

CPC COOPERATIVE PATENT CLASSIFICATION

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

LIGHTING; HEATING

F24 HEATING; RANGES; VENTILATING (NOTE omitted)

F24D DOMESTIC- OR SPACE-HEATING SYSTEMS, e.g. CENTRAL HEATING SYSTEMS; DOMESTIC HOT-WATER SUPPLY SYSTEMS; ELEMENTS OR COMPONENTS THEREFOR (preventing corrosion [C23F](#); water supply in general [E03](#); using steam or condensate extracted or exhausted from steam engine plants for heating purposes [F01K 17/02](#); steam traps [F16T](#); domestic stoves or ranges [F24B](#), [F24C](#); water or air heaters having heat generating means [F24H](#); combined heating and refrigeration systems [F25B](#); heat exchange apparatus or elements [F28](#); removing furring [F28G](#))

NOTE

In this subclass, the following expression is used with the meaning indicated:

- "Central heating system" means a system in which heat is generated or stored at central sources and is distributed by means of a transfer fluid to the spaces or areas to be heated.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

Central Heating Systems

1/00 Steam central heating systems ([F24D 10/00](#), [F24D 11/00](#) take precedence)

- 1/005 . {in combination with systems for domestic water supply}
- 1/02 . operating with live steam {(F24D 1/005 takes precedence)}
- 1/04 . operating with exhaust steam {(F24D 1/005 takes precedence)}
- 1/06 . operating with superheated steam {(F24D 1/005 takes precedence)}
- 1/08 . Feed-line arrangements, e.g. providing for heat-accumulator tanks, expansion tanks
- 3/00 Hot-water central heating systems** ([F24D 10/00](#), [F24D 11/00](#) take precedence)
- 3/005 . {combined with solar energy (solar heat collectors per se [F24S](#))}
- 3/02 . with forced circulation, e.g. by pumps (pump constructions [F04](#))
- 3/04 . with the water under high pressure
- 3/06 . . Arrangements or devices for maintaining high pressure
- 3/08 . in combination with systems for domestic hot-water supply
- 3/082 . . {Hot water storage tanks specially adapted therefor}
- 3/085 . . . {Double-walled tanks}
- 3/087 . . {Tap water heat exchangers specially adapted therefore}

- 3/10 . Feed-line arrangements, e.g. providing for heat-accumulator tanks, expansion tanks {Hydraulic components of a central heating system}
- 3/1008 . . {expansion tanks}
- 3/1016 . . . {Tanks having a bladder}
- 3/1025 . . . {Compressor controlled pressure heads}
- 3/1033 . . . {with compressed gas cylinder}
- 3/1041 . . . {Flow-through}
- 3/105 . . {pumps combined with multiple way valves}
- 3/1058 . . {disposition of pipes and pipe connections}
- 3/1066 . . . {Distributors for heating liquids}
- 3/1075 {Built up from modules}
- 3/1083 . . {Filling valves or arrangements for filling}
- 3/1091 . . {Mixing cylinders}
- 3/12 . Tube and panel arrangements for ceiling, wall, or underfloor heating (electric underfloor heating [F24D 13/02](#); special adaptations of floors for incorporating ducts, e.g. for heating or ventilating, [E04B 5/48](#); building elements of block or other shape for the construction of parts of buildings characterised by special adaptations, e.g. serving for locating conduits, [E04C 1/39](#); building elements of relatively thin form for the construction of parts of buildings with special adaptations for auxiliary purposes, e.g. serving for locating conduits, [E04C 2/52](#))
- 3/122 . . {Details}
- 3/125 . . . {Hydraulic pipe connections}
- 3/127 . . . {Mechanical connections between panels}
- 3/14 . . incorporated in a ceiling, wall or floor
- 3/141 . . . {Tube mountings specially adapted therefor}
- 3/142 {integrated in prefabricated construction elements}

- 3/143 {Tube clips with barbed anchors}
- 3/144 {Clips for fastening heating tubes on a reinforcement net or mesh, e.g. mesh for concrete reinforcement}
- 3/145 . . . {Convecting elements concealed in wall or floor}
- 3/146 . . . {Tubes specially adapted for underfloor heating}
- 3/147 . . . {arranged in facades}
- 3/148 . . . {with heat spreading plates}
- 3/149 . . . {Tube-laying devices}
- 3/16 . . mounted on, or adjacent to, a ceiling, wall or floor
- 3/165 . . . {Suspended radiant heating ceiling}
- 3/18 . . using heat pumps

5/00 Hot-air central heating systems ([F24D 10/00](#), [F24D 11/00](#) take precedence; air conditioning [F24F](#)); Exhaust gas central heating systems

- 5/005 . . {combined with solar energy (solar heat collectors [per se F24S](#))}
- 5/02 . . operating with discharge of hot air into the space or area to be heated
- 5/04 . . with return of the air or the air-heater
- 5/06 . . operating without discharge of hot air into the space or area to be heated
- 5/08 . . with hot air led through radiators
- 5/10 . . with hot air led through heat-exchange ducts in the walls, floor or ceiling
- 5/12 . . using heat pumps

7/00 Central heating systems employing heat-transfer fluids not covered by groups [F24D 1/00](#) - [F24D 5/00](#), e.g. oil, salt, gas ([F24D 10/00](#), [F24D 11/00](#) take precedence)

9/00 Central heating systems employing combinations of heat transfer fluids covered by two or more of groups [F24D 1/00](#) - [F24D 7/00](#) ([F24D 10/00](#), [F24D 11/00](#) take precedence)

- 9/02 . . Hot water and steam systems

10/00 District heating systems

- 10/003 . . {Domestic delivery stations having a heat exchanger}
- 10/006 . . {Direct domestic delivery stations}

11/00 Central heating systems using heat accumulated in storage masses (self-contained storage heating units [F24D 15/02](#); storage masses, [see the relevant subclasses](#))

- 11/001 . . {district heating system}
- 11/002 . . {water heating system}
- 11/003 . . {combined with solar energy}
- 11/004 . . {with conventional supplementary heat source}
- 11/005 . . {with recuperation of waste heat}
- 11/006 . . {air heating system}
- 11/007 . . {combined with solar energy}
- 11/008 . . {with conventional supplementary heat source}
- 11/009 . . {with recuperation of waste heat}
- 11/02 . . using heat pumps {using heat-pumps ([for producing heat in general F25B 29/00](#))}
- 11/0207 . . {district heating system}
- 11/0214 . . {water heating system}
- 11/0221 . . . {combined with solar energy}
- 11/0228 . . . {combined with conventional heater}

- 11/0235 . . . {with recuperation of waste energy}
- 11/0242 {contained in exhausted air}
- 11/025 {contained in waste water}
- 11/0257 . . {air heating system}
- 11/0264 . . . {combined with solar energy}
- 11/0271 . . . {combined with conventional energy}
- 11/0278 . . . {with recuperation of waste energy}
- 11/0285 {contained in exhausted air}
- 11/0292 {contained in waste water}

12/00 Other central heating systems

- 12/02 . . having more than one heat source ([F24D 3/18](#), [F24D 5/12](#), [F24D 11/02](#) take precedence)

Other domestic- or space-heating systems

13/00 Electric heating systems (electric water or air heaters [F24H](#))

- 13/02 . . solely using resistance heating, e.g. underfloor heating
- 13/022 . . {resistances incorporated in construction elements}
- 13/024 . . . {in walls, floors, ceilings}
- 13/026 . . . {in door, windows}
- 13/028 . . . {Glass panels, e.g. mirrors, design radiators, etc.}
- 13/04 . . using electric heating of heat-transfer fluid in separate units of the system

15/00 Other domestic- or space-heating systems

- 15/02 . . consisting of self-contained heating units, e.g. storage heaters
- 15/04 . . using heat pumps

17/00 Domestic hot-water supply systems (combined with domestic- or space-heating systems [F24D 1/00](#) - [F24D 15/00](#))

- 17/0005 . . {using recuperation of waste heat ([F24D 17/0036](#) takes precedence)}
- 17/001 . . {with accumulation of heated water}
- 17/0015 . . {using solar energy ([F24D 17/0036](#) takes precedence)}
- 17/0021 . . {with accumulation of the heated water}
- 17/0026 . . {with conventional heating means ([F24D 17/0036](#) takes precedence)}
- 17/0031 . . {with accumulation of the heated water}
- 17/0036 . . {with combination of different kinds of heating means}
- 17/0042 . . {recuperated waste heat and solar energy}
- 17/0047 . . . {with accumulation of the heated water}
- 17/0052 . . {recuperated waste heat and conventional heating means}
- 17/0057 . . . {with accumulation of the heated water}
- 17/0063 . . {solar energy and conventional heaters}
- 17/0068 . . . {with accumulation of the heated water}
- 17/0073 . . {Arrangements for preventing the occurrence or proliferation of microorganisms in the water}
- 17/0078 . . {Recirculation systems}
- 17/0084 . . {Coaxial tubings}
- 17/0089 . . {Additional heating means, e.g. electric heated buffer tanks or electric continuous flow heaters, located close to the consumer, e.g. directly before the water taps in bathrooms, in domestic hot water lines}
- 17/0094 . . {Recovering of cold water}

- 17/02 . . using heat pumps
- 19/00** **Details (of water or air heaters [F24H 9/00](#); of heat-exchange or heat-transfer apparatus, of general application [F28F](#))**
 - 19/0002 . . {Means for connecting central heating radiators to circulation pipes}
 - 19/0004 . . {In a one pipe system}
 - 19/0007 . . . {Comprising regulation means}
 - 19/0009 . . {In a two pipe system}
 - 19/0012 . . . {Comprising regulation means}
 - 19/0014 . . {Connection means adaptable for one and two pipe systems}
 - 19/0017 . . {Connections between supply and inlet or outlet of central heating radiators}
 - 19/0019 . . . {Means for adapting connections}
 - 19/0021 . . . {Flexible tubes or hoses}
 - 19/0024 . . . {Connections for plate radiators}
 - 19/0026 . . {Places of the inlet on the radiator}
 - 19/0029 . . . {on a top corner}
 - 19/0031 . . . {on the top in the middle}
 - 19/0034 . . . {on a bottom corner}
 - 19/0036 . . . {on the bottom in the middle}
 - 19/0039 . . {Places of the outlet on the radiator}
 - 19/0041 . . . {on the top in the middle}
 - 19/0043 . . . {on the opposite top corner}
 - 19/0046 . . . {on the top on the same side}
 - 19/0048 . . . {on the bottom in the middle}
 - 19/0051 . . . {on the bottom on the opposite corner}
 - 19/0053 . . . {on the bottom on the same side}
 - 19/0056 . . {Supplies from the central heating system}
 - 19/0058 . . . {coming out the floor}
 - 19/006 {Alongside the radiator}
 - 19/0063 {under the radiator}
 - 19/0065 . . . {coming out the wall}
 - 19/0068 {alongside the radiator}
 - 19/007 {under the radiator}
 - 19/0073 . . {Means for changing the flow of the fluid inside a radiator}
 - 19/0075 . . {Valves for isolating the radiator from the system}
 - 19/0078 . . {Plugs}
 - 19/008 . . {Details related to central heating radiators}
 - 19/0082 . . {Humidifiers for radiators}
 - 19/0085 . . {Fresh air entries for air entering the room to be heated by the radiator}
 - 19/0087 . . {Fan arrangements for forced convection}
 - 19/009 . . {Magnets, e.g. for attaching a cover}
 - 19/0092 . . {Devices for preventing or removing corrosion, slime or scale}
 - 19/0095 . . {Devices for preventing damage by freezing}
 - 19/0097 . . {Casings or frame structures for hydraulic components}
 - 19/02 . . Arrangement of mountings or supports for radiators
 - 19/0203 . . . {Types of supporting means}
 - 19/0206 . . . {Tube shaped supports inserted into a wall}
 - 19/0209 . . . {Supporting means having bracket}
 - 19/0213 . . . {Floor mounted supporting means}
 - 19/0216 . . . {Supporting means having a rail}
 - 19/022 . . {Constructional details of supporting means for radiators}
 - 19/0223 . . . {Distance pieces between the radiator and the wall}
 - 19/0226 {Additional means supporting the process of mounting}
 - 19/023 {Radiators having fixed suspension means for connecting the radiator to the support means}
 - 19/0233 {Templates for installing the radiator}
 - 19/0236 {Water tubes or pipes forming part of the supporting means}
 - 19/024 . . . {Functioning details of supporting means for radiators}
 - 19/0243 {Means for moving the radiator horizontally to adjust the radiator position}
 - 19/0246 {Means for moving the radiator vertically to adjust the radiator position}
 - 19/025 {Eccentric means for moving the radiator vertically}
 - 19/0253 {Adjusting a dimension, e.g. length, of the radiator support, e.g. telescopic rails}
 - 19/0256 {Radiators clamped by supporting means}
 - 19/0259 {Radiators clamped by supporting means around a column or tube}
 - 19/0263 {Radiators clamped by supporting means between two columns or tubes}
 - 19/0273 {Radiators fixed in order to prevent undesired detachment}
 - 19/0276 {Radiators fixed on the bottom}
 - 19/0279 {Radiators fixed on the sides}
 - 19/0283 {Radiators fixed on the top}
 - 19/0286 {Radiators fixed using a spring}
 - 19/0289 {Radiators fixed using a flexible clip}
 - 19/0293 {Radiators rotating without being demounted}
 - 19/04 . . in skirtings
 - 19/06 . . Casings, cover lids or ornamental panels, for radiators
 - 19/061 . . . {Radiator shelves}
 - 19/062 . . . {Heat reflecting or insulating shields}
 - 19/064 . . . {Coverings not directly attached to a radiator, e.g. box-like coverings}
 - 19/065 . . . {Grids attached to the radiator and covering its top}
 - 19/067 . . . {Front coverings attached to the radiator}
 - 19/068 . . . {Side coverings attached to the radiator}
 - 19/08 . . Arrangements for drainage, venting or aerating ([valves for drainage F16K](#), e.g. [F16K 21/00](#); for [venting or aerating F16K 24/00](#))
 - 19/081 . . . {for steam heating systems}
 - 19/082 . . . {for water heating systems}
 - 19/083 {Venting arrangements}
 - 19/085 {Arrangement of venting valves for central heating radiators}
 - 19/086 {hand-operated}
 - 19/087 {automatic}
 - 19/088 {Draining arrangements}
 - 19/10 . . Arrangement or mounting of control or safety devices ([control valves F16K](#); [only the heater being controlled F24H 9/20](#)) (including control or safety methods)
 - 19/1003 . . . {for steam heating systems}
 - 19/1006 . . . {for water heating systems}
 - 19/1009 {for central heating}
 - 19/1012 {by regulating the speed of a pump}
 - 19/1015 {using a valve or valves}
 - 19/1018 {Radiator valves}
 - 19/1021 {a by pass valve}

19/1024	. . . . . {a multiple way valve}
19/1027	. . . . . {hand operated}
19/103	. . . . . {bimetal operated}
19/1033	. . . . . {motor operated}
19/1036	. . . . . {Having differential pressure measurement facilities}
19/1039	. . . . {the system uses a heat pump}
19/1042	. . . . {the system uses solar energy}
19/1045	. . . . {the system uses a heat pump and solar energy}
19/1048	. . . . {Counting of energy consumption}
19/1051	. . . {for domestic hot water}
19/1054	. . . . {the system uses a heat pump}
19/1057	. . . . {the system uses solar energy}
19/106	. . . . {the system uses a heat pump and solar energy}
19/1063	. . . . {counting of energy consumption}
19/1066	. . . {for the combination of central heating and domestic hot water}
19/1069	. . . . {regulation in function of the temperature of the domestic hot water}
19/1072	. . . . {the system uses a heat pump}
19/1075	. . . . {the system uses solar energy}
19/1078	. . . . {the system uses a heat pump and solar energy}
19/1081	. . . . {counting of energy consumption}
19/1084	. . {for air heating systems}
19/1087	. . . {system using a heat pump}
19/109	. . . {system using solar energy}
19/1093	. . . {system using a heat pump and solar energy}
19/1096	. . {for electric heating systems}

2200/00 Heat sources or energy sources

2200/02	. Photovoltaic energy
2200/04	. Gas or oil fired boiler
2200/043	. . More than one gas or oil fired boiler
2200/046	. . Condensing boilers
2200/06	. Solid fuel fired boiler
2200/062	. . Coal fired boilers
2200/065	. . Wood fired boilers
2200/067	. . . Pellet fired boilers
2200/07	. Solid fuel burners
2200/08	. Electric heater
2200/10	. Fire place
2200/11	. Geothermal energy
2200/115	. . Involving mains water supply
2200/12	. Heat pump
2200/123	. . Compression type heat pumps
2200/126	. . Absorption type heat pumps
2200/13	. Heat from a district heating network
2200/14	. Solar energy
2200/15	. Wind energy
2200/16	. Waste heat
2200/18	. . Flue gas recuperation
2200/19	. . Fuel cells
2200/20	. . Sewage water
2200/22	. . Ventilation air
2200/24	. . Refrigeration
2200/26	. . Internal combustion engine
2200/28	. . Biological processes

2200/29	. . Electrical devices, e.g. computers, servers
2200/30	. . Friction
2200/31	. . Air conditioning systems
2200/32	. involving multiple heat sources in combination or as alternative heat sources

Central Heating Systems**2220/00 Components of central heating installations excluding heat sources**

2220/003	. Generic central heating systems
2220/006	. Parts of a building integrally forming part of heating systems, e.g. a wall as a heat storing mass
2220/02	. Fluid distribution means
2220/0207	. . Pumps
2220/0214	. . Inlets or outlets
2220/0221	. . Mixing cylinders
2220/0228	. . Branched distribution conduits
2220/0235	. . Three-way-valves
2220/0242	. . Multiple way valves
2220/025	. . Check valves
2220/0257	. . Thermostatic valves
2220/0264	. . Hydraulic balancing valves
2220/0271	. . Valves
2220/0278	. . Expansion vessels
2220/0285	. . Pipe sections
2220/0292	. . Fluid distribution networks
2220/04	. Sensors
2220/042	. . Temperature sensors
2220/044	. . Flow sensors
2220/046	. . Pressure sensors
2220/048	. . Level sensors, e.g. water level sensors
2220/06	. Heat exchangers
2220/07	. Heat pipes
2220/08	. Storage tanks
2220/10	. Heat storage materials, e.g. phase change materials or static water enclosed in a space
2220/20	. Heat consumers
2220/2009	. . Radiators
2220/2018	. . . Column radiators having vertically extending tubes
2220/2027	. . . Convectors (radiators wherein heat transfer mainly takes place by convection)
2220/2036	. . . Electric radiators
2220/2045	. . . Radiators having horizontally extending tubes
2220/2054	. . . Panel radiators with or without extended convection surfaces
2220/2063	. . . Central heating radiators having heat storage material incorporated
2220/2072	. . . Radiators being skirting boards between floor and wall or ledges between wall and ceiling
2220/2081	. . Floor or wall heating panels
2220/209	. . Sanitary water taps

2240/00 Characterizing positions, e.g. of sensors, inlets, outlets

2240/10	. Placed within or inside of
2240/12	. Placed outside of
2240/20	. Placed at top position
2240/22	. Placed at bottom position
2240/24	. Placed at centre position
2240/243	. . Vertically centred
2240/246	. . Horizontally centred

- 2240/26 . Vertically distributed at fixed positions, e.g. multiple sensors distributed over the height of a tank, or a vertical inlet distribution pipe having a plurality of orifices
- 2240/28 . Horizontally distributed at fixed positions
- 2240/30 . At vertical variable positions, e.g. a movable inlet pipe within a tank
- 2240/32 . At horizontal variable positions