

CPC COOPERATIVE PATENT CLASSIFICATION

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

ENGINES OR PUMPS

F03 MACHINES OR ENGINES FOR LIQUIDS; WIND, SPRING, OR WEIGHT MOTORS; PRODUCING MECHANICAL POWER OR A REACTIVE PROPULSIVE THRUST, NOT OTHERWISE PROVIDED FOR

F03B MACHINES OR ENGINES FOR LIQUIDS (positive-displacement engines for liquid [F03C](#); machines for liquids and gases [F01](#); positive-displacement machines for liquids [F04](#), rotary fluid gearing of the hydrokinetic type [F16H 41/00](#))

NOTES

1. Attention is drawn to the notes preceding Class [F01](#), especially as regards the definition of "reaction type".
2. This subclass comprises:
 - engines, other than of positive-displacement type, driven by liquids;
 - machines, other than of positive-displacement type, for liquids.

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.

Non-positive-displacement machines or engines characterised by specified type, e.g. water turbines (adaptations of machines or engines for special use [F03B 13/00](#); controlling [F03B 15/00](#))

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|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 3/125 | . . {Rotors for radial flow at high-pressure side and axial flow at low-pressure side, e.g. for Francis-type turbines} |
| | | 3/126 | . . {Rotors for essentially axial flow, e.g. for propeller turbines (with adjustable blades F03B 3/14)} |
| | | 3/128 | . . {Mounting, demounting} |
| | | 3/14 | . . Rotors having adjustable blades {(blade form or construction F03B 3/123)} |
| | | 3/145 | . . . {Mechanisms for adjusting the blades (if the regulation aspect is preponderant, see F03B 15/00 and subgroups)} |
| | | 3/16 | . Stators |
| | | 3/18 | . . Stator blades; Guide conduits or vanes, e.g. adjustable {(conduits in dams or the like F03B 13/08 ; arrangement of valves F03B 11/004)} |
| | | 3/183 | . . . {Adjustable vanes, e.g. wicket gates} |
| | | 3/186 | . . . {Spiral or volute casings} |
| | | 5/00 | Machines or engines characterised by non-bladed rotors, e.g. serrated, using friction |
| | | 7/00 | Water wheels {(of swinging flap type F03B 17/06)} |
| | | 7/003 | . {with buckets receiving the liquid} |
| | | 7/006 | . {of the endless-chain type} |
| | | 9/00 | Endless-chain machines or engines |
| | | 9/005 | . {with buckets receiving the liquid} |
| | | 11/00 | Parts or details not provided for in, or of interest apart from, the preceding groups (controlling F03B 15/00, {e.g. wear-protection couplings, between turbine and generator} |
| | | 11/002 | . {Injecting air or other fluid (F03D 80/40 , F03B 11/04 , F03B 15/00 take precedence)} |
| 1/00 | Engines of impulse type, i.e. turbines with jets of high-velocity liquid impinging on blades or like rotors, e.g. Pelton wheels; Parts or details peculiar thereto | | |
| 1/02 | . Buckets; Bucket-carrying rotors | | |
| 1/04 | . Nozzles (in general B05B); Nozzle-carrying members | | |
| 3/00 | Machines or engines of reaction type; Parts or details peculiar thereto | | |
| 3/02 | . with radial flow at high-pressure side and axial flow at low-pressure side of rotors, e.g. Francis turbines {(rotors per se F03B 3/125)} | | |
| 3/04 | . with substantially axial flow throughout rotors, e.g. propeller turbines {(rotors per se F03B 3/126)} | | |
| 3/06 | . . with adjustable blades, e.g. Kaplan turbines {(rotors per se F03B 3/14)} | | |
| 3/08 | . with pressure-velocity transformation exclusively in rotors | | |
| 3/10 | . characterised by having means for functioning alternatively as pumps or turbines {(starting F03B 15/005)} | | |
| 3/103 | . . {the same wheel acting as turbine wheel and as pump wheel} | | |
| 3/106 | . . {the turbine wheel and the pumps wheel being mounted in adjacent positions on the same shaft in a single casing} | | |
| 3/12 | . Blades; Blade-carrying rotors | | |
| 3/121 | . . {Blades, their form or construction} | | |
| 3/123 | . . . {specially designed as adjustable blades, e.g. for Kaplan-type turbines} | | |

- 11/004 . {Valve arrangements (F03B 3/10 takes precedence; adjustable wicket gates F03B 3/183; valves in general F16K)}
- 11/006 . {Sealing arrangements (F03B 3/14, F03B 3/183, F03B 13/083 takes precedence; sealings in general F16J)}
- 11/008 . {Measuring or testing arrangements (in general G01)}
- 11/02 . Casings {(spiral or volute casings F03B 3/186)}
- 11/025 . . {Covers}
- 11/04 . for diminishing cavitation or vibration, e.g. balancing
- 11/06 . Bearing arrangements
- 11/063 . . {Arrangements for balancing axial thrust}
- 11/066 . . . {in vertical axis machines}
- 11/08 . for removing foreign matter, e.g. mud
- 13/00 Adaptations of machines or engines for special use; Combinations of machines or engines with driving or driven apparatus (if the apparatus aspects are predominant, see the relevant subclasses for such apparatus, e.g. H02K 7/18); Power stations or aggregates (incorporating only machines or engines of positive-displacement type F03C; hydraulic engineering aspects E02B; {combinations with wind energy converters F03D 9/008})**
- 13/02 . Adaptations for drilling wells
- 13/04 . Adaptations for use in dentistry {for driving tools or the like having relatively small outer diameter, e.g. pipe cleaning tools}
- 13/06 . Stations or aggregates of water-storage type, {e.g. comprising a turbine and a pump}(turbines characterised by having means for functioning alternatively as pumps F03B 3/10)
- 13/08 . Machine or engine aggregates in dams or the like; Conduits therefor {, e.g. diffusors (bulb groups F03B 13/105)}
- 13/083 . . {The generator rotor being mounted as turbine rotor rim}
- 13/086 . . {Plants characterised by the use of siphons; their regulation (siphon weirs E02B 7/18; siphons in general F04F 10/00)}
- 13/10 . Submerged units incorporating electric generators or motors
- 13/105 . . {Bulb groups}
- 13/12 . characterised by using wave or tide energy
- 13/14 . . using wave energy
- 13/141 . . . {with a static energy collector}
- 13/142 {which creates an oscillating water column}
- 13/144 {which lifts water above sea level}
- 13/145 {for immediate use in an energy converter}
- 13/147 {for later use}
- 13/148 . . . {using the static pressure increase due to the wave}
- 13/16 . . . using the relative movement between a wave-operated member, {i.e. a "wom"} and another member, {i.e. a reaction member or "rem"}
- 13/18 where the other member, {i.e. rem} is fixed, at least at one point, with respect to the sea bed or shore
- 13/1805 {and the wom is hinged to the rem}
- 13/181 {for limited rotation}
- 13/1815 {with an up-and-down movement}
- 13/182 {with a to-and-fro movement}
- 13/1825 {for 360° rotation}
- 13/183 {of a turbine-like wom}
- 13/1835 {of an endless-belt type wom}
- 13/184 {of a water-wheel type wom}
- 13/1845 {and the wom slides relative to the rem}
- 13/185 {not vertically}
- 13/1855 {where the connection between wom and conversion system takes tension and compression (F03B 13/187, F03B 13/1875 take precedence)}
- 13/186 {the connection being of the rack-and-pinion type}
- 13/1865 {where the connection between wom and conversion system takes tension only (F03B 13/187, F03B 13/1875 take precedence)}
- 13/187 {and the wom directly actuates the piston of a pump}
- 13/1875 {and the wom is the piston or the cylinder in a pump}
- 13/188 {and the wom is flexible or deformable}
- 13/1885 {and the wom is tied to the rem}
- 13/189 {acting directly on the piston of a pump}
- 13/1895 {where the tie is a tension/compression member}
- 13/20 wherein both members {, i.e. wom and rem} are movable relative to the sea bed or shore
- 13/22 . . . using the flow of water resulting from wave movements to drive a motor or turbine {(F03B 13/144 takes precedence)}
- 13/24 . . . to produce a flow of air, e.g. to drive an air turbine {(F03B 13/142 takes precedence)}
- 13/26 . . using tide energy
- 13/262 . . . {using the relative movement between a tide-operated member and another member}
- 13/264 . . . {using the horizontal flow of water resulting from tide movement}
- 13/266 . . . {to compress air}
- 13/268 . . . {making use of a dam}
- 15/00 Controlling (controlling in general G05 (; regulation of plants characterised by the use of siphons F03B 13/086))**
- 15/005 . {Starting, also of pump-turbines}
- 15/02 . by varying liquid flow
- 15/04 . . of turbines (rotors having adjustable blades F03B 3/06, F03B 3/14; adjustable guide vanes F03B 3/18; specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors F03B 15/20)
- 15/06 . . . Regulating, i.e. acting automatically
- 15/08 by speed, e.g. by measuring electric frequency or liquid flow
- 15/10 without retroactive action
- 15/12 with retroactive action
- 15/14 by or of water level
- 15/16 by power output
- 15/18 for safety purposes, e.g. preventing overspeed
- 15/20 . . specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors (nozzles F03B 1/04)

- 15/22 . . . for safety purposes
- 17/00 Other machines or engines**
- 17/005 . {Installations wherein the liquid circulates in a closed loop ([F03B 13/06](#) takes precedence); Alleged [perpetua mobilia](#) of this or similar kind ([perpetua mobilia](#) using hydrostatic thrust or buoyancy [F03B 17/04](#))}
- 17/02 . using hydrostatic thrust
- 17/025 . . {and reciprocating motion}
- 17/04 . . Alleged [perpetua mobilia](#) {(with closed loop circulation or similar [F03B 17/005](#))}
- 17/06 . using liquid flow {with predominantly kinetic energy conversion}, e.g. of swinging-flap type {, "run-of-river", "ultra-low head" ([F03B 13/264](#) takes precedence)}
- 17/061 . . {with rotation axis substantially in flow direction}
- 17/062 . . {with rotation axis substantially at right angle to flow direction}
- 17/063 . . . {the flow engaging parts having no movement relative to the rotor during its rotation}
- 17/064 {and a rotor of the endless-chain type}
- 17/065 . . . {the flow engaging parts having a cyclic movement relative to the rotor during its rotation}
- 17/066 {and a rotor of the endless-chain type}
- 17/067 {the cyclic relative movement being positively coupled to the movement of rotation}
- 17/068 {and a rotor of the endless-chain type}