



US00D786427S

(12) **United States Design Patent** (10) **Patent No.:** **US D786,427 S**  
**Nelson** (45) **Date of Patent:** **\*\* May 9, 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.: **29/510,851**

FOREIGN PATENT DOCUMENTS  
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.

OTHER PUBLICATIONS  
“Faulding Inc. receives FDA permission to market patented Safe-Connect Valve”, dated Dec. 2, 1996.  
(Continued)  
*Primary Examiner* — David Muller  
(74) *Attorney, Agent, or Firm* — Knobbe, Martens, Olson & Bear, LLP

(56) **References Cited**  
U.S. PATENT DOCUMENTS

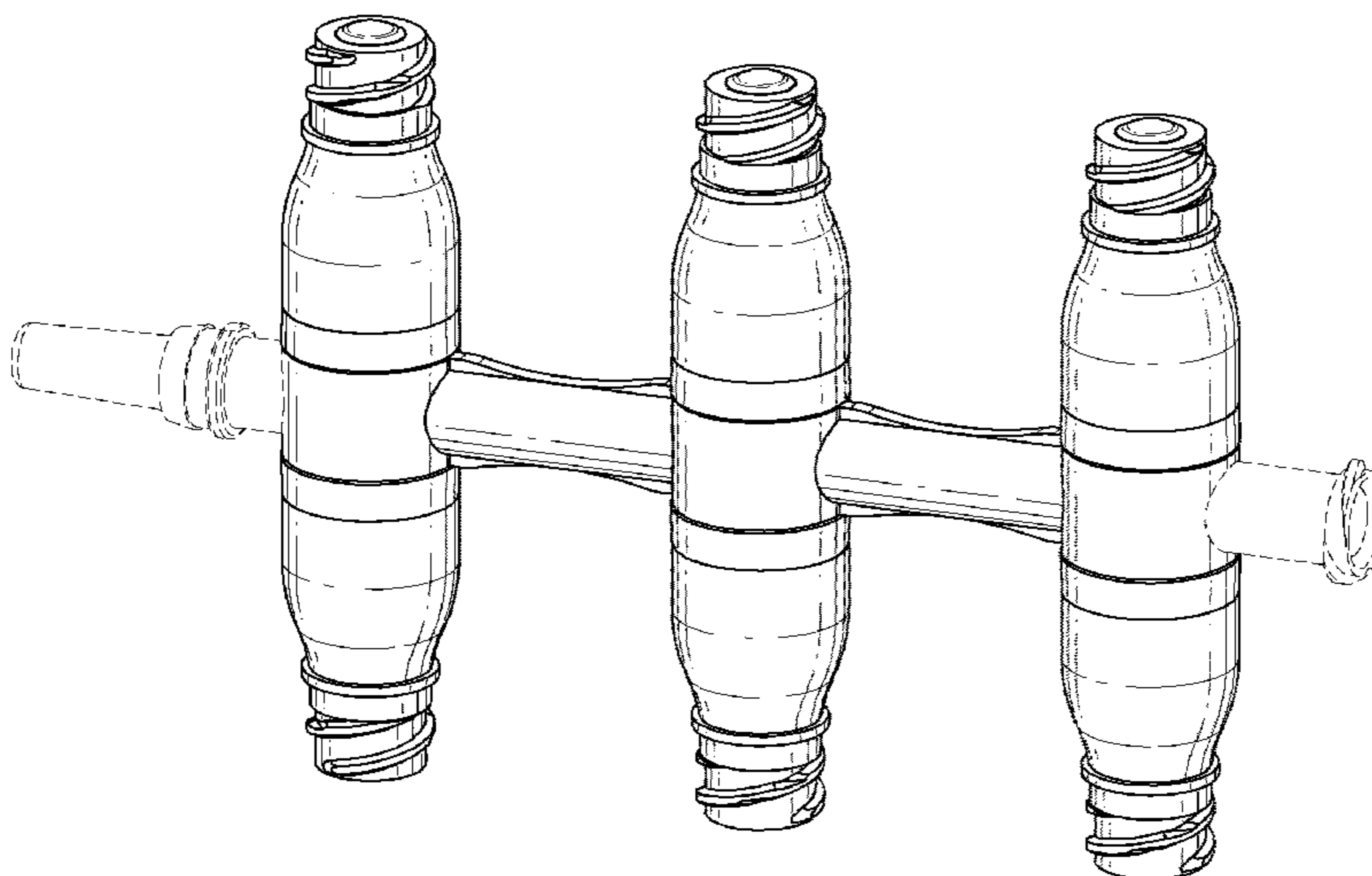
274,447 A 3/1883 Kennish  
1,578,517 A 3/1926 Hein  
1,923,501 A 8/1933 Perry  
2,210,098 A 8/1940 Ravenscroft  
2,289,677 A 7/1942 Perelson  
2,577,780 A 12/1951 Lockhart  
2,756,282 A 7/1956 Deane  
2,756,740 A 7/1956 Deane  
2,809,665 A 10/1957 Crowe  
2,847,995 A 8/1958 Adams  
2,999,499 A 9/1961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

(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 lines in the Figures show portions of the fluid manifold which form no part of the claimed design.

**1 Claim, 5 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	Panthafer
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	Poholshy 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	Heritze 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	Kahonen 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	Weinheier 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 et al.	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
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	Wienheimer	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	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	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
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	Mansourt 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	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	Mcmahon	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

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

\* cited by examiner

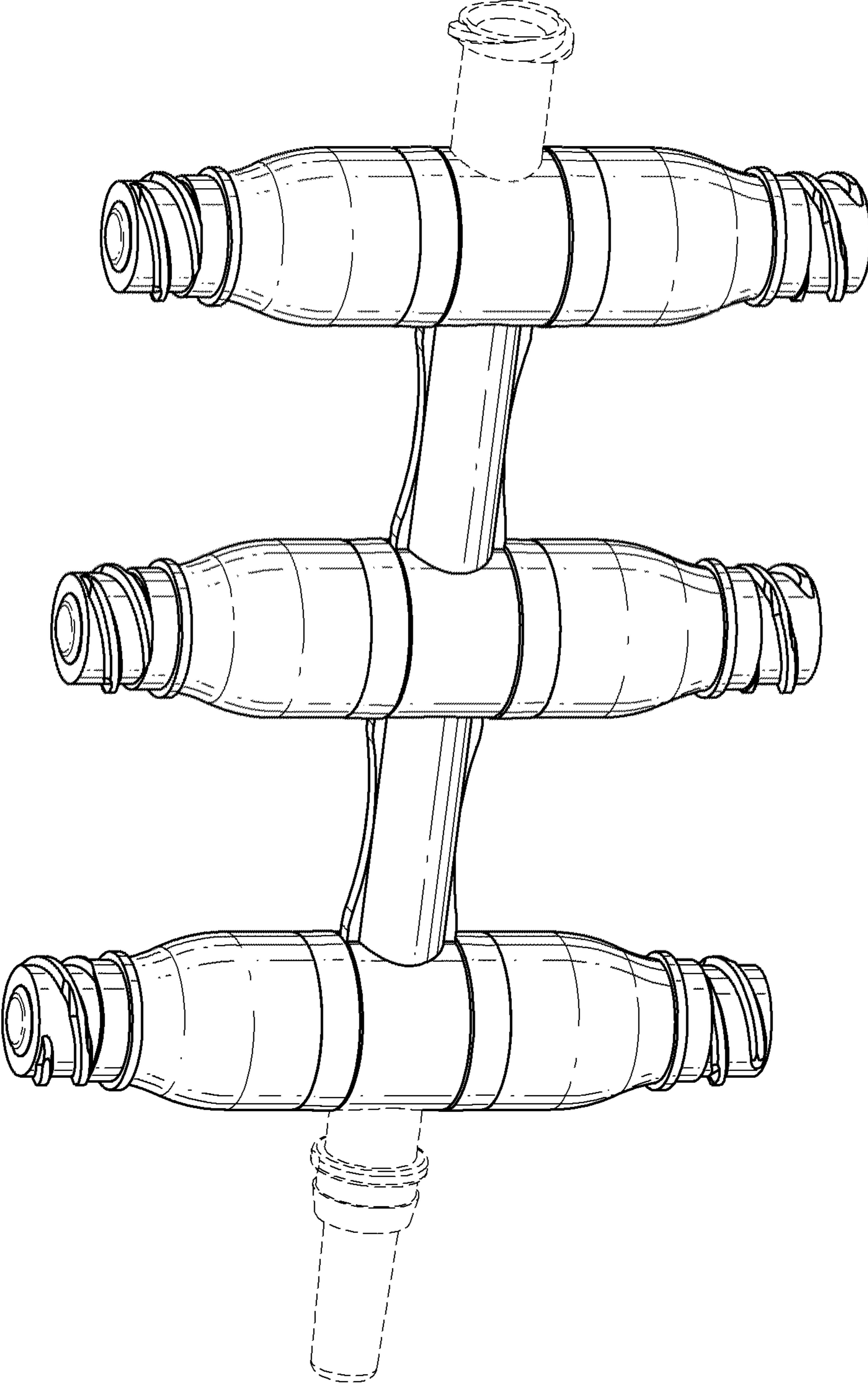


FIG. 1



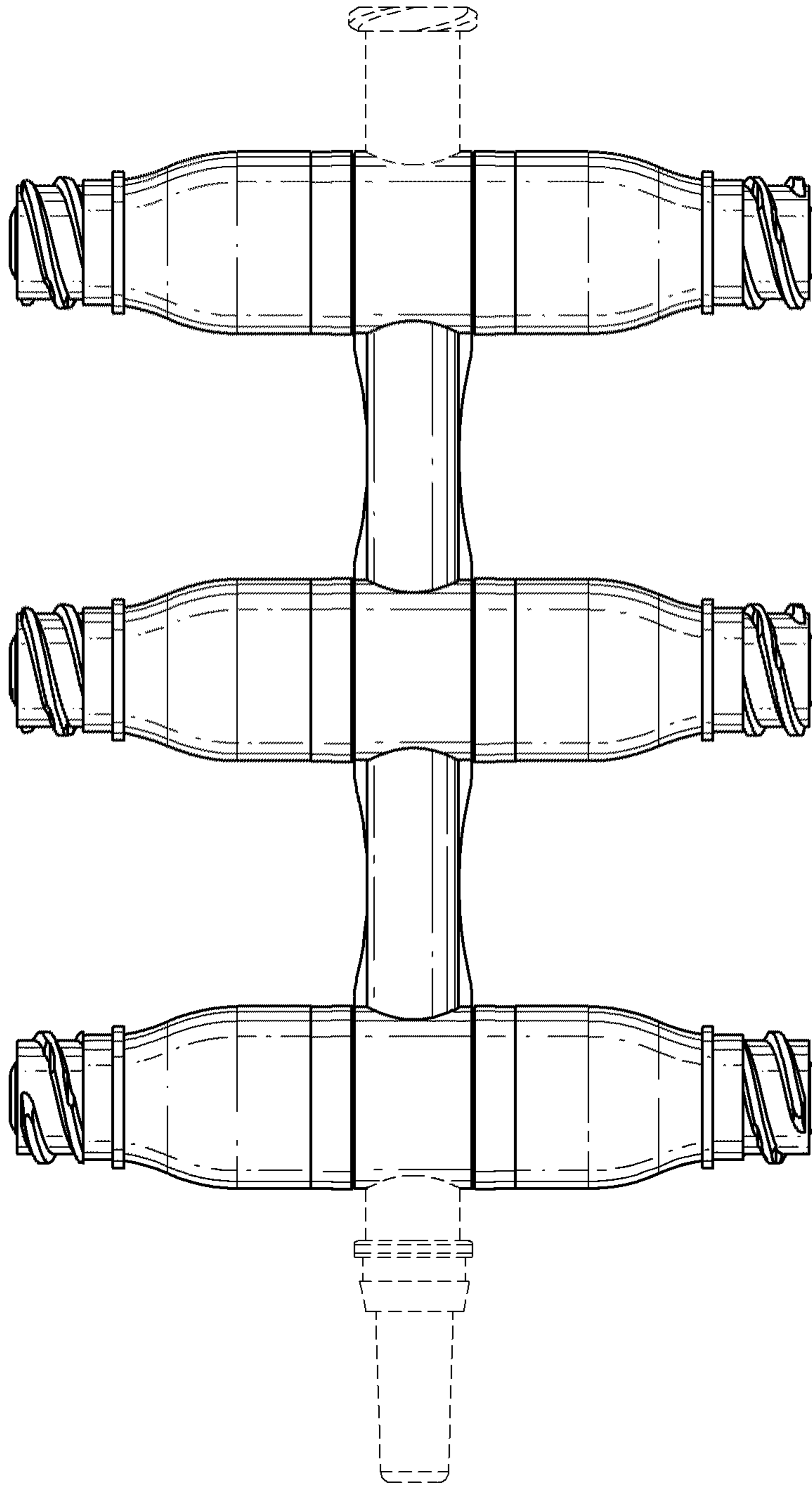


FIG. 2

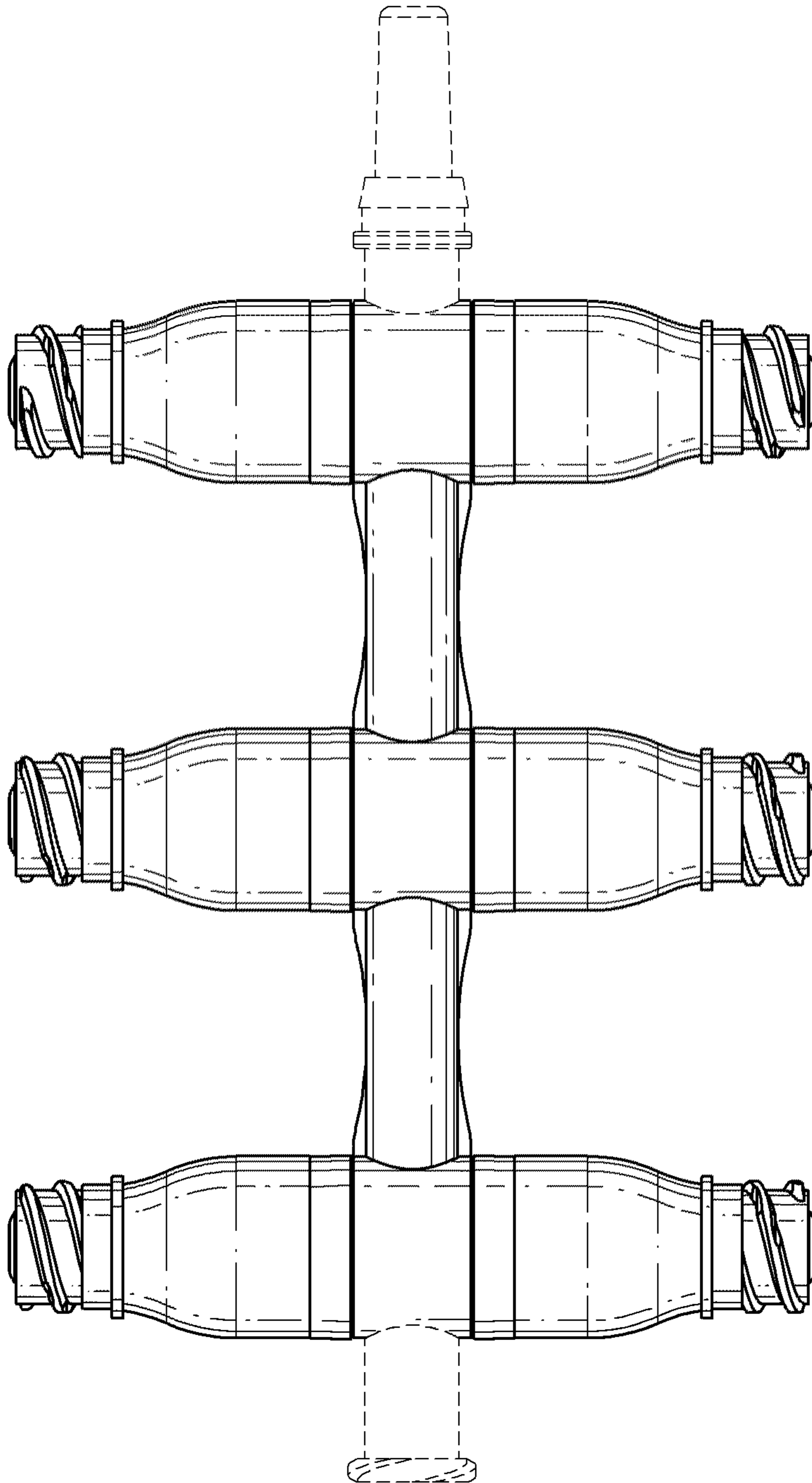


FIG. 3

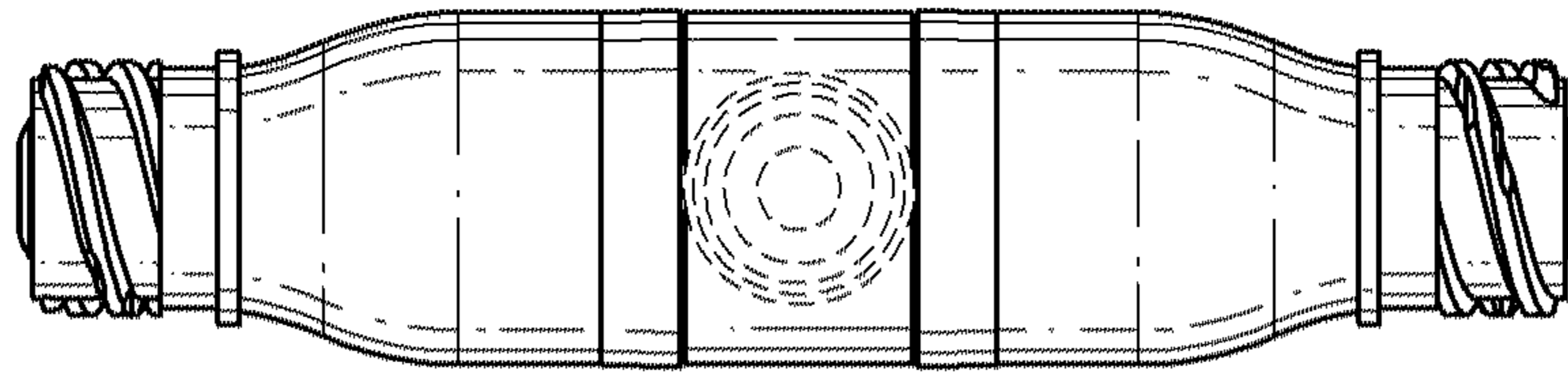


FIG. 5

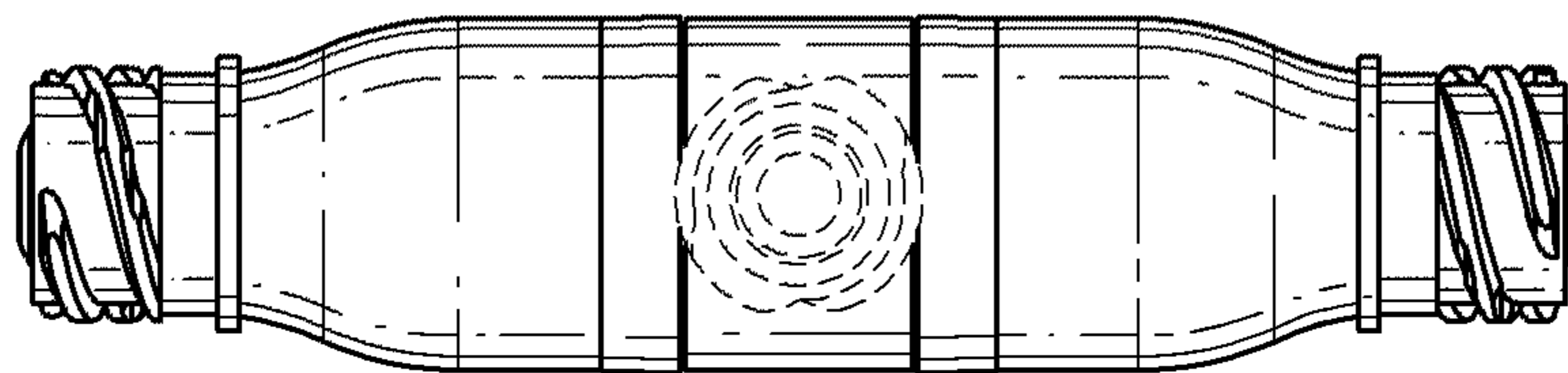


FIG. 4

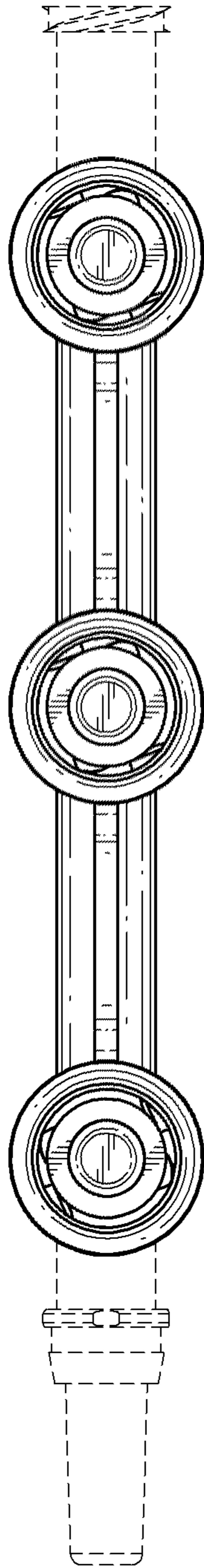


FIG. 6

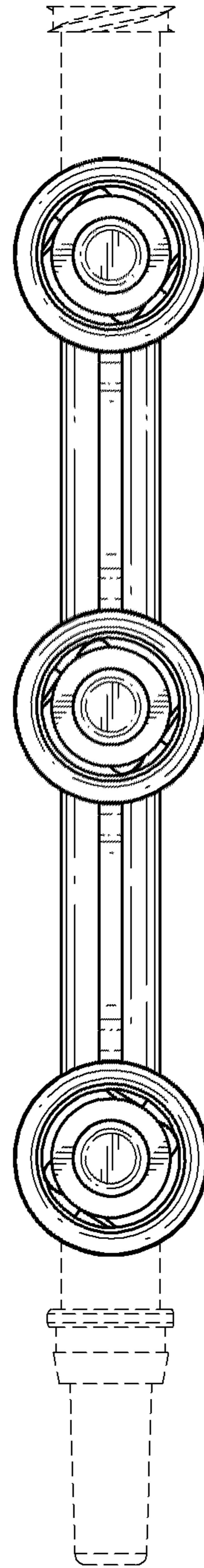


FIG. 7