

**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

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| C10J 3/64           | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>with decomposition of the distillation products</li> </ul> </li> </ul>  |
| C10J 3/66           | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>by introducing them into the gasification zone</li> </ul> </li> </ul>   |
| C10J 3/72           | <ul style="list-style-type: none"> <li>Other features</li> </ul>   |
| C10J 3/721          | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Multistage gasification, e.g. plural parallel or serial gasification stages}</li> </ul> </li> </ul>  |
| C10J 3/723          | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Controlling or regulating the gasification process}</li> </ul> </li> </ul>   |
| C10J 3/725          | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Redox processes}</li> </ul> </li> </ul>  |
| C10J 3/726          | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Start-up}</li> </ul> </li> </ul>   |
| C10J 3/728          | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Shut down}</li> </ul> </li> </ul>  |
| C10J 3/74           | <ul style="list-style-type: none"> <li>Construction of shells or jackets</li> </ul>  |
| C10J 3/76           | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Water jackets; Steam boiler-jackets</li> </ul> </li> </ul>  |
| C10J 3/78           | <ul style="list-style-type: none"> <li>High-pressure apparatus</li> </ul>  |
| C10J 3/80           | <ul style="list-style-type: none"> <li>with arrangements for preheating the blast or the water vapour</li> </ul>   |
| C10J 3/82           | <ul style="list-style-type: none"> <li>Gas withdrawal means</li> </ul>   |
| C10J 3/84           | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>with means for removing dust or tar from the gas</li> </ul> </li> </ul>   |
| C10J 3/845          | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Quench rings}</li> </ul> </li> </ul> </li> </ul>   |
| C10J 3/86           | <ul style="list-style-type: none"> <li>combined with waste-heat boilers</li> </ul>   |
| <b>C10J 2200/00</b> | <b>Details of gasification apparatus</b>   |
| C10J 2200/06        | <ul style="list-style-type: none"> <li>Catalysts as integral part of gasifiers (<a href="#">catalysts added to the feed C10J 2300/0986</a>)</li> </ul>   |
| C10J 2200/09        | <ul style="list-style-type: none"> <li>Mechanical details of gasifiers not otherwise provided for, e.g. sealing means</li> </ul>   |
| C10J 2200/12        | <ul style="list-style-type: none"> <li>Electrodes present in the gasifier</li> </ul>   |
| C10J 2200/15        | <ul style="list-style-type: none"> <li>Details of feeding means</li> </ul>   |
| C10J 2200/152       | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Nozzles or lances for introducing gas, liquids or suspensions</li> </ul> </li> </ul>  |
| C10J 2200/154       | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Pushing devices, e.g. pistons</li> </ul> </li> </ul>  |
| C10J 2200/156       | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Sluices, e.g. mechanical sluices for preventing escape of gas through the feed inlet</li> </ul> </li> </ul>                                   |
| C10J 2200/158       | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Screws</li> </ul> </li> </ul>   |
| C10J 2200/31        | <ul style="list-style-type: none"> <li>Mobile gasifiers, e.g. for use in cars, ships or containers</li> </ul>  |
| C10J 2200/33        | <ul style="list-style-type: none"> <li>Laboratory scale gasifiers</li> </ul>   |
| C10J 2200/36        | <ul style="list-style-type: none"> <li>Moving parts inside the gasification reactor not otherwise provided for (<a href="#">devices for distributing fuel evenly over a fixed bed C10J 3/32</a>)</li> </ul>                  |
| C10J 2200/39        | <ul style="list-style-type: none"> <li>Gasifiers designed as centrifuge</li> </ul>   |
| <b>C10J 2300/00</b> | <b>Details of gasification processes</b>   |
| C10J 2300/06        | <ul style="list-style-type: none"> <li>Modeling or simulation of processes</li> </ul>  |
| C10J 2300/09        | <ul style="list-style-type: none"> <li>Details of the feed, e.g. feeding of spent catalyst, inert gas or halogens</li> </ul>   |
| C10J 2300/0903      | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Feed preparation</li> </ul> </li> </ul>   |
| C10J 2300/0906      | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Physical processes, e.g. shredding, comminuting, chopping, sorting</li> </ul> </li> </ul> </li> </ul> |
| C10J 2300/0909      | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Drying</li> </ul> </li> </ul> </li> </ul>   |
| C10J 2300/0913      | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Carbonaceous raw material</li> </ul> </li> </ul>  |
| C10J 2300/0916      | <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Biomass</li> </ul> </li> </ul> </li> </ul>  |

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| 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