



(12) **United States Patent**
Schreck

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(54) **MINIMALLY-INVASIVE HEART VALVES AND METHODS OF USE**

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(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.⁷** **A61F 2/24**

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(52) **U.S. Cl.** **623/2.18; 623/2.1; 623/2.14; 623/2.17; 623/2.28; 623/2.33**

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(58) **Field of Search** **623/2.1, 2.14, 623/2.17, 2.18, 2.38, 2.33, 2.23, 2.28**

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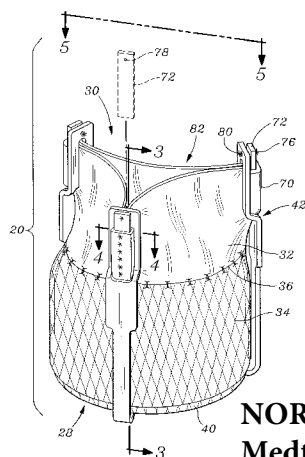
(57) **ABSTRACT**

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Expandable heart valves for minimally invasive valve replacement surgeries are disclosed. In a first embodiment, an expandable pre-assembled heart valve includes a plastically-expandable annular base having plurality of upstanding commissure posts. A tubular flexible member including a prosthetic section and a fabric section is provided, with the prosthetic section being connected to the commissure posts and defining leaflets therebetween, and the fabric section being attached to the annular base. In a second embodiment, an expandable heart valve includes an annular tissue-engaging base and a subassembly having an elastic wireform and a plurality of leaflets connected thereto. The annular base and subassembly are separately stored and connected just prior to delivery to the host annulus. Preferably, the leaflet subassembly is stored in its relaxed configuration to avoid deformation of the leaflets. The expandable heart valves may be implanted using a balloon catheter. Preferably, the leaflets of the heart valves are secured to the commissure regions of the expandable stents using a clamping arrangement to reduce stress.

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20 Claims, 10 Drawing Sheets



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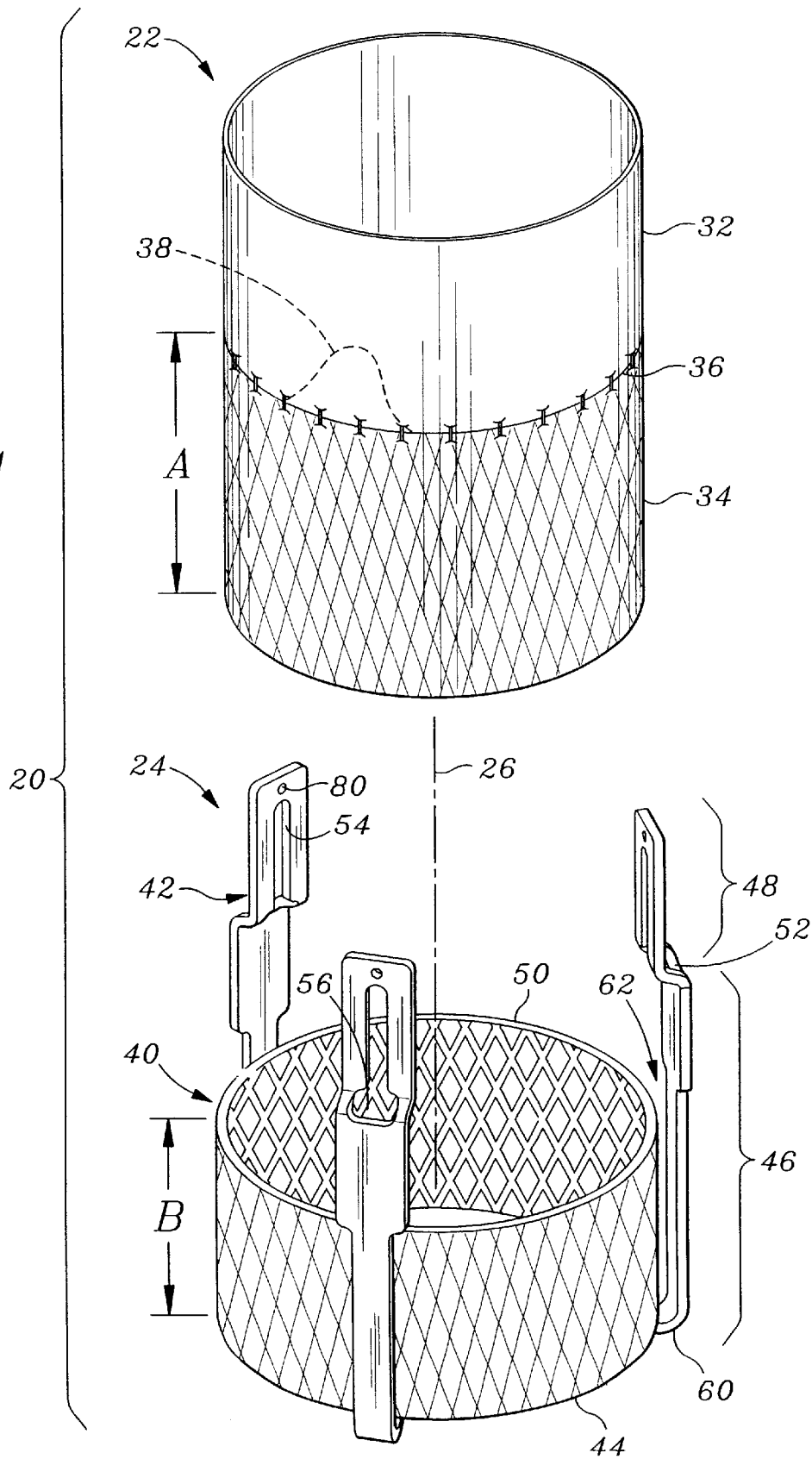
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Fig. 1



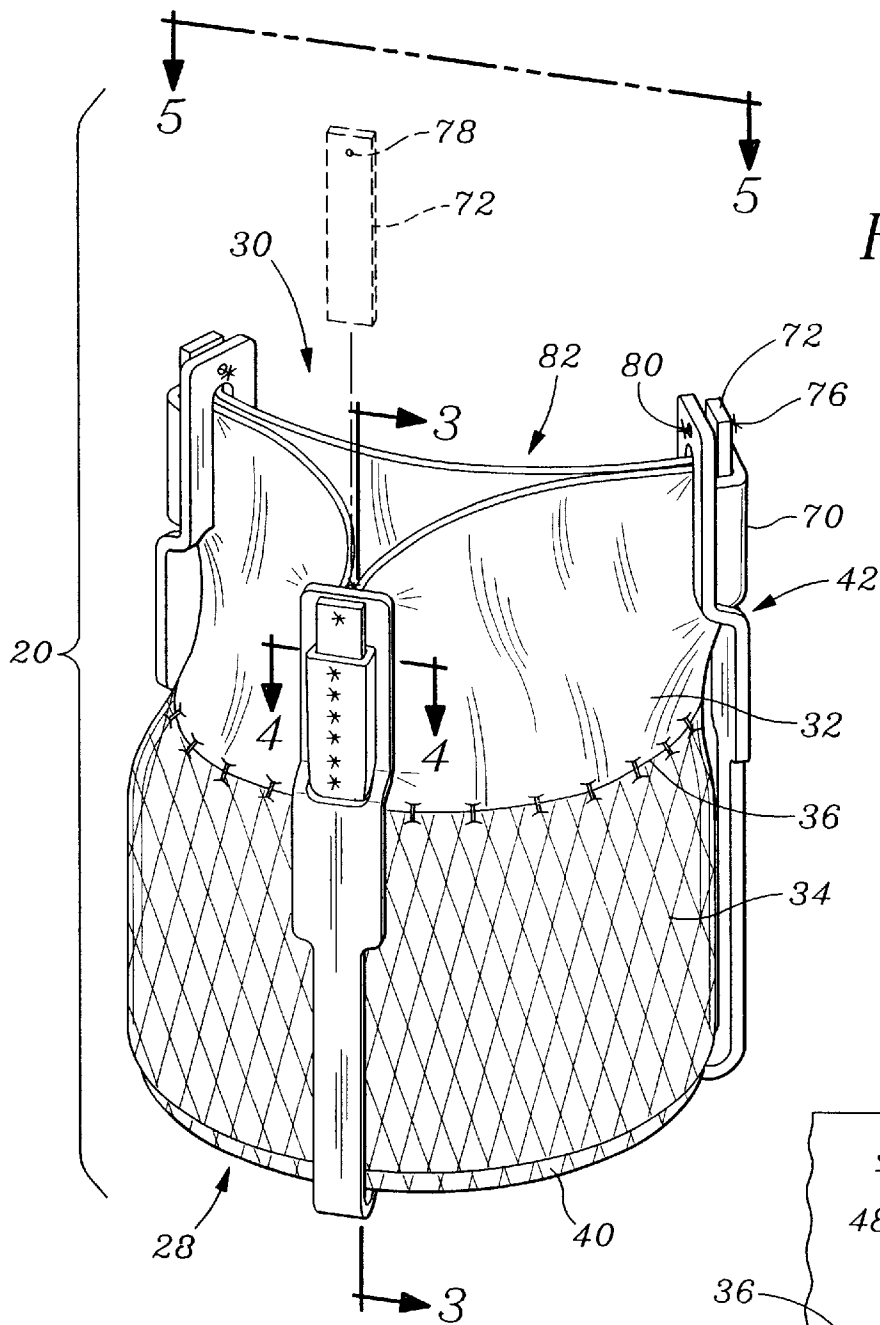


Fig. 2

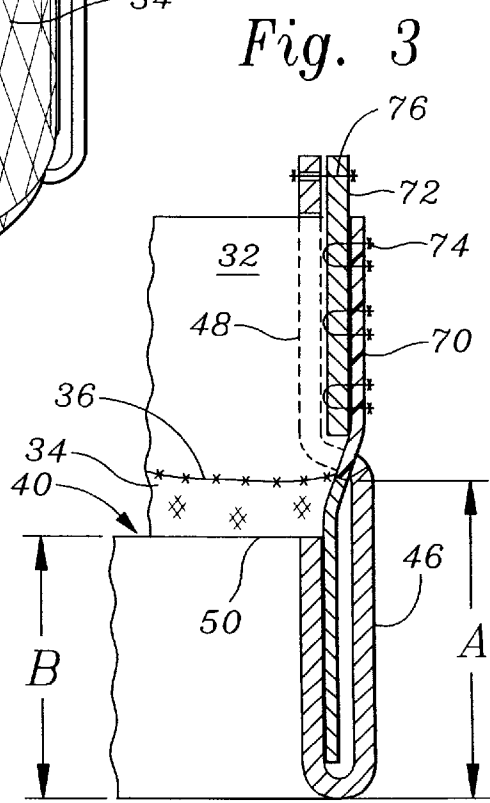


Fig. 3

Fig. 4

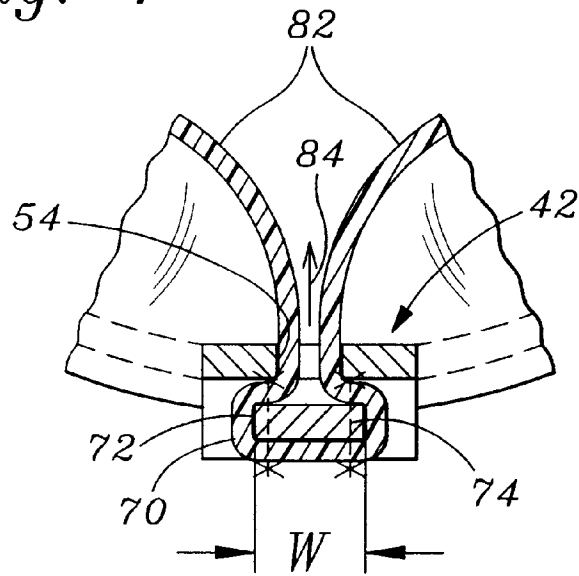
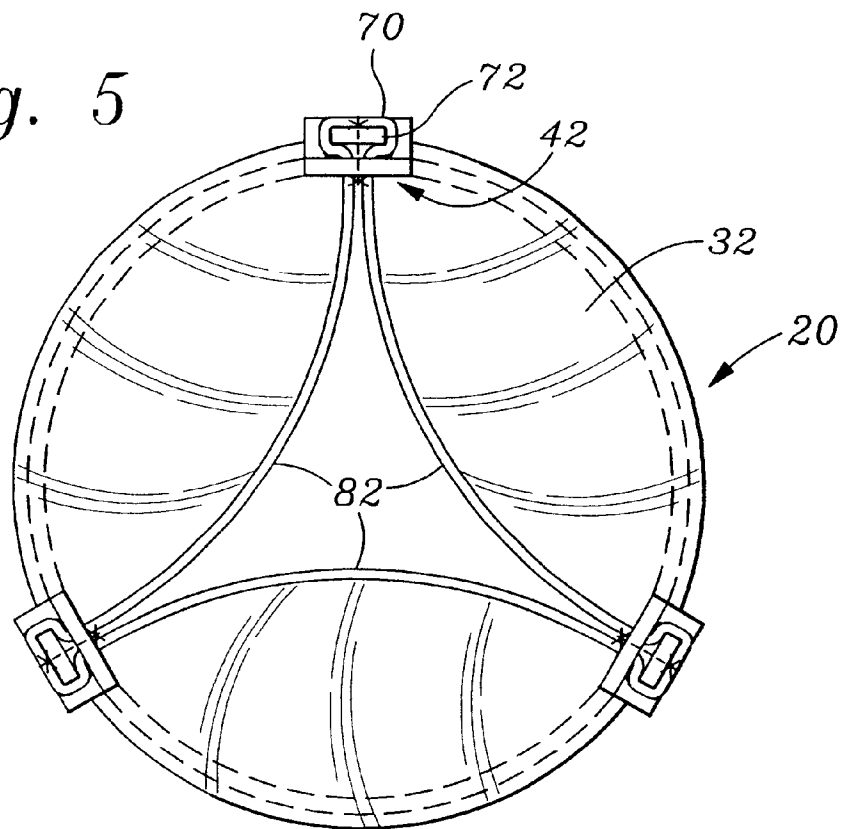


Fig. 5



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