SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

F24 HEATING; RANGES; VENTILATING

F24H FLUID HEATERS, e.g. WATER OR AIR HEATERS, HAVING HEAT-GENERATING MEANS, IN GENERAL (heat-transfer, heat-exchange or heat-storage materials C09K 5/00; tube furnaces for thermal non-catalytic cracking C10G 9/20; devices, e.g. valves, for venting and aerating enclosures F16K 24/00; steam traps or like apparatus F16T; steam generation F22; combustion apparatus F23; domestic stoves or ranges F24B, F24C; domestic- or space-heating systems F24D; furnaces, kilns, ovens, retorts F27; heat-exchangers F28; electric heating elements or arrangements H05B)

Note(s) [3]

1. The distinguishing feature of the air heaters covered by this subclass is that the heat is predominantly released to the air by convection, mostly by forced circulation of the air. The domestic stoves or ranges covered by subclass F24B, F24C may also be fired or electric air heaters but they release their heat to a considerable extent by radiation and only to some extent by natural convention.
2. In this subclass, the following terms or expressions are used with the meanings indicated:
   - "water" includes other liquids and means always the liquid to be heated;
   - "air" includes other gases or gas mixtures and means always the gas to be heated;
   - "furnace tubes" means tubes inside the heater wherein combustion is performed;
   - "fire tubes" means tubes inside the heater through which flue-gases flow from a combustion chamber located outside the tubes;
   - "heater" means apparatus including both heat generating means and means for transferring the generated heat to water or air.
3. All storage heaters are classified in group F24H 7/00.

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1/00 Water heaters having heat generating means, e.g. boiler, flow-heater, water-storage heater (F24H 7/00, F24H 8/00 take precedence; details F24H 9/00; steam boilers F22B; domestic stoves or ranges with additional provisions for heating water F24B 9/00, F24C 13/00) **[1, 5, 2006.01]**

1/06 • Portable or mobile, e.g. collapsible **[1, 2006.01]**

1/08 • Packaged or self-contained boilers, i.e. water heaters with control devices and pump in a single unit **[1, 2006.01]**

1/10 • Continuous-flow heaters, i.e. heaters in which heat is generated only while the water is flowing, e.g. with direct contact of the water with the heating medium (F24H 1/50 takes precedence) **[1, 5, 2006.01]**

1/12 • • in which the water is kept separate from the heating medium **[1, 2006.01]**

1/14 • • • by tubes, e.g. bent in serpentine form **[1, 2006.01]**

1/16 • • • • helically or spirally coiled **[1, 2006.01]**

1/18 • Water-storage heaters (F24H 1/50 takes precedence; combined with water-heating stoves for central heating F24H 1/22) **[1, 5, 2006.01]**

1/20 • • with immersed heating elements, e.g. electric elements or furnace tubes **[1, 2006.01]**

1/22 • Water heaters other than continuous-flow or water-storage heaters, e.g. water heaters for central heating (F24H 1/50 takes precedence) **[1, 5, 2006.01]**

1/24 • • with water mantle surrounding the combustion chamber or chambers (F24H 1/40, F24H 1/44 take precedence) **[1, 3, 2006.01]**

1/26 • • • the water mantle forming an integral body **[1, 2006.01]**

1/28 • • • • including one or more furnace or fire tubes **[1, 2006.01]**

1/30 • • • the water mantle being built-up from sections **[1, 2006.01]**

1/32 • • • • with vertical sections arranged side by side **[1, 2006.01]**

1/34 • • with water chamber arranged adjacent to the combustion chamber or chambers, e.g. above or at side (F24H 1/24, F24H 1/44 take precedence) **[1, 2006.01]**

1/36 • • • the water chamber including one or more fire tubes **[1, 2006.01]**

1/38 • • with water contained in separate elements, e.g. radiator-type element (F24H 1/40, F24H 1/44 take precedence) **[1, 2006.01]**

1/40 • • with water tube or tubes (F24H 1/44 takes precedence) **[1, 2006.01]**

1/41 • • • in serpentine form **[3, 2006.01]**
1/43 • • • helically or spirally coiled **[3, 2006.01]**
1/44 • • with combinations of two or more of the types covered by groups F24H 1/24-F24H 1/40 **[1, 2006.01]**
1/46 • Water heaters having plural combustion chambers **[1, 2, 5, 2006.01]**
1/48 • Water heaters for central heating incorporating heaters for domestic water **[5, 2006.01]**
1/50 • • incorporating domestic water tanks **[5, 2006.01]**
1/52 • • incorporating heat exchangers for domestic water (F24H 1/50 takes precedence) **[5, 2006.01]**

3/00 Air heaters having heat generating means (F24H 7/00, F24H 8/00 take precedence; details F24H 9/00; domestic stoves or ranges with additional provisions for convection heating of air F24B, F24C) **[1, 5, 2006.01]**
3/02 • with forced circulation (F24H 3/12 takes precedence) **[1, 2006.01]**
3/04 • • the air being in direct contact with the heating medium, e.g. electric heating element **[1, 2006.01]**
3/06 • • the air being kept separate from the heating medium, e.g. using forced circulation of air over radiators **[1, 2006.01]**
3/08 • • • by tubes **[1, 2006.01]**
3/10 • • • by plates **[1, 2006.01]**
3/12 • with additional heating arrangements **[1, 2006.01]**

4/00 Fluid heaters using heat pumps [5, 2006.01]
4/02 • Liquid heaters **[5, 2006.01]**
4/04 • • Storage heaters **[5, 2006.01]**
4/06 • Gas heaters **[5, 2006.01]**

6/00 Combined water and air heaters (F24H 8/00 takes precedence) **[1, 5, 2006.01]**

7/00 Storage heaters, i.e. heaters in which the energy is stored as heat in masses for subsequent release (domestic stoves or ranges with additional heat storage masses F24B 1/24, F24C 15/34) **[1, 2006.01]**
7/02 • the released heat being conveyed to a transfer fluid, e.g. air, water **[1, 2006.01]**
7/04 • • with forced circulation of the transfer fluid **[1, 2006.01]**
7/06 • the released heat being radiated **[1, 2006.01]**

8/00 Fluid heaters having heat-generating means specially adapted for extracting latent heat from flue gases by means of condensation [5, 2006.01]

9/00 Details [1, 2006.01]
9/02 • Casings; Cover lids; Ornamental panels **[1, 2006.01]**
9/06 • Arrangement of mountings or supports **[1, 2006.01]**
9/12 • Connecting heaters to circulation pipes (pipe joints in general F16L) **[1, 2006.01]**
9/14 • Connecting different sections, e.g. in water heaters (in radiators F28F 9/26) **[1, 2006.01]**
9/16 • Arrangements for water drainage (valves for drainage F16K, e.g. F16K 21/00; in pipes or pipe systems in general F16L 55/00; in domestic-or space-heating systems F24D 19/08) **[1, 2006.01]**
9/18 • Arrangement or mounting of grates, burners, or heating elements (burners F23D; grates F23H; electric heating elements H05B) **[1, 2006.01]**
9/20 • Arrangement or mounting of control or safety devices (control valves F16K; safety devices for burners F23D; combustion control devices F23N; of systems comprising a heater, see the relevant subclasses, e.g. of control heating systems F24D 19/10; automatic switching for electric heating apparatus H05B 1/02) **[1, 2006.01]**