

# 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.

<b>1/00</b>	<b>Steam accumulators (use of accumulators in steam engine plants <a href="#">F01K 3/00</a>)</b>	<b>3/08</b>	Use of accumulators and the plant being specially adapted for a specific use
1/02	for storing steam otherwise than in a liquid	3/10	for vehicle drive, e.g. for accumulator locomotives
1/04	for storing steam in a liquid, e.g. Ruth's type (in alkali to increase steam pressure <a href="#">F22B 1/20</a> )	3/12	having two or more accumulators
1/06	Internal fittings facilitating steam distribution, steam formation, or circulation (acting during charging or discharging <a href="#">F01K 1/08</a> ; fittings facilitating circulation through multiple accumulators <a href="#">F01K 1/14</a> )	3/14	having both steam accumulator and heater, e.g. superheating accumulator (steam superheaters <a href="#">per se</a> <a href="#">F22G</a> )
1/08	Charging or discharging of accumulators with steam (peculiar to multiple accumulators <a href="#">F01K 1/12</a> )	3/16	Mutual arrangement of accumulator and heater
1/10	specially adapted for superheated steam	3/18	having heaters (having both steam accumulator and heater <a href="#">F01K 3/14</a> ; steam heaters <a href="#">per se</a> <a href="#">F22</a> )
1/12	Multiple accumulators; Charging, discharging or control specially adapted therefor	3/181	{using nuclear heat ( <a href="#">F01K 3/26</a> takes precedence)}
1/14	Circulation	3/183	{one heater being a fired superheater}
1/16	Other safety or control means	3/185	{using waste heat from outside the plant ( <a href="#">F02G 5/00</a> takes precedence)}
1/18	for steam pressure	3/186	{using electric heat}
1/20	Other steam-accumulator parts, details, or accessories	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 ( <a href="#">F01K 7/00</a> , <a href="#">F01K 13/02</a> 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 ( <a href="#">F01K 3/247</a> 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}
		<b>5/00</b>	<b>Plants characterised by use of means for storing steam in an alkali to increase steam pressure, e.g. of Honigmann or Koenemann type</b>
<b>3/00</b>	<b>Plants characterised by the use of steam or heat accumulators, or intermediate steam heaters, therein (regenerating exhaust steam <a href="#">F01K 19/00</a>)</b>		
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 <a href="#">per se</a> <a href="#">F01K 1/04</a> )}		
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 ( <a href="#">F01K 3/004</a> takes precedence)		

5/02	• used in regenerative installation	9/00	<b>Plants characterised by condensers arranged or modified to co-operate with the engines</b> (by condensers structurally combined with engines <a href="#">F01K 11/00</a> ; steam condensers <a href="#">per se</a> <a href="#">F28B</a> )( <a href="#">F01K 23/04</a> takes precedence)
7/00	<b>Steam engine plants characterised by the use of specific types of engine</b> ( <a href="#">F01K 3/02</a> takes precedence); <b>Plants or engines characterised by their use of special steam systems, cycles or processes</b> (reciprocating-piston engines using uniflow principle <a href="#">F01B 17/04</a> ); <b>Control means specially adapted for such systems, cycles or processes; Use of withdrawn or exhaust steam for feed-water heating</b>	9/003	• {condenser cooling circuits}
7/02	• the engines being of multiple-expansion type (the engines being only of turbine type <a href="#">F01K 7/16</a> ; the engines using steam of critical or supercritical pressure <a href="#">F01K 7/32</a> ; the engines being of extraction or non-condensing type <a href="#">F01K 7/34</a> )	9/006	• {Vacuum-breakers}
7/025	• • {Consecutive expansion in a turbine or a positive displacement engine}	9/02	• Arrangements or modifications of condensate or air pumps
7/04	• • Control means specially adapted therefor	9/023	• • {Control thereof}
7/06	• the engines being of multiple-inlet-pressure type ( <a href="#">F01K 7/02</a> takes precedence; the engines being only of turbine type <a href="#">F01K 7/16</a> ; the engines using steam of critical or over-critical pressure <a href="#">F01K 7/32</a> ; the engines being of extraction or non-condensing type <a href="#">F01K 7/34</a> )	9/026	• • {Returning condensate by capillarity}
7/08	• • Control means specially adapted therefor	9/04	• with dump valves to by-pass stages
7/10	• characterised by the engine exhaust pressure (the engines being only of turbine type <a href="#">F01K 7/16</a> ; the engines using steam of critical or over-critical pressure <a href="#">F01K 7/32</a> ; the engines being of extraction or non-condensing type <a href="#">F01K 7/34</a> )	11/00	<b>Plants characterised by the engines being structurally combined with boilers or condensers</b>
7/12	• • of condensing type	11/02	• the engines being turbines
7/14	• • • Control means specially adapted therefor	11/04	• the boilers or condensers being rotated in use
7/16	• the engines being only of turbine type (the engines using steam of critical or supercritical pressure <a href="#">F01K 7/32</a> ; the engines being of extraction or non-condensing type <a href="#">F01K 7/34</a> )	13/00	<b>General layout or general methods of operation of complete plants</b>
7/165	• • {Controlling means specially adapted therefor}	13/003	• {Arrangements for measuring or testing (in general <a href="#">G01</a> )}
7/18	• • the turbine being of multiple-inlet-pressure type	13/006	• {Auxiliaries or details not otherwise provided for}
7/20	• • • Control means specially adapted therefor	13/02	• Controlling, e.g. stopping or starting
7/22	• • the turbines having inter-stage steam heating	13/025	• • {Cooling the interior by injection during idling or stand-by}
7/223	• • • {Inter-stage moisture separation}	15/00	<b>Adaptations of plants for special use</b> ( <a href="#">F01K 7/02</a> takes precedence)
7/226	• • • {Inter-stage steam injection}	15/02	• for driving vehicles, e.g. locomotives (arrangements in vehicles, see the relevant vehicle classes)
7/24	• • • Control or safety means specially adapted therefor	15/025	• • {the vehicle being a steam locomotive}
7/26	• • the turbines having inter-stage steam accumulation	15/04	• • the vehicles being waterborne vessels
7/28	• • • Control means specially adapted therefor	15/045	• • • {Control thereof ( <a href="#">F01K 3/22</a> , <a href="#">F01K 7/00</a> , <a href="#">F01K 13/02</a> take precedence)}
7/30	• • the turbines using exhaust steam only	17/00	<b>Using steam or condensate extracted or exhausted from steam engine plant</b> (for heating feed-water <a href="#">F01K 7/34</a> ; returning condensate to boiler <a href="#">F22D</a> ( <a href="#">F01K 7/36</a> takes precedence))
7/32	• the engines using steam of critical or supercritical pressure	17/005	• {by means of a heat pump (heat pumps systems <a href="#">per se</a> <a href="#">F25B</a> )}
7/34	• the engines being of extraction or non-condensing type; Use of steam for feed-water heating (feed-water heaters in general <a href="#">F22D</a> )	17/02	• for heating purposes, e.g. industrial, domestic ( <a href="#">F01K 17/06</a> takes precedence; domestic- or space-heating systems, e.g. central-heating systems, in general <a href="#">F24D 1/00</a> , <a href="#">F24D 3/00</a> , <a href="#">F24D 9/00</a> )
7/345	• • {Control or safety-means particular thereto}	17/025	• • {in combination with at least one gas turbine, e.g. a combustion gas turbine}
7/36	• • the engines being of positive-displacement type	17/04	• for specific purposes other than heating ( <a href="#">F01K 17/06</a> takes precedence)
7/38	• • the engines being of turbine type	17/06	• Returning energy of steam, in exchanged form, to process, e.g. use of exhaust steam for drying solid fuel or plant
7/40	• • Use of two or more feed-water heaters in series	19/00	<b>Regenerating or otherwise treating steam exhausted from steam engine plant</b> ( <a href="#">F01K 3/006</a> takes precedence) plants characterised by use of means for storing steam in an alkali to increase steam pressure <a href="#">F01K 5/00</a> ; returning condensate to boiler <a href="#">F22D</a> )
7/42	• • Use of desuperheaters for feed-water heating	19/02	• Regenerating by compression
7/44	• • Use of steam for feed-water heating and another purpose	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 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 (particularly adapted for a specific process see the relevant classes)}
- 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