

[015] In some embodiments, the delivery assembly further comprises a shaft disposed radially within the catheter and an expanding element disposed on a distal end portion the shaft, wherein the expanding element is configured such that relative axial motion between the expanding element and the arms of the catheter in a first direction causes the arms to radially expand and relative axial motion between the expanding element and the arms of the catheter in a second direction allows the arms to radially compress. In some embodiments, the expanding element has a frusto-conical shape.

[016] In some embodiments, the delivery assembly is configured such that relative rotational motion between the shaft and the expanding element causes relative axial motion between the expanding element and the arms of the catheter. In some embodiments, the delivery assembly is configured such that relative axial motion between the shaft and the arms causes relative axial motion between the expanding element and the arms of the catheter.

[017] In some embodiments, the plurality of expandable arms comprises 2 to 15 arms.

[018] The foregoing and other objects, features, and advantages of the invention will become more apparent from the following detailed description, which proceeds with reference to the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[019] FIG. 1 is a perspective view of an embodiment of a prosthetic implant delivery assembly.

[020] FIG. 2 is a perspective view of the delivery assembly of FIG. 1 with the prosthetic implant in a tilted configuration.

[021] FIG. 3 is a perspective view of the prosthetic implant of the delivery assembly of FIG. 1.

[022] FIG. 4 is a side view of a locking catheter of the delivery assembly of FIG. 1.

What is claimed is:

1. A prosthetic implant delivery assembly, comprising:
a prosthetic implant comprising an expandable stent portion having a longitudinal axis extending from a first end portion of the stent to a second end portion of the stent;
and
an elongate catheter having a longitudinal axis extending from a proximal end portion of the catheter to a distal end portion of the catheter and a plurality of arms extending axially from the distal end of the catheter,
wherein the first end portion of the stent is releasably and pivotably coupled to at least one of the arms of the catheter such that the stent can pivot about the at least one of the arms so that the longitudinal axis of the stent is tilted relative to the longitudinal axis of the catheter; wherein the first end portion of the stent comprises a plurality of apices which are circumferentially-spaced apart relative to each other, each of the arms of the catheter comprises an aperture at a distal end of the arm, and the apices extend through respective apertures of the arms; wherein the assembly further comprises a plurality of elongate locking elements corresponding to the arms of the catheter, wherein each of the apices of the stent comprises a respective opening, and the locking elements are configured to extend through the openings of the apices of the stent, such that the locking elements releasably couple the arms of the catheter to the stent when the apices of the stent are inserted through the apertures of the arms; and wherein at least one of the locking elements is axially moveable relative to another locking element.
2. The delivery assembly of claim 1, wherein a length of at least one of the locking elements is different than a length of another locking element.
3. The delivery assembly of claim 1 or 2, wherein at least one of the apertures of the arms has a different length than another aperture of the arms.
4. The delivery assembly of claim 1 or 2, wherein the catheter further comprises a plurality of sleeves, and the sleeves are configured to be axially slidable relative to a respective aperture of the arms such that the sleeves can be used to alter an

effective size of the aperture of the arm, wherein the effective size of the aperture is the portion of the aperture that is unobstructed by the sleeve.

5. The delivery assembly of claim 1 or 2, wherein at least one arm of the catheter is axially moveable relative to another arm.

6. The delivery assembly of claim 1 or 2, wherein a length of at least one arm of the catheter is different than a length of another arm.

7. The delivery assembly of claim 1 or 2, wherein the delivery assembly is configured for implanting the prosthetic implant to a native aortic valve via a retrograde approach.

8. The delivery assembly of claim 1 or 2, wherein the longitudinal axis of the stent can tilt up to 60 degrees relative to the longitudinal axis of the catheter.

9. The delivery assembly of claim 1 or 2, wherein the longitudinal axis of the stent can tilt from 0 degrees to 45 degrees relative to the longitudinal axis of the catheter.

10. A prosthetic implant delivery assembly, comprising:

a prosthetic implant comprising an expandable stent portion having a plurality of apices circumferentially spaced around a first end portion of the stent, wherein at least some of the apices comprise an aperture; and

an elongate catheter comprising a plurality of radially expandable arms extending axially from a distal end of a shaft of the catheter, each arm having a hook portion which extends radially inwardly,

wherein the hook portions of the arms releasably engage a respective aperture of the stent, and the arms of the catheter are configured such that the arms can expand radially relative to the catheter when the arms are exposed from within a sheath such that the hook portions disengage the apertures of the stent;

wherein the assembly further comprises a shaft disposed radially within the catheter and an expanding element disposed on a distal end portion the shaft, wherein the expanding element is configured such that relative axial motion between the expanding

element and the arms of the catheter in a first direction causes the arms to radially expand and relative axial motion between the expanding element and the arms of the catheter in a second direction allows the arms to radially compress.

11. The delivery assembly of claim 10, wherein the hook portions of the arms extend radially inwardly and are angled proximally.

12. The delivery assembly of claim 10 or 11, wherein the expandable stent is a self-expandable stent.

13. The delivery assembly of any of claims 10-12, wherein the expandable arms of the catheter are self-expandable.

14. The delivery assembly of claim 10, wherein the expanding element has a frusto-conical shape.

15. The delivery assembly of claim 10 or 14, wherein the delivery assembly is configured such that relative rotational motion between the shaft and the expanding element causes relative axial motion between the expanding element and the arms of the catheter.

16. The delivery assembly of claim 10 or claim 14, wherein the delivery assembly is configured such that relative axial motion between the shaft and the arms causes relative axial motion between the expanding element and the arms of the catheter.

17. The delivery assembly of any of claims 10, 11 or 14, wherein the plurality of expandable arms comprises 2 to 20 arms.

18. The delivery assembly of claim 15, wherein an outer surface of the expanding element is formed with longitudinally extending slots, wherein the slots are configured for receiving the arms of the catheter, allowing relative axial motion between the expanding element and the arms, and preventing relative rotational motion between the expanding element and the arms.

19. The delivery assembly of any of claims 10, 11, 14, or 18, wherein the expanding element is movable relative to the arms of the catheter between a first position and a second position, wherein in the first position, the expanding element is disposed distally relative to the second position, and wherein in the second position, the expanding element contacts the arms of the catheter and forces the arms to expand radially outwardly.

20. The delivery assembly of any of claims 10, 11, 14, or 18, wherein the arms of the catheter are radially tapered relative to distal end portions of the arms at a release point such that the arms expand radially relative to the catheter when the release point is exposed from within the sheath such that the hook portions disengage the apertures of the stent.