



US006077295A

United States Patent [19]
Limon et al.

[11] **Patent Number:** **6,077,295**
[45] **Date of Patent:** ***Jun. 20, 2000**

- [54] **SELF-EXPANDING STENT DELIVERY SYSTEM**
- [75] Inventors: **Timothy A. Limon**, Cupertino;
Richard J. Saunders, Redwood City,
both of Calif.
- [73] Assignee: **Advanced Cardiovascular Systems, Inc.**, Santa Clara, Calif.
- [*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).
- [21] Appl. No.: **08/680,429**
- [22] Filed: **Jul. 15, 1996**
- [51] **Int. Cl.**⁷ **A61F 2/06**
- [52] **U.S. Cl.** **623/1; 606/108; 606/192**
- [58] **Field of Search** **606/1, 108, 191-200; 623/1, 11, 12**

- 5,026,377 6/1991 Burton et al. .
- 5,034,001 7/1991 Garrison et al. .
- 5,035,706 7/1991 Gianturco et al. .
- 5,037,392 8/1991 Hillstead .
- 5,037,427 8/1991 Harada et al. .
- 5,041,126 8/1991 Gianturco .
- 5,059,166 10/1991 Fischell et al. .
- 5,061,275 10/1991 Wallsten et al. .
- 5,064,435 11/1991 Porter .
- 5,071,407 12/1991 Termin et al. .
- 5,078,720 1/1992 Burton et al. .
- 5,089,005 2/1992 Harada .
- 5,089,006 2/1992 Stiles .
- 5,092,877 3/1992 Pinchuk .
- 5,108,416 4/1992 Ryan et al. .
- 5,123,917 6/1992 Lee .
- 5,135,517 8/1992 McCoy .
- 5,158,548 10/1992 Lau et al. .
- 5,163,952 11/1992 Froix .
- 5,163,958 11/1992 Pinchuk .
- 5,171,262 12/1992 MacGregor .
- 5,183,085 2/1993 Timmermans .

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

- 2102019 5/1994 Canada .
- 0 556 940 8/1993 European Pat. Off. .
- 0 596 145 5/1994 European Pat. Off. .
- 90 10 130 U 9/1990 Germany .
- WO 95/33422 12/1995 WIPO .
- WO 96/39998 12/1996 WIPO .

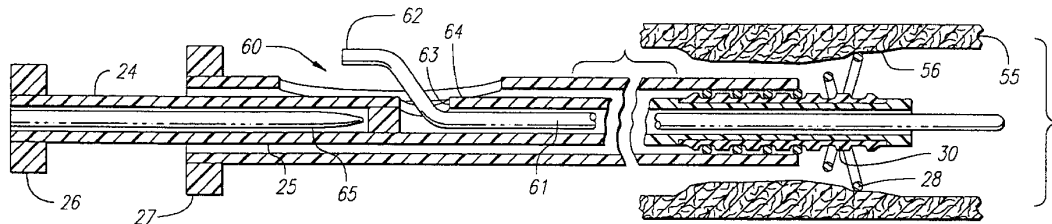
- [56] **References Cited**
- U.S. PATENT DOCUMENTS**
- 4,300,244 11/1981 Bokros .
- 4,512,338 4/1985 Balco et al. .
- 4,580,568 4/1986 Gianturco .
- 4,655,771 4/1987 Wallsten .
- 4,740,207 4/1988 Kreamer .
- 4,762,128 8/1988 Rosenbluth .
- 4,795,458 1/1989 Regan .
- 4,830,003 5/1989 Wolff et al. .
- 4,878,906 11/1989 Lindemann et al. .
- 4,886,062 12/1989 Wiktor .
- 4,893,623 1/1990 Rosenbluth .
- 4,907,336 3/1990 Gianturco .
- 4,913,141 4/1990 Hillstead .
- 4,950,227 8/1990 Savin et al. .
- 4,969,458 11/1990 Wiktor .
- 4,969,890 11/1990 Sugita et al. .
- 4,990,155 2/1991 Wilkoff .
- 4,998,539 3/1991 Delsanti .
- 5,002,560 3/1991 Machold et al. .

Primary Examiner—Glenn K. Dawson
Attorney, Agent, or Firm—Fulwider Patton Lee & Utecht, LLP

[57] **ABSTRACT**

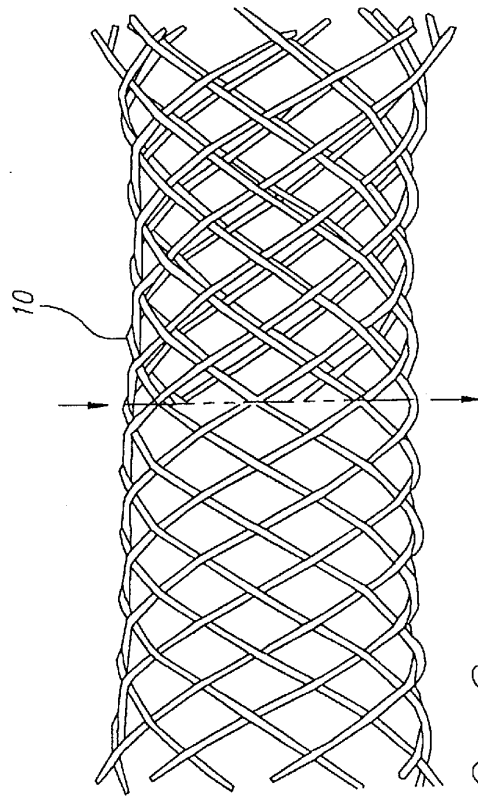
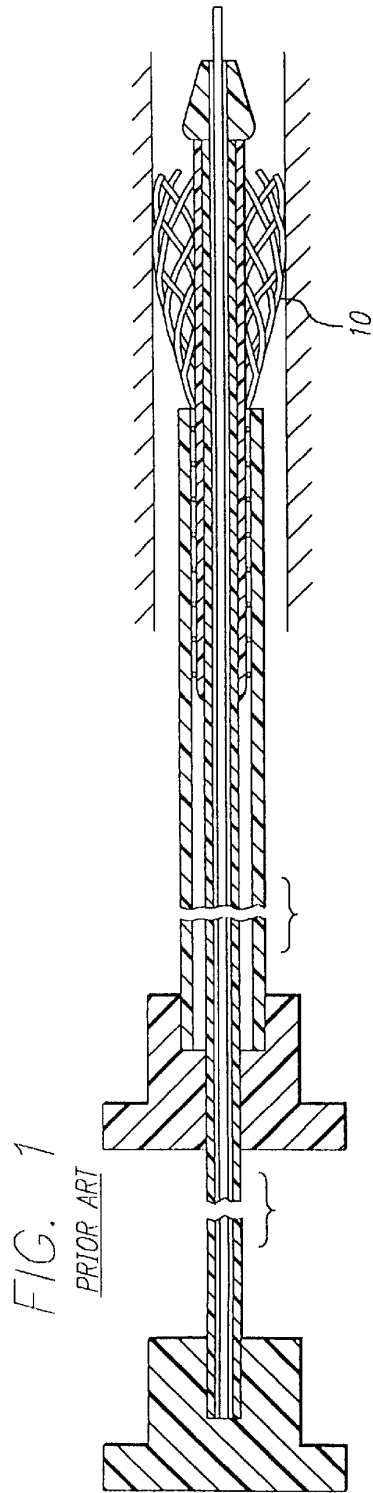
A stent-delivery catheter system delivers and implants a self-expanding stent intraluminally into a human patient's body lumen. A self-expanding stent is removably attached to the distal end of an inner member so that attachment projections prevent axial movement of the stent on the inner member while the stent is being delivered and implanted in a patient's body lumen.

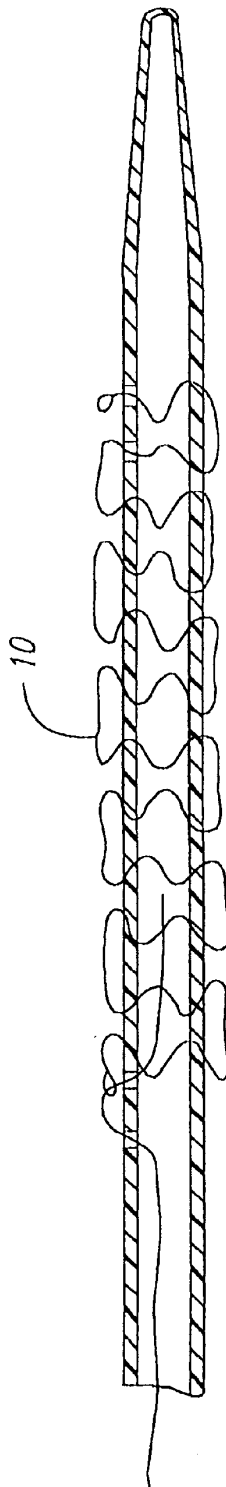
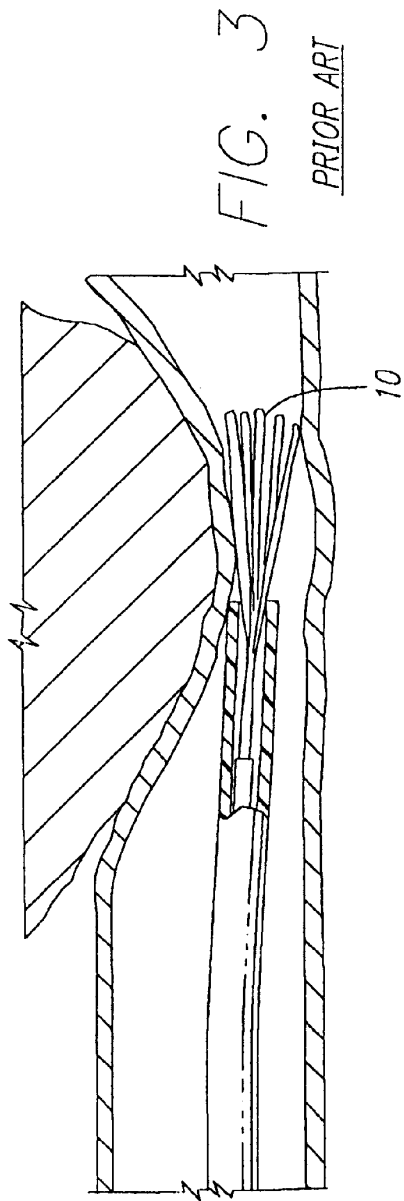
13 Claims, 6 Drawing Sheets



U.S. PATENT DOCUMENTS

5,192,297	3/1993	Hull .	5,378,239	1/1995	Termin et al. .
5,197,978	3/1993	Hess .	5,395,390	3/1995	Simon et al. .
5,222,969	6/1993	Gillis .	5,403,341	4/1995	Solar .
5,222,971	6/1993	Willard et al. .	5,405,377	4/1995	Cragg .
5,226,913	7/1993	Pinchuk .	5,411,507	5/1995	Heckeke .
5,242,451	9/1993	Harada et al. .	5,415,664	5/1995	Pinchuk .
5,256,146	10/1993	Ensminger et al. .	5,443,496	8/1995	Schwartz et al. .
5,258,020	11/1993	Froix .	5,453,090	9/1995	Martinez et al. .
5,263,964	11/1993	Purdy .	5,456,694	10/1995	Marin et al. .
5,282,823	2/1994	Schwartz et al. .	5,478,349	12/1995	Nicholas .
5,282,824	2/1994	Gianturco .	5,484,444	1/1996	Braunschweiler et al. .
5,304,200	4/1994	Spaulding .	5,496,277	3/1996	Termin et al. .
5,306,294	4/1994	Winston et al. .	5,522,883	6/1996	Slater et al. .
5,354,308	10/1994	Simon et al. .	5,534,007	7/1996	St. Germain et al. .
5,354,309	10/1994	Schnepf-Pesch et al. .	5,554,181	9/1996	Das .
5,372,600	12/1994	Beyar et al. .	5,690,643	11/1997	Wijay 606/108
			5,935,135	8/1999	Bramfitt et al. 606/108





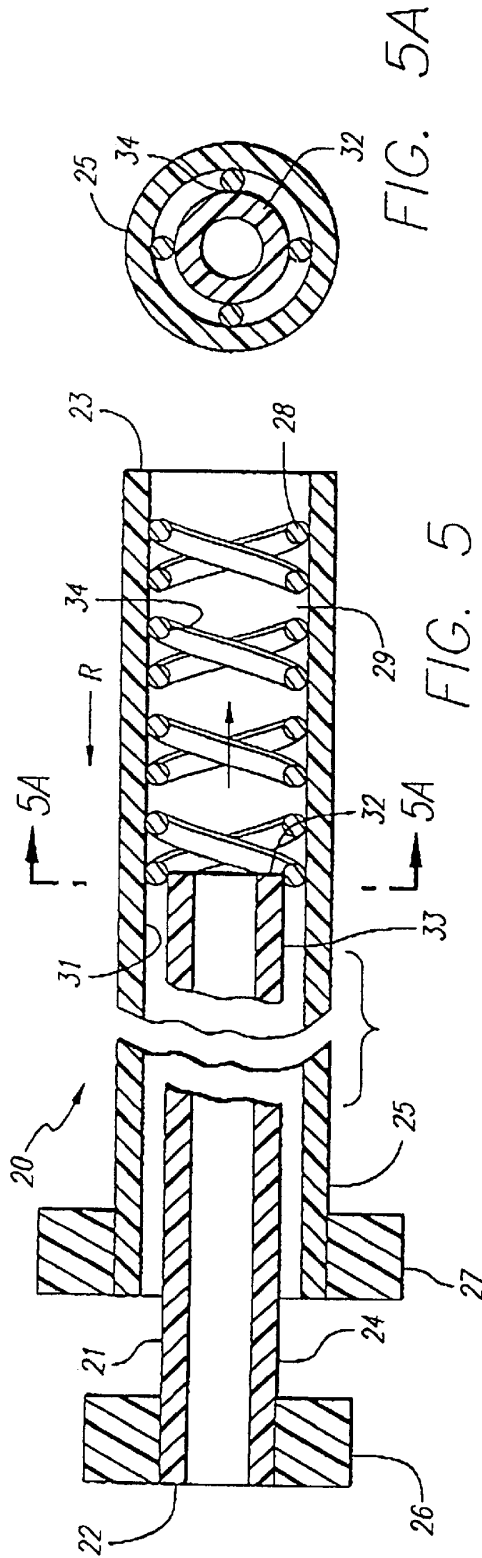


FIG. 5A

FIG. 5

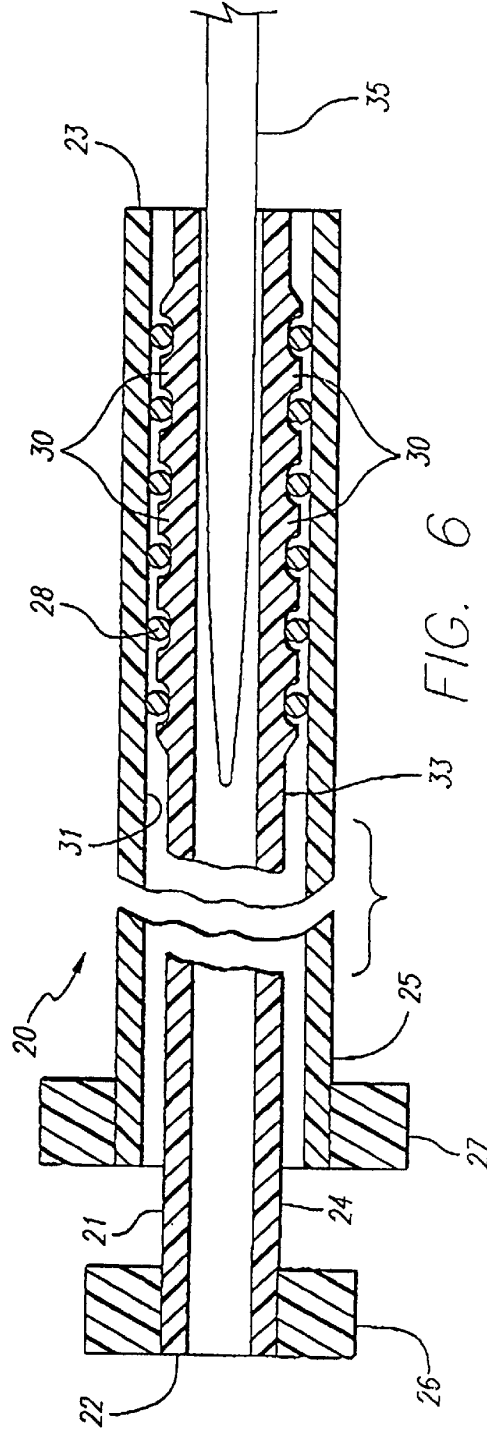
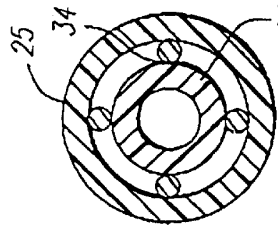


FIG. 6

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.