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Mathis et al.

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(54) **FIXED ANCHOR AND PULL MITRAL VALVE DEVICE AND METHOD**

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See application file for complete search history.

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(56) **References Cited**

U.S. PATENT DOCUMENTS

3,620,212 A 11/1971 Fannon, Jr. et al.
3,786,806 A 1/1974 Johnson et al.

(Continued)

FOREIGN PATENT DOCUMENTS

EP 0893133 1/1999
EP 0903110 A1 3/1999

(Continued)

OTHER PUBLICATIONS

Reuter et al.; U.S. Appl. No. 12/642,525 entitled "Adjustable Height Focal Tissue Deflector," filed Dec. 18, 2009.

(Continued)

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(52) **U.S. Cl.**

CPC *A61F 2/2451* (2013.01); *A61F 2/24* (2013.01); *A61F 2/2442* (2013.01); *A61F 2/2466* (2013.01); *A61B 2017/00243* (2013.01); *A61N 1/057* (2013.01); *A61N 2001/0585* (2013.01)

(58) **Field of Classification Search**

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(57) **ABSTRACT**

A device affects the mitral valve annulus geometry of a heart. The device includes a first anchor configured to be positioned within and anchored to the coronary sinus of the heart adjacent the mitral valve annulus within the heart and a second anchor configured to be positioned within the coronary sinus of the heart proximal to the first anchor and adjacent the mitral valve annulus within the heart. The second anchor, when deployed, anchors against distal movement and is moveable in a proximal direction. The device further includes a connecting member having a fixed length permanently attached to the first and second anchors. As a result, when the first and second anchors are within the coronary sinus with the first anchor anchored in the coronary sinus, the second anchor may be displaced proximally to affect the geometry of the mitral valve annulus and released to maintain the effect on the mitral valve geometry.

5 Claims, 4 Drawing Sheets

