

ECLA**EUROPEAN CLASSIFICATION****F22D**

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

F22D1/00

Feed-water heaters, i.e. economisers or like preheaters

F22D1/00B

- [N: Feed-water heater systems ([F22D1/32B](#), [F22D1/36](#) and [F22D1/40](#) take precedence)]

F22D1/00D

- [N: with heating tubes ([F22D1/24](#) takes precedence)] [N9911]

F22D1/02

- with water tubes arranged in the boiler furnace, fire tubes, or flue ways (heat-exchange tubes in general F28F)

F22D1/04

- . the tubes having plain outer surfaces, e.g. in vertical arrangement

F22D1/06

- . . in horizontal arrangement

F22D1/08

- . the tubes having fins, ribs, gills, corrugations, or the like on their outer surfaces, e.g. in vertical arrangement

F22D1/10

- . . in horizontal arrangement ([hollow fire-bars, grates, or the like used as water tubes F23H3/02](#))

F22D1/12

- . Control devices, e.g. for regulating steam temperature

F22D1/14

- . Safety or venting devices ([safety devices for boilers in general F22B37/42](#))

F22D1/16

- with water tubes arranged otherwise than in the boiler furnace, fire tubes, or flue ways

F22D1/18

- . and heated indirectly

F22D1/20

- . and directly connected to boilers

F22D1/22

- . and provided for rotary movements

F22D1/24

- with fire tubes or flue ways traversing feed-water vessels

F22D1/26

- with means, other than tubes, to separate water and heating medium, e.g. bulk heaters without internal flues or tubes, jacketed smoke-boxes or flue or flues

F22D1/28

- for direct heat transfer, e.g. by mixing water and steam

F22D1/30

- . with stages, steps, baffles, dishes, circular troughs, or other means to cause interrupted or cascading fall of water ([de-aeration apparatus C02F](#))

F22D1/32

- arranged to be heated by steam, e.g. bled from turbines

F22D1/32B

- . [N: Schematic arrangements or control devices therefor]

F22D1/34

- . and returning condensate to boiler with main feed supply

F22D1/36

- Water and air preheating systems

F22D1/38

- . Constructional features of water and air preheating systems

- F22D1/40 . Combinations of exhaust-steam and smoke-gas preheaters ([for locomotives F22D1/42](#))
- F22D1/42 . specially adapted for locomotives
- F22D1/44 . . Smoke-gas preheaters
- F22D1/46 . . Exhaust-steam preheaters
- F22D1/48 . . Details
- F22D1/50 . incorporating thermal de-aeration of feed-water (de-aeration produced in the course of direct heat transfer [F22D1/28](#); thermal de-aeration of water per se [B01D19/00](#), [C02F1/20](#); valves for venting [F16K24/04](#))
- F22D3/00** **Accumulators for preheated water**
- F22D3/02 . arranged within combustion chambers
- F22D3/04 . combined with steam accumulators
- F22D3/06 . directly connected to boilers
- F22D3/08 . specially adapted for locomotives ([locomotives boilers F22B13/06](#))
- F22D3/10 . . Control devices ([controlling water feed to boilers, or water level F22D5/00](#))
- F22D5/00** **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 G05D9/00](#))
- F22D5/02 . 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
- F22D5/04 . with pivoting buckets
- F22D5/06 . 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
- F22D5/08 . with float-actuated valves
- F22D5/10 . . and with pistons or membranes unitary with the feed inlet valves
- F22D5/12 . . and with dipping tubes
- F22D5/14 . responsive to thermal expansion and contraction, e.g. of solid elements
- F22D5/16 . . of fluids
- F22D5/18 . for varying the speed or delivery pressure of feed pumps
- F22D5/20 . . without floats
- F22D5/22 . . with floats
- F22D5/24 . with electric switches

- F22D5/26 . Automatic feed-control systems ([automatic safety devices F22B37/42](#); [controlling in general G05](#))
- F22D5/28 . . responsive to amount of steam withdrawn; responsive to steam pressure
- F22D5/30 . . responsive to both water level and amount of steam withdrawn or steam pressure
- F22D5/32 . . influencing the speed or delivery pressure of the feed pumps
- F22D5/34 . . Applications of valves ([valves per se F16K](#))
- F22D5/36 . . for feeding a number of steam boilers designed for different ranges of temperature and pressure

F22D7/00 **Auxiliary devices for promoting water circulation** ([adaptation of boilers for promoting water circulation F22B37/34](#)) [[C0901](#)]

- F22D7/02 . Saddles or like directing plates fitted to furnace tubes
- F22D7/04 . Injectors for water or steam
- F22D7/06 . Rotary devices, e.g. propellers
- F22D7/08 . . Arrangements of pumps, e.g. outside the boilers
- F22D7/10 . . . within the boilers
- F22D7/12 . Control devices
- F22D7/14 . specially adapted for locomotive boilers

F22D11/00 **Feed-water supply not provided for in other main groups**

- F22D11/00B . [[N: Emergency feed-water supply \(safety devices for boilers in general F22B37/42\)](#)]
- F22D11/00D . [[N: Arrangements of feedwater cleaning with a boiler](#)] [[N9911](#)]
- F22D11/02 . Arrangements of feed-water pumps ([F22D11/06](#) takes precedence; pumps per se [F04](#))
- F22D11/04 . . with means to eliminate steam formation
- F22D11/06 . . for returning condensate to boiler