

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	• Balanced flues (combining air supply and flue gas exhaust)	2700/001	• Ash removal, handling and treatment means
2211/101	• . with coaxial duct arrangement	2700/002	• Ash and slag handling in pulverulent fuel furnaces
2211/20	• Common flues for several combustion devices	2700/003	• Ash removal means for incinerators
2211/30	• 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	• Chimney with internal flue pipe system	2900/01001	• Sorting and classifying ashes or fly-ashes from the combustion chamber before further treatment
2213/00	Chimneys or flues	2900/01002	• Cooling of ashes from the combustion chamber by indirect heat exchangers (for preheating air F23L 2900/15041)
2213/10	• Linings	2900/01003	• Ash crushing means associated with ash removal means
2213/101	• . Fastening means therefor	2900/01004	• Separating water from ash
2213/20	• Joints; Connections	2900/01005	• Mixing water to ash
2213/201	• . between stack and branch pipes	2900/01006	• Airlock sealing associated with ash removal means
2213/202	• . between duct or stack sections	2900/01007	• Thermal treatments of ash, e.g. temper or shock-cooling for granulation
2213/203	• . between stack/duct and combustion apparatus	2900/01009	• Controls related to ash or slag extraction
2213/204	• . Sealing arrangements	2900/01021	• Removing ashes from the ash pit using reciprocating means, e.g. pushers
2213/30	• Specific materials	2900/11001	• Conducting systems with a gas flow bypass from main flue to an auxiliary flue
2213/301	• . flexible	2900/11002	• Modelling systems adapted for designing arrangements for conducting or purifying combustion fumes, e.g. flues
2213/302	• . plastic	2900/13001	• Preventing or reducing corrosion in chimneys
2213/303	• . metallic	2900/13002	• Initial heating of the flue before starting combustion
2213/304	• . ceramic	2900/13003	• Means for reducing the noise in smoke conducting ducts or systems
2213/305	• . glass	2900/13004	• Water draining devices associated with flues
2213/40	• Heat insulation fittings	2900/13005	• Protections for chimneys or flue tops against external factors, e.g. birds
2213/50	• Top cover	2900/13006	• Devices for heating the chimney top to avoid ice formation
2213/60	• Service arrangements	2900/13021	• Means for supporting the lining of conducting means, e.g. ducts or chimneys
2213/70	• Safety arrangements	2900/13022	• Manufacturing processes for the lining of conducting means, e.g. by extrusion
2215/00	Preventing emissions (solids only F23J 2217/00)	2900/13023	• Ducts with non-circular cross-section
2215/10	• Nitrogen; Compounds thereof	2900/15001	• Irradiating fumes with electron or light beams, e.g. UV, for oxidizing or dissociating SO _x and NO _x
2215/101	• . Nitrous oxide (N ₂ O)	2900/15002	• Cleaning fumes by letting them to pass a molten metal bath
2215/20	• Sulfur; Compounds thereof	2900/15003	• Supplying fumes with ozone
2215/30	• Halogen; Compounds thereof	2900/15004	• Preventing plume emission at chimney outlet
2215/301	• . Dioxins; Furans	2900/15021	• Preventing emission of hexavalent chromium at the chimney outlet
2215/40	• Carbon monoxide	2900/15022	• Electrochemical cell filters
2215/50	• Carbon dioxide	2900/15023	• Magnetic filters
2215/60	• Heavy metals; Compounds thereof	2900/15024	• Photocatalytic filters
2217/00	Intercepting solids	2900/15025	• Cyclone walls forming heat exchangers
2217/10	• by filters	2900/15026	• Cyclone separators with horizontal axis
2217/101	• . Baghouse type	2900/15027	• Preventing emission of CO ₂ at the chimney outlet by using sea weeds filters or absorbers
2217/102	• . electrostatic	2900/15041	• Means for absorbing SO _x using seawater
2217/103	• . ultrafine [HEPA]	2900/15061	• Deep cooling or freezing of flue gas rich of CO ₂ to deliver CO ₂ -free emissions, or to deliver liquid CO ₂
2217/104	• . High temperature resistant (ceramic) type	2900/15081	• Reheating of flue gases
2217/105	• . Granular bed		
2217/20	• by baffles		
2217/30	• by screens		
2217/40	• by cyclones		
2217/50	• by cleaning fluids (washers or scrubbers)		
2217/60	• using settling/precipitation chambers		
2219/00	Treatment devices		
2219/10	• Catalytic reduction devices		
2219/20	• Non-catalytic reduction devices		
2219/201	• . Reducing species generators, e.g. plasma, corona		
2219/30	• Sorption devices using carbon, e.g. coke		
2219/40	• Sorption with wet devices, e.g. scrubbers		
2219/50	• Sorption with semi-dry devices, e.g. with slurries		
2219/60	• Sorption with dry devices, e.g. beds		
2219/70	• Condensing contaminants with coolers		
2219/80	• Quenching		
2700/00	Ash removal, handling and treatment means; Ash and slag handling in pulverulent fuel furnaces; Ash removal means for incinerators		