

## ECLA EUROPEAN CLASSIFICATION

- F23C COMBUSTION APPARATUS USING FLUENT FUEL (combustion apparatus for solid fuel only F23B; burners F23D; constructional details of combustion chambers not otherwise provided for F23M; combustion chambers for generating combustion products of high pressure or high velocity F23R)**
- F23C1/00** Combustion apparatus specially adapted for combustion of two or more kinds of fuel simultaneously or alternately, at least one kind of fuel being fluent ([combustion apparatus characterised by the combination of two or more combustion chambers F23C6/00](#); pilot flame igniters [F23Q9/00](#))[M1111]
- F23C1/02 . lump or liquid fuel
- F23C1/04 . lump or gaseous fuel
- F23C1/06 . lump or pulverulent fuel
- F23C1/08 . liquid or gaseous fuel
- F23C1/10 . liquid or pulverulent fuel
- F23C1/12 . gaseous or pulverulent fuel
- F23C3/00** Combustion apparatus characterised by the shape of the combustion chamber
- F23C3/00B . [N: the chamber having an elongated tubular form, e.g. for a radiant tube]
- F23C3/00C . [N: the chamber being arranged for submerged combustion ([F23C3/00B](#) takes precedence)]
- F23C3/00F . [N: the chamber being arranged for cyclonic combustion (for waste [F23G5/32](#))]
- F23C3/00F1 . . [N. for pulverulent fuel]
- F23C5/00** Disposition of burners with respect to the combustion chamber or to one another; Mounting of burners in combustion apparatus ([F23C1/00](#), [F23C11/04](#) take precedence)
- F23C5/02 . Structural details of mounting
- F23C5/06 . . Provision for adjustment of burner position during operation
- F23C5/08 . Disposition of burners
- F23C5/10 . . [N: IPC2] to obtain a flame ring
- F23C5/12 . . . [N: IPC2] for pulverulent fuel
- F23C5/14 . . to obtain a single flame of concentrated or substantially planar form, e.g. pencil or sheet flame ([F23C5/32](#) takes precedence)

- F23C5/24 . . . to obtain a loop flame
- F23C5/28 . . . to obtain flames in opposing directions, e.g. impacting flames
- F23C5/32 . . . to obtain rotating flames i.e. flames moving helically or spirally
  
- F23C6/00** **Combustion apparatus characterised by the combination of two or more combustion chambers** [N: or combustion zones, e.g. for staged combustion]
  
- F23C6/02 . . . in parallel arrangement
- F23C6/04 . . . in series connection (consuming smoke or fumes in separate combustion apparatus [F23G7/06](#))
- F23C6/04A . . . [N: with fuel supply in stages (for staged combustion [F23C6/04B1](#))]
- F23C6/04B . . . [N: with staged combustion in a single enclosure]
- F23C6/04B1 . . . . [N: with fuel supply in stages]
  
- F23C7/00** **Combustion apparatus characterised by arrangements for air supply (inlets for fluidisation air [F23C10/20](#))[M1111]**
  
- F23C7/00A . . . [N: the air being submitted to a rotary or spinning motion (cyclonic combustion chamber [F23C3/00F](#))]
- F23C7/00A1 . . . . [N: using vanes]
- F23C7/00A1A . . . . . [N: adjustable]
- F23C7/00B . . . [N: Flow control devices ([F23C7/00A1A](#) takes precedence)]
- F23C7/02 . . . Disposition of air supply not passing through burner (to obtain a cyclonic tapering flame when burning pulverulent fuel [F23C5/32](#))
- F23C7/04 . . . . to obtain maximum heat transfer to wall of combustion chamber
- F23C7/06 . . . . for heating the incoming air (arrangements of regenerators and recuperators [F23L15/00](#))
- F23C7/08 . . . . . indirectly by a secondary fluid other than the combustion products
  
- F23C9/00** **Combustion apparatus characterised by arrangements for returning combustion products or flue gases to the combustion chamber (fluidised bed combustion apparatus with means for recirculation of particles entrained from the bed [F23C10/02](#); fluidised bed combustion apparatus with devices for removal and partial reintroduction of material from the bed [F23C10/26](#)) [M1111]**
  
- F23C9/00B . . . [N: for pulverulent fuel (for fluidized bed [F23C10/02](#))]
- F23C9/00C . . . [N: the recirculation taking place in the combustion chamber]
- F23C9/06 . . . for completing combustion
- F23C9/08 . . . for reducing temperature in combustion chamber e.g. for protecting walls of combustion chamber
  
- F23C10/00** **Fluidised bed combustion apparatus [N9911]**

- F23C10/00B . [N: for pulverulent solid fuel ([F23C10/00D](#) to [F23C10/32](#) take precedence)] [N9911]
- F23C10/00D . [N: comprising two or more beds] [N9911]
- F23C10/00R . [N: comprising a rotating bed] [N9911]
- F23C10/01 . in a fluidised bed of catalytic particles [N0605]
- F23C10/02 . with means specially adapted for achieving or promoting a circulating movement of particles within the bed or for a recirculation of particles entrained from the bed [N9911]
- F23C10/04 . . the particles being circulated to a section, e.g. a heat-exchange section or a return duct, at least partially shielded from the combustion zone, before being reintroduced into the combustion zone [N9911]
- F23C10/06 . . . the circulating movement being promoted by inducing differing degrees of fluidisation in different parts of the bed [N9911]
- F23C10/08 . . . characterised by the arrangement of separation apparatus, e.g. cyclones, for separating particles from the flue gases [N9911]
- F23C10/10 . . . . the separation apparatus being located outside the combustion chamber [N9911]
- F23C10/12 . . the particles being circulated exclusively within the combustion zone [N9911]
- F23C10/14 . . . the circulating movement being promoted by inducing differing degrees of fluidisation in different parts of the bed [N9911]
- F23C10/16 . specially adapted for operation at superatmospheric pressures, e.g. by the arrangement of the combustion chamber and its auxiliary systems inside a pressure vessel [N9911]
- F23C10/18 . Details; Accessories [N9911]
- F23C10/20 . . Inlets for fluidisation air, e.g. grids; Bottoms [N9911]
- F23C10/22 . . Fuel feeders specially adapted for fluidised bed combustion apparatus ([F23C10/26](#) takes precedence) [N9911]
- F23C10/24 . . Devices for removal of material from the bed ([devices for controlling the level of the bed or the amount of material in the bed F23C10/30](#)) [N9911]
- F23C10/26 . . . combined with devices for partial reintroduction of material into the bed, e.g. after separation of agglomerated parts [N9911]
- F23C10/28 . . Control devices specially adapted for fluidised bed, combustion apparatus [N9911]
- F23C10/30 . . . for controlling the level of the bed or the amount of material in the bed [N9911]
- F23C10/32 . . . . by controlling the rate of recirculation of particles separated from the flue gases [N9911]
  
- F23C13/00** **Apparatus in which combustion takes place in the presence of catalytic material (in a fluidised bed of catalytic particles [F23C10/01](#); radiant gas burners using catalysis for flameless combustion [F23D14/18](#)) [N0605]**
- F23C13/02 . characterised by arrangements for starting the operation, e.g. for heating the catalytic material to operating temperature [N0605]
- F23C13/04 . characterised by arrangements of two or more catalytic elements in series connection [N0605]

- F23C13/06** . in which non-catalytic combustion takes place in addition to catalytic combustion, e.g. downstream of a catalytic element [N0605]
- F23C13/08** . characterised by the catalytic material [N0605]
- F23C15/00** **Apparatus in which combustion takes place in pulses influenced by acoustic resonance in a gas mass** [N: (for generating combustion products of high pressure or high velocity [F23R7/00](#); starting devices [F23D11/42](#))] [N0605] [C0803]
- F23C99/00** **Subject-matter not provided for in other groups of this subclass** [N0605]
- F23C99/00F** . [N: Applying electric means or magnetism to combustion (for combustion engines [F02B51/04](#), [F02M27/04](#))] [N1111]
- F23C99/00G** . [N: Combustion process using sound or vibrations (for combustion engines [F02B51/06](#), [F02M27/08](#); liquid fuel burners using ultrasonic means for spraying the fuel [F23D11/34](#))] [N1111]
- F23C99/00H** . [N: Suspension-type burning, i.e. fuel particles carried along with a gas flow while burning (fluidized-bed combustion apparatus [F23C10/00](#))] [N1111]
- F23C99/00M** . [N: Flameless combustion stabilised within a bed of porous heat-resistant material ([F23C13/00](#) takes precedence; gas burners with radiant combustion on a porous surface [F23D14/16](#))] [N1111]
- F23C99/00Q** . [N: Combustion methods wherein flame cooling techniques other than fuel or air staging or fume recirculation are used] [N1111]