

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

REGULATING OR CONTROLLING COMBUSTION (control devices specially adapted for fluidised-bed combustion apparatus [F23C 10/28](#) ; condition reponsive 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 5/18 . using detectors sensitive to rate of flow of air or fuel
- F23N 5/184 . . { using electronic means }
- 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 2005/00 Systems for controlling combustion ([F23N 1/00](#) , [F23N 3/00](#) take precedence)**

- F23N 2005/16 . using noise-sensitive detectors
- F23N 2005/165 . . with ultrasonic means

- F23N 2005/18 . 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 2005/185 . . using detectors sensitive to rate of flow of fuel

- 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	Inginition 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