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Root et al.

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(54) **COAXIAL GUIDE CATHETER FOR INTERVENTIONAL CARDIOLOGY PROCEDURES**

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See application file for complete search history.

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(56) **References Cited**

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U.S. PATENT DOCUMENTS

4,289,128 A 9/1981 Rūsh
4,723,936 A 2/1988 Buchbinder et al.

(Continued)

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FOREIGN PATENT DOCUMENTS

(*) Notice: This patent is subject to a terminal disclaimer.

EP 0313558 1/1988
EP 0365993 5/1990

(Continued)

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Related U.S. Patent Documents

Reissue of:

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OTHER PUBLICATIONS

Saeko Takahashi, et al., "New Method to Increase a Backup Support Of A 6 French Guiding Coronary Catheter", *Catheterization and Cardiovascular Interventions*, 63:452-456 (2004), 5 Pages; Published online in *Wiley InterScience* (www.interscience.wiley.com).

(Continued)

U.S. Applications:

(60) Continuation of application No. 14/070,161, filed on Nov. 1, 2013, now Pat. No. Re. 45,380, which is an application for the reissue of Pat. No. 8,292,850,

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(Continued)

(51) **Int. Cl.**
A61M 5/178 (2006.01)
A61M 25/00 (2006.01)
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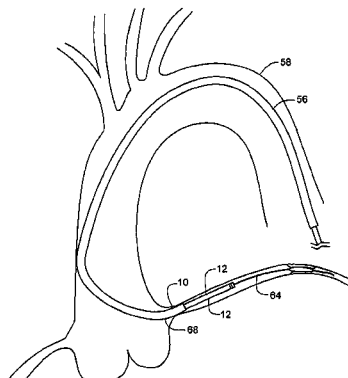
(52) **U.S. Cl.**
CPC **A61M 25/01** (2013.01); **A61M 25/0069** (2013.01)

(58) **Field of Classification Search**
CPC A61M 25/0009; A61M 25/0069; A61M 25/0105; A61M 25/01; A61M 25/04; A61M 2025/015; A61M 25/0102; A61M 25/0147; A61B 17/1204; A61B 17/12136; A61B 2017/00526; B29C 65/00

(57) **ABSTRACT**

A coaxial guide catheter to be passed through guide catheter having a first lumen, for use with interventional cardiology devices that are insertable into a branch artery that branches off from a main artery. The coaxial guide catheter is extended through the lumen of the guide catheter and beyond the distal end of the guide catheter and inserted into the branch artery. The device assists in resisting axial and shear forces exerted by an interventional cardiology device passed through the second lumen and beyond the flexible distal tip portion that would otherwise tend to dislodge the guide catheter from the branch artery.

31 Claims, 13 Drawing Sheets



Related U.S. Application Data

which is a division of application No. 12/824,734, filed on Jun. 28, 2010, now Pat. No. 8,142,413, which is a division of application No. 11/416,629, filed on May 3, 2006, now Pat. No. 8,048,032.

(56)

References Cited

U.S. PATENT DOCUMENTS

4,762,129	A	8/1988	Bonzel	
4,813,930	A	3/1989	Elliott	
4,832,028	A	5/1989	Patel	
4,909,252	A	3/1990	Goldberger	
4,932,413	A	6/1990	Shockey et al.	
4,946,440	A	8/1990	Hall	
4,994,745	A	2/1991	Mizuta	
5,002,531	A	3/1991	Bonzel	
5,098,412	A	3/1992	Shiu	
5,102,403	A	4/1992	Alt	
5,120,323	A *	6/1992	Shockey	A61M 25/01 600/434
5,122,125	A	6/1992	Deuss	
5,232,445	A	8/1993	Bonzel	
5,234,416	A	8/1993	Macaulay et al.	
5,257,974	A	11/1993	Cox	
5,328,472	A	7/1994	Steinke et al.	
5,368,567	A	11/1994	Lee	
5,441,489	A	8/1995	Utsumi et al.	
5,445,624	A	8/1995	Jimenez	
5,472,425	A	12/1995	Teirstein	
5,527,292	A *	6/1996	Adams	A61M 25/0102 600/585
5,549,553	A	8/1996	Ressemann et al.	
5,599,326	A	2/1997	Carter	
5,658,263	A	8/1997	Dang et al.	
5,690,613	A	11/1997	Verbeck	
5,776,141	A	7/1998	Klein et al.	
5,792,124	A	8/1998	Horrigan et al.	
5,911,715	A	6/1999	Berg et al.	
5,980,486	A	11/1999	Enger	
6,159,195	A	12/2000	Ha et al.	
6,193,686	B1	2/2001	Estrada et al.	

6,338,725	B1	1/2002	Hermann et al.	
6,409,863	B1	6/2002	Williams et al.	
6,475,195	B1	11/2002	Voda	
6,488,655	B1	12/2002	Wantink et al.	
6,503,223	B1	1/2003	Sekido et al.	
6,503,353	B1	1/2003	Peterson et al.	
6,548,010	B1	4/2003	Stivland et al.	
6,575,958	B1	6/2003	Happ et al.	
6,591,472	B1	7/2003	Noone et al.	
6,595,952	B2	7/2003	Forsberg	
6,610,068	B1	8/2003	Yang	
6,635,029	B1	10/2003	Venturelli	
6,638,268	B2	10/2003	Niazi	
6,689,144	B2	2/2004	Gerberding	
6,706,018	B2	3/2004	Westlund et al.	
6,755,812	B2	6/2004	Peterson et al.	
6,860,876	B2	3/2005	Chen	
7,232,452	B2	6/2007	Adams et al.	
7,294,124	B2	11/2007	Eidenschink	
7,544,201	B2	6/2009	Pepper	
7,697,996	B2	4/2010	Manning et al.	
7,717,899	B2	5/2010	Bowe et al.	
7,762,984	B2	7/2010	Kumoyama et al.	
8,048,032	B2	11/2011	Root et al.	
8,142,413	B2	3/2012	Root et al.	
8,292,850	B2	10/2012	Root et al.	
2003/0195546	A1	10/2003	Solar et al.	
2004/0010280	A1 *	1/2004	Adams	A61B 17/12136 606/194
2004/0127927	A1	7/2004	Adams	
2005/0004523	A1	1/2005	Osborne et al.	
2005/0182437	A1	8/2005	Bonnette et al.	
2007/0260219	A1	11/2007	Root et al.	

FOREIGN PATENT DOCUMENTS

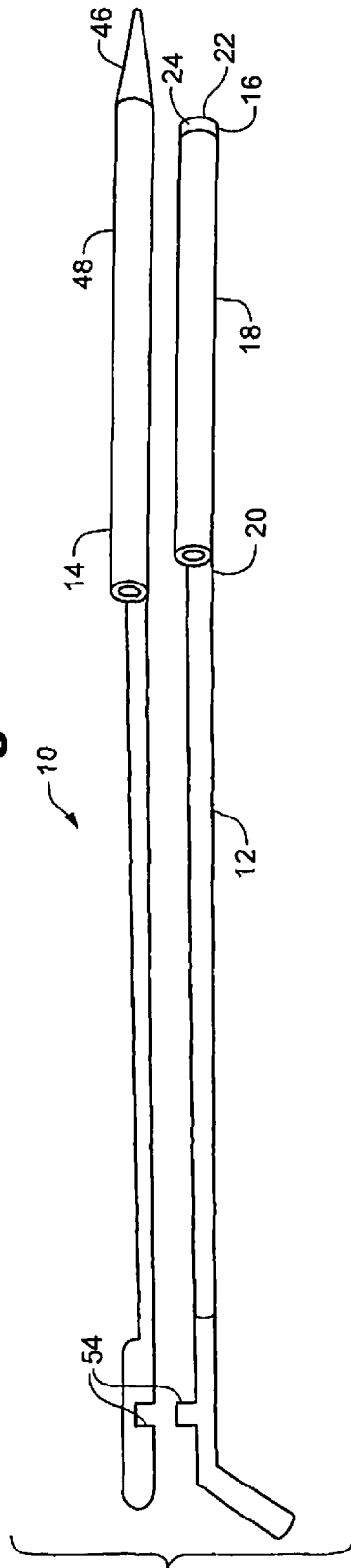
EP	0380873	8/1990
WO	WO84/03633	9/1984

OTHER PUBLICATIONS

U.S. Appl. No. 11/416,629, filed Jun. 28, 2010; Howard Root et al.
U.S. Appl. No. 12/824,734, filed Jun. 28, 2010, Howard Root et al.

* cited by examiner

Fig. 1



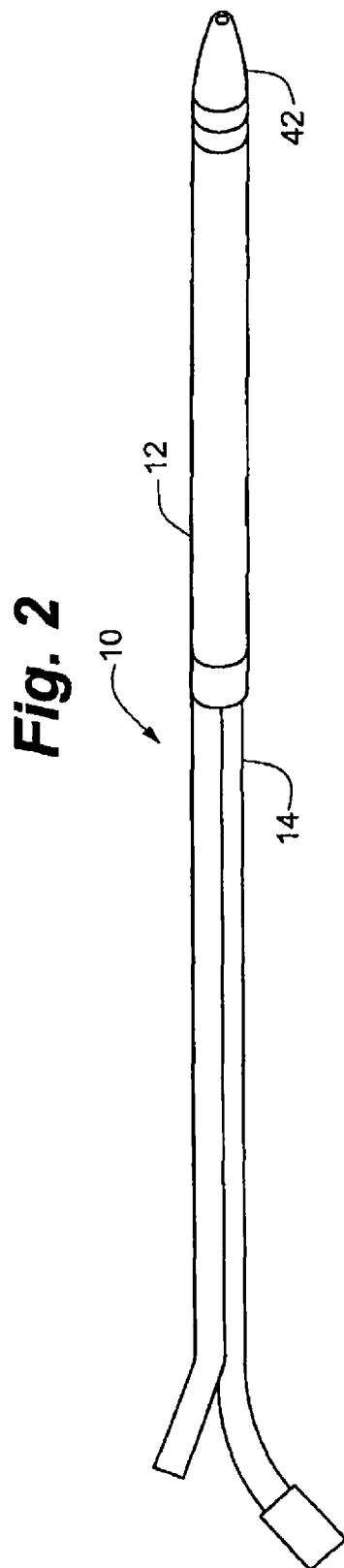
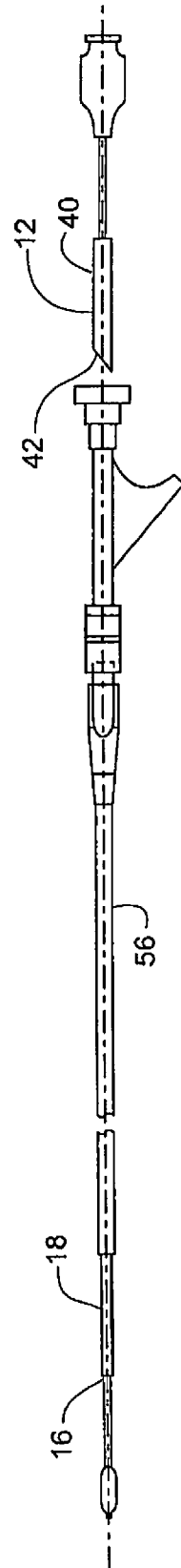


Fig. 3



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