



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

(10) **Patent No.:** **US D1,069,106 S**  
(45) **Date of Patent:** **\*\* Apr. 1, 2025**

(54) **CATHETER PLACEMENT DEVICE**

FOREIGN PATENT DOCUMENTS

(71) Applicant: **C. R. Bard, Inc.**, Franklin Lakes, NJ  
(US)

AU 691141 B2 5/1998  
AU 710967 B2 9/1999

(Continued)

(72) Inventors: **Jason R. Stats**, Layton, UT (US);  
**Chad A. Hadley**, North Salt Lake, UT  
(US); **Daniel B. Blanchard**, Bountiful,  
UT (US)

OTHER PUBLICATIONS

EP 22192364.2 filed Aug. 26, 2022 Extended European Search  
Report dated Nov. 30, 2022.

(Continued)

(73) Assignee: **C. R. Bard, Inc.**, Franklin Lakes, NJ  
(US)

*Primary Examiner* — David G Muller

(\*\*) Term: **15 Years**

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

(21) Appl. No.: **29/757,778**

(57) **CLAIM**

(22) Filed: **Nov. 9, 2020**

The ornamental design for a catheter placement device, as  
shown and described.

**Related U.S. Application Data**

**DESCRIPTION**

(60) Division of application No. 29/654,521, filed on Jun.  
25, 2018, now Pat. No. Des. 903,100, which is a  
continuation of application No. 29/536,043, filed on  
Aug. 12, 2015, now abandoned, which is a  
(Continued)

FIG. 1 is a top perspective view of a catheter placement  
device;

FIG. 2 is a bottom perspective view of the catheter place-  
ment device illustrated in FIG. 1;

(51) **LOC (15) Cl.** ..... **24-02**

FIG. 3 is a first side view of the catheter placement device  
illustrated in FIG. 1;

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

FIG. 4 is a second side view of the catheter placement device  
illustrated in FIG. 1;

USPC ..... **D24/112**

FIG. 5 is a front view of the catheter placement device  
illustrated in FIG. 1;

(58) **Field of Classification Search**

USPC ..... D24/112–114, 108, 133, 130, 127, 186  
CPC ..... A61M 25/00; A61M 39/00; A61M 27/00;  
A61M 25/0043; A61M 25/0067; A61M  
25/0097

FIG. 6 is a rear view of the catheter placement device  
illustrated in FIG. 1;

See application file for complete search history.

FIG. 7 is a top view of the catheter placement device  
illustrated in FIG. 1; and,

(56) **References Cited**

FIG. 8 is a bottom view of the catheter placement device  
illustrated in FIG. 1.

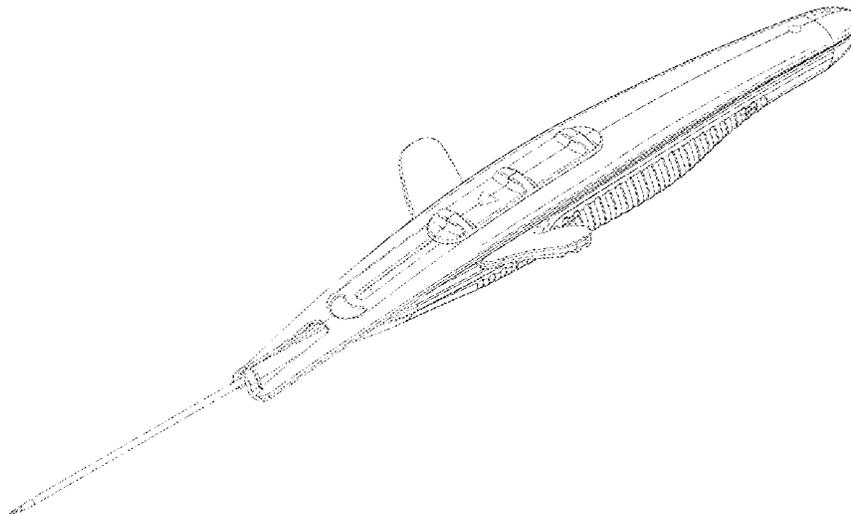
U.S. PATENT DOCUMENTS

The broken lines immediately adjacent the shaded areas  
represent the bounds of the claimed design while all other  
broken lines are directed to environment; the broken lines  
form no part of the claimed design.

2,211,975 A 8/1940 Hendrickson  
2,259,488 A 10/1941 Raiche  
2,330,400 A 9/1943 Winder

(Continued)

**1 Claim, 4 Drawing Sheets**



**Related U.S. Application Data**

continuation of application No. 14/702,580, filed on  
May 1, 2015, now Pat. No. 9,950,139.

(56)

**References Cited**

## U.S. PATENT DOCUMENTS

D138,589 S	8/1944	Brandenburg	4,895,346 A	1/1990	Steigerwald
3,185,151 A	5/1965	Czorny	4,900,307 A	2/1990	Kulli
3,297,030 A	1/1967	Czorny et al.	4,906,956 A	3/1990	Kakahana
3,416,567 A	12/1968	von Dardel et al.	4,908,021 A	3/1990	McFarlane
3,469,579 A	9/1969	Hubert	4,909,793 A	3/1990	Vining et al.
3,500,828 A	3/1970	Podhora	4,911,691 A	3/1990	Aniuk et al.
3,552,384 A	1/1971	Pierie et al.	4,913,704 A	4/1990	Kurimoto
3,572,334 A	3/1971	Petterson	4,917,102 A	4/1990	Miller et al.
3,585,996 A	6/1971	Reynolds et al.	4,917,668 A	4/1990	Haindl
3,589,361 A	6/1971	Loper et al.	4,917,671 A	4/1990	Chang
3,592,192 A	7/1971	Harautuneian	4,929,235 A	5/1990	Merry et al.
3,595,230 A	7/1971	Suyeoka et al.	4,935,010 A	6/1990	Cox et al.
3,610,240 A	10/1971	Harautuneian	4,944,725 A	7/1990	McDonald
3,682,173 A	8/1972	Center	4,944,728 A	7/1990	Carrell et al.
3,766,916 A	10/1973	Moorehead et al.	4,955,863 A	9/1990	Walker et al.
3,884,242 A	5/1975	Bazell et al.	4,961,729 A	10/1990	Vaillancourt
3,921,631 A	11/1975	Thompson	4,966,586 A	10/1990	Vaillancourt
3,995,628 A	12/1976	Gula et al.	4,966,589 A	10/1990	Kaufman
4,027,668 A	6/1977	Dunn	4,994,042 A	2/1991	Vadher
4,037,600 A	7/1977	Poncy et al.	4,994,047 A	2/1991	Walker et al.
4,079,738 A	3/1978	Dunn et al.	4,995,866 A	2/1991	Amplatz et al.
4,106,506 A	8/1978	Koehn et al.	5,007,901 A	4/1991	Shields
4,177,809 A	12/1979	Moorehead	5,009,642 A	4/1991	Sahi
4,292,970 A	10/1981	Hession, Jr.	5,019,048 A	5/1991	Margolin
4,317,445 A	3/1982	Robinson	5,019,049 A	5/1991	Haining
4,345,602 A	8/1982	Yoshimura et al.	D318,733 S	7/1991	Wyzgala
4,354,491 A	10/1982	Marbry	5,034,347 A	7/1991	Kakahana
4,368,730 A	1/1983	Sharrock	5,047,013 A	9/1991	Rossdeutscher
4,387,879 A	6/1983	Tauschinski	D321,250 S	10/1991	Jepson et al.
4,417,886 A	11/1983	Frankhouser et al.	5,053,014 A	10/1991	Van Heugten
4,449,693 A	5/1984	Gereg	5,054,501 A	10/1991	Chuttani et al.
4,456,017 A	6/1984	Miles	5,061,254 A	10/1991	Karakelle et al.
4,464,171 A	8/1984	Garwin	5,064,416 A	11/1991	Newgard et al.
4,509,534 A	4/1985	Tassin, Jr.	5,078,694 A	1/1992	Wallace
4,509,945 A	4/1985	Kramann et al.	5,078,696 A	1/1992	Nedbaluk
4,511,359 A	4/1985	Vaillancourt	5,078,702 A	1/1992	Pomeranz
4,512,766 A	4/1985	Vaillancourt	5,084,023 A	1/1992	Lemieux
4,525,157 A	6/1985	Vaillancourt	5,085,645 A	2/1992	Purdy et al.
4,581,019 A	4/1986	Curelaru et al.	5,088,984 A	2/1992	Fields
4,585,440 A	4/1986	Tchervenkov et al.	5,093,692 A	3/1992	Su et al.
D287,877 S	1/1987	Holewinski et al.	5,098,392 A	3/1992	Fleischhacker et al.
4,728,322 A	3/1988	Walker et al.	5,098,395 A	3/1992	Fields
4,738,659 A	4/1988	Sleiman	5,098,396 A	3/1992	Taylor et al.
4,747,831 A	5/1988	Kulli	5,098,405 A	3/1992	Peterson et al.
4,767,407 A	8/1988	Foran	5,108,375 A	4/1992	Harrison et al.
4,767,408 A	8/1988	McFarlane	5,108,376 A	4/1992	Bonaldo
4,772,264 A	9/1988	Cragg	5,112,312 A	5/1992	Luther
4,772,267 A	9/1988	Brown	5,116,323 A	5/1992	Kreuzer et al.
4,781,703 A	11/1988	Walker et al.	5,120,317 A	6/1992	Luther
4,792,531 A	12/1988	Kakahana	5,125,906 A	6/1992	Fleck
4,798,193 A	1/1989	Giesy et al.	5,135,487 A	8/1992	Morrill et al.
4,813,934 A	3/1989	Engelson et al.	5,137,515 A	8/1992	Hogan
4,826,070 A	5/1989	Kakahana	5,149,326 A	9/1992	Woodgrift et al.
4,828,547 A	5/1989	Sahi et al.	5,154,703 A	10/1992	Bonaldo
4,834,708 A	5/1989	Pillari	5,156,590 A	10/1992	Vilmar
4,834,718 A	5/1989	McDonald	5,156,596 A	10/1992	Balbierz et al.
4,840,613 A	6/1989	Balbierz	5,158,544 A	10/1992	Weinstein
4,840,622 A	6/1989	Hardy	5,167,637 A	12/1992	Okada et al.
4,842,591 A	6/1989	Luther	5,176,650 A	1/1993	Haining
4,846,812 A	7/1989	Walker et al.	5,186,168 A	2/1993	Spofford et al.
4,850,961 A	7/1989	Wanderer et al.	5,186,712 A	2/1993	Kelso et al.
4,860,757 A	8/1989	Lynch et al.	5,188,607 A	2/1993	Wu
4,863,431 A	9/1989	Vaillancourt	5,190,528 A	3/1993	Fonger et al.
4,869,259 A	9/1989	Elkins	5,192,301 A	3/1993	Kamiya et al.
D304,079 S	10/1989	McFarlane	5,195,974 A	3/1993	Hardy
4,871,358 A	10/1989	Gold	5,195,980 A	3/1993	Catlin
4,874,377 A	10/1989	Newgard et al.	5,195,985 A	3/1993	Hall
4,883,461 A	11/1989	Sawyer	5,205,830 A	4/1993	Dassa et al.
4,883,699 A	11/1989	Aniuk et al.	5,215,527 A	6/1993	Beck et al.
4,894,052 A	1/1990	Crawford	5,215,528 A	6/1993	Purdy et al.
			5,217,435 A	6/1993	Kring
			5,219,335 A	6/1993	Willard et al.
			5,221,255 A	6/1993	Mahurkar et al.
			5,222,944 A	6/1993	Harris
			5,225,369 A	7/1993	Su et al.
			5,226,899 A	7/1993	Lee et al.
			D338,955 S	8/1993	Gresl et al.
			5,234,410 A	8/1993	Graham et al.
			5,242,411 A	9/1993	Yamamoto et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,246,426	A	9/1993	Lewis et al.	5,571,073	A	11/1996	Castillo
5,246,430	A	9/1993	MacFarlane	5,573,510	A	11/1996	Isaacson
5,254,107	A	10/1993	Soltész	5,575,777	A	11/1996	Cover et al.
5,257,980	A	11/1993	Van Antwerp et al.	5,591,194	A	1/1997	Berthiaume
5,267,982	A	12/1993	Sylvanowicz	5,599,291	A	2/1997	Balbierz et al.
5,269,771	A	12/1993	Thomas et al.	5,599,327	A	2/1997	Sugahara et al.
D345,419	S	3/1994	Horrigan et al.	5,609,583	A	3/1997	Hakki et al.
5,290,310	A	3/1994	Makower et al.	5,613,663	A	3/1997	Schmidt et al.
5,297,546	A	3/1994	Spofford et al.	5,613,954	A	3/1997	Nelson et al.
5,312,359	A	5/1994	Wallace	5,630,802	A	5/1997	Moellmann et al.
5,312,361	A	5/1994	Zadini et al.	5,630,823	A	5/1997	Schmitz-Rode et al.
5,312,363	A	5/1994	Ryan et al.	5,634,475	A	6/1997	Wolvek
5,318,541	A	6/1994	Viera et al.	5,634,913	A	6/1997	Stinger
5,320,608	A	6/1994	Gerrone	5,637,091	A	6/1997	Hakky et al.
5,322,517	A	6/1994	Sircom et al.	5,645,076	A	7/1997	Yoon
5,330,435	A	7/1994	Vaillancourt	5,651,772	A	7/1997	Arnett
5,334,159	A	8/1994	Turkel	D383,538	S	9/1997	Erskine et al.
5,338,311	A	8/1994	Mahurkar	5,662,622	A	9/1997	Gore et al.
5,352,205	A	10/1994	Dales et al.	5,674,241	A	10/1997	Bley et al.
5,358,796	A	10/1994	Nakamura et al.	5,676,658	A	10/1997	Erskine
5,366,441	A	11/1994	Crawford	5,683,368	A	11/1997	Schmidt
5,368,661	A	11/1994	Nakamura et al.	5,683,370	A	11/1997	Luther et al.
D353,668	S	12/1994	Banks et al.	5,685,855	A	11/1997	Erskine
5,376,082	A	12/1994	Phelps	5,685,858	A	11/1997	Kawand
5,376,094	A	12/1994	Kline	5,685,860	A	11/1997	Chang et al.
5,380,290	A	1/1995	Makower et al.	5,688,249	A	11/1997	Chang et al.
5,380,292	A	1/1995	Wilson	5,693,025	A	12/1997	Stevens
5,395,341	A	3/1995	Slater	5,695,474	A	12/1997	Daugherty
5,397,311	A	3/1995	Walker et al.	5,697,914	A	12/1997	Brimhall
5,405,323	A	4/1995	Rogers et al.	5,700,250	A	12/1997	Erskine
5,415,177	A	5/1995	Zadini et al.	5,702,367	A	12/1997	Cover et al.
5,415,645	A	5/1995	Friend et al.	5,702,369	A	12/1997	Mercereau
5,419,766	A	5/1995	Chang et al.	5,704,914	A	1/1998	Stocking et al.
5,419,777	A	5/1995	Hofling	5,722,425	A	3/1998	Bostrom
5,423,760	A	6/1995	Yoon	5,725,503	A	3/1998	Arnett
5,425,718	A	6/1995	Tay et al.	5,730,150	A	3/1998	Peppel et al.
5,431,506	A	7/1995	Masunaga	5,730,733	A	3/1998	Mortier et al.
5,439,449	A	8/1995	Mapes et al.	5,730,741	A	3/1998	Horzowski et al.
5,445,625	A	8/1995	Voda	5,738,144	A	4/1998	Rogers
5,454,785	A	10/1995	Smith	5,738,660	A	4/1998	Luther
5,454,790	A	10/1995	Dubrul	5,743,882	A	4/1998	Luther
5,456,258	A	10/1995	Kondo et al.	5,743,888	A	4/1998	Wilkes et al.
5,456,668	A	10/1995	Ogle, II	5,749,371	A	5/1998	Zadini et al.
5,458,658	A	10/1995	Sircom	5,749,857	A	5/1998	Cuppy
5,466,230	A	11/1995	Davila	5,749,861	A	5/1998	Guala et al.
5,480,389	A	1/1996	McWha et al.	5,750,741	A	5/1998	Crocker et al.
5,482,395	A	1/1996	Gasparini	5,755,693	A	5/1998	Walker et al.
5,484,419	A	1/1996	Fleck	5,755,709	A	5/1998	Cuppy
5,487,734	A	1/1996	Thorne et al.	5,762,630	A	6/1998	Bley et al.
5,489,273	A	2/1996	Whitney et al.	5,762,636	A	6/1998	Rupp et al.
5,496,281	A	3/1996	Krebs	5,765,682	A	6/1998	Bley et al.
5,501,671	A	3/1996	Rosen et al.	5,779,679	A	7/1998	Shaw
5,501,675	A	3/1996	Erskine	5,779,680	A	7/1998	Yoon
5,507,300	A	4/1996	Mukai et al.	5,779,681	A	7/1998	Bonn
5,512,052	A	4/1996	Jesch	5,782,807	A	7/1998	Falvai et al.
5,514,108	A	5/1996	Stevens	D397,434	S	8/1998	Pike
5,520,655	A	5/1996	Davila et al.	5,792,124	A	8/1998	Horrigan et al.
5,520,657	A	5/1996	Sellers et al.	5,800,395	A	9/1998	Botich et al.
D371,195	S	6/1996	Krebs	5,807,339	A	9/1998	Bostrom et al.
5,522,807	A	6/1996	Luther	5,807,342	A	9/1998	Musgrave et al.
5,527,290	A	6/1996	Zadini et al.	5,807,350	A	9/1998	Diaz
5,527,291	A	6/1996	Zadini et al.	5,810,780	A	9/1998	Brimhall et al.
5,531,701	A	7/1996	Luther	5,810,835	A	9/1998	Ryan et al.
5,531,713	A	7/1996	Mastronardi et al.	5,813,411	A	9/1998	Van Bladel et al.
5,533,988	A	7/1996	Dickerson et al.	5,817,058	A	10/1998	Shaw
5,535,785	A	7/1996	Werge et al.	5,817,069	A	10/1998	Arnett
5,542,933	A	8/1996	Marks	5,824,001	A	10/1998	Erskine
5,554,136	A	9/1996	Luther	5,827,202	A	10/1998	Miraki et al.
5,562,629	A	10/1996	Haughton et al.	5,827,221	A	10/1998	Phelps
5,562,630	A	10/1996	Nichols	5,827,227	A	10/1998	DeLago
5,562,631	A	10/1996	Bogert	5,830,190	A	11/1998	Howell
5,562,633	A	10/1996	Wozencroft	5,830,224	A	11/1998	Cohn et al.
5,562,634	A	10/1996	Flumene et al.	5,839,470	A	11/1998	Hiejima et al.
5,569,202	A	10/1996	Kovalic et al.	5,843,002	A	12/1998	Pecor et al.
5,569,217	A	10/1996	Luther	5,843,038	A	12/1998	Bailey
				5,846,259	A	12/1998	Berthiaume
				5,851,196	A	12/1998	Arnett
				5,853,393	A	12/1998	Bogert
				5,855,615	A	1/1999	Bley et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,858,002	A	1/1999	Jesch	6,228,062	B1	5/2001	Howell et al.
5,865,806	A	2/1999	Howell	6,228,073	B1	5/2001	Noone et al.
5,873,864	A	2/1999	Luther et al.	6,245,045	B1	6/2001	Stratienko
5,879,332	A	3/1999	Schwemberger et al.	6,251,092	B1	6/2001	Qin et al.
5,879,337	A	3/1999	Kuracina et al.	6,268,399	B1	7/2001	Hultine et al.
5,885,217	A	3/1999	Gisselberg et al.	6,270,480	B1	8/2001	Dorr et al.
5,885,251	A	3/1999	Luther	6,273,871	B1	8/2001	Davis et al.
5,891,098	A	4/1999	Huang	6,280,419	B1	8/2001	Vojtasek
5,891,105	A	4/1999	Mahurkar	6,287,278	B1	9/2001	Woehr et al.
5,895,398	A	4/1999	Wensel et al.	6,309,379	B1	10/2001	Willard et al.
5,902,274	A	5/1999	Yamamoto et al.	6,319,244	B2	11/2001	Suresh et al.
5,902,832	A	5/1999	Van Bladel et al.	6,322,537	B1	11/2001	Chang
5,911,705	A	6/1999	Howell	D452,003	S	12/2001	Niermann
5,911,710	A	6/1999	Barry et al.	6,325,781	B1	12/2001	Takagi et al.
5,913,848	A	6/1999	Luther et al.	6,325,797	B1	12/2001	Stewart et al.
5,916,208	A	6/1999	Luther et al.	6,336,914	B1	1/2002	Gillespie, III
5,928,199	A	7/1999	Nakagami	6,352,520	B1	3/2002	Miyazaki
D413,382	S	8/1999	Maissami	6,368,337	B1	4/2002	Kieturakis et al.
5,935,110	A	8/1999	Brimhall	6,379,333	B1	4/2002	Brimhall et al.
5,941,854	A	8/1999	Bhitiyakul	6,379,372	B1	4/2002	Dehdashtian et al.
5,944,690	A	8/1999	Falwell et al.	D457,955	S	5/2002	Bilitz
5,947,930	A	9/1999	Schwemberger et al.	6,406,442	B1	6/2002	McFann et al.
5,951,520	A	9/1999	Burzynski et al.	D460,179	S	7/2002	Isoda et al.
5,954,698	A	9/1999	Pike	6,422,989	B1	7/2002	Hektner
5,957,893	A	9/1999	Luther et al.	6,436,070	B1	8/2002	Botich et al.
5,964,744	A	10/1999	Balbierz et al.	6,436,112	B2	8/2002	Wensel et al.
5,967,490	A	10/1999	Pike	6,443,929	B1	9/2002	Kuracina et al.
5,984,895	A	11/1999	Padilla et al.	6,451,052	B1	9/2002	Burmeister et al.
5,984,903	A	11/1999	Nadal	6,461,362	B1	10/2002	Halseth et al.
5,989,220	A	11/1999	Shaw et al.	6,475,217	B1	11/2002	Platt
5,989,271	A	11/1999	Bonnette et al.	6,478,779	B1	11/2002	Hu
5,997,507	A	12/1999	Dysarz	6,485,473	B1	11/2002	Lynn
5,997,510	A	12/1999	Schwemberger	6,485,497	B2	11/2002	Wensel et al.
6,001,080	A	12/1999	Kuracina et al.	6,497,681	B1	12/2002	Brenner
6,004,278	A	12/1999	Botich et al.	6,506,181	B2	1/2003	Meng et al.
6,004,294	A	12/1999	Brimhall et al.	6,514,236	B1	2/2003	Stratienko
6,004,295	A	12/1999	Langer et al.	6,524,276	B1	2/2003	Halseth et al.
6,011,988	A	1/2000	Lynch et al.	D471,980	S	3/2003	Caizza
6,019,736	A	2/2000	Avellanet et al.	6,527,759	B1	3/2003	Tachibana et al.
6,022,319	A	2/2000	Willard et al.	6,530,913	B1	3/2003	Giba et al.
6,024,727	A	2/2000	Thorne et al.	6,530,935	B2	3/2003	Wensel et al.
6,024,729	A	2/2000	Dehdashtian et al.	6,540,725	B1	4/2003	Ponzi
6,045,734	A	4/2000	Luther et al.	6,540,732	B1	4/2003	Botich et al.
6,056,726	A	5/2000	Isaacson	6,544,239	B2	4/2003	Kinsey et al.
6,059,484	A	5/2000	Greive	6,547,762	B1	4/2003	Botich et al.
6,066,100	A	5/2000	Willard et al.	6,558,355	B1	5/2003	Metzger et al.
6,074,378	A	6/2000	Mouri et al.	6,582,402	B1	6/2003	Erskine
6,077,244	A	6/2000	Botich et al.	6,582,440	B1	6/2003	Brumbach
6,080,137	A	6/2000	Pike	6,585,703	B1	7/2003	Kassel et al.
6,083,237	A	7/2000	Huitema et al.	6,589,262	B1	7/2003	Honebrink et al.
6,096,004	A	8/2000	Meglan et al.	6,595,955	B2	7/2003	Ferguson et al.
6,096,005	A	8/2000	Botich et al.	6,595,959	B1	7/2003	Stratienko
6,109,264	A	8/2000	Sauer	6,599,296	B1	7/2003	Gillick et al.
6,117,108	A	9/2000	Woehr et al.	6,607,511	B2	8/2003	Halseth et al.
6,120,494	A	9/2000	Jonkman	6,616,630	B1	9/2003	Woehr et al.
6,126,633	A	10/2000	Kaji et al.	6,620,136	B1	9/2003	Pressly, Sr. et al.
6,126,641	A	10/2000	Shields	6,623,449	B2	9/2003	Paskar
6,139,532	A	10/2000	Howell et al.	6,623,456	B1	9/2003	Holdaway et al.
6,139,557	A	10/2000	Passafaro et al.	6,626,868	B1	9/2003	Prestidge et al.
6,159,179	A	12/2000	Simonson	6,626,869	B1	9/2003	Bint
6,171,234	B1	1/2001	White et al.	6,629,959	B2	10/2003	Kuracina et al.
6,171,287	B1	1/2001	Lynn et al.	6,632,201	B1	10/2003	Mathias et al.
6,176,842	B1	1/2001	Tachibana et al.	6,638,252	B2	10/2003	Moulton et al.
6,193,690	B1	2/2001	Dysarz	6,641,564	B1	11/2003	Kraus
6,197,001	B1	3/2001	Wilson et al.	6,645,178	B1	11/2003	Junker et al.
6,197,007	B1	3/2001	Thorne et al.	6,652,486	B2	11/2003	Bialecki et al.
6,197,041	B1	3/2001	Shichman et al.	6,652,490	B2	11/2003	Howell
6,203,527	B1	3/2001	Zadini et al.	6,663,577	B2	12/2003	Jen et al.
6,213,978	B1	4/2001	Voyten	6,663,592	B2	12/2003	Rhad et al.
6,217,558	B1	4/2001	Zadini et al.	6,666,865	B2	12/2003	Platt
6,221,047	B1	4/2001	Greene et al.	6,679,900	B2	1/2004	Kieturakis et al.
6,221,048	B1	4/2001	Phelps	6,689,102	B2	2/2004	Greene
6,221,049	B1	4/2001	Selmon et al.	6,692,508	B2	2/2004	Wensel et al.
6,224,569	B1	5/2001	Brimhall	6,692,509	B2	2/2004	Wensel et al.
6,228,060	B1	5/2001	Howell	6,695,814	B2	2/2004	Greene et al.
				6,695,856	B2	2/2004	Kieturakis et al.
				6,695,860	B1	2/2004	Ward et al.
				6,699,221	B2	3/2004	Vaillancourt
				6,702,811	B2	3/2004	Stewart et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,706,018	B2	3/2004	Westlund et al.	7,422,572	B2	9/2008	Popov et al.
6,711,444	B2	3/2004	Koblish	7,458,954	B2	12/2008	Ferguson et al.
6,712,790	B1	3/2004	Prestidge et al.	7,465,294	B1	12/2008	Vladimirsky
6,712,797	B1	3/2004	Southern, Jr.	7,468,057	B2	12/2008	Ponzi
6,716,197	B2	4/2004	Svendsen	7,470,254	B2	12/2008	Basta et al.
6,730,062	B2	5/2004	Hoffman et al.	7,491,176	B2	2/2009	Mann
6,740,063	B2	5/2004	Lynn	7,494,010	B2	2/2009	Opie et al.
6,740,096	B2	5/2004	Teague et al.	7,500,965	B2	3/2009	Menzi et al.
6,745,080	B2	6/2004	Koblish	7,507,222	B2	3/2009	Cindrich et al.
6,749,588	B1	6/2004	Howell et al.	7,513,887	B2	4/2009	Halseth et al.
6,764,468	B1	7/2004	East	7,513,888	B2	4/2009	Sircom et al.
D494,270	S	8/2004	Reschke	7,524,306	B2	4/2009	Botich et al.
6,776,788	B1	8/2004	Klint et al.	7,530,965	B2	5/2009	Villa et al.
6,796,962	B2	9/2004	Ferguson et al.	7,534,227	B2	5/2009	Kulli
6,824,545	B2	11/2004	Sepetka et al.	7,534,231	B2	5/2009	Kuracina et al.
6,832,715	B2	12/2004	Eungard et al.	7,544,170	B2	6/2009	Williams et al.
6,835,190	B2	12/2004	Nguyen	7,556,617	B2	7/2009	Voorhees, Jr. et al.
6,837,867	B2	1/2005	Kortelling	7,566,323	B2	7/2009	Chang
6,860,871	B2	3/2005	Kuracina et al.	D601,243	S	9/2009	Bierman et al.
6,872,193	B2	3/2005	Shaw et al.	7,597,681	B2	10/2009	Sutton et al.
6,887,220	B2	5/2005	Hogendijk	7,608,057	B2	10/2009	Woehr et al.
6,902,546	B2	6/2005	Ferguson	D604,839	S	11/2009	Crawford et al.
6,905,483	B2	6/2005	Newby et al.	7,611,485	B2	11/2009	Ferguson
6,913,595	B2	7/2005	Mastorakis	7,611,487	B2	11/2009	Woehr et al.
6,916,311	B2	7/2005	Vojtasek	7,611,499	B2	11/2009	Woehr et al.
6,921,386	B2	7/2005	Shue et al.	7,618,395	B2	11/2009	Ferguson
6,921,391	B1	7/2005	Barker et al.	7,625,360	B2	12/2009	Woehr et al.
6,929,624	B1	8/2005	Del Castillo	7,628,769	B2	12/2009	Grandt et al.
6,939,325	B2	9/2005	Haining	7,632,243	B2	12/2009	Bialecki et al.
6,942,652	B1	9/2005	Pressly, Sr. et al.	7,645,263	B2	1/2010	Angel et al.
6,953,448	B2	10/2005	Moulton et al.	7,654,988	B2	2/2010	Moulton et al.
6,958,054	B2	10/2005	Fitzgerald	7,658,725	B2	2/2010	Bialecki et al.
6,958,055	B2	10/2005	Donnan et al.	D612,043	S	3/2010	Young et al.
6,960,191	B2	11/2005	Howlett et al.	7,678,080	B2	3/2010	Shue et al.
6,972,002	B2	12/2005	Thorne	7,682,358	B2	3/2010	Gullickson et al.
6,974,438	B2	12/2005	Shekalim	7,691,088	B2	4/2010	Howell
6,994,693	B2	2/2006	Tal	7,691,090	B2	4/2010	Belley et al.
7,001,396	B2	2/2006	Glazier et al.	7,691,093	B2	4/2010	Brimhall
7,004,927	B2	2/2006	Ferguson et al.	7,695,458	B2	4/2010	Belley et al.
7,008,404	B2	3/2006	Nakajima	7,699,807	B2	4/2010	Faust et al.
7,018,372	B2	3/2006	Casey et al.	D615,197	S	5/2010	Koh et al.
7,018,390	B2	3/2006	Turovskiy et al.	7,708,721	B2	5/2010	Khaw
7,025,746	B2	4/2006	Tal	7,713,243	B2	5/2010	Hillman
7,029,467	B2	4/2006	Currier et al.	7,717,875	B2	5/2010	Knudson et al.
7,033,335	B2	4/2006	Haarala et al.	7,722,567	B2	5/2010	Tal
7,044,935	B2	5/2006	Shue et al.	7,722,569	B2	5/2010	Soderholm et al.
7,060,055	B2	6/2006	Wilkinson et al.	D617,893	S	6/2010	Bierman et al.
7,090,656	B1	8/2006	Botich et al.	7,731,687	B2	6/2010	Menzi et al.
7,094,243	B2	8/2006	Mulholland et al.	7,731,691	B2	6/2010	Cote et al.
7,097,633	B2	8/2006	Botich et al.	7,736,332	B2	6/2010	Carlyon et al.
7,125,396	B2	10/2006	Leinsing et al.	7,736,337	B2	6/2010	Diep et al.
7,125,397	B2	10/2006	Woehr et al.	7,736,339	B2	6/2010	Woehr et al.
7,141,040	B2	11/2006	Lichtenberg	7,736,342	B2	6/2010	Abriles et al.
7,153,276	B2	12/2006	Barker et al.	7,740,615	B2	6/2010	Shaw et al.
7,163,520	B2	1/2007	Bernard et al.	7,744,574	B2	6/2010	Pederson et al.
7,169,159	B2	1/2007	Green et al.	7,753,877	B2	7/2010	Bialecki et al.
7,179,244	B2	2/2007	Smith et al.	7,753,887	B2	7/2010	Botich et al.
7,186,239	B2	3/2007	Woehr	7,762,984	B2	7/2010	Kumoyama et al.
7,191,900	B2	3/2007	Opie et al.	7,762,993	B2	7/2010	Perez
7,192,433	B2	3/2007	Osyepka et al.	7,766,879	B2	8/2010	Tan et al.
7,204,813	B2	4/2007	Shue et al.	7,776,052	B2	8/2010	Greenberg et al.
7,214,211	B2	5/2007	Woehr et al.	7,785,296	B2	8/2010	Muskatello et al.
7,255,685	B2	8/2007	Pressly, Sr. et al.	7,794,424	B2	9/2010	Paskar
7,264,613	B2	9/2007	Woehr et al.	7,798,994	B2	9/2010	Brimhall
7,291,130	B2	11/2007	McGurk	7,803,142	B2	9/2010	Longson et al.
7,303,547	B2	12/2007	Pressly, Sr. et al.	7,828,773	B2	11/2010	Swisher et al.
7,303,548	B2	12/2007	Rhad et al.	7,828,774	B2	11/2010	Harding et al.
7,314,462	B2	1/2008	O'Reagan et al.	7,833,201	B2	11/2010	Carlyon et al.
7,331,966	B2	2/2008	Soma et al.	7,850,644	B2	12/2010	Gonzalez et al.
7,344,516	B2	3/2008	Erskine	7,857,770	B2	12/2010	Raulerson et al.
7,354,422	B2	4/2008	Riesenberger et al.	D634,843	S	3/2011	Kim et al.
7,374,554	B2	5/2008	Menzi et al.	7,896,862	B2	3/2011	Long et al.
7,381,205	B2	6/2008	Thommen	7,905,857	B2	3/2011	Swisher
7,396,346	B2	7/2008	Nakajima	7,914,488	B2	3/2011	Dickerson
7,413,562	B2	8/2008	Ferguson et al.	7,914,492	B2	3/2011	Heuser
				7,922,696	B2	4/2011	Tal et al.
				7,922,698	B2	4/2011	Riesenberger et al.
				7,927,314	B2	4/2011	Kuracina et al.
				7,935,080	B2	5/2011	Howell et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,959,613	B2	6/2011	Rhad et al.	8,585,651	B2	11/2013	Asai
7,972,313	B2	7/2011	Woehr et al.	8,585,660	B2	11/2013	Murphy
7,972,324	B2	7/2011	Quint	8,591,467	B2	11/2013	Walker et al.
D643,531	S	8/2011	van der Weiden	8,591,468	B2	11/2013	Woehr et al.
8,029,470	B2	10/2011	Whiting et al.	8,597,249	B2	12/2013	Woehr et al.
8,029,472	B2	10/2011	Leinsing et al.	8,622,931	B2	1/2014	Teague et al.
8,048,031	B2	11/2011	Shaw et al.	8,622,958	B2	1/2014	Jones et al.
8,048,039	B2	11/2011	Carlyon et al.	8,622,972	B2	1/2014	Nystrom et al.
8,057,404	B2	11/2011	Fujiwara et al.	D700,318	S	2/2014	Amoah et al.
8,062,261	B2	11/2011	Adams	8,647,301	B2	2/2014	Bialecki et al.
8,075,529	B2	12/2011	Nakajima et al.	8,647,313	B2	2/2014	Woehr et al.
8,079,979	B2	12/2011	Moorehead	8,647,324	B2	2/2014	DeLegge et al.
D653,329	S	1/2012	Lee-Sepsick	8,652,104	B2	2/2014	Goral et al.
8,100,858	B2	1/2012	Woehr et al.	8,657,790	B2	2/2014	Tal et al.
8,105,286	B2	1/2012	Anderson et al.	8,672,888	B2	3/2014	Tal
8,105,315	B2	1/2012	Johnson et al.	8,679,063	B2	3/2014	Stout et al.
8,123,727	B2	2/2012	Luther et al.	8,690,833	B2	4/2014	Belson
8,152,758	B2	4/2012	Chan et al.	8,715,242	B2	5/2014	Helm, Jr.
8,162,881	B2	4/2012	Lilley, Jr. et al.	8,721,546	B2	5/2014	Belson
8,167,851	B2	5/2012	Sen	8,728,030	B2	5/2014	Woehr
8,177,753	B2	5/2012	Vitullo et al.	8,728,035	B2	5/2014	Warring et al.
RE43,473	E	6/2012	Newby et al.	8,740,859	B2	6/2014	McKinnon et al.
8,192,402	B2	6/2012	Anderson et al.	8,740,964	B2	6/2014	Hartley
8,202,251	B2	6/2012	Bierman et al.	8,747,387	B2	6/2014	Belley et al.
8,202,253	B1	6/2012	Wexler	8,753,317	B2	6/2014	Osborne et al.
8,206,343	B2	6/2012	Racz	8,764,711	B2	7/2014	Kuracina et al.
8,211,070	B2	7/2012	Woehr et al.	D710,495	S	8/2014	Wu et al.
8,221,387	B2	7/2012	Shelso et al.	8,814,833	B2	8/2014	Farrell et al.
8,226,612	B2	7/2012	Nakajima	D713,957	S	9/2014	Woehr et al.
8,235,945	B2	8/2012	Baid	D714,436	S	9/2014	Lee-Sepsick
8,251,923	B2	8/2012	Carrez et al.	8,827,965	B2	9/2014	Woehr et al.
8,251,950	B2	8/2012	Albert et al.	8,845,584	B2	9/2014	Ferguson et al.
D667,111	S	9/2012	Robinson	D715,931	S	10/2014	Watanabe et al.
8,257,322	B2	9/2012	Kochler et al.	8,864,714	B2	10/2014	Harding et al.
8,273,054	B2	9/2012	St. Germain et al.	8,900,192	B2	12/2014	Anderson et al.
8,286,657	B2	10/2012	Belley et al.	8,932,257	B2	1/2015	Woehr
8,298,186	B2	10/2012	Popov	8,932,258	B2	1/2015	Blanchard et al.
8,303,543	B2	11/2012	Abulhaj	8,932,259	B2	1/2015	Stout et al.
8,308,685	B2	11/2012	Botich et al.	8,945,011	B2	2/2015	Sheldon et al.
8,308,691	B2	11/2012	Woehr et al.	8,951,230	B2	2/2015	Tanabe et al.
D672,456	S	12/2012	Lee-Sepsick	8,956,327	B2	2/2015	Bierman et al.
8,323,249	B2	12/2012	White et al.	8,974,426	B2	3/2015	Corcoran et al.
8,328,762	B2	12/2012	Woehr et al.	8,979,802	B2	3/2015	Woehr
8,328,837	B2	12/2012	Binmoeller	8,986,227	B2	3/2015	Belson
8,333,735	B2	12/2012	Woehr et al.	D726,908	S	4/2015	Yu et al.
8,337,424	B2	12/2012	Palmer et al.	8,998,852	B2	4/2015	Blanchard et al.
8,337,463	B2	12/2012	Woehr et al.	9,005,169	B2	4/2015	Gravesen et al.
8,337,471	B2	12/2012	Baid	9,011,351	B2	4/2015	Hoshinouchi
D675,318	S	1/2013	Luk et al.	9,011,381	B2	4/2015	Yamada et al.
8,361,020	B2	1/2013	Stout	D728,781	S	5/2015	Pierson et al.
8,361,038	B2	1/2013	McKinnon et al.	9,022,979	B2	5/2015	Woehr
8,376,994	B2	2/2013	Woehr et al.	9,033,927	B2	5/2015	Maan et al.
8,377,006	B2	2/2013	Tal et al.	D733,289	S	6/2015	Blanchard et al.
8,382,721	B2	2/2013	Woehr et al.	9,044,583	B2	6/2015	Vaillancourt
8,388,583	B2	3/2013	Stout et al.	D735,321	S	7/2015	Blanchard
8,403,886	B2	3/2013	Bialecki et al.	9,089,671	B2	7/2015	Stout et al.
8,412,300	B2	4/2013	Sonderegger	9,089,674	B2	7/2015	Ginn et al.
8,414,539	B1	4/2013	Kuracina et al.	9,095,683	B2	8/2015	Hall et al.
8,419,688	B2	4/2013	Woehr et al.	9,101,746	B2	8/2015	Stout et al.
8,444,605	B2	5/2013	Kuracina et al.	9,108,021	B2	8/2015	Hyer et al.
8,454,536	B2	6/2013	Raulerson et al.	9,114,231	B2	8/2015	Woehr et al.
8,460,247	B2	6/2013	Woehr et al.	9,114,241	B2	8/2015	Stout et al.
8,469,928	B2	6/2013	Stout et al.	9,126,012	B2	9/2015	McKinnon et al.
8,496,628	B2	7/2013	Erskine	9,138,252	B2	9/2015	Bierman et al.
D687,548	S	8/2013	Hayashi	9,138,545	B2	9/2015	Shaw et al.
8,506,533	B2	8/2013	Carlyon et al.	9,138,559	B2	9/2015	Odland et al.
8,509,340	B2	8/2013	Michelitsch	RE45,776	E	10/2015	Root et al.
8,517,959	B2	8/2013	Kurosawa et al.	D740,410	S	10/2015	Korkuch et al.
8,529,515	B2	9/2013	Woehr et al.	9,149,625	B2	10/2015	Woehr et al.
8,535,271	B2	9/2013	Fuchs et al.	9,149,626	B2	10/2015	Woehr et al.
8,540,728	B2	9/2013	Woehr et al.	9,155,863	B2	10/2015	Isaacson et al.
8,545,454	B2	10/2013	Kuracina et al.	9,162,036	B2	10/2015	Caples et al.
8,568,372	B2	10/2013	Woehr et al.	9,162,037	B2	10/2015	Belson et al.
8,574,203	B2	11/2013	Stout et al.	9,180,275	B2	11/2015	Helm
8,579,881	B2	11/2013	Agro et al.	D746,445	S	12/2015	Lazarus
				9,205,231	B2	12/2015	Call et al.
				9,216,109	B2	12/2015	Badawi et al.
				9,220,531	B2	12/2015	Datta et al.
				9,220,871	B2	12/2015	Thorne et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,220,882 B2	12/2015	Belley et al.	10,722,685 B2	7/2020	Blanchard et al.
D748,254 S	1/2016	Freigang et al.	10,806,906 B2	10/2020	Warring et al.
9,227,038 B2	1/2016	Woehr	D914,208 S *	3/2021	Shabudin ..... D24/130
9,242,071 B2	1/2016	Morgan et al.	D921,884 S *	6/2021	Tran ..... D24/113
9,242,072 B2	1/2016	Morgan et al.	D933,216 S *	10/2021	Gloess ..... D24/133
RE45,896 E	2/2016	Stout et al.	D944,395 S *	2/2022	Harris ..... D24/112
D748,774 S	2/2016	Caron	D952,842 S *	5/2022	Harris ..... D24/133
D748,777 S	2/2016	Uenishi et al.	11,389,626 B2	7/2022	Tran et al.
D749,214 S	2/2016	Uenishi et al.	11,400,260 B2	8/2022	Huang et al.
D749,727 S	2/2016	Wapler et al.	D964,559 S *	9/2022	Fujii ..... D24/130
D751,194 S	3/2016	Yu et al.	D982,741 S *	4/2023	Lee-Sepsick ..... D24/112
D752,737 S	3/2016	Ohashi	D1,037,439 S *	7/2024	Williams ..... D24/113
9,289,237 B2	3/2016	Woehr et al.	2001/0014786 A1	8/2001	Greene et al.
9,308,352 B2	4/2016	Teoh et al.	2001/0020153 A1	9/2001	Howell
9,308,354 B2	4/2016	Farrell et al.	2002/0052576 A1	5/2002	Massengale
9,320,870 B2	4/2016	Woehr	2002/0077595 A1	6/2002	Hundertmark et al.
D755,368 S	5/2016	Efinger et al.	2002/0103446 A1	8/2002	McFann et al.
9,352,119 B2	5/2016	Burkholz et al.	2002/0107526 A1	8/2002	Greenberg et al.
9,352,127 B2	5/2016	Yeh et al.	2002/0128604 A1	9/2002	Nakajima
9,352,129 B2	5/2016	Nardeo et al.	2002/0165497 A1	11/2002	Greene
9,358,364 B2	6/2016	Isaacson et al.	2002/0177812 A1	11/2002	Moulton et al.
9,370,641 B2	6/2016	Woehr et al.	2003/0032922 A1	2/2003	Moorehead
9,381,324 B2	7/2016	Fuchs et al.	2003/0032936 A1	2/2003	Lederman
9,399,116 B2	7/2016	Goral et al.	2003/0060760 A1	3/2003	Botich et al.
9,408,569 B2	8/2016	Andreae et al.	2003/0073956 A1	4/2003	Hoffman et al.
9,421,345 B2	8/2016	Woehr et al.	2003/0120214 A1	6/2003	Howell
9,427,549 B2	8/2016	Woehr et al.	2003/0153874 A1	8/2003	Tal
D775,330 S	12/2016	Blennow et al.	2003/0187396 A1	10/2003	Ponzi
9,522,254 B2	12/2016	Belson	2003/0204186 A1	10/2003	Geistert
D776,259 S	1/2017	Eldredge	2004/0019329 A1	1/2004	Erskine
9,545,495 B2	1/2017	Goral et al.	2004/0030291 A1	2/2004	Holdaway et al.
9,554,817 B2	1/2017	Goldfarb et al.	2004/0034383 A1	2/2004	Belson
D779,059 S	2/2017	Nino et al.	2004/0044302 A1	3/2004	Bernard et al.
D779,661 S	2/2017	McKnight et al.	2004/0044313 A1	3/2004	Nakajima
9,579,486 B2	2/2017	Burkholz et al.	2004/0092879 A1	5/2004	Kraus et al.
9,586,027 B2	3/2017	Tisci et al.	2004/0106903 A1	6/2004	Shue et al.
9,592,367 B2	3/2017	Harding et al.	2004/0111059 A1	6/2004	Howlett et al.
9,616,201 B2	4/2017	Belson	2004/0122373 A1	6/2004	Botich et al.
9,623,210 B2	4/2017	Woehr	2004/0176758 A1	9/2004	Yassinzadeh
9,675,784 B2	6/2017	Belson	2004/0193118 A1	9/2004	Bergeron
9,687,633 B2	6/2017	Teoh	2004/0215146 A1	10/2004	Lampropoulos et al.
D791,311 S	7/2017	Yantz	2004/0236288 A1	11/2004	Howell et al.
9,707,378 B2	7/2017	Leinsing et al.	2004/0243061 A1	12/2004	McGurk
9,717,523 B2	8/2017	Feng et al.	2004/0267204 A1	12/2004	Brustowicz
9,717,887 B2	8/2017	Tan	2005/0004524 A1	1/2005	Newby et al.
9,737,252 B2	8/2017	Teoh et al.	2005/0004532 A1	1/2005	Woehr et al.
9,750,532 B2	9/2017	Toomey et al.	2005/0010095 A1	1/2005	Stewart et al.
9,750,928 B2	9/2017	Burkholz et al.	2005/0020940 A1	1/2005	Opie et al.
9,757,540 B2	9/2017	Belson	2005/0021002 A1	1/2005	Deckman et al.
9,764,085 B2	9/2017	Teoh	2005/0027256 A1	2/2005	Barker et al.
9,764,117 B2	9/2017	Bierman et al.	2005/0033137 A1	2/2005	Oral et al.
9,775,972 B2	10/2017	Christensen et al.	2005/0040061 A1	2/2005	Opie et al.
9,782,568 B2	10/2017	Belson	2005/0075606 A1	4/2005	Botich et al.
9,789,279 B2	10/2017	Burkholz et al.	2005/0107769 A1	5/2005	Thommen
9,795,766 B2	10/2017	Teoh	2005/0119619 A1	6/2005	Haining
9,844,646 B2	12/2017	Knutsson	2005/0131350 A1	6/2005	Shaw et al.
9,861,792 B2	1/2018	Hall et al.	2005/0165355 A1	7/2005	Fitzgerald
9,872,971 B2	1/2018	Blanchard	2005/0197623 A1	9/2005	Leeffang et al.
D810,282 S	2/2018	Ratjen	2005/0245847 A1	11/2005	Schaeffer
D815,737 S	4/2018	Bergstrom et al.	2005/0256505 A1	11/2005	Long et al.
9,950,139 B2	4/2018	Blanchard et al.	2005/0273057 A1	12/2005	Popov
9,962,525 B2	5/2018	Woehr	2006/0025721 A1	2/2006	Duffy et al.
10,004,878 B2	6/2018	Ishida	2006/0036219 A1	2/2006	Alvin
10,086,171 B2	10/2018	Belson	2006/0079787 A1	4/2006	Whiting et al.
10,232,146 B2	3/2019	Braithwaite et al.	2006/0084964 A1	4/2006	Knudson et al.
10,328,239 B2	6/2019	Belson	2006/0155245 A1	7/2006	Woehr
10,357,635 B2	7/2019	Korkuch et al.	2006/0161115 A1	7/2006	Fangrow
10,384,039 B2	8/2019	Ribelin et al.	2006/0167405 A1	7/2006	King et al.
10,426,931 B2	10/2019	Blanchard et al.	2006/0200080 A1	9/2006	Abulhaj
D870,271 S	12/2019	Kheradpir et al.	2006/0229563 A1	10/2006	O'Reagan et al.
D870,883 S	12/2019	Harding et al.	2006/0264834 A1	11/2006	Vaillancourt
10,493,262 B2	12/2019	Tran et al.	2006/0264841 A1	11/2006	Cote et al.
10,525,236 B2	1/2020	Belson	2007/0043422 A1	2/2007	Shmulewitz et al.
10,688,280 B2	6/2020	Blanchard et al.	2007/0060999 A1	3/2007	Randall et al.
10,688,281 B2	6/2020	Blanchard et al.	2007/0083162 A1	4/2007	O'Reagan et al.
			2007/0083188 A1	4/2007	Grandt et al.
			2007/0100284 A1	5/2007	Leinsing et al.
			2007/0123803 A1	5/2007	Fujiwara et al.
			2007/0142779 A1	6/2007	Duane et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2007/0179446	A1	8/2007	Carrez et al.	2012/0123354	A1	5/2012	Woehr
2007/0191777	A1	8/2007	King	2012/0157854	A1	6/2012	Kurrus et al.
2007/0191786	A1	8/2007	Raines et al.	2012/0179104	A1	7/2012	Woehr et al.
2007/0193903	A1	8/2007	Opie et al.	2012/0184896	A1	7/2012	DeLegge et al.
2007/0225647	A1	9/2007	Luther et al.	2012/0197200	A1	8/2012	Belson
2007/0233007	A1	10/2007	Adams	2012/0220942	A1	8/2012	Hall et al.
2007/0244438	A1	10/2007	Perez	2012/0220956	A1	8/2012	Kuracina et al.
2007/0255221	A1	11/2007	Nakajima	2012/0259293	A1	10/2012	Bialecki et al.
2007/0276288	A1	11/2007	Khaw	2012/0271232	A1	10/2012	Katsurada et al.
2008/0039796	A1	2/2008	Nakajima	2012/0296282	A1	11/2012	Koehler et al.
2008/0065011	A1	3/2008	Marchand et al.	2012/0310179	A1	12/2012	Truitt et al.
2008/0082082	A1	4/2008	Carlyon et al.	2012/0316500	A1	12/2012	Bierman et al.
2008/0097330	A1	4/2008	King et al.	2012/0323181	A1	12/2012	Shaw et al.
2008/0108911	A1	5/2008	Palmer et al.	2013/0030391	A1	1/2013	Baid
2008/0108944	A1	5/2008	Woehr et al.	2013/0158506	A1	6/2013	Harris et al.
2008/0108974	A1	5/2008	Yee Roth	2013/0184645	A1	7/2013	Baid
2008/0125709	A1	5/2008	Chang et al.	2013/0204206	A1	8/2013	Morgan et al.
2008/0131300	A1	6/2008	Junod et al.	2013/0204226	A1	8/2013	Keyser
2008/0132846	A1	6/2008	Shue et al.	2013/0218082	A1	8/2013	Hyer et al.
2008/0147010	A1	6/2008	Nakajima et al.	2013/0304030	A1	11/2013	Gray et al.
2008/0243165	A1	10/2008	Mauch et al.	2013/0310764	A1	11/2013	Burkholz et al.
2008/0262430	A1	10/2008	Anderson et al.	2013/0324930	A1	12/2013	Fuchs et al.
2008/0262431	A1	10/2008	Anderson et al.	2014/0012203	A1	1/2014	Woehr et al.
2008/0294111	A1	11/2008	Tal et al.	2014/0031752	A1	1/2014	Blanchard et al.
2008/0300574	A1	12/2008	Belson et al.	2014/0039461	A1	2/2014	Anderson et al.
2009/0018567	A1	1/2009	Escudero et al.	2014/0058329	A1	2/2014	Walker et al.
2009/0030380	A1	1/2009	Binmoeller	2014/0058336	A1	2/2014	Burkholz et al.
2009/0036836	A1	2/2009	Nystrom et al.	2014/0058357	A1	2/2014	Keyser et al.
2009/0048566	A1	2/2009	Ferguson et al.	2014/0073928	A1	3/2014	Yamashita et al.
2009/0131872	A1	5/2009	Popov	2014/0074034	A1	3/2014	Tanabe et al.
2009/0157006	A1	6/2009	Nardeo et al.	2014/0088509	A1	3/2014	Sonderegger et al.
2009/0221961	A1	9/2009	Tal et al.	2014/0094774	A1	4/2014	Blanchard
2009/0227953	A1	9/2009	Tan et al.	2014/0094836	A1	4/2014	Feng et al.
2009/0287154	A1	11/2009	Harding et al.	2014/0114239	A1	4/2014	Dib et al.
2009/0292243	A1	11/2009	Harding et al.	2014/0128775	A1	5/2014	Andreae et al.
2009/0299291	A1	12/2009	Baid	2014/0135702	A1	5/2014	Woehr et al.
2010/0010441	A1	1/2010	Belson	2014/0135703	A1	5/2014	Yeh et al.
2010/0010447	A1	1/2010	Luther et al.	2014/0143999	A1	5/2014	Goral et al.
2010/0016838	A1	1/2010	Butts et al.	2014/0180250	A1	6/2014	Belson
2010/0036331	A1	2/2010	Sen	2014/0188003	A1	7/2014	Belson
2010/0056910	A1	3/2010	Yanuma	2014/0194853	A1	7/2014	Morgan et al.
2010/0057183	A1	3/2010	Mangiardi et al.	2014/0214005	A1	7/2014	Belson
2010/0087787	A1	4/2010	Woehr et al.	2014/0221977	A1	8/2014	Belson
2010/0094116	A1	4/2010	Silverstein	2014/0236099	A1	8/2014	Nakagami et al.
2010/0094310	A1	4/2010	Warring et al.	2014/0243734	A1	8/2014	Eubanks et al.
2010/0137815	A1	6/2010	Kuracina et al.	2014/0249488	A1	9/2014	Woehr
2010/0168674	A1	7/2010	Shaw et al.	2014/0257359	A1	9/2014	Tegels et al.
2010/0204654	A1	8/2010	Mulholland et al.	2014/0276224	A1	9/2014	Ranganathan et al.
2010/0204660	A1	8/2010	McKinnon et al.	2014/0276432	A1	9/2014	Bierman et al.
2010/0204675	A1	8/2010	Woehr et al.	2014/0276434	A1	9/2014	Woehr et al.
2010/0210934	A1	8/2010	Belson	2014/0303561	A1	10/2014	Li
2010/0238705	A1	9/2010	Kim et al.	2014/0323988	A1	10/2014	Magnani et al.
2010/0246707	A1	9/2010	Michelitsch	2014/0336582	A1	11/2014	Tisci et al.
2010/0331732	A1	12/2010	Raulerson et al.	2014/0357983	A1	12/2014	Toomey et al.
2011/0004162	A1	1/2011	Tal	2014/0358123	A1	12/2014	Ueda et al.
2011/0009827	A1	1/2011	Bierman et al.	2014/0364809	A1	12/2014	Isaacson et al.
2011/0015573	A1	1/2011	Maan et al.	2014/0371715	A1	12/2014	Farrell et al.
2011/0021994	A1	1/2011	Anderson et al.	2014/0371720	A1	12/2014	Urmey
2011/0046570	A1	2/2011	Stout et al.	2014/0378867	A1	12/2014	Belson
2011/0125097	A1	5/2011	Shaw et al.	2015/0025467	A1	1/2015	Woehr
2011/0137252	A1	6/2011	Oster et al.	2015/0038909	A1	2/2015	Christensen et al.
2011/0196315	A1	8/2011	Chappel	2015/0038910	A1	2/2015	Harding et al.
2011/0207157	A1	8/2011	Gautier et al.	2015/0038943	A1	2/2015	Warring et al.
2011/0218496	A1	9/2011	Bierman	2015/0051584	A1	2/2015	Korkuch et al.
2011/0251559	A1	10/2011	Tal et al.	2015/0080801	A1	3/2015	Tanabe et al.
2011/0276002	A1	11/2011	Bierman	2015/0080810	A1	3/2015	Henderson et al.
2011/0282285	A1	11/2011	Blanchard et al.	2015/0088095	A1	3/2015	Luther et al.
2011/0288482	A1	11/2011	Farrell et al.	2015/0094659	A1	4/2015	Schraga
2011/0306933	A1	12/2011	Djordjevic et al.	2015/0119806	A1	4/2015	Blanchard et al.
2011/0319838	A1	12/2011	Goral et al.	2015/0119852	A1	4/2015	Wexler
2012/0053523	A1	3/2012	Harding	2015/0126932	A1	5/2015	Knutsson
2012/0071857	A1	3/2012	Goldfarb et al.	2015/0151086	A1	6/2015	Teoh
2012/0078231	A1	3/2012	Hoshinouchi	2015/0151088	A1	6/2015	Lim et al.
2012/0101440	A1	4/2012	Kamen et al.	2015/0190168	A1	7/2015	Bierman et al.
2012/0123332	A1	5/2012	Erskine	2015/0190570	A1	7/2015	Teoh
				2015/0190617	A1	7/2015	Anderson et al.
				2015/0202414	A1	7/2015	Hwang
				2015/0202421	A1	7/2015	Ma et al.
				2015/0224267	A1	8/2015	Farrell et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2015/0231364 A1 8/2015 Blanchard et al.  
 2015/0238705 A1 8/2015 Gravesen et al.  
 2015/0290431 A1 10/2015 Hall et al.  
 2015/0306347 A1 10/2015 Yagi  
 2015/0306356 A1 10/2015 Gill  
 2015/0328434 A1 11/2015 Gaur  
 2015/0328438 A1 11/2015 Baid  
 2015/0335858 A1 11/2015 Woehr et al.  
 2015/0359473 A1 12/2015 Garrett et al.  
 2016/0008580 A1 1/2016 Woehr et al.  
 2016/0015943 A1 1/2016 Belson et al.  
 2016/0015945 A1 1/2016 Warring et al.  
 2016/0022312 A1 1/2016 Tang et al.  
 2016/0022963 A1 1/2016 Belson  
 2016/0030716 A1 2/2016 Mallin et al.  
 2016/0045715 A1 2/2016 Galgano et al.  
 2016/0089513 A1 3/2016 Ishida  
 2016/0106959 A1 4/2016 Woehr  
 2016/0114136 A1 4/2016 Woehr  
 2016/0114137 A1 4/2016 Woehr et al.  
 2016/0158503 A1 6/2016 Woehr  
 2016/0158526 A1 6/2016 Woehr  
 2016/0175563 A1 6/2016 Woehr et al.  
 2016/0184557 A1 6/2016 Call et al.  
 2016/0199575 A1 7/2016 Belley et al.  
 2016/0206852 A1 7/2016 Morgan et al.  
 2016/0206858 A1 7/2016 Ishida  
 2016/0220161 A1 8/2016 Goral et al.  
 2016/0220786 A1 8/2016 Mitchell et al.  
 2016/0256667 A1 9/2016 Ribelin et al.  
 2016/0296729 A1 10/2016 Fuchs et al.  
 2016/0310704 A1 10/2016 Ng et al.  
 2016/0331937 A1 11/2016 Teoh  
 2016/0331938 A1 11/2016 Blanchard et al.  
 2016/0354580 A1 12/2016 Teoh et al.  
 2016/0361490 A1 12/2016 Phang et al.  
 2016/0361519 A1 12/2016 Teoh et al.  
 2017/0000982 A1 1/2017 Ishida  
 2017/0035992 A1 2/2017 Harding et al.  
 2017/0043132 A1 2/2017 Ishida  
 2017/0080205 A1 3/2017 Lauer  
 2017/0087338 A1 3/2017 Belson  
 2017/0136217 A1 5/2017 Riesenberger et al.  
 2017/0203050 A1 7/2017 Bauer et al.  
 2017/0209668 A1 7/2017 Belson  
 2017/0246429 A1 8/2017 Tan et al.  
 2017/0259036 A1 9/2017 Belson  
 2017/0361071 A1 12/2017 Belson  
 2018/0028780 A1 2/2018 Blanchard et al.  
 2018/0071509 A1 3/2018 Tran et al.  
 2018/0099123 A1 4/2018 Woehr  
 2018/0126125 A1 5/2018 Hall et al.  
 2018/0133437 A1 5/2018 Blanchard  
 2018/0229003 A1 8/2018 Blanchard et al.  
 2018/0229004 A1 8/2018 Blanchard et al.  
 2019/0022358 A1 1/2019 Belson  
 2019/0192829 A1 6/2019 Belson et al.  
 2019/0201667 A1 7/2019 Braithwaite et al.  
 2019/0240459 A1 8/2019 Belson  
 2019/0275303 A1 9/2019 Tran et al.  
 2019/0307986 A1 10/2019 Belson  
 2019/0351193 A1 11/2019 Hall  
 2019/0351196 A1 11/2019 Ribelin et al.  
 2020/0001051 A1 1/2020 Huang et al.  
 2020/0094037 A1 3/2020 Tran et al.  
 2020/0261696 A1 8/2020 Blanchard  
 2020/0261703 A1 8/2020 Belson et al.  
 2020/0316347 A1 10/2020 Belson  
 2021/0052858 A1 2/2021 Isaacson et al.  
 2021/0308428 A1 10/2021 Blanchard et al.  
 2021/0402155 A1 12/2021 Hall et al.  
 2022/0362523 A1 11/2022 Huang et al.  
 2022/0379093 A1 12/2022 Nielson  
 2023/0398345 A1 12/2023 Tran et al.

2024/0189552 A1 6/2024 Ribelin et al.  
 2024/0207584 A1 6/2024 Belson et al.  
 2024/0390652 A1 11/2024 Blanchard

## FOREIGN PATENT DOCUMENTS

CA 3203907 A1 6/2022  
 CN 1178707 A 4/1998  
 CN 1319023 A 10/2001  
 CN 1523970 A 8/2004  
 CN 1871043 A 11/2006  
 CN 101242868 A 8/2008  
 CN 101293122 A 10/2008  
 CN 101417159 A 4/2009  
 CN 101784300 A 7/2010  
 CN 102099075 A 6/2011  
 CN 102939129 A 2/2013  
 CN 104689456 A 6/2015  
 CN 105073174 A 11/2015  
 CN 105188826 A 12/2015  
 CN 105705191 A 6/2016  
 DE 20210394 U1 9/2002  
 EP 0314470 A2 5/1989  
 EP 417764 A1 3/1991  
 EP 475857 A1 3/1992  
 EP 515710 A1 12/1992  
 EP 567321 A2 10/1993  
 EP 652020 A2 5/1995  
 EP 0730880 A1 9/1996  
 EP 747075 A2 12/1996  
 EP 750916 A2 1/1997  
 EP 778043 A1 6/1997  
 EP 800790 A2 10/1997  
 EP 832663 A2 4/1998  
 EP 910988 A1 4/1999  
 EP 942761 A1 9/1999  
 EP 1075850 A2 2/2001  
 EP 1378263 A2 1/2004  
 EP 1418971 A2 5/2004  
 EP 1457229 A1 9/2004  
 EP 1611916 A1 1/2006  
 EP 1907042 A2 4/2008  
 EP 1974765 A1 10/2008  
 EP 2150304 A2 2/2010  
 EP 2272432 A1 1/2011  
 EP 2347785 A1 7/2011  
 EP 2569046 A1 3/2013  
 GB 2529270 A 2/2016  
 JP 2003-159334 A 6/2003  
 JP 2004-130074 A 4/2004  
 JP 2004-223252 A 8/2004  
 JP 2005-137888 A 6/2005  
 JP 2009-500129 A 1/2009  
 JP 2010-088521 A 4/2010  
 JP 2013-529111 A 7/2013  
 JP 2018-118079 A 8/2018  
 JP 6692869 B2 5/2020  
 WO 83/01575 A1 5/1983  
 WO 1992013584 A1 8/1992  
 WO 92/22344 A1 12/1992  
 WO 1994006681 A2 3/1994  
 WO 1995011710 A1 5/1995  
 WO 95/19193 A1 7/1995  
 WO 95/23003 A1 8/1995  
 WO 96/32981 A1 10/1996  
 WO 1996040359 A1 12/1996  
 WO 97/05912 A2 2/1997  
 WO 97/21458 A1 6/1997  
 WO 1997045151 A1 12/1997  
 WO 98/24494 A1 6/1998  
 WO 1998030268 A1 7/1998  
 WO 1998053875 A1 12/1998  
 WO 1999008742 A1 2/1999  
 WO 1999026682 A1 6/1999  
 WO 00/06226 A1 2/2000  
 WO 00/12160 A1 3/2000  
 WO 2000012167 A1 3/2000  
 WO 00/47256 A1 8/2000  
 WO 0067829 A1 11/2000

(56)

**References Cited**

## FOREIGN PATENT DOCUMENTS

WO	2001007103	A1	2/2001
WO	01/26725	A1	4/2001
WO	02/41932	A2	5/2002
WO	02/066093	A2	8/2002
WO	02/076526	A2	10/2002
WO	03/11381	A1	2/2003
WO	03/043686	A1	5/2003
WO	03/047675	A2	6/2003
WO	2004/018031	A2	3/2004
WO	2005002659	A1	1/2005
WO	2004106203	A3	3/2005
WO	2005/074412	A2	8/2005
WO	2005/087306	A1	9/2005
WO	2006062996	A2	6/2006
WO	2007006055	A2	1/2007
WO	2007/032343	A1	3/2007
WO	2007094841	A1	8/2007
WO	2007098355	A1	8/2007
WO	2007098359	A1	8/2007
WO	2008005618	A2	1/2008
WO	2008030999	A2	3/2008
WO	2008/131300	A2	10/2008
WO	2008/137956	A2	11/2008
WO	2009/001309	A1	12/2008
WO	2008147600	A1	12/2008
WO	2009031161	A1	3/2009
WO	2009114837	A2	9/2009
WO	2009/124990	A1	10/2009
WO	2010015676	A1	2/2010
WO	2010/048449	A2	4/2010
WO	2010/132608	A2	11/2010
WO	2011036574	A1	3/2011
WO	2011143621	A1	11/2011
WO	2012/037213	A1	3/2012
WO	2012106266	A1	8/2012
WO	2012154277	A1	11/2012
WO	2012166746	A1	12/2012
WO	2012174109	A1	12/2012
WO	2013119557	A1	8/2013
WO	2013126446	A1	8/2013
WO	2013187827	A1	12/2013
WO	2014006403	A1	1/2014
WO	2014029424	A1	2/2014
WO	2014074417	A2	5/2014
WO	2014081942	A1	5/2014
WO	2014/123848	A1	8/2014
WO	2014120741	A1	8/2014
WO	2014133617	A1	9/2014
WO	2014140257	A1	9/2014
WO	2014140265	A1	9/2014
WO	2014/165783	A1	10/2014
WO	2014158908	A1	10/2014
WO	2014182421	A1	11/2014
WO	2014197656	A1	12/2014
WO	2014204593	A1	12/2014
WO	2015017136	A1	2/2015
WO	2015024904	A1	2/2015
WO	2015035393	A1	3/2015
WO	2015058136	A1	4/2015
WO	15108913	A1	7/2015
WO	2015/168655	A2	11/2015
WO	15164912	A1	11/2015
WO	2016/037127	A1	3/2016
WO	16178974	A1	11/2016
WO	2018/049413	A1	3/2018
WO	2018157339	A1	9/2018
WO	2018170349	A1	9/2018
WO	2019173641	A1	9/2019
WO	2022250956	A1	12/2022

## OTHER PUBLICATIONS

U.S. Appl. No. 16/867,349, filed May 5, 2020 Final Office Action dated Dec. 28, 2022.

U.S. Appl. No. 16/902,031, filed Jun. 15, 2020 Non-Final Office Action dated Dec. 21, 2022.

U.S. Appl. No. 17/164,653, filed Feb. 1, 2021, Notice of Allowance dated Nov. 1, 2022.

U.S. Appl. No. 17/337,273, filed Jun. 2, 2021 Notice of Allowance dated Oct. 5, 2022.

U.S. Appl. No. 17/471,051, filed Sep. 9, 2021 Restriction Requirement dated Dec. 22, 2021.

U.S. Appl. No. 17/863,179, filed Jul. 12, 2022 Non-Final Office Action dated Dec. 7, 2022.

U.S. Appl. No. 16/867,349, filed May 5, 2020 Notice of Allowance dated Oct. 24, 2023.

U.S. Appl. No. 16/902,031, filed Jun. 15, 2020 Advisory Action dated Oct. 25, 2023.

U.S. Appl. No. 16/902,031, filed Jun. 15, 2020 Non-Final Office Action dated Jan. 17, 2024.

U.S. Appl. No. 17/353,602, filed Jun. 21, 2021 Advisory Action dated Dec. 26, 2023.

U.S. Appl. No. 17/353,602, filed Jun. 21, 2021 Final Office Action dated Sep. 28, 2023.

U.S. Appl. No. 17/353,602, filed Jun. 21, 2021 Non-Final Office Action dated Feb. 1, 2024.

U.S. Appl. No. 17/471,051, filed Sep. 9, 2021 Notice of Allowance dated Nov. 22, 2023.

U.S. Appl. No. 17/493,806, filed Oct. 4, 2021 Notice of Allowance dated Oct. 31, 2023.

U.S. Appl. No. 17/863,179, filed Jul. 12, 2022 Notice of Allowance dated Feb. 13, 2024.

U.S. Appl. No. 16/450,800, filed Jun. 24, 2019 Notice of Allowance dated Nov. 3, 2021.

U.S. Appl. No. 16/490,023, filed Aug. 29, 2019 Non-Final Office Action dated Oct. 4, 2021.

U.S. Appl. No. 15/154,384, filed May 13, 2016 Notice of Allowance dated Mar. 17, 2021.

U.S. Appl. No. 16/292,076, filed Mar. 4, 2019 Corrected Notice of Allowance dated Feb. 25, 2021.

U.S. Appl. No. 16/292,076, filed Mar. 4, 2019 Notice of Allowance dated Feb. 4, 2021.

U.S. Appl. No. 16/295,906, filed Mar. 7, 2019 Notice of Allowance dated Mar. 4, 2021.

U.S. Appl. No. 16/296,087, filed Mar. 7, 2019 Non-Final Office Action dated Mar. 26, 2021.

U.S. Appl. No. 16/296,087, filed Mar. 7, 2019 Restriction Requirement dated Feb. 8, 2021.

U.S. Appl. No. 16/389,719, filed Apr. 19, 2019 Non-Final Office Action dated Mar. 19, 2021.

U.S. Appl. No. 16/529,602, filed Aug. 1, 2019 Notice of Allowance dated Jan. 19, 2021.

U.S. Appl. No. 29/658,136, filed Jul. 27, 2018 Notice of Allowance dated Mar. 23, 2021.

Access Scientific, The Pice Wand® Product Data Sheet, Revision F, May 22, 2012.

Access Scientific, The Powerwand® Extended Dwell Catheter Brochure (<http://accessscientific.com/media/4Fr-POWERWAND-Brochure.pdf>) last accessed Sep. 25, 2015.

BD Angiocath™ Autoguard™ Shielded IV Catheter Brochure, © 2001.

BD Medical Systems, I.V. Catheter Family Brochure (2006).

BD Saf-T-Intima™ Integrated Safety IV Catheter Brochure, © 2001.

Becton Dickinson, Insyte® AutoGuard™ Shielded I.V. Catheter Brochure, 1998.

CA 2,799,360 filed May 13, 2011 Office Action dated Jun. 7, 2017.

CN 201180029526.7 filed Dec. 14, 2012 First Office Action dated Apr. 21, 2014.

CN 201280008866.6 filed Aug. 14, 2013 Second Office Action dated Aug. 17, 2015.

CN 201280008866.6 filed Aug. 14, 2013 First Office Action dated Dec. 31, 2014.

CN 201280008866.6 filed Aug. 14, 2013 Third Office Action dated Jan. 25, 2016.

CN 201380073657.4 filed Aug. 21, 2015 Office Action dated Jun. 28, 2017.

(56)

**References Cited**

## OTHER PUBLICATIONS

- CN 201380073657.4 filed Aug. 21, 2015 Office Action dated Mar. 2, 2018.
- CN 201480019467.9 filed Sep. 29, 2015 Office Action dated Apr. 6, 2017.
- CN 201510079782.7 filed Feb. 13, 2015 Office Action dated Dec. 30, 2016.
- CN 201510079782.7 filed Feb. 13, 2015 Office Action dated Feb. 5, 2018.
- CN 201510079782.7 filed Feb. 13, 2015 Office Action dated Sep. 19, 2017.
- CN 201580022407.7 filed Nov. 2, 2016 Office Action dated Jan. 31, 2019.
- CN 201580022407.7 filed Nov. 2, 2016 Office Action dated Sep. 16, 2019.
- Cook Medical “Lunderquist Extra-Stiff wire guide” (2012).
- Endovascular Today “Coiled Stainless Steel Guidewires” Buyer’s Guide pp. 13-20, (2012).
- EP 07783404.2 filed Jan. 19, 2009 Office Action dated Apr. 16, 2019.
- EP 07783404.2 filed Jan. 19, 2009 Office Action dated Mar. 7, 2018.
- EP 10075422.5 filed Jul. 5, 2008 European search report and written opinion dated Dec. 1, 2010.
- EP 11781384.0 filed Sep. 21, 2012 Extended European Search Report dated Oct. 31, 2017.
- EP 12782187.4 filed Sep. 10, 2013 European search report and written opinion dated Aug. 30, 2016.
- EP 12782187.4 filed Sep. 10, 2013 European search report and written opinion dated Dec. 17, 2015.
- EP 12782187.4 filed Sep. 10, 2013 Office Action dated Apr. 24, 2018.
- EP 12782187.4 filed Sep. 10, 2013 Office Action dated Nov. 28, 2018.
- EP 13876666.2 filed Sep. 7, 2015 Extended European Search Report dated Sep. 20, 2016.
- EP 15785819.2 filed Dec. 2, 2016 Extended European Search Report dated Dec. 4, 2017.
- EP 16797029.2 filed Nov. 21, 2017 Extended European Search Report dated May 3, 2018.
- EP 16797029.2 filed Nov. 21, 2017 Office Action dated Mar. 27, 2020.
- EP 16797047.4 filed Dec. 6, 2017 Supplemental European Search Report dated Jan. 9, 2019.
- EP 19181963.0 filed Jun. 24, 2019 Extended European Search Report dated Jul. 16, 2019.
- EP17849786.3 filed Apr. 12, 2019 Extended European Search Report dated May 13, 2020.
- European office action dated Apr. 21, 2008 for EP Application No. 06800027.2.
- European office action dated Aug. 6, 2012 for EP Application No. 07783404.2.
- European office action dated Oct. 5, 2010 for EP Application No. 07783404.2.
- European search report and opinion dated Jul. 10, 2009 for EP Application No. 07783404.2.
- Hadaway, Lynn C., A Midline Alternative to Central and Peripheral Venous Access, Caring Magazine, May 1990, pp. 45-50.
- International search report and written opinion dated Apr. 2, 2012 for PCT/US2012/023192.
- International search report and written opinion dated Jun. 1, 2007 for PCT/US2006/026671.
- International search report and written opinion dated Oct. 23, 2008 for PCT/US2007/068393.
- JP 2013-510353 filed Oct. 31, 2012 First Office Action dated Feb. 19, 2015.
- JP 2013-510353 filed Oct. 31, 2012 Office Action dated Dec. 15, 2016.
- JP 2013-510353 filed Oct. 31, 2012 Second Office Action dated Jan. 28, 2016.
- JP 2015-560173 filed Aug. 28, 2015 Office Action dated Aug. 2, 2018.
- JP 2015-560173 filed Aug. 28, 2015 Office Action dated Sep. 19, 2017.
- JP 2016-107046 filed May 30, 2016 Office Action dated Apr. 26, 2017.
- EP 22159383.3 filed Mar. 1, 2022 Extended European Search Report dated May 30, 2022.
- PCT/US2019/052225 filed Sep. 20, 2019 International Search Report and Written Opinion dated Jun. 25, 2020.
- U.S. Appl. No. 15/869,872, filed Jan. 12, 2018 Notice of Allowance dated Dec. 24, 2021.
- U.S. Appl. No. 16/296,087, filed Mar. 7, 2019 Notice of Allowance dated Mar. 8, 2022.
- U.S. Appl. No. 16/490,023, filed Aug. 29, 2019 Notice of Allowance dated Mar. 14, 2022.
- U.S. Appl. No. 16/867,349, filed May 5, 2020 Non-Final Office Action dated Jun. 16, 2022.
- U.S. Appl. No. 16/868,461, filed May 6, 2020 Final Office Action dated May 25, 2022.
- U.S. Appl. No. 16/868,461, filed May 6, 2020 Non-Final Office Action dated Feb. 15, 2022.
- U.S. Appl. No. 16/996,769, filed Aug. 18, 2020 Non-Final Office Action dated Mar. 2, 2022.
- U.S. Appl. No. 16/996,769, filed Aug. 18, 2020 Notice of Allowance dated Jun. 13, 2022.
- EP 20855351.1 filed Mar. 7, 2022 Extended European Search Report dated Sep. 7, 2023.
- U.S. Appl. No. 16/867,349, filed May 5, 2020 Non-Final Office Action dated Jul. 20, 2023.
- U.S. Appl. No. 16/902,031, filed Jun. 15, 2020 Final Office Action dated Aug. 18, 2023.
- U.S. Appl. No. 17/471,051, filed Sep. 9, 2021 Final Office Action dated Aug. 23, 2023.
- U.S. Appl. No. 17/493,806, filed Oct. 4, 2021 Non-Final Office Action dated Jul. 31, 2023.
- U.S. Appl. No. 17/863,179, filed Jul. 12, 2022 Advisory Action dated Aug. 23, 2023.
- U.S. Appl. No. 18/094,917, filed Jan. 9, 2023 Notice of Allowance dated Sep. 13, 2023.
- U.S. Appl. No. 16/696,844, filed Nov. 26, 2019 Notice of Allowance dated Apr. 17, 2023.
- U.S. Appl. No. 16/867,349, filed May 5, 2020 Advisory Action dated Mar. 13, 2023.
- U.S. Appl. No. 16/868,461, filed May 6, 2020 Examiner’s Answer dated Jan. 31, 2023.
- U.S. Appl. No. 17/353,602, filed Jun. 21, 2021 Non-Final Office Action dated Mar. 30, 2023.
- U.S. Appl. No. 17/471,051, filed Sep. 9, 2021 Non-Final Office Action dated May 24, 2023.
- U.S. Appl. No. 17/863,179, filed Jul. 12, 2022 Final Office Action dated Jun. 14, 2023.
- U.S. Appl. No. 18/094,917, filed Jan. 9, 2023 Non-Final Office Action dated Jun. 8, 2023.
- U.S. Appl. No. 15/154,384, filed May 13, 2016 Notice of Allowance dated Apr. 29, 2021.
- U.S. Appl. No. 15/862,380, filed Jan. 4, 2018 Notice of Allowance dated Jun. 16, 2021.
- U.S. Appl. No. 16/296,087, filed Mar. 7, 2019 Final Office Action dated Sep. 10, 2021.
- U.S. Appl. No. 16/389,719, filed Apr. 19, 2019 Final Office Action dated Jun. 14, 2021.
- U.S. Appl. No. 16/450,800, filed Jun. 24, 2019 Non-Final Office Action dated Jul. 9, 2021.
- U.S. Appl. No. 16/490,023, filed Aug. 29, 2019 Restriction Requirement dated May 4, 2021.
- U.S. Appl. No. 16/529,622, filed Aug. 1, 2019 Non-Final Office Action dated May 7, 2021.
- U.S. Appl. No. 16/529,622, filed Aug. 1, 2019 Notice of Allowance dated Aug. 23, 2021.
- U.S. Appl. No. 29/654,521, filed Jun. 25, 2018 Restriction Requirement dated Apr. 8, 2020.

(56)

**References Cited**

## OTHER PUBLICATIONS

U.S. Appl. No. 29/654,527, filed Jun. 25, 2018 Notice of Allowability dated Sep. 30, 2020.

U.S. Appl. No. 29/654,527, filed Jun. 25, 2018 Notice of Allowance dated Aug. 18, 2020.

U.S. Appl. No. 29/654,527, filed Jun. 25, 2018 Restriction Requirement dated Mar. 10, 2020.

U.S. Appl. No. 29/658,136, filed Jul. 27, 2018 Non-Final Office Action dated Sep. 9, 2020.

U.S. Appl. No. 29/658,136, filed Jul. 27, 2018 Restriction Requirement dated May 11, 2020.

Waltimire, B. and Rasor, J.S., Midline catheter: Virtually bloodless insertion technique and needle safety tube minimize potential for transmission of bloodborne disease. Sponsored by national Foundation for Infectious Diseases. 5th National forum on AIDS, Hepatitis, and other blood-borne diseases. Atlanta, GA, Mar. 1992.

U.S. Appl. No. 14/866,738, filed Sep. 25, 2015 Non-Final Office Action dated Oct. 31, 2016.

U.S. Appl. No. 14/866,738, filed Sep. 25, 2015 Notice of Allowance dated Sep. 24, 2020.

U.S. Appl. No. 14/866,738, filed Sep. 25, 2015 Notice of Panel Decision dated Jun. 23, 2017.

U.S. Appl. No. 14/866,738, filed Sep. 25, 2015 Patent Board Decision dated Jul. 13, 2020.

U.S. Appl. No. 14/876,735, filed Oct. 6, 2015 Non-Final Office Action dated Mar. 30, 2017.

U.S. Appl. No. 15/154,384, filed May 13, 2016 Final Office Action dated Dec. 24, 2020.

U.S. Appl. No. 15/154,384, filed May 13, 2016 Final Office Action dated Nov. 27, 2019.

U.S. Appl. No. 15/154,384, filed May 13, 2016 Non-Final Office Action dated Jun. 26, 2020.

U.S. Appl. No. 15/154,384, filed May 13, 2016 Non-Final Office Action dated Jun. 28, 2019.

U.S. Appl. No. 15/154,384, filed May 13, 2016 Restriction Requirement dated Jan. 25, 2019.

U.S. Appl. No. 15/154,808, filed May 13, 2016 Advisory Action dated Oct. 26, 2018.

U.S. Appl. No. 15/154,808, filed May 13, 2016 Final Office Action dated Aug. 16, 2018.

U.S. Appl. No. 15/154,808, filed May 13, 2016 Non-Final Office Action dated Apr. 6, 2018.

U.S. Appl. No. 15/154,808, filed May 13, 2016 Notice of Allowance dated Apr. 16, 2019.

U.S. Appl. No. 15/154,808, filed May 13, 2016 Restriction Requirement dated Jan. 3, 2018.

U.S. Appl. No. 15/377,880, filed Dec. 13, 2016 Final Office Action dated Oct. 19, 2018.

U.S. Appl. No. 15/377,880, filed Dec. 13, 2016 Non-Final Office Action dated May 14, 2018.

U.S. Appl. No. 15/481,773, filed Apr. 7, 2017 Final Office Action dated Jan. 10, 2019.

U.S. Appl. No. 15/481,773, filed Apr. 7, 2017 Non-Final Office Action dated Jun. 29, 2018.

U.S. Appl. No. 15/608,802, filed May 30, 2017 Non-Final Office Action dated Jun. 6, 2019.

U.S. Appl. No. 15/692,915, filed Aug. 31, 2017 Non-Final Office Action dated Jan. 29, 2018.

U.S. Appl. No. 15/702,537, filed Sep. 12, 2017 Final Office Action dated Mar. 8, 2019.

U.S. Appl. No. 15/702,537, filed Sep. 12, 2017 Non-Final Office Action dated Nov. 29, 2018.

U.S. Appl. No. 15/702,537, filed Sep. 12, 2017 Notice of Allowance dated Jul. 31, 2019.

U.S. Appl. No. 15/727,528, filed Oct. 6, 2017 Final Office Action dated Jan. 28, 2020.

U.S. Appl. No. 15/727,528, filed Oct. 6, 2017 Non-Final Office Action dated Sep. 20, 2019.

U.S. Appl. No. 15/727,528, filed Oct. 6, 2017 Restriction Requirement dated Aug. 7, 2019.

U.S. Appl. No. 15/727,528, filed Oct. 6, 2017 Notice of Allowance dated Mar. 27, 2020.

U.S. Appl. No. 15/862,380, filed Jan. 4, 2018 Final Office Action dated Oct. 26, 2020.

U.S. Appl. No. 15/862,380, filed Jan. 4, 2018 Non-Final Office Action dated Jul. 9, 2020.

U.S. Appl. No. 15/862,380, filed Jan. 4, 2018 Restriction Requirement dated Dec. 23, 2019.

U.S. Appl. No. 15/869,872, filed Jan. 12, 2018 Advisory Action dated Sep. 23, 2020.

U.S. Appl. No. 15/869,872, filed Jan. 12, 2018 Final Office Action dated Jun. 25, 2020.

U.S. Appl. No. 15/869,872, filed Jan. 12, 2018 Non-Final Office Action dated Apr. 10, 2020.

U.S. Appl. No. 15/951,931, filed Apr. 12, 2018 Non-Final Office Action dated Nov. 19, 2019.

U.S. Appl. No. 15/951,931, filed Apr. 12, 2018 Notice of Allowance dated Feb. 20, 2020.

U.S. Appl. No. 15/951,931, filed Apr. 12, 2018 Notice of Allowability dated Apr. 16, 2020.

U.S. Appl. No. 15/951,954, filed Apr. 12, 2018 Non-Final Office Action dated Nov. 4, 2019.

U.S. Appl. No. 15/951,954, filed Apr. 12, 2018 Notice of Allowance dated Feb. 23, 2020.

U.S. Appl. No. 15/951,954, filed Apr. 12, 2018 Notice of Allowability dated Apr. 7, 2020.

U.S. Appl. No. 16/138,523, filed Sep. 21, 2018 Notice of Allowance dated Mar. 26, 2020.

U.S. Appl. No. 16/292,076, filed Mar. 4, 2019 Non-Final Office Action dated Aug. 10, 2020.

U.S. Appl. No. 16/295,906, filed Mar. 7, 2019 Final Office Action dated Dec. 22, 2020.

U.S. Appl. No. 16/295,906, filed Mar. 7, 2019 Non-Final Office Action dated Sep. 4, 2020.

U.S. Appl. No. 29/536,043, filed Aug. 12, 2015 Final Office Action dated Mar. 26, 2018.

U.S. Appl. No. 29/536,043, filed Aug. 12, 2015 Non-Final Office Action dated Aug. 31, 2017.

U.S. Appl. No. 29/545,436, filed Nov. 12, 2015 Final Office Action dated Mar. 26, 2018.

U.S. Appl. No. 29/545,436, filed Nov. 12, 2015 Non-Final Office Action dated Sep. 12, 2017.

U.S. Appl. No. 29/654,521, filed Jun. 25, 2018 Notice of Allowability dated Sep. 30, 2020.

U.S. Appl. No. 29/654,521, filed Jun. 25, 2018 Notice of Allowance dated Aug. 17, 2020.

U.S. Appl. No. 14/044,623, filed Oct. 2, 2013 Notice of Allowance dated Nov. 6, 2014.

U.S. Appl. No. 14/099,050, filed Dec. 6, 2013 Advisory Action dated Jun. 1, 2017.

U.S. Appl. No. 14/099,050, filed Dec. 6, 2013 Final Office Action dated Jan. 30, 2017.

U.S. Appl. No. 14/099,050, filed Dec. 6, 2013 Non-Final Office Action dated Dec. 22, 2015.

U.S. Appl. No. 14/099,050, filed Dec. 6, 2013 Non-Final Office Action dated Jul. 19, 2016.

U.S. Appl. No. 14/099,050, filed Dec. 6, 2013 Notice of Allowance dated Sep. 14, 2017.

U.S. Appl. No. 14/099,050, filed Dec. 6, 2013 Notice of Panel Decision dated Aug. 1, 2017.

U.S. Appl. No. 14/167,149, filed Jan. 29, 2014 Non-Final Office Action dated Oct. 21, 2015.

U.S. Appl. No. 14/167,149, filed Jan. 29, 2014 Notice of Allowance dated Jul. 6, 2016.

U.S. Appl. No. 14/174,071, filed Feb. 6, 2014 Final Office Action dated Dec. 2, 2016.

U.S. Appl. No. 14/174,071, filed Feb. 6, 2014 Non-Final Office Action dated Jul. 29, 2016.

U.S. Appl. No. 14/174,071, filed Feb. 6, 2014 Non-Final Office Action dated Mar. 31, 2016.

U.S. Appl. No. 14/192,541, filed Feb. 27, 2014 Non-Final Office Action dated Jul. 20, 2016.

(56)

**References Cited**

## OTHER PUBLICATIONS

U.S. Appl. No. 14/192,541, filed Feb. 27, 2014 Notice of Allowance dated Dec. 6, 2016.

U.S. Appl. No. 14/192,541, filed Feb. 27, 2014 Notice of Corrected Allowability dated Mar. 8, 2017.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Advisory Action dated May 19, 2017.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Examiner's Answer dated Jun. 20, 2018.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Final Office Action dated Mar. 9, 2017.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Final Office Action dated Nov. 6, 2017.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Non-Final Office Action dated Nov. 16, 2016.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Notice of Allowance dated Aug. 19, 2020.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Panel Decision dated Jul. 14, 2017.

U.S. Appl. No. 14/250,093, filed Apr. 10, 2014 Patent Board Decision dated Jun. 8, 2020.

U.S. Appl. No. 14/477,717, filed Sep. 4, 2014, Notice of allowance dated Feb. 17, 2015.

U.S. Appl. No. 14/477,717, filed Sep. 4, 2014, Office action dated Dec. 18, 2014.

U.S. Appl. No. 14/585,800, filed Dec. 30, 2014 Final Office Action dated May 11, 2018.

U.S. Appl. No. 14/585,800, filed Dec. 30, 2014 Non-Final Office Action dated May 16, 2016.

U.S. Appl. No. 14/585,800, filed Dec. 30, 2014 Non-Final Office Action dated Nov. 29, 2016.

U.S. Appl. No. 14/585,800, filed Dec. 30, 2014 Non-Final Office Action dated Nov. 3, 2017.

U.S. Appl. No. 14/585,800, filed Dec. 30, 2014 Non-Final Office Action dated Oct. 8, 2015.

U.S. Appl. No. 14/585,800, filed Dec. 30, 2014 Notice of Allowance dated Feb. 25, 2019.

U.S. Appl. No. 14/585,800, filed Dec. 30, 2014 Notice of Allowance dated Jul. 3, 2017.

U.S. Appl. No. 14/702,580, filed May 1, 2015 Advisory Action dated Nov. 13, 2017.

U.S. Appl. No. 14/702,580, filed May 1, 2015 Final Office Action dated Sep. 1, 2017.

U.S. Appl. No. 14/702,580, filed May 1, 2015 Non-Final Office Action dated May 3, 2017.

U.S. Appl. No. 14/702,580, filed May 1, 2015 Notice of Allowance dated Dec. 8, 2017.

U.S. Appl. No. 14/750,658, filed Jun. 25, 2016 Non-Final Office Action dated Mar. 9, 2017.

U.S. Appl. No. 14/750,658, filed Jun. 25, 2016 Notice of Allowance dated Jul. 20, 2017.

U.S. Appl. No. 14/846,387, filed Sep. 4, 2015 Advisory Action dated May 10, 2018.

U.S. Appl. No. 14/846,387, filed Sep. 4, 2015 Final Office Action dated Mar. 22, 2018.

U.S. Appl. No. 14/846,387, filed Sep. 4, 2015 Non-Final Office Action dated Sep. 22, 2017.

U.S. Appl. No. 14/846,387, filed Sep. 4, 2015 Notice of Allowance dated Oct. 29, 2018.

U.S. Appl. No. 14/866,441, filed Sep. 25, 2015 Advisory Action dated Dec. 22, 2016.

U.S. Appl. No. 14/866,441, filed Sep. 25, 2015 Final Office Action dated Jun. 5, 2018.

U.S. Appl. No. 14/866,441, filed Sep. 25, 2015 Final Office Action dated Sep. 23, 2016.

U.S. Appl. No. 14/866,441, filed Sep. 25, 2015 Non-Final Office Action dated Apr. 7, 2017.

U.S. Appl. No. 14/866,441, filed Sep. 25, 2015 Non-Final Office Action dated Mar. 14, 2016.

U.S. Appl. No. 14/866,441, filed Sep. 25, 2015 Notice of Allowance dated Oct. 17, 2018.

U.S. Appl. No. 14/866,738, filed Sep. 25, 2015 Final Office Action dated Feb. 24, 2017.

U.S. Appl. No. 14/866,738, filed Sep. 25, 2015 Non-Final Office Action dated Nov. 6, 2017.

JP 2016-107046 filed May 30, 2016 Office Action dated Jul. 28, 2016.

JP 2016-107046 filed May 30, 2016 Office Action dated Nov. 7, 2017.

JP 2016-563441 filed Oct. 19, 2016 Office Action dated Jan. 25, 2019.

JP 2018-039302 filed Mar. 6, 2018 Office Action dated Feb. 20, 2019.

Menlo Care, Landmark® Midline Catheter Maintenance and Reference Guide (1993).

Menlo Care, Landmark® Midline Catheters Brochure, 1991.

Menlo Care, Landmark® Venous Access Device Insertion Instructions (1992).

Menlo Care, Landmark™ Aquavene® Catheters Brochure, 1992.

Menlo Care, Publications on Aquavene® Technology, Aug. 1992.

Notice of allowance dated Jan. 29, 2014 for U.S. Appl. No. 12/307,519.

Notice of allowance dated Jun. 10, 2015 for U.S. Appl. No. 11/577,491.

Office action dated Mar. 10, 2011 for U.S. Appl. No. 12/307,519.

Office action dated Mar. 15, 2011 for U.S. Appl. No. 11/577,491.

Office action dated Mar. 27, 2013 for U.S. Appl. No. 13/358,099.

Office action dated Aug. 2, 2010 for U.S. Appl. No. 11/577,491.

Office action dated Aug. 18, 2014 for U.S. Appl. No. 11/577,491.

Office action dated Oct. 25, 2010 for U.S. Appl. No. 12/307,519.

Office action dated Nov. 4, 2013 for U.S. Appl. No. 12/307,519.

Office action dated Mar. 12, 2015 for U.S. Appl. No. 11/577,491.

PCT/CN2017/075370 filed Mar. 1, 2017 International Search Report and Written Opinion dated Nov. 30, 2017.

PCT/US15/28950 filed May 1, 2015 International Search Report and Written Opinion dated Oct. 19, 2015.

PCT/US2008/062954 filed May 7, 2008 International search report and written opinion dated Jan. 16, 2009.

PCT/US2011/036530 filed May 13, 2011 International Search Report dated Oct. 6, 2011.

PCT/US2011/036530 filed May 13, 2011 Written Opinion of the International Searching Authority dated Oct. 6, 2011.

PCT/US2012/026618 International Preliminary Report on Patentability dated Aug. 27, 2013.

PCT/US2012/026618 International Search Report and Written Opinion dated Jun. 25, 2012.

PCT/US2013/073577 filed Dec. 6, 2013 International Search Report and Written Opinion dated Feb. 24, 2014.

PCT/US2014/013557 filed Jan. 29, 2014 International search report and written opinion dated Apr. 14, 2014.

PCT/US2015/048676 filed Sep. 4, 2015 International search report and written opinion dated Dec. 4, 2015.

PCT/US2016/032449 filed May 13, 2016 International Search Report and Written Opinion dated Oct. 5, 2016.

PCT/US2016/032534 filed May 13, 2016 International Search Report and Written Opinion dated Oct. 5, 2016.

PCT/US2017/051214 filed Sep. 12, 2017 International Search Report and Written Opinion dated Nov. 13, 2017.

PCT/US2019/021231 filed Mar. 7, 2019 International Search Report and Written Opinion, dated Jun. 27, 2019.

PR Newswire, Luther Medical Products, Inc. Receives Approval to Supply Improved Neonatal Product to Japan, Aug. 20, 1998.

Rasor, Julia S, Review of Catheter-related infection rates: comparison of conventional catheter materials with Aquavene®, JVAn vol. 1, No. 3, Spring 1991.

RU 2017141812 filed Nov. 30, 2017 Office Action dated Jan. 31, 2018.

SG 11201709185X filed Nov. 8, 2017 Office Action dated Oct. 5, 2018.

SG 11201709193S filed Nov. 8, 2017 Office Action dated Oct. 5, 2018.

(56)

**References Cited**

OTHER PUBLICATIONS

U.S. Appl. No. 12/598,053, filed Apr. 20, 2010 Notice of allowance dated Jan. 16, 2014.  
U.S. Appl. No. 12/598,053, filed Apr. 20, 2010 Office action dated Aug. 28, 2013.  
U.S. Appl. No. 12/598,053, filed Apr. 20, 2010 Office action dated Dec. 4, 2012.  
U.S. Appl. No. 12/598,053, filed Apr. 20, 2010 Office action dated May 8, 2013.  
U.S. Appl. No. 12/598,053, filed Apr. 20, 2010 Office action dated Oct. 24, 2013.  
U.S. Appl. No. 13/107,781, filed May 13, 2011 Final Office Action dated Jul. 18, 2014.  
U.S. Appl. No. 13/107,781, filed May 13, 2011 Non-Final Office Action dated Dec. 30, 2013.  
U.S. Appl. No. 13/405,096, filed Feb. 24, 2012 Advisory Action dated Apr. 18, 2014.  
U.S. Appl. No. 13/405,096, filed Feb. 24, 2012 Final Office Action dated Jan. 31, 2014.  
U.S. Appl. No. 13/405,096, filed Feb. 24, 2012 Non-Final Office Action dated Aug. 20, 2013.  
U.S. Appl. No. 13/405,096, filed Feb. 24, 2012 Non-Final Office Action dated Nov. 18, 2014.  
U.S. Appl. No. 13/405,096, filed Feb. 24, 2012 Notice of Allowance dated Mar. 11, 2015.  
PCT/US2020/046860 filed Aug. 18, 2020 International Search Report and Written Opinion dated Nov. 18, 2020.

U.S. Appl. No. 16/696,844, filed Nov. 26, 2019 Non-Final Office Action dated Aug. 1, 2022.  
U.S. Appl. No. 17/164,653, filed Feb. 1, 2021, Restriction Requirement dated Sep. 7, 2022.  
EP 24156803.9 filed May 12, 2022 Extended European Search Report dated Jun. 24, 2024.  
EP 24185948.7 filed Jul. 2, 2024 Extended European Search Report dated Oct. 4, 2024.  
PCT/US2019/021231 filed Oct. 6, 2020 Supplementary European Search Report dated May 28, 2021.  
PCT/US2024/031131 filed May 24, 2024 International Search Report and Written Opinion dated Sep. 20, 2024.  
U.S. Appl. No. 16/902,031, filed Jun. 15, 2020 Examiner's Answer dated Nov. 7, 2024.  
U.S. Appl. No. 16/902,031, filed Jun. 15, 2020 Final Office Action dated Apr. 26, 2024.  
U.S. Appl. No. 17/353,602, filed Jun. 21, 2021 Notice of Allowance dated Aug. 7, 2024.  
U.S. Appl. No. 17/877,502, filed Jul. 29, 2022 Final Office Action dated Nov. 7, 2024.  
U.S. Appl. No. 17/877,502, filed Jul. 29, 2022 Non-Final Office Action dated Apr. 16, 2024.  
U.S. Appl. No. 18/443,030, filed Feb. 15, 2024 Final Office Action dated Nov. 7, 2024.  
U.S. Appl. No. 18/443,030, filed Feb. 15, 2024 Non-Final Office Action dated Aug. 28, 2024.  
U.S. Appl. No. 29/757,781, filed Nov. 9, 2020 Restriction Requirement dated Oct. 17, 2024.

\* cited by examiner

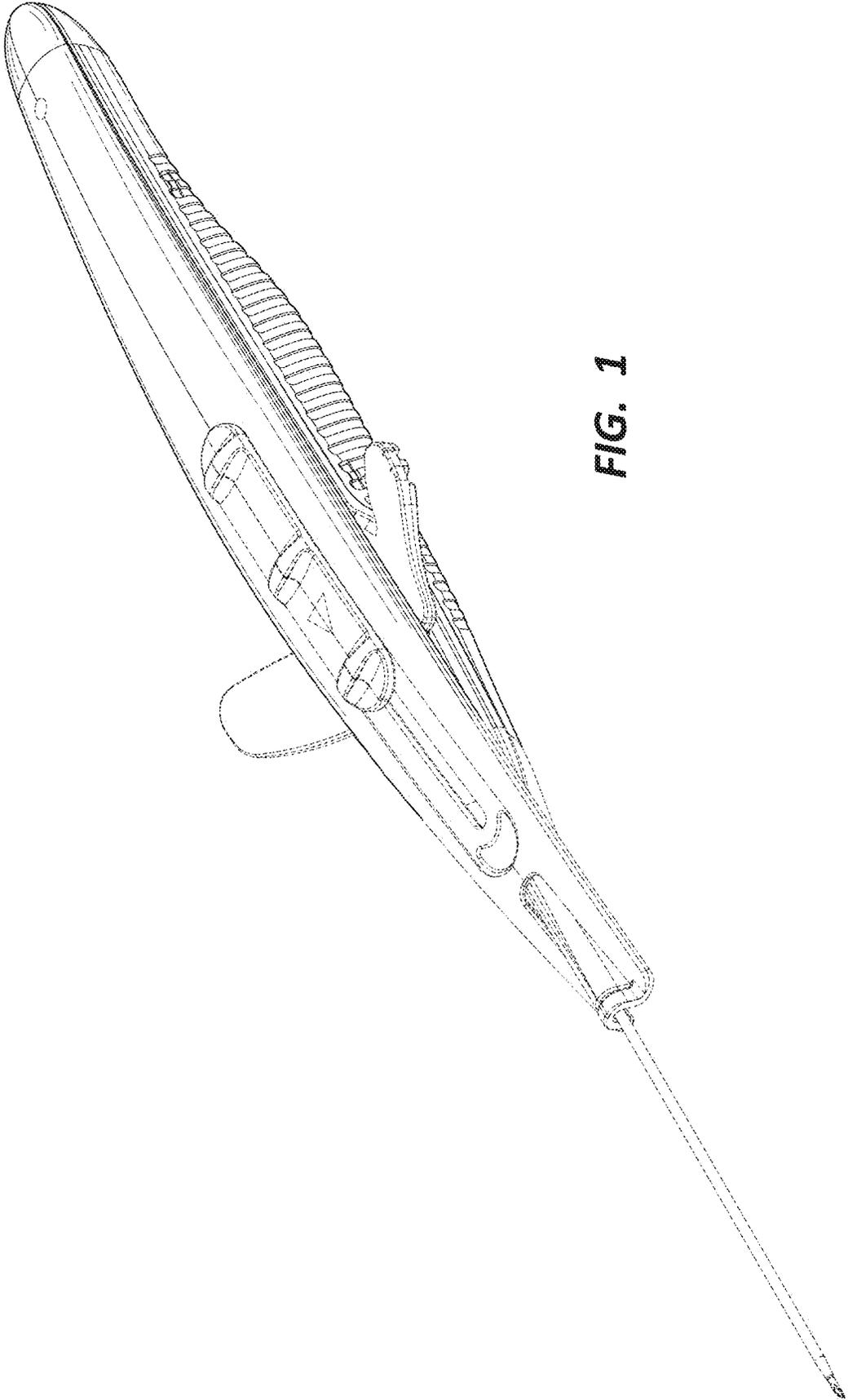


FIG. 1

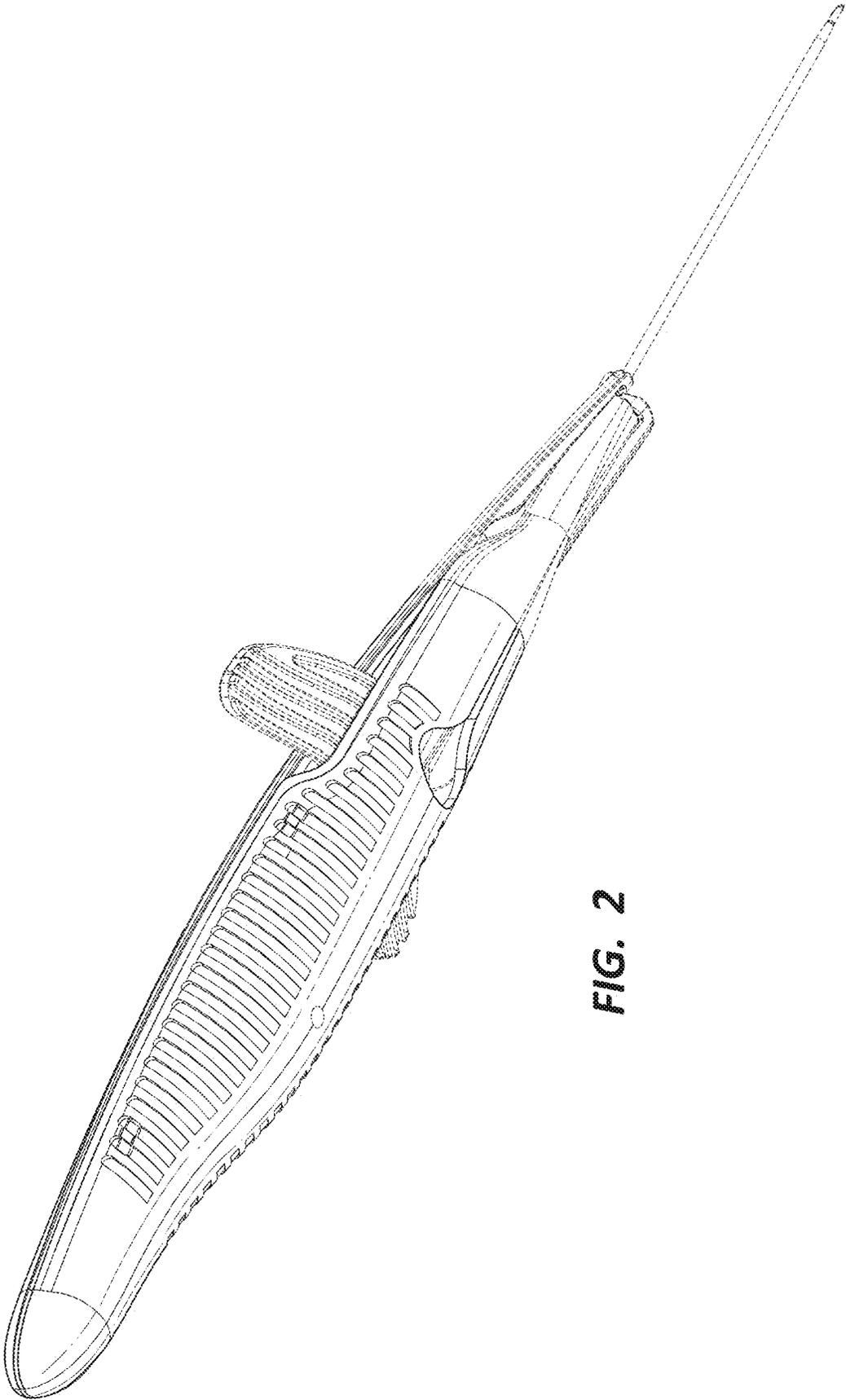


FIG. 2

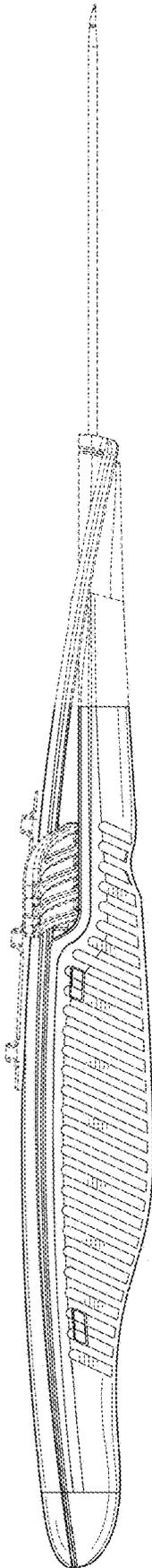


FIG. 3

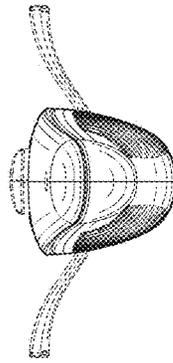


FIG. 6

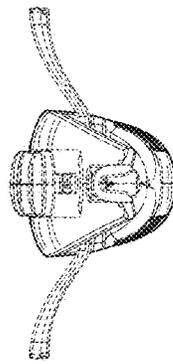


FIG. 5

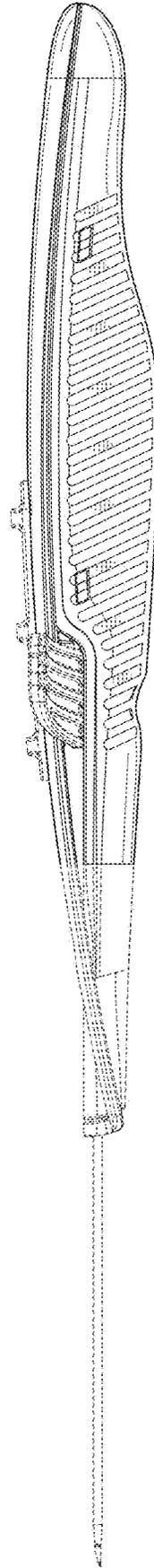


FIG. 4

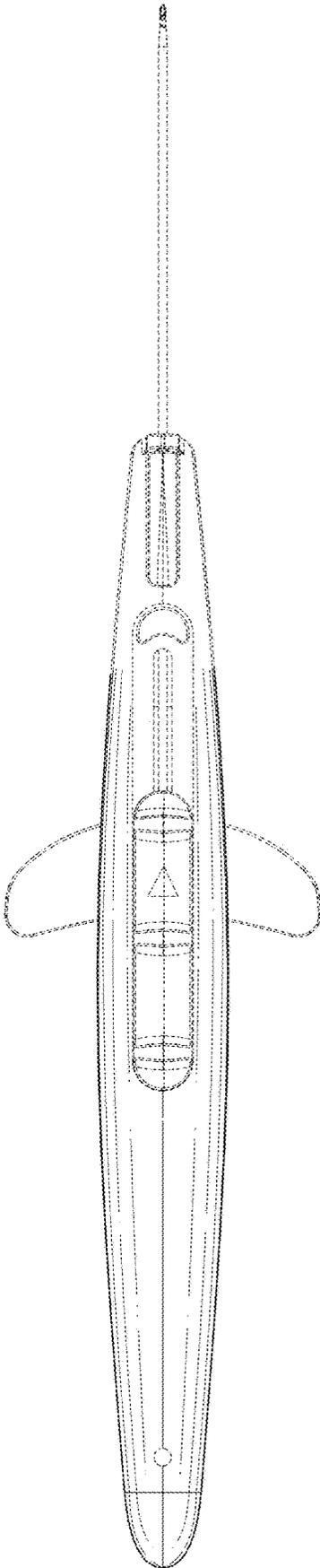


FIG. 7

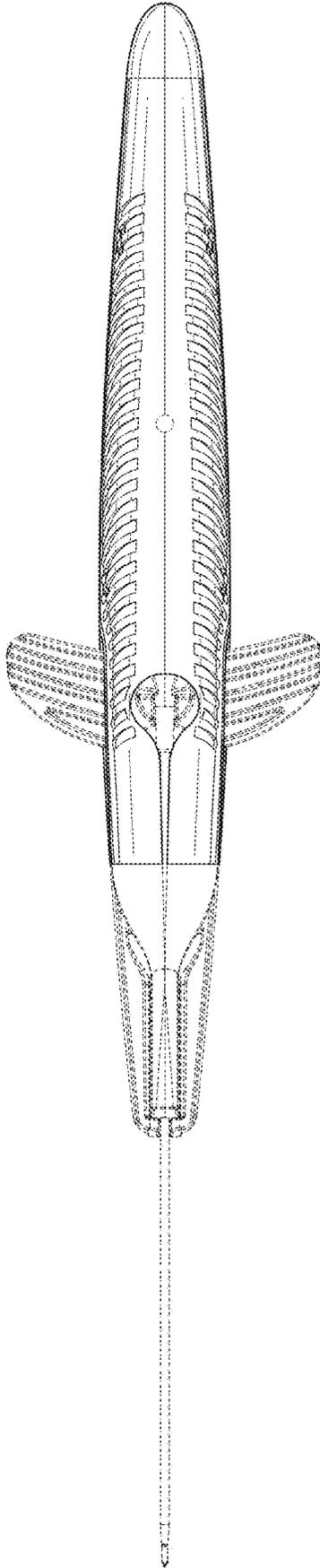


FIG. 8