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# United States Patent [19]

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Tartaglia et al.

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[54] **APPARATUS FOR PERCUTANEOUSLY PERFORMING MYOCARDIAL REVASCULARIZATION HAVING MEANS FOR SENSING TISSUE PARAMETERS AND METHODS OF USE**

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[75] Inventors: **Joseph M. Tartaglia**, Morgan Hill; **Vahid Saadat**, Redwood Shores; **Eric W. Leopold**, Redwood City; **Peter K. Park**, Santa Clara, all of Calif.; **Susan Philip**, Gladstone, Oreg.

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[73] Assignee: **Angiotrax, Inc.**, Sunnyvale, Calif.

[\*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **09/274,790**

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(List continued on next page.)

### Related U.S. Application Data

[63] Continuation-in-part of application No. 08/863,877, May 27, 1997, Pat. No. 5,910,150.

[60] Provisional application No. 60/032,196, Dec. 2, 1996.

[51] **Int. Cl.<sup>7</sup>** ..... **A61B 17/32**

[52] **U.S. Cl.** ..... **606/170; 606/159; 600/564**

[58] **Field of Search** ..... 606/1, 159, 169, 606/170, 171; 600/564, 565

*Primary Examiner*—Michael Buiz  
*Assistant Examiner*—William W Lewis  
*Attorney, Agent, or Firm*—Fish & Neave; Nicola A. Pisano

### [57] ABSTRACT

Apparatus and methods for percutaneously performing myocardial revascularization are provided using a catheter having an end region that is directable to contact a patient's endocardium at a plurality of positions. A cutting head is disposed within a lumen of the catheter and coupled to a drive tube that rotates and reciprocates the drive shaft. One or more stabilizing elements are disposed on the distal end to retain the catheter in position when the cutting head is actuated. The cutting head and drive tube include a lumen through which severed tissue is aspirated. Mechanisms and methods are provided for providing the operator with information to assess the desirability of treating a proposed site. Mechanisms also are provided for controlling the maximum extension of the cutting head beyond a distal endface of the catheter, independent of the degree of tortuosity imposed on the catheter.

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**45 Claims, 9 Drawing Sheets**

