



United States Patent [19]

Bessler et al.

[11] Patent Number: **5,855,601**

[45] Date of Patent: **Jan. 5, 1999**

[54] **ARTIFICIAL HEART VALVE AND METHOD AND DEVICE FOR IMPLANTING THE SAME**

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[21] Appl. No.: **668,376**

[22] Filed: **Jun. 21, 1996**

[51] Int. Cl.⁶ **A61F 2/24**

[52] U.S. Cl. **623/2; 623/900**

[58] Field of Search **623/2, 1, 900**

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,574,865	4/1971	Hamaker	623/2
3,671,979	6/1972	Moulopoulos .	
3,874,388	4/1975	King et al. .	
4,056,854	11/1977	Boretos et al. .	
4,592,340	6/1986	Boyles .	
4,631,052	12/1986	Kensey .	
4,692,139	9/1987	Stiles .	
4,705,507	11/1987	Boyles .	
4,794,928	1/1989	Kletschka .	
4,816,029	3/1989	Penny, III et al.	623/2
4,883,458	11/1989	Shiber .	
4,886,061	12/1989	Fischell et al. .	
4,960,424	10/1990	Grooters .	
4,966,604	10/1990	Reiss .	
4,979,939	12/1990	Shiber .	
4,994,077	2/1991	Dobben .	
5,007,896	4/1991	Shiber .	
5,019,090	5/1991	Pinchuk .	
5,032,128	7/1991	Alonso .	
5,047,041	9/1991	Samuels .	
5,069,679	12/1991	Taheri .	
5,080,660	1/1992	Buelna .	
5,133,725	7/1992	Quadri .	

5,141,491	8/1992	Bowald .	
5,152,771	10/1992	Sabbaghian et al. .	
5,163,953	11/1992	Vince .	
5,297,564	3/1994	Love .	
5,332,402	7/1994	Teitelbaum .	
5,370,685	12/1994	Stevens .	
5,397,351	3/1995	Pavcnik et al.	623/2
5,411,552	5/1995	Andersen et al.	623/2
5,469,868	11/1995	Reger .	
5,480,424	1/1996	Cox .	
5,489,295	2/1996	Piplani et al.	623/1
5,489,298	2/1996	Love et al. .	
5,562,729	10/1996	Purdy et al.	623/2
5,571,175	11/1996	Vanney et al.	623/2

FOREIGN PATENT DOCUMENTS

1644946A	4/1991	Russian Federation .	
1697790	12/1991	U.S.S.R.	623/2
WO 91/17118	11/1991	WIPO .	
WO 91/17720	11/1991	WIPO .	
9407437	4/1994	WIPO	623/2

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[57] **ABSTRACT**

An artificial heart valve comprises a relatively rigid stent member having a first cylindrical shape and a flexible valve disposed in the stent member, the stent member being self-expandable to a second cylindrical shape and collapsible to its first cylindrical shape. The valve comprises a circular portion comprising a plurality of leaflets extending from the periphery of the circular portion towards the center thereof, the leaflets being configured to allow for flow of blood through the valve in one direction only. The diameter of the circular portion is substantially the same as the inside diameter of the stent member when the stent member is in its second cylindrical shape, the valve member being attached to the stent member.

20 Claims, 8 Drawing Sheets

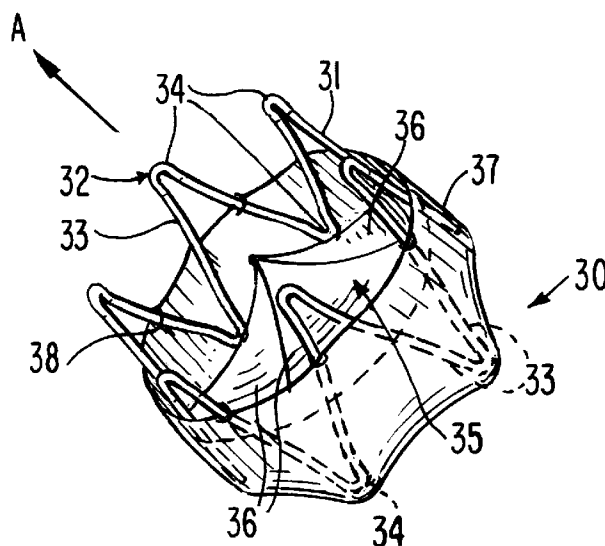


FIG. 1

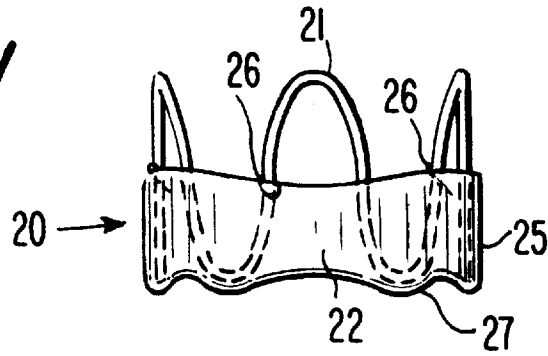


FIG. 2

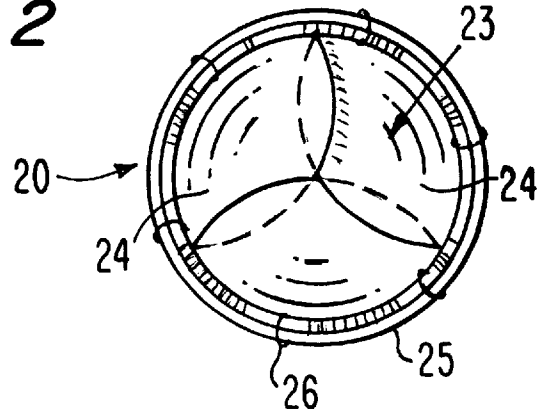
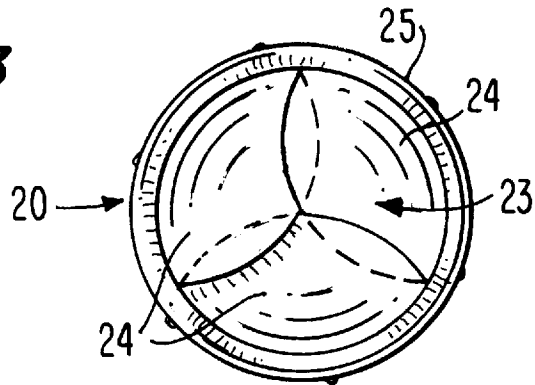


FIG. 3



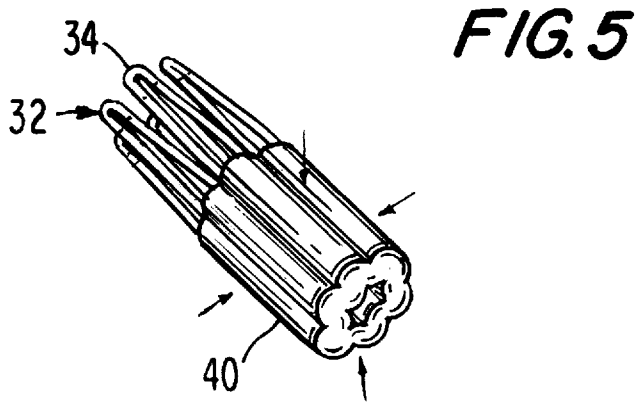
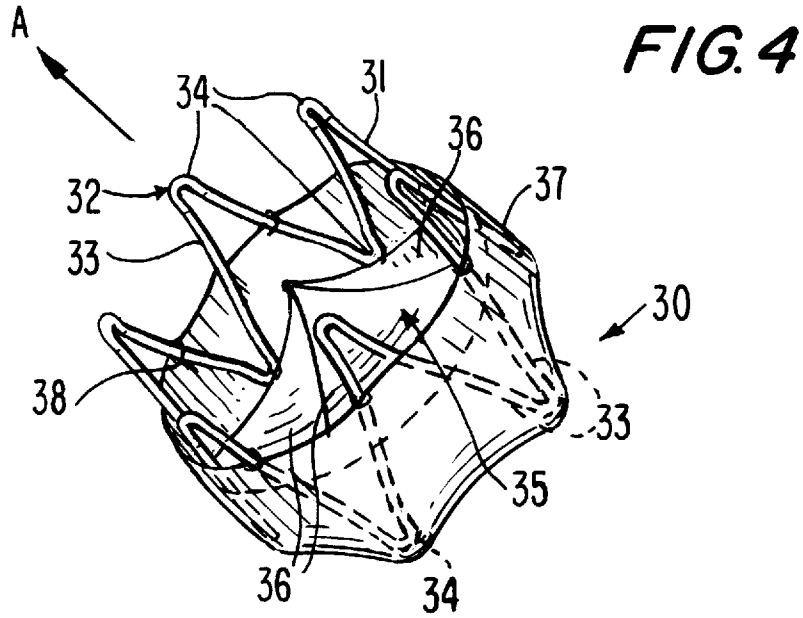


FIG. 6

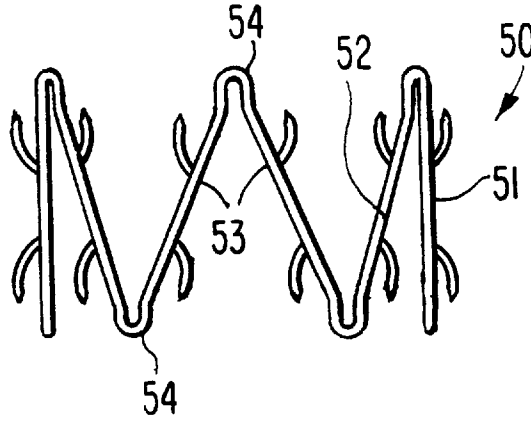
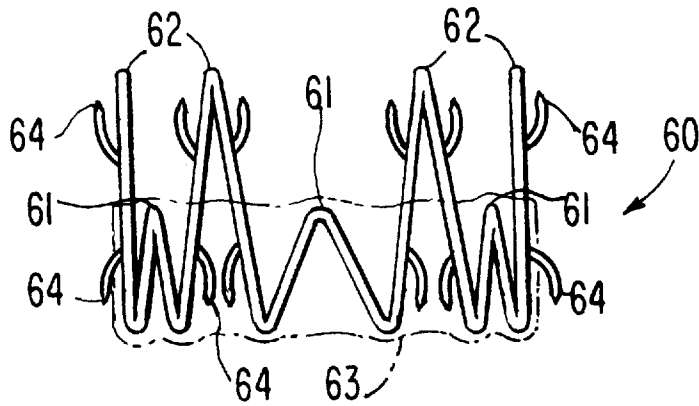
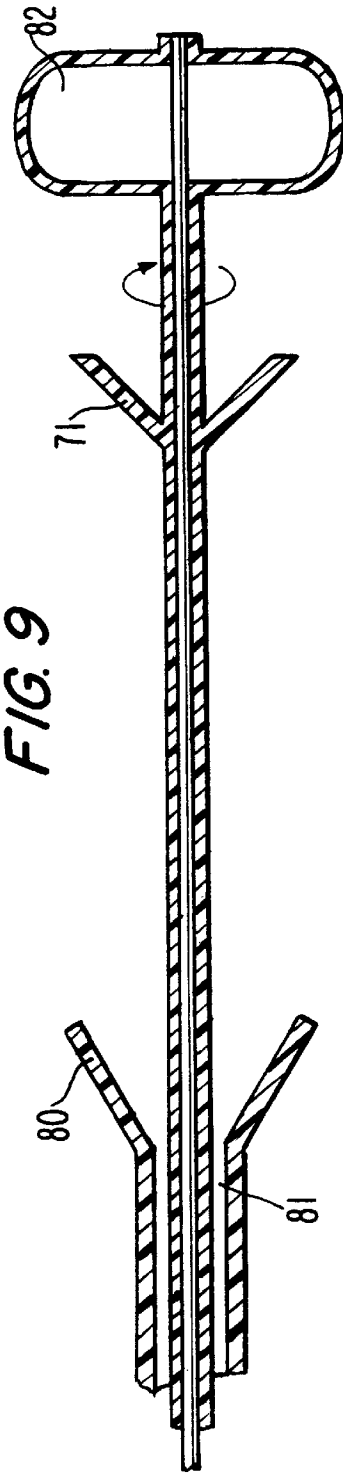
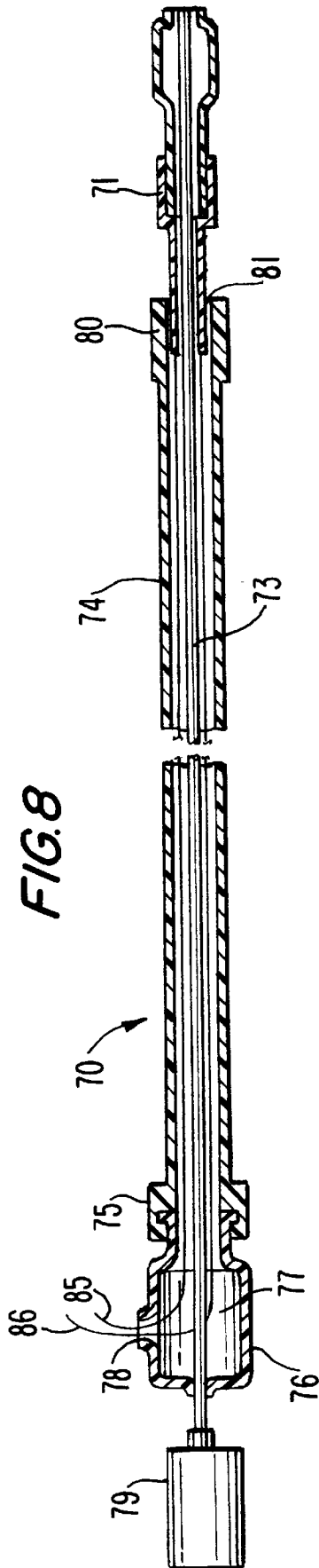


FIG. 7





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