

**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 3/14D](#)) }

[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. diffusers (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. rem } 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. wom and rem } 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 <a href="#">F03B 3/06</a> , <a href="#">F03B 3/14</a> ; adjustable guide vanes <a href="#">F03B 3/18</a> ; specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors <a href="#">F03B 15/20</a> )
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 ( <a href="#">nozzles F03B 1/04</a> )
F03B 15/22	. . . for safety purposes
<b>F03B 17/00</b>	<b>Other machines or engines</b>
F03B 17/005	. { Installations wherein the liquid circulates in a closed loop ( <a href="#">F03B 13/06</a> takes precedence) ; Alleged perpetua mobilia of this or similar kind (perpetua mobilia using hydrostatic thrust or buoyancy <a href="#">F03B 17/04</a> ) }
F03B 17/02	. using hydrostatic thrust
F03B 17/025	. . {and reciprocating motion }
F03B 17/04	. . Alleged perpetua mobilia { (with closed loop circulation or similar <a href="#">F03B 17/005</a> ) }
F03B 17/06	. using liquid flow {with predominantly kinetic energy conversion }, e.g. of swinging-flap type, {"run-of-river", "ultra-low head" ( <a href="#">F03B 13/264</a> 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 }