WHAT IS CLAIMED IS:

1. A device for treating a thrombus in a vessel, the device comprising:

a first portion comprising a plurality of wires woven to form a textile structure expandable from a collapsed configuration to an expanded configuration,

the textile structure comprising, in the expanded configuration:

five to twenty self-expanding bulbs, and

a plurality of necks,

pairs of the five to twenty self-expanding bulbs spaced along a longitudinal axis of the textile structure by a neck of the plurality of necks,

the plurality of wires comprising shape-memory wires;

a second portion including a tubular member; and

a bonding zone coupling the first portion and the second portion.

2. The device of Claim 1, wherein the five to twenty self-expanding bulbs comprises:

a first bulb;

a second bulb distal to the first bulb, the first bulb and the second bulb having a first diameter;

a third bulb distal to the second bulb;

a fourth bulb distal to the third bulb, the third bulb and the fourth bulb having a second diameter smaller than the first diameter;

a fifth bulb distal to the fourth bulb;

a sixth bulb distal to the fifth bulb;

a seventh bulb distal to the sixth bulb, the fifth bulb, the sixth bulb, and the seventh bulb having a third diameter smaller than the second diameter;

an eighth bulb distal to the seventh bulb;

a ninth bulb distal to the eighth bulb; and

a tenth bulb distal to the ninth bulb, the eighth bulb, the ninth bulb, and the tenth bulb having a fourth diameter smaller than the third diameter.

3. The device of Claim 2, wherein each of the first bulb, the second bulb, the third bulb, the fourth bulb, the fifth bulb, the sixth bulb, the seventh bulb, the eighth bulb, the ninth bulb, and the tenth bulb has a spherical shape.

4. The device of Claim 1, wherein the second portion comprises a hypotube having a longitudinal axis and comprising:

a first pattern of longitudinally-spaced rows each including two kerfs and two stems, the two stems in each of the rows of the first pattern circumferentially opposite, the stems of the first pattern offset in a first circumferential direction; and

a second pattern of longitudinally-spaced rows each including two kerfs and two stems, the two stems in each of the rows of the second pattern circumferentially opposite, the rows of the second pattern singly alternatingly interspersed with the rows of the first pattern, the stems of the second pattern offset in a second circumferential direction opposite the first circumferential direction.

5. The device of Claim 4, wherein the longitudinally-spaced rows of the first pattern are at an angle with respect to the longitudinal axis of the hypotube, and wherein the longitudinally-spaced rows of the second pattern are at an angle with respect to the longitudinal axis of the hypotube.

6. The device of Claim 4, wherein the kerfs in each of the longitudinally-spaced rows of the first pattern and the longitudinally-spaced rows of the second pattern comprise rounded edges.

7. The device of Claim 4, wherein the hypotube comprises:

a first section having a first pitch of the longitudinally-spaced rows of the first pattern and the longitudinally-spaced rows of the second pattern;

a second section having a second pitch of the longitudinally-spaced rows of the first pattern and the longitudinally-spaced rows of the second pattern, the second section proximal to the first section, the second pitch greater than the first pitch;

a third section having a third pitch of the longitudinally-spaced rows of the first pattern and the longitudinally-spaced rows of the second pattern, the third section proximal to the second section, the third pitch greater than the second pitch; and

a fourth section having a fourth pitch of the longitudinally-spaced rows of the first pattern and the longitudinally-spaced rows of the second pattern, the fourth section proximal to the third section, the fourth pitch greater than the third pitch.

8. The device of Claim 1, wherein at least two of the five to twenty self-expanding bulbs have different outer diameters in the expanded configuration.

9. The device of Claim 1, wherein at least two of the five to twenty self-expanding bulbs have different shapes in the expanded configuration.

10. The device of Claim 1, wherein at least one of the five to twenty self-expanding bulbs has a spherical shape in the expanded configuration.

11. The device of Claim 1, wherein at least one of the five to twenty self-expanding bulbs has an oblong shape in the expanded configuration.

12. The device of Claim 1, wherein the first portion is hollow.

13. The device of Claim 1, wherein the first portion comprises a free distal end.

14. The device of Claim 1, wherein a diameter of the first portion in the collapsed configuration is between 0.25 mm and 0.5 mm.

15. The device of Claim 1, wherein the textile structure is tapered or stepped from a proximal end to a distal end.

16. The device of Claim 1, wherein the bonding zone includes a proximal end of the first portion within a distal end of the second portion.

17. The device of Claim 16, wherein the bonding zone comprises a ring or cylinder around the plurality of wires.

18. The device of Claim 17, wherein the plurality of wires is welded to the ring or cylinder.

19. The device of Claim 1, wherein the bonding zone includes a distal end of the second portion within a proximal end of the first portion.

20. The device of Claim 19, wherein the bonding zone comprises heat-shrink tubing around the proximal end of the first portion.

21. The device of Claim 1, wherein the bonding zone includes a distal end of the second portion within a distal end of the first portion.

22. The device of Claim 21, wherein the first portion comprises a free proximal end.

23. The device of Claim 1, wherein the bonding zone comprises silver-based lead-free solder.

24. The device of Claim 1, wherein the plurality of wires comprises radiopaque wires and wherein the radiopaque wires are spaced or clustered to increase visibility under x-ray.

25. The device of Claim 1, wherein the plurality of wires comprises radiopaque wires and wherein at least two of the radiopaque wires form at least two longitudinally offset sine waves visibly distinct from the shape memory wires under x-ray.

26. The device of Claim 25, wherein the at least two longitudinally offset sine waves facilitate length measurement in the vessel.

27. The device of Claim 25, wherein crossings of the at least two longitudinally offset sine waves are spaced at regular intervals.

28. The device of Claim 25, wherein at least one of the at least two longitudinally offset sine waves comprises a plurality of circumferentially adjacent radiopaque wires that are parallel and longitudinally spaced along the textile structure.

29. The device of Claim 1, wherein a first neck of the plurality of necks has a different parameter than a second neck of the plurality of necks, and wherein the different neck parameter includes at least one of length, diameter, and shape.

30. The device of Claim 1, wherein the first portion comprises a distal end comprising a distal end of each of the plurality of wires trimmed along a plane transverse to the longitudinal axis of the textile structure.

31. The device of Claim 30, wherein the distal end of each of the plurality of wires is trimmed at an angle of 90° to the longitudinal axis of the textile structure.

32. The device of Claim 30, wherein the distal end of the first portion comprises a polymer coating at least the distal end of each of the plurality of wires.

33. The device of Claim 32, wherein the polymer comprises radiopaque particles.

34. The device of Claim 32, wherein the distal end of the first portion comprises a lumen maintained by absence of the polymer.

35. The device of Claim 1, wherein the five to twenty bulbs are phase shifted relative to the longitudinal axis of the textile structure.

36. The device of Claim 1, wherein the textile structure comprises:

a first shape at a first temperature,

wherein the first shape comprises a spiral;

a second shape at a second temperature higher than the first temperature,

wherein the second shape comprises the expanded configuration; and

a third shape comprising stress-induced martensite,

the third shape different than the first shape and the second shape,

wherein the textile structure is configured to self-expand from the third shape to the second shape upon deployment from a sheath, and

wherein the textile structure is configured to transform from the second shape to the first shape upon exposure to the first temperature or lower.

37. The device of Claim 36, wherein the first temperature is less than 25 °C.

38. The device of Claim 36, wherein the second temperature is between 25 °C and 37 °C.

39. The device of Claim 1, wherein the tubular member comprises:

a wire; and

a hypotube comprising a lumen, the hypotube distal to the wire,

wherein a portion of the wire is coupled inside the lumen of the hypotube.

40. The device of Claim 1, wherein the tubular member comprises a plurality of different austenitic finish temperatures along a longitudinal axis of the tubular member.

41. The device of Claim 1, wherein the tubular member comprises a plurality of different shape sets along a longitudinal axis of the tubular member.

42. The device of Claim 1, wherein the tubular member comprises a plurality of different materials along a longitudinal axis of the tubular member.

43. The device of Claim 1,

wherein the first portion comprises pores between the plurality of wires,

wherein the second portion comprises:

a wire comprising shape-memory material, the wire having a distal end comprising:

a first shape at a first temperature, and

a second shape at a second temperature different than the first temperature, the second shape being a straightened form of the first shape; and

a tubular element, and

wherein the bonding zone reversibly couples the first portion and the second portion, the bonding zone comprising the plurality of wires and the pores of the first portion being engaged with the wire in the first shape and with the tubular element.

44. The device of Claim 43, wherein the wire comprises a coiling portion proximal to the distal end, the coiling portion comprising:

a coil at the first temperature; and

a straightened form of the coil at the second temperature.

45. The device of Claim 43, wherein the bonding zone comprises solder between the proximal portion and the distal portion, the bonding zone having a tensile strength less than 18,600 kPa.

46. The device of Claim 1,

wherein a proximal part of the first portion has a first shape at a first temperature and a second shape at a second temperature different than the first temperature, the second shape being a straightened form of the first shape,

wherein the tubular member comprises a distal end comprising a socket, and

wherein the bonding zone reversibly couples the first portion and the second portion, the bonding zone comprising the proximal part of the first portion mechanically forced into the socket.

47. The device of Claim 46, wherein the socket includes at least one of a slit, a recess, and a radially outward dimple.

48. The device of Claim 46, wherein the bonding zone comprises the first portion radially outward of the tubular member.

49. The device of Claim 46, wherein the bonding zone comprises the tubular member radially outward of the first portion.

50. The device of Claim 1,

wherein the first portion comprises pores between the plurality of wires creating a plurality of grooves,

wherein the second portion comprises a distal end comprising a plurality of ridges, and

wherein the bonding zone reversibly couples the first portion and the second portion, the bonding zone comprising the plurality of ridges mechanically forced into the plurality of grooves.

51. The device of Claim 50, wherein the ridges comprise threads at an angle to a longitudinal axis of the distal end of the second portion.

52. The device of Claim 50, wherein the ridges are perpendicular to a longitudinal axis of the distal end of the second portion.

53. The device of Claim 1, wherein the five to twenty self-expanding bulbs comprises:

a first bulb;

a second bulb distal to the first bulb, the first bulb and the second bulb having a first diameter;

a third bulb distal to the second bulb;

a fourth bulb distal to the third bulb, the third bulb and the fourth bulb having a second diameter smaller than the first diameter;

a fifth bulb distal to the fourth bulb; and

a sixth bulb distal to the fifth bulb; the fifth bulb and the sixth bulb having a third diameter smaller than the second diameter.

54. The device of Claim 1, wherein the bonding zone includes a distal end of the second portion within at least part of the first portion.

55. A method of treating a thrombus in a vessel, the method comprising:

providing the device of any one of Claims 1-54;

expanding from the collapsed configuration to the expanded configuration at least some of the five to twenty self-expanding bulbs; and

entrapping the thrombus in the at least some of the five to twenty self-expanding bulbs.

56. The method of Claim 55, wherein entrapping the thrombus includes torsionally rasping the thrombectomy device.

57. A method of treating a thrombus, the method comprising:

expanding from a collapsed configuration to an expanded configuration at least some bulbs out of five to twenty bulbs of a textile structure of a first portion of a thrombectomy device,

wherein a plurality of wires are woven to form the textile structure, the plurality of wires comprising shape-memory wires,

wherein the textile structure comprises a plurality of necks, pairs of the five to twenty bulbs spaced along a longitudinal axis of the textile structure by a neck of the plurality of necks,

wherein the thrombectomy device further comprises:

a second portion including a tubular member, and

a bonding zone coupling the first portion and the second portion;

entrapping the thrombus in the at least some bulbs in the expanded configuration; and

retracting the thrombectomy device from the vessel.

58. The method of Claim 57, wherein expanding the at least some bulbs to the expanded configuration comprises retracting a microcatheter surrounding the five to twenty bulbs in the collapsed configuration.

59. The method of Claim 58, wherein retracting the microcatheter is at least until a distal end of the microcatheter is proximal to the thrombus.

60. The method of Claim 58, wherein retracting the thrombectomy device from the vessel comprises retracting the microcatheter at a similar rate.

61. The method of Claim 57, wherein the second portion includes a hypotube including a plurality of longitudinally spaced kerfs.

62. The method of Claim 61, wherein the plurality of longitudinally spaced kerfs includes a plurality of interspersed cut patterns.

63. The method of Claim 61, wherein a pitch of the plurality of longitudinally spaced kerfs varies longitudinally along the hypotube.

64. The method of Claim 61, wherein at least some of the plurality of longitudinally spaced kerfs includes rounded edges.

65. The method of Claim 57, wherein retracting the thrombectomy device from the vessel comprises applying negative suction to the vessel.

66. The method of Claim 57, wherein expanding the at least some bulbs from the collapsed configuration to the expanded configuration comprises expanding the vessel by 0% to 30%.

67. The method of Claim 57, wherein entrapping the thrombus includes torsionally rasping the thrombectomy device.

68. The method of Claim 67, wherein torsionally rasping effects at least one of:

removing portions of the thrombus attached to an endothelium wall of the vessel,

entrapping the thrombus in the distal portion of the thrombectomy device, and

collecting emboli in the distal portion of the thrombectomy device.

69. The method of Claim 67, wherein torsionally rasping comprises rotating the second portion of the thrombectomy device.

70. The method of Claim 67, wherein, during torsionally rasping the thrombectomy device, a ratio of rotation of the first portion of the thrombectomy device to rotation of the second portion of the thrombectomy device is not 1:1.

71. The method of Claim 67, wherein torsionally rasping the thrombectomy device comprises rotating the second portion of the thrombectomy device at least 360 degrees, resulting in a rotation of the first portion of the thrombectomy device of less than 360 degrees.

72. The method of Claim 57, wherein the vessel comprises a blood vessel in a brain or a blood vessel in a leg.

73. The method of Claim 57, further comprising:

measuring a length of the thrombus in the vessel;

measuring a length of the thrombus out of the vessel, wherein retracting the thrombectomy device from the vessel comprises removing the thrombus from the vessel in substantially one piece; and

comparing the length of the thrombus in the vessel to the length of the thrombus out of the vessel.

74. The method of Claim 73, further comprising, if the length of the thrombus out of the vessel is less than the length of the thrombus in the vessel, removing remaining thrombus from the vessel.

75. The method of Claim 73, wherein measuring the length of the thrombus out of the vessel comprises placing the thrombus proximate to a ruler on a package of the thrombectomy device.

76. The method of Claim 57, further comprising measuring a length of the thrombus in the vessel, wherein expanding the at least some bulbs includes retracting a sheath surrounding the five to twenty bulbs in the collapsed configuration by a customizable retraction length, the

customizable retraction length based at least partially on the measured length of the thrombus in the vessel.

77. The method of Claim 76, wherein the customizable retraction length is greater than a length of the at least some bulbs after expanding.

78. The method of Claim 76, wherein the plurality of wires comprises radiopaque wires and wherein at least two of the radiopaque wires are configured to form crossing points visible under x-ray, the crossing points configured to provide approximate length measurement.

79. The method of Claim 57, wherein the textile structure comprises a second shape upon exposure to a temperature or lower than the temperature.

80. The method of Claim 79, wherein the second shape comprises a spiral.

81. The method of Claim 79, wherein the temperature is 25 °C.

82. The method of Claim 79, wherein the temperature is 18 °C.

83. The method of Claim 79, wherein the textile structure comprises a third shape upon exposure to a second temperature or higher than the second temperature.

84. The method of Claim 83, wherein the second temperature is 37 °C.

WHAT IS CLAIMED IS:

1. A device for treating a thrombus in a vessel, the device comprising:

a distal portion comprising a plurality of wires woven to form a textile structure expandable from a collapsed configuration to an expanded configuration,

the textile structure comprising, in the expanded configuration:

a first bulb,

a second bulb distal to the first bulb, the first bulb and the second bulb having a first diameter,

a first neck longitudinally between the first bulb and the second bulb,

a third bulb distal to the second bulb,

a second neck longitudinally between the second bulb and the third bulb,

a fourth bulb distal to the third bulb, the third bulb and the fourth bulb having a second diameter smaller than the first diameter,

a third neck longitudinally between the third bulb and the fourth bulb,

a fifth bulb distal to the fourth bulb,

a fourth neck longitudinally between the fourth bulb and the fifth bulb,

a sixth bulb distal to the fifth bulb; the fifth bulb and the sixth bulb having a third diameter smaller than the second diameter, and

a fifth neck longitudinally between the fifth bulb and the sixth bulb;

the plurality of wires comprising:

a plurality of shape-memory wires, and

a plurality of radiopaque wires;

a proximal portion including a tubular member, the tubular member comprising:

a wire; and

a hypotube comprising a lumen, the hypotube distal to the wire,

wherein a portion of the wire is coupled inside the lumen of the hypotube; and

a bonding zone coupling the distal portion and the proximal portion.

2. The device of Claim 1, wherein the textile structure further comprises a plurality of bulbs, the plurality of bulbs at least one of proximal to, distal to, and between the first, second, third, fourth, fifth, and sixth bulbs.

3. The device of Claim 1 or 2, wherein the distal portion is hollow.

4. The device of any one of Claims 1 to 3, wherein the distal portion comprises a free distal end.

5. A device for treating a thrombus in a vessel, the device comprising:

a first portion comprising a plurality of wires woven to form a textile structure expandable from a collapsed configuration to an expanded configuration,

the textile structure comprising, in the expanded configuration:

four to twenty self-expanding bulbs, wherein the four to twenty self-expanding bulbs comprises:

a first bulb;

a second bulb distal to the first bulb, the first bulb and the second bulb having a first diameter;

a third bulb distal to the second bulb; and

a fourth bulb distal to the third bulb, the third bulb and the fourth bulb having a second diameter smaller than the first diameter;

a plurality of necks,

pairs of the four to twenty self-expanding bulbs spaced along a longitudinal axis of the textile structure by a neck of the plurality of necks,

the plurality of wires comprising shape-memory wires;

a second portion including a tubular member; and

a bonding zone coupling the first portion and the second portion.

6. The device of Claim 5, wherein the tubular member comprises:

a wire; and

a hypotube comprising a lumen, the hypotube distal to the wire,

wherein a portion of the wire is coupled inside the lumen of the hypotube.

7. The device of Claim 5 or 6, wherein the tubular member comprises a plurality of different austenitic finish temperatures along a longitudinal axis of the tubular member.

8. The device of any one of Claims 5 to 7, wherein the first portion is hollow.

9. The device of any one of Claims 5 to 8, wherein the first portion comprises a free distal end.

10. A device for treating a thrombus in a vessel, the device comprising:

a first portion comprising a plurality of wires woven to form a textile structure expandable from a collapsed configuration to an expanded configuration,

the textile structure comprising, in the expanded configuration:

a plurality of self-expanding bulbs, and

a plurality of necks,

pairs of the plurality of self-expanding bulbs spaced along a longitudinal axis of the textile structure by a neck of the plurality of necks,

a second portion including a tubular member,

the tubular member comprising:

a wire; and

a hypotube comprising a lumen, the hypotube distal to the wire,

wherein a distal end of the wire is coupled inside the lumen at a proximal end of the hypotube; and

a bonding zone coupling the first portion and a distal end of the hypotube.

11. The device of Claim 10, wherein the plurality of self-expanding bulbs comprises:

a first bulb;

a second bulb distal to the first bulb, the first bulb and the second bulb having a first diameter;

a third bulb distal to the second bulb; and

a fourth bulb distal to the third bulb, the third bulb and the fourth bulb having a second diameter smaller than the first diameter.

12. The device of Claim 10, wherein the plurality of self-expanding bulbs comprises:

a first bulb;

a second bulb distal to the first bulb, the first bulb and the second bulb having a first diameter;

a third bulb distal to the second bulb;

a fourth bulb distal to the third bulb, the third bulb and the fourth bulb having a second diameter smaller than the first diameter; and

a fifth bulb distal to the fourth bulb, the fifth bulb having a third diameter smaller than the second diameter.

13. The device of Claim 10, wherein the plurality of self-expanding bulbs comprises:

a first bulb;

a second bulb distal to the first bulb, the first bulb and the second bulb having a first diameter;

a third bulb distal to the second bulb;

a fourth bulb distal to the third bulb, the third bulb and the fourth bulb having a second diameter smaller than the first diameter;

a fifth bulb distal to the fourth bulb; and

a sixth bulb distal to the fifth bulb, the fifth bulb and the sixth bulb having a third diameter smaller than the second diameter.

14. The device of any one of Claims 10 to 13, wherein the textile structure comprises:

a first shape at a first temperature,

wherein the first shape comprises a spiral;

a second shape at a second temperature higher than the first temperature,

wherein the second shape comprises the expanded configuration; and

a third shape comprising stress-induced martensite,

the third shape different than the first shape and the second shape,

wherein the textile structure is configured to self-expand from the third shape to the second shape upon deployment from a sheath, and

wherein the textile structure is configured to transform from the second shape to the first shape upon exposure to the first temperature or lower.

15. The device of any one of Claims 10 to 14, wherein the tubular member comprises a plurality of different austenitic finish temperatures along a longitudinal axis of the tubular member.

16. The device of any one of Claims 10 to 15, wherein the tubular member comprises a plurality of different shape sets along a longitudinal axis of the tubular member.

17. The device of any one of Claims 10 to 16, wherein the hypotube has a longitudinal axis and comprises:

a first pattern of longitudinally-spaced rows each including two kerfs and two stems, the two stems in each of the rows of the first pattern circumferentially opposite, the stems of sequential said rows of the first pattern offset in a first circumferential direction; and

a second pattern of longitudinally-spaced rows each including two kerfs and two stems, the two stems in each of the rows of the second pattern circumferentially opposite, the rows of the second pattern singly alternatingly interspersed with the rows of the first pattern, the stems of sequential said rows of the second pattern offset in a second circumferential direction opposite the first circumferential direction.

18. The device of any one of Claims 10 to 17, wherein the plurality of bulbs comprises four to ten bulbs.

19. The device of any one of Claims 10 to 18, wherein the first portion is hollow.

20. The device of any one of Claims 10 to 19, wherein the first portion comprises a free distal end.