

US00D793551S

(12) **United States Design Patent** (10) **Patent No.:** **US D793,551 S**  
**Nelson** (45) **Date of Patent:** **\*\* Aug. 1, 2017**

(54) **FLUID MANIFOLD**  
(71) Applicant: **ICU Medical, Inc.**, San Clemente, CA (US)  
(72) Inventor: **David Nelson**, Laguna Beach, CA (US)  
(73) Assignee: **ICU Medical, Inc.**, San Clemente, CA (US)

3,134,380 A 5/1964 Armao  
3,135,261 A 6/1964 Carroll  
3,171,412 A 3/1965 Braun  
3,176,021 A 3/1965 Volungis et al.  
3,191,655 A 6/1965 McCord  
3,193,154 A 7/1965 Bross et al.  
3,334,860 A 8/1967 Bolton, Jr.  
(Continued)

(\*\*) Term: **14 Years**  
(21) Appl. No.: **29/510,852**

CA 1 105 959 7/1981  
CA 2 149 725 11/1995  
(Continued)

(22) Filed: **Dec. 3, 2014**  
(51) **LOC (10) Cl.** ..... **24-02**  
(52) **U.S. Cl.**  
USPC ..... **D24/129**  
(58) **Field of Classification Search**  
USPC ..... D24/127-131, 112-114, 133, 186;  
606/181, 185; 604/264, 523-528, 272,  
604/187, 158, 164.01-164.11, 181, 184,  
604/227; 600/101, 139, 143;  
128/200.24, 207.14, 207.15  
CPC ..... A61M 25/00; A61M 39/00; A61M 27/00;  
A61M 25/0043; A61M 25/0067; A61M  
25/0097; A61F 2/958  
See application file for complete search history.

FOREIGN PATENT DOCUMENTS

OTHER PUBLICATIONS

U.S. Appl. No. 29/510,852, Dec. 3, 2014, Nelson.  
(Continued)

*Primary Examiner* — David Muller  
(74) *Attorney, Agent, or Firm* — Knobbe, Martens, Olson & Bear, LLP

(57) **CLAIM**

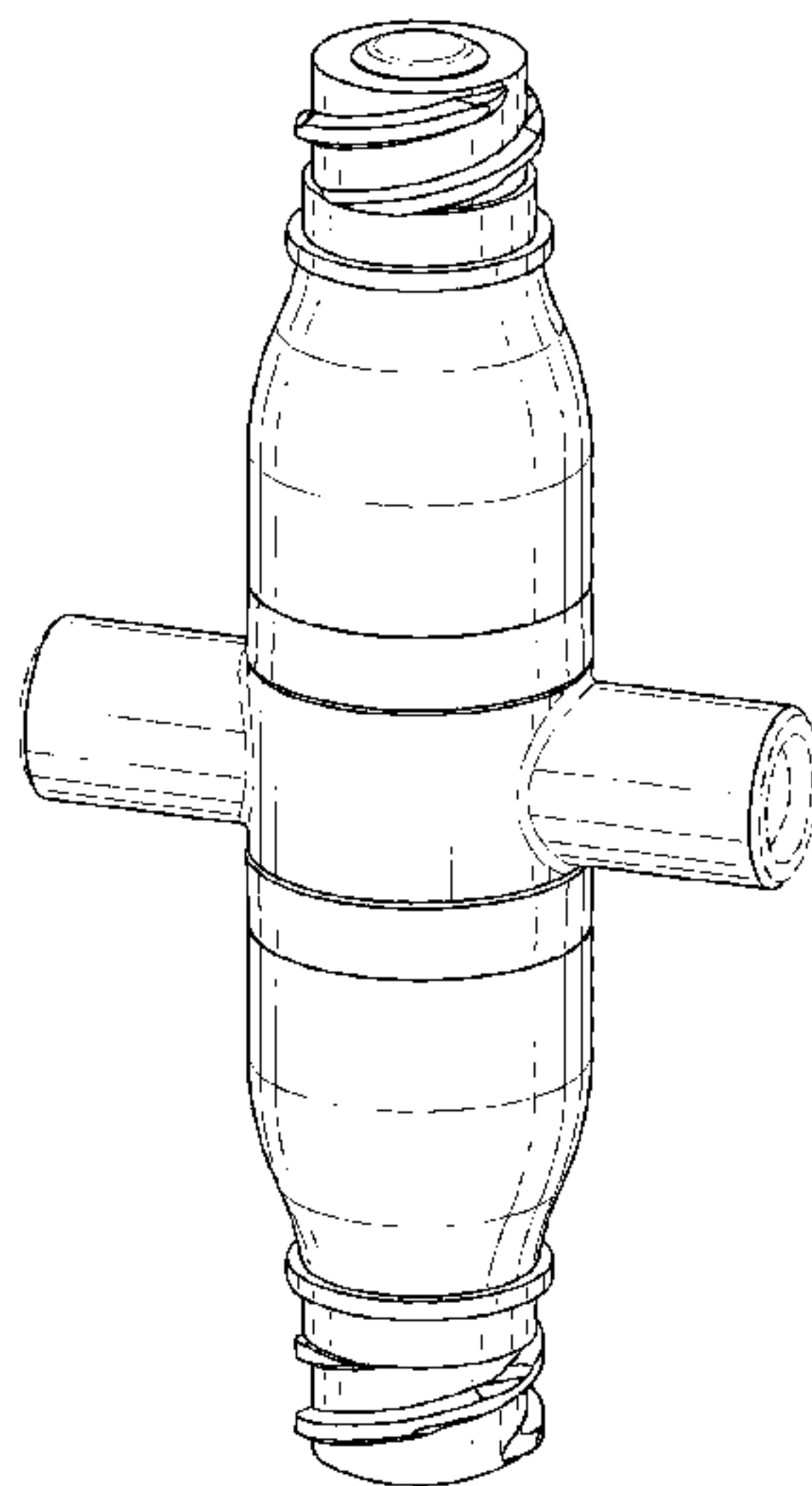
The ornamental design for a fluid manifold, as shown and described.

**DESCRIPTION**

FIG. 1 is a front perspective view of a fluid manifold showing my new design;  
FIG. 2 is a front elevational view thereof;  
FIG. 3 is a rear elevational view thereof;  
FIG. 4 is a right side elevational view thereof;  
FIG. 5 is a left side elevational view thereof;  
FIG. 6 is a top plan view thereof; and,  
FIG. 7 is a bottom plan view thereof.  
The broken line showing of parts of the drawings is included for the purpose of illustrating use and environment and forms no part of the claimed design.

(56) **References Cited**  
U.S. PATENT DOCUMENTS  
274,447 A 3/1883 Kennish  
1,578,517 A 3/1926 Hein  
1,923,501 A 8/1933 Perry  
2,210,098 A 8/1940 Ravenscroft  
2,289,677 A 7/1942 Perelson  
2,577,780 A 12/1951 Lockhart  
2,756,282 A 7/1956 Deane  
2,756,740 A 7/1956 Deane  
2,809,665 A 10/1957 Crowe  
2,847,995 A 8/1958 Adams  
2,999,499 A 9/1961 Willet

**1 Claim, 3 Drawing Sheets**



(56)

References Cited

U.S. PATENT DOCUMENTS

3,352,531 A	11/1967	Kilmarx	4,457,749 A	7/1984	Bellotti et al.
3,354,881 A	11/1967	Bloch	4,483,368 A	11/1984	Panthofer
3,385,301 A	5/1968	Harautuneian	4,508,367 A	4/1985	Oreopoulos et al.
3,502,097 A	3/1970	Muller	4,511,359 A	4/1985	Vaillancourt
3,534,771 A	10/1970	Eyerdam et al.	4,512,766 A	4/1985	Vaillancourt
3,570,484 A	3/1971	Steer et al.	4,556,086 A	12/1985	Raines
3,630,199 A	12/1971	Gangarosa	4,564,054 A	1/1986	Gustavsson
3,648,684 A	3/1972	Barnwell et al.	4,566,480 A	1/1986	Parham
3,659,602 A	5/1972	Cloyd	4,592,356 A	6/1986	Gutierrez
3,717,174 A	2/1973	Dewall	4,607,868 A	8/1986	Harvey et al.
3,726,282 A	4/1973	Patel	4,610,469 A	9/1986	Wolff-Mooij
3,788,519 A	1/1974	Mengel	4,617,012 A	10/1986	Vaillancourt
3,830,241 A	8/1974	Dye et al.	4,619,640 A	10/1986	Poholsky et al.
3,831,629 A	8/1974	Mackal et al.	4,623,068 A	11/1986	Brown et al.
3,852,385 A	12/1974	Huggins	4,645,494 A	2/1987	Lee et al.
3,861,388 A	1/1975	Vaughn	4,666,429 A	5/1987	Stone
3,889,675 A	6/1975	Stewart	4,673,400 A	6/1987	Martin
3,896,853 A	7/1975	Bernhard	4,676,228 A	6/1987	Krasner et al.
3,965,910 A	6/1976	Fischer	4,683,916 A	8/1987	Raines
3,974,832 A	8/1976	Kruck	4,706,487 A	11/1987	Bandou et al.
3,976,063 A	8/1976	Henneman et al.	4,710,168 A	12/1987	Schwab et al.
3,976,073 A	8/1976	Quick et al.	4,725,267 A	2/1988	Vaillancourt
3,977,403 A	8/1976	Patel	4,730,635 A	3/1988	Linden
3,986,508 A	10/1976	Barrington	4,752,292 A	6/1988	Lopez et al.
3,993,063 A	11/1976	Larrabee	D296,592 S	7/1988	Wellenstam
3,994,293 A	11/1976	Ferro	4,758,224 A	7/1988	Siposs
4,005,710 A	2/1977	Zeddies et al.	4,759,756 A	7/1988	Forman et al.
4,019,512 A	4/1977	Tenczar	4,775,369 A	10/1988	Schwartz
4,022,205 A	5/1977	Tenczar	4,778,447 A	10/1988	Velde et al.
4,040,420 A	8/1977	Speer	4,778,453 A	10/1988	Lopez
4,076,285 A	2/1978	Martinez	4,781,702 A	11/1988	Herrli
4,079,738 A	3/1978	Dunn et al.	4,804,015 A	2/1989	Albinsson
4,080,965 A	3/1978	Phillips	D300,177 S	3/1989	Bellotti et al.
4,121,585 A	10/1978	Becker, Jr.	D300,361 S *	3/1989	Tokarz ..... D24/129
4,128,098 A	12/1978	Bloom et al.	4,810,241 A	3/1989	Rogers et al.
4,133,441 A	1/1979	Mittleman et al.	4,813,938 A	3/1989	Raulerson
4,143,853 A	3/1979	Abramson	4,819,684 A	4/1989	Zaugg et al.
4,149,535 A	4/1979	Volder	4,832,214 A	5/1989	Schrader et al.
4,161,949 A	7/1979	Thanawalla	4,834,664 A	5/1989	Lin
4,186,775 A	2/1980	Muroi	4,834,716 A	5/1989	Ogle, II
4,187,846 A	2/1980	Lolachi et al.	D303,013 S	8/1989	Konopka
4,191,183 A	3/1980	Mendelson	4,874,377 A	10/1989	Newgard et al.
4,198,983 A	4/1980	Becker et al.	4,878,897 A	11/1989	Katzin
4,200,096 A	4/1980	Charvin	4,880,414 A	11/1989	Whipple
4,214,779 A	7/1980	Losell	4,889,527 A	12/1989	Herrli
4,219,912 A	9/1980	Adams	4,915,687 A	4/1990	Sivert
4,243,034 A	1/1981	Brandt	4,917,668 A	4/1990	Haindl
4,257,416 A	3/1981	Prager	4,919,167 A	4/1990	Manska
D259,278 S	5/1981	McCaw et al.	4,928,212 A	5/1990	Benavides
4,294,249 A	10/1981	Sheehan et al.	4,934,657 A	6/1990	Dodson
4,294,250 A	10/1981	Dennehey	4,943,896 A	7/1990	Johnson
4,296,949 A	10/1981	Muetterties et al.	4,946,445 A	8/1990	Lynn
4,306,705 A	12/1981	Svensson	4,963,133 A	10/1990	Whipple
4,324,239 A	4/1982	Gordon et al.	4,964,855 A	10/1990	Todd et al.
4,328,802 A	5/1982	Curley et al.	4,966,199 A	10/1990	Ruschke
4,329,987 A	5/1982	Rogers et al.	4,969,883 A	11/1990	Gilbert et al.
4,334,551 A	6/1982	Pfister	D314,050 S	1/1991	Sone
4,338,933 A	7/1982	Bayard et al.	4,985,399 A	1/1991	Matsuda et al.
4,342,315 A	8/1982	Jackson	4,987,181 A	1/1991	Bichon et al.
4,346,703 A	8/1982	Dennehey et al.	4,991,413 A	2/1991	Arnalda
4,362,156 A	12/1982	Feller et al.	4,991,629 A	2/1991	Ernesto et al.
4,387,879 A	6/1983	Tauschinski	4,998,713 A	3/1991	Vaillancourt
RE31,315 E	7/1983	Jenkins et al.	4,998,927 A	3/1991	Vaillancourt
4,392,851 A	7/1983	Elias	5,006,114 A	4/1991	Rogers et al.
4,405,163 A	9/1983	Voges et al.	5,009,490 A	4/1991	Kouno et al.
4,405,312 A	9/1983	Gross et al.	5,018,532 A	5/1991	Etheredge, III
4,411,662 A	10/1983	Pearson	5,024,657 A	6/1991	Needham et al.
4,417,890 A	11/1983	Dennehey et al.	5,031,675 A	7/1991	Lindgren
4,421,296 A	12/1983	Stephens	5,041,087 A	8/1991	Loo et al.
4,429,856 A	2/1984	Jackson	5,046,456 A	9/1991	Heyman et al.
4,432,759 A	2/1984	Gross et al.	5,049,128 A	9/1991	Duquette
4,432,765 A	2/1984	Oscarsson	D321,250 S	10/1991	Jepson et al.
4,439,188 A	3/1984	Dennehey et al.	D321,251 S	10/1991	Jepson et al.
4,439,193 A	3/1984	Larkin	5,061,253 A	10/1991	Yoshida
4,449,693 A	5/1984	Gereg	5,064,416 A	11/1991	Newgard
			5,065,783 A	11/1991	Ogle, II
			5,071,411 A	12/1991	Hillstead
			5,098,385 A	3/1992	Walsh
			5,098,405 A	3/1992	Peterson et al.



(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,098,406 A	3/1992	Sawyer	5,456,676 A	10/1995	Nelson et al.
5,100,394 A	3/1992	Dudar et al.	5,462,255 A	10/1995	Rosen et al.
5,108,380 A	4/1992	Herlitz et al.	5,470,319 A	11/1995	Mayer
5,114,408 A	5/1992	Fleischhaker et al.	5,474,544 A	12/1995	Lynn
5,116,361 A	5/1992	Kim et al.	5,480,393 A	1/1996	Bommarito
5,122,123 A	6/1992	Vaillancourt	5,487,731 A	1/1996	Denton
5,125,915 A	6/1992	Berry et al.	5,501,426 A	3/1996	Atkinson et al.
5,135,489 A	8/1992	Jepson et al.	5,501,526 A	3/1996	Asai et al.
5,137,524 A	8/1992	Lynn et al.	5,509,433 A	4/1996	Paradis
5,147,333 A	9/1992	Raines	5,514,116 A	5/1996	Vaillancourt et al.
5,154,703 A	10/1992	Bonaldo	5,520,665 A	5/1996	Fleetwood
5,158,554 A	10/1992	Jepson et al.	5,522,804 A	6/1996	Lynn
5,163,922 A	11/1992	McElveen, Jr. et al.	5,533,708 A	7/1996	Atkinson et al.
5,167,238 A	12/1992	Newman	5,533,996 A	7/1996	Murphey et al.
5,167,636 A	12/1992	Clement	5,535,771 A	7/1996	Purdy et al.
5,171,234 A	12/1992	Jepson et al.	5,535,785 A	7/1996	Werge et al.
5,180,761 A	1/1993	Shiao	5,540,661 A	7/1996	Tomisaka et al.
5,188,620 A	2/1993	Jepson et al.	5,549,566 A	8/1996	Elias et al.
5,190,067 A	3/1993	Paradis et al.	5,549,577 A	8/1996	Siegel et al.
5,199,947 A	4/1993	Lopez et al.	5,549,651 A	8/1996	Lynn
5,201,717 A	4/1993	Wyatt et al.	5,555,908 A	9/1996	Edwards et al.
5,201,722 A	4/1993	Moorehead et al.	5,556,388 A	9/1996	Johlin, Jr.
5,203,775 A	4/1993	Frank et al.	5,562,632 A	10/1996	Davila et al.
5,211,638 A	5/1993	Dudar et al.	5,569,235 A	10/1996	Ross et al.
5,215,538 A	6/1993	Larkin	5,573,516 A	11/1996	Tyner
5,221,271 A	6/1993	Nicholson et al.	5,577,706 A	11/1996	King
5,224,515 A	7/1993	Foster et al.	5,578,059 A	11/1996	Patzer
5,242,393 A	9/1993	Brimhall et al.	5,597,536 A	1/1997	Mayer
5,242,423 A	9/1993	Goodsir et al.	5,603,706 A	2/1997	Wyatt et al.
5,242,425 A	9/1993	White et al.	5,609,584 A	3/1997	Gettig et al.
5,242,432 A	9/1993	DeFrank	5,616,129 A	4/1997	Mayer
5,251,873 A	10/1993	Atkinson et al.	5,616,130 A	4/1997	Mayer
5,253,842 A	10/1993	Huebscher et al.	5,617,897 A	4/1997	Myers
5,255,676 A	10/1993	Russo	5,620,424 A	4/1997	Abramson
5,256,155 A	10/1993	Yerlikaya et al.	5,620,434 A	4/1997	Brony
5,267,966 A	12/1993	Paul	5,624,414 A	4/1997	Boettger
5,269,771 A	12/1993	Thomas et al.	5,632,735 A	5/1997	Wyatt et al.
5,273,533 A	12/1993	Bonaldo	5,639,810 A	6/1997	Smith, III et al.
5,280,876 A	1/1994	Atkins	5,660,205 A	8/1997	Epstein
5,284,475 A	2/1994	Mackal	5,669,891 A	9/1997	Vaillancourt
5,290,254 A	3/1994	Vaillancourt	5,674,206 A	10/1997	Allton et al.
5,292,308 A	3/1994	Ryan	5,676,346 A	10/1997	Leinsing
5,293,902 A	3/1994	Lapierie	5,685,866 A	11/1997	Lopez
5,295,657 A	3/1994	Atkinson	5,690,612 A	11/1997	Lopez et al.
5,295,658 A	3/1994	Atkinson et al.	5,690,865 A	11/1997	Kindt-Larsen et al.
5,301,686 A	4/1994	Newman	5,694,686 A	12/1997	Lopez
5,306,265 A	4/1994	Ragazzi	5,695,466 A	12/1997	Lopez et al.
5,312,083 A	5/1994	Ekman	5,699,821 A	12/1997	Paradis
5,312,377 A	5/1994	Dalhon	5,700,248 A	12/1997	Lopez
5,322,518 A	6/1994	Schneider	5,728,751 A	3/1998	Patnaik
5,324,270 A	6/1994	Kayon et al.	5,730,418 A	3/1998	Feith et al.
5,336,192 A	8/1994	Palestrant	5,738,663 A	4/1998	Lopez
5,342,316 A	8/1994	Wallace	5,749,861 A	5/1998	Guala et al.
5,342,326 A	8/1994	Peppel et al.	5,769,825 A	6/1998	Lynn
5,344,414 A	9/1994	Lopez et al.	5,775,671 A	7/1998	Cote, Sr.
5,348,542 A	9/1994	Ellis	5,776,113 A	7/1998	Daugherty et al.
5,353,837 A	10/1994	Faust	5,782,816 A	7/1998	Werschmidt et al.
5,356,396 A	10/1994	Wyatt et al.	5,788,215 A	8/1998	Ryan
5,360,413 A	11/1994	Leason et al.	5,797,897 A	8/1998	Jepson et al.
5,380,306 A	1/1995	Brinon	5,806,551 A	9/1998	Meloul et al.
5,389,086 A	2/1995	Attermeier et al.	5,806,831 A	9/1998	Paradis
5,395,348 A	3/1995	Ryan	5,807,348 A	9/1998	Zinger et al.
5,398,530 A	3/1995	Derman	5,817,068 A	10/1998	Urrutia
5,401,245 A	3/1995	Haining	5,817,069 A	10/1998	Arnett
5,402,826 A	4/1995	Molnar et al.	5,820,601 A	10/1998	Mayer
5,402,982 A	4/1995	Atkinson et al.	5,833,213 A	11/1998	Ryan
5,407,437 A	4/1995	Heimreid	5,836,923 A	11/1998	Mayer
5,409,471 A	4/1995	Atkinson et al.	5,839,715 A	11/1998	Leinsing
5,411,483 A	5/1995	Loomas et al.	5,843,046 A	12/1998	Motisi et al.
5,411,499 A	5/1995	Dudar et al.	5,846,233 A	12/1998	Lilley et al.
5,417,673 A	5/1995	Gordon	5,865,807 A	2/1999	Blake, III
5,439,451 A	8/1995	Collinson et al.	5,873,862 A	2/1999	Lopez
5,439,452 A	8/1995	McCarty	5,882,348 A	3/1999	Winterton et al.
5,441,487 A	8/1995	Vedder	5,899,888 A	5/1999	Jepson et al.
5,442,941 A	8/1995	Kahonan et al.	5,901,942 A	5/1999	Lopez
			5,911,710 A	6/1999	Barry et al.
			5,928,204 A	7/1999	Lopez
			5,935,620 A	8/1999	Baudin
			5,947,954 A	9/1999	Bonaldo



(56)

References Cited

U.S. PATENT DOCUMENTS

5,954,313 A	9/1999	Ryan	6,755,391 B2	6/2004	Newton et al.
5,957,898 A	9/1999	Jepson et al.	6,758,833 B2	7/2004	Lopez
5,967,490 A	10/1999	Pike	6,783,709 B2	8/2004	Harreld et al.
5,979,868 A	11/1999	Wu et al.	6,802,490 B2	10/2004	Leinsing
6,009,902 A	1/2000	Troiani et al.	6,808,161 B1	10/2004	Hishikawa
6,019,748 A	2/2000	Lopez	6,840,501 B2	1/2005	Doyle
6,029,946 A	2/2000	Doyle	6,848,139 B2	2/2005	Simon et al.
6,036,171 A	3/2000	Weinheimer et al.	6,866,656 B2	3/2005	Tingey et al.
6,039,302 A	3/2000	Cote, Sr. et al.	6,869,426 B2	3/2005	Ganem
6,048,335 A	4/2000	Mayer	6,871,838 B2	3/2005	Raines et al.
6,050,978 A	4/2000	Orr et al.	6,883,778 B1	4/2005	Newton et al.
6,063,062 A	5/2000	Paradis	6,892,998 B2	5/2005	Newton
6,079,432 A	6/2000	Paradis	6,908,459 B2	6/2005	Harding et al.
6,089,541 A	7/2000	Weinheimer et al.	6,916,309 B2	7/2005	Fangrow, Jr.
6,099,511 A	8/2000	Devos et al.	6,932,795 B2	8/2005	Lopez et al.
6,113,068 A	9/2000	Ryan	6,964,406 B2	11/2005	Doyle
6,116,571 A	9/2000	Hettinger	6,991,215 B2	1/2006	Kiehne
6,117,114 A	9/2000	Paradis	6,994,315 B2	2/2006	Ryan et al.
6,132,403 A	10/2000	Lopez	6,997,917 B2	2/2006	Niedospial, Jr. et al.
6,132,404 A	10/2000	Lopez	7,014,169 B2	3/2006	Newton et al.
6,142,446 A	11/2000	Leinsing	7,025,744 B2	4/2006	Utterberg et al.
6,152,900 A	11/2000	Mayer	7,033,339 B1	4/2006	Lynn
6,162,206 A	12/2000	Bindokas et al.	7,037,302 B2	5/2006	Vaillancourt
6,162,251 A	12/2000	Kredovski	7,044,441 B2	5/2006	Doyle
6,168,137 B1	1/2001	Paradis	7,074,216 B2	7/2006	Fowles et al.
6,170,800 B1	1/2001	Meloul et al.	7,100,890 B2	9/2006	Cote et al.
6,171,287 B1	1/2001	Lynn	7,104,520 B2	9/2006	Leinsing et al.
6,177,037 B1	1/2001	Mayer	7,114,701 B2	10/2006	Peppel
6,183,448 B1	2/2001	Mayer	7,125,396 B2	10/2006	Leinsing et al.
6,189,859 B1	2/2001	Rohrbough et al.	7,140,592 B2	11/2006	Phillips et al.
D438,955 S *	3/2001	Rudzena ..... D24/121	7,184,825 B2	2/2007	Leinsing et al.
6,206,861 B1	3/2001	Mayer	D546,946 S *	7/2007	Blake ..... D24/129
6,210,624 B1	4/2001	Mayer	7,244,249 B2	7/2007	Leinsing et al.
6,213,996 B1	4/2001	Jepson et al.	7,252,652 B2	8/2007	Moorehead et al.
6,228,065 B1	5/2001	Lynn	7,264,859 B2	9/2007	Souns et al.
6,228,069 B1	5/2001	Barth et al.	D557,281 S	12/2007	Miller et al.
6,245,048 B1	6/2001	Fangrow et al.	D557,283 S	12/2007	Miller et al.
6,254,579 B1	7/2001	Cogger et al.	7,306,197 B2	12/2007	Parrino et al.
6,261,282 B1	7/2001	Jepson et al.	7,306,199 B2	12/2007	Leinsing et al.
6,261,630 B1	7/2001	Nazarova et al.	7,314,061 B2	1/2008	Peppel
6,279,783 B1	8/2001	Brown et al.	7,326,188 B1	2/2008	Russell et al.
6,290,206 B1	9/2001	Doyle	7,329,249 B2	2/2008	Bonaldo
6,299,131 B1	10/2001	Ryan	7,335,182 B1	2/2008	Hilaire
6,299,132 B1	10/2001	Weinheimer	7,357,792 B2	4/2008	Newton et al.
6,325,782 B1	12/2001	Lopez	D570,880 S	6/2008	Miller et al.
D454,637 S *	3/2002	Nestenborg ..... D24/112	7,396,348 B2	7/2008	Newton et al.
6,364,869 B1	4/2002	Bonaldo	7,422,369 B2	9/2008	Bergman et al.
6,428,520 B1	8/2002	Lopez et al.	7,470,261 B2	12/2008	Lynn
6,444,324 B1	9/2002	Yang et al.	7,470,262 B2	12/2008	Hiejima et al.
6,482,188 B1	11/2002	Rogers et al.	7,497,848 B2	3/2009	Leinsing et al.
D468,015 S *	12/2002	Horppu ..... D24/129	7,497,849 B2	3/2009	Fangrow, Jr.
D468,016 S	12/2002	Mosler et al.	7,510,545 B2	3/2009	Peppel
6,541,802 B2	4/2003	Doyle	7,520,489 B2	4/2009	Ruschke
6,543,745 B1	4/2003	Enerson	7,530,546 B2	5/2009	Ryan et al.
6,572,592 B1	6/2003	Lopez	7,533,696 B2 *	5/2009	Paul, Jr. .... A61M 25/00 137/843
6,585,229 B2	7/2003	Cote, Sr. et al.	7,556,060 B2	7/2009	Guala
6,595,964 B2	7/2003	Finley et al.	7,559,530 B2	7/2009	Korogi et al.
6,595,981 B2	7/2003	Huet	7,563,243 B2	7/2009	Mendels
6,599,273 B1	7/2003	Lopez	7,581,561 B2	9/2009	Funamara et al.
6,605,076 B1	8/2003	Jepson et al.	7,584,767 B2	9/2009	Funamura et al.
6,609,696 B2	8/2003	Enerson	7,588,563 B2	9/2009	Guala
6,635,044 B2	10/2003	Lopez	7,591,449 B2	9/2009	Raines et al.
6,651,956 B2	11/2003	Miller	7,601,141 B2	10/2009	Dikeman et al.
6,656,517 B2	12/2003	Michal et al.	7,615,035 B2	11/2009	Peppel
6,669,673 B2	12/2003	Lopez	7,624,749 B2	12/2009	Guala
6,669,681 B2	12/2003	Jepson et al.	7,628,774 B2	12/2009	Fangrow, Jr.
6,673,053 B2	1/2004	Wang et al.	7,645,274 B2	1/2010	Whitley
6,682,509 B2	1/2004	Lopez	7,651,481 B2	1/2010	Raybuck
6,689,109 B2	2/2004	Lynn	7,666,170 B2	2/2010	Guala
6,695,817 B1	2/2004	Fangrow, Jr.	7,673,653 B2	3/2010	Mijers et al.
6,706,022 B1	3/2004	Leinsing et al.	7,703,486 B2	4/2010	Costanzo
6,712,791 B2	3/2004	Lui et al.	7,713,250 B2	5/2010	Harding et al.
6,727,294 B2	4/2004	Kanayama et al.	7,717,882 B2	5/2010	Harding
6,740,063 B2	5/2004	Lynn	7,717,886 B2	5/2010	Lopez
6,745,998 B2	6/2004	Doyle	7,743,799 B2	6/2010	Mosler et al.
			7,753,338 B2	7/2010	Desecki
			7,753,892 B2	7/2010	Newton et al.
			7,758,566 B2	7/2010	Simpson et al.



(56)

References Cited

U.S. PATENT DOCUMENTS

7,763,013 B2	7/2010	Baldwin et al.	8,221,391 B2	7/2012	Fangrow, Jr.
7,763,199 B2	7/2010	Fangrow	8,241,268 B2	8/2012	Whitley
7,771,383 B2	8/2010	Truitt et al.	8,277,424 B2	10/2012	Pan
7,784,766 B2	8/2010	Guala	8,286,657 B2	10/2012	Belley et al.
7,815,168 B2	10/2010	Vangsness et al.	8,286,936 B2	10/2012	Kitani et al.
7,824,393 B2	11/2010	Fangrow, Jr.	8,287,518 B2	10/2012	Kitani et al.
7,837,658 B2	11/2010	Cote, Sr. et al.	8,298,195 B2	10/2012	Peppel
7,841,581 B2	11/2010	Thorne, Jr. et al.	8,298,196 B1	10/2012	Mansour
7,842,026 B2	11/2010	Cahill et al.	8,337,483 B2	12/2012	Harding et al.
7,857,284 B2	12/2010	Kimball et al.	8,361,408 B2	1/2013	Lynn
7,857,285 B2	12/2010	Lee et al.	8,366,658 B2	2/2013	Davis et al.
7,857,802 B2	12/2010	Brandenburger et al.	8,366,676 B2	2/2013	Harding et al.
7,857,805 B2	12/2010	Raines	8,372,043 B2	2/2013	Grimm et al.
7,862,537 B2	1/2011	Zinger et al.	8,377,010 B2	2/2013	Harding et al.
7,867,204 B2	1/2011	Bartholomew et al.	8,382,741 B2	2/2013	Chelak
7,879,012 B2	2/2011	Kane et al.	8,398,598 B2	3/2013	Carlyon et al.
7,900,659 B2	3/2011	Whitley et al.	8,398,607 B2	3/2013	Fangrow, Jr.
7,905,873 B2	3/2011	Rondeau et al.	8,403,886 B2	3/2013	Bialecki et al.
7,909,056 B2	3/2011	Truitt et al.	8,403,894 B2	3/2013	Lynn et al.
7,914,502 B2	3/2011	Newton et al.	8,403,905 B2	3/2013	Yow
D638,933 S *	5/2011	Hill ..... D24/129	8,408,226 B2	4/2013	Raines et al.
7,947,032 B2	5/2011	Harding et al.	8,409,164 B2	4/2013	Fangrow
7,954,515 B2	6/2011	Gerst	8,409,165 B2	4/2013	Niedospial, Jr. et al.
7,975,722 B2	7/2011	Kiehne	8,414,542 B2	4/2013	Stroup
7,981,090 B2	7/2011	Plishka et al.	8,439,880 B2	5/2013	Rondeau
7,981,381 B2	7/2011	Lurvey et al.	8,444,628 B2	5/2013	Fangrow, Jr.
7,984,730 B2	7/2011	Ziv et al.	8,454,579 B2	6/2013	Fangrow, Jr.
D643,920 S *	8/2011	Gil Pascual ..... D24/130	8,529,524 B2	9/2013	Newton et al.
7,988,128 B2	8/2011	Wentling	8,628,515 B2	1/2014	Fangrow, Jr.
7,993,328 B2	8/2011	Whitley	8,636,720 B2	1/2014	Truitt et al.
7,998,134 B2	8/2011	Fangrow et al.	8,640,725 B2	2/2014	Truitt et al.
8,006,953 B2	8/2011	Bennett	8,671,964 B2	3/2014	Py
D644,731 S	9/2011	Fangrow, Jr.	8,679,090 B2	3/2014	Anderson et al.
8,015,990 B2	9/2011	Pascal et al.	8,684,994 B2	4/2014	Lev et al.
8,021,354 B2	9/2011	Huang	8,701,696 B2	4/2014	Guala
8,034,021 B2	10/2011	Mendels	8,702,675 B2	4/2014	Imai
8,034,035 B2	10/2011	Weaver et al.	8,715,222 B2	5/2014	Truitt et al.
8,038,663 B2	10/2011	Miner	8,715,247 B2	5/2014	Mansour et al.
8,042,838 B2	10/2011	Buckler et al.	8,721,627 B2	5/2014	Alpert
8,048,038 B2	11/2011	Guala	D707,355 S *	6/2014	Bow ..... D24/129
8,062,266 B2	11/2011	McKinnon et al.	8,747,370 B2	6/2014	Feith et al.
8,062,267 B2	11/2011	McKinnon et al.	8,758,306 B2	6/2014	Lopez et al.
8,062,280 B2	11/2011	Jepson et al.	8,801,678 B2	8/2014	Panian et al.
8,066,648 B1	11/2011	Mark	8,834,432 B2	9/2014	Winsor et al.
8,066,669 B2	11/2011	Christensen et al.	8,840,577 B1	9/2014	Zollinger et al.
8,066,670 B2	11/2011	Cluff et al.	8,864,725 B2	10/2014	Ranalletta et al.
8,070,189 B2	12/2011	Yow et al.	8,870,846 B2	10/2014	Davis et al.
8,070,725 B2	12/2011	Christensen	8,876,784 B2	11/2014	Cote, Sr. et al.
8,074,964 B2	12/2011	Mansour et al.	8,882,742 B2	11/2014	Dikeman et al.
8,096,525 B2	1/2012	Ryan	8,910,919 B2	12/2014	Bonnal et al.
8,100,868 B2	1/2012	Newton et al.	8,951,233 B2	2/2015	Mansour
8,100,869 B2	1/2012	Vangsness et al.	8,968,261 B2	3/2015	Kimball et al.
8,105,314 B2	1/2012	Fangrow	8,968,271 B2	3/2015	Guala
D654,166 S *	2/2012	Lair ..... D24/129	8,974,425 B2	3/2015	Tachizaki et al.
D655,000 S *	2/2012	Mirigian ..... D24/130	8,979,804 B2	3/2015	Ho et al.
8,123,738 B2	2/2012	Vaillancourt	9,017,295 B2	4/2015	Pan
8,133,209 B2	3/2012	Guala	9,032,997 B2	5/2015	Abura et al.
8,136,330 B2	3/2012	Ostler et al.	9,039,047 B2	5/2015	Imai
8,137,303 B2	3/2012	Stout et al.	9,044,585 B2	6/2015	Masuda et al.
8,142,403 B2	3/2012	Carlyon	9,061,130 B2	6/2015	Truitt et al.
8,152,790 B2	4/2012	Lopez et al.	9,067,049 B2	6/2015	Panian et al.
8,156,971 B2	4/2012	Costanzo	D734,456 S *	7/2015	Cromett ..... D24/129
8,162,006 B2	4/2012	Guala	9,089,680 B2	7/2015	Ueda et al.
8,162,013 B2	4/2012	Rosenquist et al.	9,089,681 B2	7/2015	Ueda et al.
8,162,914 B2	4/2012	Kraushaar et al.	9,089,682 B2	7/2015	Yeh et al.
8,167,863 B2	5/2012	Yow	D737,436 S *	8/2015	Lev ..... D24/129
8,172,823 B2	5/2012	Rondeau et al.	9,108,034 B2	8/2015	Winsor
8,177,760 B2	5/2012	Rome et al.	9,114,244 B2	8/2015	Yeh et al.
8,177,768 B2	5/2012	Leinsing	9,119,950 B2	9/2015	Mansour et al.
8,177,772 B2	5/2012	Christensen et al.	9,138,572 B2	9/2015	Zeytoonian et al.
8,182,452 B2	5/2012	Mansour et al.	9,144,672 B2	9/2015	Mansour et al.
8,197,452 B2	6/2012	Harding et al.	9,162,029 B2	10/2015	Zollinger
8,197,466 B2	6/2012	Yokota et al.	9,192,753 B2	11/2015	Lopez et al.
8,211,089 B2	7/2012	Winsor et al.	9,198,831 B2	12/2015	Rogers
8,221,363 B2	7/2012	Jepson	9,205,243 B2	12/2015	Lopez et al.
			9,212,772 B2	12/2015	Ho et al.
			9,220,882 B2	12/2015	Belley et al.
			9,234,616 B2	1/2016	Carrez et al.
			9,278,205 B2	3/2016	Quach et al.



(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,278,206	B2	3/2016	Fangrow et al.	2010/0270792	A1	10/2010	Lauer
9,289,588	B2	3/2016	Chen	2010/0283238	A1	11/2010	Deighan et al.
9,314,604	B2	4/2016	Bonnal et al.	2010/0292673	A1	11/2010	Korogi et al.
9,345,641	B2	5/2016	Krause et al.	2010/0292674	A1	11/2010	Jepson et al.
9,352,086	B2	5/2016	Guala	2010/0300556	A1	12/2010	Carmody et al.
9,370,466	B2	6/2016	Garfield et al.	2010/0324502	A1	12/2010	Guala
9,370,651	B2	6/2016	Zollinger et al.	2011/0004183	A1	1/2011	Carrez et al.
9,375,559	B2	6/2016	Feith et al.	2011/0024664	A1	2/2011	Burnard et al.
9,381,339	B2	7/2016	Wu et al.	2011/0028914	A1	2/2011	Mansour et al.
9,393,398	B2	7/2016	Truitt et al.	2011/0028915	A1	2/2011	Siopes et al.
9,409,007	B2	8/2016	Yeh	2011/0046572	A1	2/2011	Fangrow
9,421,354	B2	8/2016	Carmody et al.	2011/0048540	A1	3/2011	Stroup
9,433,708	B2	9/2016	Eddy	2011/0054440	A1	3/2011	Lewis
2001/0049508	A1	12/2001	Fangrow, Jr.	2011/0060293	A1	3/2011	Guala
2002/0120333	A1	8/2002	Keogh et al.	2011/0087164	A1	4/2011	Mosler et al.
2004/0006330	A1	1/2004	Fangrow, Jr.	2011/0106046	A1	5/2011	Hiranuma et al.
2005/0020981	A1	1/2005	Kurth	2011/0125104	A1	5/2011	Lynn
2005/0059952	A1	3/2005	Giuliano et al.	2011/0130717	A1	6/2011	David et al.
2005/0121638	A1	6/2005	Doyle	2011/0130724	A1	6/2011	Mansour et al.
2005/0222541	A1	10/2005	Lopez et al.	2011/0130726	A1	6/2011	Crawford et al.
2006/0004331	A1	1/2006	Fangrow, Jr.	2011/0130727	A1	6/2011	Crawford et al.
2006/0161115	A1	7/2006	Fangrow, Jr.	2011/0130728	A1	6/2011	McKinnon
2006/0200088	A1	9/2006	Lopez	2011/0152832	A1	6/2011	Foshee et al.
2006/0200089	A1	9/2006	Lopez et al.	2011/0166532	A1	7/2011	Brandenburger et al.
2006/0200090	A1	9/2006	Lopez et al.	2011/0178493	A1	7/2011	Okiyama
2006/0206061	A1	9/2006	Lopez et al.	2011/0257590	A1	10/2011	Winsor et al.
2006/0211997	A1	9/2006	Fangrow, Jr.	2011/0264037	A1	10/2011	Foshee et al.
2006/0211998	A1	9/2006	Fangrow, Jr.	2011/0266477	A1	11/2011	Stroup
2006/0211999	A1	9/2006	Fangrow, Jr.	2011/0275988	A1	11/2011	Davis et al.
2006/0212001	A1	9/2006	Fangrow, Jr.	2011/0276010	A1	11/2011	Davis et al.
2006/0212003	A1	9/2006	Fangrow, Jr.	2011/0276031	A1	11/2011	Hoang et al.
2006/0212006	A1	9/2006	Fangrow, Jr.	2011/0295235	A1	12/2011	Fangrow
2006/0224127	A1	10/2006	Fangrow, Jr.	2011/0306940	A1	12/2011	Miyasaka
2006/0264842	A1	11/2006	Fangrow, Jr.	2011/0319821	A1	12/2011	Kitani et al.
2006/0264844	A1	11/2006	Fangrow, Jr.	2011/0319859	A1	12/2011	Zeytoonian et al.
2006/0264849	A1	11/2006	Lopez et al.	2012/0013121	A1	1/2012	Weckstrom
2006/0264909	A1	11/2006	Fangrow, Jr.	2012/0022469	A1	1/2012	Alpert
2006/0264910	A1	11/2006	Fangrow, Jr.	2012/0042971	A1	2/2012	Py
2006/0270999	A1	11/2006	Fangrow, Jr.	2012/0046636	A1	2/2012	Kriheli
2006/0271016	A1	11/2006	Fangrow, Jr.	2012/0053529	A1	3/2012	Imai
2006/0276757	A1	12/2006	Fangrow, Jr.	2012/0059314	A1	3/2012	Eichhorst
2006/0276758	A1	12/2006	Fangrow, Jr.	2012/0059334	A1	3/2012	Pan
2007/0100284	A1	5/2007	Leinsing et al.	2012/0059346	A1	3/2012	Sheppard et al.
2007/0106205	A1	5/2007	Connell et al.	2012/0065626	A1	3/2012	Naftalovitz et al.
2007/0112312	A1	5/2007	Fangrow, Jr.	2012/0095407	A1	4/2012	Chebator et al.
2007/0112313	A1	5/2007	Fangrow, Jr.	2012/0109077	A1	5/2012	Ryan
2007/0224865	A1	9/2007	Fangrow, Jr.	2012/0130305	A1	5/2012	Bonnal et al.
2007/0225425	A1	9/2007	Nash et al.	2012/0130352	A1	5/2012	Naftalovitz et al.
2007/0235676	A1	10/2007	Vangsness et al.	2012/0150129	A1	6/2012	Jin et al.
2007/0254000	A1	11/2007	Guo et al.	2012/0153201	A1	6/2012	Larose et al.
2007/0270756	A1	11/2007	Peppel et al.	2012/0157928	A1	6/2012	Mermet
2008/0039802	A1	2/2008	Vangsness et al.	2012/0157933	A1	6/2012	Newton et al.
2008/0086097	A1	4/2008	Rasmussen et al.	2012/0179108	A1	7/2012	Delabie
2008/0086099	A1	4/2008	McKinnon et al.	2012/0192968	A1	8/2012	Bonnal et al.
2008/0097407	A1	4/2008	Plishka	2012/0209238	A1	8/2012	Rosenquist et al.
2008/0249508	A1	10/2008	Lopez et al.	2012/0215182	A1	8/2012	Mansour et al.
2009/0005761	A1	1/2009	Guala	2012/0220955	A1	8/2012	Maseda et al.
2009/0198209	A1	8/2009	Usher et al.	2012/0220977	A1	8/2012	Yow
2009/0209922	A1	8/2009	Boisjoly	2012/0220984	A1	8/2012	Christensen et al.
2009/0292252	A1	11/2009	Lareau et al.	2012/0245564	A1	9/2012	Tekeste et al.
2010/0030163	A1	2/2010	Carrez et al.	2012/0259292	A1	10/2012	Koehler
2010/0030164	A1	2/2010	Kimball et al.	2012/0316514	A1	12/2012	Mansour
2010/0036330	A1	2/2010	Plishka et al.	2012/0316536	A1	12/2012	Carrez et al.
2010/0059474	A1	3/2010	Brandenburger et al.	2012/0323063	A1	12/2012	Costanzo
2010/0059702	A1	3/2010	Mansour et al.	2012/0330277	A1	12/2012	Winsor et al.
2010/0063456	A1	3/2010	Rahimy et al.	2013/0012870	A1	1/2013	Dikeman et al.
2010/0063482	A1	3/2010	Mansour et al.	2013/0030386	A1	1/2013	Panian et al.
2010/0108681	A1	5/2010	Jepson et al.	2013/0035668	A1	2/2013	Kitani et al.
2010/0152680	A1	6/2010	Memahon	2013/0046315	A1	2/2013	Woehr et al.
2010/0174242	A1	7/2010	Anderson et al.	2013/0053815	A1	2/2013	Mucientes et al.
2010/0241088	A1	9/2010	Ranalletta et al.	2013/0060205	A1	3/2013	Mansour et al.
2010/0249723	A1	9/2010	Fangrow, Jr.	2013/0066293	A1	3/2013	Garfield et al.
2010/0249724	A1	9/2010	Cote, Sr. et al.	2013/0079730	A1	3/2013	Mosler et al.
2010/0249725	A1	9/2010	Cote, Sr. et al.	2013/0138075	A1	5/2013	Lambert
2010/0264343	A1	10/2010	Jeory	2013/0253478	A1	9/2013	Fangrow, Jr.
				2013/0289534	A1	10/2013	Fangrow, Jr.
				2013/0331800	A1	12/2013	Newton et al.
				2014/0031765	A1	1/2014	Siopes et al.
				2014/0135709	A1	5/2014	Zollinger



(56)

References Cited

U.S. PATENT DOCUMENTS

2014/0142519 A1 5/2014 Truitt et al.  
 2014/0155836 A1 6/2014 Truitt et al.  
 2014/0174578 A1 6/2014 Bonnal et al.  
 2014/0180219 A1 6/2014 Ho et al.  
 2014/0180258 A1 6/2014 Ho et al.  
 2014/0209197 A1 7/2014 Carrez et al.  
 2014/0257198 A1 9/2014 Truitt et al.  
 2014/0261860 A1 9/2014 Heath et al.  
 2014/0276455 A1 9/2014 Yeh et al.  
 2014/0276456 A1 9/2014 Eddy  
 2014/0276458 A1 9/2014 Mansour et al.  
 2014/0276459 A1 9/2014 Yeh et al.  
 2014/0276463 A1 9/2014 Mansour et al.  
 2014/0276466 A1 9/2014 Yeh et al.  
 2014/0296794 A1 10/2014 Li  
 2014/0303602 A1 10/2014 Mansour et al.  
 2014/0316350 A1 10/2014 Yamaguchi et al.  
 2014/0358033 A1 12/2014 Lynn  
 2014/0371686 A1 12/2014 Sano et al.  
 2015/0040987 A1 2/2015 Reichert et al.  
 2015/0040988 A1 2/2015 Reichert et al.  
 2015/0045746 A1 2/2015 Macy, Jr. et al.  
 2015/0045772 A1 2/2015 Reichert et al.  
 2015/0126942 A1 5/2015 Lopez et al.  
 2015/0148756 A1 5/2015 Lynn  
 2015/0151100 A1 6/2015 Mansour  
 2015/0157799 A1 6/2015 Chen et al.  
 2015/0157800 A1 6/2015 Chen et al.  
 2015/0157848 A1 6/2015 Wu et al.  
 2015/0176715 A1 6/2015 Huang et al.  
 2015/0190627 A1 7/2015 Ueda et al.  
 2015/0196749 A1 7/2015 Ziv et al.  
 2015/0196750 A1 7/2015 Ueda et al.  
 2015/0202424 A1 7/2015 Harton  
 2015/0258325 A1 9/2015 Panian et al.  
 2015/0265827 A1 9/2015 Keyser et al.  
 2015/0265829 A1 9/2015 Truitt et al.  
 2015/0297817 A1 10/2015 Guala  
 2015/0297880 A1 10/2015 Ogawa et al.  
 2015/0313523 A1 11/2015 Chelak et al.  
 2015/0374910 A1 12/2015 Mansour  
 2016/0000364 A1 1/2016 Mendels et al.  
 2016/0001057 A1 1/2016 Lopez et al.  
 2016/0089492 A1 3/2016 Burnard et al.  
 2016/0089529 A1 3/2016 Bolz et al.  
 2016/0114147 A1 4/2016 Siopes et al.  
 2016/0136051 A1 5/2016 Lavi  
 2016/0144110 A1 5/2016 Ueda  
 2016/0158524 A1 6/2016 Quach et al.  
 2016/0235961 A1 8/2016 Maffei  
 2016/0279404 A1 9/2016 Nelson  
 2016/0317798 A1 11/2016 Lopez et al.

FOREIGN PATENT DOCUMENTS

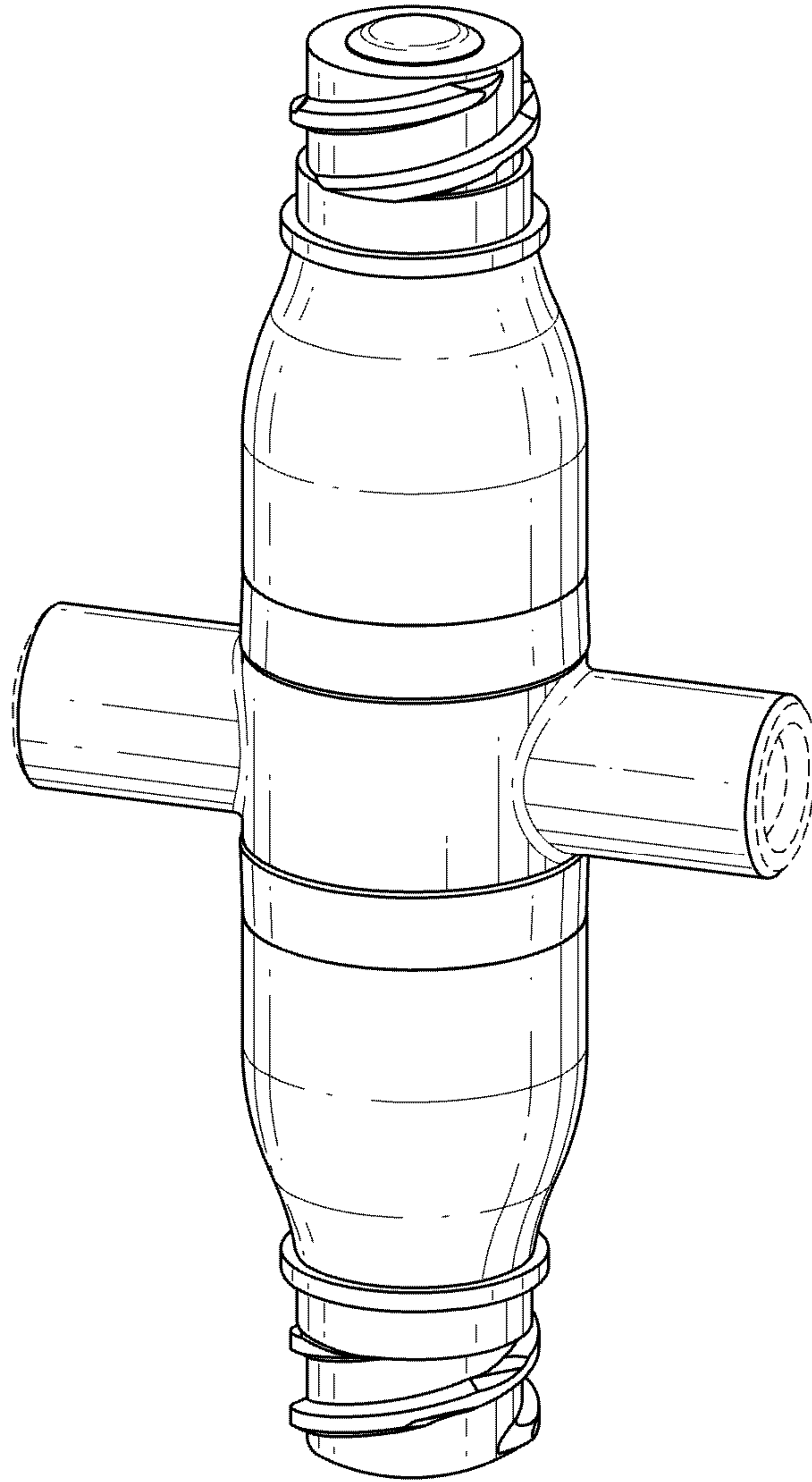
CA 2 175 021 11/1996  
 CH 636526 6/1983  
 CH 670955 7/1989  
 DE 855 319 9/1952

DE 84 25 197.2 9/1985  
 DE 37 40 269 6/1989  
 EP 0 263 789 4/1988  
 EP 0 309 771 4/1989  
 EP 0 399 119 11/1990  
 EP 0 446 463 9/1991  
 GB 2 000 685 1/1979  
 GB 2 001 146 1/1979  
 GB 2 034 185 6/1980  
 WO WO 92/20736 11/1992  
 WO WO 99/59672 11/1999  
 WO WO 99/61093 12/1999  
 WO WO 03/018104 3/2003  
 WO WO 2005/115521 8/2005  
 WO WO 2006/013433 2/2006  
 WO WO 2006/062912 6/2006  
 WO WO 2008/048777 4/2008  
 WO WO 2009/052433 4/2009  
 WO WO 2009/111596 9/2009  
 WO WO 2010/004471 1/2010

OTHER PUBLICATIONS

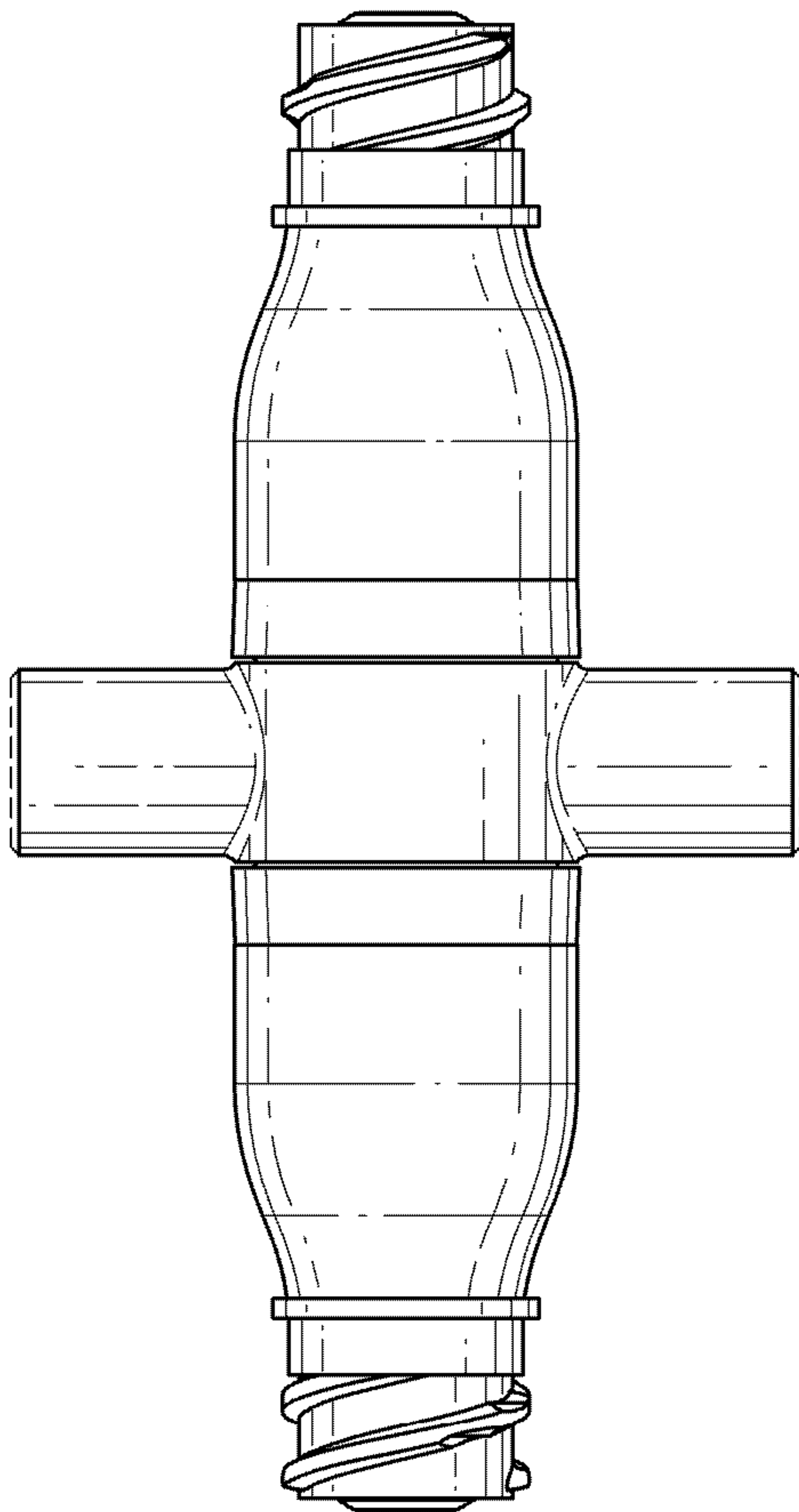
“Faulding Inc. receives FDA permission to market patented Safe-Connect Valve”, dated Dec. 2, 1996.  
 BD Medical: Needleless IV Access Devices, one page, 2007.  
 Capless Backcheck Valve, dated Sep. 3, 1993.  
 CardinalHealth, SmartSite Brochure: “SmartSite® Disposables,” 2004, in 12 pages.  
 CareFusion, Medegen Introduces MaxPlus® Clear, First and Only Clear Positive Displacement Connector for Use in Infusion Therapy, MaxGuard News, one page article, dated Mar. 10, 2008—Ontario, CA.  
 Caresite™ Luer Access Device, dated 2010.  
 Clearlink, needleless IV access system, Baxter 2007 brochure in 2 pages.  
 F.D.A. 510(k) Summary of Safety and Effectiveness, dated Nov. 17, 1997.  
 LifeShield TKO Anti-Reflux Device Brochure, appears to contain a date of Feb. 8.  
 MEDI-4955 Liquid Silicone Rubber from NuSil Silicone Technology, dated Dec. 17, 2010.  
 MicroClave Connector Brochure. The MicroClave was available before Mar. 25, 2008.  
 MicroClave Neutral Displacement Connector a Needlefree Closed System Device. Brochure Sep. 24, 2008.  
 MicroClave Product Page Video Shots dated Sep. 24, 2008.  
 Nexus Medical Nexus TKO, appears to contain a date of Mar. 2006.  
 PASV Valve Connector Brochure, which appears to be at least as early as Feb. 20, 2001.  
 Saechtling Tworzywa Sztuczne, WN-T Warszawa, 1999, V edition, pp. 224-225.

\* cited by examiner

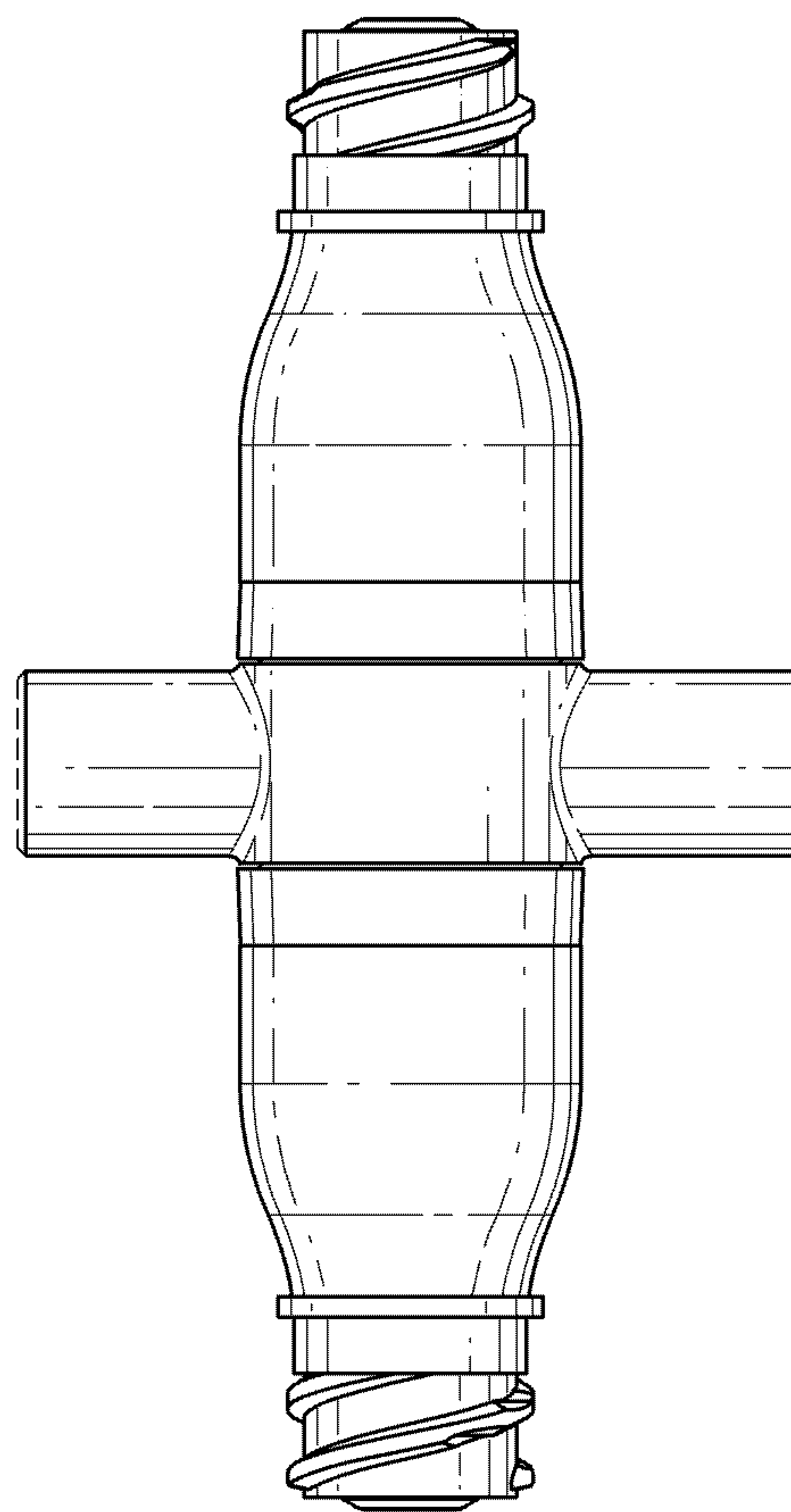


*FIG. 1*





*FIG. 2*



*FIG. 3*

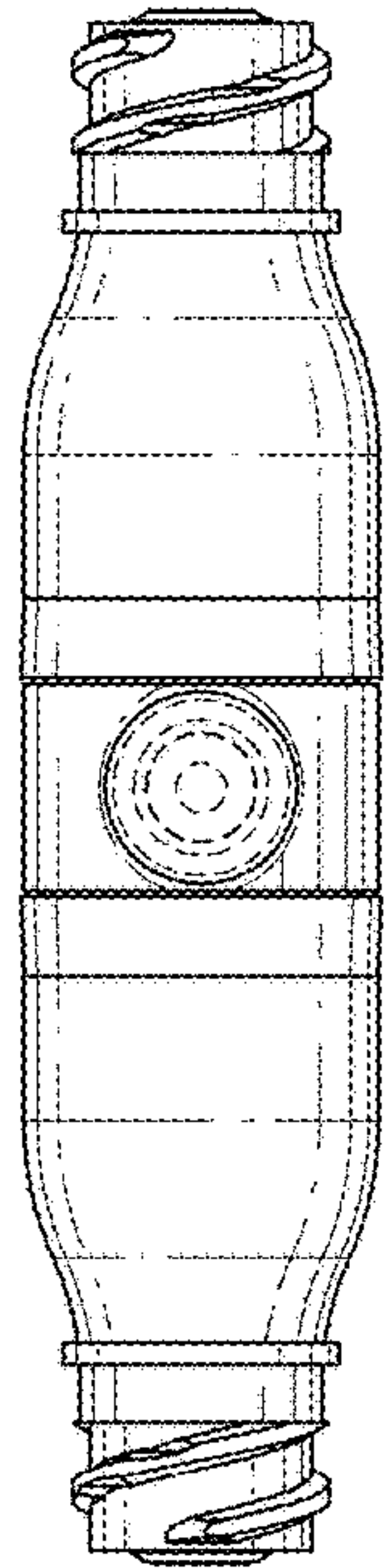


FIG. 4

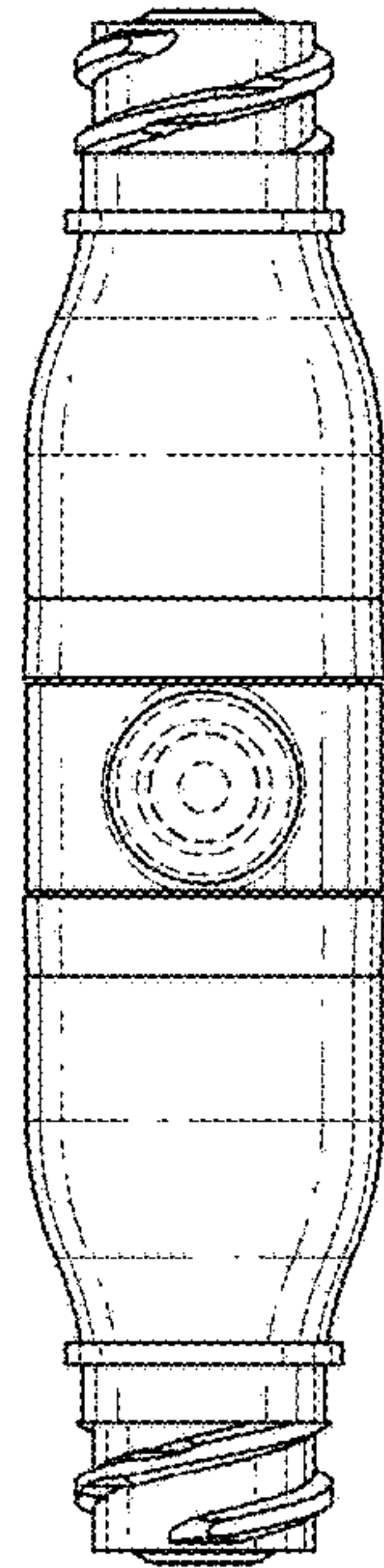


FIG. 5

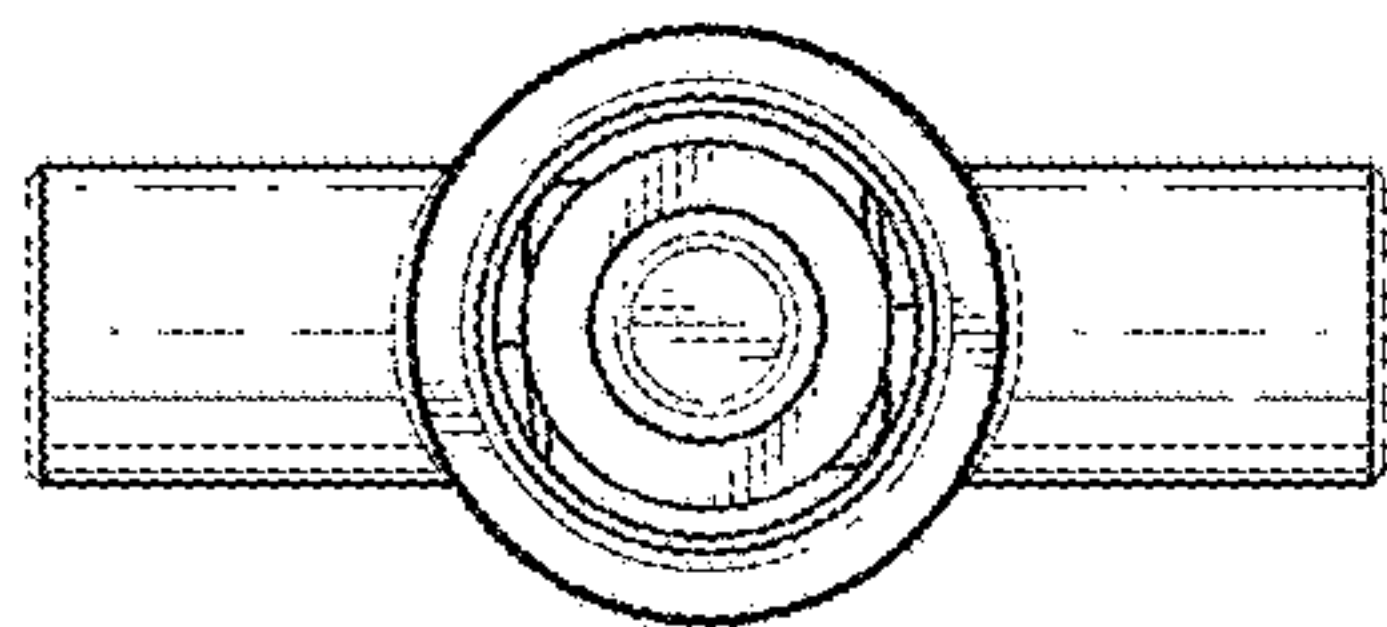


FIG. 6

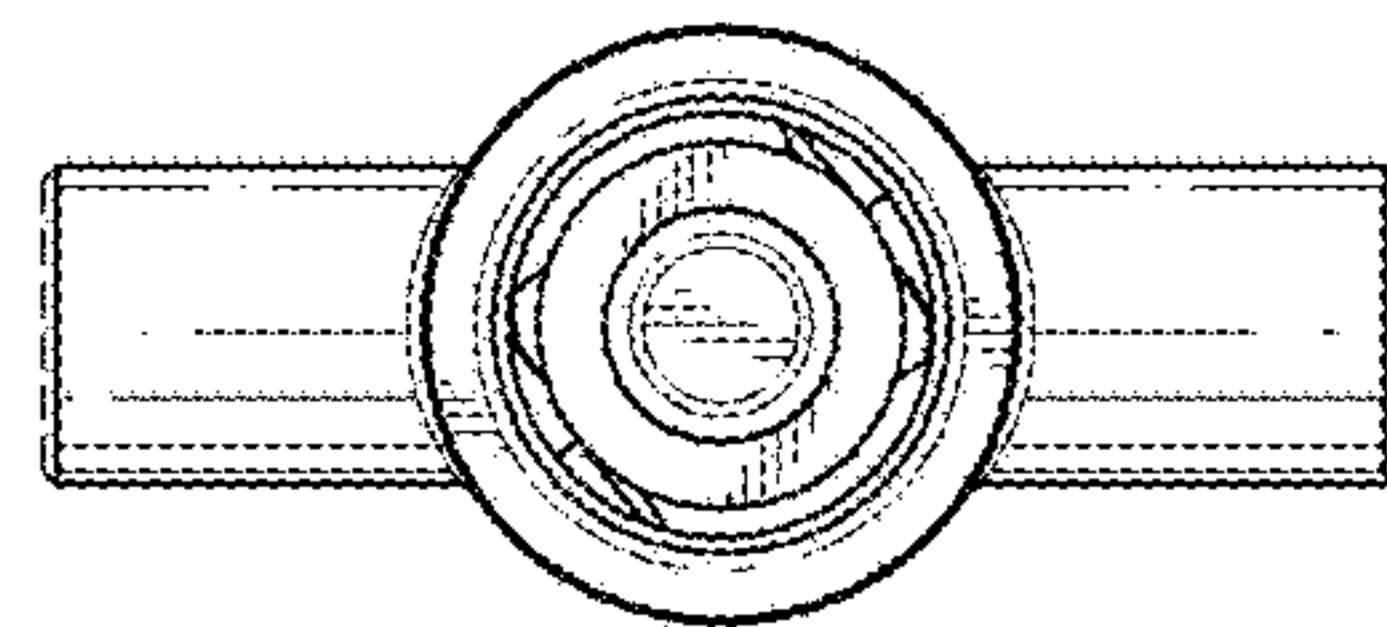


FIG. 7