Claims

1. A thruster for propelling a marine vessel, the thruster comprising:

an upper housing;

a lower housing, the lower housing being arranged to rotate relative to the upper housing;

a first body arranged within the upper housing, the first body comprising at least one first inductor to provide a magnetic field; and

a second body arranged within the lower housing, the second body comprising at least one second inductor to generate an electrical current from the magnetic field to transmit power between the first and second bodies,

wherein each of the first and second bodies comprises a ring, and the first and second bodies are configured to provide a substantially constant degree of overlap at all relative rotational positions such that, in use, the power transmission between the first and second bodies is continuous and at least substantially constant at all relative rotational positions, and wherein the at least one first inductor is tuned to resonate within a predetermined frequency band and the at least one second inductor is tuned to resonate within a predetermined frequency band, the frequency band of the at least one second inductor at least partially overlapping with the frequency band of the at least one first inductor.

2. A thruster as claimed in claim 1, the first body being fixedly attached to and spaced from the upper housing via one or more first attachment members.

3. A thruster as claimed in claim 2, the one or more first attachment members forming, in use, a support structure for maintaining the position of the first body relative to the upper housing.

4. A thruster as claimed in any of the preceding claims, the second body being fixedly attached to and spaced from the lower housing via one or more second attachment members.

5. A thruster as claimed in claim 4, the one or more second attachment members forming, in use, a support structure for maintaining the position of the second body relative to the lower housing.

6. A thruster as claimed in any of claims 3 to 5, the support structure

comprising a frame which is fixedly attached, in use, to the lower housing.

7. A thruster as claimed in any of the preceding claims, one or more of the at least one first inductor and one or more of the at least one second inductor being configured on separate parts of the first body and second body respectively.

8. A thruster as claimed in any of the preceding claims, the at least one first inductor and the at least one second inductor being configured within the first body and second body at one or more respective radial locations.

9. A thruster as claimed in any of the preceding claims, the at least one first inductor and the at least one second inductor being configured at matching radial locations within the first and second bodies respectively.

10. A thruster as claimed in any of claims 1 to 9, any two or more of the first inductors and/or second inductors being equidistantly spaced around the perimeter of the respective bodies.

11. A thruster as claimed in any of claims 1 to 9, any two or more of the first inductors and/or second inductors being disproportionately spaced around the perimeter of the respective bodies.

12. A thruster as claimed in any of the preceding claims, the first and second bodies being spaced between about 1mm to 100mm apart.

13. A thruster as claimed in any of the preceding claims, the first and second bodies being spaced between about 10mm to 20mm apart.

14. A thruster as claimed in any of the preceding claims, each body comprising a conductive material.

15. A thruster as claimed in any of the preceding claims, each body comprising a facing surface comprising one or more of a flat or textured surface.

16. A thruster as claimed in any of the preceding claims, one of first and second bodies being concentrically arranged relative to the other of the first and second bodies.

17. A thruster as claimed in any of the preceding claims, further comprising radio

frequency communication circuitry coupled to the second inductor to receive electrical energy from the second inductor.

18. A thruster as claimed in claim 17, further comprising a sensor to sense an operating condition of at least a part of the thruster, the radio frequency communication circuitry being coupled to the sensor and being configured to transmit a wireless signal for the sensed operating condition.

19. A thruster as claimed in any of the preceding claims, further comprising a controller to control the lower housing to rotate relative to the upper housing.

20. A thruster as claimed in any of the preceding claims, wherein the upper housing is a stationary part of an azimuth thruster, and the lower housing is a rotatable part of the azimuth thruster.

21. A thruster as claimed in any of the preceding claims, wherein the first inductor and the second inductor are configured to form a resonant transformer.

22. A thruster as claimed in any of the preceding claims, the first body comprising a plurality of first inductors to provide a magnetic field.

23. A thruster as claimed in any of the preceding claims, the second body comprising a plurality of second inductors to generate an electrical current from the magnetic field.

24. A thruster as claimed in any of the preceding claims 1 to 21, wherein the first body comprises a plurality of first inductors to provide a magnetic field, wherein each of the first inductors is configured as a discrete module from other similar modules, and wherein the second body comprises a plurality of second inductors to generate an electrical current from the magnetic field to transmit power between the first and second bodies, wherein each of the second inductors is configured as a discrete module from other similar modules.

25. A thruster as claimed in claim 24, wherein the plurality of first inductors are circumferentially positioned with the first body at one or more respective radial locations, and wherein the plurality of second inductors are circumferentially positioned with the second body at matching circumferential and/or radial

positions relative to the first inductors.

26. A vessel comprising a thruster as claimed in any of claims 1 to 25.