CPC COOPERATIVE PATENT CLASSIFICATION

C10J PRODUCTION OF PRODUCER GAS, WATER-GAS, SYNTHESIS GAS FROM SOLID CARBONACEOUS MATERIAL, OR MIXTURES CONTAINING THESE GASES (synthesis gas from liquid or gaseous hydrocarbons C01B ; underground gasification of minerals E21B 43/295) ; CARBURETTING AIR OR OTHER GASES

Guidance heading:

C10J 1/00 **Production of fuel gases by carburetting air or other gases without pyrolysis** (for internal-combustion engines F02)

C10J 1/02 . Carburetting air
C10J 1/04 . . Controlling supply of air
C10J 1/06 . . with materials which are liquid at ordinary temperatures
C10J 1/08 . . . by passage of air through or over the surface of the liquid
C10J 1/10 . . . . with the liquid absorbed on carriers
C10J 1/12 . . . by atomisation of the liquid
C10J 1/14 . . . Controlling the supply of liquid in accordance with the air supply
C10J 1/16 . . with solid hydrocarbons
C10J 1/18 . . in rotary carburettors

C10J 1/20 . Carburetting gases other than air

C10J 1/207 . Carburetting by pyrolysis of solid carbonaceous material in a fuel bed (C10J 3/66 takes precedence)

C10J 1/213 . Carburetting by pyrolysis of solid carbonaceous material in a carburettor

C10J 1/22 . Adding materials to prevent vapour deposition

C10J 1/24 . Controlling humidity of the air or gas to be carburetted

C10J 1/26 . using raised temperatures or pressures

C10J 1/28 . Odorising air gas

C10J 3/00 **Production of combustible gases containing carbon monoxide from solid carbonaceous fuels** (destructive distillation processes C10B)

C10J 3/002 . { Horizontal gasifiers, e.g. belt-type gasifiers }

C10J 3/005 . { Rotary drum or kiln gasifiers }

C10J 3/007 . { Screw type gasifiers }

C10J 3/02 . Fixed-bed gasification of lump fuel
C10J 3/04 .. Cyclic processes, e.g. alternate blast and run
C10J 3/06 .. Continuous processes
C10J 3/08 ... with ash-removal in liquid state
C10J 3/10 ... using external heating
C10J 3/12 ... using solid heat-carriers
C10J 3/14 ... using gaseous heat-carriers
C10J 3/16 ... simultaneously reacting oxygen and water with the carbonaceous material
C10J 3/18 ... using electricity
C10J 3/20 .. Apparatus ; Plant
C10J 3/22 ... Arrangement or dispositions of valves or flues
C10J 3/24 .... to permit flow of gases or vapours other than upwardly through the fuel bed
C10J 3/26 ..... downwardly
C10J 3/28 .... fully automatic
C10J 3/30 ... Fuel charging devices
C10J 3/32 ... Devices for distributing fuel evenly over the bed or for stirring up the fuel bed
C10J 3/34 ... Grates ; Mechanical ash-removing devices
C10J 3/36 .... Fixed grates
C10J 3/38 ..... with stirring beams
C10J 3/40 .... Movable grates
C10J 3/42 ..... Rotary grates
C10J 3/44 ... adapted for use on vehicles

C10J 3/46 . Gasification of granular or pulverulent flues in suspension

WARNING

Groups C10J 3/463 , C10J 3/466 , C10J 3/482 , C10J 3/485 , C10J 3/503 , C10J 3/506 , C10J 3/523 and C10J 3/526 are not complete pending a reorganisation. See also C10J 3/46

C10J 3/463 .. { in stationary fluidised beds }
C10J 3/466 .. { Entrained flow processes }
C10J 3/48 .. Apparatus ; Plant
C10J 3/482 ... { Gasifiers with stationary fluidised bed }
C10J 3/485 ... { Entrained flow gasifiers }
C10J 3/487 .... { Swirling or cyclonic gasifiers }
C10J 3/50 ... Fuel charging devices
C10J 3/503 .... { for gasifiers with stationary fluidised bed }
C10J 3/506 .... { for entrained flow gasifiers }
C10J 3/52 ... Ash-removing devices
C10J 3/523 .... { for gasifiers with stationary fluidised bed }
C10J 3/526 .... { for entrained flow gasifiers }
C10J 3/54 .. Gasification of granular or pulverulent fuels by the Winkler technique, i.e. by

fluidisation

C10J 3/56 . . . Apparatus ; Plant

C10J 3/57 . Gasification using molten salts or metals (C10J 3/02 , C10J 3/46 take precedence)

C10J 3/58 . combined with pre-distillation of the fuel

C10J 3/60 . . Processes

C10J 3/62 . . . with separate withdrawal of the distillation products

C10J 3/64 . . . with decomposition of the distillation products

C10J 3/66 . . . . by introducing them into the gasification zone

C10J 3/72 . Other features

C10J 3/721 . . { Multistage gasification, e.g. plural parallel or serial gasification stages }

C10J 3/723 . . { Controlling or regulating the gasification process }

C10J 3/725 . . { Redox processes }

C10J 3/726 . . { Start-up }

C10J 3/728 . . { Shut down }

C10J 3/74 . . Construction of shells or jackets

C10J 3/76 . . . Water jackets ; Steam boiler-jackets

C10J 3/78 . . High-pressure apparatus

C10J 3/80 . . with arrangements for preheating the blast or the water vapour

C10J 3/82 . . Gas withdrawal means

C10J 3/84 . . . with means for removing dust or tar from the gas

C10J 3/845 . . . . { Quench rings }

C10J 3/86 . . combined with waste-heat boilers

Guidance heading:

C10J 2200/00 Details of gasification apparatus

C10J 2200/06 . Catalysts as integral part of gasifiers (catalysts added to the feed C10J 2300/0986)

C10J 2200/09 . Mechanical details of gasifiers not otherwise provided for, e.g. sealing means

C10J 2200/12 . Electrodes present in the gasifier

C10J 2200/15 . Details of feeding means

C10J 2200/152 . . Nozzles or lances for introducing gas, liquids or suspensions

C10J 2200/154 . . Pushing devices, e.g. pistons

C10J 2200/156 . . Sluices, e.g. mechanical sluices for preventing escape of gas through the feed inlet

C10J 2200/158 . . Screws

C10J 2200/31 . Mobile gasifiers, e.g. for use in cars, ships or containers

C10J 2200/33 . Laboratory scale gasifiers

C10J 2200/36 . Moving parts inside the gasification reactor not otherwise provided for (devices for distributing fuel evenly over a fixed bed C10J 3/32)

C10J 2200/39 . Gasifiers designed as centrifuge

Guidance heading:

C10J 2300/00 Details of gasification processes

C10J 2300/06 . Modeling or simulation of processes

C10J 2300/09 . Details of the feed, e.g. feeding of spent catalyst, inert gas or halogens
C10J 2300/0903 .. Feed preparation
C10J 2300/0906 ... Physical processes, e.g. shredding, comminuting, chopping, sorting
C10J 2300/0909 ... Drying
C10J 2300/0913 .. Carbonaceous raw material
C10J 2300/0916 ... Biomass
C10J 2300/092 .... Wood, cellulose
C10J 2300/0923 .... Sludge, e.g. from water treatment plant
C10J 2300/0926 ... Slurries comprising bio-oil or bio-coke, i.e. charcoal, obtained e.g. by fast pyrolysis of biomass
C10J 2300/093 ... Coal
C10J 2300/0933 .... Coal fines for producing water gas
C10J 2300/0936 .... Coal fines for producing producer gas
C10J 2300/094 ... Char
C10J 2300/0943 ... Coke
C10J 2300/0946 ... Waste, e.g. MSW, tires, glass, tar sand, peat, paper, lignite, oil shale
C10J 2300/095 ... Exhaust gas from an external process for purification
C10J 2300/0953 .. Gasifying agents
C10J 2300/0956 ... Air or oxygen enriched air
C10J 2300/0959 ... Oxygen
C10J 2300/0963 ... Ozone
C10J 2300/0966 ... Hydrogen
C10J 2300/0969 ... Carbon dioxide
C10J 2300/0973 ... Water
C10J 2300/0976 .... as steam
C10J 2300/0979 .... as supercritical steam
C10J 2300/0983 .. Additives
C10J 2300/0986 ... Catalysts
C10J 2300/0989 ... Hydrocarbons as additives to gasifying agents to improve caloric properties
C10J 2300/0993 ... Inert particles, e.g. as heat exchange medium in a fluidized or moving bed, heat carriers, sand
C10J 2300/0996 ... Calcium-containing inorganic materials, e.g. lime

C10J 2300/12 . Heating the gasifier
C10J 2300/1207 .. using pyrolysis gas as fuel
C10J 2300/1215 .. using synthesis gas as fuel
C10J 2300/1223 .. by burners
C10J 2300/123 .. by electromagnetic waves, e.g. microwaves
C10J 2300/1238 ... by plasma
C10J 2300/1246 .. by external or indirect heating
C10J 2300/1253 .. by injecting hot gas
C10J 2300/1261 .. by pulse burners
C10J 2300/1269 .. by radiating device, e.g. radiant tubes
C10J 2300/1276 ... by electricity, e.g. resistor heating
C10J 2300/1284 .. by renewable energy, e.g. solar energy, photovoltaic cells, wind
C10J 2300/1292 ... mSolar energy

C10J 2300/16 . Integration of gasification processes with another plant or parts within the plant
C10J 2300/1603 .. with gas treatment (gas cleaning C10K 1/00)
C10J 2300/1606 ... Combustion processes
C10J 2300/1609 ... Post-reduction, e.g. on a red-white-hot coke or coal bed
C10J 2300/1612 ... CO2-separation and sequestration, i.e. long time storage
C10J 2300/1615 ... Stripping
C10J 2300/1618 ... Modification of synthesis gas composition, e.g. to meet some criteria
C10J 2300/1621 ... Compression of synthesis gas
C10J 2300/1625 .. with solids treatment
C10J 2300/1628 ... Ash post-treatment
C10J 2300/1631 .... Ash recycling
C10J 2300/1634 .... Ash vitrification
C10J 2300/1637 ... Char combustion
C10J 2300/164 .. with conversion of synthesis gas
C10J 2300/1643 ... Conversion of synthesis gas to energy
C10J 2300/1646 .... integrated with a fuel cell (gasification of solids in fuel cells H01M 8/0643)
C10J 2300/165 .... integrated with a gas turbine or gas motor (gas turbine plants provided with a gas producer F02C 3/28 ; engines using solid fuels F02B 43/08)
C10J 2300/1653 .... integrated in an gasification combined cycle (IGCC) (engines driven by heat coming from a gasification or pyrolysis unit F01K 23/067)
C10J 2300/1656 ... Conversion of synthesis gas to chemicals
C10J 2300/1659 .... to liquid hydrocarbons (Fischer-Tropsch process C10G 2/00)
C10J 2300/1662 .... to methane (SNG) (production of synthetic natural gas C10L 3/08)
C10J 2300/1665 .... to alcohols, e.g. methanol or ethanol (preparation of alcohols in general C07C 29/00)
C10J 2300/1668 .... to urea (preparation of urea C07C 273/00) ; to ammonia (preparation of ammonia C01C 1/0405)
C10J 2300/1671 .. with the production of electricity
C10J 2300/1675 ... making use of a steam turbine

C10J 2300/1678 .. with air separation (separating gases using rectification of air F25J 3/04521)
C10J 2300/1681 .. with biological plants, e.g. involving bacteria, algae, fungi
C10J 2300/1684 .. with electrolysis of water
C10J 2300/1687 .. with steam generation
C10J 2300/169 .. with water treatments (treatment of water in general or water purification C02F)
C10J 2300/1693 .. with storage facilities for intermediate, feed and/or product
C10J 2300/1696 .. with phase separation, e.g. after condensation

C10J 2300/18 . Details of the gasification process, e.g. loops, autothermal operation
C10J 2300/1807 .. Recycle loops, e.g. gas, solids, heating medium, water
C10J 2300/1815 ... for carbon dioxide
C10J 2300/1823 ... for synthesis gas
C10J 2300/183 .. Non-continuous or semi-continuous processes (cyclic processes in fixed bed gasification C10J 3/04)
C10J 2300/1838 .. Autothermal gasification by injection of oxygen or steam
C10J 2300/1846 .. Partial oxidation, i.e. injection of air or oxygen only
C10J 2300/1853 .. Steam reforming, i.e. injection of steam only
C10J 2300/1861 .. Heat exchange between at least two process streams
C10J 2300/1869 ... with one stream being air, oxygen or ozone
C10J 2300/1876 ... with one stream being combustion gas
C10J 2300/1884 ... with one stream being synthesis gas
C10J 2300/1892 ... with one stream being water/steam