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Cox

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[54] METHOD OF REPLACING HEART VALVES
USING FLEXIBLE TUBES

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Related U.S. Application Data

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5,480,424.

[51] Int. Cl.⁶ A61F 2/24

[52] U.S. Cl. 623/2; 623/1; 623/66;
623/900; 623/901; 435/238

[58] Field of Search 623/1, 2, 66, 900,
623/901; 435/238

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Primary Examiner—John G. Weiss

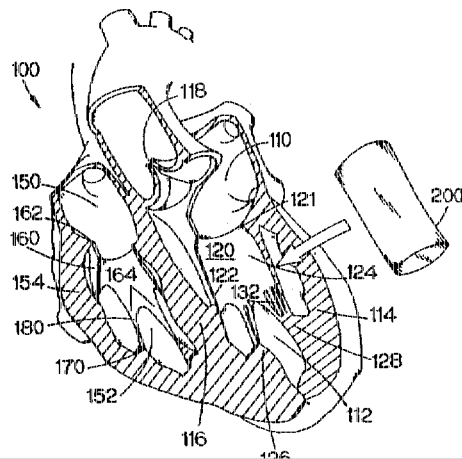
Assistant Examiner—Francis K. Cuddihy

Attorney, Agent, or Firm—Boyd D. Cox; Patrick D. Kelly

[57] ABSTRACT

This invention comprises a method of using tubular material to replace a heart valve during cardiac surgery. To create a replacement atrioventricular (mitral or tricuspid) valve, the tube inlet is sutured to a valve annulus from which the native leaflets have been removed, and the tube outlet is sutured to papillary muscles in the ventricle. To create a semilunar (aortic or pulmonary) valve, the tube inlet is sutured to an annulus from which the native cusps have been removed, and the tube is either "tacked" at three points distally inside the artery, or sutured longitudinally along three lines; this allows the flaps of tissue between the three fixation points at the valve outlet to function as movable cusps. These approaches generate flow patterns that closely duplicate the flow patterns of native valves. One preferred tubular material comprises submucosal tissue from a small intestine, from the same patient who is undergoing the cardiac operation; this eliminates the risk of immune rejection and the need to treat the tissue to reduce antigenicity. Intestinal tissue from human cadavers or animals such as genetically engineered hypoallergenic pigs can also be used, if properly treated, or a biocompatible synthetic tubular material can be used.

10 Claims, 4 Drawing Sheets



Medtronic Exhibit 1021

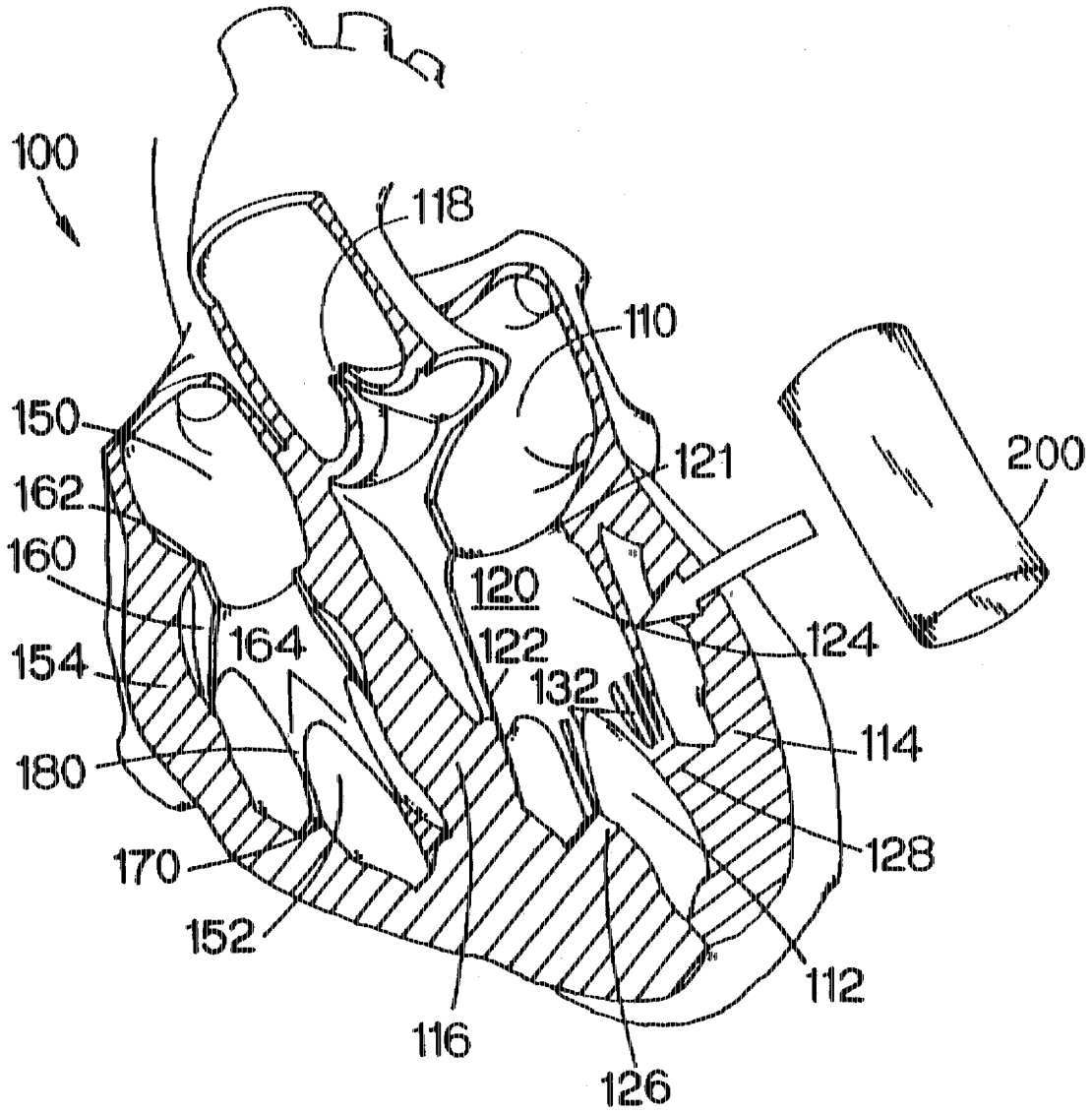


FIG.1.

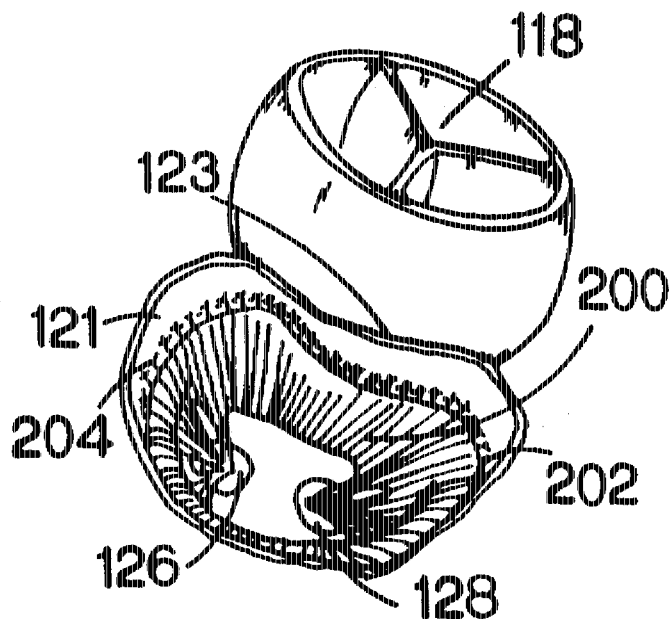


FIG. 2.

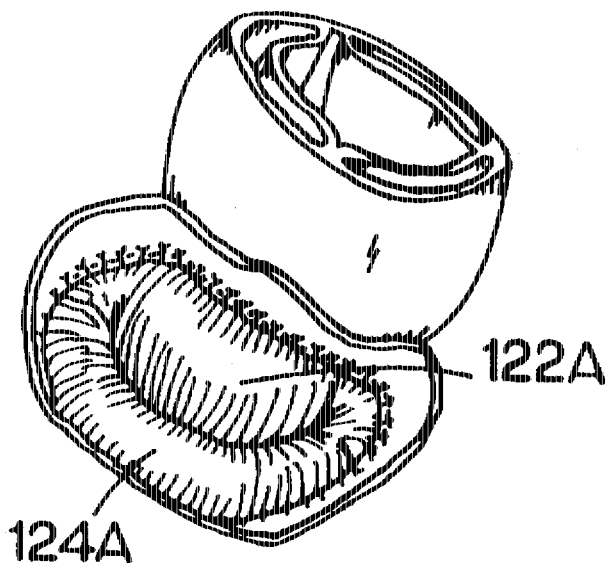


FIG. 3.

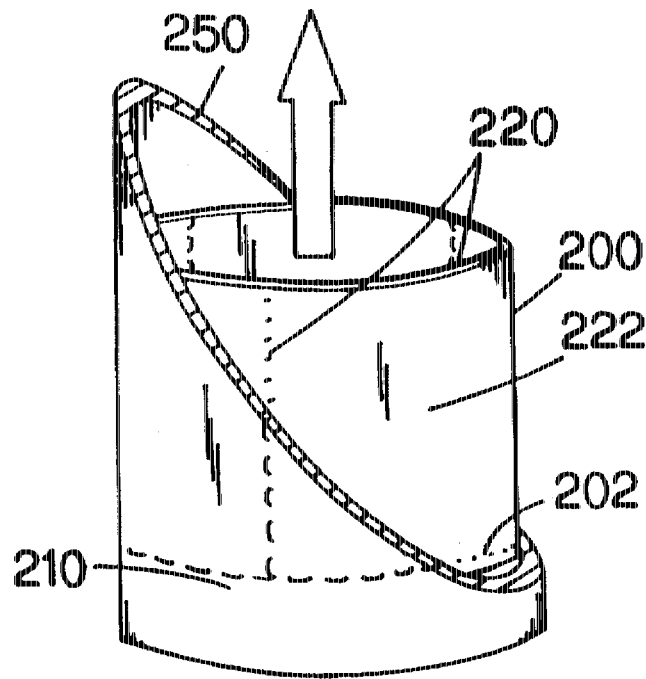


FIG. 4.

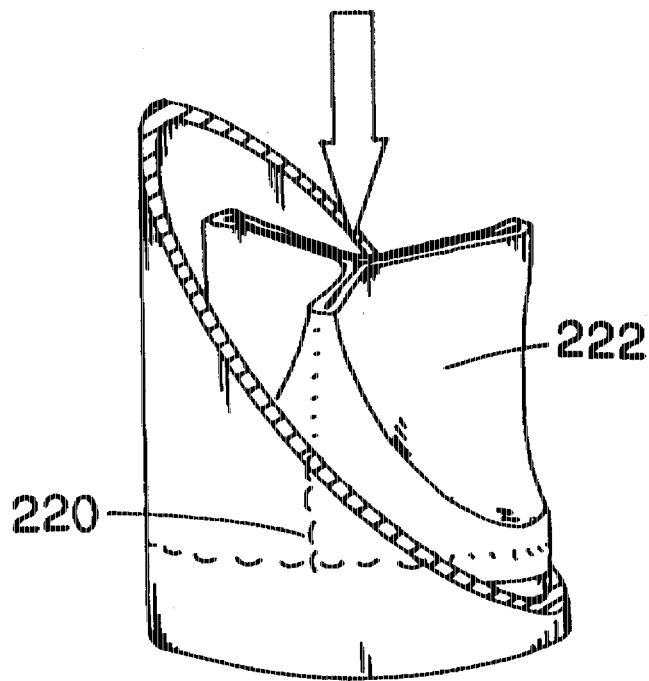


FIG. 5.

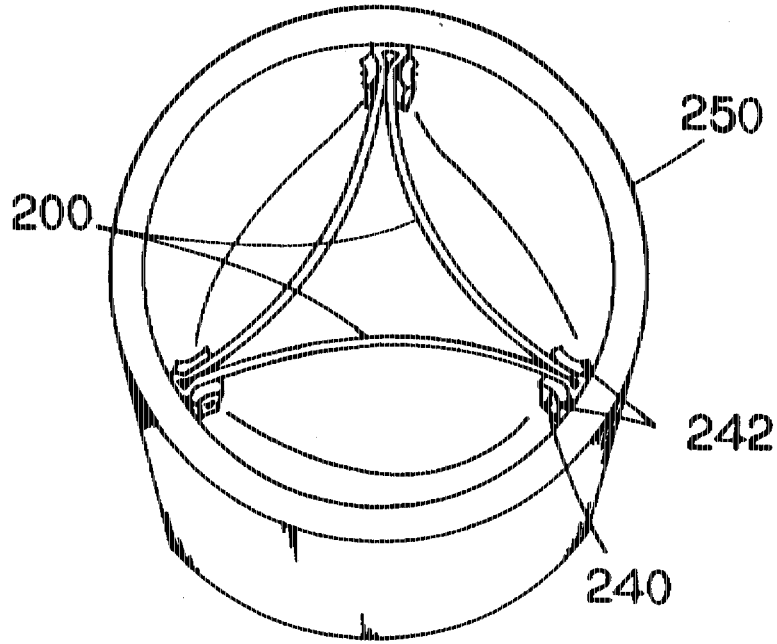


FIG. 6.

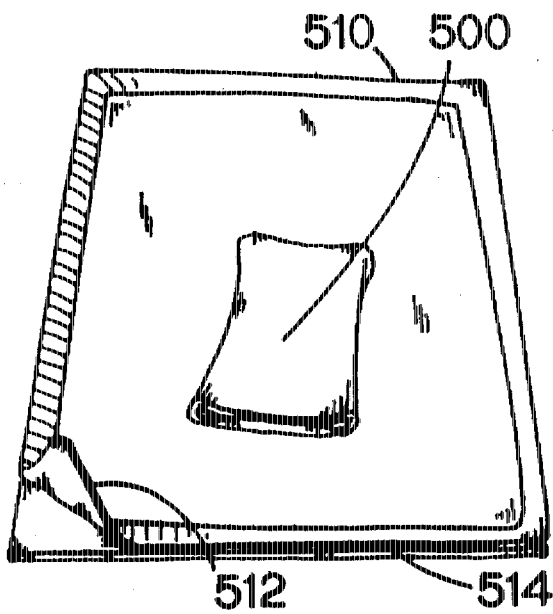


FIG. 7.

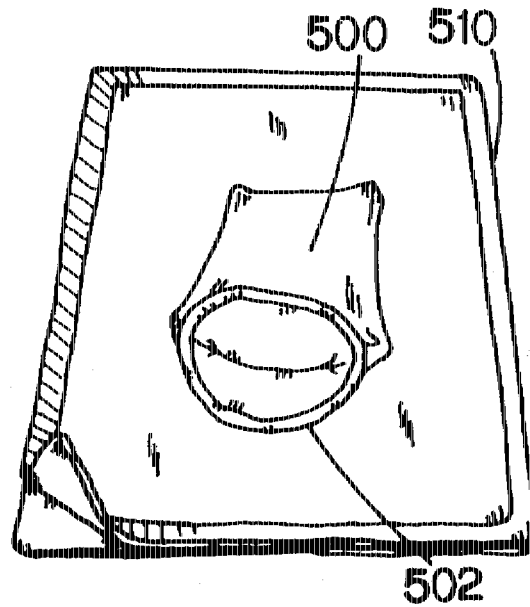


FIG. 8.

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