

SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

F23 COMBUSTION APPARATUS; COMBUSTION PROCESSES

Note(s)

In this class, the following terms or expressions are used with the meanings indicated:

- "combustion" means a heat-producing sequence of chemical reactions between a burnable substance and molecular oxygen, e.g. in air, in most cases generating light in the form of flames or a glow;
- "combustion chamber" means a chamber in which fuel is burned to establish a self-supporting fire or flame and which surrounds that fire or flame;
- "burner" means a device by which fluid fuel, or solid fuel suspended in air, is passed to a combustion space where it burns to produce a self-supporting flame;
- "air" means a mixture of gases containing free oxygen and able to promote or support combustion.

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 together with fluid fuel or with solid fuel suspended in air, simultaneously or alternately, F23C, F23D 17/00)

Note(s) [2006.01]

1. This subclass only covers combustion wherein the main body of fuel is either essentially stationary during combustion or mechanically transported, as opposed to pneumatically transported or suspended in air, during combustion.
2. In this subclass, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.
3. In this subclass, methods are classified in the groups that cover the apparatus used. Methods that are not related to a particular type of apparatus are classified in group F23B 90/00.
4. In this subclass, it is desirable to add the indexing codes of groups F23B 101/00-F23B 103/00.

Subclass index

COMBUSTION APPARATUS

| | |
|--|-------------|
| Combinations of two or more combustion chambers..... | 10/00 |
| Specially adapted for portability or transportability..... | 20/00 |
| Functional types..... | 30/00-60/00 |
| Returning solid combustion residues to the combustion chamber..... | 70/00 |
| Creating a distinct flow path for flue gases or for non-combusted gases given off by the fuel..... | 80/00 |
| COMBUSTION METHODS NOT RELATED TO A PARTICULAR TYPE OF APPARATUS..... | 90/00 |
| SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS..... | 99/00 |

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|--------------|--|--------------|--|
| 10/00 | Combustion apparatus characterised by the combination of two or more combustion chambers [2006.01, 2011.01] | 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 [2006.01] |
| 10/02 | • including separate secondary combustion chambers [2011.01] | 30/06 | • • with fuel-supporting surfaces that are specially adapted for advancing the fuel through the combustion zone [2006.01] |
| 20/00 | Combustion apparatus specially adapted for portability or transportability [2006.01] | 30/08 | • • • with fuel-supporting surfaces that move through the combustion zone, e.g. with chain grates [2006.01] |
| 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 [2006.01] | 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 [2006.01] |
| 30/02 | • with movable, e.g. vibratable, fuel-supporting surfaces; with fuel-supporting surfaces that have movable parts [2006.01] | 40/00 | Combustion apparatus with driven means for feeding fuel into the combustion chamber [2006.01] |

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|-------|---|-------|--|
| 40/02 | <ul style="list-style-type: none">the fuel being fed by scattering over the fuel-supporting surface [2006.01] | 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 [2006.01] |
| 40/04 | <ul style="list-style-type: none">the fuel being fed from below through an opening in the fuel-supporting surface [2006.01] | 80/02 | <ul style="list-style-type: none">by means for returning flue gases to the combustion chamber or to the combustion zone [2006.01] |
| 40/06 | <ul style="list-style-type: none">the fuel being fed along the fuel-supporting surface [2006.01] | 80/04 | <ul style="list-style-type: none">by means for guiding the flow of flue gases, e.g. baffles [2006.01] |
| 40/08 | <ul style="list-style-type: none">into pot- or trough-shaped grates [2006.01] | | |
| 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 [2006.01] | 90/00 | Combustion methods not related to a particular type of apparatus [2006.01, 2011.01] |
| 50/02 | <ul style="list-style-type: none">the fuel forming a column, stack or thick layer with the combustion zone at its bottom [2006.01] | 90/02 | <ul style="list-style-type: none">Start-up techniques [2011.01] |
| 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 [2006.01] | 90/04 | <ul style="list-style-type: none">including secondary combustion (in separate combustion chambers F23B 10/02) [2011.01] |
| 50/06 | <ul style="list-style-type: none">the flue gases being removed downwards through one or more openings in the fuel-supporting surface [2006.01] | 90/06 | <ul style="list-style-type: none">the primary combustion being a gasification or pyrolysis in a reductive atmosphere [2011.01] |
| 50/08 | <ul style="list-style-type: none">with fuel-deflecting bodies forming free combustion spaces inside the fuel layer [2006.01] | 90/08 | <ul style="list-style-type: none">in the presence of catalytic material [2011.01] |
| 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 [2006.01] | 99/00 | Subject matter not provided for in other groups of this subclass [2006.01] |
| 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 conveyor terminating above the fuel bed [2006.01] | | |
| 60/00 | Combustion apparatus in which the fuel burns essentially without moving [2006.01] | | |
| 60/02 | <ul style="list-style-type: none">with combustion air supplied through a grate [2006.01] | | |
| 70/00 | Combustion apparatus characterised by means for returning solid combustion residues to the combustion chamber [2006.01] | | |

Indexing scheme related to adaptation of combustion apparatus to boilers [2006.01]

| | |
|--------|---|
| 101/00 | Adaptation of combustion apparatus to boilers in which the combustion chamber is situated inside the boiler vessel, e.g. surrounded by cooled surfaces [2006.01] |
| 103/00 | Adaptation of combustion apparatus for placement in or against an opening of a boiler, e.g. for replacing an oil burner [2006.01] |
| 103/02 | <ul style="list-style-type: none">for producing an essentially horizontal flame [2006.01] |

F23C **METHODS OR APPARATUS FOR COMBUSTION USING FLUID FUEL OR SOLID FUEL SUSPENDED IN AIR**
(burners F23D)

Note(s) [2006.01]

In this subclass, methods are classified in the groups that cover the apparatus used.

Subclass index

| | |
|---|-------|
| COMBUSTION APPARATUS SPECIALLY ADAPTED FOR COMBUSTION OF TWO OR MORE TYPES OF FUEL..... | 1/00 |
| COMBINATIONS OF TWO OR MORE COMBUSTION CHAMBERS..... | 6/00 |
| FUNCTIONAL TYPES OF COMBUSTION APPARATUS | |
| Fluidised bed combustion..... | 10/00 |
| Catalytic combustion..... | 13/00 |
| Resonant combustion..... | 15/00 |
| COMBUSTION APPARATUS CHARACTERISED BY SUBSYSTEMS | |
| Combustion chambers..... | 3/00 |
| Arrangement or mounting of burners..... | 5/00 |
| Air supply..... | 7/00 |
| Arrangements for returning flue gases or combustion products..... | 9/00 |
| SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS..... | 99/00 |

| | | |
|------|--|---|
| 1/00 | Combustion apparatus specially adapted for combustion of two or more kinds of fuel simultaneously or alternately, at least one kind of fuel being either a fluid fuel or a solid fuel suspended in air (combustion apparatus characterised by the | combination of two or more combustion chambers F23C 6/00; pilot flame igniters F23Q 9/00) [1, 7, 2006.01] |
| 1/02 | <ul style="list-style-type: none">lump and liquid fuel [1, 2006.01] | |

- 1/04 • lump and gaseous fuel [1, 2006.01]
 1/06 • lump and pulverulent fuel [1, 2006.01]
 1/08 • liquid and gaseous fuel [1, 2006.01]
 1/10 • liquid and pulverulent fuel [1, 2006.01]
 1/12 • gaseous and pulverulent fuel [1, 2006.01]
- 3/00 Combustion apparatus characterised by the shape of the combustion chamber** (F23C 15/00 takes precedence) [1, 7, 2006.01]
- 5/00 Combustion apparatus characterised by the arrangement or mounting of burners** [1, 7, 2006.01]
 5/02 • Structural details of mounting [1, 2006.01]
 5/06 • • Provision for adjustment of burner position during operation [1, 2006.01]
 5/08 • Disposition of burners [1, 2006.01]
 5/14 • • to obtain a single flame of concentrated or substantially planar form, e.g. pencil or sheet flame (F23C 5/32 takes precedence) [1, 3, 2006.01]
 5/24 • • to obtain a loop flame [1, 2006.01]
 5/28 • • to obtain flames in opposing directions, e.g. impacting flames [1, 2006.01]
 5/32 • • to obtain rotating flames, i.e. flames moving helically or spirally [3, 2006.01]
- 6/00 Combustion apparatus characterised by the combination of two or more combustion chambers** [3, 7, 2006.01]
 6/02 • in parallel arrangement [3, 2006.01]
 6/04 • in series connection [3, 2006.01]
- 7/00 Combustion apparatus characterised by arrangements for air supply** (inlets for fluidisation air F23C 10/20; baffles or shields with air supply passages F23M 9/04) [1, 7, 2006.01]
 7/02 • Disposition of air supply not passing through burner [1, 2006.01]
 7/04 • • to obtain maximum heat transfer to wall of combustion chamber [1, 2006.01]
 7/06 • • for heating the incoming air (arrangements of regenerators or recuperators F23L 15/00) [1, 2006.01]
 7/08 • • • indirectly by a secondary fluid other than the combustion products [1, 2006.01]
- 9/00 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 F23C 10/02; fluidised bed combustion apparatus with devices for removal and partial reintroduction of material from the bed F23C 10/26) [1, 7, 2006.01]
 9/06 • for completing combustion [3, 2006.01]
 9/08 • for reducing temperature in combustion chamber, e.g. for protecting walls of combustion chamber [3, 2006.01]
- 10/00 Apparatus in which combustion takes place in a fluidised bed of fuel or other particles** [7, 2006.01]
Note(s) [7]
 In this group, it is desirable to add the indexing code of group F23C 101/00.
 10/01 • in a fluidised bed of catalytic particles [2006.01]
- 10/02 • 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 [7, 2006.01]
 10/04 • • 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 [7, 2006.01]
 10/06 • • • the circulating movement being promoted by inducing differing degrees of fluidisation in different parts of the bed [7, 2006.01]
 10/08 • • • characterised by the arrangement of separation apparatus, e.g. cyclones, for separating particles from the flue gases [7, 2006.01]
 10/10 • • • • the separation apparatus being located outside the combustion chamber [7, 2006.01]
 10/12 • • the particles being circulated exclusively within the combustion zone [7, 2006.01]
 10/14 • • • the circulating movement being promoted by inducing differing degrees of fluidisation in different parts of the bed [7, 2006.01]
 10/16 • specially adapted for operation at superatmospheric pressures, e.g. by the arrangement of the combustion chamber and its auxiliary systems inside a pressure vessel [7, 2006.01]
 10/18 • Details; Accessories [7, 2006.01]
 10/20 • • Inlets for fluidisation air, e.g. grids; Bottoms [7, 2006.01]
 10/22 • • Fuel feeders specially adapted for fluidised bed combustion apparatus (F23C 10/26 takes precedence) [7, 2006.01]
 10/24 • • Devices for removal of material from the bed (devices for controlling the level of the bed or the amount of material in the bed F23C 10/30) [7, 2006.01]
 10/26 • • • combined with devices for partial reintroduction of material into the bed, e.g. after separation of agglomerated parts [7, 2006.01]
 10/28 • • Control devices specially adapted for fluidised bed combustion apparatus [7, 2006.01]
 10/30 • • • for controlling the level of the bed or the amount of material in the bed [7, 2006.01]
 10/32 • • • • by controlling the rate of recirculation of particles separated from the flue gases [7, 2006.01]
- 13/00 Apparatus in which combustion takes place in the presence of catalytic material** (in a fluidised bed of catalytic particles F23C 10/01; radiant gas burners using catalysis for flameless combustion F23D 14/18) [2006.01]
 13/02 • characterised by arrangements for starting the operation, e.g. for heating the catalytic material to operating temperature [2006.01]
 13/04 • characterised by the arrangement of two or more catalytic elements in series connection [2006.01]
 13/06 • in which non-catalytic combustion takes place in addition to catalytic combustion, e.g. downstream of a catalytic element [2006.01]
 13/08 • characterised by the catalytic material [2006.01]
- 15/00 Apparatus in which combustion takes place in pulses influenced by acoustic resonance in a gas mass** [2006.01]

F23C

99/00 Subject matter not provided for in other groups of this subclass [2006.01]

Indexing scheme associated with group F23C 10/00, relating to combustion in entrained fluidised beds. [7]

101/00 Combustion in entrained fluidised beds, i.e. fluidised beds which have no distinct upper surface [7, 2006.01]

F23D BURNERS

Subclass index

| | |
|--|-------------|
| BURNERS FOR PULVERULENT FUEL..... | 1/00 |
| BURNERS FOR COMBUSTION OF A LIQUID | |
| Using capillary action..... | 3/00 |
| Using fuel evaporation; direct spraying action..... | 5/00, 11/00 |
| Using fuel impingement on a surface..... | 7/00, 9/00 |
| BURNERS FOR COMBUSTION OF A GAS..... | 14/00 |
| BURNERS FOR COMBUSTION OF GASEOUS OR LIQUID OR PULVERULENT FUEL..... | 17/00 |
| ASSEMBLIES OF TWO OR MORE BURNERS..... | 23/00 |
| OTHER BURNERS..... | 99/00 |

1/00 Burners for combustion of pulverulent fuel [1, 2006.01]

- 1/02 • Vortex burners, e.g. for cyclone-type combustion apparatus [1, 2006.01]
- 1/04 • Burners producing cylindrical flames without centrifugal action [1, 2006.01]
- 1/06 • Burners producing sheet flames [1, 2006.01]

Combustion of a liquid

3/00 Burners using capillary action [1, 2006.01]

- 3/02 • Wick burners [1, 2006.01]
- 3/04 • • with flame spreaders (F23D 3/12 takes precedence) [1, 2006.01]
- 3/06 • • Inverted wick burners, e.g. for illumination [1, 2006.01]
- 3/08 • • characterised by shape, construction, or material, of wick [1, 2006.01]
- 3/10 • • Blue-flame burners [1, 2006.01]
- 3/12 • • • with flame spreaders [1, 2006.01]
- 3/14 • • • with mixing of air and fuel vapour in a chamber before the flame [1, 2006.01]
- 3/16 • • using candles [1, 2006.01]
- 3/18 • • Details of wick burners [1, 2006.01]
- 3/20 • • • Flame spreaders [1, 2006.01]
- 3/22 • • • Devices for mixing evaporated fuel with air [1, 2006.01]
- 3/24 • • • Carriers for wicks [1, 2006.01]
- 3/26 • • • • Safety devices thereon [1, 2006.01]
- 3/28 • • • Wick-adjusting devices [1, 2006.01]
- 3/30 • • • • directly engaging with the wick [1, 2006.01]
- 3/32 • • • • engaging with a tube carrying the wick [1, 2006.01]
- 3/34 • • • • Wick stop devices; Wick-fixing devices [1, 2006.01]
- 3/36 • • • Devices for trimming wicks [1, 2006.01]
- 3/38 • • • Devices for replacement of wicks [1, 2006.01]
- 3/40 • the capillary action taking place in one or more rigid porous bodies [1, 2006.01]

5/00 Burners in which liquid fuel evaporates in the combustion space, with or without chemical conversion of evaporated fuel [1, 2006.01]

- 5/02 • the liquid forming a pool, e.g. bowl-type evaporators, dish-type evaporators [1, 2006.01]
- 5/04 • • Pot-type evaporators, i.e. using a partially-enclosed combustion space [1, 2006.01]
- 5/06 • the liquid forming a film on one or more plane or convex surfaces [1, 2006.01]
- 5/08 • • on cascaded surfaces [1, 2006.01]
- 5/10 • • on grids [1, 2006.01]
- 5/12 • Details [1, 2006.01]
- 5/14 • • Maintaining predetermined amount of fuel in evaporator [1, 2006.01]
- 5/16 • • Safety devices [1, 2006.01]
- 5/18 • • Preheating devices [1, 2006.01]

7/00 Burners in which drops of liquid fuel impinge on a surface [1, 2006.01]

9/00 Burners in which a stream of liquid fuel impinges intermittently on a hot surface [1, 2006.01]

11/00 Burners using a direct spraying action of liquid droplets or vaporised liquid into the combustion space [1, 2006.01]

- 11/02 • the combustion space being a chamber substantially at atmospheric pressure [1, 2006.01]
- 11/04 • the spraying action being obtained by centrifugal action [1, 2006.01]
- 11/06 • • using a horizontal shaft [1, 2006.01]
- 11/08 • • using a vertical shaft [1, 2006.01]
- 11/10 • the spraying being induced by a gaseous medium, e.g. water vapour [1, 2006.01]
- 11/12 • • characterised by the shape or arrangement of the outlets from the nozzle [1, 2006.01]
- 11/14 • • • with a single outlet, e.g. slit [1, 2006.01]
- 11/16 • • in which an emulsion of water and fuel is sprayed [1, 2006.01]
- 11/18 • • the gaseous medium being water vapour generated at the nozzle [1, 2006.01]
- 11/20 • • • the water vapour being superheated [1, 2006.01]

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| 11/22 | • • the gaseous medium being vaporised fuel, e.g. for a soldering lamp [1, 2006.01] | 14/34 | • Burners specially adapted for use with means for pressurising the gaseous fuel or the combustion air [4, 2006.01] |
| 11/24 | • by pressurisation of the fuel before a nozzle through which it is sprayed by a substantial pressure reduction into a space [1, 2006.01] | 14/36 | • • in which the compressor and burner form a single unit [4, 2006.01] |
| 11/26 | • • with provision for varying the rate at which the fuel is sprayed [1, 2006.01] | 14/38 | • Torches, e.g. for brazing or heating (nozzles F23D 14/48) [4, 2006.01] |
| 11/28 | • • • with flow-back of fuel at the burner, e.g. using by-pass [1, 2006.01] | 14/40 | • • for welding (F23D 14/44 takes precedence) [4, 2006.01] |
| 11/30 | • • • with return feed of uncombusted sprayed fuel to reservoir [1, 2006.01] | 14/42 | • • for cutting (F23D 14/44 takes precedence) [4, 2006.01] |
| 11/32 | • by electrostatic means [1, 2006.01] | 14/44 | • • for use under water [4, 2006.01] |
| 11/34 | • by ultrasonic means [1, 2006.01] | 14/46 | • Details [4, 2006.01] |
| 11/36 | • Details [1, 2006.01] | 14/48 | • • Nozzles [4, 2006.01] |
| 11/38 | • • Nozzles; Cleaning devices therefor [1, 2006.01] | 14/50 | • • • Cleaning devices therefor [4, 2006.01] |
| 11/40 | • • Mixing tubes; Burner heads [1, 2006.01] | 14/52 | • • • for torches; for blow-pipes [4, 2006.01] |
| 11/42 | • • Starting devices (igniting F23Q) [1, 2006.01] | 14/54 | • • • • for cutting or welding metal [4, 2006.01] |
| 11/44 | • • Preheating devices; Vaporising devices [1, 2006.01] | 14/56 | • • • for spreading the flame over an area, e.g. for desurfacing of solid material, for surface hardening or for heating workpieces [4, 2006.01] |
| 11/46 | • • Devices on the vaporiser for controlling the feeding of the fuel [1, 2006.01] | 14/58 | • • • characterised by the shape or arrangement of the outlet or outlets from the nozzle, e.g. of annular configuration [4, 2006.01] |
| <hr/> | | 14/60 | • • Devices for simultaneous control of gas and combustion air [4, 2006.01] |
| 14/00 | Burners for combustion of a gas, e.g. of a gas stored under pressure as a liquid [4, 2006.01] | 14/62 | • • Mixing devices; Mixing tubes [4, 2006.01] |
| 14/02 | • Premix gas burners, i.e. in which gaseous fuel is mixed with combustion air upstream of the combustion zone [4, 2006.01] | 14/64 | • • • with injectors [4, 2006.01] |
| 14/04 | • • induction type, e.g. Bunsen burner [4, 2006.01] | 14/66 | • • Preheating the combustion air or gas [4, 2006.01] |
| 14/06 | • • • with radial outlets at the burner head [4, 2006.01] | 14/68 | • • Treating the combustion air or gas, e.g. by filtering or moistening [4, 2006.01] |
| 14/08 | • • • with axial outlets at the burner head [4, 2006.01] | 14/70 | • • Baffles or like flow-disturbing devices [4, 2006.01] |
| 14/10 | • • • with elongated tubular burner head [4, 2006.01] | 14/72 | • • Safety devices, e.g. operative in case of failure of gas supply [4, 2006.01] |
| 14/12 | • Radiant burners [4, 2006.01] | 14/74 | • • • Preventing flame lift-off [4, 2006.01] |
| 14/14 | • • using screens or perforated plates [4, 2006.01] | 14/76 | • • • Protecting flame and burner parts [4, 2006.01] |
| 14/16 | • • using permeable blocks [4, 2006.01] | 14/78 | • • • Cooling burner parts [4, 2006.01] |
| 14/18 | • • using catalysis for flameless combustion [4, 2006.01] | 14/80 | • • • Selection of a non-toxic gas [4, 2006.01] |
| 14/20 | • Non-premix gas burners, i.e. in which gaseous fuel is mixed with combustion air on arrival at the combustion zone (F23D 14/38 takes precedence) [4, 2006.01] | 14/82 | • • • Preventing flashback or blowback [4, 2006.01] |
| 14/22 | • • with separate air and gas feed ducts, e.g. with ducts running parallel or crossing each other [4, 2006.01] | 14/84 | • • Flame spreading or otherwise shaping (F23D 14/70 takes precedence) [4, 2006.01] |
| 14/24 | • • • at least one of the fluids being submitted to a swirling motion [4, 2006.01] | <hr/> | |
| 14/26 | • with provision for a retention flame (pilot flame igniters F23Q 9/00) [4, 2006.01] | Other burners | |
| 14/28 | • in association with a gaseous fuel source, e.g. acetylene generator, or a container for liquefied gas [4, 2006.01] | 17/00 | Burners for combustion simultaneously or alternately of gaseous or liquid or pulverulent fuel [1, 2006.01] |
| 14/30 | • Inverted burners, e.g. for illumination [4, 2006.01] | 23/00 | Assemblies of two or more burners (gas burners with provision for a retention flame F23D 14/26) [1, 2006.01] |
| 14/32 | • using a mixture of gaseous fuel and pure oxygen or oxygen-enriched air (F23D 14/38 takes precedence) [4, 2006.01] | <hr/> | |
| <hr/> | | 99/00 | Subject matter not provided for in other groups of this subclass [2010.01] |

F23G CREMATION FURNACES; CONSUMING WASTE OR LOW GRADE FUELS BY COMBUSTION

Subclass index

| | |
|--|------|
| CREMATION..... | 1/00 |
| CONSUMING WASTE OR LOW-GRADE FUELS BY COMBUSTION | |
| Processes; Functional types of apparatus..... | 5/00 |

F23G

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|---|------|
| Adaptation for specific waste or fuels..... | 7/00 |
| Details; Accessories..... | 5/44 |
| Control or safety arrangements..... | 5/50 |

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|-------------|--|-------------|--|
| 1/00 | Methods or apparatus specially adapted for cremation of human or animal carcasses [1, 2006.01] | 5/36 | • with combustion in a conical combustion chamber, e.g. "teepee" incinerators (F23G 5/22 takes precedence) [4, 2006.01] |
| 5/00 | Methods or apparatus, e.g. incinerators, specially adapted for combustion of waste or low-grade fuels [1, 4, 2006.01] | 5/38 | • having multi-hearth arrangements [4, 2006.01] |
| 5/02 | • including pretreatment [1, 4, 2006.01] | 5/40 | • Portable or mobile apparatus [4, 2006.01] |
| 5/027 | • • pyrolysing or gasifying (pyrolysis of sludge C02F 11/00; destructive distillation of carbonaceous materials C10B 53/00) [4, 2006.01] | 5/42 | • • of the basket type [4, 2006.01] |
| 5/033 | • • comminuting or crushing [4, 2006.01] | 5/44 | • Details; Accessories [4, 2006.01] |
| 5/04 | • • drying [1, 4, 2006.01] | 5/46 | • • Recuperation of heat [4, 2006.01] |
| 5/05 | • • • using drying grates [4, 2006.01] | 5/48 | • • Preventing corrosion [4, 2006.01] |
| 5/08 | • including supplementary heating [1, 4, 2006.01] | 5/50 | • Control or safety arrangements [4, 2006.01] |
| 5/10 | • • using electric means [1, 4, 2006.01] | 7/00 | Methods or apparatus, e.g. incinerators, specially adapted for combustion of specific waste or low grade fuels, e.g. chemicals (F23G 1/00 takes precedence; incinerator closets A47K 11/02; oxidation of sludge C02F 11/06; incinerating radioactive waste G21F 9/00) [1, 4, 2006.01] |
| 5/12 | • • using gaseous or liquid fuel (F23G 5/14 takes precedence) [1, 4, 2006.01] | 7/02 | • of bagasse, megasse or the like [1, 4, 2006.01] |
| 5/14 | • • including secondary combustion [4, 2006.01] | 7/04 | • of waste liquors, e.g. sulfite liquors [1, 4, 2006.01] |
| 5/16 | • • • in a separate combustion chamber [4, 2006.01] | 7/05 | • of waste oils [4, 2006.01] |
| 5/18 | • • • in a stack [4, 2006.01] | 7/06 | • of waste gases or noxious gases, e.g. exhaust gases (exhaust apparatus for engines with means for rendering the exhaust innocuous, e.g. by thermal or catalytic conversion, F01N 3/08; combustion of uncombusted material from primary combustion within apparatus for combustion of solid or fluid fuel F23B, F23C) [1, 4, 2006.01] |
| 5/20 | • with combustion in rotating or oscillating drums [4, 2006.01] | 7/07 | • • in which combustion takes place in the presence of catalytic material [2006.01] |
| 5/22 | • • the drums being conically shaped [4, 2006.01] | 7/08 | • • using flares, e.g. in stacks [4, 2006.01] |
| 5/24 | • with combustion in a vertical, substantially cylindrical, combustion chamber [4, 2006.01] | 7/10 | • of field or garden waste [4, 2006.01] |
| 5/26 | • • having rotating bottom [4, 2006.01] | 7/12 | • of plastics, e.g. rubber [4, 2006.01] |
| 5/28 | • • having raking arms [4, 2006.01] | 7/14 | • of contaminated soil, e.g. soil contaminated by oil [4, 2006.01] |
| 5/30 | • with combustion in a fluidised bed [4, 2006.01] | | |
| 5/32 | • in which the waste or low-grade fuel is subjected to a whirling movement, e.g. cyclonic incinerators [4, 2006.01] | | |
| 5/34 | • in which the waste or low-grade fuel is burnt in a pit or arranged in a heap for combustion [4, 2006.01] | | |

F23H GRATES (inlets for fluidisation air for fluidised bed combustion apparatus F23C 10/20); CLEANING OR RAKING GRATES

Subclass index

GRATES

| | |
|---|-------------------------|
| With solid bars; with hollow bars..... | 1/00, 3/00 |
| Double; inclined; revolving or rocking; travelling..... | 5/00, 7/00, 9/00, 11/00 |
| Other types..... | 13/00 |
| Details..... | 17/00 |

CLEANING ARRANGEMENTS FOR GRATES, MOVING FUEL ALONG GRATE.....15/00

| | | | |
|-------------|---|-------------|---|
| 1/00 | Grates with solid bars (double grates F23H 5/00) [1, 2006.01] | 3/04 | • externally cooled, e.g. with water, steam, or air [1, 2006.01] |
| 1/02 | • having provision for air supply or air preheating, e.g. air-supply or blast fittings which form part of the grate structure or serve as supports [1, 2006.01] | 5/00 | Double grates [1, 2006.01] |
| 1/04 | • having a variable burning surface [1, 2006.01] | 7/00 | Inclined grates (inclined travelling grates F23H 11/12) [1, 2006.01] |
| 1/06 | • having bars at different levels [1, 2006.01] | 7/02 | • with fixed bars [1, 2006.01] |
| 1/08 | • Vertical grates [1, 2006.01] | 7/04 | • • in parallel disposition [1, 2006.01] |
| 3/00 | Grates with hollow bars [1, 2006.01] | 7/06 | • with movable bars disposed parallel to direction of fuel feeding [1, 2006.01] |
| 3/02 | • internally cooled [1, 2006.01] | 7/08 | • • reciprocating along their axes [1, 2006.01] |

| | | | |
|-------|---|-------|---|
| 7/10 | • rocking about their axes [1, 2006.01, 2021.01] | 11/16 | • for multi-layer stoking [1, 2006.01] |
| 7/12 | • with movable bars disposed transversely to direction of fuel feeding [1, 2006.01] | 11/18 | • Details [1, 2006.01] |
| 7/14 | • reciprocating along their axes [1, 2006.01] | 11/20 | • Driving means [1, 2006.01] |
| 7/16 | • rocking about their axes [1, 2006.01] | 11/22 | • Moving fuel along grate; Cleaning of grate [1, 2006.01] |
| 7/18 | • reciprocating in an upward direction [1, 2006.01] | 11/24 | • Removal of ashes; Removal of clinker [1, 2006.01] |
| 9/00 | Revolving grates; Rocking or shaking grates (inclined grates F23H 7/00) [1, 2006.01, 2021.01] | 11/26 | • by dumping [1, 2006.01] |
| 9/02 | • Revolving cylindrical grates [1, 2006.01] | 11/28 | • Replaceable burning-surface [1, 2006.01] |
| 9/04 | • Grates rocked as a whole [1, 2006.01, 2021.01] | 13/00 | Grates not covered by any of groups F23H 1/00-F23H 11/00 [1, 2006.01, 2021.01] |
| 9/06 | • the bars being rocked about axes transverse to their lengths [1, 2006.01, 2021.01] | 13/02 | • Basket grates, e.g. with shaking arrangement [1, 2006.01] |
| 9/08 | • the bars being rocked about their longitudinal axes (inclined grates with movable bars disposed parallel to the direction of fuel feeding and rocking about their axes F23H 7/10) [1, 2006.01, 2021.01] | 13/04 | • Telescoping grates [1, 2006.01] |
| 9/10 | • and modified to move fuel along the grate [1, 2006.01, 2021.01] | 13/06 | • Dumping grates [1, 2006.01, 2021.01] |
| 9/12 | • the bars being vertically movable in a plane [1, 2006.01, 2021.01] | 13/08 | • Grates specially adapted for gas generators and also applicable to furnaces [1, 2006.01] |
| 11/00 | Travelling grates [1, 2006.01] | 15/00 | Cleaning arrangements for grates (not forming part of the grate F23J 1/00); Moving fuel along grates (grates with bars rocked about their longitudinal axes and specially adapted for moving fuel along the grate F23H 9/10; for travelling grates F23H 11/22) [1, 2006.01] |
| 11/02 | • with the bars disposed on transverse bearers [1, 2006.01] | 17/00 | Details of grates [1, 2006.01] |
| 11/04 | • with the bars pivoted at one side [1, 2006.01] | 17/02 | • End fittings on bars [1, 2006.01] |
| 11/06 | • with the bars movable relatively to one another [1, 2006.01] | 17/04 | • of travelling grates [1, 2006.01] |
| 11/08 | • with several individually-movable grate surfaces [1, 2006.01] | 17/06 | • Provision for vertical adjustment of grate [1, 2006.01] |
| 11/10 | • with special provision for supply of air from below and for controlling air supply [1, 2006.01] | 17/08 | • Bearers; Frames; Spacers; Supports [1, 2006.01] |
| 11/12 | • inclined travelling grates; Stepped travelling grates [1, 2006.01] | 17/10 | • Dead plates; Imperforate fuel supports [1, 2006.01] |
| 11/14 | • serving as auxiliary grates [1, 2006.01] | 17/12 | • Fire-bars [1, 2006.01] |
| F23J | REMOVAL OR TREATMENT OF COMBUSTION PRODUCTS OR COMBUSTION RESIDUES; FLUES (combustion apparatus for consuming smoke or fumes, e.g. exhaust gases, F23G 7/06) | | |

Note(s)

1. This subclass covers also the cleaning of surfaces of furnace tubes, flame tubes, water tubes, flues or the like of boilers, heat-exchange or heat-transfer conduits, which surfaces are contaminated by combustion products or combustion residues.
2. This subclass does not cover the cleaning of surfaces of boilers, heat exchange or heat-transfer conduits contaminated by other than combustion products or combustion residues, which is covered by subclass F28G.

Subclass index

REMOVAL OF SOLID COMBUSTION PRODUCTS OR RESIDUES

From combustion chamber.....1/00

From places beyond the fire.....3/00

TREATMENT OF COMBUSTION PRODUCTS OR RESIDUES

Supply of chemicals; preventing solidification; Treating smoke or fumes.....7/00, 9/00, 15/00

FLUES, FITTINGS FOR CHIMNEYS OR FLUES.....11/00, 13/00

SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS.....99/00

1/00 Removing ash, clinker, or slag from combustion chambers (devices for removal of material from the bed of fluidised bed combustion apparatus F23C 10/24) [1, 2006.01]

1/02 • Apparatus for removing ash, clinker or slag from ash-pits, e.g. by employing trucks or conveyors, by employing suction devices [1, 2006.01]

1/04 • Hand tools, e.g. rakes, prickers, tongs [1, 2006.01]

1/06 • Mechanically-operated devices, e.g. clinker pushers (forming part of the grate F23H) [1, 2006.01]

1/08 • Liquid slag removal [3, 2006.01]

3/00 Removing solid residues from passages or chambers beyond the fire, e.g. from flues by soot blowers [1, 2006.01]

3/02 • Cleaning furnace tubes; Cleaning flues or chimneys [1, 2006.01]

F23J

- 3/04 • Traps [1, 2006.01]
- 3/06 • Systems for accumulating residues from different parts of furnace plant [1, 2006.01]
- 7/00 **Arrangement of devices for supplying chemicals to fire [1, 2006.01]**
- 9/00 **Preventing premature solidification of molten combustion residues [1, 2006.01]**
- 11/00 **Devices for conducting smoke or fumes, e.g. flues** (chimney stacks E04H 12/28; removing cooking fumes from domestic stoves or ranges F24C 15/20) [1, 5, 2006.01]
- 11/02 • for conducting smoke or fumes originating from various locations to the outside, e.g. in locomotive sheds, in garages [1, 2006.01]
- 11/04 • in locomotives; in road vehicles; in ships [1, 2006.01]
- 11/06 • • for conducting smoke horizontally [1, 2006.01]
- 11/08 • for portable apparatus [1, 2006.01]
- 11/10 • for tents; for log huts; for other inflammable structures [1, 2006.01]
- 11/12 • Smoke conduit systems for factories or large buildings [1, 2006.01]

- 13/00 **Fittings for chimneys or flues** (side-supporting means for chimney stacks E04H 12/20; ladders permanently attached to chimneys E06C 9/00; draught-inducing apparatus associated with chimneys or flues F23L 17/00; tops for chimneys, terminals for flues F23L 17/02) [1, 2006.01]
- 13/02 • Linings; Jackets; Casings [1, 2006.01]
- 13/04 • Joints; Connections [1, 2006.01]
- 13/06 • Mouths; Inlet holes [1, 2006.01]
- 13/08 • Doors or covers specially adapted for smoke-boxes, flues, or chimneys [1, 2006.01]
- 15/00 **Arrangements of devices for treating smoke or fumes [1, 2006.01]**
- 15/02 • of purifiers, e.g. for removing noxious material (traps for solid residues F23J 3/04) [6, 2006.01]
- 15/04 • • using washing fluids [6, 2006.01]
- 15/06 • of coolers [6, 2006.01]
- 15/08 • of heaters [6, 2006.01]
- 99/00 **Subject matter not provided for in other groups of this subclass [2006.01]**

F23K FEEDING FUEL TO COMBUSTION APPARATUS (fuel feeders specially adapted for fluidised bed combustion apparatus F23C 10/22)

- 1/00 **Preparation of lump or pulverulent fuel in readiness for delivery to combustion apparatus [1, 2006.01]**
- 1/02 • Mixing solid fuel with a liquid, e.g. preparing slurries [1, 2006.01]
- 1/04 • Heating fuel prior to delivery to combustion apparatus [1, 2006.01]
- 3/00 **Feeding or distributing of lump or pulverulent fuel to combustion apparatus [1, 2006.01]**
- 3/02 • Pneumatic feeding arrangements, i.e. by air blast [1, 2006.01]
- 3/04 • for locomotive boiler furnaces [1, 2006.01]
- 3/06 • for shaft-type furnaces [1, 2006.01]
- 3/08 • for furnaces having movable grate bars [1, 2006.01]
- 3/10 • Under-feed arrangements [1, 2006.01]
- 3/12 • • feeding by piston [1, 2006.01]
- 3/14 • • feeding by screw [1, 2006.01]
- 3/16 • Over-feed arrangements [1, 2006.01]
- 3/18 • • Spreader stokers [1, 2006.01]
- 3/20 • • • with moving hoppers [1, 2006.01]
- 3/22 • Controlling thickness of fuel bed [1, 2006.01]
- 5/00 **Feeding or distributing other fuel to combustion apparatus [1, 2006.01]**
- 5/02 • Liquid fuel [5, 2006.01]
- 5/04 • • Feeding or distributing systems using pumps (from a central source to a plurality of burners F23K 5/06) [5, 2006.01]
- 5/06 • • from a central source to a plurality of burners [5, 2006.01]
- 5/08 • • Preparation of fuel [5, 2006.01]
- 5/10 • • • Mixing with other fluids [5, 2006.01]
- 5/12 • • • Preparing emulsions (burners spraying an emulsion of water and fuel into the combustion space F23D 11/16) [5, 2006.01]
- 5/14 • • Details thereof [5, 2006.01]
- 5/16 • • • Safety devices (cleaning or purging devices, e.g. filters F23K 5/18) [5, 2006.01]
- 5/18 • • • Cleaning or purging devices, e.g. filters [5, 2006.01]
- 5/20 • • • Preheating devices (in burners using a direct spraying action of liquid droplets or vaporised liquid into the combustion space F23D 11/44) [5, 2006.01]
- 5/22 • • • Vaporising devices (in burners using a direct spraying action of liquid droplets or vaporised liquid into the combustion space F23D 11/44) [5, 2006.01]

F23L SUPPLYING AIR OR NON-COMBUSTIBLE LIQUIDS OR GASES TO COMBUSTION APPARATUS IN GENERAL (firebridges with means for feeding air or steam F23M 3/04; baffles or shields with air supply passages F23M 9/04); VALVES OR DAMPERS SPECIALLY ADAPTED FOR CONTROLLING AIR SUPPLY OR DRAUGHT IN COMBUSTION APPARATUS; INDUCING DRAUGHT IN COMBUSTION APPARATUS; TOPS FOR CHIMNEYS OR VENTILATING SHAFTS; TERMINALS FOR FLUES

Subclass index

AIR SUPPLY

- Passages for: primary air; secondary air..... 1/00, 9/00
- Valves or dampers
- construction..... 13/00

| | |
|---|-------------|
| arrangements: before the fire; after the fire..... | 3/00, 11/00 |
| Blast-producing apparatus before the fire; heating of air for combustion..... | 5/00, 15/00 |
| SUPPLYING NON-COMBUSTIBLE LIQUIDS OR GASES, OTHER THAN AIR, TO THE FIRE..... | 7/00 |
| DRAUGHT-INDUCING..... | 17/00 |
| SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS..... | 99/00 |

| | | | |
|--------------|--|--------------|--|
| 1/00 | Passages or apertures for delivering primary air for combustion (baffles or deflectors in air inlets F23M 9/02) [1, 2006.01] | 13/02 | <ul style="list-style-type: none"> pivoted about a single axis but having no other movement (formed as linked slats each pivoted about an axis F23L 13/08) [1, 2006.01] |
| 1/02 | <ul style="list-style-type: none"> by discharging the air below the fire [1, 2006.01] | 13/04 | <ul style="list-style-type: none"> with axis perpendicular to face [1, 2006.01] |
| 3/00 | Arrangements of valves or dampers before the fire [1, 2006.01] | 13/06 | <ul style="list-style-type: none"> slidable only [1, 2006.01] |
| 5/00 | Blast-producing apparatus before the fire [1, 2006.01] | 13/08 | <ul style="list-style-type: none"> operating as a roller blind; operating as a venetian blind [1, 2006.01] |
| 5/02 | <ul style="list-style-type: none"> Arrangements of fans or blowers [1, 2006.01] | 13/10 | <ul style="list-style-type: none"> having a compound movement involving both sliding and pivoting [1, 2006.01] |
| 5/04 | <ul style="list-style-type: none"> by induction of air for combustion, e.g. using steam jet [1, 2006.01] | 15/00 | Heating of air supplied for combustion [1, 2006.01] |
| | | 15/02 | <ul style="list-style-type: none"> Arrangements of regenerators [1, 2006.01] |
| | | 15/04 | <ul style="list-style-type: none"> Arrangements of recuperators [1, 2006.01] |
| 7/00 | Supplying non-combustible liquids or gases, other than air, to the fire, e.g. oxygen, steam [1, 2006.01] | 17/00 | Inducing draught; Tops for chimneys or ventilating shafts; Terminals for flues [1, 2006.01] |
| 9/00 | Passages or apertures for delivering secondary air for completing combustion of fuel (baffles or deflectors in air inlets F23M 9/02) [1, 2006.01] | 17/02 | <ul style="list-style-type: none"> Tops for chimneys or ventilating shafts; Terminals for flues [1, 2006.01] |
| 9/02 | <ul style="list-style-type: none"> by discharging the air above the fire [1, 2006.01] | 17/04 | <ul style="list-style-type: none"> Balanced-flue arrangements, i.e. devices which combine air inlet to combustion unit with smoke outlet [1, 2006.01] |
| 9/04 | <ul style="list-style-type: none"> by discharging the air beyond the fire, i.e. nearer the smoke outlet [1, 2006.01] | 17/06 | <ul style="list-style-type: none"> branched; T-headed [1, 2006.01] |
| 9/06 | <ul style="list-style-type: none"> by discharging the air into the fire bed [1, 2006.01] | 17/08 | <ul style="list-style-type: none"> with coaxial cones or louvres [1, 2006.01] |
| 11/00 | Arrangements of valves or dampers after the fire [1, 2006.01] | 17/10 | <ul style="list-style-type: none"> wherein the top moves as a whole [1, 2006.01] |
| 11/02 | <ul style="list-style-type: none"> for reducing draught by admission of air to flues [1, 2006.01] | 17/12 | <ul style="list-style-type: none"> Devices for fastening the top or terminal to chimney, shaft, or flue [1, 2006.01] |
| 13/00 | Construction of valves or dampers for controlling air supply or draught [1, 2006.01] | 17/14 | <ul style="list-style-type: none"> Draining devices [1, 2006.01] |
| | | 17/16 | <ul style="list-style-type: none"> Induction apparatus, e.g. steam jet, acting on combustion products beyond the fire [1, 2006.01] |
| | | 99/00 | Subject matter not provided for in other groups of this subclass [2006.01] |

F23M CASINGS, LININGS, WALLS OR DOORS SPECIALLY ADAPTED FOR COMBUSTION CHAMBERS, e.g. FIREBRIDGES; DEVICES FOR DEFLECTING AIR, FLAMES OR COMBUSTION PRODUCTS IN COMBUSTION CHAMBERS; SAFETY ARRANGEMENTS SPECIALLY ADAPTED FOR COMBUSTION APPARATUS; DETAILS OF COMBUSTION CHAMBERS, NOT OTHERWISE PROVIDED FOR

| | | | |
|-------------|---|-------------|---|
| 3/00 | Firebridges [1, 2006.01] | 5/02 | <ul style="list-style-type: none"> characterised by the shape of the bricks or blocks used [1, 2006.01] |
| 3/02 | <ul style="list-style-type: none"> modified for circulation of fluids, e.g. air, steam, water [1, 2006.01] | 5/04 | <ul style="list-style-type: none"> Supports for linings [1, 2006.01] |
| 3/04 | <ul style="list-style-type: none"> for delivery of gas, e.g. air, steam [1, 2006.01] | 5/06 | <ul style="list-style-type: none"> Crowns or roofs for combustion chambers [1, 2006.01] |
| 3/06 | <ul style="list-style-type: none"> into or towards fire [1, 2006.01] | 5/08 | <ul style="list-style-type: none"> Cooling thereof; Tube walls [1, 2006.01] |
| 3/08 | <ul style="list-style-type: none"> away from fire, e.g. towards smoke outlet [1, 2006.01] | 7/00 | Doors [1, 2006.01] |
| 3/10 | <ul style="list-style-type: none"> transversely [1, 2006.01] | 7/02 | <ul style="list-style-type: none"> Frames therefor [1, 2006.01] |
| 3/12 | <ul style="list-style-type: none"> characterised by shape or construction [1, 2006.01] | 7/04 | <ul style="list-style-type: none"> Cooling doors or door frames [1, 2006.01] |
| 3/14 | <ul style="list-style-type: none"> with apertures for passage of combustion products [1, 2006.01] | 9/00 | Baffles or deflectors for air or combustion products (baffles or deflectors for air or combustion products structurally associated with burners F23D); Flame shields [1, 2006.01] |
| 3/16 | <ul style="list-style-type: none"> built-up in sections, e.g. using bars or blocks [1, 2006.01] | 9/02 | <ul style="list-style-type: none"> in air inlets [1, 2006.01] |
| 3/18 | <ul style="list-style-type: none"> double; multiple [1, 2006.01] | 9/04 | <ul style="list-style-type: none"> with air supply passages in the baffle or shield [1, 2006.01] |
| 3/20 | <ul style="list-style-type: none"> comprising loose refractory material, wholly or in part [1, 2006.01] | 9/06 | <ul style="list-style-type: none"> in fire-boxes [1, 2006.01] |
| 3/22 | <ul style="list-style-type: none"> movable; adjustable [1, 2006.01] | | |
| 5/00 | Casings; Linings; Walls [1, 2006.01] | | |

F23M

| | | | |
|-------|--|-------|---|
| 9/08 | • Helical or twisted baffles or deflectors [1, 2006.01] | 11/02 | • Preventing emission of flames or hot gases, or admission of air, through working or charging apertures [1, 2006.01] |
| 9/10 | • Baffles or deflectors formed as tubes, e.g. in water-tube boilers [1, 2006.01] | 11/04 | • Means for supervising combustion, e.g. windows [1, 2006.01] |
| 11/00 | Safety arrangements [1, 2006.01] | 20/00 | Details of combustion chambers, not otherwise provided for [2014.01] |

F23N **REGULATING OR CONTROLLING COMBUSTION** (control devices specially adapted for combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles F23C 10/28; condition responsive controls for regulating combustion in domestic stoves with open fires for solid fuel F24B 1/187)

| | | | |
|------|--|------|---|
| 1/00 | Regulating fuel supply [1, 2006.01] | 5/02 | • using devices responsive to thermal changes or to thermal expansion of a medium [1, 2006.01] |
| 1/02 | • conjointly with air supply [1, 2006.01] | 5/04 | • • using bimetallic elements [1, 2006.01] |
| 1/04 | • conjointly with air supply and with draught [1, 2006.01] | 5/06 | • • using bellows; using diaphragms [1, 2006.01] |
| 1/06 | • conjointly with draught [1, 2006.01] | 5/08 | • • using light-sensitive elements [1, 2006.01] |
| 1/08 | • conjointly with another medium, e.g. boiler water [1, 2006.01] | 5/10 | • • using thermocouples [1, 2006.01] |
| 1/10 | • • and with air supply or draught [1, 2006.01] | 5/12 | • • using ionisation-sensitive elements, i.e. flame rods [1, 2006.01] |
| 3/00 | Regulating air supply or draught (conjointly with fuel supply F23N 1/00) [1, 2006.01] | 5/14 | • • using thermo-sensitive resistors [1, 2006.01] |
| 3/02 | • Regulating draught by direct pressure operation of single valves or dampers [1, 2006.01] | 5/16 | • using noise-sensitive detectors [1, 2006.01] |
| 3/04 | • by operation of single valves or dampers by temperature-sensitive elements [1, 2006.01] | 5/18 | • using detectors sensitive to rate of flow of air or fuel [1, 2006.01] |
| 3/06 | • by conjoint operation of two or more valves or dampers (by power-assisted systems F23N 3/08) [1, 2006.01] | 5/20 | • with a time programme acting through electrical means, e.g. using time-delay relays [1, 2006.01] |
| 3/08 | • by power-assisted systems [1, 2006.01] | 5/22 | • with a time programme acting through mechanical means, e.g. using cams [1, 2006.01] |
| 5/00 | Systems for controlling combustion (regulating fuel supply F23N 1/00; regulating air supply or draught F23N 3/00) [1, 2006.01] | 5/24 | • Preventing development of abnormal or undesired conditions, i.e. safety arrangements (F23N 5/02-F23N 5/18 take precedence) [1, 2006.01] |
| | | 5/26 | • Details [1, 2006.01] |

F23Q **IGNITION** (devices for igniting matches A24F; chemical igniters C06C 9/00); **EXTINGUISHING DEVICES**

Subclass index

IGNITERS

| | |
|-------------------------------|------------------|
| Mechanical..... | 1/00 |
| Using electric sparks..... | 3/00, 5/00 |
| Incandescent..... | 7/00 |
| With pilot flame..... | 9/00 |
| By catalysis..... | 11/00 |
| Other..... | 13/00 |
| REMOTE IGNITION..... | 21/00 |
| TESTING..... | 23/00 |
| LIGHTERS CONTAINING FUEL..... | 2/00, 3/01, 7/00 |
| EXTINGUISHING DEVICES..... | 25/00 |

| | | | |
|------|--|------|--|
| 1/00 | Mechanical ignition (lighters containing fuel F23Q 2/00; matches C06F) [1, 2006.01] | 2/04 | • • with cerium-iron alloy and wick [1, 2006.01] |
| 1/02 | • using friction or shock effects [1, 2006.01] | 2/06 | • • • with friction wheel [1, 2006.01] |
| 1/04 | • • on a part moved by the fuel-controlling member, e.g. by a tap on a gas cooker [1, 2006.01] | 2/08 | • • • with ignition by spring action of the cover [1, 2006.01] |
| 1/06 | • • Portable igniters [1, 2006.01] | 2/10 | • • • with other friction member [1, 2006.01] |
| 2/00 | Lighters containing fuel, e.g. for cigarettes [1, 2006.01] | 2/12 | • • with cerium-iron alloy without wick [1, 2006.01] |
| 2/02 | • Lighters with liquid fuel [1, 2006.01] | 2/14 | • • with cerium-iron alloy and torch ignited by striking or pushing [1, 2006.01] |
| | | 2/16 | • Lighters with gaseous fuel, e.g. the gas being stored in liquid phase [1, 2006.01] |

| | | | |
|-------------|---|--------------|--|
| 2/167 | • • with adjustable flame [3, 2006.01] | 7/12 | • • • actuated by gas-controlling device [1, 2006.01] |
| 2/173 | • • • Valves therefor [3, 2006.01] | 7/14 | • Portable igniters [1, 2006.01] |
| 2/18 | • Lighters with solid fuel [1, 2006.01] | 7/16 | • • with built-in battery [1, 2006.01] |
| 2/20 | • • with cerium-iron alloy and friction wheel [1, 2006.01] | 7/18 | • • with built-in generator [1, 2006.01] |
| 2/22 | • • with cerium-iron alloy and tinder [1, 2006.01] | 7/20 | • • with built-in mains transformer [1, 2006.01] |
| 2/24 | • • with ignition pills or strips with inflammable parts [1, 2006.01] | 7/22 | • Details [1, 2006.01] |
| 2/26 | • • combined with liquid-fuel lighters [1, 2006.01] | 7/24 | • • Safety arrangements [1, 2006.01] |
| 2/28 | • Lighters characterised by electrical ignition of the fuel [1, 2006.01] | 7/26 | • • • Provision for re-ignition [1, 2006.01] |
| 2/30 | • Lighters characterised by catalytic ignition of fuel [1, 2006.01] | 9/00 | Ignition by a pilot flame [1, 2006.01] |
| 2/32 | • Lighters characterised by being combined with other objects (combinations with smokers' equipment A24F) [1, 2006.01] | 9/02 | • without interlock with main fuel supply [1, 2006.01] |
| 2/34 | • Component parts or accessories [1, 2006.01] | 9/04 | • • for upright burners, e.g. gas-cooker burners [1, 2006.01] |
| 2/36 | • • Casings [1, 2006.01] | 9/06 | • • for inverted burners, e.g. gas lamps [1, 2006.01] |
| 2/38 | • • • with containers for flints or tools [1, 2006.01] | 9/08 | • with interlock with main fuel supply [1, 2006.01] |
| 2/40 | • • Cover fastenings [1, 2006.01] | 9/10 | • • to determine the sequence of supply of fuel to pilot and main burners [1, 2006.01] |
| 2/42 | • • Fuel containers; Closures for fuel containers [1, 2006.01] | 9/12 | • • to permit the supply to the main burner in dependence upon existence of pilot flame [1, 2006.01] |
| 2/44 | • • Wicks; Wick guides or fastenings [1, 2006.01] | 9/14 | • • • using electric means, e.g. by light-sensitive elements [1, 2006.01] |
| 2/46 | • • Friction wheels; Arrangement of friction wheels [1, 2006.01] | 11/00 | Arrangement of catalytic igniters [1, 2006.01] |
| 2/48 | • • Flints (composition, manufacture C06C 15/00); Guides for, or arrangements of, flints [1, 2006.01] | 11/04 | • at the burner [1, 2006.01] |
| 2/50 | • • Protecting coverings [1, 2006.01] | 11/06 | • remote from the burner, e.g. on the chimney of a lamp [1, 2006.01] |
| 2/52 | • • Filling devices [1, 2006.01] | 11/08 | • on a part moved by the fuel-controlling member [1, 2006.01] |
| 3/00 | Ignition using electrically-produced sparks (lighters containing fuel F23Q 2/28; sparking-plugs H01T 13/00) [1, 2006.01] | 11/10 | • • and moving out of the flame after ignition [1, 2006.01] |
| 3/01 | • Hand-held lighters, e.g. for cigarettes [1, 2006.01] | 13/00 | Ignition not otherwise provided for [1, 2006.01] |
| 5/00 | Make-and-break ignition, i.e. with spark generated between electrodes by breaking contact therebetween [1, 2006.01] | 13/02 | • using gas burners, e.g. gas poker [1, 2006.01] |
| 7/00 | Incandescent ignition; Ignition using electrically-produced heat, e.g. lighters for cigarettes; Electrically-heated glowing plugs [1, 2006.01] | 13/04 | • using portable burners, e.g. torches, fire pots [1, 2006.01] |
| 7/02 | • for igniting solid fuel [1, 2006.01] | 21/00 | Devices for effecting ignition from a remote location [1, 2006.01] |
| 7/04 | • • with fans for transfer of heat to fuel [1, 2006.01] | 23/00 | Testing of ignition installations (peculiar to internal-combustion engines F02P 17/00; testing of sparking plugs H01T 13/58) [1, 2006.01] |
| 7/06 | • Igniters structurally associated with fluid-fuel burners (lighters containing fuel F23Q 2/00) [1, 2006.01] | 23/02 | • Testing of ignition timing [1, 2006.01] |
| 7/08 | • • for evaporating and igniting liquid fuel, e.g. in hurricane lanterns [1, 2006.01] | 23/08 | • Testing of components [1, 2006.01] |
| 7/10 | • • for gaseous fuel, e.g. in welding appliances [1, 2006.01] | 23/10 | • • electrically [1, 2006.01] |
| F23R | GENERATING COMBUSTION PRODUCTS OF HIGH PRESSURE OR HIGH VELOCITY, e.g. GAS-TURBINE COMBUSTION CHAMBERS (fluidised bed combustion apparatus specially adapted for operation at superatmospheric pressures F23C 10/16) | 25/00 | Extinguishing devices, e.g. for blowing-out or snuffing candle flames [1, 2006.01] |

3/00 Continuous combustion chambers using liquid or gaseous fuel [3, 2006.01]

- 3/02 • characterised by the air-flow or gas-flow configuration (reverse-flow combustion chambers F23R 3/54; cyclone or vortex type combustion chambers F23R 3/58) [3, 2006.01]
- 3/04 • • Air inlet arrangements [3, 2006.01]
- 3/06 • • • Arrangement of apertures along the flame tube [3, 2006.01]

- 3/08 • • • between annular flame tube sections, e.g. flame tubes with telescopic sections [3, 2006.01]
- 3/10 • • • for primary air (F23R 3/06 takes precedence) [3, 2006.01]
- 3/12 • • • • inducing a vortex [3, 2006.01]
- 3/14 • • • • by using swirl vanes [3, 2006.01]
- 3/16 • • with devices inside the flame tube or the combustion chamber to influence the air or gas flow [3, 2006.01]

F23R

- 3/18 • • • Flame stabilising means, e.g. flame holders for after-burners of jet-propulsion plants [3, 2006.01]
- 3/20 • • • • incorporating fuel injection means [3, 2006.01]
- 3/22 • • • • movable, e.g. to an inoperative position; adjustable, e.g. self-adjusting [3, 2006.01]
- 3/24 • • • • of the fluid-screen type [3, 2006.01]
- 3/26 • • Controlling the air flow [3, 2006.01]
- 3/28 • characterised by the fuel supply [3, 2006.01]
- 3/30 • • comprising fuel prevapourising devices [3, 2006.01]
- 3/32 • • • being tubular [3, 2006.01]
- 3/34 • • Feeding into different combustion zones [3, 2006.01]
- 3/36 • • Supply of different fuels [3, 2006.01]
- 3/38 • • comprising rotary fuel injection means [3, 2006.01]
- 3/40 • characterised by the use of catalytic means [3, 2006.01]
- 3/42 • characterised by the arrangement or form of the flame tubes or combustion chambers [3, 2006.01]
- 3/44 • • Combustion chambers comprising a tubular flame tube within a tubular casing (reverse-flow combustion chambers F23R 3/54) [3, 2006.01]

- 3/46 • • Combustion chambers comprising an annular arrangement of flame tubes within a common annular casing or within individual casings [3, 2006.01]
- 3/48 • • • Flame tube interconnectors, e.g. cross-over tubes [3, 2006.01]
- 3/50 • • Combustion chambers comprising an annular flame tube within an annular casing (toroidal combustion chambers F23R 3/52) [3, 2006.01]
- 3/52 • • Toroidal combustion chambers [3, 2006.01]
- 3/54 • • Reverse-flow combustion chambers [3, 2006.01]
- 3/56 • • Combustion chambers having rotary flame tubes [3, 2006.01]
- 3/58 • • Cyclone or vortex type combustion chambers [3, 2006.01]
- 3/60 • • Support structures; Attaching or mounting means [3, 2006.01]
- 5/00 **Continuous combustion chambers using solid or pulverulent fuel [3, 2006.01]**
- 7/00 **Intermittent or explosive combustion chambers [3, 2006.01]**