]
- 37/10 • • • • Lenses
- 37/12 • • • • electrostatic
- 37/14 • • • • magnetic
- 37/141 • • • • • Electromagnetic lenses [3]
- 37/143 • • • • • Permanent magnetic lenses [3]
- 37/145 • • • • • Combinations of electrostatic and magnetic lenses [3]
- 37/147 • • • • Arrangements for directing or deflecting the discharge along a desired path (lenses H01J 37/10) [2]
- 37/15 • • • • • External mechanical adjustment of electron- or ion-optical components (H01J 37/067, H01J 37/20 take precedence) [3]
- 37/153 • • • • Electron-optical or ion-optical arrangements for the correction of image defects, e.g. stigmators [2]
- 37/16 • • • • Vessels; Containers
- 37/18 • • • • Vacuum locks
- 37/20 • • • • Means for supporting or positioning the object or the material; Means for adjusting diaphragms or lenses associated with the support (preparing specimens for investigation G01N 1/28)
- 37/21 • • • • Means for adjusting the focus [2]
- 37/22 • • • • Optical or photographic arrangements associated with the tube
- 37/24 • • • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
- 37/244 • • • • Detectors; Associated components or circuits therefor [3]
- 37/248 • • • • Components associated with high voltage supply (high voltage supply in general H02J, H02M) [3]
- 37/252 • • • • Tubes for spot-analysing by electron or ion beams; Microanalysers (investigating or analysing thereby G01N 23/22) [3]
- 37/256 • • • • using scanning beams [3]
- 37/26 • • • • Electron or ion microscopes; Electron- or ion-diffraction tubes [2]
- 37/27 • • • • Shadow microscopy [3]
- 37/28 • • • • with scanning beams (microanalysers using scanning beams H01J 37/256)
- 37/285 • • • • Emission microscopes, e.g. field-emission microscopes [2]
- 37/29 • • • • Reflection microscopes [2]
- 37/295 • • • • Electron- or ion-diffraction tubes [2]
- 37/30 • • • • Electron-beam or ion-beam tubes for localised treatment of objects
- 37/301 • • • • Arrangements enabling beams to pass between regions of different pressure [3]
- 37/302 • • • • Controlling tubes by external information, e.g. programme control (H01J 37/304 takes precedence) [3]
- 37/304 • • • • Controlling tubes by information coming from the objects, e.g. correction signals [3]
- 37/305 • • • • for casting, melting, evaporating, or etching [2]
- 37/31 • • • • for cutting or drilling [2]
- 37/315 • • • • for welding [2]
- 37/317 • • • • for changing properties of the objects or for applying thin layers thereon, e.g. ion implantation (H01J 37/36 takes precedence) [3]
- 37/32 • • • • Gas-filled discharge tubes (heating by discharge H05B)
- 37/34 • • • • operating with cathodic sputtering (H01J 37/36 takes precedence) [3]
- 37/36 • • • • for cleaning surfaces while plating with ions of materials introduced into the discharge, e.g. introduced by evaporation [3]
- 40/00 Photoelectric discharge tubes not involving the ionisation of a gas** (H01J 49/00 takes precedence; cathode-ray or image-pick-up tubes H01J 31/26) [3]
- 40/02 • • • • Details [3]
- 40/04 • • • • Electrodes [3]
- 40/06 • • • • • Photo-emissive cathodes [3]
- 40/08 • • • • • Magnetic means for controlling discharge [3]
- 40/10 • • • • • Selection of substances for gas fillings [3]
- 40/12 • • • • • One or more circuit elements structurally associated with the tube [3]
- 40/14 • • • • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for [3]
- 40/16 • • • • • having photo-emissive cathode, e.g. alkaline photoelectric cell (operating with secondary emission H01J 43/00) [3]
- 40/18 • • • • • with luminescent coatings for influencing the sensitivity of the tube, e.g. by converting the input wavelength (image-conversion or image-amplification tubes H01J 31/50) [3]
- 40/20 • • • • • wherein a light-ray scans a photo-emissive screen [3]
- 41/00 Discharge tubes and means integral therewith for measuring gas pressure** (vacuum gauge systems using such tubes G01L 21/30); **Discharge tubes for evacuation by diffusion of ions**
- 41/02 • • • • Discharge tubes and means integral therewith for measuring gas pressure [2]
- 41/04 • • • • • with ionisation by means of thermionic cathodes [2]
- 41/06 • • • • • with ionisation by means of cold cathodes [2]
- 41/08 • • • • • with ionisation by means of radioactive substances, e.g. alphasources [2]
- 41/10 • • • • • of particle-spectrometer type (particle spectrometers in general H01J 49/00) [2]
- 41/12 • • • • • Discharge tubes for evacuating by diffusion of ions, e.g. ion pumps, getter ion pumps [2]
- 41/14 • • • • • with ionisation by means of thermionic cathodes [2]
- 41/16 • • • • • • using gettering substances [2]
- 41/18 • • • • • • with ionisation by means of cold cathodes [2]
- 41/20 • • • • • • using gettering substances [2]
- 43/00 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)
- 43/02 • • • • • Tubes in which one or a few electrodes are secondary-electron-emitting electrodes
- 43/04 • • • • • Electron multipliers
- 43/06 • • • • • • Electrode arrangements

- 43/08 • • • Cathode arrangements (construction of photo cathodes H01J 40/06, H01J 40/16, H01J 47/00, H01J 49/08)
- 43/10 • • • Dynodes (H01J 43/24, H01J 43/26 take precedence; secondary-electron-emitting electrodes in general H01J 1/32)
- 43/12 • • • Anode arrangements
- 43/14 • • • Control of electron beam by magnetic field
- 43/16 • • • Electrode arrangements using essentially one dynode
- 43/18 • • • Electrode arrangements using essentially more than one dynode
- 43/20 • • • • Dynodes consisting of sheet material, e.g. plane, bent
- 43/22 • • • • Dynodes consisting of electron-permeable material, e.g. foil, grid, tube, venetian blind
- 43/24 • • • • Dynodes having potential gradient along their surfaces
- 43/26 • • • • Box dynodes
- 43/28 • • Vessels; Windows; Screens; Suppressing undesired discharges or currents
- 43/30 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
- 45/00 Discharge tubes functioning as thermionic generators**
- 47/00 Tubes for determining the presence, intensity, density or energy of radiation or particles** (photoelectric discharge tubes not involving the ionisation of a gas H01J 40/00) [3]
- 47/02 • Ionisation chambers [3]
- 47/04 • • Capacitive ionisation chambers, e.g. the electrodes of which are used as electrometers (electrostatic dosimeters in general G01T 1/14) [3]
- 47/06 • Proportional counter tubes [3]
- 47/08 • Geiger-Müller counter tubes [3]
- 47/10 • Spark counters (H01J 47/14 takes precedence; spark gaps H01T) [3]
- 47/12 • Neutron detector tubes, e.g. BF<sub>3</sub> tubes [3]
- 47/14 • Parallel electrode spark or streamer chambers; Wire spark or streamer chambers [3]
- 47/16 • • characterised by readout of each individual wire [3]
- 47/18 • • • the readout being electrical (H01J 47/20 takes precedence) [3]
- 47/20 • • • the readout employing electrical or mechanical delay lines, e.g. magnetostrictive delay lines [3]
- 47/22 • • characterised by another type of readout [3]
- 47/24 • • • the readout being acoustical [3]
- 47/26 • • • the readout being optical [3]
- 49/00 Particle spectrometers or separator tubes** (for measuring gas pressure H01J 41/10) [3]
- Note(s)**
- 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.
- 49/02 • Details [3]
- 49/04 • • Arrangements for introducing or extracting samples to be analysed, e.g. vacuum locks; Arrangements for external adjustment of electron- or ion-optical components [3]
- 49/06 • • Electron- or ion-optical arrangements (H01J 49/04 takes precedence) [3]
- 49/08 • • Electron sources, e.g. for generating photoelectrons, secondary electrons or Auger electrons [3]
- 49/10 • • Ion sources; Ion guns [3]
- 49/12 • • • using an arc discharge, e.g. of the duoplasmatron type [3]
- 49/14 • • • using particle bombardment, e.g. ionisation chambers [3]
- 49/16 • • • using surface ionisation, e.g. field-, thermionic- or photo-emission [3]
- 49/18 • • • using spark ionisation [3]
- 49/20 • • Magnetic deflection [3]
- 49/22 • • Electrostatic deflection [3]
- 49/24 • • Vacuum systems, e.g. maintaining desired pressures [3]
- 49/26 • Mass spectrometers or separator tubes (isotope separation using these tubes B01D 59/44; mass spectrometers specially adapted for column chromatography G01N 30/72) [3]
- 49/28 • • Static spectrometers [3]
- 49/30 • • • using magnetic analysers [3]
- 49/32 • • • using double focusing [3]
- 49/34 • • Dynamic spectrometers [3]
- 49/36 • • • Radio frequency spectrometers, e.g. Bennett-type spectrometers, Redhead-type spectrometers [3]
- 49/38 • • • • Omegatrons [3]
- 49/40 • • • Time-of-flight spectrometers (H01J 49/36 takes precedence) [3]
- 49/42 • • • Stability-of-path spectrometers, e.g. monopole, quadrupole, multipole, farvitrons [3]
- 49/44 • Energy spectrometers, e.g. alpha-, beta-spectrometers [3]
- 49/46 • • Static spectrometers [3]
- 49/48 • • • using electrostatic analysers, e.g. cylindrical sector, Wien filter [3]
- 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 F21; circuits therefor H05B; arc lamps with consumable electrodes H05B; electroluminescent lamps H05B)
- 61/02 • Details
- 61/04 • • Electrodes (for igniting H01J 61/54); Screens; Shields
- 61/06 • • • Main electrodes
- 61/067 • • • • for low-pressure discharge lamps [2]
- 61/073 • • • • for high-pressure discharge lamps [2]
- 61/09 • • • • Hollow cathodes [2]
- 61/10 • • • Shield, screens, or guides for influencing the discharge
- 61/12 • • Selection of substances for gas fillings; Specified operating pressure or temperature
- 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 • • • having a metallic vapour as the principal constituent
- 61/20 • • • • mercury vapour

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- 61/22 • • • vapour of an alkali metal
- 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 • • Vessels; Containers
- 61/32 • • • Special longitudinal shape, e.g. for advertising purposes
- 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
- 61/38 • • 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
- 61/54 • • Igniting arrangements, e.g. promoting ionisation for starting (circuit arrangements H05B)
- 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, 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
- 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
- 61/72 • • having a main light-emitting filling of easily vaporisable metal vapour, e.g. mercury
- 61/74 • • having a main light-emitting filling of difficult vaporisable 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
- 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
- 61/96 • Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope, e.g. for simulating daylight (lamps with filament heated only by non-luminous discharge H01K)
- 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)**
- 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
- 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

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- 99/00 Subject matter not provided for in other groups of this subclass [2006.01]**