

6,009,614

United States Patent [19]

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[11]

[54] STENT CRIMPING TOOL AND METHOD OF

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Int. Cl.⁷ **A61M 29/00**; B23P 11/00;

B23P 19/02 [52]

29/407.08; 29/235; 606/1; 606/108; 606/198;

29/282, 280, 715, 423, 517, 234, 235, 283, 269, 270, 237; 606/1, 108, 198; 623/1;

72/402

[56] References Cited

U.S. PATENT DOCUMENTS

3/1902 Williams . 696,289 3,568,495 3/1971 Duffield et al. . 4,043,172 8/1977 Schmitton . 4,379,397 4/1983 Langr. 4,468,224 8/1984 Enzmann et al. .

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

159065 2/1921 United Kingdom .

4/1998 WIPO. WO 98/14120 WO 98/19633 5/1998 WIPO.

OTHER PUBLICATIONS

U.S. application No. 08/795,335 filed Feb. 4, 1997. U.S. application No. 08/837,771 filed Apr. 22, 1997. U.S. application No. 08/089,936 filed Jul. 15, 1997. U.S. application No. 08/962,632 filed Nov. 3, 1997.

Patent Number:

The eXTraordinary Stent, C.R. Bard Brochure (Undated).

Primary Examiner—S. Thomas Hughes Assistant Examiner—John Preta

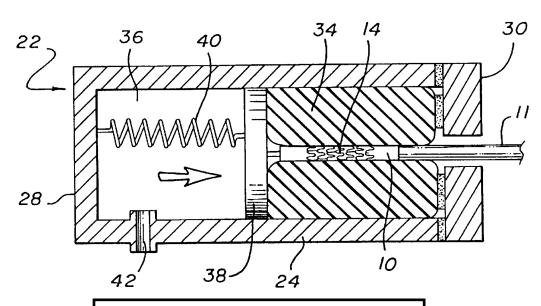
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ABSTRACT [57]

A tool and method for enabling substantially uniform and tight crimping of an intravascular stent onto a balloon catheter assembly. The crimping tool is constructed from a rigid cylindrical chassis sealed at both ends, having a hollow interior containing an elastic tube that partially occupies the interior. A piston abuts the elastic tube and forms a hermetically sealed chamber behind the piston and a closed end ofthe chassis. A port connected to an indeflator and positioned on the chassis provides an inlet into and out of the chamber. A stent that is loaded onto the balloon portion of the catheter is inserted through a central opening in another end of the chassis to position the stent catheter assembly within the axial space inside the elastic tube. The indeflator injects a fluid into the chamber thereby increasing its pressure which in turn displaces the piston into the elastic tube compressing the tube longitudinally. The elastic tube decreases in length and expands in thickness radially to crimp the stent onto the balloon catheter. Once pressure is relieved from the chamber, the piston moves away from the elastic tube, which restores to its original shape. The crimped stent and catheter can then be withdrawn. The piston may be driven by a power screw in place of fluid pressure.

28 Claims, 3 Drawing Sheets





Edwards Lifesciences v. Boston Scientific U.S. Patent No. 6,915,560 IPR2017-00444 EX. 2048

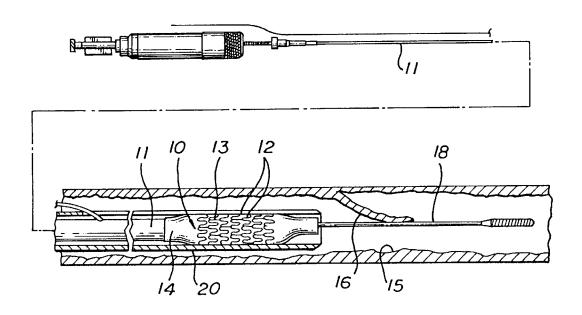
6,009,614

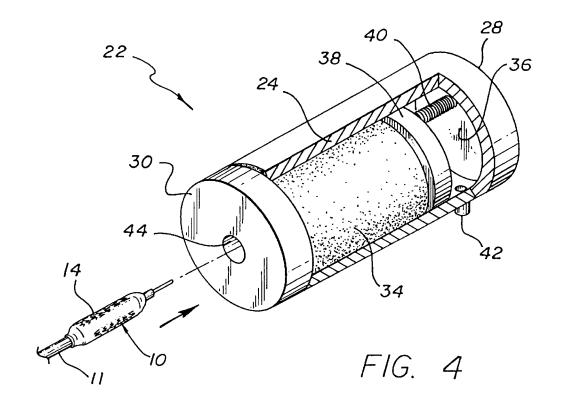
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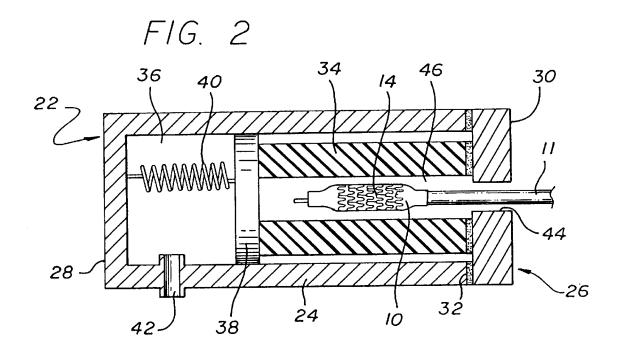
U.S. PATENT DOCUMENTS		5,626,604	5/1997	Cottone, Jr
24000	0.110	5,630,830	5/1997	Verbeek .
		5,653,691	8/1997	Rupp et al
		5,695,515	12/1997	Orejola .
		· · · · · · · · · · · · · · · · · · ·		Williams et al.
10/1987	Schiff.	· · · · ·		Green et al
2/1990	Schiff.	· · · · ·		
3/1990	Gianturco .		-	
7/1992	Charlesworth et al			
7/1992	Wiktor .	5,795,289	8/1998	Wyttenbach .
2/1993	Timmermans .	5,810,838	9/1998	Solar .
3/1993	Ishikawa et al	5,836,952	11/1998	Davis et al
8/1995	Williams et al	5,860,966	1/1999	Tower.
8/1996	Williams et al	5,893,852	4/1999	Morales .
	2 3/1986 5 2/1987 2 7/1987 3 10/1987 7 2/1990 5 3/1990 6 7/1992 2 7/1992 2 7/1993 3 3/1993 8 8/1995	2 3/1986 Schiff . 5 2/1987 Schiff . 2 7/1987 Cho et al 3 10/1987 Schiff . 7 2/1990 Schiff . 5 3/1990 Gianturco . 6 7/1992 Wiktor . 2 7/1992 Wiktor . 5 2/1993 Timmermans . 5 3/1993 Ishikawa et al 8 8/1995 Williams et al	2 3/1986 Schiff . 5,630,830 2 2/1987 Schiff . 5,653,691 2 7/1987 Cho et al 5,738,674 3 10/1987 Schiff . 5,746,764 5 3/1990 Schiff . 5,746,764 6 3/1990 Gianturco . 5,783,227 6 7/1992 Charlesworth et al 5,795,289 7 2/1993 Wiktor . 5,795,289 5 2/1993 Timmermans . 5,810,838 6 3/1993 Ishikawa et al 5,836,952 8 8/1995 Williams et al 5,860,966	2 3/1986 Schiff . 5,630,830 5/1997 2 2/1987 Schiff . 5,653,691 8/1997 2 7/1987 Cho et al 5,738,674 4/1998 3 10/1987 Schiff . 5,746,764 5/1998 5 3/1990 Gianturco . 5,783,227 7/1998 6 7/1992 Charlesworth et al 5,785,715 7/1998 2 7/1992 Wiktor . 5,795,289 8/1998 3 1993 Ishikawa et al 5,836,952 11/1998 8 8/1995 Williams et al 5,860,966 1/1999

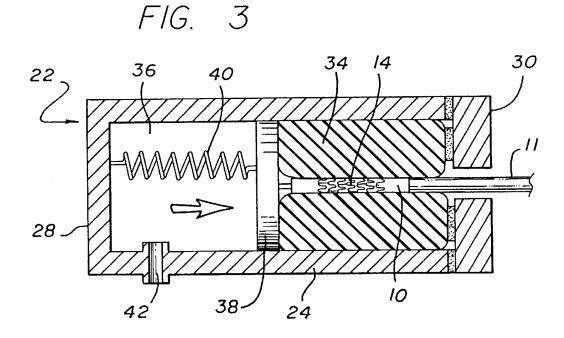


FIG. 1

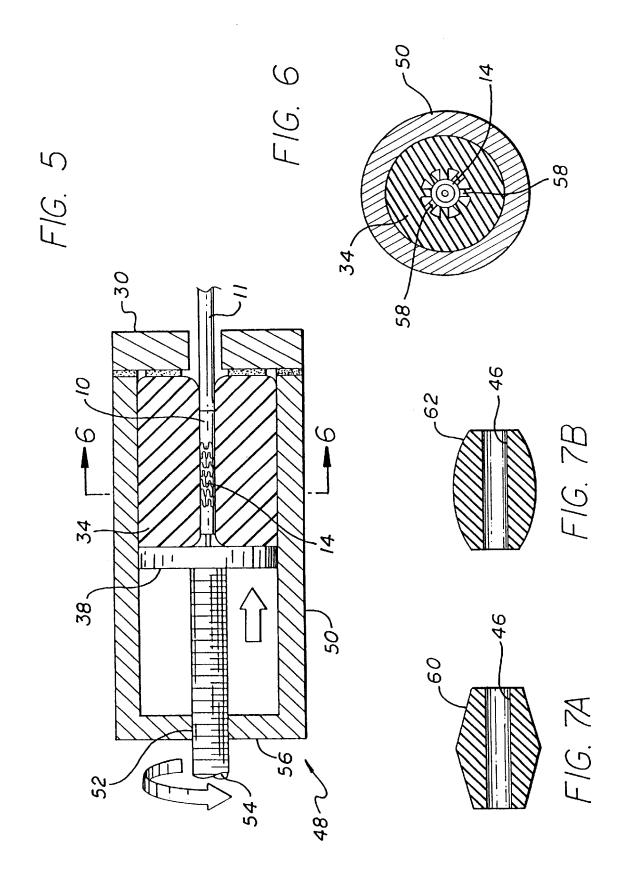












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