

**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 ( [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

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