SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

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

F02K **JET-PROPULSION PLANTS** (arrangement or mounting of jet-propulsion plants in land vehicles or vehicles in general B60K; arrangement or mounting of jet-propulsion plants in waterborne vessels B63H; controlling aircraft attitude, flight direction, or altitude by jet reaction B64C; arrangement or mounting of jet-propulsion plants in aircraft B64D; plants characterised by the power of the working fluid being divided between jet propulsion and another form of propulsion, e.g. propeller, F02B, F02C; features of jet-propulsion plants common to gas-turbine plants, air intakes or fuel supply control of air-breathing jet-propulsion plants F02C)

Note(s)

1. In this subclass, the following expression is used with the meaning indicated:
   - "jet-propulsion plants" means plants using combustion to produce a fluid stream from which a propulsive thrust on the plants is obtained on the reaction principle.
2. Attention is drawn to the Notes preceding class F01.

Subclass index

PLANTS CHARACTERISED BY JET PIPE OR NOZZLE.....1/00, 9/80
PLANTS WITH COMPRESSOR OR FAN.....3/00, 5/00
PLANTS WITHOUT COMPRESSOR OR FAN.....7/00
ROCKET-ENGINE PLANTS.....9/00
CONTROL.....1/15, 1/76, 7/00, 9/00
OTHER PLANTS.....99/00

1/00 **Plants characterised by the form or arrangement of the jet pipe or nozzle; Jet pipes or nozzles peculiar thereto** (rocket nozzles F02K 9/97) **[1, 2006.01]**

1/04 • Mounting of an exhaust cone in the jet pipe **[1, 2006.01]**

1/06 • Varying effective area of jet pipe or nozzle (F02K 1/30 takes precedence) **[1, 3, 2006.01]**

1/08 • • by axially moving or transversely deforming an internal member, e.g. the exhaust cone **[1, 2006.01]**

1/09 • • by axially moving an external member, e.g. a shroud (F02K 1/12 takes precedence) **[3, 2006.01]**

1/10 • • by distorting the jet pipe or nozzle **[1, 2006.01]**

1/11 • • by means of pivoted eyelids **[3, 2006.01]**

1/12 • • by means of pivoted flaps **[1, 2006.01]**

1/15 • • Control or regulation **[3, 2006.01]**

1/16 • • • conjointly with another control **[1, 3, 2006.01]**

1/17 • • • • with control of fuel supply **[3, 2006.01]**

1/18 • • • automatic **[1, 3, 2006.01]**

1/28 • using fluid jets to influence the jet flow **[3, 2006.01]**

1/30 • • for varying effective area of jet pipe or nozzle **[3, 2006.01]**

1/32 • • for reversing thrust **[3, 2006.01]**

1/34 • • for attenuating noise **[3, 2006.01]**

1/36 • having an ejector **[3, 2006.01]**

1/38 • Introducing air inside the jet (F02K 1/28 takes precedence) **[3, 2006.01]**

1/40 • Nozzles having means for dividing the jet into a plurality of partial jets or having an elongated cross-section outlet **[3, 2006.01]**

1/42 • • the means being movable into an inoperative position **[3, 2006.01]**

1/44 • Nozzles having means, e.g. a shield, reducing sound radiation in a specified direction (F02K 1/40 takes precedence) **[3, 2006.01]**

1/46 • Nozzles having means for adding air to the jet or for augmenting the mixing region between the jet and the ambient air, e.g. for silencing (F02K 1/28, F02K 1/36, F02K 1/38 take precedence) **[3, 2006.01]**

1/48 • • Corrugated nozzles **[3, 2006.01]**

1/50 • • Deflecting outwardly a portion of the jet by retractable scoop-like baffles **[3, 2006.01]**

1/52 • Nozzles specially constructed for positioning adjacent to another nozzle or to a fixed member, e.g. fairing **[3, 2006.01]**

1/54 • Nozzles having means for reversing jet thrust (F02K 1/32 takes precedence) **[3, 2006.01]**

1/56 • • Reversing jet main flow **[3, 2006.01]**

1/58 • • • Reversers mounted on the inner cone or the nozzle housing **[3, 2006.01]**

1/60 • • • by blocking the rearward discharge by means of pivoted eyelids or clamshells, e.g. target-type reversers **[3, 2006.01]**

1/62 • • • by blocking the rearward discharge by means of flaps **[3, 2006.01]**

1/64 • • Reversing fan flow **[3, 2006.01]**

1/66 • • • using reversing fan blades **[3, 2006.01]**

1/68 • • • Reversers mounted on the engine housing downstream of the fan exhaust section **[3, 2006.01]**

1/70 • • • using thrust reverser flaps or doors mounted on the fan housing **[3, 2006.01]**
1/72 • • • • the aft end of the fan housing being movable to uncover openings in the fan housing for the reversed flow **[3, 2006.01]**
1/74 • • Reversing at least one flow in relation to at least one other flow in a plural-flow engine **[3, 2006.01]**
1/76 • • Control or regulation of thrust reversers **[3, 2006.01]**
1/78 • Other construction of jet pipes **[3, 2006.01]**
1/80 • • Couplings or connections **[3, 2006.01]**
1/82 • • Jet pipe walls, e.g. liners **[3, 2006.01]**

3/00 Plants including a gas turbine driving a compressor or a ducted fan [1, 2006.01]
3/02 • in which part of the working fluid by-passes the turbine and combustion chamber **[1, 2006.01]**
3/04 • • the plant including ducted fans, i.e. fans with high volume, low-pressure outputs, for augmenting jet thrust, e.g. of double-flow type **[1, 2006.01]**
3/06 • • • with front fan **[1, 2006.01]**
3/062 • • • with aft fan **[3, 2006.01]**
3/065 • • • with front and aft fans **[3, 2006.01]**
3/068 • • • being characterised by a short axial length relative to diameter **[3, 2006.01]**
3/072 • • • with counter-rotating rotors **[3, 2006.01]**
3/075 • • • controlling flow ratio between flows **[3, 2006.01]**
3/077 • • • the plant being of the multiple flow type, i.e. having three or more flows **[3, 2006.01]**
3/08 • with supplementary heating of the working fluid (after-burners, combustion chambers F23R); Control thereof (control of fuel supply therefor F02C 9/26) **[1, 3, 2006.01]**
3/10 • • by after-burners (F02K 3/105 takes precedence) **[1, 3, 2006.01]**
3/105 • • Heating the by-pass flow **[3, 2006.01]**
3/11 • • • by means of burners or combustion chambers **[3, 2006.01]**
3/115 • • • by means of indirect heat exchange **[3, 2006.01]**
3/12 • characterised by having more than one gas turbine **[1, 2006.01]**

5/00 Plants including an engine, other than a gas turbine, driving a compressor or a ducted fan [1, 2006.01]
5/02 • the engine being of the reciprocating-piston type **[1, 2006.01]**

7/00 Plants in which the working-fluid is used in a jet only, i.e. the plants not having a turbine or other engine driving a compressor or a ducted fan; Control thereof (rocket-engine plants F02K 9/00) **[1, 2006.01]**
7/02 • the jet being intermittent, i.e. pulse jet **[1, 2006.01]**
7/04 • • with resonant combustion chambers **[1, 2006.01]**
7/06 • • with combustion chambers having valves **[1, 2006.01]**
7/067 • • • having aerodynamic valves **[3, 2006.01]**
7/075 • • with multiple pulse-jet engines **[3, 2006.01]**
7/08 • the jet being continuous **[1, 2006.01]**
7/10 • characterised by having ram-action compression, i.e. aero-thermo-dynamic-ducts or ram-jet engines **[1, 2006.01]**
7/12 • • Injection-induction jet engines **[3, 2006.01]**
7/14 • • with external combustion, e.g. scram-jet engines **[3, 2006.01]**
7/16 • • Composite ram-jet/turbo-jet engines **[3, 2006.01]**
7/18 • • Composite ram-jet/rocket engines **[3, 2006.01]**
7/20 • • Composite ram-jet/pulse-jet engines **[3, 2006.01]**

9/00 Rocket-engine plants, i.e. plants carrying both fuel and oxidant therefor; Control thereof (chemical composition of propellants C06B, C06D) **[1, 3, 2006.01]**
9/08 • using solid propellants (F02K 9/72 takes precedence; using semi-solid or pulverulent propellants F02K 9/70) **[3, 2006.01]**
9/10 • • Shape or structure of solid propellant charges **[3, 2006.01]**
9/12 • • • made of two or more portions burning at different rates **[3, 2006.01]**
9/14 • • • made from sheet-like materials, e.g. of carpet-roll type, of layered structure **[3, 2006.01]**
9/16 • • • of honeycomb structure **[3, 2006.01]**
9/18 • • • of the internal-burning type having a star or like shaped internal cavity **[3, 2006.01]**
9/20 • • • of the external-burning type **[3, 2006.01]**
9/22 • • • of the front-burning type **[3, 2006.01]**
9/24 • • Charging rocket engines with solid propellants; Methods or apparatus specially adapted for working solid propellant charges **[3, 2006.01]**
9/26 • • Burning control **[3, 2006.01]**
9/28 • • having two or more propellant charges with the propulsion gases exhausting through a common nozzle **[3, 2006.01]**
9/30 • • with the propulsion gases exhausting through a plurality of nozzles **[3, 2006.01]**
9/32 • • Constructional parts; Details (shape or structure of solid propellant charges F02K 9/10; starting or ignition means or arrangements F02K 9/95; rocket nozzles F02K 9/97) **[3, 2006.01]**
9/34 • • • Casings; Combustion chambers; Liners thereof **[3, 2006.01]**
9/36 • • • Propellant charge supports **[3, 2006.01]**
9/38 • • • Safety devices, e.g. to prevent accidental ignition **[3, 2006.01]**
9/40 • • • Cooling arrangements **[3, 2006.01]**
9/42 • using liquid or gaseous propellants (F02K 9/72 takes precedence) **[3, 2006.01]**
9/44 • • Feeding propellants **[3, 2006.01]**
9/46 • • • using pumps (pumps per se F04) **[3, 2006.01]**
9/48 • • • • driven by a gas turbine fed by propellant combustion gases **[3, 2006.01]**
9/50 • • • using pressurised fluid to pressurize the propellants **[3, 2006.01]**
9/52 • • • Injectors (in general B05B) **[3, 2006.01]**
9/54 • • • Leakage detectors; Purging systems; Filtration systems (filters per se B01D) **[3, 2006.01]**
9/56 • • • Control **[3, 2006.01]**
9/58 • • • • Propellant feed valves (valves in general F16K) **[3, 2006.01]**
9/60 • • Constructional parts; Details (starting or ignition means or arrangements F02K 9/95; rocket nozzles F02K 9/97) **[3, 2006.01]**
9/62 • • • Combustion or thrust chambers **[3, 2006.01]**
9/64 • • • • having cooling arrangements **[3, 2006.01]**
9/66 • • • • of the rotary type **[3, 2006.01]**
9/68 • • • Decomposition chambers **[3, 2006.01]**
9/70 • using semi-solid or pulverulent propellants **[3, 2006.01]**
9/72 • using liquid and solid propellants, i.e. hybrid rocket-engine plants **[3, 2006.01]**
9/74 • combined with another jet-propulsion plant **[3, 2006.01]**

9/76 • • with another rocket-engine plant; Multistage rocket-engine plants **[3, 2006.01]**

9/78 • • with an air-breathing jet-propulsion plant (with a ram-jet engine F02K 7/18) **[3, 2006.01]**

9/80 • characterised by thrust or thrust vector control (F02K 9/26, F02K 9/56, F02K 9/94 take precedence) **[3, 2006.01]**

9/82 • • by injection of a secondary fluid into the rocket exhaust gases **[3, 2006.01]**

9/84 • • using movable nozzles **[3, 2006.01]**

9/86 • • using nozzle throats of adjustable cross-section **[3, 2006.01]**

9/88 • • using auxiliary rocket nozzles **[3, 2006.01]**

9/90 • • using deflectors (F02K 9/82 takes precedence) **[3, 2006.01]**

9/92 • • incorporating means for reversing or terminating thrust **[3, 2006.01]**

9/94 • Re-ignitable or restartable rocket-engine plants; Intermittently operated rocket-engine plants **[3, 2006.01]**

9/95 • characterised by starting or ignition means or arrangements (safety devices F02K 9/38) **[3, 2006.01]**

9/96 • characterised by specially adapted arrangements for testing or measuring **[3, 2006.01]**

9/97 • Rocket nozzles (thrust or thrust vector control F02K 9/80) **[3, 2006.01]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]