

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 . Odourising 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