CPC    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.

1/00 Furnaces for cremation of human or animal carcasses

5/00 Incineration of waste (of specific waste F23G 7/00); Incinerator constructions; Details, accessories or control therefor

5/002 . [characterised by their grates (F23G 5/05 takes precedence)]
5/004 . . [with endless travelling grates]
5/006 . [General arrangement of incineration plant, e.g. flow sheets]
5/008 . [adapted for burning two or more kinds, e.g. liquid and solid, of waste being fed through separate inlets]
5/02 . with pretreatment
5/027 . . pyrolyzing or gasifying stage (pyrolysis of sludge C02F 11/00; destructive distillation of carbonaceous materials C10B 53/00)

5/0273 . . . [using indirect heating]
5/0276 . . . [using direct heating]
5/033 . . comminuting or crushing
5/04 . . drying
5/05 . . . using drying grates
5/08 . . having supplementary heating
5/085 . . . [High-temperature heating means, e.g. plasma, for partly melting the waste]
5/10 . . electric
5/12 . . using gaseous or liquid fuel (F23G 5/14 takes precedence)
5/14 . . including secondary combustion
5/16 . . . in a separate combustion chamber
5/165 . . . . [arranged at a different level]
5/18 . . . . . in a stack
5/20 . . having rotating or oscillating drums
5/22 . . the drums being conically shaped
5/24 . . having a vertical, substantially cylindrical, combustion chamber
5/245 . . . [with perforated bottom or grate]
5/26 . . having rotating bottom
5/28 . . having raking arms
5/30 . . having a fluidised bed

5/32 . the waste being subjected to a whirling movement, e.g. cyclonic incinerators
5/34 . the waste being burnt in a pit or arranged in a heap for combustion
5/36 . having a conical combustion chamber, e.g. "teepee" incinerators (F23G 5/22 takes precedence)
5/38 . Multi-hearth arrangements
5/40 . Portable or mobile incinerators
5/42 . . of the basket type
5/44 . . Details; Accessories
5/442 . . . [Waste feed arrangements]
5/444 . . . . [for solid waste (F23G 5/448 takes precedence)]
5/446 . . . . [for liquid waste (F23G 5/448 takes precedence)]
5/448 . . . . [in which the waste is fed in containers or the like]
5/46 . . Recuperation of heat
5/48 . . Preventing corrosion
5/50 . . Control or safety arrangements

7/00 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)

7/001 . [for sludges or waste products from water treatment installations (F23G 5/008 takes precedence)]
7/003 . [for used articles]
7/005 . . [cars, vehicles]
7/006 . . [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)]
7/008 . . [for liquid waste (waste oil F23G 7/05, waste liquors F23G 7/04, sludges F23G 7/001)]
7/02 . . of bagasse, megasse or the like
7/04 . . of waste liquors, e.g. sulfite liquors
7/05 . . of waste oils
7/06 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 90/04), 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 biomasses)
7/105 [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
2201/10 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
2202/10 in two or more stages
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 with 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
2203/21 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
2205/124 . . . Chain conveyor
2205/125 . . . Vibrating conveyor
2205/14 . . . using hopper or bin
2205/16 . . . using chute
2205/18 . . . using airllock systems
2205/20 . . . using airblast or pneumatic feeding

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)
2900/002 . . . Combining two or more furnaces
2900/003 . . . Burning with downwards directed draft through the waste mass
2900/004 . . . Waste oxidation, pyrolysis or gasification in water under supercritical conditions
2900/005 . . . Furnace with inclined hearth
2900/006 . . . Waste in combustion chamber supported on bed made of special materials
2900/007 . . . Combustion chamber walls reflecting radiant energy within the chamber
2900/008 . . . Co-combustion of two or more kinds of waste, separately fed into the furnace
2900/009 . . . Combustion of waste suspended or lifted by upward gas flows
2900/010 . . . Furnace with progressive waste movements in vertical or steeply inclined direction
2900/011 . . . Waste pyrolysis, gasification or cracking by indirect heat transfer
2900/012 . . . Waste pyrolysis, gasification or cracking in presence of catalysts
2900/013 . . . Waste pyrolysis, gasification or cracking in a mechanically fluidised bed, e.g. obtained by a centrifugal force
2900/014 . . . Waste pre-treatment by pyrolysis, gasification or cracking
2900/015 . . . Waste pre-treatment by pyrolysis, gasification or cracking followed by condensation of gas into combustible oil or fat
2900/016 . . . Pelletising waste before combustion
2900/017 . . . Thermoforming of plastic waste materials before combustion
2900/018 . . . Biologic treatment before burning, e.g. biogas generation
2900/019 . . . Compacting waste before burning
2900/020 . . . Evaporating, e.g. liquid waste before burning
2900/021 . . . Extruding waste before combustion
2900/022 . . . Preheating processes other than drying or pyrolysis
2900/023 . . . Separating non combustible matters
2900/024 . . . Drying waste by mixing with drying chemicals, e.g. with CaO
2900/025 . . . Providing additional energy for combustion, e.g. by using supplementary heating
2900/026 . . . using the heat from externally heated bodies, e.g. steel balls
2900/027 . . . using solid propellant
2900/028 . . . using solar energy
2900/029 . . . using thermit or other compositions of metal oxides as auxiliary fuel
2900/030 . . . using arc discharge electrodes to provide heat
2900/031 . . . Rotary drums with co-current flows of waste and gas
2900/032 . . . Rotary drum furnaces with counter-current flows of waste and gas
2900/033 . . . Rotary drum furnaces with foramenous drum walls, e.g. grate drums
2900/034 . . . Multi-hearth furnaces with vertical axis
2900/035 . . . Heaths or supports movable into and from the furnace, e.g. by a conveyer
2900/036 . . . Feeding waste in containers, bags or barrels
2900/037 . . . Injecting fluid waste into incinerator
2900/038 . . . 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\textsubscript{2} 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