

# CPC COOPERATIVE PATENT CLASSIFICATION

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

### LIGHTING; HEATING

**F24 HEATING; RANGES; VENTILATING** (protecting plants by heating in gardens, orchards, or forests [A01G 13/06](#); baking ovens and apparatus [A21B](#); cooking devices other than ranges [A47J](#); forging [B21J](#), [B21K](#); specially adapted for vehicles, see the relevant subclasses of [B60](#) - [B64](#); combustion apparatus in general [F23](#); drying [F26B](#); ovens in general [F27](#); electric heating elements and arrangements [H05B](#))  
(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.

#### Central Heating Systems

- |             |   |        |   |
|-------------|---|--------|---|
| <b>1/00</b> | <b>Steam central heating systems</b> ( <a href="#">F24D 10/00</a> , <a href="#">F24D 11/00</a> take precedence)     | 3/10   | • Feed-line arrangements, e.g. providing for heat-accumulator tanks, expansion tanks {Hydraulic components of a central heating system}   |
| 1/005       | • {in combination with systems for domestic water supply}   | 3/1008 | • • {expansion tanks}   |
| 1/02        | • operating with live steam {( <a href="#">F24D 1/005</a> takes precedence)}  | 3/1016 | • • • {Tanks having a bladder}  |
| 1/04        | • operating with exhaust steam {( <a href="#">F24D 1/005</a> takes precedence)}                                     | 3/1025 | • • • {Compressor controlled pressure heads}  |
| 1/06        | • operating with superheated steam {( <a href="#">F24D 1/005</a> takes precedence)}                                 | 3/1033 | • • • {with compressed gas cylinder}  |
| 1/08        | • Feed-line arrangements, e.g. providing for heat-accumulator tanks, expansion tanks                                | 3/1041 | • • • {Flow-through}  |
| <b>3/00</b> | <b>Hot-water central heating systems</b> ( <a href="#">F24D 10/00</a> , <a href="#">F24D 11/00</a> take precedence) | 3/105  | • • {pumps combined with multiple way valves}   |
| 3/005       | • {combined with solar energy (solar heat collectors per se <a href="#">F24S</a> )}                                 | 3/1058 | • • {disposition of pipes and pipe connections}   |
| 3/02        | • with forced circulation, e.g. by pumps (pump constructions <a href="#">F04</a> )                                  | 3/1066 | • • • {Distributors for heating liquids}  |
| 3/04        | • with the water under high pressure  | 3/1075 | • • • • {Built up from modules}   |
| 3/06        | • • Arrangements or devices for maintaining high pressure   | 3/1083 | • • {Filling valves or arrangements for filling}  |
| 3/08        | • in combination with systems for domestic hot-water supply   | 3/1091 | • • {Mixing cylinders}  |
| 3/082       | • • {Hot water storage tanks specially adapted therefore}   | 3/12   | • Tube and panel arrangements for ceiling, wall, or underfloor heating (electric underfloor heating <a href="#">F24D 13/02</a> ; special adaptations of floors for incorporating ducts, e.g. for heating or ventilating, <a href="#">E04B 5/48</a> ; building elements of block or other shape for the construction of parts of buildings characterised by special adaptations, e.g. serving for locating conduits, <a href="#">E04C 1/39</a> ; 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, <a href="#">E04C 2/52</a> ) |
| 3/085       | • • • {Double-walled tanks}   | 3/122  | • • {Details}   |
| 3/087       | • • {Tap water heat exchangers specially adapted therefore}   | 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 prefab 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}

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#### 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