Claims

1. A stator for interacting with magnets carried by a rotor of an electric machine, the stator comprising:

an active region arranged to be aligned with the magnets carried by the rotor;

a first inactive region and a second inactive region, wherein the first and second inactive regions are separated by the active region; and

a slotless phase winding comprising a plurality of conductive elements, wherein each conductive element comprises a conductor provided in an insulating housing, and wherein the slotless phase winding is arranged in a serpentine structure comprising:

a first active segment in which the conductive elements extend across the active region from the first inactive region to the second inactive region;

a second active segment in which the conductive elements extend across the active region from the second inactive region to the first inactive region; and

an inactive segment coupling the first active segment to the second active segment, wherein the inactive segment comprises a turn provided in the second inactive region, and wherein at least one of the conductive elements is twisted in the second inactive region;

wherein the conductive elements extend straight and untwisted across the active region.

2. The stator of claim 1, wherein the plurality of conductive elements are substantially parallel with each other in the first and/or second active segment.

3. The stator of any preceding claim, wherein the conductive elements in the first active segment are substantially parallel to the conductive elements in the second active segment.

4. The stator of any preceding claim, wherein the slotless phase winding is a first slotless phase winding, and wherein the stator is a multi-phase slotless stator comprising a plurality of slotless phase windings.

5. The stator of claim 4, wherein the first active segment of the first slotless phase winding is offset from the second active segment of the first slotless phase winding in the active region.

6. The stator of claim 5, wherein each of the plurality of slotless phase windings is arranged in a serpentine structure.

7. The stator of claim 6, wherein the serpentine structure of the first slotless phase winding is interlaced with the serpentine structure of one or more of the other slotless phase windings of the stator.

8. The stator of claim 7, wherein a first active segment of a second slotless phase winding is arranged between the first and second active segments of the first slotless phase winding.

9. The stator of claim 8, wherein an inactive segment of the second slotless phase winding is coupled to the first active segment of the second slotless phase winding; and

wherein the inactive segment of the second slotless phase winding comprises a turn provided in the second inactive region, and wherein at least one of the conductive elements of the second slotless phase winding is twisted in the second inactive region.

10. The stator of claim 9, wherein the stator is arranged to enable the conductive elements of the turn of the first slotless phase winding to pass through the turn of the second slotless phase winding.

11. The stator of claim 10, wherein the second active segment of the first slotless phase winding is arranged in the active region between first and second active segments of the second slotless phase winding.

12. The stator of any of claims 9 to 11, wherein the turn of the first slotless phase winding is arranged adjacent to the turn of the second slotless phase winding.

13. The stator of any of claims 9 to 12, wherein the first slotless phase winding is provided with the same twist as the second slotless phase winding.

14. The stator of any of claims 4 to 13, wherein a first active segment of a third slotless phase winding is provided in the active region between the first and second active segments of the first slotless phase winding.

15. The stator of any preceding claim, wherein the inactive segment of the serpentine structure of the slotless phase winding is a first inactive segment, and wherein the serpentine structure of the slotless phase winding further comprises a second inactive segment and a third active segment; and

wherein the second inactive segment couples the second active segment to the third active segment, and wherein the second inactive segment comprises a turn provided in the

first inactive region.

16. The stator of claim 15, wherein at least one of the conductive elements is twisted in the first inactive region.

17. The stator of claim 16, wherein the twist in the first inactive region comprises a half twist, and the twist in the second inactive region also comprises a half twist.

18. The stator of any preceding claim, wherein the conductive filaments of the slotless phase winding are packaged into a fiber bundle, and wherein the fiber bundle has an orthogonal or hexagonal cross-sectional shape.

19. The stator of any preceding claim, wherein the conductor of each conductive element is rectangular, circular or hexagonal cross-sectional shape.

20. The stator of any preceding claim, wherein the stator is arranged to provide a radial air gap between the stator and the rotor; and

wherein the active segments of the slotless phase winding extend in an axial direction parallel to a rotational axis of the rotor.

21. The stator of any of claims 1 to 19, wherein the stator is arranged to provide an axial air gap between the stator and the rotor; and

wherein the active segments of slotless phase winding extend in a radial direction orthogonal to the rotational axis of the rotor.

22. The stator of any preceding claim, wherein at least one of:

the stator is for interacting with magnets carried by a rotor of an electric motor, and wherein the stator is configured to apply current to the slotless phase winding to drive rotation of the rotor of the electric motor; and

the stator is for interacting with magnets carried by a rotor of a generator, and wherein the stator is configured to harness energy from a resulting current generated in the slotless phase winding in response to rotation of the magnets of the rotor of the generator.

23. An electric machine comprising:

the stator of any preceding claim; and

a rotor carrying a plurality of magnets;

wherein the electric machine is arranged so that the magnets carried by the rotor are

aligned with the active region of the stator.

24. The electric machine of claim 23, wherein a distance of an air gap between the magnets of the rotor and the active region of the stator is smaller than a cross-sectional depth of the plurality of conductive elements of the slotless phase winding.