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Austin

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

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(*) 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

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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.**⁷ **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

References Cited

U.S. PATENT DOCUMENTS

565,257 A	8/1896	Boyd	72/402
758,195 A	4/1904	Schweibert 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.

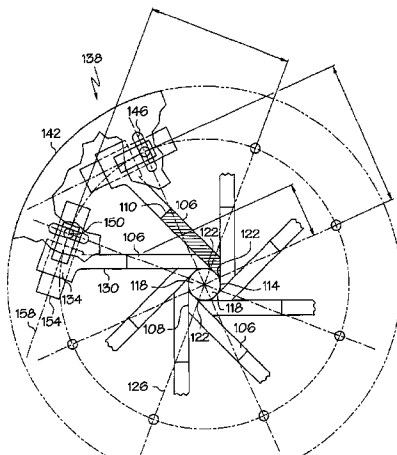
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ABSTRACT

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

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

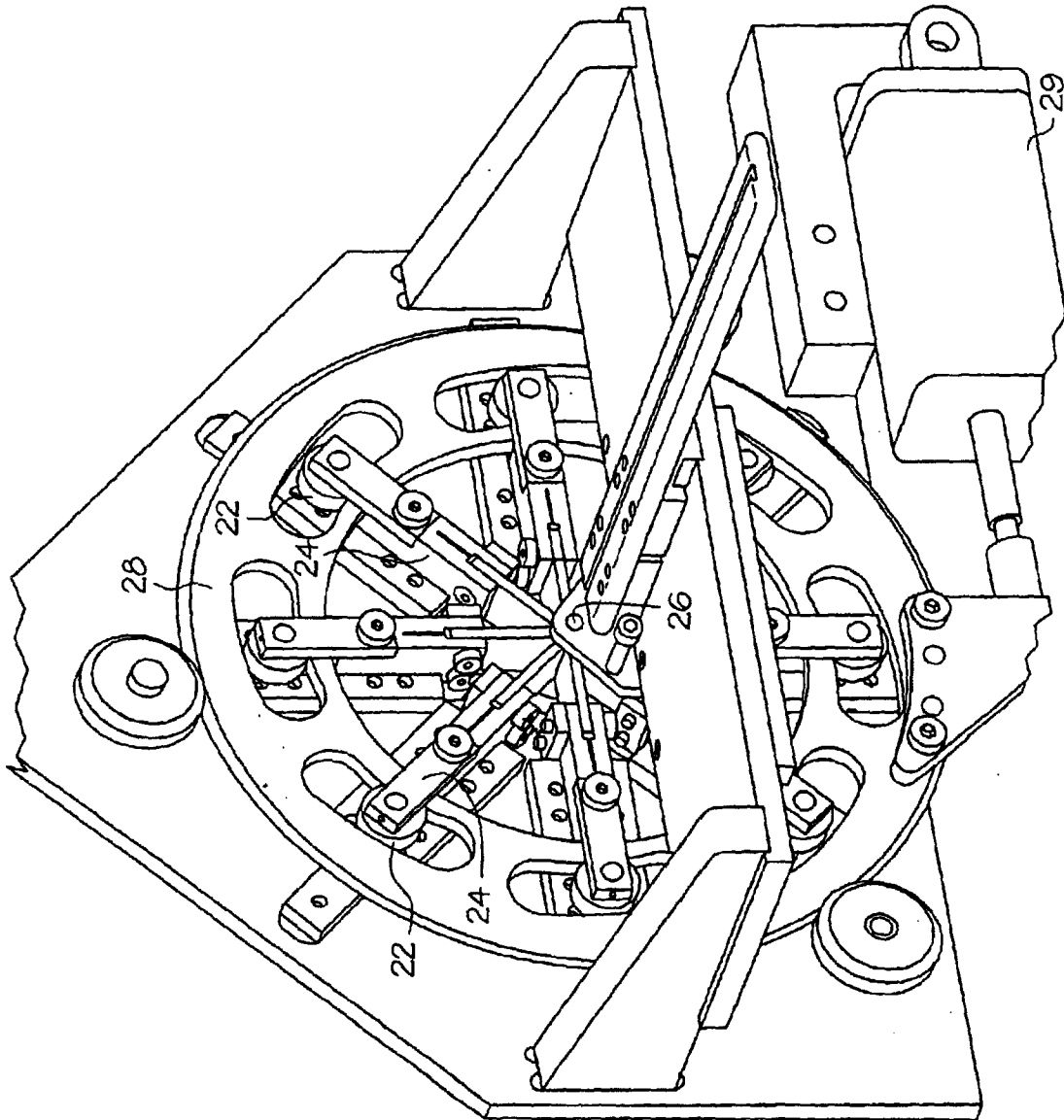


FIG. 1
PRIOR ART

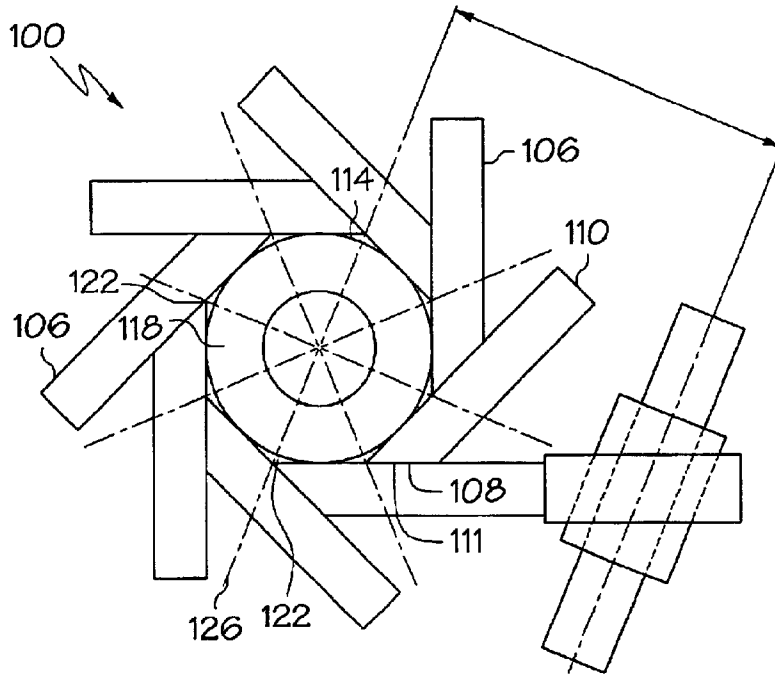


FIG. 2a

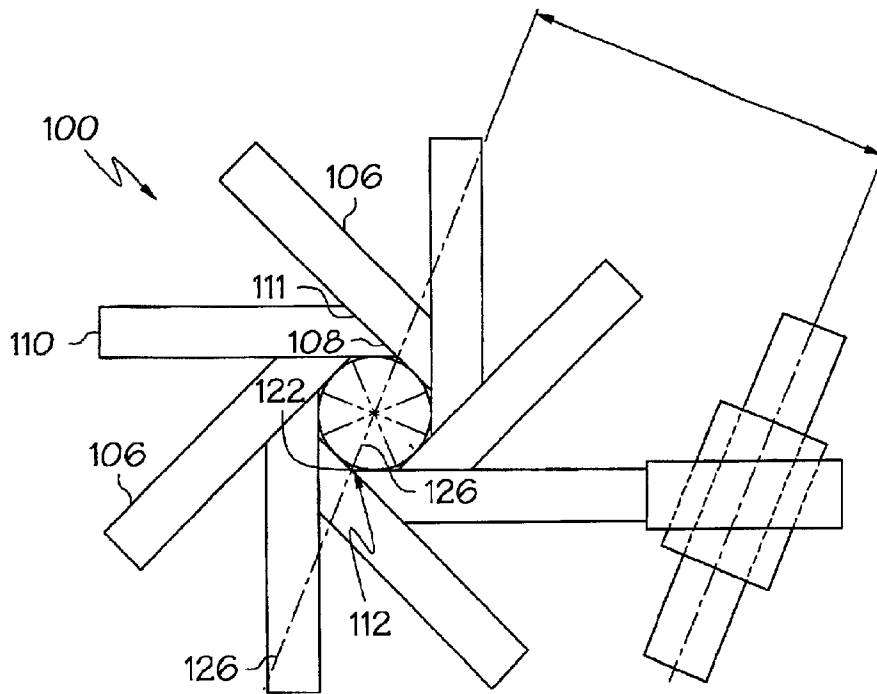


FIG. 2b

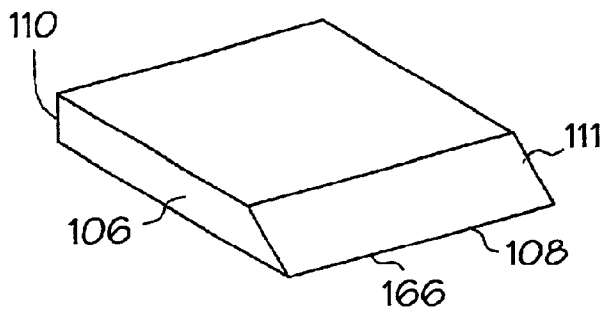


FIG. 3a

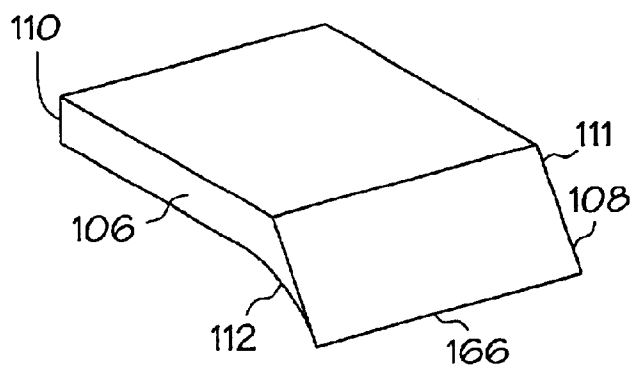


FIG. 3b

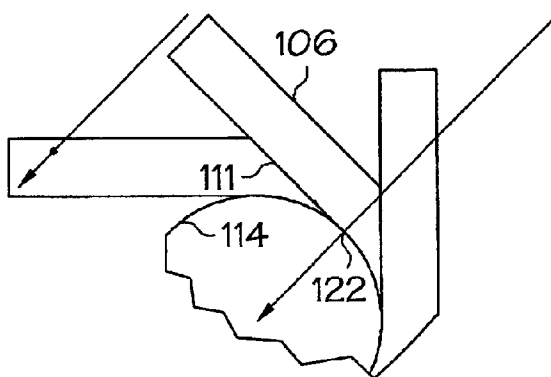


FIG. 3c

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