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 - F23N 1/10 take precedence)}

F23N 1/005 . {using electrical or electromechanical means (F23N 1/04 - F23N 1/10 take precedence)}

F23N 1/007 . {using mechanical means (F23N 1/04 - 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 - F23N 3/08 take precedence)}

F23N 3/005 . {using electrical or electromechanical means (F23N 3/02 - F23N 3/08 take precedence)}

F23N 3/007 . {using mechanical means (F23N 3/02 - 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 - 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 - F23N 5/14 take precedence)}
F23N 5/025 . . {using electrical or electromechanical means (F23N 5/04 - F23N 5/14 take precedence)}
F23N 5/027 . . {using mechanical means (F23N 5/04 - 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 - 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 conveyors
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 Ingnition 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 predeterming 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 CO_2 content in flue gas
F23N 2900/05003 . Measuring NOx 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