A POWER GENERATOR

Technical Field

The present invention relates generally to a power generator, and more particularly to an electrical power generator assembly for using kinetic energy from a flowing fluid to generate power.

The present invention relates also to an electrical power generator installation including such electrical power generator. The present invention is expected to be particularly advantageously, but not exclusively, used in the context of hydro-powered electricity generation.

Background of the Invention

Kinetic energy in flowing fluids, such as water and wind, is a known alternative to energy sources such as bio-fuels and fossil fuels for generating power. Unlike, for example, bio- and fossil fuel which, when used in electrical power generation, go hand-in-hand with emission of harmful combustion gasses into the atmosphere, generation of power by using flowing fluids has no or very little adverse effects on the atmosphere. Although known installations for harvesting wind power generally have low running costs, they tend to be expensive to install and have relatively low generation capacity. Known installations for harvesting hydropower, for example tidal power, on the other hand, have relatively higher generation capacity. However, these types of installations too are expensive, require frequent maintenance, and could be unreliable due to problems associated with silting and corrosion.

~~Object of the Invention~~

Embodiments~~It is the object~~ of the present invention seek to substantially overcome or at least ameliorate one or more of the above disadvantages, or at least to provide a useful alternative.

Summary of the Invention

In one aspect, the present invention provides an electrical power generator assembly for using kinetic energy from a flowing fluid to generate electrical power, the electrical power generator assembly including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which is arranged in generally helical fashion about the rotational axis, and at least one mounting formation connected to the blade arrangement, the at least oneeach mounting formation being adapted to permit mounting of the blade assembly for rotation about theits rotational axis, so that in use when the flowing fluid flowing past the electrical power generator assembly interacts with the blade arrangement to rotate the blade assembly about its rotational axis; and;

at least one primary coil connected to the blade arrangement for rotation with the blade arrangement, said at least one primary coil being energizable and being arranged in use to interact with at least one stationary secondary coil to generate electrical power in response to rotation of the blade assembly.; an elongated open-ended shroud extending between the head end and the tail end, the shroud having a head end section through which the flowing fluid can enter the shroud, a tail end section through which the flowing fluid can exit the shroud, and an elongated intermediate section extending between the head end section and the tail end section, the shroud being connected to and surrounding the blade assembly so that the shroud rotates with the blade assembly; and a stator disposed adjacent the shroud, wherein the at least one primary coil is integrated into the head end section of the shroud and the at least one stationary secondary coil is integrated into the stator.

The electrical power generator preferably includes a plurality of primary coils, each primary coil being connected to one of the blades at or adjacent the tip of the blade.

In one form, the electrical power generator may also include a current supply electrically connected to each primary coil, for energizing each primary coil in order to induce a magnetic field around each primary coil. In another form, the electrical power generator may also include a current supply electrically connected to each secondary coil, for energizing each secondary coil in order to induce a magnetic field which induces a current in each primary coil.

Preferably, the electrical power generator yet further includes a said at least one stationary secondary coil, for magnetically communicating with each primary coil when each primary coil is energized. The electrical power generator, preferably, includes a plurality of said secondary coils.

In a second aspect, the present invention provides an electrical power generator assembly for using kinetic energy from a flowing fluid to generate electrical power, the electrical power generator assembly including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which is arranged in generally helical fashion about the rotational axis, ~~and~~ the blade assembly including an elongated open-ended shroud extending between the head end and the tail end of the blade assembly, the shroud having a head end section through which the flowing fluid can enter the shroud, a tail end section through which the flowing fluid can exit the shroud, and an elongated intermediate section extending between the head end section and the tail end section, the shroud being connected to and surrounding the blade arrangement so that the shroud rotated with the blade arrangement;

at least one mounting formation connected to the blade arrangement, ~~each~~ the at least one mounting formation being adapted to permit rotation~~mounting~~ of the blade assembly ~~for rotation~~ about ~~its~~the

rotational axis~~, so that in use~~ when the flowing fluid ~~flowing past the electrical power generator assembly~~ interacts with the blade arrangement to rotate the blade assembly ~~about its rotational axis; and~~

at least one permanent magnet connected to the blade arrangement for rotation with the blade arrangement, said at least one permanent magnet being arranged ~~in use~~ to interact with at least one stationary secondary coil to generate electrical power in response to rotation of the blade assembly~~.~~; and a stator disposed adjacent the shroud, wherein the at least one permanent magnet is integrated into the head end section of the shroud and the at least one stationary secondary coil is integrated into the stator.

The blade assembly preferably includes an elongated shaft extending between the head end and the tail end of the blade assembly, the shaft having a longitudinal axis defining the rotational axis of the blade assembly, and the blade arrangement being mounted on and radiating from the shaft. The generator is preferably drivingly connected to the shaft. The blade arrangement preferably terminates shy of the ends of the shaft, with each mounting formation being provided by an end portion of the shaft, so that in use, the shaft, and accordingly the blade assembly, is rotatably mounted or supported. Preferably, each mounting formation includes a bearing element mounted on the shaft and adapted to be connected to a support structure, to permit rotation of the blade assembly relative to said support structure.

In one embodiment, the blade arrangement preferably includes a plurality of beams which are longitudinally spaced in said generally helical fashion along the shaft. In this embodiment, each beam is preferably mounted on the shaft such that it is adjustably rotatable around the rotational axis of the shaft, to permit adjustment of the pitch of the blade assembly. The blade arrangement, in this embodiment, further preferably includes a web or skin extending along the lengths of and connected to each pair of adjacent beams, such that the blade arrangement, irrespective of the pitch of each beam, is uninterrupted across its surface.

In another embodiment, if desired, the blade arrangement preferably includes one or more continuous helical blades.

Preferably, the blade arrangement, when seen in side elevation, tapers from the head end thereof to its tail end.

~~The power generator assembly preferably also includes an elongated open-ended shroud extending between the head end and the tail end of the blade assembly, the shroud being connected to and surrounding the blade assembly, so that the shroud rotates with the blade assembly in use. The shroud too thus has a head end and a tail end.~~ Preferably, the shroud is connected to the tip of each blade of the blade arrangement, the connection

the shroud. In another embodiment, the slotted ejector arrangement is of unitary construction, with a helical slot therein, and preferably diverges diametrically away from the shroud. In one form, the assembly preferably includes a drive means adapted to vary the axial length of the slotted ejector arrangement. In another form, the assembly preferably includes a drive means adapted to vary the axial length and radial width of the slotted ejector arrangement.

In another aspect, the present invention provides an electrical power generator assembly for using kinetic energy from a flowing fluid to generate power, the electrical power generator assembly including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which includes a plurality of blades spaced along the length of the rotation axis, and at least one mounting formation connected to the blade arrangement, the at least one~~each~~ mounting formation being adapted to permit rotation~~mounting~~ of the blade assembly ~~for rotation~~ about the~~its~~ rotational axis~~, so that in use~~ when the flowing fluid ~~flowing past the electrical power generator assembly~~ interacts with the blade arrangement to rotate the blade assembly ~~about its rotational axis; and~~

at least one primary coil connected to the blade arrangement for rotation with the blade arrangement, the primary coil being arranged ~~in use~~ to interact with at least one stationary secondary coil to generate power in response to rotation of the blade assembly~~.~~; an elongated open-ended shroud extending between the head end and the tail end of the blade assembly, the shroud having a head end section through which the flowing fluid can enter the shroud, a tail end section through which the flowing fluid can exit the shroud, and an elongated intermediate section extending between the head end section and the tail end section, the shroud being connected to and surrounding the blade assembly so that the shroud rotates with the blade assembly; and a stator disposed adjacent to the shroud, wherein the at least one primary coil is integrated into the shroud head end section and the at least one stationary secondary coil is integrated into the stator.

Preferably, the features or components of the electrical power generator according to this aspect of the invention, are similar to those of the electrical power generator according to the preceding aspect of the invention, when the blade arrangement of such power generator includes a plurality of blades.

There is also disclosed~~In a further aspect, the present invention provides~~ an electrical power generator installation, the installation including:

an electrical power generator as hereinbefore described including at least one secondary coil; and

a support structure, the electrical power generator being mounted, by means of each mounting formation of the blade arrangement, on the support structure for rotation of the blade arrangement about its rotational axis, and each secondary coil of the power generator being mounted on the mounting structure.

In the case of tidal energy or ocean stream power generation, the power generator will be submerged in the ocean. In the case of river flow power generation, the power generator will be submerged in a river or flowing stream. In the case where the flowing fluid with which the power generator is associated is wind, the power generator will be located in an open area where it will be exposed to flow of air when the wind blows.

In one embodiment, the support structure includes a network of flexible elements, for example (heavy) chains or cables. The network of flexible elements may be arranged such that the generator can be aligned such that the inlet end of the shroud opposes the direction of flow of the fluid, preferably so that it aligns itself, in accordance with the direction of flow of a fluid. In this embodiment, the network of flexible elements can, preferably, be arranged such that the generator is mounted thereon in the general fashion of a windsock. In another embodiment, the support structure is a rigid structure including a network of rigid elements.

There is also disclosed~~In another aspect, the present invention provides~~ a propulsion or pump device adapted to eject a fluid, the propulsion or pump device including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which is arranged in generally helical fashion about the rotational axis, and at least one mounting formation connected to the blade arrangement, each mounting formation being adapted to permit mounting of the blade assembly for rotation about its rotational axis, so that in use rotation of the blade assembly about its rotational axis interacts with fluid flowing through the electrical power generator assembly; and

at least one primary coil connected to the blade arrangement for rotation with the blade arrangement, said at least one primary coil being arranged in use to interact with at least one stationary secondary coil to generate rotation of the blade assembly in response to electrical power being applied to said at least one stationary secondary coil.

Brief Description of the Drawings

Preferred embodiments of the present invention will now be described, by way of examples only, with reference to the accompanying drawings wherein:

Fig. 1 is a schematic cross sectional view of a first embodiment of a power generator;

Claims

1. An electrical power generator assembly for using kinetic energy from a flowing fluid to generate electrical power, the electrical power generator including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which is arranged in generally helical fashion about the rotational axis, and at least one mounting formation connected to the blade arrangement, each mounting formation being adapted to permit mounting of the blade assembly for rotation about its rotational axis, so that in use fluid flowing past the electrical power generator assembly interacts with the blade arrangement to rotate the blade assembly about its rotational axis;

a shroud having a head end section via which a flowing fluid enters the shroud, a tail end section via which flowing fluid exits the shroud, and an elongated intermediate section extending between the head end section and the tail end section, with the intermediate section converging from the head end section towards the tail end section; and

at least one permanent magnet connected to the blade arrangement for rotation with the blade arrangement, said at least one permanent magnet being arranged in use to interact with at least one stationary secondary coil to generate electrical power in response to rotation of the blade assembly.

2. The power generator assembly as claimed in claim 1, wherein the blade assembly includes an elongated shaft extending between the head end and the tail end of the blade assembly, the shaft having a longitudinal axis defining the rotational axis of the blade assembly, and the blade arrangement being mounted on and radiating from the shaft.

3. The power generator assembly as claimed in claim 2, wherein the blade arrangement terminates shy of the ends of the shaft, with each mounting formation being provided by an end portion of the shaft, so that in use, the shaft, and accordingly the blade assembly, is rotatably mounted or supported.

4. The power generator assembly as claimed in claim 2 or 3, wherein each mounting formation includes a bearing element mounted on the shaft and adapted to be connected to a support structure, to permit rotation of the blade assembly relative to said support structure.

5. The power generator assembly as claimed in any one of the preceding claims, wherein the blade arrangement includes a plurality of beams which are longitudinally spaced in said generally helical fashion along the shaft.

6. The power generator assembly as claimed in claim 5, wherein each beam is mounted on the shaft such that it is adjustably rotatable around the rotational axis of the shaft, to permit adjustment of the pitch of the blade assembly.

7. The power generator assembly as claimed in claim 5 or 6, wherein the blade arrangement, further includes a web or skin extending along the lengths of and connected to each pair of adjacent beams, such that the blade arrangement, irrespective of the pitch of each beam, is uninterrupted across its surface.

8. The power generator assembly as claimed in any one of claims 1 to 4, wherein the blade arrangement includes one or more continuous helical blades.

9. The power generator assembly as claimed in any one of the preceding claims, wherein the blade arrangement, when seen in side elevation, tapers from the head end thereof to its tail end.

10. The power generator assembly as claimed in any one of the preceding claims, wherein the shroud is elongated and open-ended and extends between the head end and the tail end of the blade assembly, the shroud being connected to and surrounding the blade assembly, so that the shroud rotates with the blade assembly in use.

11. The power generator assembly as claimed in claim 10, wherein the shroud has a head end and a tail end.

12. The power generator assembly as claimed in claim 10 or 11, wherein the shroud is connected to the tip of each blade of the blade arrangement, the connection between the shroud and each blade being a substantially fluid impervious connection.

13. The power generator assembly as claimed in claim 10 or 11, wherein the blade arrangement includes a plurality of beams and said webs or skins, a tip of each web or skin is also connected to the shroud.

14. The power generator assembly as claimed in claim 13, wherein the connections between the webs or skins and the shroud are substantially fluid impervious connections.

15. The power generator assembly as claimed in any of claims 10 to 14, wherein in use, flowing fluid interacting with the blade arrangement to rotate the power generator assembly thus enters the shroud from its head end and exits the shroud via its tail end.

16. The power generator assembly as claimed in any one of claims 10 to 15, wherein the shroud is of thin wall construction, and converges along at least part of its length from

its head end to its tail end, said convergence corresponding to the tapering of the blade assembly.

17. The power generator assembly as claimed in any one of claims 10 to 16, wherein the shroud is of multi-section or unitary moulded construction.

18. The power generator assembly as claimed in any one of the preceding claims, wherein the head end section of the shroud converges towards the intermediate section, and the tail end section diverges away from the intermediate section, such that the shroud is generally in the form of a converging-diverging venturi having a converging elongated throat defined by the intermediate section.

19. The power generator assembly as claimed in claim 17 or 18, wherein the shroud has a circular cross-sectional profile, so that the head end section and the tail end section of the shroud are flared in bell mouth fashion.

20. The power generator assembly as claimed in claim any one of the preceding claims, wherein each mounting formation includes a bearing element connected to an end section of the shaft, the bearing elements in use being mounted on an anchored support structure, such that the power generator assembly rotates relative to the support structure.

21. The power generator assembly as claimed in any one of the preceding claims, wherein the power generator assembly includes a stator in front of the shroud

22. The power generator assembly as claimed in any one of the preceding claims, wherein the power generator assembly includes a slotted ejector arrangement behind the shroud.

23. The power generator assembly as claimed in claim 22, wherein the slotted ejector arrangement is adjacent the shroud tail end section.

24. The power generator assembly as claimed in claim 22 or 23, wherein the slotted ejector arrangement is connected to, and rotates with, the shroud.

25. The power generator assembly as claimed in claim 22 or 23, wherein the slotted ejector arrangement is not connected to, and does not rotate with, the shroud.

26. The power generator assembly as claimed in any one of claims 22 to 25, wherein the slotted ejector arrangement includes a plurality of spaced apart tubular sections.

27. The power generator assembly as claimed in any one of claims 22 to 25, wherein the slotted ejector arrangement is of unitary construction, with a helical slot therein.

28. The power generator assembly as claimed in claim 26 or 27, wherein the slotted ejector arrangement diverges diametrically away from the shroud.

29. The power generator assembly as claimed in claim 27 or 28, wherein the assembly includes a drive means adapted to vary the axial length of the slotted ejector arrangement.

30. The power generator assembly as claimed in claim 27 or 28, wherein the assembly includes a drive means adapted to vary the axial length and radial width of the slotted ejector arrangement.

31. An electrical power generator assembly for using kinetic energy from a flowing fluid to generate power, the electrical power generator including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which includes a plurality of blades spaced along the length of the rotation axis, and at least one mounting formation connected to the blade arrangement, each mounting formation being adapted to permit mounting of the blade assembly for rotation about its rotational axis, so that in use fluid flowing past the electrical power generator assembly interacts with the blade arrangement to rotate the blade assembly about its rotational axis;

a shroud having a head end section via which a flowing fluid enters the shroud, a tail end section via which flowing fluid exits the shroud, and an elongated intermediate section extending between the head end section and the tail end section, with the intermediate section converging from the head end section towards the tail end section; and

at least one primary coil connected to the blade arrangement for rotation with the blade arrangement, the primary coil being arranged in use to interact with at least one stationary secondary coil to generate power in response to rotation of the blade assembly.

32. An electrical power generator installation, the installation including:

an electrical power generator as hereinbefore described including at least one secondary coil; and

a support structure, the electrical power generator being mounted, by means of each mounting formation of the blade arrangement, on the support structure for rotation of the blade arrangement about its rotational axis, and each secondary coil of the power generator being mounted on the mounting structure.

33. The power generator installation as claimed in claim 32, wherein the power generator is submerged in the ocean.

34. The power generator installation as claimed in claim 32, wherein the power generator is submerged in a river or flowing stream.

35. The power generator installation as claimed in claim 32, wherein the power generator is located in an open area where it will be exposed to flow of air when the wind blows.

36. The power generator installation as claimed in any one of claims 32 to 35, wherein the support structure includes a network of flexible elements.

37. The power generator assembly as claimed in claim 36, wherein the network of flexible elements include (heavy) chains or cables.

38. The power generator assembly as claimed in claim 36 or 37, wherein the network of flexible elements are arranged such that the generator can be aligned such that the inlet end of the shroud opposes the direction of flow of the fluid

39. The power generator assembly as claimed in claim 38, wherein the generator aligns itself in accordance with the direction of flow of a fluid.

40. The power generator assembly as claimed in any one of claims 36 to 39, wherein the network of flexible elements are arranged such that the generator is mounted thereon in the general fashion of a windsock.

41. The power generator assembly as claimed in any one of claims 32 to 35, wherein the support structure is a rigid structure including a network of rigid elements.

42. A propulsion or pump device adapted to eject a fluid, the propulsion or pump device including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which is arranged in generally helical fashion about the rotational axis, and at least one mounting formation connected to the blade arrangement, each mounting formation being adapted to permit mounting of the blade assembly for rotation about its rotational axis, so that in use rotation of the blade assembly about its rotational axis interacts with fluid flowing through the electrical power generator assembly;

a shroud having a head end section via which a flowing fluid enters the shroud, a tail end section via which flowing fluid exits the shroud, and an elongated intermediate section extending between the head end section and the tail end section, with the intermediate section converging from the head end section towards the tail end section; and

at least one primary coil connected to the blade arrangement for rotation with the blade arrangement, said at least one primary coil being arranged in use to interact with at least one stationary secondary coil to generate rotation of the blade assembly in response to electrical power being applied to said at least one stationary secondary coil.

Claims

1. An electrical power generator assembly for using kinetic energy from a flowing fluid to generate electrical power, the electrical power generator assembly including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which is arranged in a generally helical fashion about the rotational axis, and at least one mounting formation connected to the blade arrangement, the at least one mounting formation being adapted to permit rotation of the blade assembly about the rotational axis when the flowing fluid interacts with the blade arrangement to rotate the blade assembly;

at least one primary coil connected to the blade arrangement for rotation with the blade arrangement, the at least one primary coil being energizable and being arranged to interact with at least one stationary secondary coil to generate electrical power in response to rotation of the blade assembly;

an elongated open-ended shroud extending between the head end and the tail end, the shroud having a head end section through which the flowing fluid can enter the shroud, a tail end section through which the flowing fluid can exit the shroud, and an elongated intermediate section extending between the head end section and the tail end section, the shroud being connected to and surrounding the blade assembly so that the shroud rotates with the blade assembly; and

a stator disposed adjacent the shroud,

wherein the at least one primary coil is integrated into the head end section of the shroud and the at least one stationary secondary coil is integrated into the stator.

2. The power generator assembly as claimed in claim 1, wherein the electrical power generator includes a plurality of primary coils, each primary coil being connected to one of the blades at or adjacent the tip of the blade.

3. The power generator assembly as claimed in claim 1, wherein the electrical power includes a current supply electrically connected to the at least one primary coil for energizing the at least one primary coil in order to induce a magnetic field around the at least one primary coil.

4. The power generator as claimed in claim 1, wherein the electrical power generator assembly also includes a current supply electrically connected to the at least one secondary coil for energizing the at least one secondary coil in order to induce a magnetic field which induces a current in the at least one primary coil.

5. The power generator assembly as claimed in claim 1, wherein the electrical power generator includes a plurality of said secondary coils.

6. The power generator assembly as claimed in claim 1, wherein the blade assembly includes an elongated shaft extending between the head end and the tail end, the shaft having a longitudinal axis aligned with the rotational axis of the blade assembly, and the blade arrangement being mounted on and radiating from the shaft.

7. The power generator assembly as claimed in claim 6, wherein the blade arrangement terminates shy of the ends of the shaft, and wherein the at least one mounting formation is provided on an end portion of the shaft, and wherein the shaft and the blade assembly are rotatably mounted or supported by the at least one mounting formation.

8. The power generator assembly as claimed in claim 6, wherein each mounting formation includes a bearing element mounted on the shaft and adapted to be connected to a support structure to permit rotation of the blade assembly relative to said support structure.

9. The power generator assembly as claimed in claim 1, wherein the blade arrangement includes a plurality of beams which are longitudinally spaced in said generally helical fashion along the shaft.

10. The power generator assembly as claimed in claim 9, wherein each beam is mounted on the shaft such that it is adjustably rotatable around the rotational axis of the shaft, to permit adjustment of the pitch of the blade assembly.

11. The power generator assembly as claimed in claim 9, wherein the blade arrangement further includes a web or skin extending along the lengths of and connected to each pair of adjacent beams, such that the blade arrangement, irrespective of the pitch of each beam is uninterrupted across its surface.

12. The power generator assembly as claimed in claim 1, wherein the blade arrangement includes one or more continuous helical blades.

13. The power generator assembly as claimed in claim 1, wherein the blade arrangement, when seen in side elevation, tapers from the head end thereof to its tail end.

14. The power generator assembly as claimed in claim 1, wherein the shroud is connected to a tip of each blade of the blade arrangement, the connection between the shroud and the tip of each blade being substantially impervious to fluid.

15. The power generator assembly as claimed in claim 1, wherein the blade arrangement includes a plurality of beams and said webs or skins, a tip of each web or skin is also connected to the shroud.

16. The power generator assembly as claimed in claim 1, wherein the connections between the webs or skins and the shroud are substantially fluid impervious connections.

17. The power generator assembly as claimed in claim 1, wherein the shroud is of thin wall construction, and converges along at least part of its length from the head end section to the tail end section, the convergence corresponding to the tapering of the blade assembly.

18. The power generator assembly as claimed in claim 1, wherein the shroud is of multi-section or unitary moulded construction.

19. The power generator assembly as claimed in claim 18, wherein the shroud has a circular cross-sectional profile, so that the head end section and the tail end section of the shroud are flared in bell mouth fashion.

20. The power generator assembly as claimed in claim 1, wherein the head end section of the shroud converges towards the intermediate section, and the tail end section diverges away from the intermediate section, such that the shroud is generally in the form of a converging-diverging venturi having a converging elongated throat defined by the intermediate section.

21. The power generator assembly as claimed in claim 1, wherein the power generator assembly includes a slotted ejector arrangement behind the shroud.

22. The power generator assembly as claimed in claim 21, wherein the slotted ejector arrangement is adjacent the shroud tail end section.

23. The power generator assembly as claimed in claim 21, wherein the slotted ejector arrangement is connected to, and rotates with, the shroud.

24. The power generator assembly as claimed in claim 21, wherein the slotted ejector arrangement is not connected to, and does not rotate with, the shroud.

25. The power generator assembly as claimed in claim 21, wherein the slotted ejector arrangement includes a plurality of spaced apart tubular sections.

26. The power generator assembly as claimed in claim 25, wherein the slotted ejector arrangement diverges diametrically away from the shroud.

27. The power generator assembly as claimed in claim 21, wherein the slotted ejector arrangement is of unitary construction, with a helical slot therein.

28. The power generator assembly as claimed in claim 27, wherein the assembly includes a drive means adapted to vary the axial length of the slotted ejector arrangement.

29. The power generator assembly as claimed in claim 27, wherein the assembly includes a drive means adapted to vary the axial length and radial width of the slotted ejector arrangement.

30. The power generator assembly as claimed in claim 1, wherein the intermediate section of the shroud converges from the head end section towards the tail end section.

31. The power generator assembly as claimed in claim 1, wherein the at least one mounting formation includes a bearing element connected to an end section of the shaft, the bearing element being mounted on an anchored support structure to rotate the power generator assembly relative to the support structure.

32. An electrical power generator assembly for using kinetic energy from a flowing fluid to generate electrical power, the electrical power generator assembly including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which is arranged in a generally helical fashion about the rotational axis, the blade assembly including an elongated open-ended shroud extending between the head end and the tail end of the blade assembly, the shroud having a head end section through which the flowing fluid can enter the shroud, a tail end section through which the flowing fluid can exit the shroud, and an elongated intermediate section extending between the head end section and the tail end section, the shroud being connected to and surrounding the blade arrangement so that the shroud rotates with the blade arrangement;

at least one mounting formation connected to the blade arrangement, the at least one mounting formation being adapted to permit rotation of the blade assembly about the rotational axis when the flowing fluid interacts with the blade arrangement to rotate the blade assembly;

at least one permanent magnet connected to the blade arrangement for rotation with the blade arrangement, the at least one permanent magnet being arranged to interact with at least one stationary secondary coil to generate electrical power in response to rotation of the blade assembly; and

a stator disposed adjacent the shroud,

wherein the at least one permanent magnet is integrated into the head end section of the shroud and the at least one stationary secondary coil is integrated into the stator.

33. An electrical power generator assembly for using kinetic energy from a flowing fluid to generate power, the electrical power generator assembly including:

a blade assembly having a head end for facing incoming flowing fluid, a tail end spaced from the head end for facing in the direction of the flowing fluid, and a rotational axis extending between the head end and the tail end, the blade assembly including a blade arrangement which includes a plurality of blades spaced along the length of the rotational axis, and at least one mounting formation connected to the blade arrangement, the at least one mounting formation being adapted to permit rotation of the blade assembly about the rotational axis when the flowing fluid interacts with the blade arrangement to rotate the blade assembly;

at least one primary coil connected to the blade arrangement for rotation with the blade arrangement, the primary coil being arranged to interact with at least one stationary secondary coil to generate power in response to rotation of the blade assembly;

an elongated open-ended shroud extending between the head end and the tail end of the blade assembly, the shroud having a head end section through which the flowing fluid can enter the shroud, a tail end section through which the flowing fluid can exit the shroud, and an elongated intermediate section extending between the head end section and the tail end section, the shroud being connected to and surrounding the blade assembly so that the shroud rotates with the blade assembly; and

a stator disposed adjacent to the shroud,

wherein the at least one primary coil is integrated into the shroud head end section and the at least one stationary secondary coil is integrated into the stator.