

F22 STEAM GENERATION (chemical or physical apparatus for generating gases B01J; chemical generation of gas, e.g. under pressure, Section C; removal of combustion products or residues, e.g. cleaning of the combustion contaminated surfaces of tubes of boilers, F23J; generating combustion products of high pressure or high velocity F23R; water heaters not for steam generation F24H, F28; cleaning of internal or external surfaces of heat-transfer conduits, e.g. water tubes of boilers, F28G)

F22D PREHEATING, OR ACCUMULATING PREHEATED, FEED-WATER; FEED-WATER SUPPLY; CONTROLLING WATER LEVEL; CIRCULATING WATER WITHIN BOILERS (chemical treatment of water, e.g. purification, C02F; enclosed heat-exchange apparatus in general F28D; controlling in general G05)

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| <p>1/00 Feed-water heaters, e.g. preheaters</p> <p>1/02 . with water tubes arranged in the boiler furnace, fire tubes, or flue ways (heat-exchange tubes in general F28F)</p> <p>1/04 . . the tubes having plain outer surfaces, e.g. in vertical arrangement</p> <p>1/06 . . . in horizontal arrangement</p> <p>1/08 . . the tubes having fins, ribs, gills, corrugations, or the like on their outer surfaces, e.g. in vertical arrangement</p> <p>1/10 . . . in horizontal arrangement (hollow fire-bars, grates, or the like used as water tubes F23H 3/02)</p> <p>1/12 . . Control devices, e.g. for regulating steam temperature</p> <p>1/14 . . Safety or venting devices (safety devices for boilers in general F22B 37/42)</p> <p>1/16 . with water tubes arranged otherwise than in the boiler furnace, fire tubes, or flue ways</p> <p>1/18 . . and heated indirectly</p> <p>1/20 . . and directly connected to boilers</p> <p>1/22 . . and provided for rotary movement</p> <p>1/24 . with fire tubes or flue ways traversing feed-water vessels</p> <p>1/26 . with means, other than tubes, to separate water and heating medium, e.g. bulk heaters without internal flues or tubes, jacketed smoke-boxes or flues</p> <p>1/28 . for direct heat transfer, e.g. by mixing water and steam</p> <p>1/30 . . with stages, steps, baffles, dishes, circular troughs, or other means to cause interrupted or cascading fall of water</p> <p>1/32 . arranged to be heated by steam, e.g. bled from turbines</p> <p>1/34 . . and returning condensate to boiler with main feed supply</p> <p>1/36 . Water and air preheating systems</p> <p>1/38 . . Constructional features of water and air preheating systems</p> <p>1/40 . Combinations of exhaust-steam and smoke-gas preheaters (for locomotives F22D 1/42)</p> <p>1/42 . specially adapted for locomotives</p> <p>1/44 . . Smoke-gas preheaters</p> <p>1/46 . . Exhaust-steam preheaters</p> <p>1/48 . . Details</p> <p>1/50 . incorporating thermal de-aeration of feed-water (de-aeration produced in the course of direct heat transfer F22D 1/28; thermal de-aeration of water <u>per se</u> B01D 19/00, C02F 1/20; valves for venting F16K 24/04) [3]</p> <p>3/00 Accumulators for preheated water</p> <p>3/02 . arranged within combustion chambers</p> <p>3/04 . combined with steam accumulators</p> | <p>3/06 . directly connected to boilers</p> <p>3/08 . specially adapted for locomotives (locomotive boilers F22B 13/06)</p> <p>3/10 . . Control devices (controlling water feed to boilers, or water level F22D 5/00)</p> <p>5/00 Controlling water feed or water level; Automatic water feeding or water-level regulators (steam traps F16T; measuring or indicating instruments G01; for indicating water level G01F; level control in general G05D 9/00)</p> <p>5/02 . with an intermediate compartment from which the water is fed by gravity after mechanically moving the compartment, the movement being controlled according to water level</p> <p>5/04 . with pivoting buckets</p> <p>5/06 . with receptacles external to, but in free communication with, the boilers and adapted to move up and down in accordance with change in water level</p> <p>5/08 . with float-actuated valves</p> <p>5/10 . . and with pistons or membranes unitary with the feed inlet valves</p> <p>5/12 . . and with dipping tubes</p> <p>5/14 . responsive to thermal expansion and contraction, e.g. of solid elements</p> <p>5/16 . . of fluids</p> <p>5/18 . for varying the speed or delivery pressure of feed pumps</p> <p>5/20 . . without floats</p> <p>5/22 . . with floats</p> <p>5/24 . with electric switches</p> <p>5/26 . Automatic feed-control systems (automatic safety devices F22B 37/42; controlling in general G05)</p> <p>5/28 . . responsive to amount of steam withdrawn; responsive to steam pressure</p> <p>5/30 . . responsive to both water level and amount of steam withdrawn or steam pressure</p> <p>5/32 . . influencing the speed or delivery pressure of the feed pumps</p> <p>5/34 . . Applications of valves (valves <u>per se</u> F16K)</p> <p>5/36 . . for feeding a number of steam boilers designed for different ranges of temperature and pressure</p> <p>7/00 Auxiliary devices or apparatus for promoting water circulation</p> <p>7/02 . Saddles or like directing plates fitted to furnace tubes</p> <p>7/04 . Injectors for water or steam</p> <p>7/06 . Rotary devices, e.g. propellers</p> <p>7/08 . . Arrangements of pumps, e.g. outside the boilers</p> <p>7/10 . . . within the boilers</p> <p>7/12 . Control devices</p> <p>7/14 . specially adapted for locomotive boilers</p> |
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F22D

- 11/00

Feed-water supply not provided for in other main groups

11/02

· Arrangements of feed-water pumps (F22D 11/06 takes precedence; pumps per se F04)
- 11/04

· · with means to eliminate steam formation

11/06

· · for returning condensate to boiler