

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.

Guidance heading: IPC7 groups**F23B 1/00****Combustion apparatus using only lump fuel**[F23B 1/02](#)

- . for indirect heating of a medium in a vessel, e.g. for boiling water([steam generation](#)[F22](#))

[F23B 1/04](#)

- . . External furnaces, i.e. with furnace in front of the vessel

[F23B 1/06](#)

- . . . for heating water-tube boilers, e.g. Tenbrink flue furnaces

[F23B 1/08](#)

- . . Internal furnaces, i.e. with furnaces inside the vessel

[F23B 1/10](#)

- . . . for heating locomotive boilers

[F23B 1/12](#)

- . . with a plurality of combustion chambers

[F23B 1/16](#)

- . the combustion apparatus being modified according to the form of grate or other fuel support{[for incinerators](#)[F23G 5/002](#)}

[F23B 1/165](#)

- . . {[using roller grate](#)}

[F23B 1/18](#)

- . . using inclined grate

[F23B 1/20](#)

- . . using step-type grate

[F23B 1/22](#)

- . . using travelling grate

[F23B 1/24](#)

- . . using rotating grate

[F23B 1/26](#)

- . . using imperforate fuel supports

[F23B 1/28](#)

- . . using ridge-type grate, e.g. for combustion of peat, sawdust, or pulverulent fuel{([combustion of peat, sawdust](#) [F23G 7/10](#))}

[F23B 1/30](#)

- . characterised by the form of combustion chamber

[F23B 1/32](#)

- . . rotating

[F23B 1/34](#)

- . . annular

[F23B 1/36](#)

- . . shaft-type

[F23B 1/38](#)

- . . for combustion of peat, sawdust, or pulverulent fuel on a grate or other fuel support{([combustion of peat, sawdust](#) [F23G 7/10](#))}

F23B 3/00	Combustion apparatus which is portable or removable with respect to the boiler or other apparatus which is heated
F23B 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)}
F23B 5/02	. in main combustion chamber
F23B 5/025	. . {recirculating uncombusted solids to combustion chamber}
F23B 5/04	. in separate combustion chamber; on separate grate
F23B 7/00	Combustion techniques; Other solid-fuel combustion apparatus
F23B 7/002	. {characterised by gas flow arrangements}
F23B 7/005	. . {with downdraught through fuel bed and grate}
F23B 7/007	. . {with fluegas recirculation to combustion chamber}
F23B 10/00	Combustion apparatus characterised by the combination of two or more combustion chambers
F23B 10/02	. including separate secondary combustion chambers
	<u>WARNING</u>
	Group F23B 10/02 is not complete pending a reorganisation. See also groups F23B 10/00
F23B 20/00	Combustion apparatus specially adapted for portability or transportability
F23B 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
F23B 30/02	. with movable, e.g. vibratable, fuel-supporting surfaces; with fuel-supporting surfaces that have movable parts
F23B 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
F23B 30/06	. . with fuel supporting surfaces that are specially adapted for advancing fuel through the combustion zone
F23B 30/08	. . . with fuel-supporting surfaces that move through the combustion zone, e.g. with chain grates
F23B 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
F23B 40/00	Combustion apparatus with driven means for feeding fuel into the combustion chamber
F23B 40/02	. the fuel being fed by scattering over the fuel-supporting surface
F23B 40/04	. the fuel being fed from below through an opening in the fuel-supporting surface
F23B 40/06	. the fuel being fed along the fuel-supporting surface

F23B 40/08	.. into pot- or through-shaped grates
F23B 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
F23B 50/02	. the fuel forming a column, stack or thick layer with the combustion zone at its bottom
F23B 50/04	.. the movement of combustion air and flue gases being substantially transverse to the movement of the fuel
F23B 50/06	.. the fuel gases being removed downwards through one or more openings in the fuel-supporting surface
F23B 50/08	.. with fuel-deflecting bodies forming free combustion spaces inside the fuel layer
F23B 50/10	.. with the combustion zone at the bottom of fuel-filled conduits ending at the surface of a fuel bed
F23B 50/12	. the fuel being fed to the combustion zone by free fall or by sliding along inclined surfaces, e.g. from a conveyer terminating above the fuel bed
F23B 60/00	Combustion apparatus in which the fuel burns essentially without moving
F23B 60/02	. with combustion air supplied through a grate
F23B 70/00	Combustion apparatus characterised by means returning solid combustion residues to the combustion chamber
F23B 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
F23B 80/02	. by means for returning flue gases to the combustion chamber or to the combustion zone
F23B 80/04	. by means for guiding the flow of flue gases, e.g. baffles
F23B 90/00	Combustion methods not related to a particular type of apparatus
<u>NOTE</u>	
Groups F23B 90/00 - F23B 90/08 correspond to IPC2012.01	
<u>WARNING</u>	
Groups F23B 90/00 to F23B 90/08 are not complete pending a reorganisation. See also groups F23B 1/00 to F23B 7/007	
F23B 90/02	. Start-up techniques
F23B 90/04	. including secondary combustion (in separate combustion chambers F23B 10/02)
F23B 90/06	.. the primary combustion being a gasification or pyrolysis in a reductive atmosphere
F23B 90/08	.. in the presence of catalytic material
F23B 99/00	Subject matter not provided for in other groups of this subclass
F23B 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

Guidance heading: Indexing scheme related to adaptation of combustion apparatus to boilers**F23B 2103/00** **Adaptation of combustion apparatus for placement in or against an opening of a boiler, e.g. for replacing an oil burner**

- F23B 2103/02 . for producing an essentially horizontal flame

F23B 2700/00 **Combustion apparatus for solid fuel**

- F23B 2700/003 . adapted for use in water-tube boilers
- F23B 2700/004 . adapted for use in Tenbrink boilers
- F23B 2700/005 . adapted for use in locomotives
- F23B 2700/006 . Details of locomotive combustion apparatus
- F23B 2700/007 . with pressurised combustion chambers
- F23B 2700/008 . with interchangeable combustion chambers
- F23B 2700/009 . adapted for use in various steam boilers
- F23B 2700/01 . adapted for boilers built up from sections
- F23B 2700/011 . with fuel shaft for steam boilers
- F23B 2700/012 . with predrying in fuel supply area
- F23B 2700/013 . for use in baking ovens or cooking vessels
- F23B 2700/014 . for use in reverberatory furnaces
- F23B 2700/018 . with fume afterburning by staged combustion
- F23B 2700/022 . with various types of fume afterburners
- F23B 2700/023 . with various arrangements not otherwise provided for
- F23B 2700/037 . Burners for solid or solidified fuel, e.g. metaldehyde blocks

F23B 2900/00 **Special features of, or arrangements for combustion apparatus using solid fuels; Combustion processes therefor**

- F23B 2900/00001 . Combustion chambers with integrated fuel hopper
- F23B 2900/00003 . Combustion devices specially adapted for burning metal fuels, e.g. Al or Mg
- F23B 2900/00004 . Means for generating pulsating combustion of solid fuel
- F23B 2900/00005 . Means for applying acoustical energy to flame
- F23B 2900/00006 . Means for applying electricity to flame, e.g. an electric field
- F23B 2900/99001 . Retrofitting or converting solid fuel stoves to gas or liquid fuels