### COOPERATIVE PATENT CLASSIFICATION

**F**

MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

*(NOTE omitted)*

**LIGHTING; HEATING**

**F23**

COMBUSTION APPARATUS; COMBUSTION PROCESSES

*(NOTE omitted)*

**F23G**

CREMATION FURNACES; CONSUMING WASTE PRODUCTS BY COMBUSTION

*NOTE*

This subclass covers also the burning of low-grade fuel of solid, liquid, or gaseous nature.

**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.

<table>
<thead>
<tr>
<th>1/00</th>
<th>Furnaces for cremation of human or animal carcasses</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/00</td>
<td>Incineration of waste (of specific waste F23G 7/00); Incinerator constructions; Details, accessories or control therefor</td>
</tr>
<tr>
<td>5/002</td>
<td>. . [characterised by their grates (F23G 5/05 takes precedence)]</td>
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<tr>
<td>5/004</td>
<td>. . [with endless travelling grates]</td>
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<tr>
<td>5/006</td>
<td>. [General arrangement of incineration plant, e.g. flow sheets]</td>
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<tr>
<td>5/008</td>
<td>. [adapted for burning two or more kinds, e.g. liquid and solid, of waste being fed through separate inlets]</td>
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<tr>
<td>5/02</td>
<td>. . with pretreatment</td>
</tr>
<tr>
<td>5/027</td>
<td>. . pyrolysing or gasifying stage (pyrolysis of sludge C02F 11/00; destructive distillation of carbonaceous materials C10B 53/00)</td>
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<tr>
<td>5/0273</td>
<td>. . . [using indirect heating]</td>
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<tr>
<td>5/0276</td>
<td>. . . [using direct heating]</td>
</tr>
<tr>
<td>5/033</td>
<td>. . comminuting or crushing</td>
</tr>
<tr>
<td>5/04</td>
<td>. . drying</td>
</tr>
<tr>
<td>5/05</td>
<td>. . using drying grates</td>
</tr>
<tr>
<td>5/08</td>
<td>. having supplementary heating</td>
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<tr>
<td>5/085</td>
<td>. . [High-temperature heating means, e.g. plasma, for partly melting the waste]</td>
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<tr>
<td>5/10</td>
<td>. . electric</td>
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<tr>
<td>5/12</td>
<td>. . using gaseous or liquid fuel (F23G 5/14 takes precedence)</td>
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<tr>
<td>5/14</td>
<td>. . including secondary combustion</td>
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<tr>
<td>5/16</td>
<td>. . . in a separate combustion chamber</td>
</tr>
<tr>
<td>5/165</td>
<td>. . . [arranged at a different level]</td>
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<tr>
<td>5/18</td>
<td>. . in a stack</td>
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<tr>
<td>5/20</td>
<td>. . having rotating or oscillating drums</td>
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<tr>
<td>5/22</td>
<td>. . the drums being conically shaped</td>
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<tr>
<td>5/24</td>
<td>. . having a vertical, substantially cylindrical, combustion chamber</td>
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<tr>
<td>5/245</td>
<td>. . [with perforated bottom or grate]</td>
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<tr>
<td>5/26</td>
<td>. . having rotating bottom</td>
</tr>
<tr>
<td>5/28</td>
<td>. . having raking arms</td>
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<tr>
<td>5/30</td>
<td>. . having a fluidised bed</td>
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<tr>
<td>5/32</td>
<td>. the waste being subjected to a whirling movement, e.g. cyclonic incinerators</td>
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<tr>
<td>5/34</td>
<td>. the waste being burnt in a pit or arranged in a heap for combustion</td>
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<td>5/36</td>
<td>. having a conical combustion chamber, e.g. &quot;teepee&quot; incinerators (F23G 5/22 takes precedence)</td>
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<tr>
<td>5/38</td>
<td>. Multi-hearth arrangements</td>
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<tr>
<td>5/40</td>
<td>. Portable or mobile incinerators</td>
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<tr>
<td>5/42</td>
<td>. . of the basket type</td>
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<tr>
<td>5/44</td>
<td>. . Details; Accessories</td>
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<tr>
<td>5/442</td>
<td>. . . [Waste feed arrangements]</td>
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<tr>
<td>5/444</td>
<td>. . . . [for solid waste (F23G 5/448 takes precedence)]</td>
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<tr>
<td>5/446</td>
<td>. . . . [for liquid waste (F23G 5/448 takes precedence)]</td>
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<tr>
<td>5/448</td>
<td>. . . . [in which the waste is fed in containers or the like]</td>
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<tr>
<td>5/46</td>
<td>. . Recuperation of heat</td>
</tr>
<tr>
<td>5/48</td>
<td>. . Preventing corrosion</td>
</tr>
<tr>
<td>5/50</td>
<td>. . Control or safety arrangements</td>
</tr>
<tr>
<td>7/00</td>
<td>Incinerators or other apparatus for consuming industrial waste, e.g. chemicals (incinerator closets A47K 11/02; oxidation of sludge C02F 11/06; burners in general, burner details F23D; incinerating radioactive waste G21F 9/00)</td>
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<tr>
<td>7/001</td>
<td>. . [for sludges or waste products from water treatment installations (F23G 5/008 takes precedence)]</td>
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<tr>
<td>7/003</td>
<td>. . [for used articles]</td>
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<tr>
<td>7/005</td>
<td>. . . [cars, vehicles]</td>
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<tr>
<td>7/006</td>
<td>. . . [wires, cables (production and refining of metals C22B, e.g. from scrap to produce non-ferrous metals C22B 7/00; salvaging material from cables H01B 15/003)]</td>
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<tr>
<td>7/008</td>
<td>. . . [for liquid waste (waste oil F23G 7/05, waste liquors F23G 7/04, slurges F23G 7/001)]</td>
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<tr>
<td>7/02</td>
<td>. . of bagasse, megasse or the like</td>
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<tr>
<td>7/04</td>
<td>. . of waste liquors, e.g. sulfite liquors</td>
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<tr>
<td>7/05</td>
<td>. . of waste oils</td>
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</tbody>
</table>
of waste gases or noxious gases, e.g. exhaust gases (exhaust apparatus for engines with means for rendering the exhaust innocuous, e.g. by thermal or catalytic conversion, F01N 3/08; combustion of uncombusted material from primary combustion within apparatus for combustion of solid or fluent fuel F23B; of non combusted material from primary combustion of solid fuels F23B 5/00; of gases produced by primary combustion of solid fuels F23B 900/04), F23C)

7/061 ... [with supplementary heating]
7/063 ... [electric heating]
7/065 ... [using gaseous or liquid fuel]
7/066 ... [preheating the waste gas by the heat of the combustion, e.g. recuperation type incinerator]
7/068 ... . [using regenerative heat recovery means]
7/07 ... . in which combustion takes place in the presence of catalytic material
7/08 ... . using flares, e.g. in stacks
7/085 ... . [in stacks]
7/10 ... . of field or garden waste {or biomass}
7/105 ... . (of wood waste)
7/12 ... . of plastics, e.g. rubber
7/14 ... . of contaminated soil, e.g. by oil

2200/00 Waste incineration

2201/00 Pretreatment
2201/00. Drying by heat
2201/10. Drying by heat
2201/101. using indirect heat transfer
2201/20. Dewatering by mechanical means
2201/30. Pyrolysing
2201/301. Treating pyrogases
2201/302. Treating pyrosolids
2201/303. Burning pyrogases
2201/304. Burning pyrosolids
2201/40. Gasification
2201/50. Devolatilising; from soil, objects
2201/60. Separating
2201/601. different calorific values
2201/602. different sizes
2201/603. recyclable material
2201/70. Blending
2201/701. with additives
2201/702. with other waste
2201/80. Shredding
2201/90. Cooling

2202/00 Combustion
2202/00. in two or more stages
2202/10. with controlled oxidant supply
2202/101. with controlled oxidant supply
2202/102. with supplementary heating
2202/103. in separate chambers
2202/104. with ash melting stage
2202/105. with waste supply in stages
2202/106. with recirculation of unburned solid or gaseous matter into combustion chamber
2202/20. to temperatures melting waste
2202/30. in a pressurised chamber
2202/40. in a pulsed combustion chamber
2202/50. in a matrix bed combustion chamber
2202/60. in a catalytic combustion chamber
2202/70. with application of specific energy

2202/701. . Electrical fields
2202/703. . Acoustic energy

2203/00 Furnace arrangements
2203/10. Stoker grate furnace
2203/101. with stepped or inclined grate
2203/103. with roller grate
2203/105. with endless chain or travelling grate
2203/107. with vibrating grate
2203/20. Rotary drum furnace
2203/201. using oscillating movement
2203/202. rotating around substantially vertical axis
2203/203. with conically shaped drum
2203/204. having non-circular inner cross-section
2203/205. water-cooled wall
2203/206. with charging ports in the sidewall
2203/207. with air supply ports in the sidewall
2203/208. with interior agitating members
2203/209. with variable inclination of rotation axis
2203/210. with variable speed of rotation
2203/211. Arrangement of a plurality of drums
2203/212. Sealing arrangements between rotary and stationary parts
2203/30. Cyclonic combustion furnace
2203/40. Stationary bed furnace
2203/401. with support for a grate or perforated plate
2203/403. with substantial cylindrical combustion chamber
2203/50. Fluidised bed furnace
2203/501. with external recirculation of entrained bed material
2203/502. with recirculation of bed material inside combustion chamber
2203/503. with two or more fluidised beds
2203/504. with essentially horizontal flow of bed material
2203/505. with fluidised bed rotated as a whole
2203/60. Mobile furnace
2203/601. carried by a vehicle
2203/70. Modular furnace
2203/80. Furnaces with other means for moving the waste through the combustion zone
2203/801. using conveyors
2203/8013. Screw conveyors
2203/8016. Belt conveyors
2203/803. Rams or pushers
2203/805. using a rotating hearth

2204/00 Supplementary heating arrangements
2204/10. using auxiliary fuel
2204/101. solid fuel
2204/103. gaseous or liquid fuel
2204/20. using electric energy
2204/201. Plasma
2204/202. Laser
2204/203. Microwave
2204/204. Induction

2205/00 Waste feed arrangements
2205/10. using ram or pusher
2205/101. sequentially operated
2205/12. using conveyors
2205/121. Screw conveyor
2205/122. Belt conveyor
2205/123. Roller conveyor
2206/00 Waste heat recuperation
  2206/10 reintroducing the heat in the same process, e.g. for predrying
  2206/20 using the heat in association with another installation
  2206/201 with an industrial furnace
  2206/202 with an internal combustion engine
  2206/203 with a power/heat generating installation

2207/00 Control
  2207/10 Arrangement of sensing devices
  2207/101 for temperature
  2207/1015 Heat pattern monitoring of flames
  2207/102 for pressure
  2207/103 for oxygen
  2207/104 for CO or CO₂
  2207/105 for NOx
  2207/106 for SOx
  2207/107 for halogen concentration
  2207/108 for hydrocarbon concentration
  2207/112 for waste supply flowrate
  2207/113 for oxidant supply flowrate
  2207/114 for combustion bed level
  2207/20 Waste supply
  2207/30 Oxidant supply
  2207/40 Supplementary heat supply
  2207/50 Cooling fluid supply
  2207/60 Additives supply

2208/00 Safety aspects
  2208/10 Preventing or abating fire or explosion, e.g. by purging

2209/00 Specific waste
  2209/10 Liquid waste
  2209/101 Waste liquor
  2209/102 Waste oil
  2209/103 Bagasse, megasse
  2209/12 Sludge, slurries or mixtures of liquids
  2209/14 Gaseous waste or fumes
  2209/141 Explosive gases
  2209/142 Halogen gases, e.g. silane
  2209/16 Warfare materials, e.g. ammunition
  2209/18 Radioactive materials
  2209/20 Medical materials
  2209/22 Waste papers
  2209/24 Contaminated soil; foundry sand
  2209/26 Biowaste
  2209/261 Woodwaste
  2209/262 Agricultural waste
  2209/28 Plastics or rubber like materials
  2209/281 Tyres
  2209/30 Solid combustion residues, e.g. bottom or flyash

2900/00 Special features of, or arrangements for incinerators
  2900/001 Exhaust gas recirculation (using the heat thereof)
  2900/005 Combustion of two or more furnaces
  2900/006 Burning with downwards directed draft through the waste mass
  2900/007 Waste oxidation, pyrolysis or gasification in water under supercritical conditions
  2900/008 Furnace with inclined hearth
  2900/009 Waste in combustion chamber supported on bed made of special materials
  2900/010 Combustion chamber walls reflecting radiant energy within the chamber
  2900/011 Co-combustion of two or more kinds of waste, separately fed into the furnace
  2900/012 Combustion of waste suspended or lifted by upward gas flows
  2900/013 Furnace with progressive waste movements in vertical or steeply inclined direction
  2900/014 Waste pyrolysis, gasification or cracking by indirect heat transfer
  2900/015 Waste pyrolysis, gasification or cracking in presence of catalysts
  2900/016 Waste pyrolysis, gasification or cracking in a mechanically fluidised bed, e.g. obtained by a centrifugal force
  2900/017 Waste pre-treatment by pyrolysis, gasification or cracking
  2900/018 Waste pre-treatment by pyrolysis, gasification or cracking followed by condensation of gas into combustible oil or fat
  2900/019 Pelletising waste before combustion
  2900/020 Thermoforming of plastic waste materials before combustion
  2900/021 Biologic treatment before burning, e.g. biogas generation
  2900/022 Compacting waste before burning
  2900/023 Evaporating, e.g. liquid waste before burning
  2900/024 Extruding waste before combustion
  2900/025 Preheating processes other than drying or pyrolysis
  2900/026 Separating non combustible matters
  2900/027 Drying waste by mixing with drying chemicals, e.g. with CaO
  2900/028 Providing additional energy for combustion, e.g. by using supplementary heating
  2900/029 using the heat from externally heated bodies, e.g. steel balls
  2900/030 using solid propellant
  2900/031 using solar energy
  2900/032 using thermit or other compositions of metal oxides as auxiliary fuel
  2900/033 using arc discharge electrodes to provide heat
  2900/034 Rotary drums with co-current flows of waste and gas
  2900/035 Rotary drum furnaces with counter-current flows of waste and gas
  2900/036 Rotary drum furnaces with foramenous drum walls, e.g. grate drums
  2900/037 Multi-hearth furnaces with vertical axis
  2900/038 Hearth or supports movable into and from the furnace, e.g. by a conveyor
  2900/039 Feeding waste in containers, bags or barrels
  2900/040 Injecting fluid waste into incinerator
  2900/041 using waste heat for desalinating sea water
Controlling; Monitoring or measuring

Controlling combustion air preheating
Sensing exhaust gas opacity
Sensing for exhaust gas properties, e.g. O<sub>2</sub> content
Sensing exhaust gas radioactivity
Sensing ash or slag properties
Measuring material flow rates
Sensors arranged in waste loading zone, e.g. feed hopper level
Measuring produced steam flow rate
Controlling stoker grate speed or vibrations for waste movement
Detecting the properties of waste to be incinerated, e.g. heating value, density

Incinerating particular products or waste
Air bags or seat belt pre-tensioners
Animal fat, e.g. lard, tallow, stearin
Incinerating litter from animals, e.g. poultry litter
Incinerating contaminated animal meals
Incinerating used asbestos
Incinerating used automobiles
Incinerating or pyrolysing used batteries
Incinerating remains of building materials after demolishing, e.g. fibreglass asphalt shingles
Incinerating human or animal corpses or remains
Incinerating PCB-materials
Incinerating rice or grain husks, hulls or bran
Incinerating oil shales
Incinerating drainage water from waste pits of incinerators
Temporary storage means, e.g. buffers for accumulating fumes or gases, between treatment stages