

# CPC COOPERATIVE PATENT CLASSIFICATION

## C CHEMISTRY; METALLURGY (NOTES omitted)

### CHEMISTRY

#### C10 PETROLEUM, GAS OR COKE INDUSTRIES; TECHNICAL GASES CONTAINING CARBON MONOXIDE; FUELS; LUBRICANTS; PEAT

#### 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

##### WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

|             |   |       |   |
|-------------|---|-------|---|
| <b>1/00</b> | <b>Production of fuel gases by carburetting air or other gases without pyrolysis (<a href="#">for internal-combustion engines F02</a>)</b>                | 3/16  | . . . simultaneously reacting oxygen and water with the carbonaceous material   |
| 1/02        | . Carburetting air  | 3/18  | . . . using electricity   |
| 1/04        | . . Controlling supply of air   | 3/20  | . . Apparatus; Plants   |
| 1/06        | . . with materials which are liquid at ordinary temperatures  | 3/22  | . . . Arrangements or dispositions of valves or flues   |
| 1/08        | . . . by passage of air through or over the surface of the liquid   | 3/24  | . . . . to permit flow of gases or vapours other than upwardly through the fuel bed                                   |
| 1/10        | . . . . with the liquid absorbed on carriers  | 3/26  | . . . . . downwardly  |
| 1/12        | . . . by atomisation of the liquid  | 3/28  | . . . . fully automatic   |
| 1/14        | . . . Controlling the supply of liquid in accordance with the air supply  | 3/30  | . . . Fuel charging devices   |
| 1/16        | . . with solid hydrocarbons   | 3/32  | . . . Devices for distributing fuel evenly over the bed or for stirring up the fuel bed                               |
| 1/18        | . . in rotary carburettors  | 3/34  | . . . Grates; Mechanical ash-removing devices   |
| 1/20        | . Carburetting gases other than air   | 3/36  | . . . . Fixed grates  |
| 1/207       | . Carburetting by pyrolysis of solid carbonaceous material in a fuel bed ( <a href="#">C10J 3/66 takes precedence</a> )                                   | 3/38  | . . . . . with stirring beams   |
| 1/213       | . Carburetting by pyrolysis of solid carbonaceous material in a carburettor   | 3/40  | . . . . Movable grates  |
| 1/22        | . Adding materials to prevent vapour deposition   | 3/42  | . . . . . Rotary grates   |
| 1/24        | . Controlling humidity of the air or gas to be carburetted  | 3/44  | . . . adapted for use on vehicles   |
| 1/26        | . using raised temperatures or pressures  | 3/46  | . Gasification of granular or pulverulent flues in suspension   |
| 1/28        | . Odourising air gas  | 3/463 | . . { <a href="#">in stationary fluidised beds</a> }  |
| <b>3/00</b> | <b>Production of combustible gases containing carbon monoxide from solid carbonaceous fuels (<a href="#">destructive distillation processes C10B</a>)</b> | 3/466 | . . { <a href="#">Entrained flow processes</a> }  |
| 3/002       | . { <a href="#">Horizontal gasifiers, e.g. belt-type gasifiers</a> }  | 3/48  | . . Apparatus; Plants   |
| 3/005       | . { <a href="#">Rotary drum or kiln gasifiers</a> }   | 3/482 | . . . { <a href="#">Gasifiers with stationary fluidised bed</a> }   |
| 3/007       | . { <a href="#">Screw type gasifiers</a> }  | 3/485 | . . . { <a href="#">Entrained flow gasifiers</a> }  |
| 3/02        | . Fixed-bed gasification of lump fuel   | 3/487 | . . . . { <a href="#">Swirling or cyclonic gasifiers</a> }  |
| 3/04        | . . Cyclic processes, e.g. alternate blast and run  | 3/50  | . . . Fuel charging devices   |
| 3/06        | . . Continuous processes  | 3/503 | . . . . { <a href="#">for gasifiers with stationary fluidised bed</a> }   |
| 3/08        | . . . with ash-removal in liquid state  | 3/506 | . . . . { <a href="#">for entrained flow gasifiers</a> }  |
| 3/10        | . . . using external heating  | 3/52  | . . . Ash-removing devices  |
| 3/12        | . . . using solid heat-carriers   | 3/523 | . . . . { <a href="#">for gasifiers with stationary fluidised bed</a> }   |
| 3/14        | . . . using gaseous heat-carriers   | 3/526 | . . . . { <a href="#">for entrained flow gasifiers</a> }  |
|             |   | 3/54  | . . Gasification of granular or pulverulent fuels by the Winkler technique, i.e. by fluidisation                      |
|             |   | 3/56  | . . . Apparatus; Plants   |
|             |   | 3/57  | . Gasification using molten salts or metals ( <a href="#">C10J 3/02</a> , <a href="#">C10J 3/46 take precedence</a> ) |
|             |   | 3/58  | . combined with pre-distillation of the fuel  |
|             |   | 3/60  | . . Processes   |

|                |   |           |   |
|----------------|---|-----------|---|
| 3/62           | . . . with separate withdrawal of the distillation products   | 2300/094  | . . . Char  |
| 3/64           | . . . with decomposition of the distillation products   | 2300/0943 | . . . Coke  |
| 3/66           | . . . . by introducing them into the gasification zone  | 2300/0946 | . . . Waste, e.g. MSW, tires, glass, tar sand, peat, paper, lignite, oil shale  |
| 3/72           | . Other features  | 2300/095  | . . . Exhaust gas from an external process for purification   |
| 3/721          | . . {Multistage gasification, e.g. plural parallel or serial gasification stages}   | 2300/0953 | . . Gasifying agents  |
| 3/723          | . . {Controlling or regulating the gasification process}  | 2300/0956 | . . . Air or oxygen enriched air  |
| 3/725          | . . {Redox processes}   | 2300/0959 | . . . Oxygen  |
| 3/726          | . . {Start-up}  | 2300/0963 | . . . Ozone   |
| 3/728          | . . {Shut down}   | 2300/0966 | . . . Hydrogen  |
| 3/74           | . . Construction of shells or jackets   | 2300/0969 | . . . Carbon dioxide  |
| 3/76           | . . . Water jackets; Steam boiler-jackets   | 2300/0973 | . . . Water   |
| 3/78           | . . High-pressure apparatus   | 2300/0976 | . . . . as steam  |
| 3/80           | . . with arrangements for preheating the blast or the water vapour  | 2300/0979 | . . . . as supercritical steam  |
| 3/82           | . . Gas withdrawal means  | 2300/0983 | . . Additives   |
| 3/84           | . . . with means for removing dust or tar from the gas  | 2300/0986 | . . . Catalysts   |
| 3/845          | . . . . {Quench rings}  | 2300/0989 | . . . Hydrocarbons as additives to gasifying agents to improve caloric properties   |
| 3/86           | . . combined with waste-heat boilers  | 2300/0993 | . . . Inert particles, e.g. as heat exchange medium in a fluidized or moving bed, heat carriers, sand   |
| <b>2200/00</b> | <b>Details of gasification apparatus</b>  | 2300/0996 | . . . Calcium-containing inorganic materials, e.g. lime   |
| 2200/06        | . Catalysts as integral part of gasifiers ( <a href="#">catalysts added to the feed C10J 2300/0986</a> )  | 2300/12   | . Heating the gasifier  |
| 2200/09        | . Mechanical details of gasifiers not otherwise provided for, e.g. sealing means  | 2300/1207 | . . using pyrolysis gas as fuel   |
| 2200/12        | . Electrodes present in the gasifier  | 2300/1215 | . . using synthesis gas as fuel   |
| 2200/15        | . Details of feeding means  | 2300/1223 | . . by burners  |
| 2200/152       | . . Nozzles or lances for introducing gas, liquids or suspensions   | 2300/123  | . . by electromagnetic waves, e.g. microwaves   |
| 2200/154       | . . Pushing devices, e.g. pistons   | 2300/1238 | . . . by plasma   |
| 2200/156       | . . Sluices, e.g. mechanical sluices for preventing escape of gas through the feed inlet  | 2300/1246 | . . by external or indirect heating   |
| 2200/158       | . . Screws  | 2300/1253 | . . by injecting hot gas  |
| 2200/31        | . Mobile gasifiers, e.g. for use in cars, ships or containers   | 2300/1261 | . . by pulse burners  |
| 2200/33        | . Laboratory scale gasifiers  | 2300/1269 | . . by radiating device, e.g. radiant tubes   |
| 2200/36        | . 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> ) | 2300/1276 | . . . by electricity, e.g. resistor heating   |
| 2200/39        | . Gasifiers designed as centrifuge  | 2300/1284 | . . by renewable energy, e.g. solar energy, photovoltaic cells, wind  |
| <b>2300/00</b> | <b>Details of gasification processes</b>  | 2300/1292 | . . . mSolar energy   |
| 2300/06        | . Modeling or simulation of processes   | 2300/16   | . Integration of gasification processes with another plant or parts within the plant  |
| 2300/09        | . Details of the feed, e.g. feeding of spent catalyst, inert gas or halogens  | 2300/1603 | . . with gas treatment ( <a href="#">gas cleaning C10K 1/00</a> )   |
| 2300/0903      | . . Feed preparation  | 2300/1606 | . . . Combustion processes  |
| 2300/0906      | . . . Physical processes, e.g. shredding, comminuting, chopping, sorting  | 2300/1609 | . . . Post-reduction, e.g. on a red-white-hot coke or coal bed  |
| 2300/0909      | . . . Drying  | 2300/1612 | . . . CO <sub>2</sub> -separation and sequestration, i.e. long time storage   |
| 2300/0913      | . . Carbonaceous raw material   | 2300/1615 | . . . Stripping   |
| 2300/0916      | . . . Biomass   | 2300/1618 | . . . Modification of synthesis gas composition, e.g. to meet some criteria   |
| 2300/092       | . . . . Wood, cellulose   | 2300/1621 | . . . Compression of synthesis gas  |
| 2300/0923      | . . . . Sludge, e.g. from water treatment plant   | 2300/1625 | . . with solids treatment   |
| 2300/0926      | . . . Slurries comprising bio-oil or bio-coke, i.e. charcoal, obtained, e.g. by fast pyrolysis of biomass   | 2300/1628 | . . . Ash post-treatment  |
| 2300/093       | . . . Coal  | 2300/1631 | . . . . Ash recycling   |
| 2300/0933      | . . . . Coal fines for producing water gas  | 2300/1634 | . . . . Ash vitrification   |
| 2300/0936      | . . . . Coal fines for producing producer gas   | 2300/1637 | . . . Char combustion   |
|                |   | 2300/164  | . . with conversion of synthesis gas  |
|                |   | 2300/1643 | . . . Conversion of synthesis gas to energy   |
|                |   | 2300/1646 | . . . . integrated with a fuel cell ( <a href="#">gasification of solids in fuel cells H01M 8/0643</a> )  |
|                |   | 2300/165  | . . . . integrated with a gas turbine or gas motor ( <a href="#">gas turbine plants provided with a gas producer F02C 3/28</a> ; <a href="#">engines using solid fuels F02B 43/08</a> ) |

- 2300/1653 . . . . integrated in a gasification combined cycle  
[IGCC] ([engines driven by heat coming from  
a gasification or pyrolysis unit F01K 23/067](#))
- 2300/1656 . . . Conversion of synthesis gas to chemicals
- 2300/1659 . . . . to liquid hydrocarbons ([Fischer-Tropsch  
process C10G 2/00](#))
- 2300/1662 . . . . to methane (SNG) ([production of synthetic  
natural gas C10L 3/08](#))
- 2300/1665 . . . . to alcohols, e.g. methanol or ethanol  
([preparation of alcohols in general  
C07C 29/00](#))
- 2300/1668 . . . . to urea ([preparation of urea C07C 273/00](#));  
to ammonia ([preparation of ammonia  
C01C 1/0405](#))
- 2300/1671 . . with the production of electricity
- 2300/1675 . . . making use of a steam turbine
- 2300/1678 . . with air separation ([separating gases using  
rectification of air F25J 3/04521](#))
- 2300/1681 . . with biological plants, e.g. involving bacteria,  
algae, fungi
- 2300/1684 . . with electrolysis of water
- 2300/1687 . . with steam generation
- 2300/169 . . with water treatments ([treatment of water in  
general or water purification C02F](#))
- 2300/1693 . . with storage facilities for intermediate, feed and/  
or product
- 2300/1696 . . with phase separation, e.g. after condensation
- 2300/18 . . Details of the gasification process, e.g. loops,  
autothermal operation
- 2300/1807 . . Recycle loops, e.g. gas, solids, heating medium,  
water
- 2300/1815 . . . for carbon dioxide
- 2300/1823 . . . for synthesis gas
- 2300/183 . . Non-continuous or semi-continuous processes  
([cyclic processes in fixed bed gasification  
C10J 3/04](#))
- 2300/1838 . . Autothermal gasification by injection of oxygen  
or steam
- 2300/1846 . . Partial oxidation, i.e. injection of air or oxygen  
only
- 2300/1853 . . Steam reforming, i.e. injection of steam only
- 2300/1861 . . Heat exchange between at least two process  
streams
- 2300/1869 . . . with one stream being air, oxygen or ozone
- 2300/1876 . . . with one stream being combustion gas
- 2300/1884 . . . with one stream being synthesis gas
- 2300/1892 . . . with one stream being water/steam