

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

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

- 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