CLAIMS

1. A rotor assembly comprising:

- a rotor having four blades and an axis about which the rotor rotates, each blade having a pressure surface and being spaced from the axis of the rotor such that there is a gap between the axis and an inner edge of each blade through which fluid can flow, and inner and outer edges of each blade lying in and defining a blade plane and each blade being offset from the axis of the rotor such that the axis does not lie in the blade plane, wherein blade planes of adjacent blades are substantially perpendicular to each other and wherein a blade plane of a first one of the blades is substantially perpendicular to a pressure surface of a second, adjacent one of the blades, and wherein the blades are flat;
- a casing partially surrounding the rotor, the casing having a first opening to permit a fluid flow into or out of the casing in a direction generally perpendicular to the rotor axis; and
- a second opening at an axial end of the casing to permit a fluid flow into or out of the casing in a direction generally parallel to the rotor axis,

wherein during a first mode of operation fluid flow through the rotor assembly is generally from the first opening to the second opening.

2. A rotor assembly as claimed in claim 1, wherein in a second mode of operation fluid flow through the rotor assembly is generally from the second opening to the first opening.

3. A rotor assembly as claimed in claim 1, wherein angles between the blades are such that part of the fluid flow within the inlet section may be deflected by a pressure surface of a first one of the blades through said gap between the axis and the blade inner edge and onto the pressure surface of an adjacent and substantially perpendicular second one of the blades.

4. A rotor assembly as claimed in any preceding claim, wherein an angle between each blade plane and a plane containing the rotor axis can be adjusted, with an angle between blade planes of adjacent blades remaining constant.

5. A rotor assembly as claimed in any preceding claim, further comprising a rotor cap disposed proximate an end of the blades, the rotor cap having a radial dimension up to half the swept radius of the rotor, and the rotor cap being arranged to at least partially restrict a flow of fluid from a region beyond the end of the blades into a central region of the rotor including the gap between the turbine axis and the inner edge of each blade.

6. A rotor assembly as claimed in any preceding claim, wherein the inlet section comprises a guide panel extending outwardly from the casing at an edge of the inlet, the guide panel extending generally in a direction opposite the working fluid flow direction and the guide panel being arranged to guide a portion of the working fluid flow into the casing through the inlet.

7. A rotor assembly as claimed in any preceding claim, wherein the inlet section comprises a return side guide panel extending outwardly from the casing proximate an edge of the inlet proximate a return side of the rotor, the return side guide panel extending generally in a direction opposite the working fluid flow direction and being arranged to guide a portion of the working fluid flow into the casing through the inlet.

8. A rotor assembly as claimed in claim 7, wherein, during rotation of the rotor, each blade passes through a forward position at which the blade is proximate the inlet and the blade plane is parallel to but offset from a plane of the return side guide panel.

9. A rotor assembly as claimed in any of claims 1 to 6, and 8, wherein the inlet section comprises a drive side guide panel extending outwardly from the casing proximate an edge of the inlet furthest from a return side of the rotor, the drive side guide panel extending generally in a direction opposite the working fluid flow direction and being arranged to guide a portion of the working fluid flow into the casing through the inlet.

10. A rotor assembly as claimed in claim 7, wherein the inlet section comprises a drive side guide panel extending outwardly from the casing proximate an edge of

the inlet furthest from a return side of the rotor, the drive side guide panel extending generally in a direction opposite the working fluid flow direction and being arranged to guide a portion of the working fluid flow into the casing through the inlet.

11. A rotor assembly as claimed in claim 10, wherein the return side and drive side guide panels diverge in a direction opposite the working fluid flow direction.

12. A rotor assembly as claimed in any of claims 1 to 7 and 9 to 10, wherein the inlet section comprises an inlet baffle that partially blocks the inlet of the casing, the inlet baffle extending from a side of the inlet proximate a return side of the rotor and obscuring a part of a drive side of the rotor, and the inlet baffle being configured to obstruct a portion of the working fluid flow such that a region of reduced pressure is formed at the rear of the inlet baffle to create a suction force on a returning blade as the returning blade passes or approaches the inlet baffle.

13. A rotor assembly as claimed in claim 8, wherein the inlet section comprises an inlet baffle that partially blocks the inlet of the casing, the inlet baffle extending from a side of the inlet proximate a return side of the rotor and obscuring a part of a drive side of the rotor, and the inlet baffle being configured to obstruct a portion of the working fluid flow such that a region of reduced pressure is formed at the rear of the inlet baffle to create a suction force on a returning blade as the returning blade passes or approaches the inlet baffle.

14. A rotor assembly as claimed in claim 12, wherein the inlet baffle is moveable to alter the degree to which the inlet baffle obscures the drive side of the rotor.

15. A rotor assembly as claimed in claim 13, wherein the inlet baffle is moveable to alter the degree to which the inlet baffle obscures the drive side of the rotor.

16. A fluid turbine as claimed in claim 13 or claim 15, wherein an edge of the inlet baffle can be set to lie substantially in the same plane as the blade in the forward position.

17. A fluid turbine assembly comprising a post and a rotor assembly according to any one of claims 1 to 16 the rotor assembly being rotatably attached to the post.

18. A method of generating electricity using a rotor assembly according to any one of claims 1 to 16, or a fluid turbine assembly according to claim 17, the method comprising connecting a drive shaft of the or each rotor assembly directly or indirectly to a generator.