



US00D748252S

(12) **United States Design Patent**
King et al.

(10) **Patent No.:** **US D748,252 S**

(45) **Date of Patent:** **** Jan. 26, 2016**

(54) **MULTI-LUMEN CATHETER TIP**

(71) Applicant: **C. R. Bard, Inc.**, Murray Hill, NJ (US)

(72) Inventors: **Eric M. King**, Salt Lake City, UT (US);
Ericka J. Prechtel, Salt Lake City, UT (US);
German Loesener, Sandy, UT (US)

(73) Assignee: **C. R. Bard, Inc.**, Murray Hill, NJ (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/445,258**

(22) Filed: **Feb. 8, 2013**

(51) **LOC (10) Cl.** **24-01**

(52) **U.S. Cl.**

USPC **D24/130**

(58) **Field of Classification Search**

USPC D24/127-131, 112-114, 133, 186;
606/181, 185; 604/264, 272, 115, 232,
604/187, 158, 164.08, 192, 263, 163, 181,
604/184, 198, 227; 600/101, 139, 143;
128/200.24, 207.14, 207.15

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

701,075 A	5/1902	McCully	
1,696,018 A	12/1928	Scheliberg	
1,856,811 A	5/1932	Inaki	
2,024,982 A	12/1935	Scott	
2,173,527 A	9/1939	Agayoff	
2,286,462 A	6/1942	Chaffin	
2,393,002 A	1/1946	Smith	
2,748,769 A *	6/1956	Huber	604/272
2,910,981 A	11/1959	Wilson et al.	
3,144,868 A	8/1964	Jascalevich	
3,176,690 A	4/1965	H'Doubler	
3,256,885 A	6/1966	Higgins et al.	
3,308,822 A *	3/1967	De Luca	604/274

(Continued)

FOREIGN PATENT DOCUMENTS

BE 834211 2/1976
CA 1150122 7/1983

(Continued)

OTHER PUBLICATIONS

Haire, et al., Thrombotic Complications of Subclavian Apheresis catheters in Cancer Patients: Prevention With Heparin Infusion, Journal of Clinical Apheresis, 1990, vol. 5, pp. 188-191.

(Continued)

Primary Examiner — David Muller

Assistant Examiner — Nathan Johnston

(74) *Attorney, Agent, or Firm* — Rutan & Tucker, LLP

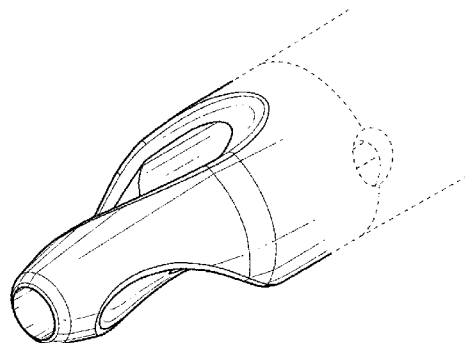
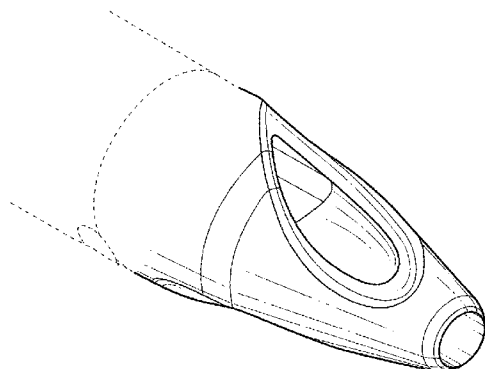
(57) **CLAIM**

The ornamental design for a multi-lumen catheter tip, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a multi-lumen catheter tip, shown attached to a first multi-lumen catheter; FIG. 2 is a first side perspective view thereof; FIG. 3 is a second side perspective view thereof; FIG. 4 is a first side view thereof; FIG. 5 is a second side view thereof; FIG. 6 is a front view thereof; FIG. 7 is a third side view thereof; FIG. 8 is a fourth side view thereof; FIG. 9 is a cross-sectional view thereof, taken along line 9-9 in FIG. 7; FIG. 10 is a cross-sectional view thereof, taken along line 10-10 in FIG. 6; and, FIG. 11 is a perspective view thereof, shown attached to a second multi-lumen catheter. The features shown in broken lines depict environmental subject matter only and form no part of the claimed design.

1 Claim, 5 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

3,416,532 A	12/1968	Grossman	4,701,159 A	10/1987	Brown et al.
3,426,759 A	2/1969	Smith	4,702,917 A	10/1987	Schindler
3,460,255 A	8/1969	Hutson	4,713,171 A	12/1987	Polaschegg
D217,795 S	6/1970	Spaven	4,717,379 A	1/1988	Ekholmer et al.
3,612,038 A	10/1971	Halligan	4,735,620 A	4/1988	Ruiz
3,736,939 A	6/1973	Taylor	4,737,141 A	4/1988	Spits et al.
3,805,794 A	4/1974	Schlesinger	4,737,152 A	4/1988	Alchas
3,812,851 A	5/1974	Rodriguez	4,738,667 A	4/1988	Galloway
3,848,604 A	11/1974	Sackner	4,748,808 A	6/1988	Hill
3,890,977 A	6/1975	Wilson	4,755,176 A	7/1988	Patel
3,929,126 A	12/1975	Corsaut	4,769,016 A	9/1988	Labianca
3,935,857 A	2/1976	Co	4,770,652 A	9/1988	Mahurkar
3,995,623 A	12/1976	Blake et al.	4,772,268 A	9/1988	Bates
4,068,659 A	1/1978	Moorehead	4,772,269 A	9/1988	Twardowski et al.
4,072,146 A	2/1978	Howes	4,776,841 A	10/1988	Catalano
4,072,153 A	2/1978	Swartz	4,777,951 A	10/1988	Cribier et al.
4,098,275 A	7/1978	Consalvo	4,784,638 A	11/1988	Ghajar et al.
4,114,625 A	9/1978	Onat	4,790,809 A	12/1988	Kuntz
4,117,836 A	10/1978	Erikson et al.	4,795,439 A	1/1989	Guest
4,129,129 A	12/1978	Amrine	4,801,297 A	1/1989	Mueller
4,134,402 A	1/1979	Mahurkar	D300,060 S *	2/1989	Molgaard-Nielsen D24/112
4,149,535 A	4/1979	Volder et al.	4,804,359 A	2/1989	Grunwald et al.
4,180,068 A	12/1979	Jacobsen et al.	4,808,155 A	2/1989	Mahurkar
D254,444 S *	3/1980	Levine D24/112	4,808,163 A	2/1989	Laub
4,248,224 A	2/1981	Jones	4,809,710 A	3/1989	Williamson
4,276,880 A	7/1981	Malmin	4,820,265 A	4/1989	DeSatnick et al.
4,292,976 A	10/1981	Banka	4,832,687 A	5/1989	Smith, III
4,299,228 A	11/1981	Peters	4,834,709 A	5/1989	Banning et al.
4,300,550 A	11/1981	Gandi et al.	4,842,582 A	6/1989	Mahurkar
4,309,994 A	1/1982	Grunwald	4,842,592 A	6/1989	Caggiani et al.
4,327,722 A	5/1982	Groshong et al.	4,846,814 A	7/1989	Ruiz
4,385,631 A	5/1983	Uthmann et al.	4,863,441 A	9/1989	Lindsay et al.
4,392,855 A	7/1983	Oreopoulos et al.	4,867,742 A	9/1989	Calderon
4,403,983 A	9/1983	Edelman et al.	4,892,518 A	1/1990	Cupp et al.
4,405,313 A	9/1983	Sisley et al.	4,894,057 A	1/1990	Howes
4,406,656 A	9/1983	Hattler et al.	4,895,561 A	1/1990	Mahurkar
D272,651 S	2/1984	Mahurkar	4,898,591 A	2/1990	Jang et al.
4,431,426 A	2/1984	Groshong et al.	4,906,238 A	3/1990	Greenfeld et al.
4,432,722 A	2/1984	Bohan, Jr. et al.	4,925,452 A	5/1990	Melinyshyn et al.
4,432,752 A	2/1984	Marlon	4,927,418 A	5/1990	Dake et al.
4,445,893 A	5/1984	Bodicky	4,935,004 A	6/1990	Cruz
4,451,252 A	5/1984	Martin et al.	4,935,010 A	6/1990	Cox et al.
4,453,928 A	6/1984	Steiger	4,935,044 A	6/1990	Schoenpflug et al.
4,465,482 A	8/1984	Tittel et al.	4,936,826 A	6/1990	Amarasinghe
4,490,138 A	12/1984	Lipsky et al.	4,950,232 A	8/1990	Ruzicka et al.
4,493,696 A	1/1985	Uldall et al.	4,950,259 A	8/1990	Geary et al.
RE31,873 E	4/1985	Howes	4,951,665 A	8/1990	Schneider
4,531,933 A	7/1985	Norton et al.	4,961,729 A	10/1990	Vaillancourt
4,543,087 A	9/1985	Sommercorn et al.	4,961,731 A	10/1990	Bodicky et al.
4,545,373 A	10/1985	Christoudias	4,961,809 A	10/1990	Martin et al.
4,549,879 A	10/1985	Groshong et al.	4,968,307 A	11/1990	Dake et al.
4,557,261 A	12/1985	Rugheimer et al.	4,969,890 A	11/1990	Sugita et al.
4,568,329 A	2/1986	Mahurkar	4,981,477 A	1/1991	Schon et al.
4,568,338 A	2/1986	Todd	4,985,014 A	1/1991	Orejola
4,573,476 A	3/1986	Ruiz	4,990,138 A	2/1991	Bacich et al.
4,581,012 A	4/1986	Brown et al.	4,994,027 A	2/1991	Farrell
4,583,968 A	4/1986	Mahurkar	4,995,865 A	2/1991	Gahara et al.
4,583,986 A	4/1986	Lapidus	5,009,636 A	4/1991	Wortley et al.
4,601,697 A	7/1986	Mammolenti et al.	5,015,230 A	5/1991	Martin et al.
4,619,643 A	10/1986	Bai	5,016,640 A	5/1991	Ruiz
4,623,327 A	11/1986	Mahurkar	5,021,044 A	6/1991	Sharkawy
4,626,240 A	12/1986	Edelman et al.	5,041,101 A	8/1991	Seder et al.
4,642,101 A	2/1987	Krolkowski et al.	5,041,107 A	8/1991	Heil, Jr.
4,643,711 A	2/1987	Bates	5,049,138 A	9/1991	Chevalier et al.
4,666,426 A	5/1987	Aigner et al.	5,053,003 A	10/1991	Dadson et al.
4,668,221 A	5/1987	Luther	5,053,004 A	10/1991	Markel et al.
4,670,009 A	6/1987	Bullock	5,053,023 A	10/1991	Martin
4,675,004 A	6/1987	Hadford et al.	5,057,073 A	10/1991	Martin
4,681,122 A	7/1987	Winters et al.	5,059,170 A	10/1991	Cameron
4,681,564 A	7/1987	Landreneau	5,069,673 A	12/1991	Shwab
4,681,570 A	7/1987	Dalton	5,074,841 A	12/1991	Ademovic et al.
4,682,978 A	7/1987	Martin et al.	5,084,013 A	1/1992	Takase et al.
4,687,471 A	8/1987	Twardowski et al.	5,098,412 A	3/1992	Shiu et al.
4,692,141 A	9/1987	Mahurkar	5,100,395 A	3/1992	Rosenberg et al.
4,694,838 A	9/1987	Wijayarthna et al.	5,102,402 A	4/1992	Dror et al.
			5,106,368 A	4/1992	Uldall et al.
			5,106,376 A	4/1992	Mononen et al.
			5,111,829 A	5/1992	Alvarez de Toledo
			5,112,301 A	5/1992	Fenton, Jr. et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

5,114,423 A	5/1992	Kasprzyk et al.	5,423,768 A	6/1995	Folden et al.
5,117,836 A	6/1992	Millar	5,431,661 A	7/1995	Koch
5,120,299 A	6/1992	Lombardi	5,451,026 A	9/1995	Smith
5,120,304 A	6/1992	Sasaki	5,451,206 A	9/1995	Young
5,122,125 A	6/1992	Deuss et al.	5,451,233 A	9/1995	Yock
5,125,904 A	6/1992	Lee	5,458,570 A	10/1995	May, Jr.
5,129,891 A	7/1992	Young	5,458,582 A	10/1995	Nakao
5,135,599 A	8/1992	Martin et al.	5,462,533 A *	10/1995	Daugherty 604/164.01
5,139,486 A	8/1992	Moss	5,472,417 A	12/1995	Martin et al.
5,156,592 A	10/1992	Martin et al.	5,472,432 A	12/1995	Martin
5,163,928 A	11/1992	Hobbs et al.	5,476,453 A	12/1995	Mehta
5,167,623 A	12/1992	Cianci et al.	5,480,380 A	1/1996	Martin
5,171,216 A	12/1992	Dasse et al.	5,486,159 A	1/1996	Mahurkar
5,171,227 A	12/1992	Twardowski et al.	5,489,278 A	2/1996	Abrahamson
5,178,616 A	1/1993	Uemiya et al.	5,496,292 A	3/1996	Burnham
5,188,592 A	2/1993	Hakki	5,496,872 A	3/1996	Constancis et al.
5,188,593 A	2/1993	Martin	5,505,710 A	4/1996	Dorsey, III
5,190,520 A	3/1993	Fenton, Jr. et al.	5,507,723 A	4/1996	Keshaviah
5,190,529 A	3/1993	McCrorry et al.	5,509,897 A	4/1996	Twardowski et al.
5,191,898 A	3/1993	Millar	5,509,900 A	4/1996	Kirkman
5,195,962 A	3/1993	Martin et al.	5,509,902 A	4/1996	Raulerson
5,197,951 A	3/1993	Mahurkar	5,542,925 A	8/1996	Orth
5,197,973 A	3/1993	Pang et al.	5,545,373 A	8/1996	Maziasz et al.
5,197,976 A	3/1993	Herweck et al.	5,556,390 A	9/1996	Hicks
5,201,723 A	4/1993	Quinn	5,556,930 A	9/1996	Brehm et al.
5,207,648 A	5/1993	Gross	5,558,635 A	9/1996	Cannon
5,207,650 A	5/1993	Martin	5,562,609 A	10/1996	Brumbach
5,209,723 A	5/1993	Twardowski et al.	5,562,696 A *	10/1996	Nobles et al. 606/185
5,209,725 A	5/1993	Roth	5,569,182 A	10/1996	Twardowski et al.
5,209,742 A	5/1993	Venema et al.	5,569,195 A	10/1996	Saab
5,215,527 A	6/1993	Beck et al.	5,571,093 A	11/1996	Cruz et al.
5,221,255 A	6/1993	Mahurkar et al.	5,584,803 A	12/1996	Stevens et al.
5,221,256 A	6/1993	Mahurkar	5,599,304 A	2/1997	Shaari
5,222,949 A	6/1993	Kaldany	5,599,328 A	2/1997	Stevens
5,226,880 A	7/1993	Martin et al.	5,607,462 A	3/1997	Imran
5,234,438 A	8/1993	Semrad	5,624,392 A	4/1997	Saab
5,236,016 A	8/1993	Vogelsang et al.	5,624,413 A	4/1997	Markel et al.
5,242,398 A	9/1993	Knoll et al.	5,632,729 A	5/1997	Cai et al.
5,246,430 A	9/1993	MacFarlane	5,637,102 A	6/1997	Tolkoff et al.
5,250,034 A	10/1993	Appling et al.	5,642,270 A	6/1997	Green et al.
5,254,084 A	10/1993	Geary	5,655,867 A	8/1997	Gysi et al.
5,273,527 A	12/1993	Schatz et al.	5,662,606 A	9/1997	Cimino et al.
5,273,534 A	12/1993	Knoepfler	5,665,067 A	9/1997	Linder et al.
5,279,596 A	1/1994	Castaneda et al.	5,674,237 A *	10/1997	Ott 606/185
5,279,599 A	1/1994	Wilk	5,685,867 A	11/1997	Twardowski et al.
5,306,240 A	4/1994	Berry	5,686,867 A	11/1997	Sutardja et al.
5,312,337 A	5/1994	Flaherty et al.	5,693,030 A	12/1997	Lee et al.
5,312,357 A	5/1994	Buijs et al.	5,695,457 A	12/1997	St. Goar et al.
5,318,517 A	6/1994	Reiman	5,704,915 A	1/1998	Melsky et al.
5,322,519 A	6/1994	Ash	5,713,849 A	2/1998	Bosma et al.
5,324,274 A	6/1994	Martin	5,713,853 A	2/1998	Clark et al.
5,330,432 A *	7/1994	Yoon 604/164.12	5,717,216 A	2/1998	McCoy et al.
5,338,308 A	8/1994	Wilk	5,718,678 A	2/1998	Fleming, III
5,342,295 A	8/1994	Imran	5,718,692 A	2/1998	Schon et al.
5,342,386 A	8/1994	Trotta	5,720,735 A	2/1998	Dorros
5,346,471 A	9/1994	Raulerson	5,738,649 A	4/1998	Macoviak
5,348,536 A	9/1994	Young et al.	5,741,329 A	4/1998	Agrawal et al.
5,350,358 A	9/1994	Martin	5,743,873 A	4/1998	Cai et al.
5,360,397 A	11/1994	Pinchuk	5,752,939 A	5/1998	Makoto et al.
5,360,407 A	11/1994	Leonard et al.	5,769,796 A	6/1998	Palermo et al.
5,364,344 A	11/1994	Beattie et al.	5,772,643 A	6/1998	Howell et al.
5,374,245 A	12/1994	Mahurkar	5,776,096 A	7/1998	Fields
5,378,230 A	1/1995	Mahurkar	5,776,111 A	7/1998	Tesio
5,380,276 A	1/1995	Miller et al.	5,785,686 A	7/1998	Runge
5,380,290 A	1/1995	Makower et al.	5,792,094 A	8/1998	Stevens et al.
5,382,238 A	1/1995	Abrahamson et al.	5,792,123 A	8/1998	Ensminger
5,389,087 A	2/1995	Miraki	5,797,869 A	8/1998	Martin et al.
5,389,090 A	2/1995	Fischell et al.	5,800,384 A	9/1998	Russell et al.
5,395,316 A	3/1995	Martin	5,800,414 A	9/1998	Cazal et al.
5,399,168 A	3/1995	Wadsworth, Jr. et al.	5,800,516 A	9/1998	Fine et al.
5,403,291 A	4/1995	Abrahamson	5,807,311 A	9/1998	Palestrant
5,405,320 A	4/1995	Twardowski et al.	5,807,318 A	9/1998	St. Goar et al.
5,405,341 A	4/1995	Martin	5,807,329 A	9/1998	Gelman
5,409,463 A	4/1995	Thomas et al.	5,809,897 A	9/1998	Powell et al.
5,417,668 A	5/1995	Setzer et al.	5,810,789 A	9/1998	Powers et al.
			5,814,016 A	9/1998	Valley et al.
			5,830,184 A	11/1998	Basta
			5,830,196 A	11/1998	Hicks
			5,833,671 A	11/1998	Macoviak et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

5,843,048 A	*	12/1998	Gross	604/264	6,409,700 B1	6/2002	Siegel, Jr. et al.
5,858,009 A		1/1999	Jonkman		6,413,228 B1	7/2002	Hung et al.
5,861,010 A		1/1999	Boussignac et al.		6,428,513 B1	8/2002	Abrahamson
5,868,717 A		2/1999	Prosl		6,443,922 B1	9/2002	Roberts et al.
5,873,865 A		2/1999	Horzewski et al.		6,450,988 B1	9/2002	Bradshaw
5,876,366 A		3/1999	Dykstra et al.		6,453,185 B1	9/2002	O'Keefe
5,876,426 A		3/1999	Kume et al.		6,454,997 B1	9/2002	Divino, Jr. et al.
5,882,347 A		3/1999	Mouris-Laan et al.		6,463,335 B1	10/2002	Munch et al.
5,891,111 A		4/1999	Ismael et al.		6,468,287 B1 *	10/2002	Baugh
5,904,670 A		5/1999	Schreiner		6,475,207 B1	11/2002	Maginot et al.
5,911,715 A		6/1999	Berg et al.		6,475,209 B1	11/2002	Larson et al.
5,913,848 A		6/1999	Luther et al.		6,478,789 B1	11/2002	Spehalski et al.
5,916,208 A		6/1999	Luther et al.		6,482,169 B1	11/2002	Kuhle
5,919,160 A		7/1999	Sanfilippo, II		6,533,763 B1	3/2003	Schneiter
5,944,732 A		8/1999	Raulerson et al.		6,565,594 B1	5/2003	Herweck et al.
5,947,937 A		9/1999	Urrutia et al.		6,576,001 B2	6/2003	Werneth et al.
5,947,953 A		9/1999	Ash et al.		6,582,459 B1	6/2003	Lau et al.
5,957,879 A		9/1999	Roberts et al.		6,585,705 B1	7/2003	Maginot et al.
5,957,893 A		9/1999	Luther et al.		6,592,565 B2	7/2003	Twardowski
5,957,912 A		9/1999	Heitzmann		6,595,966 B2	7/2003	Davey et al.
5,961,486 A		10/1999	Twardowski et al.		6,620,118 B1	9/2003	Prosl et al.
5,964,796 A		10/1999	Imran		6,638,242 B2	10/2003	Wilson et al.
5,976,103 A		11/1999	Martin		6,659,134 B2	12/2003	Navis
5,976,120 A		11/1999	Chow et al.		6,682,498 B2	1/2004	Ross
5,980,551 A		11/1999	Summers et al.		6,682,519 B1	1/2004	Schon
5,984,908 A		11/1999	Davis et al.		6,691,625 B2	2/2004	Duncan
5,989,206 A		11/1999	Prosl et al.		6,695,832 B2	2/2004	Schon et al.
5,989,213 A		11/1999	Maginot		6,702,776 B2	3/2004	Quinn
6,001,079 A		12/1999	Pourchez		6,712,797 B1	3/2004	Southern, Jr.
6,033,382 A		3/2000	Basta		6,712,798 B2	3/2004	Constantz
6,036,654 A		3/2000	Quinn et al.		6,719,717 B1	4/2004	Johnson et al.
6,059,771 A		5/2000	Balbierz et al.		6,719,749 B1	4/2004	Schweikert et al.
6,074,374 A		6/2000	Fulton		6,723,084 B1	4/2004	Maginot et al.
6,086,555 A		7/2000	Eliassen et al.		6,723,114 B2	4/2004	Shalaby
6,090,096 A		7/2000	St. Goar et al.		6,730,299 B1	5/2004	Tayot et al.
6,099,513 A		8/2000	Spehalski		6,752,827 B2	6/2004	Ross et al.
6,103,778 A		8/2000	Hyon et al.		6,755,851 B2	6/2004	Noda et al.
6,106,540 A		8/2000	White et al.		6,758,836 B2	7/2004	Zawacki
6,113,572 A		9/2000	Gailey et al.		6,786,664 B2	9/2004	Claramunt et al.
6,117,117 A		9/2000	Mauch		6,786,884 B1	9/2004	DeCant, Jr. et al.
6,120,494 A		9/2000	Jonkman		6,796,991 B2	9/2004	Nardeo
6,126,631 A		10/2000	Loggie		6,797,107 B1	9/2004	Kotzey
6,146,354 A		11/2000	Beil		6,808,510 B1	10/2004	DiFiore
6,146,373 A		11/2000	Cragg et al.		6,814,718 B2	11/2004	McGuckin, Jr. et al.
6,152,909 A		11/2000	Bagaoisan et al.		6,819,951 B2	11/2004	Patel et al.
6,156,016 A		12/2000	Maginot		6,821,287 B1	11/2004	Jang
6,161,547 A		12/2000	Barbut		6,824,554 B1	11/2004	Jang
6,178,356 B1		1/2001	Chastain et al.		6,835,452 B1	12/2004	Hamerski
6,180,059 B1		1/2001	Divino, Jr. et al.		6,837,864 B1	1/2005	Bertolero et al.
6,190,349 B1		2/2001	Ash et al.		6,852,079 B2	2/2005	Miyano
6,190,371 B1		2/2001	Maginot et al.		6,852,097 B1	2/2005	Fulton, III
6,193,685 B1		2/2001	Goodin		6,858,019 B2	2/2005	McGuckin, Jr. et al.
6,196,996 B1		3/2001	Teirstein		6,872,198 B1	3/2005	Wilson et al.
6,206,849 B1		3/2001	Martin et al.		6,878,143 B2	4/2005	Andersen
6,210,365 B1		4/2001	Afzal		6,881,211 B2	4/2005	Schweikert et al.
6,210,380 B1		4/2001	Mauch		6,884,253 B1 *	4/2005	McFarlane
6,217,527 B1		4/2001	Selmon et al.		6,911,014 B2	6/2005	Wentling et al.
6,224,622 B1		5/2001	Kotzev		6,913,601 B2	7/2005	St. Goar et al.
6,238,406 B1		5/2001	Ellis et al.		6,916,313 B2	7/2005	Cunningham
6,264,627 B1		7/2001	Liska et al.		6,921,396 B1	7/2005	Wilson et al.
6,273,879 B1		8/2001	Keith et al.		6,921,411 B2	7/2005	Yock
6,280,413 B1		8/2001	Clark et al.		6,934,142 B2	8/2005	Grosse et al.
6,280,423 B1		8/2001	Davey et al.		6,966,886 B2	11/2005	Appling
6,287,326 B1		9/2001	Pecor		6,969,381 B2	11/2005	Voorhees
6,293,927 B1		9/2001	McGuckin, Jr.		6,979,318 B1 *	12/2005	McDonald et al.
6,293,958 B1		9/2001	Berry et al.		6,991,625 B1	1/2006	Gately et al.
6,296,631 B2		10/2001	Chow		D515,211 S	2/2006	Chesnin
6,299,631 B1		10/2001	Shalaby		6,997,894 B2	2/2006	Caresio
6,322,551 B1		11/2001	Brugger		7,008,395 B1	3/2006	Loggie
6,328,730 B1		12/2001	Harkrider, Jr.		7,011,645 B2	3/2006	McGuckin, Jr. et al.
6,342,120 B1		1/2002	Basta		7,018,384 B2	3/2006	Skakoon
6,361,529 B1		3/2002	Goodin et al.		7,029,467 B2	4/2006	Currier et al.
6,383,172 B1		5/2002	Barbut		7,066,914 B2	6/2006	Andersen
6,394,141 B2		5/2002	Wages et al.		7,066,925 B2	6/2006	Gately et al.
6,394,142 B1		5/2002	Woelfel et al.		7,074,213 B2	7/2006	McGuckin, Jr. et al.
					7,077,829 B2	7/2006	McGuckin, Jr. et al.
					7,087,053 B2	8/2006	Vanney
					7,090,654 B2	8/2006	Lotito et al.
					7,108,674 B2	9/2006	Quinn

(56)

References Cited

U.S. PATENT DOCUMENTS

D530,420	S	10/2006	Chesnin	2004/0210180	A1	10/2004	Altman
7,128,734	B1	10/2006	Wilson et al.	2004/0210187	A1	10/2004	Zawacki
7,130,700	B2	10/2006	Gardeski et al.	2004/0210237	A1	10/2004	Ross et al.
7,141,035	B2	11/2006	Haggstrom	2004/0220550	A1	11/2004	Schryver
RE39,451	E	12/2006	Kuhle	2004/0230204	A1	11/2004	Wortley et al.
7,182,746	B2	2/2007	Haarala et al.	2004/0243095	A1	12/2004	Nimkar et al.
7,300,430	B2	11/2007	Wilson et al.	2004/0249337	A1	12/2004	DiFiore
7,322,953	B2	1/2008	Redinger	2005/0003322	A1	1/2005	Logan et al.
7,347,852	B2	3/2008	Hobbs et al.	2005/0004504	A1	1/2005	Frye et al.
7,381,204	B2	6/2008	Wilson et al.	2005/0013341	A1	1/2005	Baghai
7,393,339	B2	7/2008	Zawacki et al.	2005/0025641	A1	2/2005	Shibata et al.
7,422,571	B2	9/2008	Schweikert et al.	2005/0027282	A1	2/2005	Schweikert et al.
7,465,286	B2	12/2008	Patterson et al.	2005/0027289	A1	2/2005	Castellano et al.
7,485,107	B2	2/2009	DiFiore et al.	2005/0033222	A1	2/2005	Haggstrom et al.
7,569,029	B2	8/2009	Clark	2005/0033264	A1	2/2005	Redinger
7,575,563	B2	8/2009	Appling	2005/0054989	A1	3/2005	McGuckin et al.
7,651,482	B2	1/2010	Harris	2005/0055012	A1	3/2005	Trotola
7,686,823	B2	* 3/2010	Pingleton et al.	2005/0059925	A1	3/2005	Maginot et al.
7,798,999	B2	9/2010	Bailey et al.	2005/0070842	A1	3/2005	Lotito et al.
7,972,465	B2	7/2011	Patterson et al.	2005/0080398	A1	4/2005	Markel et al.
8,021,321	B2	9/2011	Zawacki	2005/0085765	A1	4/2005	Voorhees
8,066,660	B2	11/2011	Gregersen et al.	2005/0096585	A1	5/2005	Schon et al.
8,092,415	B2	1/2012	Moehle	2005/0113904	A1	5/2005	Shank et al.
8,100,863	B2	1/2012	Moehle et al.	2005/0131341	A1	6/2005	McGuckin et al.
8,152,951	B2	4/2012	Zawacki et al.	2005/0171469	A1	8/2005	Cunningham
8,206,371	B2	6/2012	Nimkar et al.	2005/0187535	A1	8/2005	Wilson et al.
8,292,841	B2	10/2012	Gregersen	2005/0215977	A1*	9/2005	Uschold
8,500,939	B2	8/2013	Nimkar et al.	2005/0228339	A1	10/2005	Clark
8,540,661	B2	9/2013	Gregersen	2005/0245900	A1	11/2005	Ash
8,597,275	B2	12/2013	Nimkar et al.	2005/0251190	A1*	11/2005	McFarlane
8,696,614	B2	4/2014	Gregersen et al.	2005/0256461	A1	11/2005	DiFiore et al.
8,808,227	B2	8/2014	Zawacki et al.	2005/0261663	A1	11/2005	Patterson et al.
8,894,601	B2	11/2014	Moehle et al.	2005/0267400	A1	12/2005	Haarala et al.
8,992,454	B2	3/2015	Anand	2005/0277862	A1	12/2005	Anand
2001/0041857	A1	11/2001	Sansoucy	2005/0283111	A1	12/2005	Maurice
2001/0041873	A1	11/2001	Dopper et al.	2005/0288623	A1	12/2005	Hjalmarsson
2002/0013569	A1	1/2002	Sterman et al.	2005/0288706	A1	12/2005	Widomski et al.
2002/0026156	A1	2/2002	Quinn	2006/0004316	A1	1/2006	DiFiore et al.
2002/0086047	A1	7/2002	Mueller et al.	2006/0004325	A1	1/2006	Hamatake et al.
2002/0087108	A1	7/2002	Maginot et al.	2006/0009783	A1	1/2006	Rome et al.
2002/0087145	A1	7/2002	Ehwald et al.	2006/0015072	A1	1/2006	Raulerson
2002/0091362	A1	7/2002	Maginot et al.	2006/0015130	A1	1/2006	Voorhees et al.
2002/0091430	A1	7/2002	Dobak et al.	2006/0030827	A1	2/2006	Raulerson et al.
2002/0099326	A1	7/2002	Wilson et al.	2006/0047267	A1	3/2006	Gately et al.
2002/0099327	A1	7/2002	Wilson et al.	2006/0047268	A1	3/2006	Stephens
2002/0107506	A1	8/2002	McGuckin et al.	2006/0058775	A1	3/2006	Stevens et al.
2002/0138031	A1	9/2002	Ross	2006/0064072	A1	3/2006	Gately et al.
2002/0169490	A1	11/2002	Noda et al.	2006/0095062	A1	5/2006	Stephens
2002/0177904	A1	11/2002	Huxel et al.	2006/0100572	A1	5/2006	DiMatteo et al.
2003/0023198	A1	1/2003	Twardowski	2006/0161100	A1	7/2006	Hamboly
2003/0088213	A1	5/2003	Schweikert et al.	2006/0184142	A1	8/2006	Schon et al.
2003/0093027	A1	5/2003	McGuckin et al.	2006/0189922	A1	8/2006	Amarasinghe et al.
2003/0097091	A1	5/2003	Hobbs et al.	2006/0200111	A1	9/2006	Moehle et al.
2003/0144623	A1	7/2003	Heath et al.	2006/0206094	A1	9/2006	Chesnin et al.
2003/0149395	A1	8/2003	Zawacki	2006/0251612	A1	11/2006	Kotzev et al.
2003/0153898	A1	8/2003	Schon et al.	2006/0253063	A1	11/2006	Schweikert
2003/0187411	A1	10/2003	Constantz	2006/0271012	A1	11/2006	Canaud et al.
2003/0204179	A1	10/2003	Davey et al.	2007/0005003	A1	1/2007	Patterson et al.
2004/0039350	A1	2/2004	McKittrick	2007/0019181	A1	1/2007	Sinclair et al.
2004/0054321	A1	3/2004	Schon et al.	2007/0066964	A1	3/2007	Atkins
2004/0059314	A1	3/2004	Schon et al.	2007/0078478	A1	4/2007	Atkins et al.
2004/0064086	A1	4/2004	Gottlieb et al.	2007/0106206	A1	5/2007	Appling
2004/0065333	A1	4/2004	Wilson et al.	2007/0129704	A1	6/2007	O'Mahony et al.
2004/0075198	A1	4/2004	Schweikert et al.	2007/0167925	A1	7/2007	Jacqmein
2004/0087892	A1	5/2004	Cunningham	2007/0191810	A1	8/2007	Kennedy
2004/0092863	A1	5/2004	Raulerson et al.	2007/0225661	A1	9/2007	Ash et al.
2004/0097863	A1	5/2004	Appling	2007/0225682	A1	9/2007	Ash et al.
2004/0097903	A1	5/2004	Raulerson	2007/0282274	A1	12/2007	Chesnin
2004/0122418	A1	6/2004	Voorhees	2008/0021417	A1	1/2008	Zawacki et al.
2004/0147903	A1	7/2004	Latini	2008/0039774	A1	2/2008	Zawacki et al.
2004/0167463	A1	8/2004	Zawacki et al.	2008/0065029	A1*	3/2008	Racz
2004/0171997	A1	9/2004	Wilson et al.	2008/0082079	A1	4/2008	Braga et al.
2004/0172003	A1	9/2004	Wilson et al.	2008/0082080	A1	4/2008	Braga
2004/0176739	A1	9/2004	Stephens et al.	2008/0097409	A1	4/2008	Stephens
2004/0193102	A1	9/2004	Haggstrom	2008/0172012	A1*	7/2008	Hiniduma-Lokuge et al.
				2008/0214980	A1	9/2008	Anand
				2008/0214992	A1	9/2008	Haarala et al.
				2009/0112153	A1	4/2009	Gregersen et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2009/0118661 A1 5/2009 Moehle et al.
 2009/0118701 A1 5/2009 Nimkar et al.
 2009/0118707 A1 5/2009 Schweikert et al.
 2009/0118755 A1* 5/2009 Maliglowka et al. 606/185
 2009/0138034 A1* 5/2009 Maliglowka et al. 606/185
 2009/0157051 A1 6/2009 Appling et al.
 2009/0187141 A1 7/2009 Lareau et al.
 2009/0192435 A1 7/2009 Gregersen
 2009/0204052 A1 8/2009 Nimkar et al.
 2009/0204079 A1 8/2009 Nimkar et al.
 2009/0204083 A1 8/2009 O'Donnell et al.
 2009/0205189 A1 8/2009 Nimkar et al.
 2009/0209940 A1 8/2009 Nimkar et al.
 2009/0292248 A1 11/2009 Schon et al.
 2010/0081986 A1 4/2010 Matson et al.
 2010/0331780 A1 12/2010 Bellisario et al.
 2011/0020418 A1 1/2011 Bosley, Jr. et al.
 2012/0059304 A1 3/2012 Gregersen et al.
 2012/0089070 A1 4/2012 Moehle et al.
 2013/0018405 A1* 1/2013 Onishi et al. 606/185
 2013/0079752 A1 3/2013 Gregersen
 2013/0253445 A1 9/2013 Nimkar et al.
 2014/0025042 A1 1/2014 Gregersen
 2014/0088510 A1 3/2014 Nimkar et al.
 2014/0228742 A1 8/2014 Gregersen et al.
 2014/0276472 A1* 9/2014 VanderStek et al. 604/272
 2014/0277052 A1* 9/2014 Haselby et al. 606/185
 2014/0330220 A1 11/2014 Zawacki et al.
 2014/0336687 A1* 11/2014 Iwase et al. 606/185
 2015/0073336 A1 3/2015 Moehle et al.
 2015/0088100 A1 3/2015 Oborn et al.

FOREIGN PATENT DOCUMENTS

CA 2474351 A1 8/2003
 CN 2788836 Y 6/2006
 CN 101918067 A 12/2010
 CN 103170050 A 6/2013
 CN 101918066 B 7/2013
 DE 8815869 U1 2/1989
 DE 9108132 U1 9/1991
 DE 102005051211 A1 5/2007
 EP 0030854 A2 6/1981
 EP 0132344 A2 1/1985
 EP 0301854 2/1989
 EP 0332366 A2 9/1989
 EP 0386408 A1 9/1990
 EP 0453234 A1 10/1991
 EP 0476796 A1 3/1992
 EP 0495263 A1 7/1992
 EP 0650740 A1 5/1995
 EP 0711574 A1 5/1996
 EP 1471966 A1 11/2004
 EP 1599247 A2 11/2005
 GB 1503469 3/1978
 JP 56-136569 A 10/1981
 JP 8-510935 T 11/1996
 JP 2001137350 5/2001
 JP 2008500081 A 1/2008
 JP 4827377 B2 11/2011
 RU 45923 A 11/2004
 SU 459237 A1 2/1975
 WO 9108132 A1 6/1991
 WO 9316741 A1 9/1993
 WO 9316752 A1 9/1993
 WO 9709086 A1 3/1997
 WO 9717102 5/1997
 WO 9722374 A1 6/1997
 WO 9737699 10/1997
 WO 9904844 A1 2/1999
 WO 0223137 A1 4/2000
 WO 02058776 A2 8/2002
 WO 02083223 A1 10/2002
 WO 03030960 A2 4/2003

WO 03033049 A2 4/2003
 WO 03066148 A1 8/2003
 WO 2004075962 A2 9/2004
 WO 2004096334 11/2004
 WO 2004112876 12/2004
 WO 2005018712 A2 3/2005
 WO 2005023336 A2 3/2005
 WO 2005077449 8/2005
 WO 2005084741 A1 9/2005
 WO 2005118039 A1 12/2005
 WO 2006034877 4/2006
 WO 2009051967 A1 4/2009
 WO 2009055332 A1 4/2009
 WO 2009059220 A1 5/2009
 WO 2015077560 A1 5/2015

OTHER PUBLICATIONS

Hull, et al., The Groshong Catheter: Initial Experience and Early Results of Imaging-guided Placement, *Radiology*, 1992, vol. 185, pp. 803-807.
 Ignoutus, et al., Review of Radiological Insertion of Indwelling Central Venous Catheters, Minimally Invasive Therapy, 1992, 1:373-388.
 Instructions For Use (Copyright Dated 1990) for Polycath Polyurethane Central Venous Catheter; believed to have been packaged with product and sold in the United States before Jan. 4, 2000 and with related marketing materials.
 Instructions for Use (Copyright Dated 1992) for FloLock Single Lumen Bi-directional Valved Catheter; believed to have been packaged with product and sold in the United States before Jan. 2000.
 Instructions for Use (not dated) for Infuse-a-Cath Polyurethane Central Venous Catheter; believed to have been packaged with product and sold in the United States before Jan. 2000.
 Instructions For Use for Diatek Cannon Catheter Product First Sold in the United States in Sep. 2001.
 Jones, et al., Efficacy of the Supraclavicular Route for Temporary Hemodialysis Access, *Southern Medical Journal*, 1992, vol. 85, No. 7, pp. 725-726.
 JP 2010-532299 filed Apr. 30, 2010 Final Notice of Reason for Rejection dated Feb. 8, 2013.
 JP 2010-532299 filed Apr. 30, 2010 Official Action dated Apr. 23, 2012.
 JP App. No. 2003-565569 filed Feb. 7, 2003, Translated Decision of Refusal mailed Dec. 24, 2009.
 JP App. No. 2003-565569 filed Feb. 7, 2003, Translated Official Action mailed May 28, 2009.
 JP App. No. 2003-565569 filed Feb. 7, 2003, Translated Official Action mailed Nov. 7, 2008.
 Kapoian et al. *Dialysis as Treatment of End-Stage Renal Disease*, Chapter 5: Dialysis Access and Recirculation, © 1999.
 Kaupke, et al., Perforation of the Superior Vena Cava by a Subclavian Hemodialysis Catheter: early detection by angiography, *The International Journal of Artificial Organs*, 1992, vol. 15, No. 11, pp. 666-668.
 Kelber, et al., Factors Affecting Delivery of High-Efficiency Dialysis Using Temporary Vascular Access, *American Journal of Kidney Diseases*, 1993, vol. 22, No. 1, pp. 24-29.
 Lumsden, et al., Hemodialysis Access in the Pediatric Patient Population, *The American Journal of Surgery*, 1994, vol. 168, pp. 197.
 Lund, "Percutaneous Translumbar Inferior Vena Cava Cannulation and other Alternative Vascular Access Techniques" in *Venous Interventional Radiology with Clinical Perspectives*, Savader et al, eds. pp. 251-261, Apr. 10, 2000.
 Lund, et al., Percutaneous Translumbar Inferior Vena Cava Cannulation for Hemodialysis, *American Journal of Kidney Diseases*, 1995, vol. 25, No. 5, pp. 732-737.
 Maki, D., Pathogenesis, Prevention, and Management of Infections Due to Intravascular Devices Used for Infusion Therapy, in *Infections Associated with Indwelling Medical Devices*, Bisno et al, eds, American Society for Microbiology, 1989, pp. 161-177.
 Malviya et al., "Vascular Access in Gynecological Cancer Using the Groshong Right Atrial Catheter", *Gynecological Oncology* 33, 313-316 (1989).
 Mauro, et al., Radiologic Placement of Long-term Central Venous Catheters: A Review, *JVIR*, 1993, vol. 4, No. 1, pp. 127-137.

(56)

References Cited

OTHER PUBLICATIONS

- McGee, et al., Accurate placement of central venous catheters: A prospective, randomized, multicenter trial, *Critical Care Medicine*, 1993, vol. 21, No. 8, pp. 1118-1123.
- Medcomp, For Access via the Internal Jugular Vein . . . The Medcomp TESIO Catheter is the Solution: The Short and Long Term Solution to Subclavian Vein Stenosis and Difficult Access Problems, Brochure, 4 pages, 1991.
- Medcomp® Brochure, "Ash Split Cath™ XL", Dec. 2001, PN 2291.
- Medcomp® Brochure, "Ash Split Cath™", Guidewire Weave Insertion Technique, Jan. 2002, PN 2296.
- Medcomp® Brochure, "Ash Split Cath™", Jul. 2001, PN 2114.
- Medcomp® Brochure, "Ash Split Cath™", Nov. 1997, PN 2050.
- Medcomp® Brochure, "Ash Split Cath® II", Aug. 2002, PN 2334.
- Medcomp® Brochure, "Magna™ High Flow Catheter", Mar. 2002, PN 2321.
- Moss et al, Use of Silicone Dual-Lumen Catheter with a Dacron Cuff as a Long Term Vascular Access for Hemodialysis Patients, *Amer J Kidney Diseases*, vol. XVI, No. 3, pp. 211-215, Sep. 1990.
- Moss, et al., Use of a Silicone Catheter With a Dacron Cuff for Dialysis Short-Term Vascular Access, *American Journal of Kidney Diseases*, 1988, vol. XII, No. 6, pp. 492-498.
- Myers, R.D. et al, New Double-lumen Polyethylene Cannula for Push-pull Perfusion of Brain Tissue in Vivo, *Journal of Neuroscience Methods*, pp. 205-218, vol. 12, 1985.
- Northsea, C., Using Urokinase to Restore Patency in Double Lumen Catheters, *ANNA Journal* 1994, vol. 21, No. 5, pp. 261-273.
- OriGen, OriGen Biomedical Dual Lumen Catheter, from <<http://origen.net/catheter.html>>, downloaded May 13, 2009, 4 pages (reprinted for submission on Jul. 21, 2011).
- Parsa, et al., Establishment of Intravenous Lines for Long-term Intravenous Therapy and Monitoring, *Surgical Clinics of N. Am.* 1985, vol. 65, No. 4, pp. 835-865.
- Parsa, et al., Vascular Access Techniques, *Textbook of Critical Care*, W.B. Saunders, Philadelphia, PA (1989), pp. 122-127.
- Pasquale, et al., Groshong® Versus Hickman® Catheters, *Surgery, Gynecology & Obstetrics*, 1992, vol. 174, pp. 408-410.
- Passaro, et al., Long-term Silastic Catheters and Chest Pain, *Journal of Parenteral and Enteral Nutrition*, 1994, vol. 18, No. 3, pp. 240-242.
- Patel et al., "Sheathless Technique of Ash Split-Cath Insertion", *12 JVIR* 376-78 (Mar. 2001).
- Paulsen, et al., Use of Tissue Plasminogen Activator for Reopening of Clotted Dialysis Catheters, *Nephron*, 1993, vol. 64, pp. 468-470.
- PCT/US2003/003751 filed Feb. 7, 2003 Preliminary Examination Report dated May 5, 2004.
- PCT/US2003/003751 filed Feb. 7, 2003 Search Report dated Jul. 3, 2003.
- PCT/US2004/005102 filed Feb. 19, 2004 Preliminary Report Patentability dated Aug. 29, 2005.
- PCT/US2004/005102 filed Feb. 19, 2004 Search Report dated Dec. 27, 2004.
- PCT/US2004/005102 filed Feb. 19, 2004 Written Opinion dated Aug. 21, 2005.
- PCT/US2008/078551 filed Oct. 2, 2008 International Preliminary Report on Patentability dated Apr. 20, 2010.
- PCT/US2008/078551 filed Oct. 2, 2008 Search Report dated Mar. 13, 2009.
- PCT/US2008/078551 filed Oct. 2, 2008 Written Opinion dated Mar. 13, 2009.
- PCT/US2008/078560 filed Oct. 2, 2008 Preliminary Report on Patentability dated Aug. 26, 2010.
- U.S. Appl. No. 12/263,141, filed Oct. 31, 2008 Final Office Action dated May 26, 2011.
- U.S. Appl. No. 12/263,141, filed Oct. 31, 2008 Non-Final Office Action dated Jan. 5, 2011.
- U.S. Appl. No. 12/414,467, filed Mar. 30, 2009 Final Office Action dated Feb. 7, 2012.
- U.S. Appl. No. 12/414,467, filed Mar. 30, 2009 Notice of Allowance dated May 31, 2012.
- U.S. Appl. No. 12/414,467, filed Mar. 30, 2009 Non-Final Office Action dated Aug. 11, 2011.
- U.S. Appl. No. 13/294,941, filed Nov. 11, 2011 Non-Final Office Action dated May 31, 2013.
- U.S. Appl. No. 13/294,941, filed Nov. 11, 2011 Notice of Allowance dated Nov. 27, 2013.
- U.S. Appl. No. 13/329,159, filed Dec. 16, 2011 Non-Final Office Action dated May 16, 2014.
- U.S. Appl. No. 13/445,713, filed Apr. 12, 2012 Advisory Action dated Aug. 8, 2013.
- U.S. Appl. No. 13/445,713, filed Apr. 12, 2012 Final Office Action dated May 30, 2013.
- U.S. Appl. No. 13/445,713, filed Apr. 12, 2012 Non-Final Office Action dated Jan. 2, 2013.
- U.S. Appl. No. 13/445,713, filed Apr. 12, 2012 Notice of Allowance dated Oct. 18, 2013.
- US Patent File History U.S. Pat. No. 5,403,291 (Abrahamson), issued Apr. 4, 1995.
- US Patent File History U.S. Pat. No. 5,489,278 (Abrahamson), issued Feb. 6, 1996.
- US Patent File History U.S. Pat. No. 5,685,867 (Twardowski et al.), issued Nov. 11, 1997.
- Wechsler, et al., Thrombosis and Infection Caused by Thoracic Venous Catheters: Pathogenesis and Imaging Findings, *AJR*, 1993; 160:467-471.
- Weitzel, et al., Successful Use of Indwelling Cuffed Femoral Vein Catheters in Ambulatory Hemodialysis Patients, *American Journal of Kidney Diseases*, 1993, vol. 22, No. 3, pp. 426-429.
- PCT/US2008/078560 filed Oct. 2, 2008 Search Report dated Mar. 16, 2009.
- PCT/US2008/078560 filed Oct. 2, 2008 Written Opinion dated Mar. 16, 2009.
- PCT/US2008/078566 filed Oct. 2, 2008 International Preliminary Report on Patentability dated Apr. 20, 2010.
- PCT/US2008/078566 filed Oct. 2, 2008 Search Report dated Mar. 19, 2009.
- PCT/US2008/078566 filed Oct. 2, 2008 Written Opinion dated Mar. 19, 2009.
- PCT/US2008/078571 filed Oct. 2, 2008 Preliminary Report on Patentability dated Aug. 26, 2010.
- PCT/US2008/078571 filed Oct. 2, 2008 Search Report dated Mar. 20, 2009.
- PCT/US2008/078571 filed Oct. 2, 2008 Written Opinion dated Mar. 20, 2009.
- PCT/US2008/080463 filed Oct. 20, 2008 Preliminary Report on Patentability dated Apr. 27, 2010.
- PCT/US2008/080463 filed Oct. 20, 2008 Search Report dated Mar. 16, 2009.
- PCT/US2008/080463 filed Oct. 20, 2008 Written Opinion dated Apr. 16, 2009.
- PCT/US2008/082106 filed Oct. 31, 2008 International Preliminary Report on Patentability dated May 4, 2010.
- PCT/US2008/082106 filed Oct. 31, 2008 Search Report dated Jan. 12, 2009.
- PCT/US2008/082106 filed Oct. 31, 2008 Written Opinion dated Jan. 12, 2009.
- Picture of Device believed to be partial sample of a product believed to have been sold in the United States with Polycath and/or Infuse-a-Cath Instructions for Use, 1 page, 2011.
- Quinton® Catheter Products (1993).
- Raaf Dual Lumen Right Atrial Catheters Brochure—Quinton Instrument Co., 6 pages, 1993.
- Raaf, et al., Open Insertion of Right Atrial Catheters Through the Jugular Veins, *Surgery, Gynecology & Obstetrics*, 1993, vol. 177, pp. 295-298.
- Rawn, et al., The Hemodialysis Access, Chapter 9, pp. 9.1-9.11, available at <<<http://msl1.mit.edu/ESD10/kidneys/HndbkPDF/Chap09.pdf>>>, last accessed Jun. 4, 2012.
- Schwab, et al., Prospective Evaluation of a Dacron Cuffed Hemodialysis Catheter for Prolonged Use, *American Journal of Kidney Diseases*, 1988, vol. XI, No. 2, pp. 166-169.

(56)

References Cited

OTHER PUBLICATIONS

- Schwab, et al., Vascular Access: Case Oriented Discussions of Selected Critical Issues: Hemodialysis Catheters for Permanent Use, 1999.
- Septum, Wikipedia, The Free Encyclopedia, <http://en.wikipedia.org/wiki/Septum> (last visited Dec. 18, 2012) (defining "septum" as "a wall, dividing a cavity or structure into smaller ones").
- Shaffer, D., Catheter-Related Sepsis Complicating Long-Term Tunneled Central Venous Dialysis Catheters: Management by Guidewire Exchange, *American Journal of Kidney Diseases*, 1995, vol. 25, No. 4, pp. 593-596.
- Shaffer, D., Lessons From Vascular Access Procedures for Hemodialysis, *Surgical Oncology Clinics of North America*, 1995, vol. 4, No. 3, pp. 537-549.
- Sioshansi, P., New Processes for Surface Treatment of Catheters, *Artificial Organs*, 1994, 18(4):266-271.
- Swartz, et al., Successful Use of Cuffed Central Venous Hemodialysis Catheters Inserted Percutaneously, *J. Am. Soc. Nephrol.*, 1994, 4:1719-1725.
- Taber's Cyclopedic Medical Dictionary 1662 (16th ed. 1989) (defining "septum" as a "wall dividing two cavities").
- Tal, Michael G, Comparison of Recirculation Percentage of the Palindrome Catheter and Standard Hemodialysis Catheters in a Swine Model, *J Vasc Interv Radiol*, pp. 1237-1240, vol. 16, No. 9, 2005.
- Tesio, et al., Double Catheterization of the Internal Jugular Vein for Hemodialysis: Indications, Techniques, and Clinical Results, *Artificial Organs*, 1994, vol. 18, No. 4, pp. 301-304.
- The Groshong™ Peripherally Inserted Central Venous Catheter Brochure—Cath-tech®, 4 pages, 1988.
- Transcript of Videotaped Deposition of Gregory Haas (Excerpt), Sep. 23, 2003, *Thierry Pourchez and Bard Access Systems, Inc. v. Diatek, Inc. and Arrow International, Inc.*, Civil Action No. 03-CV-0972 (S.D.N.Y.).
- Transcript of Videotaped Deposition of Thierry Pourchez, vol. 1, Oct. 16, 2003, *Thierry Pourchez and Bard Access Systems, Inc. v. Diatek, Inc. and Arrow International, Inc.*, Civil Action No. 03-CV-0972 (S.D.N.Y.).
- Transcript of Videotaped Deposition of Thierry Pourchez, vol. 2, Oct. 17, 2003, *Thierry Pourchez and Bard Access Systems, Inc. v. Diatek, Inc. and Arrow International, Inc.*, Civil Action No. 03-CV-0972 (S.D.N.Y.).
- Treiman, et al., Chronic Venous Access in Patients with Cancer, *Cancer*, 1993, vol. 72, No. 3, pp. 760-765.
- Twardowski et al. "Side Holes at the Tip of Chronic Hemodialysis Catheters are Harmful," *The Journal of Vascular Access* 2001; 2:8-16.
- Twardowski et al., "Blood Recirculation in Intravenous Catheters for Hemodialysis" *J. Am. Soc. Nephrol.* 3:1978-81 (1993).
- Tyco Healthcare, Mahurkar Dual Lumen Catheters, Informational Brochure, 2 pages, 2004.
- Tyco Healthcare, Mahurkar QPlus High Flow Acute Care Catheter, Informational Brochure, 2 pages, 2004.
- Tyco Healthcare, Tal Palindrome™ Dual Lumen Catheters Order Information, Features and Benefits, Frequently Asked Questions, printed from <http://www.kendallvasculartherapy.com/VascularTherapy>, 6 pages, on Mar. 1, 2007.
- Uldall, P., Subclavian Cannulation Is No Longer Necessary or Justified in Patients with End-Stage Renal Failure, *Seminars in Dialysis*, 1994, vol. 7, No. 3, pp. 161-164.
- U.S. Appl. No. 10/371,774, filed Feb. 21, 2003 Final Office Action dated Jan. 19, 2007.
- U.S. Appl. No. 10/371,774, filed Feb. 21, 2003 Final Office Action dated Mar. 7, 2007.
- U.S. Appl. No. 10/371,774, filed Feb. 21, 2003 Non-Final Office Action dated Jul. 17, 2006.
- U.S. Appl. No. 10/371,774, filed Feb. 21, 2003 Notice of Allowance dated Jun. 1, 2007.
- U.S. Appl. No. 10/445,731, filed May 27, 2003 Non-Final Office Action dated Apr. 13, 2007.
- U.S. Appl. No. 10/445,731, filed May 27, 2003 Non-Final Office Action dated Dec. 12, 2008.
- U.S. Appl. No. 10/445,731, filed May 27, 2003 Non-Final Office Action dated May 30, 2008.
- U.S. Appl. No. 10/842,586, filed May 10, 2004 Advisory Action dated Oct. 9, 2008.
- U.S. Appl. No. 10/842,586, filed May 10, 2004 Final Office Action dated Jul. 29, 2008.
- U.S. Appl. No. 10/842,586, filed May 10, 2004 Final Office Action dated May 25, 2010.
- Arrow Cannon II Plus Brochure, 2006.
- Arrow International, Inc. et al v. Spire Biomedical, Inc.*, U.S. Dist Ct Dist MA CA No. 06-CV-11564-DPW, Declaration of Dr. Karim Valji (Jul. 17, 2008).
- Arrow International, Inc. et al v. Spire Biomedical, Inc.*, U.S. Dist Ct Dist MA CA No. 06-CV-11564-DPW, Declaration of Kenneth Todd Cassidy (Jul. 16, 2008).
- Arrow International, Inc. et al v. Spire Biomedical, Inc.*, U.S. Dist Ct Dist MA CA No. 06-CV-11564-DPW, Declaration of Rebecca R. Eisenberg in Opposition to Defendant's Motion for Partial Summary Judgment of Invalidity (Jun. 8, 2009).
- Arrow International, Inc. et al v. Spire Biomedical, Inc.*, U.S. Dist Ct Dist MA CA No. 06-CV-11564-DPW, Memorandum of Law in Support of Defendant's Motion for Summary Judgment on Invalidity [Redacted Pursuant to Jun. 10, 2008 Order on Motion to Seal].
- Arrow International, Inc. et al v. Spire Biomedical, Inc.*, U.S. Dist Ct Dist MA CA No. 06-CV-11564-DPW, Memorandum of Law in Support of Defendant's Motion for Summary Judgment on Invalidity Exhibit A (Jul. 10, 2009).
- Arrow International, Inc. et al v. Spire Biomedical, Inc.*, U.S. Dist Ct Dist MA CA No. 06-CV-11564-DPW, Plaintiff's Memorandum in Opposition to Defendant's Motion for Summary Judgment on Non-Infringement (Jul. 17, 2008).
- Arrow International, Inc. et al v. Spire Biomedical, Inc.*, U.S. Dist Ct. Dist. MA CA No. 06-CV-11564-DPW, Defendant's Omnibus Statement of Material Facts in Support of its Motions for Summary Judgment (Jun. 10, 2008) [Redacted Pursuant to Jun. 10, 2008 Order on Motion to Seal].
- Bander, et al., Central Venous Angioaccess for Hemodialysis and Its Complications, *Seminars in Dialysis*, 1992, vol. 5, No. 2, pp. 121-128.
- Baranowski, L., Central Venous Access Devices, *Journal of Intravenous Nursing*, 1993, vol. 16, No. 3, pp. 167-194.
- Bard Access Systems Hickman®, Leonard®, and Broviac® Central Venous Catheters (Long Term), Instructions for Use, 31 pages, 1999.
- Bard Access Systems Hickman®, Leonard®, and Broviac® Central Venous Catheters, Nursing Procedural Manual, 52 pages, Jun. 1994.
- Bard Davol® Hickman® Round Dual Lumen Catheters for Central Venous Access Informational Brochure, 4 pages, 1994.
- Bard Hickman® Catheters Informational Brochure, 3 pages, 1994.
- Believed to be an unpublished sketch of a conception by Dr. John Frusha; date of sketch believed to be Jun. 24, 1997.
- Berkoben, et al., Maintenance of Permanent Hemodialysis Vascular Access Patency, *ANNA Journal*, 1995, vol. 22, No. 1, pp. 17-24.
- Bolz, et al., Catheter Malfunction and Thrombus Formation on Double-Lumen Hemodialysis Catheters: An Intravascular Ultrasonographic Study, *American Journal of Kidney Diseases*, 1995, vol. 25, No. 4, pp. 597-602.
- Bour, et al., Experience With The Double Lumen Silastic® Catheter for Hemoaccess, *Surgery, Gynecology & Obstetrics*, 1990, vol. 171, pp. 33-39.
- Camp, "Care of the Groshong Catheter", *Oncol Nurs Forum*, vol. 15, No. 6, 1988.
- Campbell, et al., Radiological Insertion of Long-term Venous Access Devices, *Seminars in Interventional Radiology*, 1994, vol. II, No. 4, pp. 366-375.
- Canaud, B et al, Permanent Twin Catheter: A Vascular Access Option of Choice for Haemodialysis in Elderly Patients, pp. 82-88, vol. 17 No. 7, 1994.
- Claim Construction Order of Federal District Court dated May 9, 2003 in *Thierry Pourchez and Bard Access Systems, Inc. v. Diatek, Inc. and Arrow International, Inc.* litigation (S.D. N.Y. 03 Civ.0972).
- Claim Construction Order of Federal District Court dated Oct. 31, 2006 in *Arrow Int'l Inc. and Arrow Int'l. Investment Corp. v. Spire Biomedical, Inc.* litigation (D. Mass. Civil Action No. 06-CV-11564).

(56)

References Cited

OTHER PUBLICATIONS

- CN 200880121182.0 filed Oct. 20, 2008 First Office Action dated May 2, 2012.
- CN 200880121183.5 filed Oct. 2, 2008 First Office Action dated Mar. 28, 2012.
- CN 200880121183.5 filed Oct. 2, 2008 Second Office Action dated Aug. 17, 2012.
- CN 200880121183.5 filed Oct. 2, 2008 Third Office Action dated Dec. 11, 2012.
- CN 200880123095.9 filed Oct. 20, 2008 First Office Action dated Feb. 13, 2012.
- CN 200880123095.9 filed Oct. 20, 2008 Second Office Action dated Dec. 18, 2012.
- CN 200880123533.1 filed Jun. 30, 2008 First Office Action dated May 28, 2012.
- CN 200880123533.1 filed Jun. 30, 2008 Notice of Grant dated Dec. 24, 2012.
- Decision of Federal District Court dated Jul. 7, 2009 granting Summary Judgement of Invalidity in *Arrow Int'l. Inc. and Arrow Int'l. Investment Corp. v. Spire Biomedical, Inc.* litigation (D. Mass. Civil Action No. 06-CV-11564).
- Declaration of Gregory S. Haas (Plaintiff's Exhibit 88 in Haas Deposition), Mar. 13, 2003, *Thierry Pourchez and Bard Access Systems, Inc. v. Diatek, Inc. and Arrow International, Inc.*, Civil Action No. 03-CV-0972 (S.D.N.Y.).
- Defendant's Exhibits DX78-DX114, *Thierry Pourchez and Bard Access Systems, Inc. v. Diatek, Inc. and Arrow International, Inc.*, Civil Action No. 03-CV-0972 (S.D.N.Y.), 2003.
- Defendants' Responses and Objections to Plaintiffs' Second Set of Interrogatories (Excerpt), *Thierry Pourchez and Bard Access Systems, Inc. v. Diatek, Inc. and Arrow International, Inc.*, Civil Action No. 03-CV-0972 (S.D.N.Y.) (Oct. 8, 2003).
- Delmore et al., "Experience with the Groshong Long-Term Central Venous Catheter", *Gynecologic Oncology* 34, 216-218 (1989).
- Dialysis Vascular Access, SchonXL® Temporary Dialysis (AngioDynamics Inc.) brochure, Nov. 1998.
- Dialysis Vascular Access, Technological Innovations Improving Flow (AngioDynamics Inc.) Brochure, 4 pages, Nov. 1998.
- DiFiore, "Central Venous Dialysis Catheter Evaluation in Swine", *Journal of Vascular Access Devices*, Fall 2000.
- Donaldson, et al., Peripherally Inserted Central Venous Catheters: US-guided Vascular Access in Pediatric Patients, *Radiology*, 1995, vol. 197, pp. 542-544.
- Dunea, et al., A Survey of Permanent Double Lumen Catheters in Hemodialysis Patients. *ASAIO Transac.* 1991; 37: M276-7.
- Dupont et al, Long-term development of Permacath Quinton catheters used as a vascular access route for extra-renal detoxification; *Néphrologie*, vol. 15, pp. 105-110, 1994.
- EP 04712925.9 filed Feb. 19, 2004 Office Action dated Nov. 7, 2008.
- EP 08839196.6 filed Oct. 2, 2008 Examination Report dated Jan. 16, 2013.
- EP 08839196.6 filed Oct. 2, 2008 Search Opinion dated Jul. 12, 2011.
- EP 08839196.6 filed Oct. 2, 2008 Search Report dated Jul. 12, 2011.
- EP 08872340.8 filed Oct. 2, 2008 Extended European Search Report and an Opinion dated Apr. 19, 2012.
- Gallichio, et al., Placement of a Double Lumen Silastic Catheter for Hemodialysis Access Through The Cephalic Vein, *Journal of the American College of Surgeons*, 1994, vol. 179, pp. 171-172.
- Gravenstein, et al., In Vitro Evaluation of Relative Perforating Potential of Central Venous Catheters: Comparison of Materials, Selected Models, Number of Lumens, and Angles of Incidence to Simulated Membrane, *Journal of Clinical Monitoring*, 1991, vol. 7, pp. 1-6.
- Haindl, H., Technical complications of port-catheter systems, *Reg. Cancer Treat*, 1989, 2:238-242.
- U.S. Appl. No. 10/842,586, filed May 10, 2004 Non-Final Office Action dated Jan. 7, 2008.
- U.S. Appl. No. 10/842,586, filed May 10, 2004 Non-Final Office Action dated Jun. 16, 2009.
- U.S. Appl. No. 10/842,586, filed May 10, 2004 Non-Final Office Action dated Nov. 13, 2008.
- U.S. Appl. No. 10/842,586, filed May 10, 2004 Non-Final Office Action dated Nov. 23, 2009.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Advisory Action dated Feb. 19, 2009.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Final Office Action dated Jul. 15, 2008.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Final Office Action dated Jul. 7, 2010.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Final Office Action dated Mar. 18, 2014.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated Aug. 1, 2013.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated Aug. 18, 2011.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated Dec. 30, 2009.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated Feb. 2, 2011.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated Jul. 23, 2009.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated Jul. 9, 2014.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated May 23, 2006.
- U.S. Appl. No. 10/874,298, filed Jun. 9, 2004 Non-Final Office Action dated May 24, 2007.
- U.S. Appl. No. 11/859,106, filed Sep. 21, 2007 Final Office Action dated Sep. 1, 2009.
- U.S. Appl. No. 11/859,106, filed Sep. 21, 2007 Non-Final Office Action dated Feb. 5, 2009.
- U.S. Appl. No. 11/859,106, filed Sep. 21, 2007 Non-Final Office Action dated Mar. 30, 2011.
- U.S. Appl. No. 11/859,106, filed Sep. 21, 2007 Non-Final Office Action dated Jun. 25, 2008.
- U.S. Appl. No. 11/874,447, filed Oct. 18, 2007 Decision on Appeal dated Dec. 26, 2012.
- U.S. Appl. No. 11/874,447, filed Oct. 18, 2007 Examiner's Answer dated Apr. 28, 2010.
- U.S. Appl. No. 11/874,447, filed Oct. 18, 2007 Final Office Action dated Jul. 22, 2009.
- U.S. Appl. No. 11/874,447, filed Oct. 18, 2007 Non-Final Office Action dated Jan. 6, 2009.
- U.S. Appl. No. 11/874,447, filed Oct. 18, 2007 Non-Final Office Action dated Jul. 12, 2013.
- U.S. Appl. No. 11/874,447, filed Oct. 18, 2007 Non-Final Office Action dated Jul. 9, 2008.
- U.S. Appl. No. 11/874,447, filed Oct. 18, 2007 Notice of Allowance dated Apr. 18, 2014.
- U.S. Appl. No. 12/048,871, filed Mar. 14, 2008 Examiner's Answer dated Feb. 9, 2012.
- U.S. Appl. No. 12/048,871, filed Mar. 14, 2008 Final Office Action dated Jan. 20, 2011.
- U.S. Appl. No. 12/048,871, filed Mar. 14, 2008 Non-Final Office Action dated Jan. 7, 2010.
- U.S. Appl. No. 12/048,871, filed Mar. 14, 2008 Non-Final Office Action dated Jul. 7, 2010.
- U.S. Appl. No. 12/048,871, filed Mar. 14, 2008 Non-Final Office Action dated May 12, 2009.
- U.S. Appl. No. 12/244,514, filed Oct. 2, 2008 Final Office Action dated Jun. 19, 2012.
- U.S. Appl. No. 12/244,514, filed Oct. 2, 2008 Non-Final Office Action dated Jan. 17, 2012.
- U.S. Appl. No. 12/244,559, filed Oct. 2, 2008 Examiner's Answer dated Mar. 27, 2013.
- U.S. Appl. No. 12/244,559, filed Oct. 2, 2009 Final Office Action dated Jul. 3, 2012.
- U.S. Appl. No. 12/244,559, filed Oct. 2, 2009 Non-Final Office Action dated Mar. 14, 2012.
- U.S. Appl. No. 12/244,514, filed Oct. 2, 2008 Advisory Action dated Sep. 5, 2012.
- U.S. Appl. No. 12/244,514, filed Oct. 2, 2008 Final Office Action dated Jul. 11, 2011.

(56)

References Cited

OTHER PUBLICATIONS

U.S. Appl. No. 12/244,514, filed Oct. 2, 2008 Non-Final Office Action dated Jan. 19, 2011.
U.S. Appl. No. 12/244,544, filed Oct. 2, 2008 Final Office Action dated Jul. 11, 2011.
U.S. Appl. No. 12/244,544, filed Oct. 2, 2008 Non-Final Office Action dated Dec. 22, 2010.
U.S. Appl. No. 12/244,554, filed Oct. 2, 2008 Final Office Action dated Dec. 27, 2010.
U.S. Appl. No. 12/244,554, filed Oct. 2, 2008 Non-Final Office Action dated Jul. 6, 2010.
U.S. Appl. No. 12/253,870, filed Oct. 17, 2008 Non-Final Office Action dated Jan. 21, 2011.
U.S. Appl. No. 12/253,870, filed Oct. 17, 2008 Notice of Allowance dated Aug. 19, 2011.
U.S. Appl. No. 12/262,820, filed Oct. 31, 2008 Non-Final Office Action dated Feb. 18, 2011.
U.S. Appl. No. 12/262,820, filed Oct. 31, 2008 Notice of Allowance dated Sep. 28, 2011.

U.S. Appl. No. 12/263,141, filed Oct. 31, 2008 Advisory Action dated Aug. 17, 2011.
CN 201310073124.8 filed Mar. 7, 2013 First Office Action dated May 5, 2014.
PCT/US2014/066811 filed Nov. 21, 2014 International Search Report and Written Opinion dated Apr. 15, 2015.
U.S. Appl. No. 12/048,871, filed Mar. 14, 2008 Decision on Appeal dated Feb. 2, 2015.
U.S. Appl. No. 13/897,292, filed May 17, 2013 Final Office Action dated Apr. 9, 2015.
U.S. Appl. No. 13/897,292, filed May 17, 2013 Non-Final Office Action dated Nov. 20, 2014.
U.S. Appl. No. 14/032,858, filed Sep. 20, 2013 Final Office Action dated Mar. 31, 2015.
U.S. Appl. No. 14/032,858, filed Sep. 20, 2013 Non-Final Office Action dated Nov. 4, 2014.
U.S. Appl. No. 14/252,567, filed Apr. 14, 2014 Non-Final Office Action dated Mar. 31, 2015.
U.S. Appl. No. 14/328,541, filed Jul. 10, 2014 Non-Final Office Action dated Apr. 9, 2015.

* cited by examiner

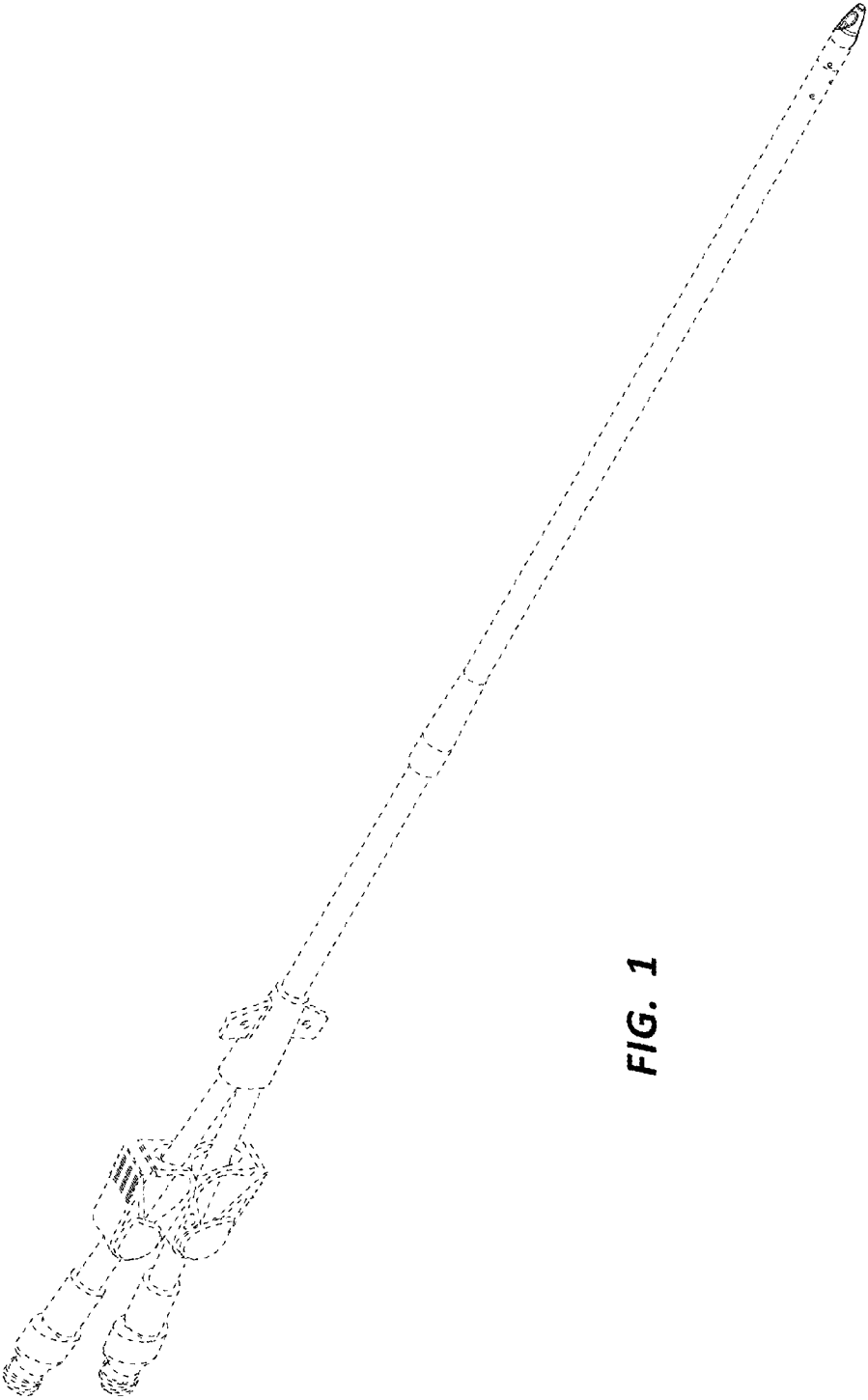


FIG. 1

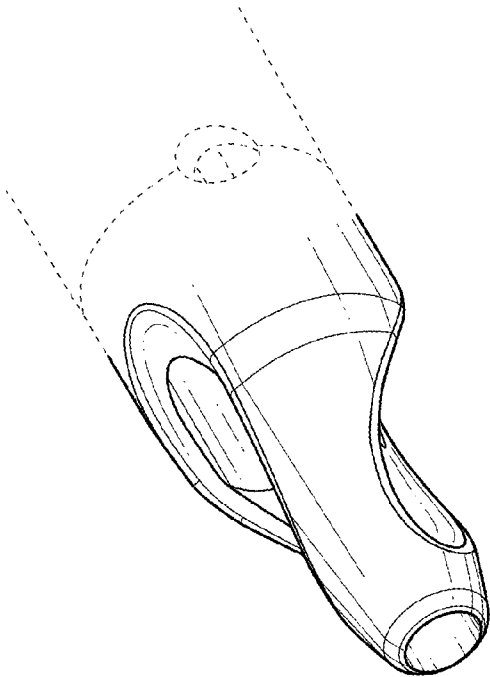


FIG. 3

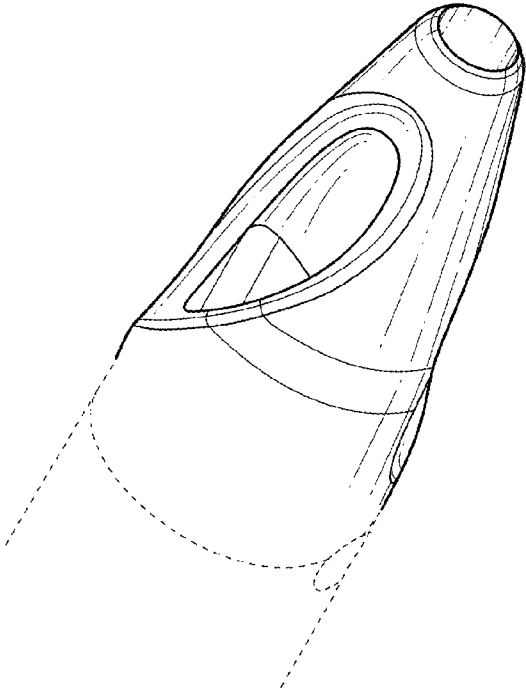


FIG. 2

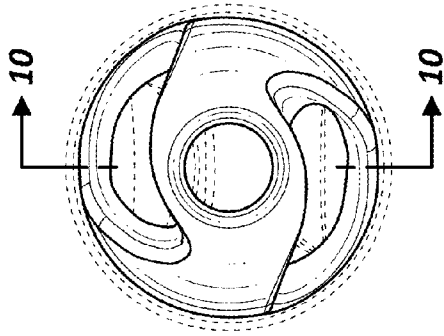


FIG. 6

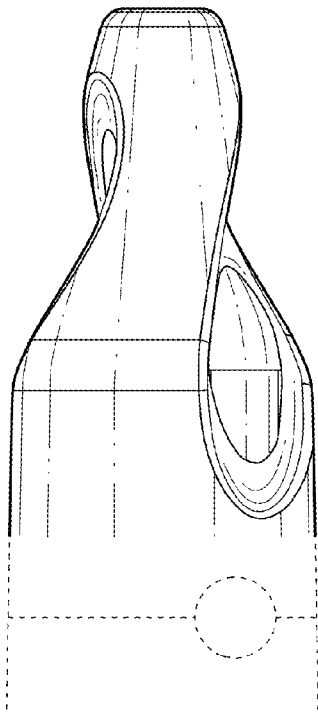


FIG. 4

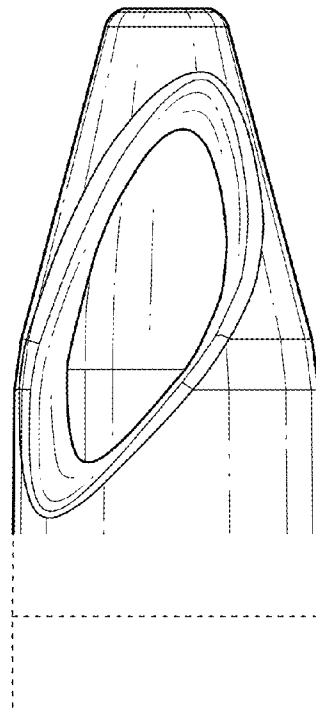


FIG. 5



FIG. 9

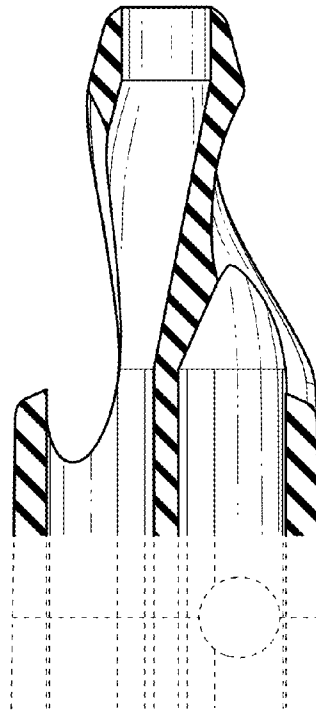


FIG. 10

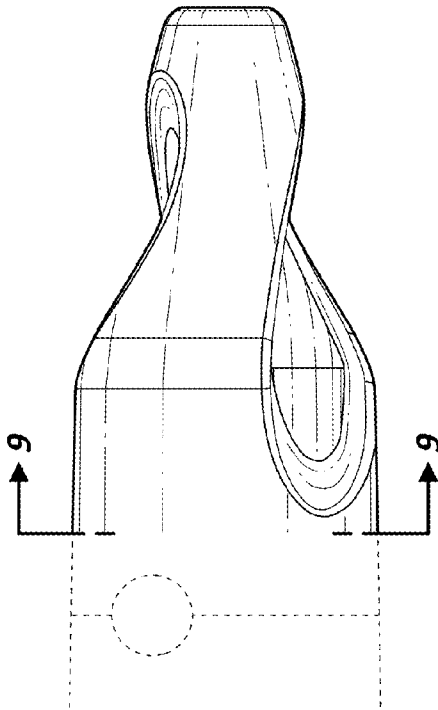


FIG. 7

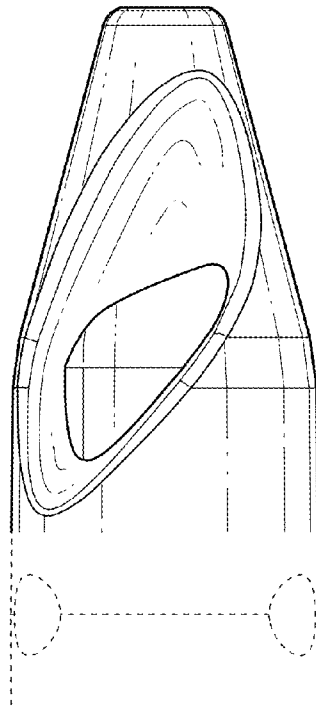


FIG. 8

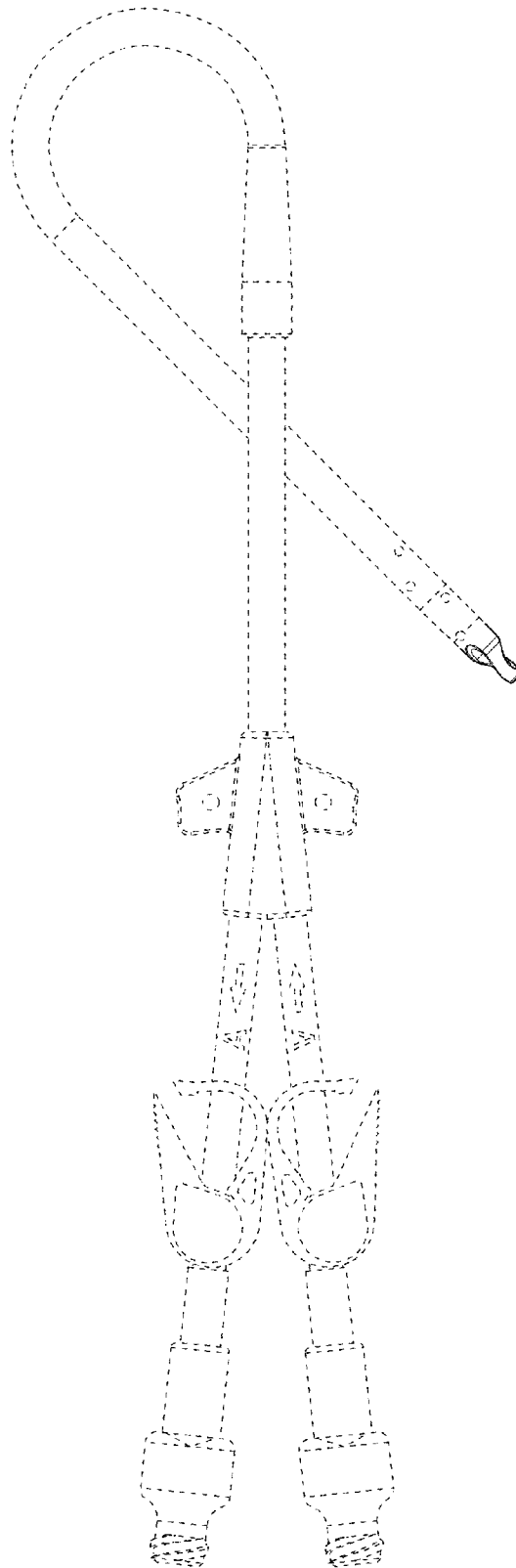


FIG. 11