

CPC COOPERATIVE PATENT CLASSIFICATION

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

LIGHTING; HEATING

F23 COMBUSTION APPARATUS; COMBUSTION PROCESSES
(NOTE omitted)

F23J REMOVAL OR TREATMENT OF COMBUSTION PRODUCTS OR COMBUSTION RESIDUES; FLUES (combustion apparatus for consuming smoke or fumes, e.g. exhaust gases, [F23G 7/06](#))

NOTE

This subclass covers the cleaning of external surfaces of water tubes of boilers

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	Removing ash, clinker, or slag from combustion chambers ({removing flyash from flue gas F23J 15/022;} devices for removal of material from the bed of fluidised bed combustion apparatus F23C 10/24)	11/10	. for tents; for log huts; for other inflammable structures
1/02	. Apparatus for removing ash, clinker, or slag from ash-pits, e.g. by employing trucks or conveyors, by employing suction devices	11/12	. Smoke conduit systems for factories or large buildings
1/04	. Hand tools, e.g. rakes, prickers, tongs	13/00	Fittings for chimneys or flues (side-supporting means for chimney stacks E04H 12/20 ; ladders permanently attached to chimneys E06C 9/00 ; draught-inducing apparatus associated with chimneys or flues F23L 17/00 ; tops for chimneys, terminals for flues F23L 17/02)
1/06	. Mechanically-operated devices, e.g. clinker pushers (forming part of the grate F23H)	13/02	. Linings; Jackets; Casings
1/08	. Liquid slag removal	13/025	. . {composed of concentric elements, e.g. double walled (terminals for balanced flue arrangements F23L 17/04 })
3/00	Removing solid residues from passages or chambers beyond the fire, e.g. from flues by soot blowers	13/04	. Joints; Connections
3/02	. Cleaning furnace tubes; Cleaning flues or chimneys	13/06	. Mouths; Inlet holes
3/023	. . {cleaning the fireside of watertubes in boilers}	13/08	. Doors or covers specially adapted for smoke-boxes, flues, or chimneys
3/026	. . {cleaning the chimneys}	15/00	Arrangements of devices for treating smoke or fumes
3/04	. Traps	15/003	. {for supplying chemicals to fumes, e.g. using injection devices}
3/06	. Systems for accumulating residues from different parts of furnace plant	15/006	. {Layout of treatment plant}
7/00	Arrangement of devices for supplying chemicals to fire	15/02	. of purifiers, e.g. for removing noxious material (traps for solid residues F23J 3/04)
9/00	Preventing premature solidification of molten combustion residues	15/022	. . {for removing solid particulate material from the gasflow}
11/00	Devices for conducting smoke or fumes, e.g. flues (chimney stacks E04H 12/28; removing cooking fumes from domestic stoves or ranges F24C 15/20 {; fume conduits of furnaces, kilns, ovens, or retorts F27D 17/002 })	15/025	. . . {using filters}
11/02	. for conducting smoke or fumes originating from various locations to the outside, e.g. in locomotive sheds, in garages	15/027	. . . {using cyclone separators}
11/04	. in locomotives; in road vehicles; in ships	15/04	. . using washing fluids {(scrubbers for removing solids only F23J 15/022 })}
11/06	. . for conducting smoke horizontally	15/06	. of coolers
11/08	. for portable apparatus	15/08	. of heaters
		99/00	Subject matter not provided for in other groups of this subclass

2211/00 Flue gas duct systems

2211/10	<ul style="list-style-type: none"> . . . Balanced flues (combining air supply and flue gas exhaust) 	2700/001	<ul style="list-style-type: none"> . . . Ash removal, handling and treatment means
2211/101	<ul style="list-style-type: none"> . . . with coaxial duct arrangement 	2700/002	<ul style="list-style-type: none"> . . . Ash and slag handling in pulverulent fuel furnaces
2211/20	<ul style="list-style-type: none"> . . . Common flues for several combustion devices 	2700/003	<ul style="list-style-type: none"> . . . Ash removal means for incinerators
2211/30	<ul style="list-style-type: none"> . . . Chimney or flue associated with building ventilation system 	2900/00	Special arrangements for conducting or purifying combustion fumes; Treatment of fumes or ashes
2211/40	<ul style="list-style-type: none"> . . . Chimney with internal flue pipe system 	2900/01001	<ul style="list-style-type: none"> . . . Sorting and classifying ashes or fly-ashes from the combustion chamber before further treatment
2213/00	Chimneys or flues	2900/01002	<ul style="list-style-type: none"> . . . Cooling of ashes from the combustion chamber by indirect heat exchangers (for preheating air F23L 2900/15041)
2213/10	<ul style="list-style-type: none"> . . . Linings 	2900/01003	<ul style="list-style-type: none"> . . . Ash crushing means associated with ash removal means
2213/101	<ul style="list-style-type: none"> . . . Fastening means therefor 	2900/01004	<ul style="list-style-type: none"> . . . Separating water from ash
2213/20	<ul style="list-style-type: none"> . . . Joints; Connections 	2900/01005	<ul style="list-style-type: none"> . . . Mixing water to ash
2213/201	<ul style="list-style-type: none"> . . . between stack and branch pipes 	2900/01006	<ul style="list-style-type: none"> . . . Airlock sealing associated with ash removal means
2213/202	<ul style="list-style-type: none"> . . . between duct or stack sections 	2900/01007	<ul style="list-style-type: none"> . . . Thermal treatments of ash, e.g. temper or shock-cooling for granulation
2213/203	<ul style="list-style-type: none"> . . . between stack/duct and combustion apparatus 	2900/01009	<ul style="list-style-type: none"> . . . Controls related to ash or slag extraction
2213/204	<ul style="list-style-type: none"> . . . Sealing arrangements 	2900/01021	<ul style="list-style-type: none"> . . . Removing ashes from the ash pit using reciprocating means, e.g. pushers
2213/30	<ul style="list-style-type: none"> . . . Specific materials 	2900/11001	<ul style="list-style-type: none"> . . . Conducting systems with a gas flow bypass from main flue to an auxiliary flue
2213/301	<ul style="list-style-type: none"> . . . flexible 	2900/11002	<ul style="list-style-type: none"> . . . Modelling systems adapted for designing arrangements for conducting or purifying combustion fumes, e.g. flues
2213/302	<ul style="list-style-type: none"> . . . plastic 	2900/13001	<ul style="list-style-type: none"> . . . Preventing or reducing corrosion in chimneys
2213/303	<ul style="list-style-type: none"> . . . metallic 	2900/13002	<ul style="list-style-type: none"> . . . Initial heating of the flue before starting combustion
2213/304	<ul style="list-style-type: none"> . . . ceramic 	2900/13003	<ul style="list-style-type: none"> . . . Means for reducing the noise in smoke conducting ducts or systems
2213/305	<ul style="list-style-type: none"> . . . glass 	2900/13004	<ul style="list-style-type: none"> . . . Water draining devices associated with flues
2213/40	<ul style="list-style-type: none"> . . . Heat insulation fittings 	2900/13005	<ul style="list-style-type: none"> . . . Protections for chimneys or flue tops against external factors, e.g. birds
2213/50	<ul style="list-style-type: none"> . . . Top cover 	2900/13006	<ul style="list-style-type: none"> . . . Devices for heating the chimney top to avoid ice formation
2213/60	<ul style="list-style-type: none"> . . . Service arrangements 	2900/13021	<ul style="list-style-type: none"> . . . Means for supporting the lining of conducting means, e.g. ducts or chimneys
2213/70	<ul style="list-style-type: none"> . . . Safety arrangements 	2900/13022	<ul style="list-style-type: none"> . . . Manufacturing processes for the lining of conducting means, e.g. by extrusion
2215/00	Preventing emissions (solids only F23J 2217/00)	2900/13023	<ul style="list-style-type: none"> . . . Ducts with non-circular cross-section
2215/10	<ul style="list-style-type: none"> . . . Nitrogen; Compounds thereof 	2900/15001	<ul style="list-style-type: none"> . . . Irradiating fumes with electron or light beams, e.g. UV, for oxidizing or dissociating SOx and NOx
2215/101	<ul style="list-style-type: none"> . . . Nitrous oxide (N₂O) 	2900/15002	<ul style="list-style-type: none"> . . . Cleaning fumes by letting them to pass a molten metal bath
2215/20	<ul style="list-style-type: none"> . . . Sulfur; Compounds thereof 	2900/15003	<ul style="list-style-type: none"> . . . Supplying fumes with ozone
2215/30	<ul style="list-style-type: none"> . . . Halogen; Compounds thereof 	2900/15004	<ul style="list-style-type: none"> . . . Preventing plume emission at chimney outlet
2215/301	<ul style="list-style-type: none"> . . . Dioxins; Furans 	2900/15021	<ul style="list-style-type: none"> . . . Preventing emission of hexavalent chromium at the chimney outlet
2215/40	<ul style="list-style-type: none"> . . . Carbon monoxide 	2900/15022	<ul style="list-style-type: none"> . . . Electrochemical cell filters
2215/50	<ul style="list-style-type: none"> . . . Carbon dioxide 	2900/15023	<ul style="list-style-type: none"> . . . Magnetic filters
2215/60	<ul style="list-style-type: none"> . . . Heavy metals; Compounds thereof 	2900/15024	<ul style="list-style-type: none"> . . . Photocatalytic filters
2217/00	Intercepting solids	2900/15025	<ul style="list-style-type: none"> . . . Cyclone walls forming heat exchangers
2217/10	<ul style="list-style-type: none"> . . . by filters 	2900/15026	<ul style="list-style-type: none"> . . . Cyclone separators with horizontal axis
2217/101	<ul style="list-style-type: none"> . . . Baghouse type 	2900/15027	<ul style="list-style-type: none"> . . . Preventing emission of CO₂ at the chimney outlet by using sea weeds filters or absorbers
2217/102	<ul style="list-style-type: none"> . . . electrostatic 	2900/15041	<ul style="list-style-type: none"> . . . Means for absorbing SOx using seawater
2217/103	<ul style="list-style-type: none"> . . . ultrafine [HEPA] 	2900/15061	<ul style="list-style-type: none"> . . . Deep cooling or freezing of flue gas rich of CO₂ to deliver CO₂-free emissions, or to deliver liquid CO₂
2217/104	<ul style="list-style-type: none"> . . . High temperature resistant (ceramic) type 	2900/15081	<ul style="list-style-type: none"> . . . Reheating of flue gases
2217/105	<ul style="list-style-type: none"> . . . Granular bed 		
2217/20	<ul style="list-style-type: none"> . . . by baffles 		
2217/30	<ul style="list-style-type: none"> . . . by screens 		
2217/40	<ul style="list-style-type: none"> . . . by cyclones 		
2217/50	<ul style="list-style-type: none"> . . . by cleaning fluids (washers or scrubbers) 		
2217/60	<ul style="list-style-type: none"> . . . using settling/precipitation chambers 		
2219/00	Treatment devices		
2219/10	<ul style="list-style-type: none"> . . . Catalytic reduction devices 		
2219/20	<ul style="list-style-type: none"> . . . Non-catalytic reduction devices 		
2219/201	<ul style="list-style-type: none"> . . . Reducing species generators, e.g. plasma, corona 		
2219/30	<ul style="list-style-type: none"> . . . Sorption devices using carbon, e.g. coke 		
2219/40	<ul style="list-style-type: none"> . . . Sorption with wet devices, e.g. scrubbers 		
2219/50	<ul style="list-style-type: none"> . . . Sorption with semi-dry devices, e.g. with slurries 		
2219/60	<ul style="list-style-type: none"> . . . Sorption with dry devices, e.g. beds 		
2219/70	<ul style="list-style-type: none"> . . . Condensing contaminants with coolers 		
2219/80	<ul style="list-style-type: none"> . . . Quenching 		
2700/00	Ash removal, handling and treatment means; Ash and slag handling in pulverulent fuel furnaces; Ash removal means for incinerators		