CPC COOPERATIVE PATENT CLASSIFICATION

F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING
(NOTE omitted)

LIGHTING; HEATING

F22 STEAM GENERATION
(NOTE omitted)

F22B METHODS OF STEAM GENERATION; STEAM BOILERS (steam engine plants where engine aspects predominate F01K; domestic central-heating systems using steam F24D; heat exchange or heat transfer in general F28; generation of vapour in the cores of nuclear reactors G21)

NOTE

This subclass covers only methods of, or apparatus for, the generation of steam under pressure for heating or power purposes

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.

General aspects of, or methods for, steam generation

1/00 **Methods of steam generation characterised by form of heating method** (solar heating F24S; jackets or other cooling means in which steam is generated and which serve for cooling other apparatus, see the subclasses for such apparatus)

1/003 . {using combustion of hydrogen with oxygen (power plants using steam created by combustion of hydrogen with oxygen F01K 25/005)}

1/006 . {using solar heat (solar heat collectors per se F24S; devices for producing mechanical power from solar energy F03G 6/00)}

1/02 . by exploitation of the heat content of hot heat carriers

1/021 . . {with heating tubes in which flows a non-specified heating fluid (for nuclear reactors F22B 1/023, for hot gas F22B 1/1884)}

1/023 . . {with heating tubes, for nuclear reactors as far as they are not classified, according to a specified heating fluid, in another group}

1/025 . . . {with vertical U shaped tubes carried on a horizontal tube sheet}

1/026 . . . {with vertical tubes between to horizontal tube sheets}

1/028 . . {Steam generation using heat accumulators (F22B 27/14 takes precedence)}

1/04 . . the heat carrier being hot slag, hot residues, or heated blocks, e.g. iron blocks

1/06 . . the heat carrier being molten; Use of molten metal, e.g. zinc, as heat transfer medium

1/063 . . . {for metal cooled nuclear reactors (heat-exchangers having a liquid metal as heat exchange medium **F28D7/00C**)}

1/066 . . . . {with double-wall tubes having a third fluid between these walls, e.g. helium for leak detection (heat-exchangers with double-wall tubes F28D 7/10; double-wall pipes per se F16L 9/18)}

1/08 . . the heat carrier being steam

1/10 . . . released from heat accumulators

1/12 . . . produced by an indirect cyclic process

1/123 . . . . {Steam generators downstream of a nuclear boiling water reactor}

1/126 . . . . {Steam generators of the Schmidt-Hartmann type}

1/14 . . . coming in direct contact with water in bulk or in sprays

1/143 . . . . {in combination with a nuclear installation}

1/146 . . . . {Loffler boilers}

1/16 . . the heat carrier being hot liquid or hot vapour, e.g. waste liquid, waste vapour

1/162 . . . {in combination with a nuclear installation}

1/165 . . . {using heat pipes (heat pipes per se F28D 15/02)}

1/167 . . . {using an organic fluid}

1/18 . . the heat carrier being a hot gas, e.g. waste gas such as exhaust gas of internal-combustion engines (use of waste heat of combustion engines, in general, F02G)

1/1807 . . . {using the exhaust gases of combustion engines}

1/1815 . . . . {using the exhaust gases of gas-turbines}

1/1823 . . . {for gas-cooled nuclear reactors}

1/183 . . . {in combination with metallurgical converter installations}

1/1838 . . . {the hot gas being under a high pressure, e.g. in chemical installations}

1/1846 . . . . {the hot gas being loaded with particles, e.g. waste heat boilers after a coal gasification plant}

1/1853 . . . {coming in direct contact with water in bulk or in sprays}
1/1861 . . . {Waste heat boilers with supplementary firing}
1/1869 . . . {Hot gas water tube boilers not provided for in F22B 1/1807 - F22B 1/1861}
1/1876 . . . . {the hot gas being loaded with particles, e.g. dust (with the hot gas being under high pressure F22B 1/1846)}
1/1884 . . . {Hot gas heating tube boilers with one or more heating tubes}
1/1892 . . . {Systems therefor not provided for in F22B 1/1807 - F22B 1/1861}
1/20 . using heat evolved in a solution absorbing steam; Soda steam boilers
1/22 . using combustion under pressure substantially exceeding atmospheric pressure
1/24 . . Pressure-fired steam boilers, e.g. using turbo-air compressors actuated by hot gases from boiler furnace
1/26 . . Steam boilers of submerged-flame type, i.e. the flame being surrounded by, or impinging on, the water to be vaporised {, e.g. water in sprays}
1/265 . . . {the water being in bulk}
1/28 . in boilers heated electrically {(superheating using an electrical heat source independent from heat supply of the steam boiler F22G 1/165)}
1/281 . . {other than by electrical resistances or electrodes}
1/282 . . {with water or steam circulating in tubes or ducts}
1/284 . . {with water in reservoirs}
1/285 . . . {the water being fed by a pump to the reservoirs}
1/287 . . {with water in sprays or in films}
1/288 . . {Instantaneous electrical steam generators built-up from heat-exchange elements arranged within a confined chamber having heat-retaining walls}
1/30 . . Electrode boilers
1/303 . . . {with means for injecting or spraying water against electrodes or with means for water circulation}
1/306 . . . . {with at least one electrode permanently above the water surface}

3/00 Other methods of steam generation; Steam boilers not provided for in other groups of this subclass
3/02 . involving the use of working media other than water
3/04 . by drop in pressure of high-pressure hot water within pressure- reducing chambers, e.g. in accumulators (steam accumulators per se F01K 1/00)
3/045 . . {the drop in pressure being achieved by compressors, e.g. with steam jet pumps}
3/06 . by transformation of mechanical, e.g. kinetic, energy into heat energy
3/08 . at critical or supercritical pressure values

Kinds of steam boilers

5/00 Steam boilers of drum type, i.e. without internal furnace or fire tubes, the boiler body being contacted externally by flue gas
5/005 . {with rotating drums}
5/02 . with auxiliary water tubes outside the boiler body
5/04 . Component parts thereof; Accessories therefor (covers or similar closure members F16J 13/00)

7/00 Steam boilers of furnace-tube type, i.e. the combustion of fuel being performed inside one or more furnace tubes built-in in the boiler body
7/02 . without auxiliary water tubes
7/04 . with auxiliary water tubes
7/06 . . inside the furnace tube in transverse arrangements
7/08 . . inside the furnace tube in longitudinal arrangement
7/10 . . outside the boiler body
7/12 . with auxiliary fire tubes; Arrangement of header boxes providing for return diversion of flue gas flow
7/14 . with both auxiliary water tubes and auxiliary fire tubes
7/16 . Component parts thereof; Accessories therefor, e.g. stay-bolt connections
7/18 . . Walling of flues; Flue gas header boxes
7/20 . . Furnace tubes

9/00 Steam boilers of fire-tube type, i.e. the flue gas from a combustion chamber outside the boiler body flowing through tubes built-in in the boiler body
9/02 . the boiler body being disposed upright, e.g. above the combustion chamber
9/04 . . the fire tubes being in upright arrangement
9/06 . . . Arrangement of header boxes providing for return diversion of flue gas flow
9/08 . . the fire tubes being in horizontal arrangement
9/10 . the boiler body being disposed substantially horizontally, e.g. at the side of the combustion chamber
9/12 . . the fire tubes being in substantially horizontal arrangement
9/14 . . . Arrangement of header boxes providing for return diversion of flue gas flow
9/16 . the boiler body containing fire tubes disposed crosswise in inclined upward arrangement
9/18 . Component parts thereof; Accessories therefor, e.g. stay-bolt connections

11/00 Steam boilers of combined fire-tube type and water-tube type, i.e. steam boilers of fire-tube type having auxiliary water tubes
11/02 . the fire tubes being in upright arrangement
11/04 . the fire tubes being in horizontal arrangement

13/00 Steam boilers of fire-box type, i.e. the combustion of fuel being performed in a chamber or fire-box with subsequent flue(s) or fire tube(s), both chamber or fire-box and flues or fire tubes being built-in in the boiler body
13/005 . {with flues, other than fire tubes}
13/02 . mounted in fixed position with the boiler body disposed upright
13/023 . . {with auxiliary water tubes inside the fire-box, e.g. vertical tubes (F22B 13/10 takes precedence)}
13/026 . . . {the tubes being in substantially horizontal arrangement}
13/04 . mounted in fixed position with the boiler body disposed substantially horizontally
13/06 . Locomobile, traction-engine, steam-roller, or locomotive boilers

13/065 . . {Combination of low and high pressure locomotive boilers}
13/08 . . without auxiliary water tubes inside the fire-box
13/10 . . with auxiliary water tubes inside the fire-box
13/12 . . . the auxiliary water tubes lining the fire-box
13/14 . Component parts thereof; Accessories therefor
13/145 . . {Firebox thermosiphons}
13/16 . . Stay-bolt connections, e.g. rigid connections
13/18 . . . Flexible connections, e.g. of ball-and-socket type

15/00 Water-tube boilers of horizontal type, i.e. the water-tube sets being arranged horizontally

17/00 Water-tube boilers of horizontally-inclined type, e.g. the water-tube sets being inclined slightly with respect to the horizontal plane

17/02 . built-up from water-tube sets in abutting connection with two header boxes in common for all sets, e.g. with flat header boxes
17/025 . . {with combined inlet and outlet header boxes, e.g. connected by U-tubes or Field tubes}
17/04 . . the water-tube sets being inclined in opposite directions, e.g. crosswise
17/06 . . the water-tube sets being bent angularly
17/08 . . the water-tube sets being curved
17/10 . built-up from water-tube sets in abutting connection with two sectional headers each for every set, i.e. with headers in a number of sections across the width or height of the boiler
17/105 . . {with tubes in series flow arrangement}
17/12 . . the sectional headers being in vertical or substantially vertical arrangement
17/14 . . the sectional headers being in horizontal or substantially horizontal arrangement
17/16 . Component parts thereof; Accessories therefor
17/18 . . Header boxes; Sectional headers

19/00 Water-tube boilers of combined horizontally-inclined type and vertical type, i.e. water-tube boilers of horizontally-inclined type having auxiliary water-tube sets in vertical or substantially vertical arrangement

21/00 Water-tube boilers of vertical or steeply-inclined type, i.e. the water-tube sets being arranged vertically or substantially vertically

21/002 . {involving a single upper drum (F22B 21/36 takes precedence)}
21/005 . {involving a central vertical drum, header or downcomer}
21/007 . {specially adapted for locomotives}
21/02 . built-up from substantially straight water tubes
21/04 . . involving a single upper drum and a single lower drum, e.g. the drums being arranged transversely
21/06 . . . the water tubes being arranged annularly in sets, e.g. in abutting connection with drums of annular shape
21/065 . . . . {involving an upper and lower drum of annular shape}
21/08 . . . the water tubes being arranged sectionally in groups or in banks, e.g. bent over at their ends
21/081 . . . . {involving a combustion chamber, placed at the side and built-up from water tubes}
21/083 . . . . {involving an upper drum and a lower drum and a fire-place between the two drums}
21/085 . . . . {the tubes being placed in layers}
21/086 . . . . {Frames built-up from water tubes}
21/088 . . . . {involving an upper drum and a lower drum and two lateral drums}
21/10 . . . the water tubes being arranged in staggered rows
21/12 . . involving two or more upper drums and two or more lower drums, e.g. with crosswise-arranged water-tube sets in abutting connections with drums
21/123 . . . {involving crossed water tubes}
21/126 . . . {involving more than two lower or upper drums}
21/14 . . involving a single upper drum and two or more lower drums
21/16 . . . the lower drums being interconnected by further water tubes
21/18 . . involving two or more upper drums and a single lower drum
21/185 . . . {involving more than two upper drums and a single lower drum}
21/20 . . involving sectional or subdivided headers in separate arrangement for each water-tube set
21/22 . built-up from water tubes of form other than straight or substantially straight
21/24 . . bent in serpentine or sinuous form
21/26 . . bent helically, i.e. coiled
21/28 . . bent spirally
21/30 . . bent in U-loop form
21/32 . . . disposed horizontally in abutting connection with upright headers or rising water mains
21/34 . built-up from water tubes grouped in panel form surrounding the combustion chamber, i.e. radiation boilers
21/341 . . {Vertical radiation boilers with combustion in the lower part}
21/343 . . . {the vertical radiation combustion chamber being connected at its upper part to a sidewards convection chamber}
21/345 . . . . {with a tube bundle between an upper and a lower drum in the convection pass}
21/346 . . {Horizontal radiation boilers}
21/348 . . {Radiation boilers with a burner at the top}
21/36 . . involving an upper drum or headers mounted at the top of the combustion chamber
21/363 . . . {involving a horizontal drum mounted in an upper corner of the boiler}
21/366 . . . {involving a horizontal drum mounted in the middle of the boiler}
21/38 . . Component parts thereof, e.g. prefabricated panels
21/40 . built-up from water tubes arranged in a comparatively long vertical shaft, i.e. tower boilers

23/00 Water-tube boilers built-up from sets of spaced double-walled water tubes of return type in unilateral abutting connection with a boiler drum or with a header box, i.e. built-up from Field water tubes comprising an inner tube arranged within an outer unilaterally-closed tube

23/02 . the water-tube, i.e. Field-tube, sets being horizontal or substantially horizontal
23/04 . the water-tube, i.e. Field-tube, sets being vertical or substantially vertical

23/06 . Component parts thereof, e.g. Field water tubes (heat-exchange tubes in general F28F)

25/00 Water-tube boilers built-up from sets of water tubes with internally-arranged flue tubes, or fire tubes, extending through the water tubes

27/00 Instantaneous or flash steam boilers

27/02 . built-up from fire tubes

27/04 . built-up from water tubes (F22B 27/12 - F22B 27/16 take precedence)

27/06 . . bent in serpentine or sinuous form

27/08 . . bent helically, i.e. coiled

27/10 . . bent spirally

27/12 . built-up from rotary heat-exchange elements, e.g. from tube assemblies

27/14 . built-up from heat-exchange elements arranged within a confined chamber having heat-retaining walls {(F22B 1/288 takes precedence)}

27/16 . involving spray nozzles for sprinkling or injecting water particles on to or into hot heat-exchange elements, e.g. into tubes {(F22B 1/287 takes precedence)}

27/165 . . {with film flow of water on heated surfaces}

29/00 Steam boilers of forced-flow type

29/02 . of forced-circulation type {(F22B 29/06 takes precedence)}

29/023 . . {without drums, i.e. without hot water storage in the boiler}

29/026 . . . {operating at critical or supercritical pressure}

29/04 . of combined-circulation type, i.e. in which convection circulation due to the difference in specific gravity between cold and hot water is promoted by additional measures, e.g. by injecting pressure-water temporarily

29/06 . of once-through type, i.e. built-up from tubes receiving water at one end and delivering superheated steam at the other end of the tubes (F22B 33/00 takes precedence)

29/061 . . {Construction of tube walls}

29/062 . . . {involving vertically-disposed water tubes}

29/064 . . . {involving horizontally- or helically-disposed water tubes}

29/065 . . . {involving upper vertically disposed water tubes and lower horizontally- or helically disposed water tubes}

29/067 . . {operating at critical or supercritical pressure (with recirculation during normal operation F22B 29/026)}

29/068 . . {operating with superimposed recirculation during normal operation (F22B 29/12 takes precedence)}

29/08 . . operating with fixed point of final state of complete evaporation {(evaporation or evaporation apparatus for physical or chemical purposes, e.g. evaporation of liquids for gas phase reactions B01B 1/005)}

29/10 . . operating with sliding point of final state of complete evaporation {(evaporation or evaporation apparatus for physical or chemical purposes, e.g. evaporation of liquids for gas phase reactions B01B 1/005)}

29/12 . . operating with superimposed recirculation during starting and low-load periods, e.g. composite boilers

31/00 Modifications of boiler construction, or of tube systems, dependent on installation of combustion apparatus; Arrangements of dispositions of combustion apparatus (steam generation characterised by heating method F22B 1/00; combustion apparatus per se F23)

31/0007 . {with combustion in a fluidized bed (fluidized bed apparatus per se B01J 8/00; fluidized bed combustors F23C 10/00)}

31/0015 . . {for boilers of the water tube type}

31/0023 . . . {with tubes in the bed (F22B 31/003 takes precedence)}

31/003 . . . {with tubes surrounding the bed or with water tube wall partitions}

31/0038 . . . . {with tubes in the bed}

31/0046 . . {for boilers of the shell type, e.g. with furnace box}

31/0053 . . . {with auxiliary water tubes}

31/0061 . . {Constructional features of bed cooling}

31/0069 . . {Systems therefor}

31/0076 . . {Controlling processes for fluidized bed boilers not related to a particular type}

31/0084 . . {with recirculation of separated solids or with cooling of the bed particles outside the combustion bed}

31/0092 . . . {with a fluidized heat exchange bed and a fluidized combustion bed separated by a partition, the bed particles circulating around or through that partition}

31/02 . Installation of water-tube boilers in chimneys, e.g. in converter chimneys

31/04 . Heat supply by installation of two or more combustion apparatus, e.g. of separate combustion apparatus for the boiler and the superheater respectively

31/045 . . {Steam generators specially adapted for burning refuse}

31/06 . . Installation of emergency heat supply

31/08 . Installation of heat-exchange apparatus or of means in boilers for heating air supplied for combustion

Steam-generation plants; Control systems

33/00 Steam-generation plants, e.g. comprising steam boilers of different types in mutual association (arrangements or dispositions of steam-generation plants in marine vessels B63H 21/00)

33/02 . Combinations of boilers having a single combustion apparatus in common

33/04 . . of boilers of furnace-tube type with boilers of water-tube type

33/06 . . of boilers of furnace-tube type with boilers of fire-tube type

33/08 . . of boilers of water tube type with boilers of fire-tube type

33/10 . . of two or more superposed boilers with separate water volumes and operating with two or more separate water levels

33/12 . Self-contained steam boilers, i.e. comprising as a unit the steam boiler, the combustion apparatus, the fuel storage, accessory machines and equipment

33/14 . Combinations of low and high pressure boilers (F22B 13/065 takes precedence)
33/16 . . of forced-flow type
33/18 . Combinations of steam boilers with other apparatus
33/185 . . {in combination with a steam accumulator}

35/00 Control systems for steam boilers ({for fluidized bed boilers F22B 31/0076;} regulation or control of steam power plants F01K 7/00; for regulating feed-water supply F22D; for controlling superheat temperature F22G 5/00; control of combustion F23N; regulating or controlling in general G05)
35/001 . {Controlling by flue gas dampers (for superheaters F22G 5/04)}
35/002 . {Control by recirculating flue gases (for superheaters F22G 5/06)}
35/004 . {Control systems for steam generators of nuclear power plants}
35/005 . {Control systems for instantaneous steam boilers}
35/007 . {Control systems for waste heat boilers}
35/008 . {Control systems for two or more steam generators (F22D 5/36 takes precedence)}
35/02 . for steam boilers with natural convection circulation
35/04 . . during starting-up periods, i.e. during the periods between the lighting of the furnaces and the attainment of the normal operating temperature of the steam boilers
35/06 . for steam boilers of forced-flow type
35/08 . . of forced-circulation type
35/083 . . . {without drum, i.e. without hot water storage in the boiler}
35/086 . . . . {operating at critical or supercritical pressure}
35/10 . . of once-through type
35/101 . . . {operating with superimposed recirculation during starting or low load periods, e.g. composite boilers (F22B 35/125 takes precedence)}
35/102 . . . {operating with fixed point of final state of complete evaporation, e.g. in a steam-water separator}
35/104 . . . {Control systems by injecting water (for superheaters F22G 5/12)}
35/105 . . . {operating at sliding pressure}
35/107 . . . {Control systems with auxiliary heating surfaces}
35/108 . . . {Control systems for steam generators having multiple flow paths}
35/12 . . . operating at critical or supercritical pressure
35/125 . . . . {operating with superimposed recirculation during starting or low load periods, e.g. composite boilers}
35/14 . . during the starting-up periods, i.e. during the periods between the lighting of the furnaces and the attainment of the normal operating temperature of the steam boilers
35/16 . . responsive to the percentage of steam in the mixture of steam and water
35/18 . Applications of computers to steam boiler control

37/00 Component parts or details of steam boilers (venting devices F16K 24/00; steam traps or like apparatus F16T)
37/001 . {Steam generators built-up from pre-fabricated elements}
37/002 . {specially adapted for nuclear steam generators, e.g. maintenance, repairing or inspecting equipment not otherwise provided for}
37/003 . . {Maintenance, repairing or inspecting equipment positioned in or via the headers}
37/005 . . . {Positioning apparatus specially adapted therefor (F22B 37/64 takes precedence)}
37/006 . . {Walking equipment, e.g. walking platforms suspended at the tube sheet (walking mechanism per se B62D 57/02)}
37/007 . . {Installation or removal of nuclear steam generators}
37/008 . {Adaptations for flue gas purification in steam generators, (flue gas purification in general F23J; gas purification in general B01D)}
37/02 . applicable to more than one kind or type of steam boiler
37/025 . . {Devices and methods for diminishing corrosion, e.g. by preventing cooling beneath the dew point}
37/04 . . and characterised by material, e.g. use of special steel alloy
37/06 . . Flue or fire tubes; Accessories therefor, e.g. fire-tube inserts
37/08 . . . Fittings preventing burning-off of the tube edges
37/10 . . Water tubes; Accessories therefor (working of metal tubes B21D; pipes in general F16L; repairing leaks in water tubes F16L 55/16; F28F 11/00; baffles, screens, or deflectors formed of water tubes F23M 9/10; cleaning internal or external surfaces of water tubes F28G)
37/101 . . . {Tubes having fins or ribs}
37/102 . . . . {Walls built-up from finned tubes}
37/103 . . . . {Internally ribbed tubes}
37/104 . . . {Connection of tubes one with the other or with collectors, drums or distributors (in general F16L)}
37/105 . . . {Penetrations of tubes through a wall and their sealing (in general F16L 5/00)}
37/106 . . . {Studding of tubes}
37/107 . . . {Protection of water tubes (in general F16L 57/00)}
37/108 . . . . {Protection of water tube walls}
37/12 . . . Forms of water tubes, e.g. of varying cross-section
37/125 . . . . {Bifurcates}
37/14 . . . Supply mains, e.g. rising mains, down-comers, in connection with water tubes
37/141 . . . . {involving vertically-disposed water tubes, e.g. walls built-up from vertical tubes}
37/142 . . . . {involving horizontally-or helically-disposed water tubes, e.g. walls built-up from horizontal or helical tubes}
37/143 . . . . {Panel shaped heating surfaces built up from tubes (F22B 37/145 takes precedence)}
37/145 . . . . {Flag-shaped panels built-up from tubes, e.g. from U-shaped tubes}
37/146 . . . . {Tube arrangements for ash hoppers and grates and for combustion chambers of the cyclone or similar type out of the flues}
37/147 . . . . {Tube arrangements for cooling orifices, doors and burners}
37/148 . . . . {Tube arrangements for the roofs}
37/16 . . . Return bends

37/165 . . . . {Closures for access openings in return bends (boiler plugs for drums or headers F22B 37/223)}
37/18 . . . Inserts, e.g. for receiving deposits from water
37/20 . . . Supporting arrangements, e.g. for securing water-tube sets (construction of tube walls of furnaces including boiler furnaces F23M 5/08)
37/201 . . . . {Suspension and securing arrangements for walls built-up from tubes}
37/202 . . . . {Suspension and securing arrangements for contact heating surfaces}
37/203 . . . . . {Horizontal tubes supported only away from their ends on vertical support tubes}
37/204 . . . . {Supporting arrangements for individual tubes, e.g. for securing tubes to a refractory wall}
37/205 . . . . {Supporting and spacing arrangements for tubes of a tube bundle}
37/206 . . . . . {Anti-vibration supports for the bends of U-tube steam generators}
37/207 . . . . {Supporting arrangements for drums and collectors}
37/208 . . . . {Backstay arrangements}
37/22 . . Drums; Headers; Accessories therefor (making boilers from sheet metal B21D 51/24; pressure vessels in general F16J 12/00; covers or similar closure members F16J 13/00)
37/221 . . . {Covers for drums, collectors, manholes or the like (in general F16J 13/00)}
37/222 . . . . {Nozzle dams introduced through a smaller manway, e.g. foldable}
37/223 . . . . {Boiler plugs, e.g. for handholes (closures for access openings in return bends F22B 37/165)}
37/225 . . . {Arrangements on drums or collectors for fixing tubes or for connecting collectors to each other}
37/226 . . . {Protection of drums against combustion}
37/227 . . . {Drums and collectors for mixing}
37/228 . . . {Headers for distributing feedwater into steam generator vessels; Accessories therefor}
37/24 . . Supporting, suspending, or setting arrangements, e.g. heat shielding (frames, engine beds F16M)
37/242 . . . {for bottom supported water-tube steam generators}
37/244 . . . {for water-tube steam generators suspended from the top}
37/246 . . . {for steam generators of the reservoir type, e.g. nuclear steam generators}
37/248 . . . . {with a vertical cylindrical wall}
37/26 . . Steam-separating arrangements (vapour-liquid separators, e.g. for drying steam, B01D; B04)
37/261 . . . {specially adapted for boiler drums}
37/263 . . . {Valves with water separators}
37/265 . . . {Apparatus for washing and purifying steam}
37/266 . . . {Separator reheaters}
37/268 . . . {specially adapted for steam generators of nuclear power plants}
37/28 . . . involving reversal of direction of flow
37/283 . . . . {specially adapted for boiler drums}
37/286 . . . . {specially adapted for steam generators of nuclear power plants}
37/30 . . . using impingement against baffle separators
37/303 . . . . {specially adapted for boiler drums}
37/306 . . . . {specially adapted for steam generators of nuclear power plants}
37/32 . . . using centrifugal force
37/322 . . . . {specially adapted for boiler drums}
37/325 . . . . {using a revolving element}
37/327 . . . . {specially adapted for steam generators of nuclear power plants}
37/34 . . Adaptations of boilers for promoting water circulation ({F22B 13/145 takes precedence }; auxiliary devices for promoting water circulation F22D 7/00)
37/36 . . Arrangements for sheathing or casing boilers
37/365 . . . {Casings of metal sheets, e.g. expansion plates, expansible joints}
37/38 . . Determining or indicating operating conditions in steam boilers, e.g. monitoring direction or rate of water flow through water tubes (measuring or indicating instruments in general G01)
37/40 . . Arrangements of partition walls in flues of steam boilers, e.g. built-up from baffles (in flues or chimneys F23J 13/00)
37/42 . . Applications, arrangements, or dispositions of alarm or automatic safety devices (for feed-water heaters F22D 1/14 {; emergency feed-water supply F22D 11/003}; alarms responsive to undesired or abnormal conditions G08B)
37/421 . . . {Arrangements for detecting leaks}
37/423 . . . {Valves for testing steam generators}
37/425 . . . {Feed-water supply alarm devices using floats}
37/426 . . . {Feed-water supply alarm devices using electric signals}
37/428 . . . {Feed-water supply alarm devices using dilatation of solids or liquids}
37/44 . . . of safety valves (safety valves per se F16K)
37/443 . . . . {Safety devices extinguishing the fire}
37/446 . . . . {Safety devices responsive to overpressure}
37/46 . . . responsive to low or high water level, e.g. for checking, suppressing, extinguishing combustion in boilers (fire-fighting, fire extinction in general A62)
37/47 . . . responsive to abnormal temperature, e.g. actuated by fusible plugs (such alarms or devices per se G08B)
37/475 . . . . {Safety devices with fusible plugs}
37/48 . . Devices for removing water, salt, or sludge from boilers (cleaning internal or external surfaces of water tubes F28G); Arrangements of cleaning apparatus in boilers (cleaning external surfaces of tubes by soot blowers F23J); Combinations thereof with boilers
37/483 . . . {specially adapted for nuclear steam generators}
37/486 . . . {Devices for removing water, salt, or sludge from boilers (F22B 37/483, F22B 37/50, F22B 37/52 and F22B 37/54 take precedence)}
37/50 . . . for draining or expelling water
37/52 . . . Washing-out devices
37/54 . . . De-sludging or blow-down devices {(F22B 37/565 takes precedence)}
37/545 . . . . {Valves specially adapted therefor (valves in general F16K)}
37/56 . . Boiler cleaning control devices, e.g. for ascertaining proper duration of boiler blow-down

37/565 . . . {Blow-down control, e.g. for ascertaining proper duration of boiler blow-down}
37/58 . . Removing tubes from headers or drums; Extracting tools
37/60 . specially adapted for steam boilers of instantaneous or flash type
37/62 . specially adapted for steam boilers of forced-flow type
37/64 . . Mounting of, or supporting arrangements for, tube units (construction of tube walls of furnaces, e.g. boiler furnaces F23M 5/08)
37/645 . . . {involving upper vertically-disposed water tubes and lower horizontally- or helically disposed water tubes}
37/66 . . . involving vertically-disposed water tubes (F22B 37/645 takes precedence)
37/68 . . . involving horizontally-disposed water tubes (F22B 37/645 takes precedence)
37/70 . . Arrangements for distributing water into water tubes
37/72 . . . involving injection devices
37/74 . . . Throttling arrangements for tubes or sets of tubes
37/76 . Adaptations or mounting of devices for observing existence or direction of fluid flow (devices per se G01P)
37/78 . Adaptations or mounting of level indicators (level indicators per se G01F)