

CPC**COOPERATIVE PATENT CLASSIFICATION****F23N**

REGULATING OR CONTROLLING COMBUSTION([control devices specially adapted for fluidised-bed combustion apparatus F23C 10/28](#) ; [condition responsive controls for regulating combustion in domestic stoves with open fires for solid fuel F24B 1/187](#))

F23N 1/00

Regulating fuel supply

- F23N 1/002 . {using electronic means([F23N 1/04](#) to [F23N 1/10](#) take precedence)}
- F23N 1/005 . {using electrical or electromechanical means([F23N 1/04](#) to [F23N 1/10](#) take precedence)}
- F23N 1/007 . {using mechanical means([F23N 1/04](#) to [F23N 1/10](#) take precedence)}
- F23N 1/02 . conjointly with air supply
- F23N 1/022 .. {using electronic means}
- F23N 1/025 .. {using electrical or electromechanical means}
- F23N 1/027 .. {using mechanical means}
- F23N 1/04 . conjointly with air supply and with draught
- F23N 1/042 .. {using electronic means}
- F23N 1/045 .. {using electrical or electromechanical means}
- F23N 1/047 .. {using mechanical means}
- F23N 1/06 . conjointly with draught
- F23N 1/062 .. {using electronic means}
- F23N 1/065 .. {using electrical or electromechanical means}
- F23N 1/067 .. {using mechanical means}
- F23N 1/08 . conjointly with another medium, e.g. boiler water
- F23N 1/082 .. {using electronic means}
- F23N 1/085 .. {using electrical or electromechanical means}
- F23N 1/087 .. {using mechanical means}
- F23N 1/10 .. and with air supply or draught
- F23N 1/102 ... {using electronic means}
- F23N 1/105 ... {using electrical or electromechanical means}
- F23N 1/107 ... {using mechanical means}

F23N 3/00

Regulating air supply or draught([conjointly with fuel supply F23N 1/00](#))

- F23N 3/002 . {using electronic means([F23N 3/02](#) to [F23N 3/08](#) take precedence)}

- F23N 3/005 . {using electrical or electromechanical means([F23N 3/02](#) to [F23N 3/08](#) take precedence)}
- F23N 3/007 . {using mechanical means([F23N 3/02](#) to [F23N 3/08](#) take precedence)}
- F23N 3/02 . Regulating draught by direct pressure operation of single valves or dampers
- F23N 3/04 . by operation of single valves or dampers by temperature sensitive elements
- F23N 3/042 . . {using electronic means}
- F23N 3/045 . . {using electrical or electromechanical means}
- F23N 3/047 . . {using mechanical means}
- F23N 3/06 . by conjoint operation of two or more valves or dampers([F23N 3/08](#) takes precedence)
- F23N 3/065 . . {using mechanical means}
- F23N 3/08 . by power-assisted systems
- F23N 3/082 . . {using electronic means}
- F23N 3/085 . . {using electrical or electromechanical means}
- F23N 3/087 . . {using mechanical means}
- F23N 5/00** **Systems for controlling combustion**([F23N 1/00](#) , [F23N 3/00](#) take precedence)
- F23N 5/003 . {using detectors sensitive to combustion gas properties([F23N 5/02](#) , [F23N 5/18](#) to [F23N 5/26](#) take precedence)}
- F23N 5/006 . . {the detector being sensitive to oxygen}
- F23N 5/02 . using devices responsive to thermal changes or to thermal expansion of a medium
- F23N 5/022 . . {using electronic means([F23N 5/04](#) to [F23N 5/14](#) take precedence)}
- F23N 5/025 . . {using electrical or electromechanical means([F23N 5/04](#) to [F23N 5/14](#) take precedence)}
- F23N 5/027 . . {using mechanical means([F23N 5/04](#) to [F23N 5/14](#) take precedence)}
- F23N 5/04 . . using bimetallic elements
- F23N 5/042 . . . {using electronic means}
- F23N 5/045 . . . {using electrical or electromechanical means}
- F23N 5/047 . . . {using mechanical means}
- F23N 5/06 . . using bellows; using diaphragms
- F23N 5/062 . . . {using electronic means}
- F23N 5/065 . . . {using electrical or electromechanical means}
- F23N 5/067 . . . {using mechanical means}
- F23N 5/08 . . using light-sensitive elements
- F23N 5/082 . . . {using electronic means}
- F23N 5/085 . . . {using electrical or electromechanical means}
- F23N 5/087 . . . {using mechanical means}

F23N 5/10	.. using thermocouples
F23N 5/102	... {using electronic means}
F23N 5/105	... {using electrical or electromechanical means}
F23N 5/107	... {using mechanical means e.g. safety valves}
F23N 5/12	.. using ionisation-sensitive elements, i.e. flame rods{(testing of other ignition means, e.g. flame F02P 17/12 ; analysing gases by investigating the ionisation by using heat G01N 27/626)}
F23N 5/123	... {using electronic means}
F23N 5/126	... {using electrical or electromechanical means}
F23N 5/14	.. using thermo-sensitive resistors
F23N 5/143	... {using electronic means}
F23N 5/146	... {using electrical or electromechanical means}
F23N 5/16	. using noise-sensitive detectors
F23N 2005/165	.. {with ultrasonic means}
F23N 5/18	. using detectors sensitive to rate of flow of air or fuel
F23N 2005/181	.. {using detectors sensitive to rate of flow of air}
F23N 2005/182	... {Air flow switch}
F23N 5/184	.. {using electronic means}
F23N 2005/185	.. {using detectors sensitive to rate of flow of fuel}
F23N 5/187	.. {using electrical or electromechanical means}
F23N 5/188	.. {using mechanical means}
F23N 5/20	. with a time programme acting through electrical means, e.g. using time-delay relays
F23N 5/203	.. {using electronic means}
F23N 5/206	.. {using electrical or electromechanical means}
F23N 5/22	. with a time programme acting through mechanical means, e.g. using cams
F23N 5/24	. Preventing development of abnormal or undesired conditions, i.e. safety arrangements(F23N 5/02 to F23N 5/18 take precedence)
F23N 5/242	.. {using electronic means}
F23N 5/245	.. {using electrical or electromechanical means}
F23N 5/247	.. {using mechanical means}
F23N 5/26	. Details
F23N 5/265	.. {using electronic means}
F23N 2021/00	Pretreatment or prehandling
F23N 2021/02	. using belt conveyers
F23N 2021/04	. Preheating liquid fuel

- F23N 2021/06 . Preheating gaseous fuel
- F23N 2021/08 . Preheating the air
- F23N 2021/10 . Analysing fuel properties, e.g. density, calorific
- F23N 2021/12 . Recycling exhaust gases

F23N 2023/00 Signal processing; Details thereof

- F23N 2023/02 . Multiplex transmission
- F23N 2023/04 . Memory
- F23N 2023/06 . Sampling
- F23N 2023/08 . Microprocessor; Microcomputer
- F23N 2023/10 . Correlation
- F23N 2023/12 . Integration
- F23N 2023/14 . Differentiation
- F23N 2023/16 . Measuring bridge
- F23N 2023/18 . Chopper
- F23N 2023/20 . Opto-coupler
- F23N 2023/22 . Timing network
- F23N 2023/24 . . with bimetallic elements
- F23N 2023/26 . . with capacitors
- F23N 2023/28 . . with more than one timing element
- F23N 2023/30 . Switches
- F23N 2023/32 . . Reed switches
- F23N 2023/34 . with feedforward processing
- F23N 2023/36 . PID signal processing
- F23N 2023/38 . Remote control
- F23N 2023/40 . Simulation
- F23N 2023/42 . Function generator

- F23N 2023/44 . Optimum control
- F23N 2023/46 . Identification
- F23N 2023/48 . Learning / Adaptive control
- F23N 2023/50 . Human control
- F23N 2023/52 . Fuzzy logic
- F23N 2023/54 . Recording

F23N 2025/00 Measuring

- F23N 2025/02 . filling height in burners
- F23N 2025/04 . pressure
- F23N 2025/06 . . for determining flow
- F23N 2025/08 . temperature
- F23N 2025/10 . . stack temperature
- F23N 2025/12 . . room temperature
- F23N 2025/13 . . outdoor temperature
- F23N 2025/14 . . Ambient temperature around burners
- F23N 2025/16 . . burner temperature
- F23N 2025/18 . . feedwater temperature
- F23N 2025/19 . . outlet temperature water heat-exchanger
- F23N 2025/20 . . entrant temperature
- F23N 2025/21 . . outlet temperature
- F23N 2025/22 . heat losses
- F23N 2025/24 . . indicated in an amount of money
- F23N 2025/26 . humidity
- F23N 2025/30 . . measuring lambda

F23N 2027/00 Ignition or checking

- F23N 2027/02 . Starting or ignition cycles
- F23N 2027/04 . Prepurge
- F23N 2027/06 . Postpurge
- F23N 2027/08 . Hold fire apparatus

F23N 2027/10	. Sequential burner running
F23N 2027/12	. Burner simulation or checking
F23N 2027/14	. . Flame simulation
F23N 2027/16	. . Checking components, e.g. electronic
F23N 2027/18	. Applying test signals, e.g. periodic
F23N 2027/20	. Calibrating devices
F23N 2027/22	. Pilot burners(ignition circuits therefor F23N 2027/32)
F23N 2027/24	. . the pilot burner not burning continuously
F23N 2027/26	. . comprising two or more distinct pilot burners
F23N 2027/28	. Ignition circuits
F23N 2027/30	. . for pilot burners
F23N 2027/32	. Igniting for a predetermined number of cycles
F23N 2027/34	. Continuously applied ignition cycles
F23N 2027/36	. Spark ignition, e.g. by means of a high voltage
F23N 2027/38	. Electrical resistance ignition
F23N 2027/40	. Catalytic ignition
F23N 2027/42	. Ceramic glow ignition
F23N 2029/00	Flame sensors
F23N 2029/02	. Pilot flame sensors
F23N 2029/04	. sensitive to the colour of flames
F23N 2029/06	. with periodical shutters; Modulation signals
F23N 2029/08	. detecting flame flicker
F23N 2029/10	. comprising application of periodical fuel flow fluctuations
F23N 2029/12	. with flame rectification current detecting means
F23N 2029/14	. using two or more different types of flame sensor
F23N 2029/16	. using two or more of the same types of flame sensor

- F23N 2029/18 . Flame sensor cooling means
- F23N 2029/20 . Camera viewing
- F23N 2029/22 . the sensor`s sensivity being variable

F23N 2031/00 Fail safe

- F23N 2031/02 . using electric energy accumulators
- F23N 2031/04 . for electrical power failures
- F23N 2031/06 . for flame failures
- F23N 2031/08 . . for pilot flame failures
- F23N 2031/10 . for component failures
- F23N 2031/12 . for ignition failures
- F23N 2031/14 . for earthquakes
- F23N 2031/16 . using melting materials or shape memory alloys
- F23N 2031/18 . Detecting fluid leaks
- F23N 2031/20 . Warning devices
- F23N 2031/22 . . using warning lamps
- F23N 2031/24 . Freezing
- F23N 2031/26 . for clogging air inlet
- F23N 2031/28 . preventing flash-back or blow-back
- F23N 2031/30 . Representation of working time

F23N 2033/00 Ventilators

- F23N 2033/02 . in stacks
- F23N 2033/04 . . with variable speed
- F23N 2033/06 . at the air intake
- F23N 2033/08 . . with variable speed
- F23N 2033/10 . forcing air through heat exchangers

F23N 2035/00**Valves, nozzles or pumps**

- F23N 2035/02 . Air or combustion gas valves or dampers
- F23N 2035/04 . . in stacks
- F23N 2035/06 . . at the air intake
- F23N 2035/08 . . used with heat exchanges
- F23N 2035/10 . . power assisted, e.g. using electric motors
- F23N 2035/12 . Fuel valves
- F23N 2035/14 . . electromagnetically operated
- F23N 2035/16 . . variable flow or proportional valves
- F23N 2035/18 . . Groups of two or more valves
- F23N 2035/20 . . Membrane valves
- F23N 2035/22 . . cooperating with magnets
- F23N 2035/24 . . Valve details
- F23N 2035/26 . Fuel nozzles
- F23N 2035/28 . . Spray fuel nozzles
- F23N 2035/30 . Pumps

F23N 2037/00**Controlling**([F23N 5/00](#) takes precedence)

- F23N 2037/02 . two or more burners
- F23N 2037/04 . at two or more different localities
- F23N 2037/06 . two predetermining temperatures, e.g. day-night
- F23N 2037/08 . two or more different types of fuel simultaneously
- F23N 2037/10 . High or low fire
- F23N 2037/12 . catalytic burners
- F23N 2037/14 . burners with gasification or vaporizer elements
- F23N 2037/16 . secondary air
- F23N 2037/18 . fluidized bed burners
- F23N 2037/20 . one or more bypass conduits
- F23N 2037/22 . water injection

- F23N 2037/24 . height of burner
- F23N 2037/26 . . oxygen-air ratio
- F23N 2037/28 . . oxygen as pure oxydant
- F23N 2037/30 . . matrix burners
- F23N 2037/32 . . Nox

F23N 2039/00 Fuels

- F23N 2039/02 . Solid fuels
- F23N 2039/04 . Gaseous fuels
- F23N 2039/06 . Liquid fuels

F23N 2041/00 Applications

- F23N 2041/02 . Space-heating
- F23N 2041/04 . Heating water
- F23N 2041/06 . Space-heating and heating water
- F23N 2041/08 . Household apparatus
- F23N 2041/10 . Generating vapour
- F23N 2041/11 . Torches
- F23N 2041/12 . Stack-torches
- F23N 2041/14 . Vehicle heating, the heat being derived otherwise than from the propulsion plant
- F23N 2041/16 . Spectrometer burners
- F23N 2041/18 . Incinerating apparatus
- F23N 2041/20 . Gas turbines
- F23N 2041/22 . Absorption refrigerator

F23N 2900/00 Special features of, or arrangements for controlling combustion

- F23N 2900/01001 . Micro Electro Mechanical Systems (MEMS) for controlling fuel supply to burners
- F23N 2900/01002 . Electromagnetically operated fuel valves with a single solenoid controlling two or more cores

- F23N 2900/05001 . Measuring CO content in flue gas
- F23N 2900/05002 . Measuring CO₂ content in flue gas
- F23N 2900/05003 . Measuring NO_x content in flue gas
- F23N 2900/05004 . Details of components, e.g. connecting adaptors
- F23N 2900/05005 . Mounting arrangements for sensing, detecting or measuring devices
- F23N 2900/05006 . Controlling systems using neuronal networks
- F23N 2900/05101 . Connections between thermocouple and magnetic valves, e.g. by plug and socket connectors
- F23N 2900/05181 . Controlling air to fuel ratio by using a single differential pressure detector