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 . . pyrolising or gasifying stage (pyrolisation 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 . . {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
2201/10 . 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 airlock 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 CO_2
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
2900/00001 . Exhaust gas recirculation (using the heat thereof F23G 2206/10)
2900/50001 . Combination of two or more furnaces
2900/50002 . Burning with downwards directed draft through the waste mass
2900/50003 . Waste oxidation, pyrolysis or gasification in water under supercritical conditions
2900/50004 . Furnace with inclined hearth
2900/50005 . Waste in combustion chamber supported on bed made of special materials
2900/50006 . Combustion chamber walls reflecting radiant energy within the chamber
2900/50007 . Co-combustion of two or more kinds of waste, separately fed into the furnace
2900/50008 . Combustion of waste suspended or lifted by upward gas flows
2900/50009 . Furnace with progressive waste movements in vertical or steeply inclined direction
2900/50201 . Waste pyrolysis, gasification or cracking by indirect heat transfer
2900/50202 . Waste pyrolysis, gasification or cracking in presence of catalysts
2900/50203 . Waste pyrolysis, gasification or cracking in a mechanically fluidised bed, e.g. obtained by a centrifugal force
2900/50204 . Waste pre-treatment by pyrolysis, gasification or cracking
2900/50205 . Waste pre-treatment by pyrolysis, gasification or cracking followed by condensation of gas into combustible oil or fat
2900/50206 . Pelletising waste before combustion
2900/50207 . Thermoforming of plastic waste materials before combustion
2900/50208 . Biologic treatment before burning, e.g. biogas generation
2900/50209 . Compacting waste before burning
2900/50211 . Evaporating, e.g. liquid waste before burning
2900/50212 . Extruding waste before combustion
2900/50213 . Preheating processes other than drying or pyrolysis
2900/50214 . Separating non combustible matters
2900/50401 . Drying waste by mixing with drying chemicals, e.g. with CaO
2900/508 . Providing additional energy for combustion, e.g. by using supplementary heating
2900/50801 . . using the heat from externally heated bodies, e.g. steel balls
2900/50802 . . using solid propellant
2900/50803 . . using solar energy
2900/50804 . . using thermit or other compositions of metal oxides as auxiliary fuel
2900/51001 . . using arc discharge electrodes to provide heat
2900/52001 . Rotary drums with co-current flows of waste and gas
2900/52002 . Rotary drum furnaces with counter-current flows of waste and gas
2900/52003 . Rotary drum furnaces with foramenous drum walls, e.g. grate drums
2900/53801 . Multi-hearth furnaces with vertical axis
2900/54001 . Hearths or supports movable into and from the furnace, e.g. by a conveyor
2900/54401 . Feeding waste in containers, bags or barrels
2900/54402 . Injecting fluid waste into incinerator
2900/54601 . using waste heat for desalinating sea water

2900/55 . Controlling; Monitoring or measuring
2900/55001 . . Controlling combustion air preheating
2900/55002 . . Sensing exhaust gas opacity
2900/55003 . . Sensing for exhaust gas properties, e.g. O_2 content
2900/55004 . . Sensing exhaust gas radioactivity
2900/55005 . . Sensing ash or slag properties
2900/55006 . . Measuring material flow rates
2900/55007 . . Sensors arranged in waste loading zone, e.g. feed hopper level
2900/55008 . . Measuring produced steam flow rate
2900/55009 . . Controlling stoker grate speed or vibrations for waste movement
2900/55011 . . Detecting the properties of waste to be incinerated, e.g. heating value, density
2900/70 . Incinerating particular products or waste
2900/7001 . . Air bags or seat belt pre-tensioners
2900/7002 . . Animal fat, e.g. lard, tallow, stearin
2900/7003 . . Incinerating litter from animals, e.g. poultry litter
2900/7004 . . Incinerating contaminated animal meals
2900/7005 . . Incinerating used asbestos
2900/7006 . . Incinerating used automobiles
2900/7007 . . Incinerating or pyrolysing used batteries
2900/7008 . . Incinerating remains of building materials after demolishing, e.g. fibreglass asphalt shingles
2900/7009 . . Incinerating human or animal corpses or remains
2900/7011 . . Incinerating PCB-materials
2900/7012 . . Incinerating rice or grain husks, hulls or bran
2900/7013 . . Incinerating oil shales
2900/70401 . . Incinerating drainage water from waste pits of incinerators
2900/70601 . Temporary storage means, e.g. buffers for accumulating fumes or gases, between treatment stages