

CLAIMS:

1. A prosthetic heart valve, comprising:
a frame comprising a plurality of strut members, the frame being radially collapsible and expandable between a collapsed configuration and an expanded configuration, the frame having an inflow end and an outflow end, and defining a longitudinal axis;
a leaflet structure situated at least partially within the frame; and
a covering disposed around the frame, the covering comprising:
a first woven portion extending circumferentially around the frame, the first woven portion comprising a plurality of texturized strands extending along the longitudinal axis of the frame;
a second woven portion extending circumferentially around the frame and spaced apart from the first woven portion along the longitudinal axis of the frame;
wherein the texturized strands extend along the longitudinal axis of the frame from the first woven portion to the second woven portion and form a floating portion between the first woven portion and the second woven portion.
2. The prosthetic heart valve of claim 1, wherein the covering is resiliently stretchable between a first state corresponding to the radially expanded configuration of the frame, and a second state corresponding to the radially collapsed configuration of the frame.
3. The prosthetic heart valve of claim 2, wherein the floating portion is resiliently stretchable between the first state and the second state of the covering.
4. The prosthetic heart valve of claim 1, wherein the texturized strands are configured to provide compressible volume to the floating portion of the covering when the frame is in the expanded configuration.

5. The prosthetic heart valve of claim 1, wherein the texturized strands are woven into a leno weave pattern in the first woven portion and in the second woven portion.

6. The prosthetic heart valve of claim 1, wherein the covering defines a plurality of circumferentially spaced-apart openings.

7. The prosthetic heart valve of claim 6, wherein the openings in the covering overlie openings defined by strut members of the frame.

8. The prosthetic heart valve of claim 6, wherein the openings have been cut into a portion of the covering made of a bias cloth to inhibit fraying around the openings.

9. The prosthetic heart valve of claim 1, wherein the covering further comprises a third woven portion on the opposite side of the first woven portion from the floating portion, the third woven portion comprising the texturized strands of the first woven portion.

10. The prosthetic heart valve of claim 9, wherein the texturized strands are woven into a plain weave pattern in the third woven portion.

11. The prosthetic heart valve of claim 9, wherein the third woven portion is folded over apices of strut members at the inflow end of the frame.

12. The prosthetic heart valve of claim 9, wherein:
the covering further comprises a fourth woven portion on the opposite side of the second woven portion from the floating portion; and
the fourth woven portion comprises the texturized strands, and the texturized strands are woven into a plain weave pattern in the fourth woven portion.

13. The prosthetic heart valve of claim 12, wherein the fourth woven portion comprises a plurality of extension portions that overlie openings defined by the strut members of the frame when the frame is in the expanded configuration.

14. The prosthetic heart valve of claim 13, wherein the extension portions are tapered in a direction toward the outflow end of the frame.

15. The prosthetic heart valve of claim 1, wherein the frame is at least one of a mechanically-expandable frame and a plastically-expandable frame.

16. The prosthetic heart valve of claim 1, wherein the covering comprises a plurality of floating portions spaced apart from each other along the longitudinal axis of the frame.

17. The prosthetic heart valve of claim 1, wherein the floating portions are heat set to make them softer and/or more texturized.

18. The prosthetic heart valve of claim 1, wherein twisted PET strands are used in a warp direction and textured PET strands are used in a weft direction.

19. The prosthetic heart valve of claim 18, wherein the twisted PET strands in the warp direction are arranged to weave in leno pattern and the textured PET strands in the weft direction form the floating portion without any weave structure.

20. The prosthetic heart valve of claim 19, wherein the coverings is heat shrunk to achieve a stretchability between 80-160% and wherein the frame is a mechanically-expandable frame.

21. The prosthetic heart valve of claim 1, wherein the covering comprises at least one of a low-friction layer or low-friction coating on a least a portion thereof.

22. The prosthetic heart valve of claim 21, wherein the low-friction layer or low-friction coating is formed via electrospinning.

23. The prosthetic heart valve of claim 1, further comprising strips of material that are helically wrapped around struts and apices at an end of the frame.

24. The prosthetic heart valve of claim 1, wherein:
the covering comprises a first protective portion folded over apices of the strut members at the inflow end of the frame; and
the covering further comprises a second protective portion folded over apices of the strut members at the outflow end of the frame.

~~1. — A prosthetic heart valve, comprising:~~
~~a frame comprising a plurality of strut members, the frame being radially collapsible and expandable between a collapsed configuration and an expanded configuration, the frame having an inflow end and an outflow end, and defining a longitudinal axis;~~
~~a leaflet structure situated at least partially within the frame; and~~
~~a sealing member disposed around the frame, the sealing member comprising:~~
~~a first woven portion extending circumferentially around the frame, the first woven portion comprising a plurality of texturized yarns extending along the longitudinal axis of the frame;~~
~~a second woven portion extending circumferentially around the frame and spaced apart from the first woven portion along the longitudinal axis of the frame;~~
~~wherein the texturized yarns extend along the longitudinal axis of the frame from the first woven portion to the second woven portion and form a floating yarn portion between the first woven portion and the second woven portion.~~

~~2.——The prosthetic heart valve of claim 1, wherein the sealing member is resiliently stretchable between a first state corresponding to the radially expanded configuration of the frame, and a second state corresponding to the radially collapsed configuration of the frame.~~

~~3.——The prosthetic heart valve of claim 2, wherein the floating yarn portion is resiliently stretchable between the first state and the second state of the sealing member.~~

~~4.——The prosthetic heart valve of any of claims 1-3, wherein the texturized yarns are configured to provide compressible volume to the floating yarn portion of the sealing member when the frame is in the expanded configuration.~~

~~5.——The prosthetic heart valve of any of claims 1-4, wherein the texturized yarns are woven into a leno weave pattern in the first woven portion and in the second woven portion.~~

~~6.——The prosthetic heart valve of any of claims 1-5, wherein the sealing member defines a plurality of circumferentially spaced apart openings.~~

~~7.——The prosthetic heart valve of claim 6, wherein the openings in the sealing member overlie openings defined by strut members of the frame.~~

~~8.——The prosthetic heart valve of any of claims 1-7, wherein the sealing member further comprises a third woven portion on the opposite side of the first woven portion from the floating yarn portion, the third woven portion comprising the texturized yarns of the first woven portion.~~

~~9.——The prosthetic heart valve of claim 8, wherein the texturized yarns are woven into a plain weave pattern in the third woven portion.~~

~~10. — The prosthetic heart valve of claim 8 or claim 9, wherein the third woven portion is folded over apices of strut members at the inflow end of the frame.~~

~~11. — The prosthetic heart valve of any of claims 8–10, wherein:
the sealing member further comprises a fourth woven portion on the opposite side of the second woven portion from the floating yarn portion; and
the fourth woven portion comprises the texturized yarns, and the texturized yarns are woven into a plain weave pattern in the fourth woven portion.~~

~~12. — The prosthetic heart valve of claim 11, wherein the fourth woven portion comprises a plurality of extension portions that overlie openings defined by the strut members of the frame when the frame is in the expanded configuration.~~

~~13. — The prosthetic heart valve of claim 12, wherein the extension portions are tapered in a direction toward the outflow end of the frame.~~

~~14. — The prosthetic heart valve of any of claims 1–10, wherein:
the sealing member comprises a first protective portion folded over apices of the strut members at the inflow end of the frame; and
the sealing member further comprises a second protective portion folded over apices of the strut members at the outflow end of the frame.~~

~~15. — The prosthetic heart valve of any of claims 1–14, wherein the frame is a mechanically expandable frame.~~

~~16. — The prosthetic heart valve of any of claims 1–14, wherein the frame is a plastically expandable frame.~~

~~17.—The prosthetic heart valve of any of claims 1–14, wherein the sealing member comprises a plurality of floating yarn portions spaced apart from each other along the longitudinal axis of the frame.~~

~~18.—A prosthetic heart valve, comprising:
a frame comprising a plurality of strut members, the frame being radially collapsible and expandable between a collapsed configuration and an expanded configuration, the frame having an inflow end and an outflow end, and defining a longitudinal axis;
a leaflet structure situated at least partially within the frame; and
a covering disposed around the frame, the covering comprising:
a first woven portion extending circumferentially around the frame, the first woven portion comprising a plurality of texturized strands extending along the longitudinal axis of the frame;
a second woven portion extending circumferentially around the frame and spaced apart from the first woven portion along the longitudinal axis of the frame;
wherein the texturized strands extend along the longitudinal axis of the frame from the first woven portion to the second woven portion and form a floating portion between the first woven portion and the second woven portion.~~

~~19.—The prosthetic heart valve of claim 18, wherein the covering is resiliently stretchable between a first state corresponding to the radially expanded configuration of the frame, and a second state corresponding to the radially collapsed configuration of the frame.~~

~~20.—The prosthetic heart valve of claim 19, wherein the floating portion is resiliently stretchable between the first state and the second state of the covering.~~

~~21.—The prosthetic heart valve of any of claims 18–20, wherein the texturized strands are configured to provide compressible volume to the floating portion of the covering when the frame is in the expanded configuration.~~

~~22.—— The prosthetic heart valve of any of claims 18-21, wherein the texturized strands are woven into a leno weave pattern in the first woven portion and in the second woven portion.~~

~~23.—— The prosthetic heart valve of any of claims 18-22, wherein the covering defines a plurality of circumferentially spaced apart openings.~~

~~24.—— The prosthetic heart valve of claim 23, wherein the openings in the covering overlie openings defined by strut members of the frame.~~

~~25.—— The prosthetic heart valve of claim 23, wherein the openings have been cut into a portion of the covering made of a bias cloth to inhibit fraying around the openings.~~

~~26.—— The prosthetic heart valve of any of claims 18-24, wherein the covering further comprises a third woven portion on the opposite side of the first woven portion from the floating portion, the third woven portion comprising the texturized strands of the first woven portion.~~

~~27.—— The prosthetic heart valve of claim 26, wherein the texturized strands are woven into a plain weave pattern in the third woven portion.~~

~~28.—— The prosthetic heart valve of claim 26 or claim 27, wherein the third woven portion is folded over apices of strut members at the inflow end of the frame.~~

~~29.—— The prosthetic heart valve of any of claims 26-28, wherein:
the covering further comprises a fourth woven portion on the opposite side of the second woven portion from the floating portion; and
the fourth woven portion comprises the texturized strands, and the texturized strands are woven into a plain weave pattern in the fourth woven portion.~~

~~30.—The prosthetic heart valve of claim 29, wherein the fourth woven portion comprises a plurality of extension portions that overlie openings defined by the strut members of the frame when the frame is in the expanded configuration.~~

~~31.—The prosthetic heart valve of claim 30, wherein the extension portions are tapered in a direction toward the outflow end of the frame.~~

~~32.—The prosthetic heart valve of any of claims 18-28, wherein:
the covering comprises a first protective portion folded over apices of the strut members at the inflow end of the frame; and
the covering further comprises a second protective portion folded over apices of the strut members at the outflow end of the frame.~~

~~33.—The prosthetic heart valve of any of claims 18-32, wherein the frame is a mechanically expandable frame.~~

~~34.—The prosthetic heart valve of any of claims 18-32, wherein the frame is a plastically expandable frame.~~

~~35.—The prosthetic heart valve of any of claims 18-32, wherein the covering comprises a plurality of floating portions spaced apart from each other along the longitudinal axis of the frame.~~

~~36.—The prosthetic heart valve of any of claims 18-35, wherein the floating portions are heat set to make them softer and/or more texturized.~~

~~37.—The prosthetic heart valve of any of claims 18-20, wherein twisted PET strands are used in a warp direction and textured PET strands are used in a weft direction.~~

~~38.—The prosthetic heart valve of claim 37, wherein the twisted PET strands in the warp direction are arranged to weave in leno pattern and the textured PET strands in the weft direction form the floating portion without any weave structure.~~

~~39.—The prosthetic heart valve of claim 38, wherein the coverings is heat shrunk to achieve a stretchability between 80-160%.~~

~~40.—The prosthetic heart valve of any of claims 37-39, wherein the frame is a mechanically expandable frame.~~

~~41.—The prosthetic heart valve of any of claims 18-40, wherein the covering comprises at least one of a low friction layer or low friction coating on at least a portion thereof.~~

~~42.—The prosthetic heart valve of claim 41, wherein the low friction layer or low friction coating is formed via electrospinning.~~

~~43.—The prosthetic heart valve of any of claims 18-41, further comprising strips of material that are helically wrapped around struts and apices at an end of the frame.~~

~~44.—A prosthetic heart valve, comprising:
a frame comprising a plurality of strut members, the frame having an inflow end and an outflow end, the strut members defining a plurality of openings in the frame at the outflow end of the frame;
a leaflet structure situated at least partially within the frame; and
a covering disposed around the frame, the covering defining a plurality of openings that are aligned with the openings in the frame.~~

~~45.—The prosthetic heart valve of claim 44, wherein:
the frame comprises an outer surface; and~~

~~the covering covers the entire outer surface of the frame.~~

~~46.—The prosthetic heart valve of claim 44 or claim 45, wherein:~~

~~the covering comprises a first portion adjacent the inflow end of the frame including a plush pile layer; and~~

~~the covering further comprises a second portion without a pile layer adjacent the outflow end of the frame; and~~

~~the second portion of the covering defines the openings of the covering.~~

~~47.—The prosthetic heart valve of claim 46, wherein the second portion of the covering is formed of a bias cloth.~~