

**CPC****COOPERATIVE PATENT CLASSIFICATION****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](#))

**NOTE**

Attention is drawn to the notes preceding Class [F01](#), especially as regards the definition of "reaction type".

This subclass comprises:

- engines, other than of positive-displacement type, driven by liquids;
- machines, other than of positive-displacement type, for liquids.

**Guidance heading:** **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](#))

**F03B 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**

[F03B 1/02](#) . Buckets; Bucket-carrying rotors

[F03B 1/04](#) . Nozzles (in general [B05B](#)); Nozzle-carrying members

**F03B 3/00** **Machines or engines of reaction type; Parts or details peculiar thereto**

[F03B 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 3/12C](#))}

[F03B 3/04](#) . with substantially axial flow throughout rotors, e.g. propeller turbines {(rotors per se [F03B 3/126](#))}

[F03B 3/06](#) . . with adjustable blades, e.g. Kaplan turbines {(rotors per se [F03B 3/14](#))}

[F03B 3/08](#) . with pressure-velocity transformation exclusively in rotors

[F03B 3/10](#) . characterised by having means for functioning alternatively as pumps or turbines { starting [F03B 15/005](#) }

[F03B 3/103](#) . . { the same wheel acting as turbine wheel and as pump wheel }

[F03B 3/106](#) . . { the turbine wheel and the pumps wheel being mounted in adjacent positions on the same shaft in a single casing }

- F03B 3/12 . Blades; Blade-carrying rotors
- F03B 3/121 .. { Blades, their form or construction }
- F03B 3/123 ... { specially designed as adjustable blades, e.g. for Kaplan-type turbines }
- F03B 3/125 .. { Rotors for radial flow at high-pressure side and axial flow at low-pressure side, e.g. for Francis-type turbines }
- F03B 3/126 .. { Rotors for essentially axial flow, e.g. for propeller turbines (with adjustable blades [F03B 3/14](#)) }
- F03B 3/128 .. { Mounting, demounting }
- F03B 3/14 .. Rotors having adjustable blades { blade form or construction [F03B 3/123](#) }
- F03B 3/145 ... { Mechanisms for adjusting the blades (if the regulation aspect is preponderant, see [F03B 15/00](#) and subgroups) }
  
- F03B 3/16 . Stators
- F03B 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](#) }
- F03B 3/183 ... { Adjustable vanes, e.g. wicket gates }
- F03B 3/186 ... { Spiral or volute casings }
  
- F03B 5/00** **Machines or engines characterised by non-bladed rotors, e.g. serrated, using friction**
  
- F03B 7/00** **Water wheels** { of swinging flap type [F03B 17/06](#) }
  
- F03B 7/003 . { with buckets receiving the liquid }
- F03B 7/006 . { of the endless-chain type }
  
- F03B 9/00** **Endless-chain machines or engines**
  
- F03B 9/005 . { with buckets receiving the liquid }
  
- F03B 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 }
  
- F03B 11/002 . { Injecting air or other fluid ([F03D 11/0025](#), [F03B 11/04](#), [F03B 15/00](#) take precedence) }
- F03B 11/004 . { Valve arrangements ([F03B 3/10](#) takes precedence; adjustable wicket gates [F03B 3/183](#); valves in general [F16K](#)) }
- F03B 11/006 . { Sealing arrangements ([F03B 3/14](#), [F03B 3/183](#), [F03B 13/083](#) takes precedence; sealings in general [F16J](#)) }
- F03B 11/008 . { Measuring or testing arrangements (in general [G01](#)) }

- F03B 11/02 . Casings { [Spiral or volute casings F03B 3/186](#) }
- F03B 11/025 .. { [Covers](#) }
- F03B 11/04 . for diminishing cavitation or vibration, e.g. balancing
- F03B 11/06 . Bearing arrangements
- F03B 11/063 .. { [Arrangements for balancing axial thrust](#) }
- F03B 11/066 ... { [in vertical axis machines](#) }
- F03B 11/08 . for removing foreign matter, e.g. mud
- F03B 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](#) })
- F03B 13/02 . Adaptations for drilling wells
- F03B 13/04 . Adaptations for use in dentistry { [for driving tools or the like having relatively small outer diameter, e.g. pipe cleaning tools](#) }
- F03B 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](#))
- F03B 13/08 . Machine or engine aggregates in dams or the like; Conduits therefor, { [e.g. diffusors \(bulb groups F03B 13/105\)](#) }
- F03B 13/083 .. { [The generator rotor being mounted as turbine rotor rim](#) }
- F03B 13/086 .. { [Plants characterised by the use of siphons; their regulation \(siphon weirs E02B 7/18; siphons in general F04F 10/00\)](#) }
- F03B 13/10 . Submerged units incorporating electric generators or motors
- F03B 13/105 .. { [Bulb groups](#) }
- F03B 13/12 . characterised by using wave or tide energy
- F03B 13/14 .. using wave energy
- F03B 13/141 ... { [with a static energy collector](#) }
- F03B 13/142 .... { [which creates an oscillating water column](#) }
- F03B 13/144 .... { [which lifts water above sea level](#) }
- F03B 13/145 ..... { [for immediate use in an energy converter](#) }
- F03B 13/147 ..... { [for later use](#) }
- F03B 13/148 ... { [using the static pressure increase due to the wave](#) }
- F03B 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" }

F03B 13/18	....	where the other member, { i.e. <a href="#">rem</a> } is fixed, at least at one point, with respect to the sea bed or shore
F03B 13/1805	.....	{ and the wom is hinged to the rem }
F03B 13/181	.....	{ for limited rotation }
F03B 13/1815	.....	{ with an up-and-down movement }
F03B 13/182	.....	{ with a to-and-fro movement }
F03B 13/1825	.....	{ for 360° rotation }
F03B 13/183	.....	{ of a turbine-like wom }
F03B 13/1835	.....	{ of an endless-belt type wom }
F03B 13/184	.....	{ of a water-wheel type wom }
F03B 13/1845	.....	{ and the wom slides relative to the rem }
F03B 13/185	.....	{ not vertically }
F03B 13/1855	.....	{ where the connection between wom and conversion system takes tension and compression ( <a href="#">F03B 13/187</a> , <a href="#">F03B 13/1875</a> take precedence)}
F03B 13/186	.....	{ the connection being of the rack-and-pinion type }
F03B 13/1865	.....	{ where the connection between wom and conversion system takes tension only ( <a href="#">F03B 13/187</a> , <a href="#">F03B 13/1875</a> take precedence)}
F03B 13/187	.....	{ and the wom directly actuates the piston of a pump }
F03B 13/1875	.....	{ and the wom is the piston or the cylinder in a pump }
F03B 13/188	.....	{ and the wom is flexible or deformable }
F03B 13/1885	.....	{ and the wom is tied to the rem }
F03B 13/189	.....	{ acting directly on the piston of a pump }
F03B 13/1895	.....	{ where the tie is a tension/compression member }
F03B 13/20	....	wherein both members { i.e. <a href="#">wom</a> and <a href="#">rem</a> } are movable relative to the sea bed or shore
F03B 13/22	...	using the flow of water resulting from wave movements to drive a motor or turbine {( <a href="#">F03B 13/144</a> takes precedence)}
F03B 13/24	...	to produce a flow of air, e.g. to drive an air turbine {( <a href="#">F03B 13/142</a> takes precedence)}
F03B 13/26	..	using tide energy
F03B 13/262	...	{ using the relative movement between a tide-operated member and another member }
F03B 13/264	...	{ using the horizontal flow of water resulting from tide movement }
F03B 13/266	...	{ to compress air }
F03B 13/268	...	{ making use of a dam }
<b>F03B 15/00</b>		<b>Controlling</b> (controlling in general <a href="#">G05</a> ) { regulation of plants characterised by the use of siphons <a href="#">F03B 13/086</a> }
F03B 15/005	.	{ Starting, also of pump-turbines }
F03B 15/02	.	by varying liquid flow

- F03B 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](#))
- F03B 15/06      ...      Regulating, i.e. acting automatically
- F03B 15/08      ....      by speed, e.g. by measuring electric frequency or liquid flow
- F03B 15/10      .....      without retroactive action
- F03B 15/12      .....      with retroactive action
- F03B 15/14      ....      by or of water level
- F03B 15/16      ....      by power output
- F03B 15/18      ....      for safety purposes, e.g. preventing over-speed
- F03B 15/20      ..      specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors (nozzles [F03B 1/04](#))
- F03B 15/22      ...      for safety purposes

## **F03B 17/00      Other machines or engines**

- F03B 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](#))}
- F03B 17/02      .      using hydrostatic thrust
- F03B 17/025      ..      { and reciprocating motion }
- F03B 17/04      ..      Alleged perpetua mobilia {(with closed loop circulation or similar [F03B 17/005](#))}
- F03B 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)}
- F03B 17/061      ..      { with rotation axis substantially in flow direction }
- F03B 17/062      ..      { with rotation axis substantially at right angle to flow direction }
- F03B 17/063      ...      { the flow engaging parts having no movement relative to the rotor during its rotation }
- F03B 17/064      ....      { and a rotor of the endless-chain type }
- F03B 17/065      ...      { the flow engaging parts having a cyclic movement relative to the rotor during its rotation }
- F03B 17/066      ....      { and a rotor of the endless-chain type }
- F03B 17/067      ....      { the cyclic relative movement being positively coupled to the movement of rotation }
- F03B 17/068      .....      { and a rotor of the endless-chain type }