CLAIMS

1. An intravascular blood pump, comprising:

a catheter;

a housing in which a rotor is housed, the housing being attached to a distal end of the catheter; and

a drive shaft extending through the catheter and connected to the rotor, at least a portion of the drive shaft being flexible, the drive shaft comprising an outer layer of wound or braided wires, an inner layer of wound or braided wires, and a reinforcement element arranged within at least the outer layer of wound or braided wires,

wherein the drive shaft is rotatably supported in a proximal bearing located proximal of the rotor and a distal bearing located distal of the rotor, and

wherein the reinforcement element extends from at least a point within the proximal bearing to a point within the distal bearing,

wherein the reinforcement element comprises a stepped proximal end with a portion of reduced diameter, and a portion of increased diameter.

2. The intravascular blood pump of claim 1, wherein the portion of reduced diameter extends from a point at or substantially near where the catheter is attached to the housing to a point within the restriction element.

3. The intravascular blood pump of claim 1, wherein the portion of reduced diameter extends from a point within the restriction element to a point within the proximal bearing.

4. The intravascular blood pump of claim 2, wherein the portion of increased diameter extends from a point within the restriction element to a point within the distal bearing.

5. The intravascular blood pump of claim 1, wherein the inner layer of wound or braided wires is omitted between a point within the restriction element and a point within the distal bearing.

6. The intravascular blood pump of claim 3, wherein the portion of increased diameter extends from a point within the proximal bearing to a point within the distal bearing.

7. The intravascular blood pump of claim 6, wherein the inner layer of wound or braided wires is omitted between a point within the proximal bearing and a point within the distal bearing.

8. The intravascular blood pump of claim 1, wherein the portion of increased diameter is configured to fit within the outer layer of the wound or braided wires in a portion of the drive shaft in which the inner layer of wound or braided wires has been omitted.

9. The intravascular blood pump of claim 1, wherein the reinforcement element extends from a point proximal to the proximal bearing to a point within the distal bearing.

10. The intravascular blood pump of claim 1 or claim 9, wherein the proximal bearing comprises a bearing sleeve attached to the drive shaft and an outer bearing ring attached to the housing, the bearing sleeve being configured to rotate within the outer bearing ring.

11. The intravascular blood pump of claim 10, further comprising a restriction element attached to the housing and located proximal of the proximal bearing and configured to prevent the bearing sleeve from becoming dislodged from the outer bearing ring.

12. The intravascular blood pump of claim 1, wherein:

at least one of the reinforcement element or the housing comprises Nitinol or Ultra-Stiff Nitinol; and

the housing comprises a cage surrounding the rotor, the cage having a plurality of struts.

13. The intravascular blood pump of claim 1, further comprising:

a downstream tubing attached to the housing and through which the catheter is disposed, wherein the downstream tubing is bent,

wherein the downstream tubing is made of a flexible material such that it may be compressed or expanded.

14. An intravascular blood pump, comprising:

a catheter;

a housing in which a rotor is housed, the housing being attached to a distal end of the catheter; and

a drive shaft extending through the catheter and connected to the rotor, the drive shaft comprising an outer layer of wound or braided wires, an inner layer of wound or braided wires, and a reinforcement element arranged within at least the outer layer of wound or braided wires, wherein the drive shaft is rotatably supported in a proximal bearing located proximal

of the rotor and a distal bearing located distal of the rotor, and

wherein the reinforcement element extends from at least a point within the proximal bearing to a point within the distal bearing,

wherein the reinforcement element comprises a stepped proximal end with a portion of reduced diameter, and a portion of increased diameter.

15. The intravascular blood pump of claim 14, wherein the portion of reduced diameter extends from a point substantially near where the catheter is attached to the housing to a point within the restriction element.

16. The intravascular blood pump of claim 14 or claim 15, wherein the portion of reduced diameter extends from a point within the restriction element to a point within the proximal bearing.

17. The intravascular blood pump of any one of claims 14 to 16, wherein the portion of increased diameter extends from a point within the restriction element to a point within the distal bearing.

18. The intravascular blood pump of any one of claims 14 to 17, wherein the inner layer of wound or braided wires is omitted between a point within the restriction element and a point within the distal bearing.

19. The intravascular blood pump of any one of claims 14 to 18, wherein the portion of increased diameter extends from a point within the proximal bearing to a point within the distal bearing.

20. The intravascular blood pump of any one of claims 14 to 19, wherein the portion of increased diameter is configured to fit within the outer layer of the drive shaft in a portion of the drive shaft in which the inner layer has been omitted.