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.

1/00 Production of fuel gases by carburetting air or other gases without pyrolysis (for internal-combustion engines F02)

1/02 . Carburetting air
1/04 . Controlling supply of air
1/06 . with materials which are liquid at ordinary temperatures
1/08 . by passage of air through or over the surface of the liquid
1/10 . with the liquid absorbed on carriers
1/12 . by atomisation of the liquid
1/14 . Controlling the supply of liquid in accordance with the air supply
1/16 . with solid hydrocarbons
1/18 . in rotary carburettors
1/20 . Carburetting gases other than air
1/207 . Carburetting by pyrolysis of solid carbonaceous material in a fuel bed (C10J 3/66 takes precedence)
1/213 . Carburetting by pyrolysis of solid carbonaceous material in a carburettor
1/22 . Adding materials to prevent vapour deposition
1/24 . Controlling humidity of the air or gas to be carburetted
1/26 . using raised temperatures or pressures
1/28 . Odorising air gas

3/00 Production of combustible gases containing carbon monoxide from solid carbonaceous fuels (destructive distillation processes C10B)

3/002 . (Horizontal gasifiers, e.g. belt-type gasifiers)
3/005 . (Rotary drum or kiln gasifiers)
3/007 . (Screw type gasifiers)
3/02 . Fixed-bed gasification of lump fuel
3/04 . Cyclic processes, e.g. alternate blast and run
3/06 . Continuous processes
3/08 . with ash-removal in liquid state
3/10 . using external heating
3/12 . using solid heat-carriers
3/14 . using gaseous heat-carriers

3/16 . . . simultaneously reacting oxygen and water with the carbonaceous material
3/18 . . . using electricity
3/20 . . . Apparatus; Plants
3/22 . . . Arrangements or dispositions of valves or flues
3/24 . . . to permit flow of gases or vapours other than upwardly through the fuel bed
3/26 . . . downwardly
3/28 . . . fully automatic
3/30 . . . Fuel charging devices
3/32 . . . Devices for distributing fuel evenly over the bed or for stirring up the fuel bed
3/34 . . . Grates; Mechanical ash-removing devices
3/36 . . . Fixed grates
3/38 . . . with stirring beams
3/40 . . . Movable grates
3/42 . . . Rotary grates
3/44 . . . adapted for use on vehicles
3/46 . Gasification of granular or pulverulent fuels in suspension

WARNING

C10J 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 (C10J 3/02, C10J 3/46 take precedence)
3/58 . . . combined with pre-distillation of the fuel
3/60 . . . Processes
3/62 . . . with separate withdrawal of the distillation products
3/64 . . . with decomposition of the distillation products
3/66 . . . . by introducing them into the gasification zone
3/72 . . . Other features
3/721 . . . [Multistage gasification, e.g. plural parallel or serial gasification stages]
3/723 . . . [Controlling or regulating the gasification process]
3/725 . . . [Redox processes]
3/726 . . . [Start-up]
3/728 . . . [Shut down]
3/74 . . . Construction of shells or jackets
3/76 . . . Water jackets; Steam boiler-jackets
3/78 . . . High-pressure apparatus
3/80 . . . with arrangements for preheating the blast or the vapour
3/82 . . . Gas withdrawal means
3/84 . . . with means for removing dust or tar from the gas
3/845 . . . [Quench rings]
3/86 . . . combined with waste-heat boilers

2200/00 Details of gasification apparatus
2200/06 . . . Catalysts as integral part of gasifiers (catalysts added to the feed C10J 2300/0986)
2200/09 . . . Mechanical details of gasifiers not otherwise provided for, e.g. sealing means
2200/12 . . . Electrodes present in the gasifier
2200/15 . . . Details of feeding means
2200/152 . . . Nozzles or lances for introducing gas, liquids or suspensions
2200/154 . . . Pushing devices, e.g. pistons
2200/156 . . . Sluices, e.g. mechanical sluices for preventing escape of gas through the feed inlet
2200/158 . . . Screws
2200/31 . . . Mobile gasifiers, e.g. for use in cars, ships or containers
2200/33 . . . Laboratory scale gasifiers
2200/36 . . . Moving parts inside the gasification reactor not otherwise provided for (devices for distributing fuel evenly over a fixed bed C10J 3/32)
2200/39 . . . Gasifiers designed as centrifuge

2300/00 Details of gasification processes
2300/06 . . . Modeling or simulation of processes
2300/09 . . . Details of the feed, e.g. feeding of spent catalyst, inert gas or halogens
2300/0903 . . . Feed preparation
2300/0906 . . . Physical processes, e.g. shredding, comminuting, chopping, sorting
2300/0909 . . . Drying
2300/0913 . . . Carbonaceous raw material
2300/0916 . . . Biomass
2300/092 . . . . Wood, cellulose
2300/0926 . . . . Slurries comprising bio-oil or bio-coke, i.e. charcoal, obtained, e.g. by fast pyrolysis of biomass
2300/093 . . . Coal
2300/0933 . . . Coal fines for producing water gas
2300/0936 . . . Coal fines for producing producer gas
2300/094 . . . Char
2300/0943 . . . Coke
2300/0946 . . . Waste, e.g. MSW, tires, glass, tar sand, peat, paper, lignite, oil shale
2300/095 . . . Exhaust gas from an external process for purification
2300/0953 . . . Gasifying agents
2300/0956 . . . Air or oxygen enriched air
2300/0959 . . . Oxygen
2300/0963 . . . Ozone
2300/0966 . . . Hydrogen
2300/0969 . . . Carbon dioxide
2300/0973 . . . Water
2300/0976 . . . . as steam
2300/0979 . . . . as supercritical steam
2300/0983 . . . Additives
2300/0986 . . . Catalysts
2300/0989 . . . Hydrocarbons as additives to gasifying agents to improve caloric properties
2300/0993 . . . Inert particles, e.g. as heat exchange medium in a fluidized or moving bed, heat carriers, sand
2300/0996 . . . Calcium-containing inorganic materials, e.g. lime
2300/12 . . . Heating the gasifier
2300/1207 . . . using pyrolysis gas as fuel
2300/1215 . . . using synthesis gas as fuel
2300/1223 . . . by burners
2300/123 . . . by electromagnetic waves, e.g. microwaves
2300/1238 . . . by plasma
2300/1246 . . . by external or indirect heating
2300/1253 . . . by injecting hot gas
2300/1261 . . . by pulse burners
2300/1269 . . . by radiating device, e.g. radiant tubes
2300/1276 . . . by electricity, e.g. resistor heating
2300/1284 . . . by renewable energy, e.g. solar energy, photovoltaic cells, wind
2300/1292 . . . mSolar energy
2300/16 . . . Integration of gasification processes with another plant or parts within the plant
2300/1603 . . . with gas treatment (gas cleaning C10K 1/00)
2300/1606 . . . Combustion processes
2300/1609 . . . Post-reduction, e.g. on a red-white-hot coke or coal bed
2300/1612 . . . CO$_2$-separation and sequestration, i.e. long time storage
2300/1615 . . . Stripping
2300/1618 . . . Modification of synthesis gas composition, e.g. to meet some criteria
2300/1621 . . . Compression of synthesis gas
2300/1625 . . . with solids treatment
2300/1628 . . . Ash post-treatment
2300/1631 . . . Ash recycling
2300/1634 . . . Ash vitrification
2300/1637 . . . Char combustion
2300/164 . . . . with conversion of synthesis gas

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Conversion of synthesis gas to energy
integrated with a fuel cell (gasification of solids in fuel cells H01M 8/0643)
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)
integrated in a gasification combined cycle [IGCC] (engines driven by heat coming from a gasification or pyrolysis unit F01K 23/067)
Conversion of synthesis gas to chemicals
to liquid hydrocarbons (Fischer-Tropsch process C10G 2/00)
to methane (SNG) (production of synthetic natural gas C10L 3/08)
to alcohols, e.g. methanol or ethanol (preparation of alcohols in general C07C 29/00)
to urea (preparation of urea C07C 273/00); to ammonia (preparation of ammonia C01C 1/0405)
with the production of electricity
making use of a steam turbine
with air separation (separating gases using rectification of air F25J 3/0452)
with biological plants, e.g. involving bacteria, algae, fungi
with electrolysis of water
with steam generation
with water treatments (treatment of water in general or water purification C02E)
with storage facilities for intermediate, feed and/or product
with phase separation, e.g. after condensation
Details of the gasification process, e.g. loops, autothermal operation
Recycle loops, e.g. gas, solids, heating medium, water
for carbon dioxide
for synthesis gas
Non-continuous or semi-continuous processes (cyclic processes in fixed bed gasification C10J 3/04)
Autothermal gasification by injection of oxygen or steam
Partial oxidation, i.e. injection of air or oxygen only
Steam reforming, i.e. injection of steam only
Heat exchange between at least two process streams
with one stream being air, oxygen or ozone
with one stream being combustion gas
with one stream being synthesis gas
with one stream being water/steam