



US006823576B2

(12) **United States Patent**  
**Austin**

(10) **Patent No.:** **US 6,823,576 B2**  
(45) **Date of Patent:** **Nov. 30, 2004**

(54) **METHOD AND APPARATUS FOR CONTRACTING, LOADING OR CRIMPING SELF-EXPANDING AND BALLOON EXPANDABLE STENT DEVICES**

(75) Inventor: **Michael Austin, Co. Galway (IE)**

(73) Assignee: **SciMed Life Systems, Inc., Maple Grove, MN (US)**

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

3,416,352	A	12/1968	Ribback	72/121
3,664,213	A	5/1972	Anati	81/91
3,695,087	A	* 10/1972	Tuberman	72/402
3,731,518	A	5/1973	Blocher	72/402
4,164,523	A	* 8/1979	Hanning	264/28
4,413,989	A	11/1983	Schjeldahl et al.	604/96
4,434,645	A	3/1984	Svercl et al.	72/402
4,456,000	A	6/1984	Schjeldahl et al.	128/1
4,490,421	A	12/1984	Levy	428/35
4,578,982	A	* 4/1986	Schrock	72/402
RE32,983	E	7/1989	Levy	428/36.92

(List continued on next page.)

**FOREIGN PATENT DOCUMENTS**

DE	295 06 654.7	7/1995
DE	195 32 288 A1	3/1997
EP	0 630 623 A2	12/1994
EP	0 701 800 A1	3/1996
EP	935 952 A2	8/1999
WO	90/00098	1/1990
WO	96/03092	2/1996
WO	97/20593	12/1997
WO	98/19633	5/1998

(21) Appl. No.: **09/966,686**

(22) Filed: **Oct. 1, 2001**

(65) **Prior Publication Data**

US 2002/0035774 A1 Mar. 28, 2002

**Related U.S. Application Data**

(63) Continuation of application No. 09/401,218, filed on Sep. 22, 1999, now Pat. No. 6,360,577.

(51) **Int. Cl.**<sup>7</sup> ..... **B23P 11/00; B21D 41/00**

(52) **U.S. Cl.** ..... **29/516; 29/515; 72/402; 72/121**

(58) **Field of Search** ..... 29/505, 516, 515, 29/508, 283.5, 282, 237, 751; 606/1; 72/402, 121; 425/DIG. 110, DIG. 9, 547, 551, 552

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

565,257	A	8/1896	Boyd	72/402
758,195	A	4/1904	Schweinert et al.	72/402
1,665,915	A	4/1928	Ekman	72/402
1,889,795	A	12/1932	Smith et al.	72/402
2,292,421	A	8/1942	Wolf	72/402
2,751,077	A	6/1956	Latin et al.	207/4
2,887,222	A	* 5/1959	Latin et al.	72/121
2,986,192	A	5/1961	Macleod	153/1
3,084,389	A	* 4/1963	Doyle	264/522

**OTHER PUBLICATIONS**

Hawley's Condensed Chemical Dictionary, p. 873, 1993.

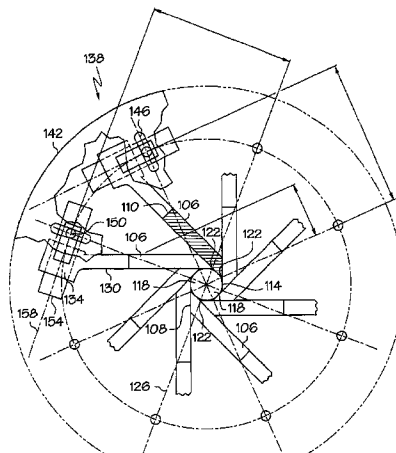
*Primary Examiner*—Marc Jimenez

(74) *Attorney, Agent, or Firm*—Vidas, Arrett & Steinkraus

(57) **ABSTRACT**

An apparatus for manipulating a medical device is formed of at least three coupled movable blades which are disposed about a reference circle to form an aperture whose size may be varied. The aperture capable of being sized to contain a medical device. Each blade is in communication with an actuation device which is capable of moving the blade to alter the size of the aperture. Each blade includes a single radial point which a) lies on the circumference of the reference circle prior to movement of the blade, and b) may be moved only along a radius of the reference circle on movement of the blade.

**32 Claims, 15 Drawing Sheets**



**Edwards Lifesciences v. Boston Scientific Scimed**  
**U.S. Patent No. 6,915,560**  
**IPR2017-00444 EX. 2014**

## U.S. PATENT DOCUMENTS

4,854,031 A	8/1989	Eisenzimmer .....	72/402	5,792,415 A	8/1998	Hijlkema .....	264/530
4,906,244 A	3/1990	Pinchuk et al. ....	606/194	5,807,520 A	9/1998	Wang et al. ....	264/520
4,942,756 A *	7/1990	Charzewski .....	72/402	5,810,871 A	9/1998	Tuckey et al.	
RE33,561 E	3/1991	Levy .....	428/36.92	5,810,873 A	9/1998	Morales .....	606/198
5,026,377 A	6/1991	Burton et al.		5,836,952 A *	11/1998	Davis et al. ....	606/1
5,087,394 A	2/1992	Keith		5,836,965 A	11/1998	Jendersee et al.	
5,108,415 A	4/1992	Pinchuk et al. ....	606/194	5,860,966 A	1/1999	Tower	
5,156,612 A	10/1992	Pinchuk et al. ....	606/194	5,893,852 A *	4/1999	Morales .....	606/108
5,163,989 A	11/1992	Campbell et al. ....	65/110	5,893,867 A	4/1999	Bagaoisan et al.	
5,183,085 A	2/1993	Timmermans .....	140/89	5,911,752 A	6/1999	Dustrude et al. ....	623/1
5,195,350 A	3/1993	Aikens et al. ....	72/402	5,920,975 A	7/1999	Morales .....	29/282
5,261,263 A	11/1993	Whitesell .....	72/402	5,931,851 A	8/1999	Morales .....	606/194
5,270,086 A	12/1993	Hamlin		5,935,476 A *	8/1999	Langstedt .....	425/174.8 R
5,290,305 A	3/1994	Inoue		5,951,540 A	9/1999	Verbeek .....	606/1
5,304,340 A	4/1994	Downey		5,974,652 A	11/1999	Kimes et al. ....	29/516
5,334,146 A	8/1994	Ozasa		5,992,000 A *	11/1999	Humphrey et al. ....	29/516
5,338,172 A *	8/1994	Williamson et al. ....	425/143	6,009,614 A *	1/2000	Morales .....	29/516
5,358,486 A	10/1994	Saab		6,018,857 A	2/2000	Duffy et al. ....	29/407.01
5,381,686 A	1/1995	Thorup		6,024,737 A	2/2000	Morales .....	606/1
5,411,521 A	5/1995	Putnam et al.		6,033,380 A	3/2000	Butaric et al. ....	604/96
5,437,083 A	8/1995	Williams et al.		6,051,002 A	4/2000	Morales .....	606/108
5,509,184 A	4/1996	Herrero		6,063,092 A	5/2000	Shin .....	606/108
5,545,210 A *	8/1996	Hess et al. ....	623/1	6,063,102 A	5/2000	Morales .....	606/198
5,546,646 A	8/1996	Williams et al. ....	29/407.08	6,074,381 A *	6/2000	Dinh et al. ....	606/1
5,591,222 A	1/1997	Susawa et al.		6,092,273 A	7/2000	Villareal .....	29/516
5,626,604 A	5/1997	Cottone, Jr. ....	606/198	6,108,886 A	8/2000	Kimes et al. ....	29/280
5,628,754 A	5/1997	Shevlin et al.		6,125,523 A	10/2000	Brown et al. ....	29/516
5,630,830 A	5/1997	Verbeek		6,141,855 A	11/2000	Morales .....	29/516
5,672,169 A	9/1997	Verbeek		6,167,605 B1 *	1/2001	Morales .....	29/282
5,700,285 A *	12/1997	Myers et al. ....	623/1	6,176,116 B1 *	1/2001	Wilhelm et al. ....	72/409.12
5,715,723 A	2/1998	Owens .....	72/402	6,240,615 B1	6/2001	Kimes et al. ....	29/516
5,725,519 A	3/1998	Penner et al. ....	606/1	6,296,655 B1	10/2001	Gaudoin et al. ....	606/194
5,738,674 A	4/1998	Williams et al.		6,303,071 B1 *	10/2001	Sugawara et al. ....	425/526
5,746,644 A	5/1998	Cheetham		6,309,383 B1 *	10/2001	Campbell et al. ....	606/1
5,746,764 A	5/1998	Green et al.		6,360,577 B2	3/2002	Austin .....	72/402
5,749,921 A	5/1998	Lenker et al.		6,364,870 B1 *	4/2002	Pinchasik .....	29/516
5,766,057 A	6/1998	Maack		6,387,117 B1 *	5/2002	Arnold et al. ....	72/416
5,766,203 A	6/1998	Imran et al.		6,568,235 B1 *	5/2003	Kokish .....	72/402

\* cited by examiner

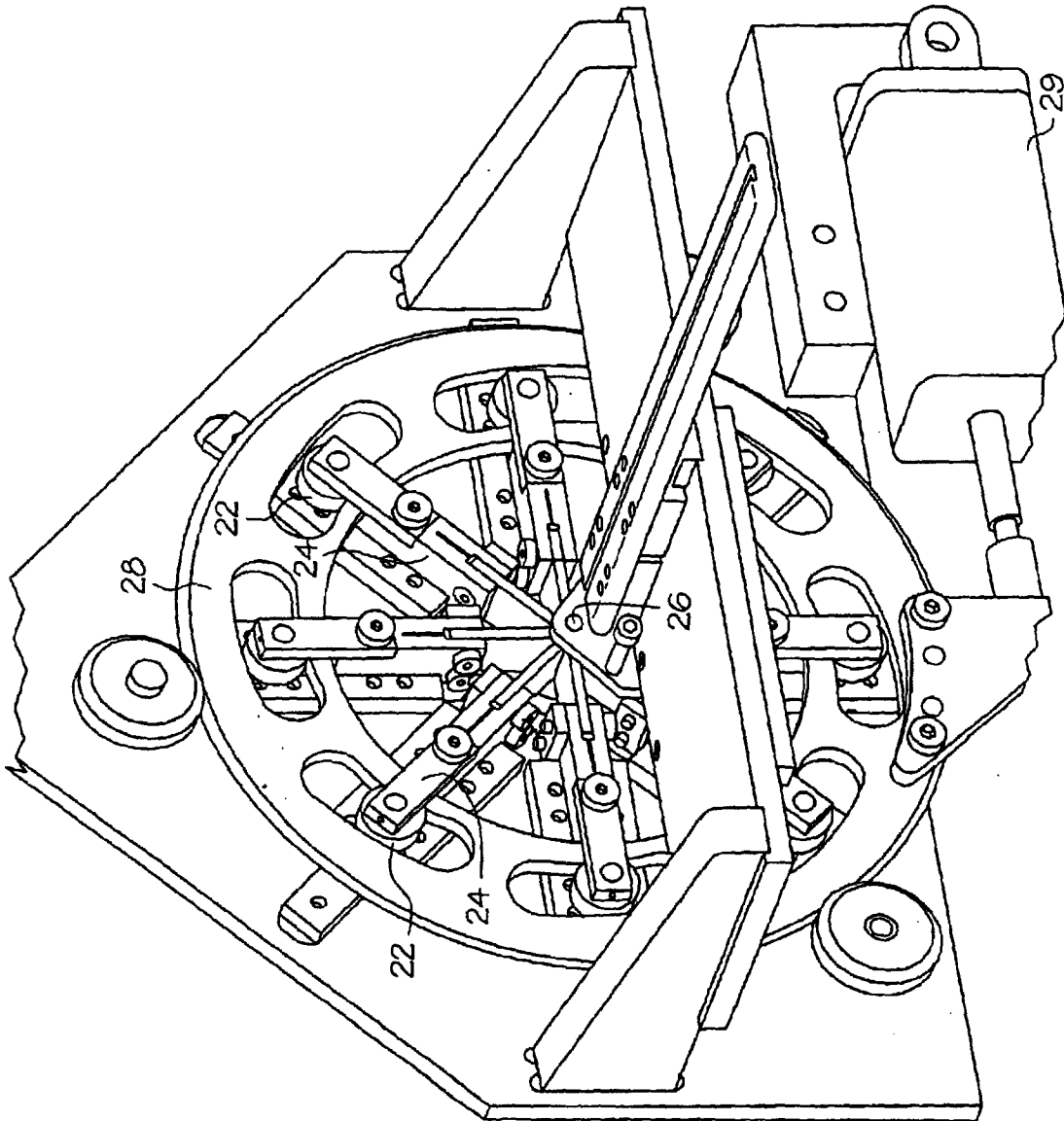


FIG. 1  
PRIOR ART

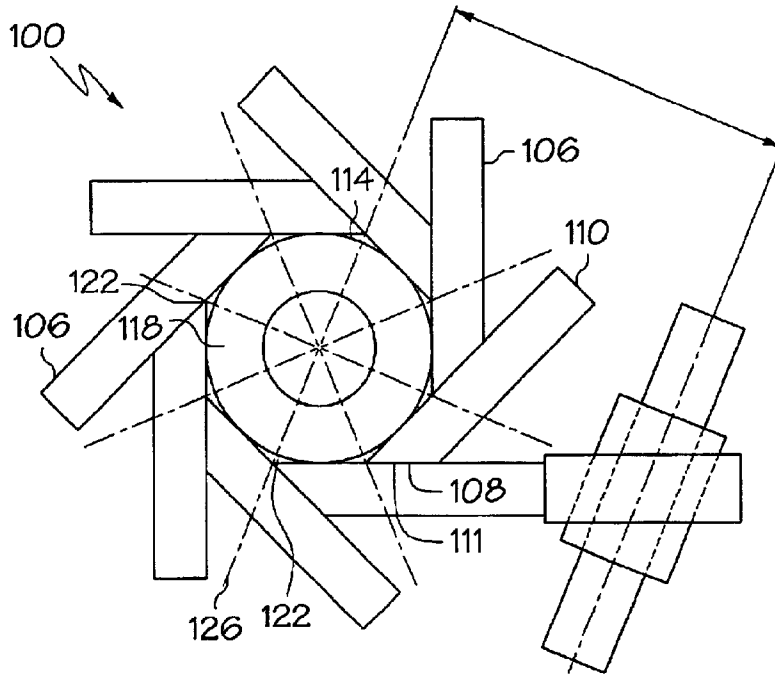


FIG. 2a

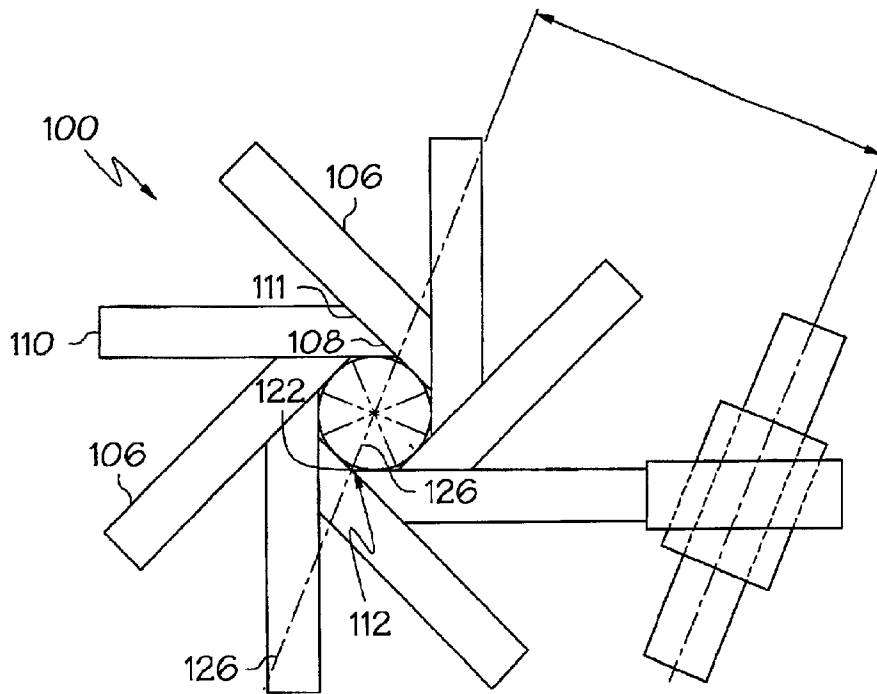


FIG. 2b

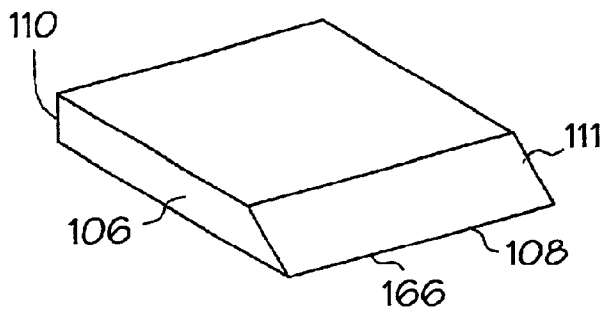


FIG. 3a

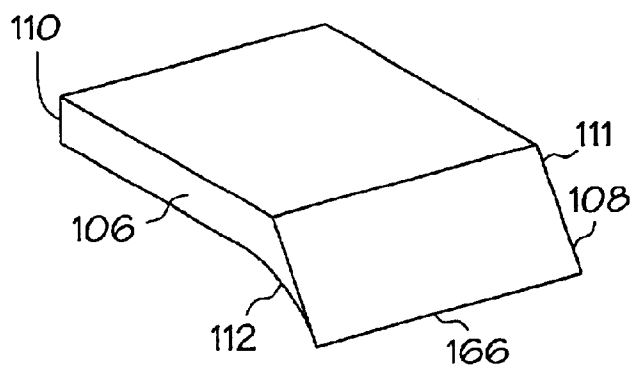


FIG. 3b

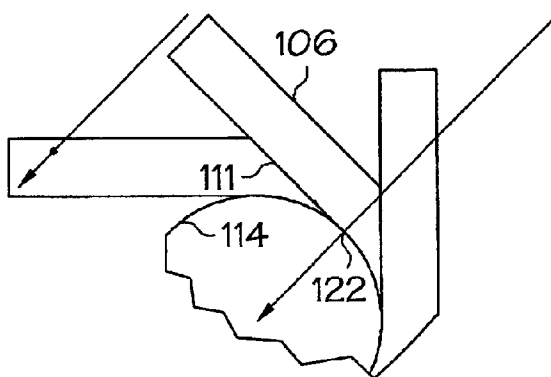


FIG. 3c

# 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.