

**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**

**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

**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

**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 ( <a href="#">gas cleaning C10K 1/00</a> )
C10J 2300/1606	. . .	Combustion processes

- C10J 2300/1609 . . . Post-reduction, e.g. on a red-white-hot coke or coal bed
- C10J 2300/1612 . . . CO<sub>2</sub>-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