

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**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 [{\(combustion of peat, sawdust F23G 7/10\)}](#)

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| 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 | <ul style="list-style-type: none"> in main combustion chamber |
| F23B 5/025 | <ul style="list-style-type: none"> <ul style="list-style-type: none"> {recirculating uncombusted solids to combustion chamber} |
| F23B 5/04 | <ul style="list-style-type: none"> in separate combustion chamber; on separate grate |
| F23B 7/00 | Combustion techniques; Other solid-fuel combustion apparatus |
| F23B 7/002 | <ul style="list-style-type: none"> {characterised by gas flow arrangements} |
| F23B 7/005 | <ul style="list-style-type: none"> <ul style="list-style-type: none"> {with downdraught through fuel bed and grate} |
| F23B 7/007 | <ul style="list-style-type: none"> <ul style="list-style-type: none"> {with fluegas recirculation to combustion chamber} |
| F23B 10/00 | Combustion apparatus characterised by the combination of two or more combustion chambers |
| F23B 10/02 | <ul style="list-style-type: none"> including separate secondary combustion chambers <p><u>WARNING</u></p> <p>Group F23B 10/02 is not complete pending a reorganisation. See also groups F23B 10/00</p> |
| 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 | <ul style="list-style-type: none"> with movable, e.g. vibratable, fuel-supporting surfaces; with fuel-supporting surfaces that have movable parts |
| F23B 30/04 | <ul style="list-style-type: none"> <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> <ul style="list-style-type: none"> with fuel supporting surfaces that are specially adapted for advancing fuel through the combustion zone |
| F23B 30/08 | <ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> with fuel-supporting surfaces that move through the combustion zone, e.g. with chain grates |
| F23B 30/10 | <ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> the fuel being fed by scattering over the fuel-supporting surface |
| F23B 40/04 | <ul style="list-style-type: none"> the fuel being fed from below through an opening in the fuel-supporting surface |
| F23B 40/06 | <ul style="list-style-type: none"> the fuel being fed along the fuel-supporting surface |

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| F23B 40/08 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> the fuel forming a column, stack or thick layer with the combustion zone at its bottom |
| F23B 50/04 | <ul style="list-style-type: none"> the movement of combustion air and flue gases being substantially transverse to the movement of the fuel |
| F23B 50/06 | <ul style="list-style-type: none"> the fuel gases being removed downwards through one or more openings in the fuel-supporting surface |
| F23B 50/08 | <ul style="list-style-type: none"> with fuel-deflecting bodies forming free combustion spaces inside the fuel layer |
| F23B 50/10 | <ul style="list-style-type: none"> with the combustion zone at the bottom of fuel-filled conduits ending at the surface of a fuel bed |
| F23B 50/12 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> by means for returning flue gases to the combustion chamber or to the combustion zone |
| F23B 80/04 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Start-up techniques |
| F23B 90/04 | <ul style="list-style-type: none"> including secondary combustion (in separate combustion chambers F23B 10/02) |
| F23B 90/06 | <ul style="list-style-type: none"> the primary combustion being a gasification or pyrolysis in a reductive atmosphere |
| F23B 90/08 | <ul style="list-style-type: none"> 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**

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