

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

- . 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

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 (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