

What is claimed is:

1. A prosthetic valve delivery apparatus, comprising:
a handle
a gearbox;
an input torque shaft extending distally from the handle and having a distal end portion operatively connected to the gearbox; and
a plurality of output torque shafts operatively connected to and extending distally from the gearbox, wherein rotation of the input torque shaft causes rotation of the output torque shafts via the gear box.
2. The prosthetic valve delivery apparatus of claim 1, further comprising a motor disposed in the handle, the motor being operatively connected to a proximal end portion of the input torque shaft, wherein actuation of the motor results in rotation of the input torque shaft.
3. The prosthetic valve delivery apparatus of any previous claim, wherein the gearbox comprises:
a drive gear operatively connected to and driven by the input torque shaft;
a plurality of driven gears configured to be driven by the drive gear, wherein each driven gear is operatively connected to and rotates one of the output torque shafts.
4. The prosthetic valve delivery apparatus of claim 3, wherein the drive gear comprises an internal gear and the driven gears comprise pinion gears positioned inside of the internal gear.
5. The prosthetic valve delivery apparatus of claims 3 or 4, wherein the drive gear is mounted on the distal end portion of the input torque shaft and each driven gear is mounted on one of the output torque shafts.

6. The prosthetic valve delivery apparatus of any of claims 3-5, wherein the drive gear has teeth that mesh with teeth of each driven gear.

7. The prosthetic valve delivery apparatus of any of claims 3-6, wherein the gearbox further comprises at least one idler gear configured to transfer rotational motion from the drive gear to one of the driven gears.

8. The prosthetic valve delivery apparatus of any previous claim, wherein the plurality of output torque shafts comprises three output torque shafts.

9. The prosthetic valve delivery apparatus of any previous claim, wherein each output torque shaft comprises a connector at its distal end configured to form a releasable connection with an actuator on a prosthetic heart valve.

10. The prosthetic valve delivery apparatus of any previous claim, wherein the input torque shaft defines a central rotation axis collinear with a central longitudinal axis of the delivery apparatus, and each output torque shaft defines a rotation axis offset from the central longitudinal axis of the delivery apparatus.

11. The prosthetic valve delivery apparatus of any previous claim, in combination with a prosthetic valve comprising a radially expandable and compressible frame and a plurality of actuators configured to radially expand and compress the frame, wherein each output torque shaft is releasably coupled to a screw of an actuator to transfer rotational motion from the torque shaft to the screw, whereby rotation of the screws causes radial expansion or compression of the frame.

12. The prosthetic valve delivery apparatus of any previous claim, wherein the input torque shaft extends at least the majority of the length of the delivery apparatus.

13. A prosthetic valve delivery assembly, comprising:

a prosthetic valve comprising a radially expandable and compressible frame and a plurality of actuators configured to radially expand and compress the frame;

a delivery apparatus comprising a handle, an input torque shaft extending from the handle, a gear mechanism coupled to a distal end portion of the input torque shaft, and a plurality of output torque shafts coupled to and extending distally from the gear mechanism;

wherein the gear mechanism transfers rotational motion of the input torque shaft to the output torque shafts;

wherein each output torque shaft is releasably coupled to one of the actuators such that rotation of the output torque shafts causes the actuators to radially expand or compress the prosthetic valve.

14. The assembly of claim 13, wherein the distal end portion of the input torque shaft, the gear mechanism, and the output torque shafts are configured to be inserted into a patient's vasculature.

15. The assembly of any of claims 13-14, wherein the gear mechanism comprises a drive gear operatively connected to the distal end portion of the input torque shaft and a plurality of driven gears configured to be driven by the drive gear, each driven gear being operatively connected to one of the output torque shafts.