CPC COOPERATIVE PATENT CLASSIFICATION

F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING
(NOTE omitted)

ENGINES OR PUMPS

F01 MACHINES OR ENGINES IN GENERAL; ENGINE PLANTS IN GENERAL; STEAM ENGINES

F01K STEAM ENGINE PLANTS; STEAM ACCUMULATORS; ENGINE PLANTS NOT OTHERWISE PROVIDED FOR; ENGINES USING SPECIAL WORKING FLUIDS OR CYCLES (gas-turbine or jet-propulsion plants F02; nuclear power plants, engine arrangements therein G21D)

NOTE

Attention is drawn to the notes preceding class F01, especially as regards the definitions of "steam" and "special vapour".

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 **Steam accumulators** (use of accumulators in steam engine plants F01K 3/00)
1/02 . for storing steam otherwise than in a liquid
1/04 . for storing steam in a liquid, e.g. Ruth's type (in alkali to increase steam pressure F22B 1/20)
1/06 . . Internal fittings facilitating steam distribution, steam formation, or circulation (acting during charging or discharging F01K 1/08; fittings facilitating circulation through multiple accumulators F01K 1/14)
1/08 . Charging or discharging of accumulators with steam (peculiar to multiple accumulators F01K 1/12)
1/10 . specially adapted for superheated steam
1/12 . Multiple accumulators; Charging, discharging or control specially adapted therefor
1/14 . . Circulation
1/16 . Other safety or control means
1/18 . . for steam pressure
1/20 . Other steam-accumulator parts, details, or accessories

Steam engine plants

3/00 **Plants characterised by the use of steam or heat accumulators, or intermediate steam heaters, therein** (regenerating exhaust steam F01K 19/00)
3/002 . {Steam conversion}
3/004 . {Accumulation in the liquid branch of the circuit}
3/006 . {Accumulators and steam compressors}
3/008 . {Use of steam accumulators of the Ruth type for storing steam in water; Regulating thereof (Ruth accumulators per se F01K 1/04)}
3/02 . Use of accumulators and specific engine types; Control thereof
3/04 . . the engine being of multiple-inlet-pressure type
3/06 . the engine being of extraction or non-condensing type {(F01K 3/004 takes precedence)}
3/08 . Use of accumulators and the plant being specially adapted for a specific use
3/10 . . for vehicle drive, e.g. for accumulator locomotives
3/12 . having two or more accumulators
3/14 . having both steam accumulator and heater, e.g. superheating accumulator (steam superheaters per se F22G)
3/16 . . Mutual arrangement of accumulator and heater
3/18 . having heaters (having both steam accumulator and heater F01K 3/14; steam heaters per se F22)
3/181 . . {using nuclear heat (F01K 3/26 takes precedence)}
3/183 . . . {one heater being a fired superheater}
3/185 . . {using waste heat from outside the plant (F02G 5/00 takes precedence)}
3/186 . . {using electric heat}
3/188 . . {using heat from a specified chemical reaction}
3/20 . . with heating by combustion gases of main boiler
3/205 . . . {more than one circuit being heated by one boiler}
3/22 . . . Controlling, e.g. starting, stopping (F01K 7/00, F01K 13/02 take precedence)
3/24 . . with heating by separately-fired heaters
3/242 . . . {delivering steam to a common mains}
3/245 . . . {delivering steam at different pressure levels (F01K 3/247 takes precedence)}
3/247 . . . {one heater being an incinerator}
3/26 . . with heating by steam
3/262 . . . {by means of heat exchangers}
3/265 . . . . {using live steam for superheating or reheating}
3/267 . . . {by mixing with steam, e.g. LOFFLER-boiler}

5/00 **Plants characterised by use of means for storing steam in an alkali to increase steam pressure, e.g. of Honigmann or Koenemann type**

5/02 . used in regenerative installation

7/00 Steam engine plants characterised by the use of specific types of engine (F01K 3/02 takes precedence)**; Plants or engines characterised by their use of special steam systems, cycles or processes** (reciprocating-piston engines using uniflow principle F01B 17/04)**; Control means specially adapted for such systems, cycles or processes; Use of withdrawn or exhaust steam for feed-water heating**

7/02 . the engines being of multiple-expansion type (the engines being only of turbine type F01K 7/16; the engines using steam of critical or overcritical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)

7/025 . . {Consecutive expansion in a turbine or a positive displacement engine}

7/04 . . Control means specially adapted therefor

7/06 . the engines being of multiple-inlet-pressure type (F01K 7/02 takes precedence; the engines being only of turbine type F01K 7/16; the engines using steam of critical or over-critical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)

7/08 . . Control means specially adapted therefor

7/10 . characterised by the engine exhaust pressure (the engines being only of turbine type F01K 7/16; the engines using steam of critical or over-critical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)

7/12 . . of condensing type

7/14 . . . Control means specially adapted therefor

7/16 . the engines being only of turbine type (the engines using steam of critical or overcritical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)

7/165 . . {Controlling means specially adapted therefor}

7/18 . . the turbine being of multiple-inlet-pressure type

7/20 . . . Control means specially adapted therefor

7/22 . . the turbines having inter-stage steam heating

7/223 . . . {Inter-stage moisture separation}

7/226 . . . {Inter-stage steam injection}

7/24 . . . Control or safety means specially adapted therefor

7/26 . . the turbines having inter-stage steam accumulation

7/28 . . . Control means specially adapted therefor

7/30 . . the turbines using exhaust steam only

7/32 . the engines using steam of critical or overcritical pressure

7/34 . the engines being of extraction or non-condensing type; Use of steam for feed-water heating (feed-water heaters in general F22D)

7/345 . . {Control or safety-means particular thereto}

7/36 . . the engines being of positive-displacement type

7/38 . . the engines being of turbine type

7/40 . . Use of two or more feed-water heaters in series

7/42 . . Use of desuperheaters for feed-water heating

7/44 . . Use of steam for feed-water heating and another purpose

9/00 Plants characterised by condensers arranged or modified to co-operate with the engines (by condensers structurally combined with engines F01K 11/00; steam condensers per se F28B)(F01K 23/04 takes precedence)

9/003 . {condenser cooling circuits}

9/006 . {Vacuum-breakers}

9/02 . Arrangements or modifications of condensate or air pumps

9/023 . . {Control thereof}

9/026 . . {Returning condensate by capillarity}

9/04 . with dump valves to by-pass stages

11/00 Plants characterised by the engines being structurally combined with boilers or condensers

11/02 . the engines being turbines

11/04 . the boilers or condensers being rotated in use

13/00 General layout or general methods of operation of complete plants

13/003 . {Arrangements for measuring or testing (in general G01)}

13/006 . {Auxiliaries or details not otherwise provided for}

13/02 . Controlling, e.g. stopping or starting

13/025 . . {Cooling the interior by injection during idling or stand-by}

15/00 Adaptations of plants for special use {(F01K 7/02 takes precedence)**}**

15/02 . for driving vehicles, e.g. locomotives

15/025 . . {the vehicle being a steam locomotive}

15/04 . . the vehicles being waterborne vessels

15/045 . . . {Control thereof (F01K 3/22, F01K 7/00, F01K 13/02 take precedence)}

17/00 Using steam or condensate extracted or exhausted from steam engine plant (for heating feed-water F01K 7/34; returning condensate to boiler F22D {F01K 7/36 takes precedence})

17/005 . {by means of a heat pump (heat pumps systems per se F25B)}

17/02 . for heating purposes, e.g. industrial, domestic (F01K 17/06 takes precedence; domestic- or space-heating systems, e.g. central-heating systems, in general F24D 1/00, F24D 3/00, F24D 9/00)

17/025 . . {in combination with at least one gas turbine, e.g. a combustion gas turbine}

17/04 . for specific purposes other than heating (F01K 17/06 takes precedence)

17/06 . Returning energy of steam, in exchanged form, to process, e.g. use of exhaust steam for drying solid fuel or plant

19/00 Regenerating or otherwise treating steam exhausted from steam engine plant ({F01K 3/006 takes precedence} plants characterised by use of means for storing steam in an alkali to increase steam pressure F01K 5/00; returning condensate to boiler F22D)

19/02 . Regenerating by compression

19/04 . . in combination with cooling or heating

19/06 . . in engine cylinder

19/08 . . compression done by injection apparatus, jet blower, or the like

19/10 . Cooling exhaust steam other than by condenser; Rendering exhaust steam invisible

21/00 Steam engine plants not otherwise provided for

21/005 . {using mixtures of liquid and steam or evaporation of a liquid by expansion}

21/02 . with steam-generation in engine-cylinders

21/04 . using mixtures of steam and gas; Plants generating or heating steam by bringing water or steam into direct contact with hot gas ({F01K 25/005, F02B 47/02 take precedence; injecting water or steam into a as gas turbine plant F02C 3/305}; direct-contact steam generators in general F22B)

21/042 . . {pure steam being expanded in a motor somewhere in the plant (F01K 21/045 takes precedence)}

21/045 . . {Introducing gas and steam separately into the motor, e.g. admission to a single rotor through separate nozzles}

21/047 . . {having at least one combustion gas turbine}

21/06 . Treating live steam, other than thermodynamically, e.g. for fighting deposits in engine

23/00 Plants characterised by more than one engine delivering power external to the plant, the engines being driven by different fluids

23/02 . the engine cycles being thermally coupled

23/04 . . condensation heat from one cycle heating the fluid in another cycle

23/06 . . combustion heat from one cycle heating the fluid in another cycle

23/061 . . . {with combustion in a fluidised bed (plants with a fluidised-bed combustor comprising only gas-turbines F02C 3/205; fluidised-bed apparatus per se B01J 8/18; fluidised-bed combustors F23C 10/00; fluidised-bed steam-boilers F22B 31/0007)}

23/062 . . . . {the combustion bed being pressurised (pressurised fluid bed combustion per se F23C 10/16)}

23/064 . . . {in combination with an industrial process, e.g. chemical, metallurgical}

23/065 . . . {the combustion taking place in an internal combustion piston engine, e.g. a diesel engine}

23/067 . . . {the combustion heat coming from a gasification or pyrolysis process, e.g. coal gasification (gas turbines with fuel gasifiers F02C 3/28)}

23/068 . . . . {in combination with an oxygen producing plant, e.g. an air separation plant}

23/08 . . . with working fluid of one cycle heating the fluid in another cycle

23/10 . . . with exhaust fluid of one cycle heating the fluid in another cycle (F01K 17/025 takes precedence)

23/101 . . . . {Regulating means specially adapted therefor (F01K 23/105, F01K 23/108 take precedence)}

23/103 . . . . {with afterburner in exhaust boiler}

23/105 . . . . . {Regulating means specially adapted therefor}

23/106 . . . . {with water evaporated or preheated at different pressures in exhaust boiler}

23/108 . . . . . {Regulating means specially adapted therefor}

23/12 . the engines being mechanically coupled (F01K 23/02 takes precedence)

23/14 . . including at least one combustion engine

23/16 . . all the engines being turbines (F01K 23/14 takes precedence)

23/18 . characterised by adaptation for specific use

25/00 Plants or engines characterised by use of special working fluids, not otherwise provided for; Plants operating in closed cycles and not otherwise provided for

25/005 . {the working fluid being steam, created by combustion of hydrogen with oxygen}

25/02 . the fluid remaining in the liquid phase

25/04 . the fluid being in different phases, e.g. foamed

25/06 . using mixtures of different fluids (plants using mixtures of steam and gas F01K 21/04)

25/065 . . {with an absorption fluid remaining at least partly in the liquid state, e.g. water for ammonia (F01K 5/00 takes precedence)}

25/08 . using special vapours

25/085 . . {the vapour being sulfur}

25/10 . . the vapours being cold, e.g. ammonia, carbon dioxide, ether

25/103 . . . {Carbon dioxide (F01K 25/065 takes precedence)}

25/106 . . . {Ammonia (F01K 25/065 takes precedence)}

25/12 . . the vapours being metallic, e.g. mercury

25/14 . . using industrial or other waste gases

27/00 Plants for converting heat or fluid energy into mechanical energy, not otherwise provided for

27/005 . {by means of hydraulic motors}

27/02 . Plants modified to use their waste heat, other than that of exhaust, e.g. engine-friction heat