

**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 . . . 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