

CPC**COOPERATIVE PATENT CLASSIFICATION****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".

F01K 1/00

Steam accumulators (use of accumulators in steam engine plants [F01K 3/00](#))

F01K 1/02

- for storing steam otherwise than in a liquid

F01K 1/04

- for storing steam in a liquid, e.g. Ruth's type (in alkali to increase steam pressure [F22B 1/20](#))

F01K 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](#))

F01K 1/08

- Charging or discharging of accumulators with steam (peculiar to multiple accumulators [F01K 1/12](#))

F01K 1/10

- specially adapted for superheated steam

F01K 1/12

- Multiple accumulators; Charging, discharging or regulating peculiar thereto

F01K 1/14

- Circulation

F01K 1/16

- Other safety or regulating means

F01K 1/18

- for steam pressure

F01K 1/20

- Other steam-accumulator parts, details, or accessories

Steam engine plants**F01K 3/00**

Plants characterised by the use of steam or heat accumulators, or intermediate steam heaters, therein (regenerating exhaust steam [F01K 19/00](#))

F01K 3/002

- {Steam conversion}

F01K 3/004

- {Accumulation in the liquid branch of the circuit}

F01K 3/006

- {Accumulators and steam compressors}

F01K 3/008

- {Use of steam accumulators of the Ruth type for storing steam in water; Regulating thereof (Ruth accumulators per se [F01K 1/04](#))}

F01K 3/02

- Use of accumulators and specific engine types; Regulating thereof

F01K 3/04

- the engine being of multiple-inlet-pressure type

F01K 3/06

- the engine being of extraction or non-condensing type {([F01K 3/004](#) takes precedence)}

F01K 3/08

- Use of accumulators and the plant being specially adapted for a specific use

F01K 3/10

- for vehicle drive, e.g. for accumulator locomotives

F01K 3/12

- having two or more accumulators

- F01K 3/14
 - having both steam accumulator and heater, e.g. superheating accumulator (steam superheaters per se F22G)
- F01K 3/16
 - • Mutual arrangement of accumulator and heater
- F01K 3/18
 - having heaters (having both steam accumulator and heater F01K 3/14; steam heaters per se F22)
- F01K 3/181
 - • {using nuclear heat (F01K 3/26 takes precedence)}
- F01K 3/183
 - • • {one heater being a fired superheater}
- F01K 3/185
 - • {using waste heat from outside the plant (F02G 5/00 takes precedence)}
- F01K 3/186
 - • {using electric heat}
- F01K 3/188
 - • {using heat from a specified chemical reaction}
- F01K 3/20
 - • with heating by combustion gases of main boiler
- F01K 3/205
 - • • {more than one circuit being heated by one boiler}
- F01K 3/22
 - • • Controlling, e.g. starting, stopping (F01K 7/00, F01K 13/02 take precedence)
- F01K 3/24
 - • with heating by separately-fired heaters
- F01K 3/242
 - • • {delivering steam to a common mains}
- F01K 3/245
 - • • {delivering steam at different pressure levels (F01K 3/247 takes precedence)}
- F01K 3/247
 - • • {one heater being an incinerator}
- F01K 3/26
 - • with heating by steam
- F01K 3/262
 - • • {by means of heat exchangers}
- F01K 3/265
 - • • • {using live steam for superheating or reheating}
- F01K 3/267
 - • • {by mixing with steam e.g. LOFFLER-boiler}
- F01K 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
- F01K 5/02
 - used in regenerative installation
- F01K 7/00**

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); Regulating means peculiar to such systems, cycles, or processes; Use of withdrawn or exhaust steam for feed-water heating
- F01K 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 supercritical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)
- F01K 7/025
 - • {Consecutive expansion in a turbine or a positive displacement engine}
- F01K 7/04
 - • Regulating means peculiar thereto
- F01K 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 supercritical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)
- F01K 7/08
 - • Regulating means peculiar thereto

- F01K 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](#))
- F01K 7/12
 - . of condensing type
- F01K 7/14
 - . . . Regulating means peculiar thereto
- F01K 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](#))
- F01K 7/165
 - . . {Regulating means specially adapted therefor}
- F01K 7/18
 - . . the turbine being of multiple-inlet-pressure type
- F01K 7/20
 - . . . Regulating means peculiar thereto
- F01K 7/22
 - . . the turbines having inter-stage steam heating
- F01K 7/223
 - . . . {Inter-stage moisture separation}
- F01K 7/226
 - . . . {Inter-stage steam injection}
- F01K 7/24
 - . . . Regulating or safety means peculiar thereto
- F01K 7/26
 - . . the turbines having inter-stage steam accumulation
- F01K 7/28
 - . . . Regulating means peculiar thereto
- F01K 7/30
 - . . the turbines using exhaust steam only
- F01K 7/32
 - the engines using steam of critical or overcritical pressure
- F01K 7/34
 - the engines being of extraction or non-condensing type; Use of steam for feed-water heating (feed-water heaters in general [F22D](#))
- F01K 7/345
 - . . {Control or safety-means particular thereto}
- F01K 7/36
 - . . the engines being of positive-displacement type
- F01K 7/38
 - . . the engines being of turbine type
- F01K 7/40
 - . . Use of two or more feed-water heaters in series
- F01K 7/42
 - . . Use of desuperheaters for feed-water heating
- F01K 7/44
 - . . Use of steam for feed-water heating and another purpose
- F01K 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)
- F01K 9/003
 - {condenser cooling circuits}
- F01K 9/006
 - {Vacuum-breakers}
- F01K 9/02
 - Arrangements or modifications of condensate or air pumps
- F01K 9/023
 - . . {Control thereof}
- F01K 9/026
 - . . {Returning condensate by capillarity}
- F01K 9/04
 - with dump valves to by-pass stages
- F01K 11/00**

Plants characterised by the engines being structurally combined with boilers or condensers
- F01K 11/02
 - the engines being turbines
- F01K 11/04
 - the boilers or condensers being rotated in use

F01K 13/00	General lay-out or general methods of operation of complete plants
F01K 13/003	<ul style="list-style-type: none"> • {Arrangements for measuring or testing (in general G01)}
F01K 13/006	<ul style="list-style-type: none"> • {Auxiliaries or details not otherwise provided for}
F01K 13/02	<ul style="list-style-type: none"> • Regulating, e.g. stopping or starting
F01K 13/025	<ul style="list-style-type: none"> • • {Cooling the interior by injection during idling or stand-by}
F01K 15/00	Adaptations of plants for special use {(F01K 7/02 takes precedence)}
F01K 15/02	<ul style="list-style-type: none"> • for driving vehicles, e.g. locomotives (arrangements in vehicles, see the relevant vehicle classes)
F01K 15/025	<ul style="list-style-type: none"> • • {the vehicle being a steam locomotive}
F01K 15/04	<ul style="list-style-type: none"> • • the vehicles being waterborne vessels
F01K 15/045	<ul style="list-style-type: none"> • • • {Control thereof (F01K 3/22, F01K 7/00, F01K 13/02 take precedence)}
F01K 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})
F01K 17/005	<ul style="list-style-type: none"> • {by means of a heat pump (heat pumps systems per se F25B)}
F01K 17/02	<ul style="list-style-type: none"> • 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)
F01K 17/025	<ul style="list-style-type: none"> • • {in combination with at least one gas turbine, e.g. a combustion gas turbine}
F01K 17/04	<ul style="list-style-type: none"> • for specific purposes other than heating (F01K 17/06 takes precedence)
F01K 17/06	<ul style="list-style-type: none"> • Returning energy of steam, in exchanged form, to process, e.g. use of exhaust steam for drying solid fuel or plant
F01K 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)
F01K 19/02	<ul style="list-style-type: none"> • Regenerating by compression
F01K 19/04	<ul style="list-style-type: none"> • • in combination with cooling or heating
F01K 19/06	<ul style="list-style-type: none"> • • in engine cylinder
F01K 19/08	<ul style="list-style-type: none"> • • compression done by injection apparatus, jet blower, or the like
F01K 19/10	<ul style="list-style-type: none"> • Cooling exhaust steam other than by condenser; Rendering exhaust steam invisible
F01K 21/00	Steam engine plants not otherwise provided for
F01K 21/005	<ul style="list-style-type: none"> • {using mixtures of liquid and steam or evaporation of a liquid by expansion}
F01K 21/02	<ul style="list-style-type: none"> • with steam-generation in engine-cylinders
F01K 21/04	<ul style="list-style-type: none"> • 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)
F01K 21/042	<ul style="list-style-type: none"> • • {pure steam being expanded in a motor somewhere in the plant (F01K 21/045 takes precedence)}

- F01K 21/045 . . {Introducing gas and steam separately into the motor, e.g. admission to a single rotor through separate nozzles}
- F01K 21/047 . . {having at least one combustion gas turbine}
- F01K 21/06 . Treating live steam, other than thermo-dynamically, e.g. for fighting deposits in engine

- F01K 23/00** **Plants characterised by more than one engine delivering power external to the plant, the engines being driven by different fluids**
- F01K 23/02 . the engine cycles being thermally coupled
- F01K 23/04 . . condensation heat from one cycle heating the fluid in another cycle
- F01K 23/06 . . combustion heat from one cycle heating the fluid in another cycle
- F01K 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](#))}
- F01K 23/062 {the combustion bed being pressurised (pressurised fluid bed combustion per se [F23C 10/16](#))}
- F01K 23/064 . . . {in combination with an industrial process e.g. chemical, metallurgical (particularly adapted for a specific process see the relevant classes)}
- F01K 23/065 . . . {the combustion taking place in an internal combustion piston engine, e.g. a diesel engine}
- F01K 23/067 . . . {the combustion heat coming from a gasification or pyrolysis process, e.g. coal gasification (gas turbines with fuel gasifiers [F02C 3/28](#))}
- F01K 23/068 {in combination with an oxygen producing plant, e.g. an air separation plant}
- F01K 23/08 . . . with working fluid of one cycle heating the fluid in another cycle
- F01K 23/10 . . . with exhaust fluid of one cycle heating the fluid in another cycle ([F01K 17/025](#) takes precedence)
- F01K 23/101 {Regulating means specially adapted therefor ([F01K 23/105](#), [F01K 23/108](#) take precedence)}
- F01K 23/103 {with afterburner in exhaust boiler}
- F01K 23/105 {Regulating means specially adapted therefor}
- F01K 23/106 {with water evaporated or preheated at different pressures in exhaust boiler}
- F01K 23/108 {Regulating means specially adapted therefor}
- F01K 23/12 . the engines being mechanically coupled ([F01K 23/02](#) takes precedence)
- F01K 23/14 . . including at least one combustion engine
- F01K 23/16 . . all the engines being turbines ([F01K 23/14](#) takes precedence)
- F01K 23/18 . characterised by adaptation for specific use

- F01K 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**
- F01K 25/005 . {the working fluid being steam, created by combustion of hydrogen with oxygen}
- F01K 25/02 . the fluid remaining in the liquid phase

- F01K 25/04
 - the fluid being in different phase, e.g. foamed
- F01K 25/06
 - using mixtures of different fluids (plants using mixtures of steam and gas [F01K 21/04](#))
- F01K 25/065
 - . {with an absorption fluid remaining at least partly in the liquid state, e.g. water for ammonia ([F01K 5/00](#) takes precedence)}
- F01K 25/08
 - using special vapours
- F01K 25/085
 - . {the vapour being sulfur}
- F01K 25/10
 - . the vapours being cold, e.g. ammonia, carbon dioxide, ether
- F01K 25/103
 - . . {Carbon dioxide ([F01K 25/065](#) takes precedence)}
- F01K 25/106
 - . . {Ammonia ([F01K 25/065](#) takes precedence)}
- F01K 25/12
 - . the vapours being metallic, e.g. mercury
- F01K 25/14
 - . using industrial or other waste gases
- F01K 27/00**
 - Plants for converting heat or fluid energy into mechanical energy, not otherwise provided for**
- F01K 27/005
 - {by means of hydraulic motors}
- F01K 27/02
 - Plants modified to use their waste heat, other than that of exhaust, e.g. engine-friction heat