



US005690675A

United States Patent [19]

[11] Patent Number: **5,690,675**

Sawyer et al.

[45] Date of Patent: **Nov. 25, 1997**

[54] **METHODS FOR SEALING OF STAPLES AND OTHER FASTENERS IN TISSUE**

5,071,417	12/1991	Sinofsky	606/8
5,156,613	10/1992	Sawyer	606/213
5,209,776	5/1993	Bass et al.	106/124
5,503,638	4/1996	Cooper et al.	623/11

[75] Inventors: **Philip N. Sawyer**, Brooklyn, N.Y.;
Philip M. Sawyer, Menlo Park; **Cary J. Reich**, Laguna Hills, both of Calif.

FOREIGN PATENT DOCUMENTS

[73] Assignee: **Fusion Medical Technologies, Inc.**,
Mountain View, Calif.

92/14513	3/1992	WIPO
93/01758	4/1993	WIPO

[21] Appl. No.: **481,712**

OTHER PUBLICATIONS

[22] Filed: **Jun. 7, 1995**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 303,336, Sep. 6, 1994, which is a continuation-in-part of Ser. No. 7,691, Jan. 22, 1993, abandoned, which is a continuation-in-part of Ser. No. 832,171, Feb. 6, 1992, abandoned, which is a continuation-in-part of Ser. No. 654,860, Feb. 13, 1991, Pat. No. 5,156,613.

Oz, M. C. et al. SPIE vol. 1200, pp.55-59 (1990).
 Joel D. Cooper, MD "Technique to Reduce Air Leaks After Resection of Emphysematous Lung," Ann Thorac Surg, 57:1038-1039. (1994).
 Product Brochure, Peri-Strips™ for Staple Line Reinforcement, Bio-Vascular, Inc., two pages, Rev. 97003A (1994).
 Product Brochure, Peri-Guard® Processed Bovine Pericardium, Bio-Vascular, six pages, 98501 Rev. A (1992).

[51] **Int. Cl.**⁶ **A61B 17/00**

Primary Examiner—Raj Bawa
Attorney, Agent, or Firm—Townsend and Townsend and Crew LLP

[52] **U.S. Cl.** **606/229; 606/27; 606/32; 606/213; 606/214; 606/228; 606/230; 128/898**

[57] **ABSTRACT**

[58] **Field of Search** 424/400; 606/7, 606/8, 10, 12, 17, 213, 214, 40, 3, 215, 27, 32, 2, 228, 229, 230, 233; 128/898, DIG. 8; 607/1

Wounds in lung tissue are closed in a two step method consisting essentially of applying fasteners to a region adjacent to the wound, wherein the fasteners may cause penetrations. The fasteners are present in a preformed layer of collagen, fibrin, fibrinogen, elastin, albumin, or a combination thereof, and energy is applied to the region to fuse the material to the tissue and seal perforations in the tissue.

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,854,320 8/1989 Dew et al. 128/397

14 Claims, 4 Drawing Sheets