

**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](#))}

**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

**WARNING**

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	<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>
<b>F23B 2101/00</b>	<b>Adaptation of combustion apparatus to boilers in which the combustion chamber is situated inside the boiler vessel, e.g. surrounded by cooled surfaces</b>

**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