CPC  COOPERATIVE PATENT CLASSIFICATION

F  MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

ENGINES OR PUMPS
F02  COMBUSTION ENGINES; HOT-GAS OR COMBUSTION-PRODUCT ENGINE PLANTS

F02C  GAS-TURBINE PLANTS; AIR INTAKES FOR JET-PROPULSION PLANTS; CONTROLLING FUEL SUPPLY IN AIR-BREATHING JET-PROPULSION PLANTS

( construction of turbines F01D; jet-propulsion plants F02K; construction of compressors or fans F04; gas-turbine combustion chambers F23R; using gas turbines in compression refrigeration plants F25B 11/00; using gas-turbine plants in vehicles, see the relevant vehicle classes)

NOTES
1. This subclass covers:
   • combustion product or hot gas turbine plants;
   • internal combustion turbines or turbine plants;
   • turbine plants in which the working fluid is an unheated, pressurised gas.
2. This subclass does not cover:
   • steam turbine plants, which are covered by subclass F01K;
   • special vapour plants, which are covered by subclass F01K.
3. In this subclass, the following expression is used with the meaning indicated:
   • “gas-turbine plants” covers all the subject matter of Note (1) above and covers also features of jet-propulsion plants common to gas-turbine plants.
4. Attention is drawn to the Notes preceding class F01.

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.

<table>
<thead>
<tr>
<th>1/00</th>
<th>Gas-turbine plants characterised by the use of hot gases or unheated pressurised gases, as the working fluid (by the use of combustion products F02C 3/00, F02C 5/00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/002</td>
<td>using an auxiliary fluid</td>
</tr>
<tr>
<td>1/005</td>
<td>[being recirculated]</td>
</tr>
<tr>
<td>1/007</td>
<td>combination of cycles</td>
</tr>
<tr>
<td>1/02</td>
<td>the working fluid being an unheated pressurised gas</td>
</tr>
<tr>
<td>1/04</td>
<td>the working fluid being heated indirectly (in a fluidised-bed combustor F02C 3/205)</td>
</tr>
<tr>
<td>1/05</td>
<td>characterised by the type or source of heat, e.g. using nuclear or solar energy</td>
</tr>
<tr>
<td>1/06</td>
<td>using reheated exhaust gas (F02C 1/08 takes precedence)</td>
</tr>
<tr>
<td>1/08</td>
<td>Semi-closed cycles</td>
</tr>
<tr>
<td>1/10</td>
<td>Closed cycles</td>
</tr>
<tr>
<td>1/105</td>
<td>[construction; details]</td>
</tr>
<tr>
<td>3/00</td>
<td>Gas-turbine plants characterised by the use of combustion products as the working fluid (generated by intermittent combustion F02C 5/00)</td>
</tr>
<tr>
<td>3/02</td>
<td>using exhaust-gas pressure in a pressure exchanger to compress combustion-air (pressure exchangers per se F04F 13/00)</td>
</tr>
</tbody>
</table>

| 3/04 | having a turbine driving a compressor (power transmission arrangements F02C 7/36; control of working fluid flow F02C 9/16) |
| 3/045 | having compressor and turbine passages in a single rotor-module (F02C 3/073 takes precedence) |
| 3/05 | the compressor and the turbine being of the radial flow type |
| 3/055 | the compressor being of the positive-displacement type |
| 3/06 | the compressor comprising only axial stages (F02C 3/10 takes precedence) |
| 3/062 | [the turbine being of the radial-flow type] |
| 3/064 | [the compressor having concentric stages] |
| 3/067 | having counter-rotating rotors (F02C 3/073 takes precedence) |
| 3/073 | the compressor and turbine stages being concentric |
| 3/08 | the compressor comprising at least one radial stage (F02C 3/10 takes precedence) |
| 3/085 | [the turbine being of the radial-flow type (radial-radial) (F02C 3/05 takes precedence)] |
| 3/09 | of the centripetal type |
| 3/10 | with another turbine driving an output shaft but not driving the compressor |
Gas-turbine plants being formed at least partly in the turbine rotor (or in another rotating part of the plant)

The combustion chamber being in the reverse flow-type

The vehicles being airscrew-driven

Turbochargers, i.e. plants for augmenting mechanical power output of internal-combustion piston engines by means of charge pressure

Gas-turbine plants having means for storing energy, e.g. for meeting peak loads

for storing compressed air

using the waste heat of gas-turbine plants outside the plants themselves, e.g. gas-turbine power heat plants (using waste heat as source of energy for refrigeration plants F25B 27/02; using the waste heat of a gas turbine for steam generation or in a steam cycle see F01K 23/10)

Gas-turbine plants having a common power output

Plural gas-turbine plants having a common power output

Plural gas-turbine plants providing heated or pressurised working fluid for other apparatus, e.g. without mechanical power output (F02C 6/18 takes precedence ; for a fluidised-bed combustor F02C 3/205))

providing compressed gas (F02C 6/10 takes precedence)

the gas being bled from the gas-turbine compressor

supplying working fluid to a user, e.g. a chemical process, which returns working fluid to a turbine of the plant

Turbochargers, i.e. plants for augmenting mechanical power output of internal-combustion piston engines by increase of charge pressure

Gas-turbine plants having means for storing energy, e.g. for meeting peak loads

for storing compressed air

using the waste heat of gas-turbine plants outside the plants themselves, e.g. gas-turbine power heat plants (using waste heat as source of energy for refrigeration plants F25B 27/02; using the waste heat of a gas turbine for steam generation or in a steam cycle see F01K 23/10)

Adaptations of gas-turbine plants for driving vehicles

the vehicles being waterborne vessels

the vehicles being airscrew driven

Features, components parts, details or accessories, not provided for in, or of interest apart from groups F02C 1/00 - F02C 6/00; Air intakes for jet-propulsion plants (controlling F02C 9/00)

Air intakes for gas-turbine plants or jet-propulsion plants

having variable geometry

having provisions for noise suppression
7/047 . . . Heating to prevent icing
7/05 . . . having provisions for obviating the penetration of damaging objects or particles
7/052 . . . with dust-separation devices
7/055 . . . with intake grids, screens or guards
7/057 . . . Control or regulation (conjointly with fuel supply control F02C 9/50; with nozzle area control F02K 1/16)
7/06 . . . Arrangements of bearings (bearings F16C); Lubricating ((of turbo machines F01D 25/18; of machines or) engines in general F01M)
7/08 . . . Heating air supply before combustion, e.g. by exhaust gases
7/10 . . . by means of regenerative heat-exchangers
7/105 . . . of the rotary type (rotary heat exchangers per se F02D)
7/12 . . . Cooling of plants (of component parts, see the relevant subclasses, e.g. F01D; cooling of engines in general F01P)
7/125 . . . (by partial arc admission of the working fluid or by intermittent admission of working and cooling fluid)
7/14 . . . of fluids in the plant (e.g. lubricant or fuel (F02C 7/185 takes precedence))
7/141 . . . of working fluid
7/143 . . . before or between the compressor stages
7/1435 . . . (by water injection)
7/16 . . . characterised by cooling medium
7/18 . . . the medium being gaseous, e.g. air (F02C 7/125 takes precedence)
7/185 . . . [Cooling means for reducing the temperature of the cooling air or gas]
7/20 . . . Mounting or supporting of plant; Accommodating heat expansion or creep
7/22 . . . Fuel supply systems
7/222 . . . [Fuel flow conduits, e.g. manifolds]
7/224 . . . Heating fuel before feeding to the burner
7/228 . . . Dividing fuel between various burners
7/232 . . . Fuel valves [(control of fuel supply by means of fuel metering valves F02C 9/263)]; Draining valves or systems (valves in general F16K)
7/236 . . . Fuel delivery systems comprising two or more pumps
7/2365 . . . [comprising an air supply system for the atomisation of fuel]
7/24 . . . Heat or noise insulation (air intakes having provisions for noise suppression F02C 7/045; turbine exhaust heads, chambers, or the like F01D 25/30; silencing nozzles of jet-propulsion plants F02K 1/00)
7/25 . . . Fire protection or prevention (in general A62)
7/26 . . . Starting; Ignition
7/262 . . . Restarting after flame-out
7/264 . . . Ignition
7/266 . . . Electric (sparking plugs H01T)
7/268 . . . Starting drives for the rotor [acting directly on the rotor of the gas turbine to be started]
7/27 . . . Fluid drives (turbine starters F02C 7/277)
7/272 . . . generated by cartridges
7/275 . . . Mechanical drives
7/277 . . . the starter being a [separate] turbine
7/28 . . . Arrangement of seals
7/30 . . . Preventing corrosion [or unwanted deposits] in gas-swept spaces
7/32 . . . Arrangement, mounting, or driving, of auxiliaries
7/36 . . . Power transmission arrangements between the different shafts of the gas turbine plant, or between the gas-turbine plant and the power user ((F02C 3/107 - F02C 3/13 and) F02C 7/32 take precedence; couplings for transmitting rotation F16D; gearing in general F16H)
9/00 Controlling gas-turbine plants; Controlling fuel supply in air-breathing jet-propulsion plants (controlling air intakes F02C 7/057; controlling turbines F01D; controlling compressors F04D 27/00; controlling in general G05)
9/16 . . . Control of working fluid flow (F02C 9/48 takes precedence; control of air-intake flow F02C 7/057)
9/18 . . . by bleeding, bypassing or acting on variable working fluid interconnections between turbines or compressors or their stages {([F02C 3/113 takes precedence])}
9/20 . . . by throttling; by adjusting vanes
9/22 . . . by adjusting turbine vanes
9/24 . . . Control of the pressure level in closed cycles
9/26 . . . Control of fuel supply (F02C 9/48 takes precedence; fuel valves F02C 7/232)
9/263 . . . [by means of fuel metering valves]
9/266 . . . [specially adapted for gas turbines with intermittent fuel injection]
9/28 . . . Regulating systems responsive to plant or ambient parameters, e.g. temperature, pressure, rotor speed (F02C 9/30 - F02C 9/38, F02C 9/44 take precedence)
9/285 . . . [Mechanical command devices linked to the throttle lever]
9/30 . . . characterised by variable fuel pump output
9/32 . . . characterised by throttling of fuel (F02C 9/38 takes precedence)
9/34 . . . Joint control of separate flows to main and auxiliary burners
9/36 . . . characterised by returning of fuel to sump (F02C 9/38 takes precedence)
9/38 . . . characterised by throttling and returning of fuel to sump
9/40 . . . specially adapted to the use of a special fuel or a plurality of fuels
9/42 . . . specially adapted for the control of two or more plants simultaneously
9/44 . . . responsive to the speed of aircraft, e.g. Mach number control, optimisation of fuel consumption
9/46 . . . Emergency fuel control
9/48 . . . Control of fuel supply conjointly with another control of the plant (with nozzle section control F02K 1/17)
9/50 . . . with control of working fluid flow
9/52 . . . by bleeding or by-passing the working fluid
9/54 . . . by throttling the working fluid, by adjusting vanes
9/56 . . . with power transmission control
9/58 . . . with control of a variable-pitch propeller