



[54] STENT DELIVERY SYSTEM WITH STENT SECUREMENT MEANS

0 442 657 A2 9/1991 European Pat. Off. .
0 259 091 B1 7/1993 European Pat. Off. .
0 553 960 A1 8/1993 European Pat. Off. .
0 627 201 A1 12/1994 European Pat. Off. .
0 699 451 A2 3/1996 European Pat. Off. .
0 707 837 A1 4/1996 European Pat. Off. .
WO 93/19703 10/1993 WIPO .
WO 96/03072 2/1996 WIPO .
WO 96/03092 A1 2/1996 WIPO .

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[\*] Notice: This patent is subject to a terminal disclaimer.

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[52] U.S. Cl. 606/108; 606/195; 606/198

[58] Field of Search 606/108, 194, 606/195, 198; 604/96

[56] References Cited

U.S. PATENT DOCUMENTS

- 4,328,056 5/1982 Snooks .
4,338,942 7/1982 Fogarty .
4,423,725 1/1984 Baran et al. .
4,608,984 9/1986 Fogarty .
4,733,665 3/1988 Palmaz .
4,740,207 4/1988 Kreamer .
4,744,366 5/1988 Jang .
4,848,343 7/1989 Walstein et al. .
4,875,480 10/1989 Imbert .
4,950,227 8/1990 Savin et al. .
5,007,926 4/1991 Derbyshire .

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

0 266 957 A2 5/1988 European Pat. Off. .

OTHER PUBLICATIONS

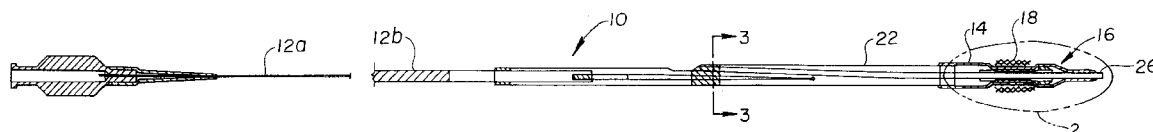
Julio C. Palmaz et al., Expandable Intraluminal Graft: A Preliminary Study, Work in Progress, From the Departments of Radioloty (J.C.P., R.R.S., S.R.R.) and Pathology (F.O.T.) University of Texas Health Science Center at Sanantonio and Memroial Medical Center (W.J.K.), Corpus Christi, Texas, Radiology, vol. 356, No. 1, pp. 73-77.

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[57] ABSTRACT

A stent delivery system to facilitate introduction and placement of a stent, including a catheter having an expandable distal portion constructed and arranged for expanding the outer diameter of the catheter from a contracted state to an expanded state: a stent positioned around the distal portion of the catheter having a contracted condition and being expandable to an expanded condition, and being sized in the contracted condition to closely surround the catheter in the contracted state, the expandable distal portion of the catheter including a balloon within which there is included on the catheter shaft at least one body of a diameter larger than the catheter shaft to which the stent and balloon are fitted, as by crimping, for holding the stent in place until it is released therefrom by expansion of the balloon.

33 Claims, 4 Drawing Sheets



## U.S. PATENT DOCUMENTS

5,026,377	6/1991	Burton et al. .	5,415,664	5/1995	Pinchuk .	
5,037,392	8/1991	Hillstead .	5,441,515	8/1995	Khosravi et al. ....	606/194
5,049,132	9/1991	Shaffer et al. .	5,445,646	8/1995	Euteneuer et al. .	
5,108,416	4/1992	Ryan et al. ....	5,447,497	9/1995	Sogard et al. .	
5,116,318	5/1992	Hillstead .	5,453,090	9/1995	Martinez et al. .	
5,148,548	9/1992	Lau et al. .	5,458,615	10/1995	Klemm et al. .	
5,226,880	7/1993	Martin .	5,470,313	11/1995	Crocker et al. .	
5,226,889	7/1993	Sheiban .	5,507,768	4/1996	Lau et al. .	
5,242,399	9/1993	Lau et al. .	5,512,051	4/1996	Wang et al. .	
5,290,306	3/1994	Trotta et al. .	5,534,007	7/1996	St. Germain et al. .	
5,304,198	4/1994	Samson ....	5,536,252	7/1996	Imran et al. .	
5,342,305	8/1994	Shonk .	5,571,086	11/1996	Kaplan et al. ....	604/96
5,344,426	9/1994	Lau et al. .	5,571,089	11/1996	Crocker ....	604/96
5,358,487	10/1994	Miller .	5,591,228	1/1997	Edoga ....	606/194
5,403,341	4/1995	Solar .	5,632,760	5/1997	Sheiban et al. ....	606/195
5,405,380	4/1995	Gianotti et al. .	5,653,691	8/1997	Rupp et al. ....	604/96
5,409,495	4/1995	Osborn ....	5,817,102	10/1998	Johnson et al. ....	606/108
			B1 4,733,665	1/1994	Palmaz .	

Fig. 1

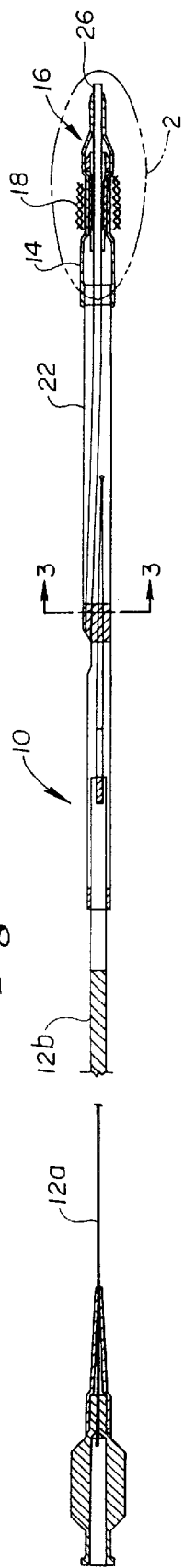
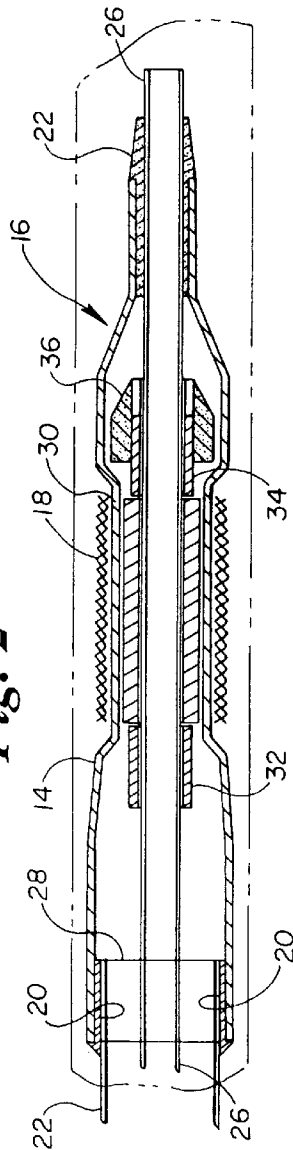
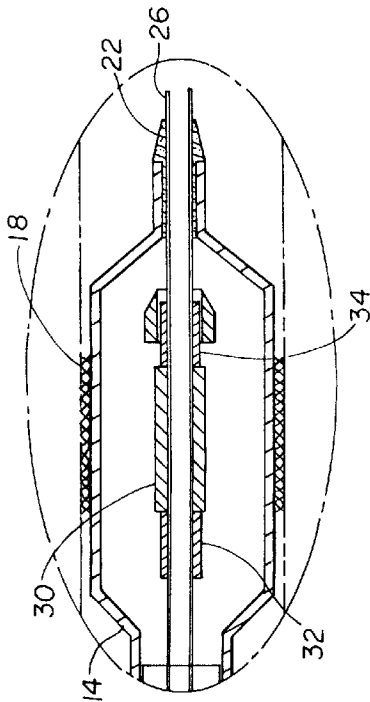


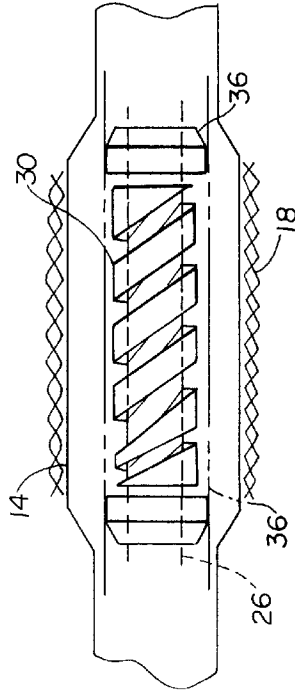
Fig. 2



**Fig. 3**



**Fig. 4**



**Fig. 6**

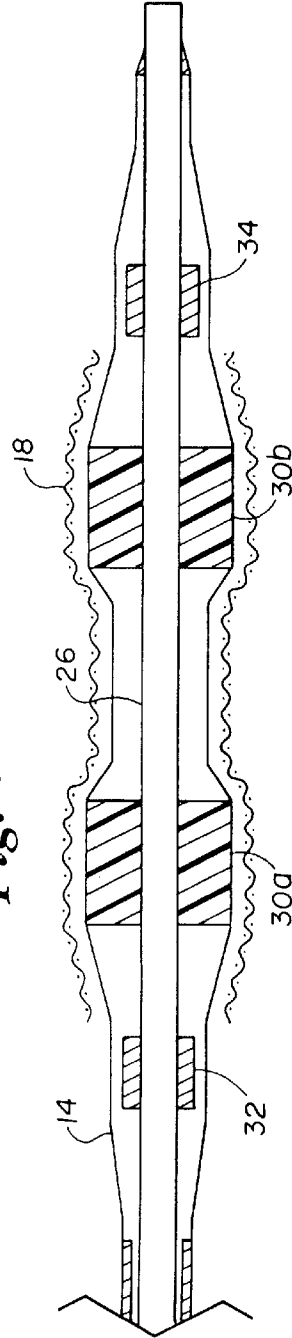
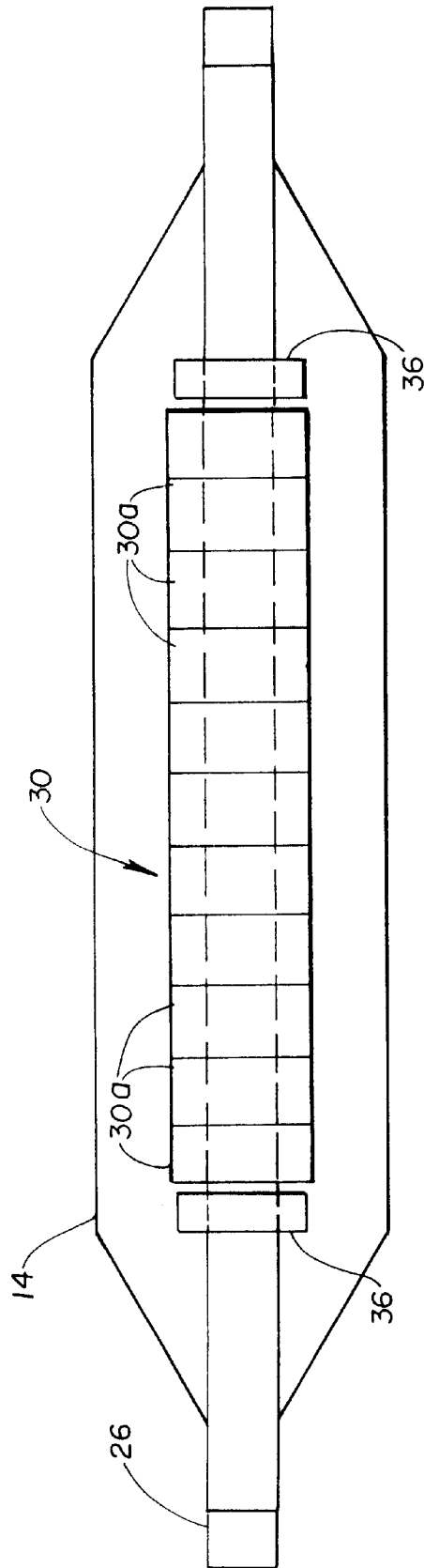


Fig. 5



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