

ECLA EUROPEAN 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".

- F01K1/00 Steam accumulators (use of accumulators in steam engine plants [F01K3/00](#))**
- F01K1/02 . for storing steam otherwise than in a liquid
 - F01K1/04 . for storing steam in a liquid, e.g. Ruth's type (in alkali to increase steam pressure [F22B1/20](#))
 - F01K1/06 . . Internal fittings facilitating steam distribution, steam formation, or circulation (acting during charging or discharging [F01K1/08](#); fittings facilitating circulation through multiple accumulators [F01K1/14](#))
 - F01K1/08 . Charging or discharging of accumulators with steam (peculiar to multiple accumulators [F01K1/12](#))
 - F01K1/10 . specially adapted for superheated steam
 - F01K1/12 . Multiple accumulators; Charging, discharging or regulating peculiar thereto
 - F01K1/14 . . Circulation
 - F01K1/16 . Other safety or regulating means
 - F01K1/18 . . for steam pressure
 - F01K1/20 . Other steam-accumulator parts, details, or accessories

Guide heading: Steam engine plants

- F01K3/00 Plants characterised by the use of steam or heat accumulators, or intermediate steam heaters, therein (regenerating exhaust steam [F01K19/00](#))**
- F01K3/00B . [N: Steam conversion]
 - F01K3/00C . [N: Accumulation in the liquid branch of the circuit]
 - F01K3/00D . [N: Accumulators and steam compressors]
 - F01K3/00E . [N: Use of steam accumulators of the Ruth type for storing steam in water; Regulating thereof (Ruth accumulators per se [F01K1/04](#))]

- F01K3/02 . Use of accumulators and specific engine types; Regulating thereof
- F01K3/04 . . the engine being of multiple-inlet-pressure type
- F01K3/06 . the engine being of extraction or non-condensing type [N: ([F01K3/00C](#) takes precedence)]
- F01K3/08 . Use of accumulators and the plant being specially adapted for a specific use
- F01K3/10 . . for vehicle drive, e.g. for accumulator locomotives
- F01K3/12 . having two or more accumulators
- F01K3/14 . having both steam accumulator and heater, e.g. superheating accumulator ([steam superheaters per se F22G](#))
- F01K3/16 . . Mutual arrangement of accumulator and heater
- F01K3/18 . having heaters ([having both steam accumulator and heater F01K3/14](#); [steam heaters per se F22](#))
- F01K3/18B . . [N: using nuclear heat ([F01K3/26](#) takes precedence)]
- F01K3/18B2 . . . [N: one heater being a fired superheater]
- F01K3/18C . . [N: using waste heat from outside the plant ([F02G5/00](#) takes precedence)]
- F01K3/18D . . [N: using electric heat]
- F01K3/18F . . [N: using heat from a specified chemical reaction]
- F01K3/20 . . with heating by combustion gases of main boiler
- F01K3/20B . . . [N: more than one circuit being heated by one boiler]
- F01K3/22 . . . Controlling, e.g. starting, stopping ([F01K7/00](#), [F01K13/02](#) take precedence)
- F01K3/24 . . with heating by separately-fired heaters
- F01K3/24B . . . [N: delivering steam to a common mains]
- F01K3/24C . . . [N: delivering steam at different pressure levels ([F01K3/24D](#) takes precedence)]
- F01K3/24D . . . [N: one heater being an incinerator]
- F01K3/26 . . with heating by steam
- F01K3/26B . . . [N: by means of heat exchangers]
- F01K3/26B2 [N: using live steam for superheating or reheating]
- F01K3/26C . . . [N: by mixing with steam e.g. LOFFLER-boiler]

- F01K5/00** **Plants characterised by use of means for storing steam in an alkali to increase steam pressure, e.g. of Honigmann or Koenemann type**
- F01K5/02 . used in regenerative installation

- F01K7/00** **Plants characterised by the use of specific types of engine ([F01K3/02](#) takes precedence); Plants or engines characterised by their use of special steam systems, cycles, or processes ([reciprocating piston engines using uniflow principle F01B17/04](#)); Regulating means peculiar to such systems, cycles, or processes; Use of withdrawn or exhaust steam for feed-water heating**
- F01K7/02 . the engines being of multiple-expansion type ([the engines being only of turbine type F01K7/16](#); [the engines using steam of critical or overcritical pressure F01K7/32](#); the

- engines being of extraction or non-condensing type [F01K7/34](#))
- F01K7/02B . . [N: Consecutive expansion in a turbine or a positive displacement engine]
- F01K7/04 . . Regulating means peculiar thereto
- F01K7/06 . the engines being of multiple-inlet-pressure type ([F01K7/02](#) takes precedence; the engines being only of turbine type [F01K7/16](#); the engines using steam of critical or over-critical pressure [F01K7/32](#); the engines being of extraction or non-condensing type [F01K7/34](#))
- F01K7/08 . . Regulating means peculiar thereto
- F01K7/10 . characterised by the engine exhaust pressure (the engines being only of turbine type [F01K7/16](#); the engines using steam of critical or over-critical pressure [F01K7/32](#); the engines being of extraction or non-condensing type [F01K7/34](#))
- F01K7/12 . . of condensing type
- F01K7/14 . . . Regulating means peculiar thereto
- F01K7/16 . the engines being only of turbine type (the engines using steam of critical or overcritical pressure [F01K7/32](#); the engines being of extraction or non-condensing type [F01K7/34](#))
- F01K7/16B . . [N: Regulating means specially adapted therefor]
- F01K7/18 . . the turbine being of multiple-inlet-pressure type
- F01K7/20 . . . Regulating means peculiar thereto
- F01K7/22 . . the turbines having inter-stage steam heating
- F01K7/22B . . . [N: Inter-stage moisture separation]
- F01K7/22C . . . [N: Inter-stage steam injection]
- F01K7/24 . . . Regulating or safety means peculiar thereto
- F01K7/26 . . the turbines having inter-stage steam accumulation
- F01K7/28 . . . Regulating means peculiar thereto
- F01K7/30 . . the turbines using exhaust steam only
- F01K7/32 . the engines using steam of critical or overcritical pressure
- F01K7/34 . the engines being of extraction or non-condensing type; Use of steam for feed-water heating ([feed-water heaters in general F22D](#))
- F01K7/34B . . [N: Control or safety-means particular thereto]
- F01K7/36 . . the engines being of positive-displacement type
- F01K7/38 . . the engines being of turbine type
- F01K7/40 . . Use of two or more feed-water heaters in series
- F01K7/42 . . Use of desuperheaters for feed-water heating
- F01K7/44 . . Use of steam for feed-water heating and another purpose
- F01K9/00** **Plants characterised by condensers arranged or modified to co-operate with the engines (by condensers structurally combined with engines [F01K11/00](#); steam condensers per se [F28B](#)) ([F01K23/04](#) takes precedence)**
- F01K9/00B . [N: condenser cooling circuits]
- F01K9/00C . [N: Vacuum-breakers]

- F01K9/02 . Arrangements or modifications of condensate or air pumps
- F01K9/02B . . [N: Control thereof]
- F01K9/02C . . [N: Returning condensate by capillarity]
- F01K9/04 . with dump valves to by-pass stages

- F01K11/00** **Plants characterised by the engines being structurally combined with boilers or condensers**
- F01K11/02 . the engines being turbines
- F01K11/04 . the boilers or condensers being rotated in use

- F01K13/00** **General lay-out or general methods of operation of complete plants**
- F01K13/00B . [N: Arrangements for measuring or testing (in general [G01](#))]
- F01K13/00C . [N: Auxiliaries or details not otherwise provided for]
- F01K13/02 . Regulating, e.g. stopping or starting
- F01K13/02B . . [N: Cooling the interior by injection during idling or stand-by]

- F01K15/00** **Adaptations of plants for special use [N: [F01K7/02](#) takes precedence]**
- F01K15/02 . for driving vehicles, e.g. locomotives (arrangements in vehicles, see the relevant vehicle classes)
- F01K15/02B . . [N: the vehicle being a steam locomotive]
- F01K15/04 . . the vehicles being waterborne vessels
- F01K15/04B . . . [N: Control thereof ([F01K3/22](#), [F01K7/00](#), [F01K13/02](#) take precedence)]

- F01K17/00** **Using steam or condensate extracted or exhausted from steam engine plant (for heating feed-water [F01K7/34](#); returning condensate to boiler [F22D](#)) [N: [F01K7/36](#) takes precedence]**
- F01K17/00B . [N: by means of a heat pump (heat pumps systems per se [F25B](#))]
- F01K17/02 . for heating purposes, e.g. industrial, domestic ([F01K17/06](#) takes precedence; domestic- or space-heating systems, e.g. central-heating systems, in general [F24D1/00](#), [F24D3/00](#), [F24D9/00](#))
- F01K17/02B . . [N: in combination with at least one gas turbine, e.g. a combustion gas turbine] [N9801]
- F01K17/04 . for specific purposes other than heating ([F01K17/06](#) takes precedence)
- F01K17/06 . Returning energy of steam, in exchanged form, to process, e.g. use of exhaust steam for drying solid fuel or plant

- F01K19/00** **Regenerating or otherwise treating steam exhausted from steam engine plant**

nts characterised by use of means for storing steam in an alkali to increase steam pressure [F01K5/00](#); returning condensate to boiler [F22D](#)) [N: [F01K3/00D](#) takes precedence]

- F01K19/02 . Regenerating by compression
- F01K19/04 . . in combination with cooling or heating
- F01K19/06 . . in engine cylinder
- F01K19/08 . . compression done by injection apparatus, jet blower, or the like
- F01K19/10 . Cooling exhaust steam other than by condenser; Rendering exhaust steam invisible

F01K21/00 Steam engine plants not otherwise provided for

- F01K21/00B . [N: using mixtures of liquid and steam or evaporation of a liquid by expansion]
- F01K21/02 . with steam-generation in engine-cylinders
- F01K21/04 . using mixtures of steam and gas; Plants generating or heating steam by bringing water or steam into direct contact with hot gas ([N: [F01K25/00B](#), [F02B47/02](#) take precedence; injecting water or steam into a gas turbine plant [F02C3/30B](#)]; direct-contact steam generators in general [F22B](#)) [C9604]
- F01K21/04B . . [N: pure steam being expanded in a motor somewhere in the plant ([F01K21/04C](#) takes precedence)]
- F01K21/04C . . [N: Introducing gas and steam separately into the motor, e.g. admission to a single rotor through separate nozzles]
- F01K21/04E . . [N: having at least one combustion gas turbine] [N9604]
- F01K21/06 . Treating live steam, other than thermo-dynamically, e.g. for fighting deposits in engine

F01K23/00 Plants characterised by more than one engine delivering power external to the plant, the engines being driven by different fluids

- F01K23/02 . the engine cycles being thermally coupled
- F01K23/04 . . condensation heat from one cycle heating the fluid in another cycle
- F01K23/06 . . combustion heat from one cycle heating the fluid in another cycle
- F01K23/06B . . . [N: with combustion in a fluidised bed (plants with a fluidised-bed combustor comprising only gas-turbines [F02C3/20F](#); fluidised-bed apparatus per se [B01J8/18](#); fluidised-bed combustors [F23C10/00](#); fluidised-bed steam-boilers [F22B31/00B](#))]
- F01K23/06B2 [N: the combustion bed being pressurised (pressurised fluid bed combustion per se [F23C10/16](#))]
- F01K23/06C . . . [N: in combination with an industrial process e.g. chemical, metallurgical (particularly adapted for a specific process see the relevant classes)]
- F01K23/06D . . . [N: the combustion taking place in an internal combustion piston engine, e.g. a diesel engine] [N9603]
- F01K23/06G . . . [N: the combustion heat coming from a gasification or pyrolysis process, e.g. coal gasification (gas turbines with fuel gasifiers [F02C3/28](#))] [C0010]
- F01K23/06G2 [N: in combination with an oxygen producing plant, e.g. an air separation

- plant]
- F01K23/08 . . . with working fluid of one cycle heating the fluid in another cycle
 - F01K23/10 . . . with exhaust fluid of one cycle heating the fluid in another cycle ([F01K17/02B](#) takes precedence) [C9801]
 - F01K23/10B [N: Regulating means specially adapted therefor ([F01K23/10F2](#), [F01K23/10P2](#) take precedence)] [C0003]
 - F01K23/10F [N: with afterburner in exhaust boiler] [N0003]
 - F01K23/10F2 [N: Regulating means specially adapted therefor] [N0003]
 - F01K23/10P [N: with water evaporated or preheated at different pressures in exhaust boiler]
 - F01K23/10P2 [N: Regulating means specially adapted therefor]

 - F01K23/12 . the engines being mechanically coupled ([F01K23/02](#) takes precedence)
 - F01K23/14 . . including at least one combustion engine
 - F01K23/16 . . all the engines being turbines ([F01K23/14](#) takes precedence)

 - F01K23/18 . characterised by adaptation for specific use

 - F01K25/00** **Plants or engines characterised by use of special working fluids, not otherwise provided for; Plants operating in closed cycles and not otherwise provided for**

 - F01K25/00B . [N: the working fluid being steam, created by combustion of hydrogen with oxygen]
 - F01K25/02 . the fluid remaining in the liquid phase
 - F01K25/04 . the fluid being in different phase, e.g. foamed
 - F01K25/06 . using mixtures of different fluids (plants using mixtures of steam and gas [F01K21/04](#))
 - F01K25/06B . . [N: with an absorption fluid remaining at least partly in the liquid state, e.g. water for ammonia ([F01K5/00](#) takes precedence)]
 - F01K25/08 . using special vapours
 - F01K25/08B . . [N: the vapour being sulfur]
 - F01K25/10 . . the vapours being cold, e.g. ammonia, carbon dioxide, ether
 - F01K25/10B . . . [N: Carbon dioxide ([F01K25/06B](#) takes precedence)]
 - F01K25/10C . . . [N: Ammonia ([F01K25/06B](#) takes precedence)]
 - F01K25/12 . . the vapours being metallic, e.g. mercury
 - F01K25/14 . . using industrial or other waste gases

 - F01K27/00** **Plants for converting heat or fluid energy into mechanical energy, not otherwise provided for**

 - F01K27/00B . [N: by means of hydraulic motors]

 - F01K27/02 . Plants modified to use their waste heat, other than that of exhaust, e.g. engine-friction heat