

# 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.}

<b>1/00</b>	<b>Removing ash, clinker, or slag from combustion chambers</b> ({ <a href="#">removing flyash from flue gas F23J 15/022</a> ;}) <a href="#">devices for removal of material from the bed of fluidised bed combustion apparatus F23C 10/24</a> )	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	<b>13/00</b>	<b>Fittings for chimneys or flues</b> ( <a href="#">side-supporting means for chimney stacks E04H 12/20</a> ; <a href="#">ladders permanently attached to chimneys E06C 9/00</a> ; <a href="#">draught-inducing apparatus associated with chimneys or flues F23L 17/00</a> ; <a href="#">tops for chimneys, terminals for flues F23L 17/02</a> )
1/06	• Mechanically-operated devices, e.g. clinker pushers ( <a href="#">forming part of the grate F23H</a> )	13/02	• Linings; Jackets; Casings
1/08	• Liquid slag removal	13/025	• . { <a href="#">composed of concentric elements, e.g. double walled (terminals for balanced flue arrangements F23L 17/04)</a> }
<b>3/00</b>	<b>Removing solid residues from passages or chambers beyond the fire, e.g. from flues by soot blowers</b>	13/04	• Joints; Connections
3/02	• Cleaning furnace tubes; Cleaning flues or chimneys	13/06	• Mouths; Inlet holes
3/023	• . { <a href="#">cleaning the fireside of watertubes in boilers</a> }	13/08	• Doors or covers specially adapted for smoke-boxes, flues, or chimneys
3/026	• . { <a href="#">cleaning the chimneys</a> }	<b>15/00</b>	<b>Arrangements of devices for treating smoke or fumes</b>
3/04	• Traps	15/003	• { <a href="#">for supplying chemicals to fumes, e.g. using injection devices</a> }
3/06	• Systems for accumulating residues from different parts of furnace plant	15/006	• { <a href="#">Layout of treatment plant</a> }
<b>7/00</b>	<b>Arrangement of devices for supplying chemicals to fire</b>	15/02	• of purifiers, e.g. for removing noxious material ( <a href="#">traps for solid residues F23J 3/04</a> )
<b>9/00</b>	<b>Preventing premature solidification of molten combustion residues</b>	15/022	• . { <a href="#">for removing solid particulate material from the gasflow</a> }
<b>11/00</b>	<b>Devices for conducting smoke or fumes, e.g. flues</b> ( <a href="#">chimney stacks E04H 12/28</a> ; <a href="#">removing cooking fumes from domestic stoves or ranges F24C 15/20</a> {; <a href="#">fume conduits of furnaces, kilns, ovens, or retorts F27D 17/302</a> })	15/025	• . . { <a href="#">using filters</a> }
11/02	• for conducting smoke or fumes originating from various locations to the outside, e.g. in locomotive sheds, in garages	15/027	• . . { <a href="#">using cyclone separators</a> }
11/04	• in locomotives; in road vehicles; in ships	15/04	• . using washing fluids {( <a href="#">scrubbers for removing solids only F23J 15/022</a> )}
11/06	• . for conducting smoke horizontally	15/06	• of coolers
11/08	• for portable apparatus	15/08	• of heaters
		<b>99/00</b>	<b>Subject matter not provided for in other groups of this subclass</b>
		<b>2211/00</b>	<b>Flue gas duct systems</b>

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	<b>2900/00</b>	<b>Special arrangements for conducting or purifying combustion fumes; Treatment of fumes or ashes</b>
2211/40	• Chimney with internal flue pipe system	2900/01001	• Sorting and classifying ashes or fly-ashes from the combustion chamber before further treatment
<b>2213/00</b>	<b>Chimneys or flues</b>	2900/01002	• Cooling of ashes from the combustion chamber by indirect heat exchangers
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
<b>2215/00</b>	<b>Preventing emissions</b>	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 <sub>x</sub> and NO <sub>x</sub>
2215/101	• . Nitrous oxide (N <sub>2</sub> 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
<b>2217/00</b>	<b>Intercepting solids</b>	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 <sub>2</sub> at the chimney outlet by using sea weeds filters or absorbers
2217/102	• . electrostatic	2900/15041	• Means for absorbing SO <sub>x</sub> using seawater
2217/103	• . ultrafine [HEPA]	2900/15061	• Deep cooling or freezing of flue gas rich of CO <sub>2</sub> to deliver CO <sub>2</sub> -free emissions, or to deliver liquid CO <sub>2</sub>
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		
<b>2219/00</b>	<b>Treatment devices</b>		
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		
<b>2700/00</b>	<b>Ash removal, handling and treatment means; Ash and slag handling in pulverulent fuel furnaces; Ash removal means for incinerators</b>		