

CPC COOPERATIVE PATENT CLASSIFICATION

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

LIGHTING; HEATING

F22 STEAM GENERATION (NOTE omitted)

F22D PREHEATING, OR ACCUMULATING PREHEATED, FEED-WATER FOR STEAM GENERATION; FEED-WATER SUPPLY FOR STEAM GENERATION; CONTROLLING WATER LEVEL FOR STEAM GENERATION; AUXILIARY DEVICES FOR PROMOTING WATER CIRCULATION WITHIN STEAM BOILERS

| | | | |
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| 1/00 | Feed-water heaters, i.e. economisers or like preheaters | 1/42 | . specially adapted for locomotives |
| | | 1/44 | . . Smoke-gas preheaters |
| 1/003 | . {Feed-water heater systems (F22D 1/325 , F22D 1/36 and F22D 1/40 take precedence)} | 1/46 | . . Exhaust-steam preheaters |
| 1/006 | . {with heating tubes (F22D 1/24 takes precedence)} | 1/48 | . . Details |
| 1/02 | . with water tubes arranged in the boiler furnace, fire tubes or flue ways | 1/50 | . incorporating thermal de-aeration of feed-water (de-aeration produced in the course of direct heat transfer F22D 1/28) |
| 1/04 | . . the tubes having plain outer surfaces, e.g. in vertical arrangement | 3/00 | Accumulators for preheated water |
| 1/06 | . . . in horizontal arrangement | 3/02 | . arranged within combustion chambers |
| 1/08 | . . the tubes having fins, ribs, gills, corrugations, or the like on their outer surfaces, e.g. in vertical arrangement | 3/04 | . combined with steam accumulators |
| | | 3/06 | . directly connected to boilers |
| 1/10 | . . . in horizontal arrangement | 3/08 | . specially adapted for locomotives |
| 1/12 | . . Control devices, e.g. for regulating steam temperature | 3/10 | . . Control devices |
| 1/14 | . . Safety or venting devices | 5/00 | Controlling water feed or water level; Automatic water feeding or water-level regulators |
| 1/16 | . with water tubes arranged otherwise than in the boiler furnace, fire tubes, or flue ways | 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 |
| 1/18 | . . and heated indirectly | | |
| 1/20 | . . and directly connected to boilers | 5/04 | . with pivoting buckets |
| 1/22 | . . and provided for rotary movements | 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 |
| 1/24 | . with fire tubes or flue ways traversing feed-water vessels | | |
| 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 flue or flues | 5/08 | . with float-actuated valves |
| | | 5/10 | . . and with pistons or membranes unitary with the feed inlet valves |
| 1/28 | . for direct heat transfer, e.g. by mixing water and steam | 5/12 | . . and with dipping tubes |
| 1/30 | . . with stages, steps, baffles, dishes, circular troughs, or other means to cause interrupted or cascading fall of water | 5/14 | . responsive to thermal expansion and contraction, e.g. of solid elements |
| | | | . . of fluids |
| 1/32 | . arranged to be heated by steam, e.g. bled from turbines | 5/16 | . for varying the speed or delivery pressure of feed pumps |
| | | 5/18 | |
| 1/325 | . . {Schematic arrangements or control devices therefor} | 5/20 | . . without floats |
| | | 5/22 | . . with floats |
| 1/34 | . . and returning condensate to boiler with main feed supply | 5/24 | . with electric switches |
| | | 5/26 | . Automatic feed-control systems |
| 1/36 | . Water and air preheating systems | 5/28 | . . responsive to amount of steam withdrawn; responsive to steam pressure |
| 1/38 | . . Constructional features of water and air preheating systems | 5/30 | . . responsive to both water level and amount of steam withdrawn or steam pressure |
| 1/40 | . Combinations of exhaust-steam and smoke-gas preheaters | 5/32 | . . influencing the speed or delivery pressure of the feed pumps |

F22D

- 5/34 . . Applications of valves
- 5/36 . . for feeding a number of steam boilers designed for different ranges of temperature and pressure

7/00 Auxiliary devices for promoting water circulation

- 7/02 . Saddles or like directing plates fitted to furnace tubes
- 7/04 . Injectors for water or steam
- 7/06 . Rotary devices, e.g. propellers
- 7/08 . . Arrangements of pumps, e.g. outside the boilers
- 7/10 . . . within the boilers
- 7/12 . Control devices
- 7/14 . specially adapted for locomotive boilers

11/00 Feed-water supply not provided for in other main groups

- 11/003 . {Emergency feed-water supply }
- 11/006 . {Arrangements of feedwater cleaning with a boiler }
- 11/02 . Arrangements of feed-water pumps
- 11/04 . . with means to eliminate steam formation
- 11/06 . . for returning condensate to boiler