

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

<b>F23B 3/00</b>	<b>Combustion apparatus which is portable or removable with respect to the boiler or other apparatus which is heated</b>
<b>F23B 5/00</b>	<b>Combustion apparatus with arrangements for burning uncombusted material from primary combustion</b> {(combustion apparatus characterised by the combination of two or more combustion chambers <a href="#">F23C 6/00</a> ; the primary combustion being pulverulent fuel <a href="#">F23C 9/003</a> )}
<a href="#">F23B 5/02</a>	<ul style="list-style-type: none"> <li>in main combustion chamber</li> </ul>
<a href="#">F23B 5/025</a>	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{recirculating uncombusted solids to combustion chamber}</li> </ul> </li> </ul>
<a href="#">F23B 5/04</a>	<ul style="list-style-type: none"> <li>in separate combustion chamber; on separate grate</li> </ul>
<b>F23B 7/00</b>	<b>Combustion techniques; Other solid-fuel combustion apparatus</b>
<a href="#">F23B 7/002</a>	<ul style="list-style-type: none"> <li>{characterised by gas flow arrangements}</li> </ul>
<a href="#">F23B 7/005</a>	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{with downdraught through fuel bed and grate}</li> </ul> </li> </ul>
<a href="#">F23B 7/007</a>	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{with fluegas recirculation to combustion chamber}</li> </ul> </li> </ul>
<b>F23B 10/00</b>	<b>Combustion apparatus characterised by the combination of two or more combustion chambers</b>
<a href="#">F23B 10/02</a>	<ul style="list-style-type: none"> <li>including separate secondary combustion chambers</li> </ul> <p><b><u>WARNING</u></b></p> <p>Group <a href="#">F23B 10/02</a> is not complete pending a reorganisation. See also groups <a href="#">F23B 10/00</a></p>
<b>F23B 20/00</b>	<b>Combustion apparatus specially adapted for portability or transportability</b>
<b>F23B 30/00</b>	<b>Combustion apparatus with driven means for agitating the burning fuel; Combustion apparatus with driven means for advancing the burning fuel through the combustion chamber</b>
<a href="#">F23B 30/02</a>	<ul style="list-style-type: none"> <li>with movable, e.g. vibratable, fuel-supporting surfaces; with fuel-supporting surfaces that have movable parts</li> </ul>
<a href="#">F23B 30/04</a>	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>with fuel-supporting surfaces that are rotatable around a horizontal or inclined axis and support the fuel on their inside, e.g. cylindrical grates</li> </ul> </li> </ul>
<a href="#">F23B 30/06</a>	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>with fuel supporting surfaces that are specially adapted for advancing fuel through the combustion zone</li> </ul> </li> </ul>
<a href="#">F23B 30/08</a>	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>with fuel-supporting surfaces that move through the combustion zone, e.g. with chain grates</li> </ul> </li> </ul> </li> </ul>
<a href="#">F23B 30/10</a>	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>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</li> </ul> </li> </ul> </li> </ul>
<b>F23B 40/00</b>	<b>Combustion apparatus with driven means for feeding fuel into the combustion chamber</b>
<a href="#">F23B 40/02</a>	<ul style="list-style-type: none"> <li>the fuel being fed by scattering over the fuel-supporting surface</li> </ul>
<a href="#">F23B 40/04</a>	<ul style="list-style-type: none"> <li>the fuel being fed from below through an opening in the fuel-supporting surface</li> </ul>
<a href="#">F23B 40/06</a>	<ul style="list-style-type: none"> <li>the fuel being fed along the fuel-supporting surface</li> </ul>

F23B 40/08	<ul style="list-style-type: none"> <li>into pot- or through-shaped grates</li> </ul>
<b>F23B 50/00</b>	<b>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</b>
F23B 50/02	<ul style="list-style-type: none"> <li>the fuel forming a column, stack or thick layer with the combustion zone at its bottom</li> </ul>
F23B 50/04	<ul style="list-style-type: none"> <li>the movement of combustion air and flue gases being substantially transverse to the movement of the fuel</li> </ul>
F23B 50/06	<ul style="list-style-type: none"> <li>the fuel gases being removed downwards through one or more openings in the fuel-supporting surface</li> </ul>
F23B 50/08	<ul style="list-style-type: none"> <li>with fuel-deflecting bodies forming free combustion spaces inside the fuel layer</li> </ul>
F23B 50/10	<ul style="list-style-type: none"> <li>with the combustion zone at the bottom of fuel-filled conduits ending at the surface of a fuel bed</li> </ul>
F23B 50/12	<ul style="list-style-type: none"> <li>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</li> </ul>
<b>F23B 60/00</b>	<b>Combustion apparatus in which the fuel burns essentially without moving</b>
F23B 60/02	<ul style="list-style-type: none"> <li>with combustion air supplied through a grate</li> </ul>
<b>F23B 70/00</b>	<b>Combustion apparatus characterised by means returning solid combustion residues to the combustion chamber</b>
<b>F23B 80/00</b>	<b>Combustion apparatus characterised by means creating a distinct flow path for flue gases or for non-combusted gases given off by the fuel</b>
F23B 80/02	<ul style="list-style-type: none"> <li>by means for returning flue gases to the combustion chamber or to the combustion zone</li> </ul>
F23B 80/04	<ul style="list-style-type: none"> <li>by means for guiding the flow of flue gases, e.g. baffles</li> </ul>
<b>F23B 90/00</b>	<b>Combustion methods not related to a particular type of apparatus</b>
	<b><u>NOTE</u></b>
	Groups <a href="#">F23B 90/00</a> - <a href="#">F23B 90/08</a> correspond to IPC2012.01
	<b><u>WARNING</u></b>
	Groups <a href="#">F23B 90/00</a> to <a href="#">F23B 90/08</a> are not complete pending a reorganisation. See also groups <a href="#">F23B 1/00</a> to <a href="#">F23B 7/007</a>
F23B 90/02	<ul style="list-style-type: none"> <li>Start-up techniques</li> </ul>
F23B 90/04	<ul style="list-style-type: none"> <li>including secondary combustion (<a href="#">in separate combustion chambers F23B 10/02</a>)</li> </ul>
F23B 90/06	<ul style="list-style-type: none"> <li>the primary combustion being a gasification or pyrolysis in a reductive atmosphere</li> </ul>
F23B 90/08	<ul style="list-style-type: none"> <li>in the presence of catalytic material</li> </ul>
<b>F23B 99/00</b>	<b>Subject matter not provided for in other groups of this subclass</b>

**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