

CPC COOPERATIVE PATENT CLASSIFICATION

F23B **METHODS OR APPARATUS FOR COMBUSTION USING ONLY SOLID FUEL** (for combustion of fuels that are solid at room temperatures, but burned in melted form, e.g. candle wax, [C11C 5/00](#), [F23C](#), [F23D](#); using solid fuel suspended in air [F23C](#), [F23D 1/00](#); using solid fuel suspended in liquids [F23C](#), [F23D 11/00](#); using solid fuel and fluent fuel simultaneously or alternately [F23C](#), [F23D 17/00](#); burning of low grade fuel [F23G](#); grates [F23H](#); feeding solid fuel to combustion apparatus [F23K](#); combustion chambers, not otherwise provided for [F23M](#); domestic apparatus [F24](#); central heating boilers [F24D](#); package boilers [F24H](#))

NOTE

This subclass is only concerned with the combustion of lump fuel, or of pulverulent or granulated fuel if no use is made of its fluent nature.

IPC7 groups

- 1/00** {Combustion apparatus using only lump fuel}
- 1/02 . {for indirect heating of a medium in a vessel, e.g. for boiling water (steam generation [F22](#))}
- 1/04 . . {External furnaces, i.e. with furnace in front of the vessel}
- 1/06 . . . {for heating water-tube boilers, e.g. Tenbrink flue furnaces}
- 1/08 . . {Internal furnaces, i.e. with furnaces inside the vessel}
- 1/10 . . . {for heating locomotive boilers}
- 1/12 . . {with a plurality of combustion chambers}
- 1/16 . {the combustion apparatus being modified according to the form of grate or other fuel support (for incinerators [F23G 5/002](#))}
- 1/165 . . {using roller grate}
- 1/18 . . {using inclined grate}
- 1/20 . . {using step-type grate}
- 1/22 . . {using travelling grate}
- 1/24 . . {using rotating grate}
- 1/26 . . {using imperforate fuel supports}
- 1/28 . . {using ridge-type grate, e.g. for combustion of peat, sawdust, or pulverulent fuel (combustion of peat, sawdust [F23G 7/10](#))}
- 1/30 . {characterised by the form of combustion chamber}
- 1/32 . . {rotating}
- 1/34 . . {annular}
- 1/36 . . {shaft-type}
- 1/38 . . {for combustion of peat, sawdust, or pulverulent fuel on a grate or other fuel support (combustion of peat, sawdust [F23G 7/10](#))}
- 3/00** {Combustion apparatus which is portable or removable with respect to the boiler or other apparatus which is heated}
- 5/00** {Combustion apparatus with arrangements for burning uncombusted material from primary combustion (combustion apparatus characterised by the combination of two or more combustion chambers [F23C 6/00](#); the primary combustion being pulverulent fuel [F23C 9/003](#))}
- 5/02 . {in main combustion chamber}
- 5/025 . . {recirculating uncombusted solids to combustion chamber}

- 5/04 . {in separate combustion chamber; on separate grate}

7/00 {Combustion techniques; Other solid-fuel combustion apparatus}

- 7/002 . {characterised by gas flow arrangements}
- 7/005 . . {with downdraught through fuel bed and grate}
- 7/007 . . {with fluegas recirculation to combustion chamber}

10/00 Combustion apparatus characterised by the combination of two or more combustion chambers

- 10/02 . including separate secondary combustion chambers

20/00 Combustion apparatus specially adapted for portability or transportability

30/00 Combustion apparatus with driven means for agitating the burning fuel; Combustion apparatus with driven means for advancing the burning fuel through the combustion chamber

- 30/02 . with movable, e.g. vibratable, fuel-supporting surfaces; with fuel-supporting surfaces that have movable parts
- 30/04 . . with fuel-supporting surfaces that are rotatable around a horizontal or inclined axis and support the fuel on their inside, e.g. cylindrical grates
- 30/06 . . with fuel supporting surfaces that are specially adapted for advancing fuel through the combustion zone
- 30/08 . . . with fuel-supporting surfaces that move through the combustion zone, e.g. with chain grates
- 30/10 . . . with fuel-supporting surfaces having fuel advancing elements that are movable, but remain essentially in the same place, e.g. with rollers or reciprocating grate bars

40/00 Combustion apparatus with driven means for feeding fuel into the combustion chamber

- 40/02 . the fuel being fed by scattering over the fuel-supporting surface
- 40/04 . the fuel being fed from below through an opening in the fuel-supporting surface
- 40/06 . the fuel being fed along the fuel-supporting surface

- 40/08 . . into pot- or through-shaped grates
- 50/00 Combustion apparatus in which the fuel is fed into or through the combustion zone by gravity, e.g. from a fuel storage situated above the combustion zone**
- 50/02 . the fuel forming a column, stack or thick layer with the combustion zone at its bottom
- 50/04 . . the movement of combustion air and flue gases being substantially transverse to the movement of the fuel
- 50/06 . . the fuel gases being removed downwards through one or more openings in the fuel-supporting surface
- 50/08 . . with fuel-deflecting bodies forming free combustion spaces inside the fuel layer
- 50/10 . . with the combustion zone at the bottom of fuel-filled conduits ending at the surface of a fuel bed
- 50/12 . the fuel being fed to the combustion zone by free fall or by sliding along inclined surfaces, e.g. from a conveyor terminating above the fuel bed
- 60/00 Combustion apparatus in which the fuel burns essentially without moving**
- 60/02 . with combustion air supplied through a grate
- 70/00 Combustion apparatus characterised by means returning solid combustion residues to the combustion chamber**
- 80/00 Combustion apparatus characterised by means creating a distinct flow path for flue gases or for non-combusted gases given off by the fuel**
- 80/02 . by means for returning flue gases to the combustion chamber or to the combustion zone
- 80/04 . by means for guiding the flow of flue gases, e.g. baffles
- 90/00 Combustion methods not related to a particular type of apparatus**
- NOTE**
- Groups [F23B 90/00](#) - [F23B 90/08](#) correspond to IPC2012.01
- 90/02 . Start-up techniques
- 90/04 . including secondary combustion ([in separate combustion chambers F23B 10/02](#))
- 90/06 . . the primary combustion being a gasification or pyrolysis in a reductive atmosphere
- 90/08 . . in the presence of catalytic material
- 99/00 Subject matter not provided for in other groups of this subclass**
- 2101/00 Adaptation of combustion apparatus to boilers in which the combustion chamber is situated inside the boiler vessel, e.g. surrounded by cooled surfaces**
- 2700/003 . adapted for use in water-tube boilers
- 2700/004 . adapted for use in Tenbrink boilers
- 2700/005 . adapted for use in locomotives
- 2700/006 . Details of locomotive combustion apparatus
- 2700/007 . with pressurised combustion chambers
- 2700/008 . with interchangeable combustion chambers
- 2700/009 . adapted for use in various steam boilers
- 2700/01 . adapted for boilers built up from sections
- 2700/011 . with fuel shaft for steam boilers
- 2700/012 . with predrying in fuel supply area
- 2700/013 . for use in baking ovens or cooking vessels
- 2700/014 . for use in reverberatory furnaces
- 2700/018 . with fume afterburning by staged combustion
- 2700/022 . with various types of fume afterburners
- 2700/023 . with various arrangements not otherwise provided for
- 2700/037 . Burners for solid or solidified fuel, e.g. metaldehyde blocks
- 2900/00 Special features of, or arrangements for combustion apparatus using solid fuels; Combustion processes therefor**
- 2900/00001 . Combustion chambers with integrated fuel hopper
- 2900/00003 . Combustion devices specially adapted for burning metal fuels, e.g. Al or Mg
- 2900/00004 . Means for generating pulsating combustion of solid fuel
- 2900/00005 . Means for applying acoustical energy to flame
- 2900/00006 . Means for applying electricity to flame, e.g. an electric field
- 2900/99001 . Retrofitting or converting solid fuel stoves to gas or liquid fuels

Indexing scheme related to adaptation of combustion apparatus to boilers

- 2103/00 Adaptation of combustion apparatus for placement in or against an opening of a boiler, e.g. for replacing an oil burner**
- 2103/02 . for producing an essentially horizontal flame
- 2700/00 Combustion apparatus for solid fuel**