Claims

1. A separation device for separating a fluid, said fluid comprising multiple components, into at least two components comprising:

a support structure;

at least one conduit mounted on or within said support structure for rotation about an axis, wherein said at least one conduit is a tube, comprising one or more vanes attached to or formed integrally with said conduit;

at least one inlet for introducing a flow of said fluid into said at least one conduit; and

at least one outlet for outputting at least one of said components therefrom, wherein the at least one outlet comprises an overflow outlet, and the overflow outlet comprises a vortex finder;

wherein the said at least one conduit is configured such that, in use, when said flow of said fluid is applied thereto, said conduit is thereby caused to rotate on or within said support structure about said axis, thereby separating said fluid into at least two components.

2. A separation device according to claim 1 in which the said at least one conduit is configured such that, in use, when said flow of said fluid having a non-zero velocity component in a direction parallel to said axis is applied thereto, said conduit is thereby caused to rotate on or within said support structure about said axis, thereby separating said fluid into at least two components.

3. A separation device according to claim 1 or 2 in which the said at least one conduit is configured such that, in use, when said flow of said fluid in a direction

substantially parallel to said axis is applied thereto, said conduit is thereby caused to rotate on or within said support structure about said axis, thereby separating said fluid into at least two components.

4. A separation device according to any previous claim in which the said at least one conduit is configured such that, in use, when said flow of said fluid is applied thereto from said inlet, said conduit is thereby caused to rotate on or within said support structure about said axis, thereby separating said fluid into at least two components.

5. A separation device according to any previous claim in which the fluid is comprised of at least one liquid phase.

6. A separation device according to claim 5 in which the fluid is comprised of at least two liquid phases.

7. A separation device according to any previous claim in which the fluid is comprised of at least one gaseous phase.

8. A separation device according to any of claims 5 to 7 in which the fluid is comprised of at least one solid phase.

9. A separation device according to any previous claim in which the said vanes are attached to or formed integrally with an inner or outer surface of said conduit.

10. A separation device according to claim 9 in which the said vanes comprise a central axle.

11. A separation device according to claim 10 in which the central axle comprises at least one of an inlet or an outlet.

12. A separation device according to any previous claim in which the at least one conduit is mounted on bearings.

13. A separation device according to any previous claim in which the support structure comprises an inner support structure.

14. A separation device according to any previous claim in which the support structure comprises an outer support structure.

15. A separation device according to any previous claim in which the support structure comprises a housing.

16. A separation device according to claim 15 in which the at least one conduit is mounted on bearings inside said housing.

17. A separation device according to any previous claim in which the at least one outlet is an underflow outlet.

18. A separation device according to any previous claim in which the at least one inlet is tangential to at least one conduit.

19. A separation device according to any previous claim in which the separation device further comprises an inlet chamber.

20. A separation device according to claim 19 in which the inlet chamber comprises a swirl chamber.

21. A separation device according to any previous claim in which the diameter of at least one conduit is between 3 mm and 3 m.

22. A separation device according to claim 21 in which the diameter of the said at least one conduit is preferably between 30 mm and 60 mm.

23. A separation device according to any previous claim in which the length of at least one conduit is between 40 mm and 3m.

24. A separation device according to claim 23 in which the length of at least one conduit is preferably between 0.5 m and 1.1 m.

25. A separation device according to any previous claim in which the at least one conduit is a plurality of conduits.

26. A separation device according to claim 25 in which the at least one inlet introduces a flow of said fluid to said plurality of conduits.

27. A separation device according to any previous claim further comprising an electrostatic field generation device for generating an electrostatic field so that the fluid experiences an electrostatic force which enhances the separation efficiency of the separation device.

28. A method for separating a fluid, said fluid comprising multiple components, into at least two components using a separation device according to claim 1, the method comprising the steps of:

introducing a flow of said fluid into said conduit, via said inlet;

thereby causing said conduit to rotate on or within said support structure about said axis, thereby separating said fluid into at least two components.

29. A method according to claim 28 in which the said flow having a non-zero velocity component in a direction parallel to the said axis of rotation.

30. A method according to claim 28 or 29 in which the said flow is in a direction substantially parallel to said axis of rotation.

31. A method according to any one of claims 28 to 30 in which the fluid is comprised of at least one liquid phase.

32. A method according to claim 31 in which the fluid is comprised of at least two liquid phases.

33. A method according to any of claims 28 to 32 in which the fluid is comprised of at least one gaseous phase.

34. A method according to any of claims 31 to 33 in which the fluid is comprised of at least one solid phase.

35. A method according to claim 31 or 34 in which the at least one phase comprises droplets, particles or bubbles with a diameter predominantly greater than 2 μm.

36. A method according to any of claims 28 to 35 in which the pressure of fluid in at least one outlet is not more than 0.8 bar less than the pressure of fluid in at least one inlet.

37. A method according to any of claims 28 to 36 in which an electrostatic field is generated so that the fluid experiences an electrostatic force which enhances the separation efficiency of the separation device.