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(12) **United States Design Patent** (10) **Patent No.:** **US D815,730 S**
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(54) **APPARATUS TO CONTROL FLUID FLOW THROUGH A TUBE**

FOREIGN PATENT DOCUMENTS

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AU 2247783 A 6/1985
CA 1213749 A1 11/1986
(Continued)

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OTHER PUBLICATIONS

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(Continued)

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

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(21) Appl. No.: **29/548,225**

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(57) **CLAIM**

Related U.S. Application Data

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Nov. 6, 2013, now Pat. No. Des. 745,661.

The ornamental design for an apparatus to control fluid flow
through a tube, as shown and described.

(51) **LOC (11) Cl.** **24-02**

(52) **U.S. Cl.**
USPC **D24/111**; D24/108; D24/169

DESCRIPTION

(58) **Field of Classification Search**
USPC D24/107, 108, 111, 112, 169, 186, 231
CPC A61M 5/1413; A61M 5/16854; A61M
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See application file for complete search history.

FIG. 1 is a front, bottom, and right side perspective view of
the apparatus to control fluid flow through a tube, showing
my new design;
FIG. 2 is a back, bottom, and left side perspective view
thereof;
FIG. 3 is a front elevational view thereof;
FIG. 4 is a back elevational view thereof;
FIG. 5 is a left side elevational view thereof;
FIG. 6 is a right side elevational view thereof;
FIG. 7 is a top plan view thereof;
FIG. 8 is a bottom plan view thereof; and,
FIG. 9 is a front, bottom, and right side perspective view
showing the door open thereof.
The broken lines in the drawings illustrate portions of the
apparatus to control fluid flow through a tube form no part
of the claimed design.

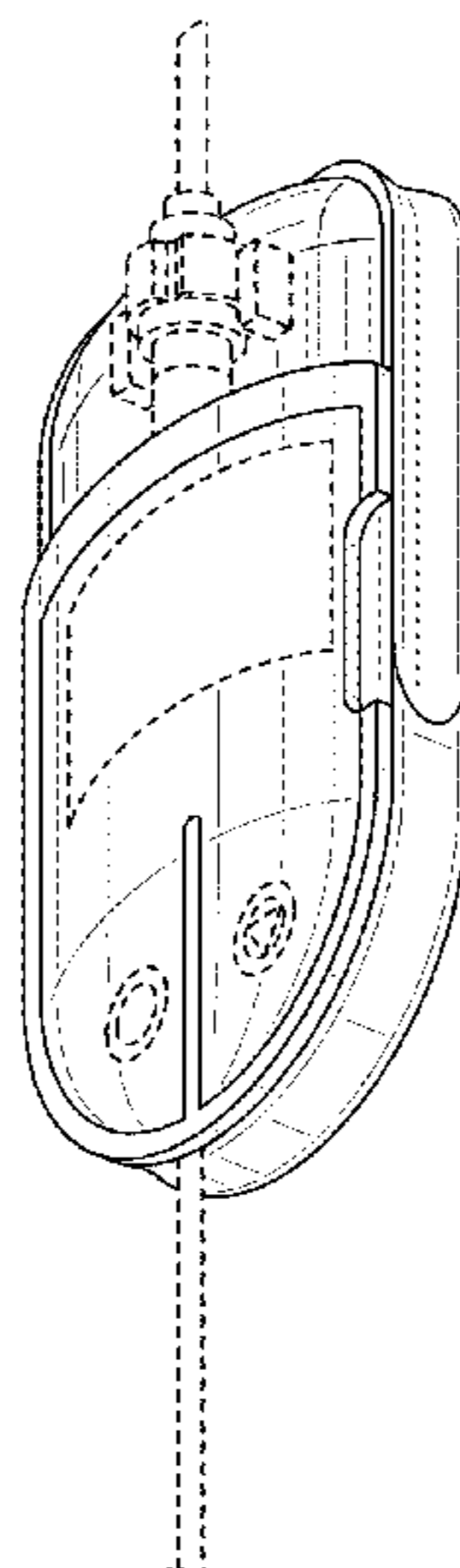
(56) **References Cited**

U.S. PATENT DOCUMENTS

2,880,764 A 4/1959 Pelavin
2,888,877 A 6/1959 Shellman
3,173,372 A 3/1965 Baldwin
3,384,336 A 5/1968 Pulman
3,609,379 A 9/1971 Hildebrandt
3,685,787 A 8/1972 Adelberg
3,733,149 A 5/1973 Jacobson

(Continued)

1 Claim, 6 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

3,790,042 A	2/1974	McCormick	5,753,820 A	5/1998	Reed
3,831,600 A	8/1974	Buckles	5,782,805 A	7/1998	Meinzer
4,038,982 A	8/1977	Burke	5,800,140 A	9/1998	Forni
4,105,028 A	8/1978	Sadlier	5,800,386 A	9/1998	Bellifemine
4,155,362 A	5/1979	Jess	5,843,045 A	12/1998	DuPont
4,247,077 A	1/1981	Banick et al.	5,896,195 A	4/1999	Juvinall
4,303,376 A	12/1981	Siekmann	5,899,665 A	5/1999	Makino
4,321,461 A	3/1982	Walter	5,920,361 A	7/1999	Gibeau
4,328,800 A	5/1982	Marx	D416,999 S	11/1999	Miyamoto
4,328,801 A	5/1982	Marx	6,015,083 A	1/2000	Hayes
4,383,252 A	5/1983	Purcell	6,049,381 A	4/2000	Reintjes
4,397,642 A	8/1983	Lamadrid	6,050,713 A	4/2000	O'Donnell
4,421,506 A	12/1983	Danby	6,083,206 A	7/2000	Molko
4,449,534 A	5/1984	Leibinsohn	6,091,483 A	7/2000	Guirguis
4,469,480 A	9/1984	Figler	6,091,492 A	7/2000	Strickland
4,490,140 A	12/1984	Carr	6,110,153 A	8/2000	Davis
4,496,351 A	1/1985	Hillel et al.	D434,150 S *	11/2000	Tumey D24/169
4,504,263 A	3/1985	Steuer	6,144,453 A	11/2000	Hallerman
4,525,163 A	6/1985	Slavik	6,149,631 A	11/2000	Haydel, Jr.
4,577,197 A	3/1986	Crean	6,159,186 A	12/2000	Wickham
4,583,975 A	4/1986	Pekkarinen	6,213,354 B1	4/2001	Kay
RE32,294 E	11/1986	Knute	6,213,739 B1	4/2001	Phallen et al.
4,634,426 A	1/1987	Kamen	6,228,047 B1	5/2001	Dadson
4,635,281 A	1/1987	Jones	D446,860 S	8/2001	Mezière
4,648,869 A	3/1987	Bobo, Jr.	6,305,908 B1	10/2001	Hermann
4,662,829 A	5/1987	Nehring	6,328,712 B1	12/2001	Cartledge
4,668,216 A	5/1987	Martin	6,362,887 B1	3/2002	Meisberger
4,673,161 A	6/1987	Flynn et al.	6,491,659 B1	12/2002	Miyamoto
4,673,820 A	6/1987	Kamen	6,500,151 B1	12/2002	Cobb
4,680,977 A	7/1987	Conero	6,503,221 B1	1/2003	Briggs
4,703,314 A	10/1987	Spani	6,523,414 B1	2/2003	Malmstrom
4,718,896 A	1/1988	Arndt	D471,274 S	3/2003	Diaz et al.
4,720,636 A	1/1988	Benner, Jr.	6,554,791 B1	4/2003	Cartledge et al.
4,722,224 A	2/1988	Scheller et al.	6,562,012 B1	5/2003	Brown
4,775,368 A	10/1988	Iwatschenko	6,574,050 B1	6/2003	Lin et al.
4,778,451 A	10/1988	Kamen	6,599,282 B2	7/2003	Burko
4,812,904 A	3/1989	Maring	6,641,556 B1	11/2003	Shigezawa
4,820,268 A	4/1989	Kawamura	6,657,545 B1	12/2003	Lin
4,820,281 A	4/1989	Lawler	6,736,801 B1	5/2004	Gallagher
4,834,744 A	5/1989	Ritson	6,810,290 B2	10/2004	Lebel et al.
4,837,708 A	6/1989	Wright	6,814,547 B2	11/2004	Childers et al.
4,846,792 A	7/1989	Bobo, Jr.	6,975,898 B2	12/2005	Seibel
4,909,786 A	3/1990	Gijsselhart	6,984,052 B1	1/2006	Del Castillo
4,920,336 A	4/1990	Meijer	7,001,365 B2	2/2006	Makkink
4,936,828 A	6/1990	Chiang	7,068,831 B2	6/2006	Florent
4,959,050 A	9/1990	Bobo, Jr.	7,070,121 B2	7/2006	Schramm
4,979,940 A	12/1990	Bobo, Jr.	7,118,549 B2	10/2006	Chan
4,981,467 A	1/1991	Bobo	7,163,740 B2	1/2007	Rosati
5,002,539 A	3/1991	Coble	7,190,275 B2	3/2007	Goldberg
5,045,069 A	9/1991	Imparato	D564,087 S	3/2008	Yodfat et al.
5,047,014 A	9/1991	Mosebach et al.	7,338,475 B2	3/2008	Brown
5,057,090 A	10/1991	Bessman	7,420,151 B2	9/2008	Fengler et al.
5,154,693 A	10/1992	East et al.	7,448,706 B2	11/2008	Yamanobe
5,154,704 A	10/1992	Archibald	7,467,055 B2	12/2008	Seshimo et al.
5,181,910 A	1/1993	Scanlon	7,498,563 B2	3/2009	Mandro
5,186,057 A	2/1993	Everhart	7,499,581 B2	3/2009	Tribble
RE34,413 E	10/1993	McCullough	7,540,859 B2	6/2009	Claude
5,267,980 A	12/1993	Dirr, Jr.	7,677,689 B2	3/2010	Kim
5,278,626 A	1/1994	Poole	7,695,448 B2	4/2010	Cassidy
5,279,558 A	1/1994	Kriesel	7,767,991 B2	8/2010	Sacchetti
5,314,316 A	5/1994	Shibamoto	7,776,927 B2	8/2010	Chu
5,328,341 A	7/1994	Forni	7,783,107 B2	8/2010	Zandifar
5,331,309 A	7/1994	Sakai	D629,503 S	12/2010	Caffey et al.
5,411,052 A	5/1995	Murray	7,892,201 B1	2/2011	Laguna
5,415,641 A	5/1995	Yerlikaya	7,892,204 B2	2/2011	Kraus
D361,617 S *	8/1995	Sancoff D24/111	7,905,859 B2	3/2011	Bynum
5,439,442 A	8/1995	Bellifemine	7,914,483 B2	3/2011	Simmons
D362,721 S	9/1995	Peeler et al.	7,918,834 B2	4/2011	Mernoe
5,482,446 A	1/1996	Williamson	7,924,424 B2	4/2011	Erickson et al.
5,526,285 A	6/1996	Campo	7,933,780 B2	4/2011	De La Huerga
5,562,615 A	10/1996	Nassif	7,952,698 B2	5/2011	Friedrich
5,588,963 A	12/1996	Roelofs	8,004,683 B2	8/2011	Tokhtuev et al.
5,601,980 A	2/1997	Gordon	8,025,634 B1	9/2011	Moubayed
5,707,588 A	1/1998	Tsukishima	8,038,657 B2	10/2011	Davis
5,718,562 A	2/1998	Lawless	8,038,663 B2	10/2011	Miner
			8,103,461 B2	1/2012	Glaser et al.
			8,112,814 B2	2/2012	Shimizu
			8,137,083 B2	3/2012	Zhou
			8,147,447 B2	4/2012	Sundar et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

8,147,448 B2	4/2012	Sundar	2006/0291211 A1	12/2006	Rodriguez
8,147,464 B2	4/2012	Spohn	2007/0088269 A1	4/2007	Valego et al.
8,184,848 B2	5/2012	Wu	2007/0102623 A1	5/2007	Fengler
8,256,984 B2	9/2012	Fathallah	2007/0228071 A1	10/2007	Kamen et al.
8,257,779 B2	9/2012	Abernathy	2007/0293817 A1	12/2007	Feng
8,282,894 B2	10/2012	Lee	2008/0004574 A1	1/2008	Dyar
D676,551 S	2/2013	Desai et al.	2008/0051732 A1	2/2008	Chen
D677,784 S	3/2013	Marguerie	2008/0147008 A1	6/2008	Lewis
8,394,062 B2	3/2013	Powers	2008/0147016 A1	6/2008	Faries
8,439,880 B2	5/2013	Rondeau	2008/0154214 A1	6/2008	Spohn
8,447,069 B2	5/2013	Huang et al.	2008/0235765 A1	9/2008	Shimizu
8,471,231 B2	6/2013	Paz	2008/0237502 A1	10/2008	Fago
8,523,797 B2	9/2013	Lowery et al.	2008/0252472 A1	10/2008	Su et al.
8,523,829 B2	9/2013	Miner et al.	2009/0097029 A1	4/2009	Tokhtuev
8,523,839 B2	9/2013	Siefert	2009/0112115 A1	4/2009	Huang
8,529,511 B2	9/2013	Boulanger	2009/0180106 A1	7/2009	Friedrich
8,531,517 B2	9/2013	Tao	2009/0224638 A1	9/2009	Weber
8,552,361 B2	10/2013	Mandro	2009/0254025 A1	10/2009	Simmons
8,622,979 B2	1/2014	Hungerford	2009/0262351 A1	10/2009	Erickson
8,638,358 B2	1/2014	Dabiri et al.	2009/0276167 A1	11/2009	Glaser
8,647,074 B2	2/2014	Moberg et al.	2009/0281460 A1	11/2009	Lowery
8,692,678 B2	4/2014	Warner et al.	2010/0021933 A1	1/2010	Okano
8,777,897 B2	7/2014	Butterfield	2010/0097451 A1	4/2010	Bruce
D712,043 S	8/2014	Sliger	2010/0114027 A1	5/2010	Jacobson
8,834,429 B2	9/2014	Grant	2010/0120601 A1	5/2010	Hayamizu
D720,449 S	12/2014	Galbraith et al.	2010/0168671 A1	7/2010	Faries, Jr.
D728,779 S	5/2015	Sabin et al.	2010/0204650 A1	8/2010	Hungerford et al.
D735,319 S	7/2015	Sabin et al.	2010/0211003 A1	8/2010	Sundar
D736,370 S	8/2015	Sabin et al.	2010/0217229 A1	8/2010	Miner
9,095,652 B2	8/2015	Dewey	2010/0229978 A1	9/2010	Zhou
9,128,051 B2	9/2015	Bui	2010/0292635 A1	11/2010	Sundar
9,134,735 B2	9/2015	Lowery et al.	2010/0309005 A1	12/2010	Warner
9,134,736 B2	9/2015	Lowery et al.	2011/0004186 A1	1/2011	Butterfield
9,144,644 B2	9/2015	Hungerford	2011/0025826 A1	2/2011	Dabiri
9,151,646 B2	10/2015	Kamen et al.	2011/0046899 A1	2/2011	Paz
D745,661 S	12/2015	Collins et al.	2011/0060284 A1	3/2011	Harr
9,216,279 B2	12/2015	Travis et al.	2011/0125103 A1	5/2011	Rondeau
9,234,850 B2	1/2016	Hammond et al.	2011/0142283 A1	6/2011	Huang
D749,206 S	2/2016	Johnson et al.	2011/0144595 A1	6/2011	Cheng
D751,689 S	3/2016	Peret et al.	2011/0166511 A1	7/2011	Sharvit
D751,690 S	3/2016	Peret et al.	2011/0178476 A1	7/2011	Lin
D752,209 S	3/2016	Peret et al.	2011/0190146 A1	8/2011	Boehm
9,295,778 B2	3/2016	Kamen et al.	2011/0190637 A1	8/2011	Knobel
D754,065 S	4/2016	Gray et al.	2011/0196304 A1	8/2011	Kramer et al.
D756,386 S	5/2016	Kendler et al.	2011/0196306 A1	8/2011	De La Huerga
D756,505 S	5/2016	Park	2011/0206247 A1	8/2011	Dachille
D758,399 S	6/2016	Kendler et al.	2011/0208123 A1	8/2011	Gray
D760,288 S	6/2016	Kendler et al.	2011/0231204 A1	9/2011	De La Huerga
D760,289 S	6/2016	Kendler et al.	2011/0251557 A1	10/2011	Powers
9,364,394 B2	6/2016	Demers et al.	2011/0275063 A1	11/2011	Weitz
9,372,486 B2	6/2016	Peret et al.	2011/0313351 A1	12/2011	Kamen et al.
D760,782 S	7/2016	Kendler et al.	2011/0313789 A1	12/2011	Kamen
D760,888 S	7/2016	Gill et al.	2011/0316919 A1	12/2011	Baldy, Jr.
9,400,873 B2	7/2016	Kamen et al.	2011/0317004 A1	12/2011	Tao
D767,756 S	9/2016	Sabin	2012/0013735 A1	1/2012	Tao
9,435,455 B2	9/2016	Peret et al.	2012/0059318 A1	3/2012	Dewey
D768,716 S	10/2016	Kendler et al.	2012/0059350 A1	3/2012	Siefert
9,465,919 B2	10/2016	Kamen et al.	2012/0095415 A1	4/2012	Sharvit
9,488,200 B2	11/2016	Kamen et al.	2012/0095433 A1	4/2012	Hungerford
D791,306 S *	7/2017	Clemente D24/111	2012/0185267 A1	7/2012	Kamen
2001/0026292 A1	10/2001	Ishizaki	2012/0197185 A1	8/2012	Tao
2001/0055462 A1	12/2001	Seibel	2012/0238997 A1	9/2012	Dewey
2002/0194933 A1	12/2002	Roelofs	2012/0265166 A1	10/2012	Yodfat
2003/0045840 A1	3/2003	Burko	2012/0310153 A1	12/2012	Moberg
2003/0055406 A1	3/2003	Lebel	2012/0310205 A1	12/2012	Lee et al.
2003/0107819 A1	6/2003	Lin et al.	2013/0035659 A1	2/2013	Hungerford
2003/0217962 A1	11/2003	Childers	2013/0083191 A1	4/2013	Lowery
2004/0044306 A1	3/2004	Lynch et al.	2013/0085443 A1	4/2013	Lowery
2004/0044309 A1	3/2004	Lynch et al.	2013/0110046 A1 *	5/2013	Nowak A61M 5/1413 604/152
2004/0171994 A1	9/2004	Goldberg	2013/0177455 A1	7/2013	Kamen
2005/0096581 A1	5/2005	Chan	2013/0182381 A1	7/2013	Gray
2005/0171491 A1	8/2005	Minh Miner et al.	2013/0184676 A1	7/2013	Kamen
2006/0096660 A1	5/2006	Diaz	2013/0188040 A1	7/2013	Kamen
2006/0140466 A1	6/2006	Seshimo	2013/0191513 A1	7/2013	Kamen
2006/0146077 A1	7/2006	Song	2013/0197693 A1	8/2013	Kamen
			2013/0201471 A1	8/2013	Bui et al.
			2013/0201482 A1	8/2013	Munro
			2013/0204188 A1	8/2013	Kamen

(56)

References Cited

U.S. PATENT DOCUMENTS

2013/0253442 A1 9/2013 Travis
 2013/0272773 A1 10/2013 Kamen
 2013/0281965 A1 10/2013 Kamen
 2013/0297330 A1 11/2013 Kamen
 2013/0310990 A1 11/2013 Peret et al.
 2013/0317753 A1 11/2013 Kamen
 2013/0317837 A1 11/2013 Ballantyne
 2013/0336814 A1 12/2013 Kamen
 2013/0339049 A1 12/2013 Blumberg, Jr.
 2013/0346108 A1 12/2013 Kamen
 2014/0043469 A1 2/2014 Engel
 2014/0081233 A1 3/2014 Hungerford
 2014/0121601 A1 5/2014 Hoenninger, III
 2014/0135695 A1 5/2014 Grant
 2014/0148757 A1 5/2014 Ambrosina
 2014/0165703 A1 6/2014 Wilt
 2014/0180711 A1 6/2014 Kamen
 2014/0188076 A1 7/2014 Kamen
 2014/0188516 A1 7/2014 Kamen
 2014/0194818 A1 7/2014 Yodfat
 2014/0195639 A1 7/2014 Kamen
 2014/0227021 A1 8/2014 Kamen
 2014/0267709 A1 9/2014 Hammond
 2014/0276457 A1 9/2014 Munro
 2014/0309612 A1 10/2014 Smisson, III
 2014/0318639 A1 10/2014 Peret
 2014/0327759 A1 11/2014 Tao
 2014/0340512 A1 11/2014 Tao
 2014/0343492 A1 11/2014 Kamen
 2015/0002667 A1 1/2015 Peret et al.
 2015/0002668 A1 1/2015 Peret et al.
 2015/0002677 A1 1/2015 Peret
 2015/0023808 A1 1/2015 Zhu
 2015/0033823 A1 2/2015 Blumberg, Jr.
 2015/0154364 A1 6/2015 Biasi et al.
 2015/0157791 A1 6/2015 Desch et al.
 2015/0219881 A1 8/2015 Munro
 2015/0238228 A1 8/2015 Langenfeld et al.
 2015/0257974 A1 9/2015 Demers et al.
 2015/0314083 A1 11/2015 Blumberg, Jr. et al.
 2015/0332009 A1 11/2015 Kane et al.
 2015/0361974 A1 12/2015 Hungerford et al.
 2016/0025641 A1 1/2016 Hammond et al.
 2016/0055397 A1 2/2016 Peret et al.
 2016/0055649 A1 2/2016 Peret et al.
 2016/0061641 A1 3/2016 Peret et al.
 2016/0063353 A1 3/2016 Peret et al.
 2016/0073063 A1 3/2016 Peret et al.
 2016/0084434 A1 3/2016 Janway et al.
 2016/0097382 A1 4/2016 Kamen et al.
 2016/0131272 A1 5/2016 Yoo
 2016/0158437 A1 6/2016 Biasi et al.
 2016/0179086 A1 6/2016 Peret et al.
 2016/0184510 A1 6/2016 Kamen et al.
 2016/0262977 A1 9/2016 Demers et al.
 2016/0287780 A1 10/2016 Lee et al.
 2016/0319850 A1 11/2016 Kamen et al.
 2016/0362234 A1 12/2016 Peret et al.

FOREIGN PATENT DOCUMENTS

DE 2023027 A1 11/1970
 DE 2631951 A1 1/1978
 DE 3617723 A1 12/1987
 DE 3643276 A1 6/1988
 DE 3822057 C2 1/1989
 DE 69229832 T2 2/2000
 EP 0112699 A2 7/1984
 EP 0441323 A1 8/1991
 EP 819495 A2 1/1998
 EP 1722310 A1 11/2006
 EP 2319551 A2 5/2011
 EP 2793977 B1 11/2015
 FR 2042606 A1 2/1971
 FR 2273264 A1 12/1975

FR 2458804 1/1981
 FR 2617593 1/1989
 GB 1301033 A 12/1972
 GB 2020735 A 11/1979
 GB 2207239 B 1/1989
 GB 2328982 A 3/1999
 JP 58163843 9/1983
 JP 04-280582 A 10/1992
 JP 3110458 B2 11/2000
 JP 2007229928 A 9/2007
 JP 2009298012 A 12/2009
 JP 2011062371 A 3/2011
 KR 1020050039780 A 4/2005
 KR 1020060111424 A 10/2006
 KR 1020100037914 A 4/2010
 NL 7006908 11/1970
 NL 8801680 A 2/1989
 NL 9101825 A 5/1993
 SE 376843 B 6/1975
 WO WO1981002770 A1 10/1981
 WO WO1993009407 A1 5/1993
 WO WO2000072181 A3 11/2000
 WO WO2002040084 A2 5/2002
 WO WO2002010262 A1 12/2002
 WO WO2004035116 A1 4/2004
 WO WO2005094919 A1 10/2005
 WO WO2006086723 A2 8/2006
 WO WO2008022880 A1 2/2008
 WO WO2008079023 A1 7/2008
 WO WO2009039203 A2 3/2009
 WO WO2009039214 A2 3/2009
 WO WO2009055639 A2 4/2009
 WO WO2010020397 A1 4/2010
 WO WO2010129720 A2 11/2010
 WO WO2011021098 A1 2/2011
 WO WO2011136667 A1 11/2011
 WO WO2012104779 A1 8/2012
 WO WO2013017949 A2 2/2013
 WO WO2013070337 A1 5/2013
 WO WO2013095459 A9 6/2013
 WO WO2013096713 A2 6/2013
 WO WO2013096718 A2 6/2013
 WO WO2013096722 A2 6/2013
 WO WO2013096909 A2 6/2013
 WO WO2013176770 A2 11/2013
 WO WO2013177357 A1 11/2013
 WO WO2014100557 A2 6/2014
 WO WO2014100571 A2 6/2014
 WO WO2014100658 A1 6/2014
 WO WO2014100687 A2 6/2014
 WO WO2014100736 A2 6/2014
 WO WO2014100744 A2 6/2014
 WO WO2014144557 A2 9/2014
 WO WO2014025736 A1 10/2014
 WO WO2014160058 A2 10/2014
 WO WO2014160249 A1 10/2014
 WO WO2014160307 A1 10/2014
 WO WO2015017275 A1 2/2015
 WO WO2015116557 A1 8/2015

OTHER PUBLICATIONS

Second Office Action and Search Report dated Jun. 27, 2016, received in Republic of China patent application No. 201280069373.3, 6 pgs.
 First Office Action dated Oct. 20, 2015, received in Republic of China patent application No. 201280069373.3, 4 pgs.
 First Office Action dated Jul. 28, 2016, received in Australian patent application No. 2012358397, 3 pgs.
 European Community Design Registration 002381669/0001-0005, Filed Jan. 8, 2014 and dated May 12, 2016, 42 pgs.
 Notification from the Eurasian Patent Organization for Application 201491218, dated Apr. 27, 2015, 2 pgs.
 Second Report of substantive examination from Superintendent of Industry and Commerce of Colombia for Patent Application 14.155.193, dated Sep. 8, 2016, 18 pgs.

(56)

References Cited

OTHER PUBLICATIONS

First Examination Report from IP Australia for Patent Application 2012358397, dated Jul. 28, 2016, 3 pgs.

Notice of Acceptance from IP Australia for Patent Application 2012358397, dated Jan. 5, 2017, 3 pgs.

English Search Report from The People's Republic of China for Patent Application 201280069373.3, dated Jul. 12, 2016, 2 pgs.

Notice of Allowance from Korean Intellectual Property Office for Patent Application 10-2014-7019883, dated Jun. 28, 2016, 3 pgs.

First Examination Report from Mexican Patent Office for Patent Application MX/a/2014/007751, dated Sep. 8, 2016, 5 pgs.

Further Examination Report from the New Zealand Intellectual Property Office for Patent Application 626382, dated Jan. 12, 2016, 2 pgs.

Notice of Acceptance from the New Zealand Intellectual Property Office for Patent Application 626382, dated Feb. 9, 2016, 1 pg.

Rule 161 Communication from the European Patent Office for Patent Application 14720397.0-1662, dated Oct. 28, 2015, 2 pgs.

Decision to Grant from the European Patent Office for Patent Application 15192051.9-1664/3006010, dated Jan. 19, 2017, 3 pgs.

Further Examination Report from the New Zealand Intellectual Property Office for Patent Application 715098, dated Jun. 13, 2016, 2 pgs.

Notice of Acceptance from the New Zealand Intellectual Property Office for Patent Application 715098, dated Sep. 9, 2016, 3 pgs.

Notice of Acceptance from the New Zealand Intellectual Property Office for Patent Application 723930, dated Nov. 16, 2016, 3 pgs.

Examination Report from the European Patent Office for EPO Application No. 16 167 576.4-1662, dated Oct. 11, 2016, 6 pgs.

Search Report from the European Patent Office for EPO Application No. 16 167 576.4-1662, dated Sep. 19, 2016, 4 pgs.

Notice of Acceptance from IP Australia for Patent Application 2016225879, dated Oct. 26, 2016, 3 pgs.

First Examination Report from the New Zealand Intellectual Property Office for Patent Application 725469, dated Nov. 8, 2016, 2 pgs.

U.S. Appl. No. 14/191,827, filed Feb. 27, 2014, U.S. Pat. No. 2015/0238228.

U.S. Appl. No. 29/564,750, filed May 16, 2016.

U.S. Appl. No. 15/161,876, filed May 23, 2016, U.S. Pat. No. 2016/0262977.

U.S. Appl. No. 15/163,906, filed May 25, 2016.

U.S. Appl. No. 29/565,908, filed May 25, 2016.

U.S. Appl. No. 62/341,396, filed May 25, 2016.

U.S. Appl. No. 29/569,450, filed Jun. 28, 2016.

U.S. Appl. No. 29/569,460, filed Jun. 28, 2016.

U.S. Appl. No. 15/205,538, filed Jul. 8, 2016, U.S. Pat. No. 2016/0319850.

U.S. Appl. No. 29/570,648, filed Jul. 11, 2016.

U.S. Appl. No. 29/571,387, filed Jul. 18, 2016.

U.S. Appl. No. 29/575,331, filed Aug. 24, 2016.

U.S. Appl. No. 29/575,316, filed Aug. 24, 2016.

U.S. Appl. No. 15/248,200, filed Aug. 26, 2016, U.S. Pat. No. 2016/0362234.

U.S. Appl. No. 15/270,321, filed Sep. 20, 2016.

U.S. Appl. No. 15/341,611, filed Nov. 2, 2016.

PCT/US2017/15382, dated Jan. 27, 2017.

U.S. Appl. No. 15/418,096, filed Jan. 27, 2017.

KR1020050039780A, English Translation.

KR1020060111424A, English Translation.

Second Office Action and Search Report dated Jun. 27, 2016, received in Republic of China patent application No. 201280069373.3, 6 pgs., English Translation.

First Office Action dated Oct. 20, 2015, received in Republic of China patent application No. 201280069373.3, 4 pgs., English Translation.

Notification from the Eurasian Patent Organization for Application 201491218, dated Apr. 27, 2015, 2 pgs., English Translation.

Second Report of substantive examination from Superintendent of Industry and Commerce of Colombia for Patent Application 14.155.193, dated Sep. 8, 2016, 18 pgs., English Translation.

Notice of Allowance from Korean Intellectual Property Office for Patent Application 10-2014-7019883, dated Jun. 28, 2016, 3 pgs., English Translation.

First Examination Report from Mexican Patent Office for Patent Application MX/a/2014/007751, dated Sep. 8, 2016, 5 pgs., English Translation.

"The OpenCV Reference Manual Release 2.3", May 10, 2011, pp. 1-263.

Invitation to Respond to Written Opinion from the Intellectual Property Office of Singapore for Application 112015075045, dated Nov. 23, 2015.

First Examination Report from the Intellectual Property Office of New Zealand for Application 626382, dated Apr. 1, 2015.

Report of substantive examination from Superintendent of Industry and Commerce of Colombia for Patent Application 14155193, dated Nov. 19, 2015.

Notice of Preliminary Rejection (Non-Final) from the Korean Intellectual Property Office ("KIPO") for Korean Patent Application No. 10-2014-7019883, dated Dec. 15, 2015.

First Examination report from the New Zealand Intellectual Property Office for New Zealand IP No. 715098, dated Jan. 12, 2016.

"Microcomputer Intravenous Infusion Drip Controller", Longfian Scitech Co., Ltd., Mar. 18, 2016 (retrieved). Advertisement listed as having a valid price starting at Mar. 10, 2016, 2 pgs, <http://marina.en.made-in-china.com/productimage/bKvQTtJcJEhs-2flj0OFZetfTSdnhcU/China-Microcomputer-Intravenous-Infusion-Drip-Controller.html>.

"DripAssist Specificaiton", Shift Labs, Mar. 18, 2016 (retrieved). 2 pgs, <http://www.shiftlabs.com/products/dripassist/specifications>.

"DripAssist Product Overview", Shift Labs, Mar. 18, 2016 (retrieved). 2 pgs, <http://www.shiftlabs.com/products/dripassist/overview>.

"DripAssist Product Brochure", Shift Labs, Mar. 18, 2016 (retrieved). 1 pg., <http://www.shiftlabs.com/sites/default/files/DripAssistOnesheet.pdf>.

"IUV Drip monitor", Allison Lipper, Mar. 18, 2016 (retrieved). 3 pgs., <http://cnx.org/contents/WmaFki2-@3/IV-Drip-Monitor>.

"AutoClamp", Ace Medical, Mar. 18, 2016 (retrieved). 2 pgs., http://ace-medical.com/2014/en/product/product/view.asp?po_no=31.

Extended European Search Report dated Mar. 3, 2016, received in European patent application No. 15192051.9, 7 pgs.

AAMI and FDA, Infusing Patients Safely: Priority Issues from the AAMI/FDA Infusion Device Summit, Symposium, Oct. 5-6, 2010, pp. 1-48, AAMI, Arlington, VA, USA.

Conway, "Analytical Analysis of Tip Travel in a Bourdon Tube", Master's Thesis, Naval Postgraduate School Monterey, Dec. 1995, pp. i-89.

Darzynkiewicz, 'Cytometry', Methods in Cell Biology, 2011, Third Edition Part A, vol. 63, pp. 44-48, Academic Press, San Diego, 2001. And please see whole document generally.

"Feature Detection", OpenCV Wiki, Oct. 31, 2011 (retrieved), 7 pgs, http://opencv.willowgarage.com/documentation/cpp/imgproc_feature_detection.html.

Galambos et al., "Progressive Probabilistic Hough Transform for Line Detection", IEEE, 10 pgs, 1999.

International Search Report & Written Opinion dated May 14, 2012, received in International patent application No. PCT/US2011/066588, 9 pgs.

International Search Report & Written Opinion dated Jun. 18, 2013, received in International patent application No. PCT/US2012/071142, 14 pgs.

International Search Report & Written Opinion dated Oct. 1, 2013, received in International patent application No. PCT/US2012/071490, 19 pgs.

International Search Report & Written Opinion dated Dec. 4, 2013, received in International patent application No. PCT/US2013/032445, 20 pgs.

International Search Report & Written Opinion dated Nov. 7, 2013, received in International patent application No. PCT/US2013/042350, 18 pgs.

(56)

References Cited

OTHER PUBLICATIONS

Invitation to Pay Additional Fees and, Where Applicable, Protest Fee dated Sep. 9, 2013, received in International patent application No. PCT/US2013/032445, 10 pgs.

Invitation to Pay Additional Fees and, Where Applicable, Protest Fee dated Sep. 26, 2013, received in International patent application No. PCT/US2013/042350, 7 pgs.

International Preliminary Report on Patentability dated Jul. 3, 2014, received in International patent application No. PCT/US2012/071142, 9 pgs.

International Search Report dated Feb. 5, 2015, received in International patent application No. PCT/US2014/029020, 7 pgs.

International Preliminary Report on Patentability and Written Opinion, dated Sep. 15, 2015, received in International patent application No. PCT/US2014/029020, 11 pgs.

Hofmann, "Modeling Medical Devices for Plug-and-Play Interoperability", MIT Department of Electrical Engineering and Computer Science, Jun. 2007, pp. 1-187.

King et al. Prototyping closed loop physiologic control with the medical device coordination framework. In SEHC 2010: Proceedings of the 2010 ICSE Workshop on Software Engineering in Health Care (pp. 1-11). New York, NY: ACM. (2010).

Jetley et al., "Safety Requirements Based Analysis of Infusion Pump Software", Proceedings of the IEEE Real Time Systems Symposium, Tuscon, Dec. 2007 pp. 1-4.

FDA US Food and Drug Administration, "Sedasys® Computer-Assisted Personalized Sedation System P08000", Jul. 16, 2013, pp. 1-2, www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/Recently-ApprovedDevices/ucm353950.htm.

Luerkens, David W. "Theory and Application of Morphological Analysis: Fine Particles and Surfaces". Boca Raton: CRC, 1991. 5-7.

Matas et al., 'Progressive Probabilistic Hough Transform', University of Surrey, Czech Technical University, 1998, pp. 1-10.

"Miscellaneous Image Transformations", OpenCV Wiki, 2011, 9 pgs., http://opencv.willowgarage.com/documentation/cpp/miscellaneous_image_transformations.

National Patient Safety Agency, Design for Patient Safety: A Guide to the Design of Electronic Infusion Devices, booklet, 2010, pp. 1-96, Edition 1, National Patient Safety Agency, London.

"Object Detection", OpenCV Wiki, 2011, 2 pgs., http://opencv.willowgarage.com/documentation/cpp/object_detection.html.

"The OpenCV Reference Manual Release 2.4.6.0", Jul. 1, 2013, pp. 1-813.

Leor et al., "A System for the Measurement of Drop Volume of Intravenous Solutions", Proceedings Computers in Cardiology 1990, pp. 405-406, Los Alamitos, California.

Butterfield, "Alaris SE Pump, Monitoring and Detection of IV Line Occlusions.", CareFusion Corporation, 2010, 4 pgs.

"Vista Basic: Instructions for Use: Software IFVB", manual, 2002, pp. 3, B. Braun Medical Inc.

Hugli et al., "Drop volume measurement by vision." Proceedings of SPIE Electronic Imaging Conference, San Diego, Jan. 2000. SPIE vol. 3866-11, pp. 60-66.

U.S. Appl. No. 61/297,544, filed Jan. 22, 2010.

U.S. Appl. No. 13/011,543, filed Jan. 21, 2011, U.S. Pat. No. 2011/0313789.

U.S. Appl. No. 61/578,674, filed Dec. 21, 2011.

U.S. Appl. No. 13/333,574, filed Dec. 21, 2011, U.S. Pat. No. 2012/0185267.

PCT/US11/66588, dated Dec. 21, 2011, WO2013095459A1.

U.S. Appl. No. 61/578,649, filed Dec. 21, 2011.

U.S. Appl. No. 61/578,658, filed Dec. 21, 2011.

U.S. Appl. No. 61/651,322, filed May 24, 2012.

U.S. Appl. No. 61/679,117, filed Aug. 3, 2012.

U.S. Appl. No. 61/738,447, filed Dec. 18, 2012.

U.S. Appl. No. 13/723,242, filed Dec. 21, 2012, U.S. Pat. No. 2013/0317753.

PCT/US12/71112, dated Dec. 21, 2012, WO2013096713A1.

U.S. Appl. No. 13/723,251, filed Dec. 21, 2012, U.S. Pat. No. 2013/0204188.

U.S. Appl. No. 61/740,474, filed Dec. 21, 2012.

PCT/US12/71142, dated Dec. 21, 2012, WO2013096722A1.

U.S. Appl. No. 13/723,244, filed Dec. 21, 2012, U.S. Pat. No. 2013/0188040.

U.S. Appl. No. 13/723,239, filed Dec. 21, 2012, U.S. Pat. No. 2013/0297330.

PCT/US12/71490, dated Dec. 21, 2012, WO2013096909A1.

U.S. Appl. No. 13/725,790, filed Dec. 21, 2012, U.S. Pat. No. 2013/0177455.

U.S. Appl. No. 13/723,253, filed Dec. 21, 2012, U.S. Pat. No. 2013/0191513.

U.S. Appl. No. 13/723,238, filed Dec. 21, 2012, U.S. Pat. No. 2013/0182381.

U.S. Appl. No. 13/724,568, filed Dec. 21, 2012, U.S. Pat. No. 2013/0184676.

PCT/US12/71131, dated Dec. 21, 2012, WO2013096718A1.

U.S. Appl. No. 13/723,235, filed Dec. 21, 2012, U.S. Pat. No. 2013/0197693.

PCT/US13/32445, dated Mar. 15, 2013, WO2013176770A1.

U.S. Appl. No. 13/840,339, filed Mar. 15, 2013, U.S. Pat. No. 2013/0336814.

U.S. Appl. No. 13/833,432, filed Mar. 15, 2013, U.S. Pat. No. 2013/0281965.

U.S. Appl. No. 13/836,497, filed Mar. 15, 2013, U.S. Pat. No. 2013/0346108.

U.S. Appl. No. 13/833,712, filed Mar. 15, 2013, U.S. Pat. No. 2013/0272773.

U.S. Appl. No. 13/834,030, filed Mar. 15, 2013, U.S. Pat. No. 2013/0310990.

PCT/US13/42350, dated May 23, 2013, WO/2013/177357A1.

U.S. Appl. No. 13/900,655, filed May 23, 2013, U.S. Pat. No. 2013/0317837.

U.S. Appl. No. 29/457,520, filed Jun. 11, 2013, U.S. Pat. No. D. 735,319.

U.S. Appl. No. 29/457,516, filed Jun. 11, 2013, U.S. Pat. No. D. 728,779.

U.S. Appl. No. 29/457,521 filed Jun. 11, 2013.

U.S. Appl. No. 29/457,522, filed Jun. 11, 2013, U.S. Pat. No. D. 736,370.

U.S. Appl. No. 61/843,574, filed Jul. 8, 2013.

U.S. Appl. No. 61/860,398, filed Jul. 31, 2013.

U.S. Appl. No. 13/971,258, filed Aug. 20, 2013, U.S. Pat. No. 2013/0339049.

U.S. Appl. No. 61/894,801, filed Oct. 23, 2013.

U.S. Appl. No. 29/471,858, filed Nov. 6, 2013, U.S. Pat. No. D. 751,690.

U.S. Appl. No. 29/471,861, filed Nov. 6, 2013, U.S. Pat. No. D. 749,206.

U.S. Appl. No. 29/471,856, filed Nov. 6, 2013, U.S. D. 751,689.

U.S. Appl. No. 29/471,859, filed Nov. 6, 2013, U.S. Pat. No. D. 745,661.

U.S. Appl. No. 29/471,864, filed Nov. 6, 2013, U.S. Pat. No. D. 752,209.

U.S. Appl. No. 61/900,431, filed Nov. 6, 2013.

U.S. Appl. No. 61/904,123, filed Nov. 14, 2013.

U.S. Appl. No. 14/101,848, filed Dec. 10, 2013, U.S. Pat. No. 2014/0165703.

U.S. Appl. No. 14/136,243, filed Dec. 20, 2013, U.S. Pat. No. 2014/0188516.

PCT/US13/76886, dated Dec. 20, 2013, WO/2014/100571A1.

U.S. Appl. No. 29/477,236, filed Dec. 20, 2013.

U.S. Appl. No. 29/477,242, filed Dec. 20, 2013.

U.S. Appl. No. 29/477,233, filed Dec. 20, 2013.

U.S. Appl. No. 29/477,232, filed Dec. 20, 2013.

U.S. Appl. No. 29/477,231, filed Dec. 20, 2013.

PCT/US13/77135, dated Dec. 20, 2013, WO/2014/100687A1.

U.S. Appl. No. 29/477,237, filed Dec. 20, 2013.

PCT/US13/76851, dated Dec. 20, 2013, WO2014100557A1.

PCT/US13/77258, dated Dec. 20, 2013, WO2014100736A1.

PCT/US13/77077, dated Dec. 20, 2013, WO/2014/100658A1.

(56)

References Cited

OTHER PUBLICATIONS

- U.S. Appl. No. 14/137,421, filed Dec. 20, 2013, U.S. Pat. No. 2014/0180711.
PCT/US13/77270, dated Dec. 20, 2013, WO/2014/100744A1.
U.S. Appl. No. 14/135,809, filed Dec. 20, 2013, U.S. Pat. No. 2014/0195639.
U.S. Appl. No. 14/135,784, filed Dec. 20, 2013, U.S. Pat. No. 2014/0188076.
U.S. Appl. No. 29/477,249, filed Dec. 20, 2013.
U.S. Appl. No. 14/137,562, filed Dec. 20, 2013, U.S. Pat. No. 2014/0227021.
U.S. Appl. No. 61/942,986, filed Feb. 21, 2014.
U.S. Appl. No. 61/953,036, filed Mar. 14, 2014.
U.S. Appl. No. 14/213,373, filed Mar. 14, 2014, U.S. Pat. No. 2014/0318639.
PCT/US14/29020, dated Mar. 14, 2014, WO/2014/144557A1.
U.S. Appl. No. 61/987,742, filed May 2, 2014.
U.S. Appl. No. 61/990,330, filed May 8, 2014.
U.S. Appl. No. 14/341,207, filed Jul. 25, 2014, U.S. Pat. No. 2015/0033823.
PCT/US2014/48227, dated Jul. 25, 2014, WO2015017275A1.
U.S. Appl. No. 14/451,904, filed Aug. 5, 2014, U.S. Pat. No. 2014/0343492.
U.S. Appl. No. 62/052,008, filed Sep. 18, 2014.
U.S. Appl. No. 14/491,161, filed Sep. 19, 2014, U.S. Pat. No. 2015/0002677.
U.S. Appl. No. 14/491,128, filed Sep. 19, 2014, U.S. Pat. No. 2015/0002667.
U.S. Appl. No. 14/491,143, filed Sep. 19, 2014, U.S. 2015/0002668.
U.S. Appl. No. 62/086,356, filed Dec. 2, 2014.
U.S. Appl. No. 14/616,079, filed Feb. 6, 2015, U.S. Pat. No. 2015/0154364.
U.S. Appl. No. 29/517,098, filed Feb. 10, 2015, U.S. Pat. No. D. 754,065.
U.S. Appl. No. 29/517,095, filed Feb. 10, 2015.
U.S. Appl. No. 29/517,097, filed Feb. 10, 2015.
U.S. Appl. No. 29/517,099, filed Feb. 10, 2015.
U.S. Appl. No. 29/517,100, filed Feb. 10, 2015.
U.S. Appl. No. 29/517,101, filed Feb. 10, 2015.
U.S. Appl. No. 29/517,096, filed Feb. 10, 2015.
U.S. Appl. No. 14/627,287, filed Feb. 20, 2015, U.S. Pat. No. 2015/0157791.
PCT/US15/16796, dated Feb. 27, 2015.
U.S. Appl. No. 14/656,945, filed Mar. 13, 2015, U.S. Pat. No. 2015/0257974.
U.S. Appl. No. 14/649,364, filed Apr. 6, 2015, U.S. Pat. No. 2015/0314083.
U.S. Appl. No. 62/168,343, filed May 29, 2015.
U.S. Appl. No. 29/531,366, filed Jun. 25, 2015.
U.S. Appl. No. 29/532,660, filed Jul. 9, 2015.
U.S. Appl. No. 14/812,149, filed Jul. 29, 2015, U.S. Pat. No. 2015/0332009.
U.S. Appl. No. 29/538,153, filed Sep. 1, 2015.
U.S. Appl. No. 62/212,871, filed Sep. 1, 2015.
U.S. Appl. No. 14/853,300, filed Sep. 14, 2015.
PCT/US15/49952, dated Sep. 14, 2015.
U.S. Appl. No. 14/873,515, filed Oct. 2, 2015, U.S. Pat. No. 2016/0097382.
U.S. Appl. No. 14/932,291, filed Nov. 4, 2015, U.S. Pat. No. 2016/0055649.
U.S. Appl. No. 14/931,928, filed Nov. 4, 2015, U.S. Pat. No. 2016/0055397.
U.S. Appl. No. 14/938,083, filed Nov. 11, 2015, U.S. Pat. No. 2016/0073063.
U.S. Appl. No. 14/938,368, filed Nov. 11, 2015, U.S. Pat. No. 2016/0061641.
U.S. Appl. No. 14/939,015, filed Nov. 12, 2015, U.S. Pat. No. 2016/0063353.
U.S. Appl. No. 14/939,586, filed Nov. 12, 2015.
U.S. Appl. No. 14/956,648, filed Dec. 2, 2015, U.S. 2016/0084434.
PCT/US2015/63359, dated Dec. 2, 2015.
U.S. Appl. No. 29/547,402, filed Dec. 3, 2015.
U.S. Appl. No. 29/547,405, filed Dec. 3, 2015.
U.S. Appl. No. 29/552,303, filed Jan. 21, 2016.
U.S. Appl. No. 29/552,942, filed Jan. 27, 2016.
U.S. Appl. No. 29/552,943, filed Jan. 27, 2016.
U.S. Appl. No. 62/288,132, filed Jan. 28, 2016.
U.S. Appl. No. 29/553,094, filed Jan. 28, 2016.
U.S. Appl. No. 29/556,048, filed Feb. 26, 2016.
U.S. Appl. No. 15/055,941, filed Feb. 29, 2016.
U.S. Appl. No. 15/059,394, filed Mar. 3, 2016.
U.S. Appl. No. 15/077,389, filed Mar. 22, 2016.
U.S. Appl. NO. 29/561,572, filed Apr. 18, 2016.
U.S. Appl. No. 29/471,859.
DE2023027A1, English Abstract.
DE2631951A1, English Abstract.
DE3617723A1, English Abstract.
DE3643276A1, English Abstract, Description, and Claims.
DE3822057C2, English Abstract.
DE69229832T2, English Abstract.
FR2042606A1, English Abstract.
FR2273264A1, English Description and Claims.
FR2458804, English Abstract.
FR2617593, English Abstract.
JP04-280582A, English Abstract.
JP2007229928A, English Abstract.
JP2009298012A, English Abstract.
JP2011062371A, English Abstract.
JP3110458B2, English Abstract.
JP58163843, English Abstract.
KR1020100037914A, English Abstract.
NL7006908, English Abstract.
Report of substantive examination from Superintendent of Industry and Commerce of Colombia for Patent Application 14155193, mailed on Nov. 19, 2015, English Machine Translation.
Notice of Preliminary Rejection (Non-Final) from the Korean Intellectual Property Office ("KIPO") for Korean Patent Application No. 10-2014-7019883, mailed on Dec. 15, 2015, English Translation.

* cited by examiner

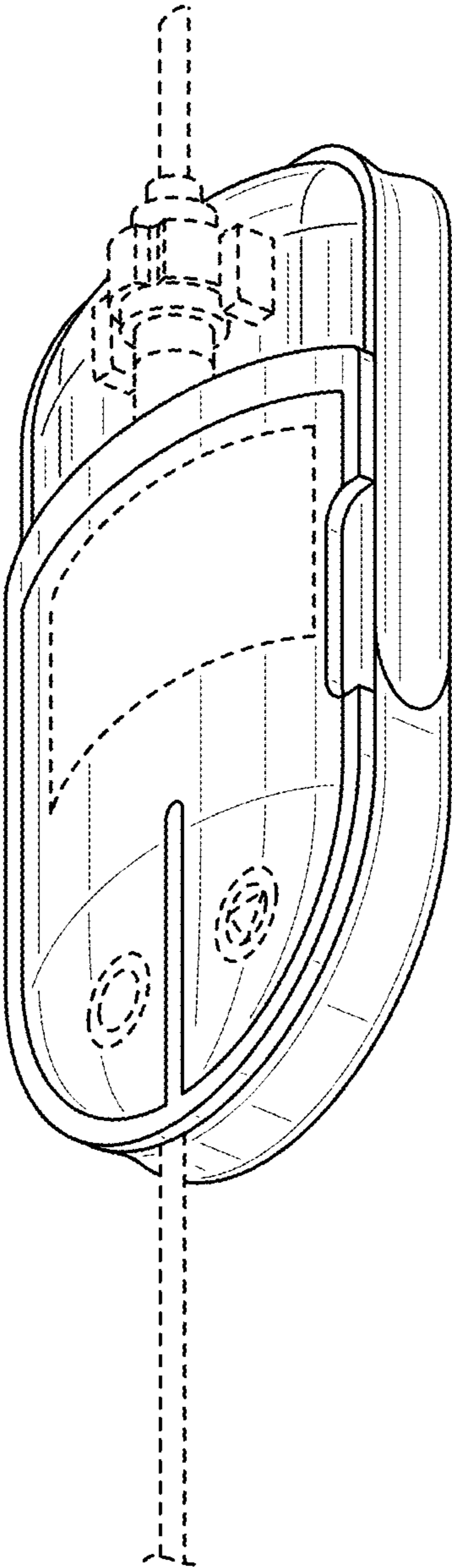


FIG. 1

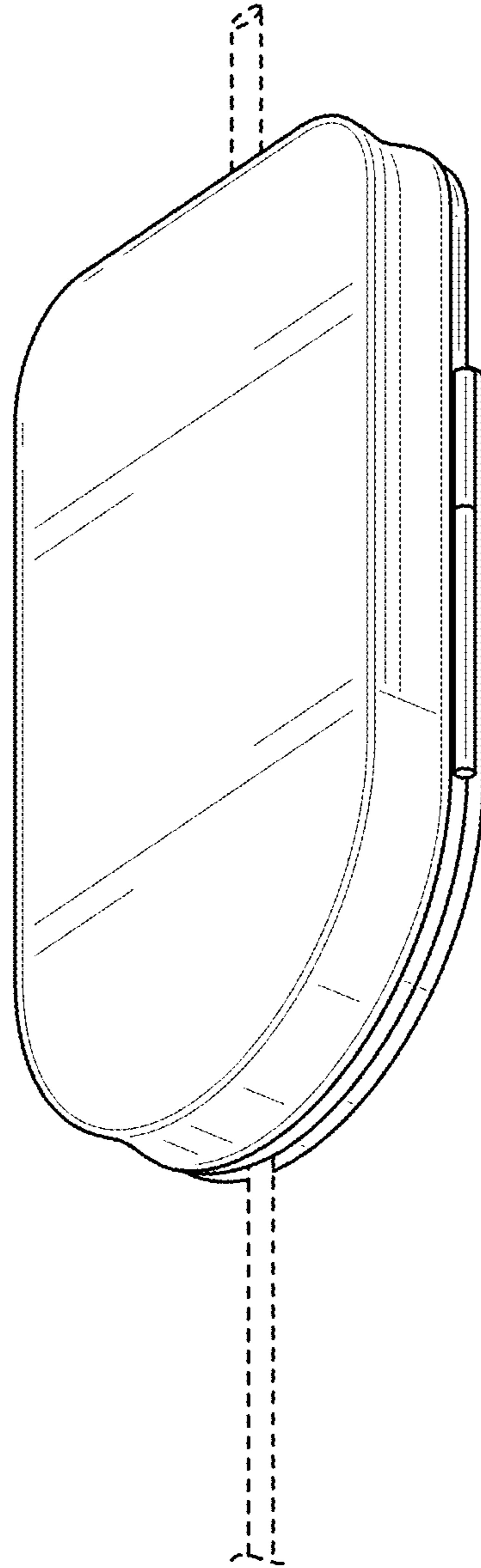


FIG. 2

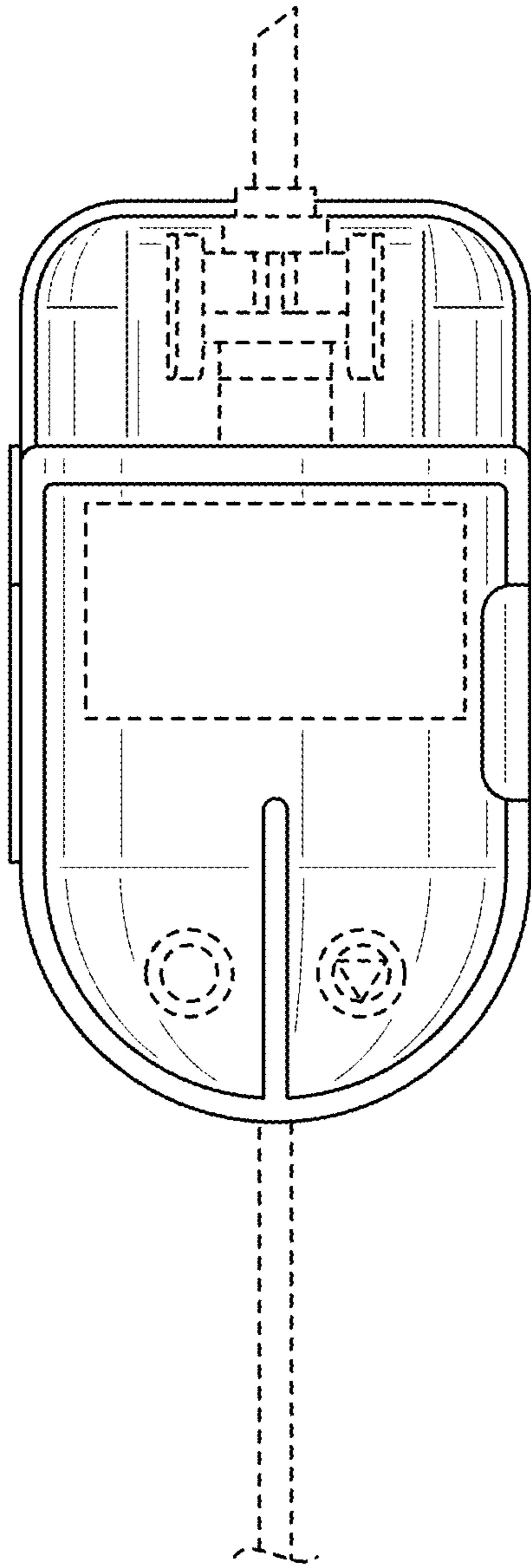


FIG. 3

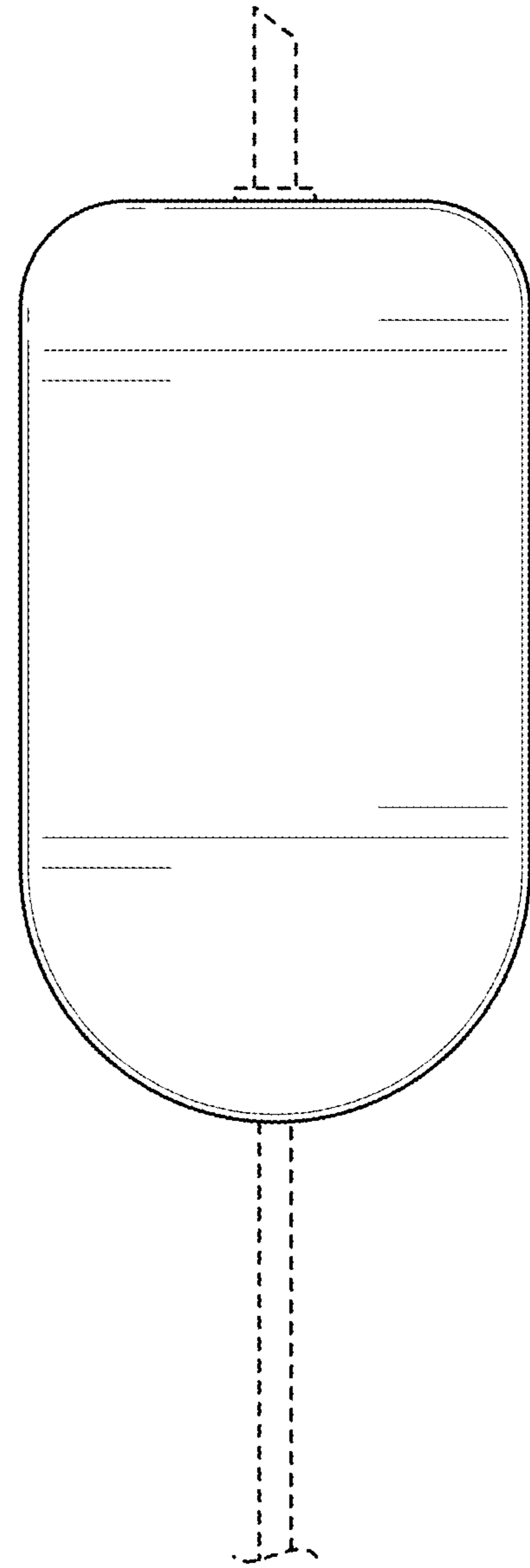


FIG. 4

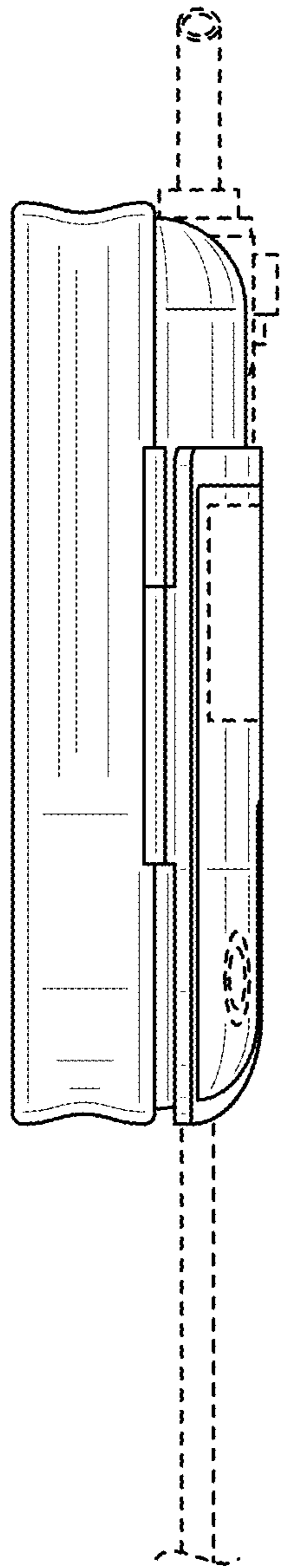


FIG. 5

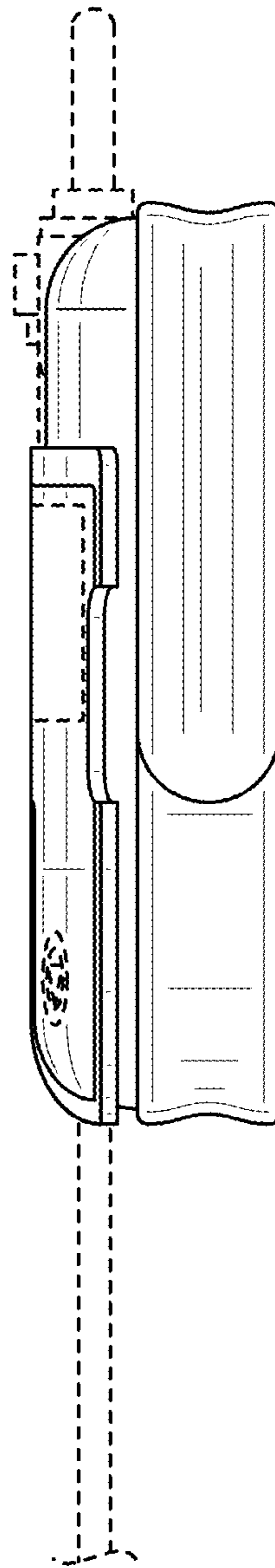


FIG. 6

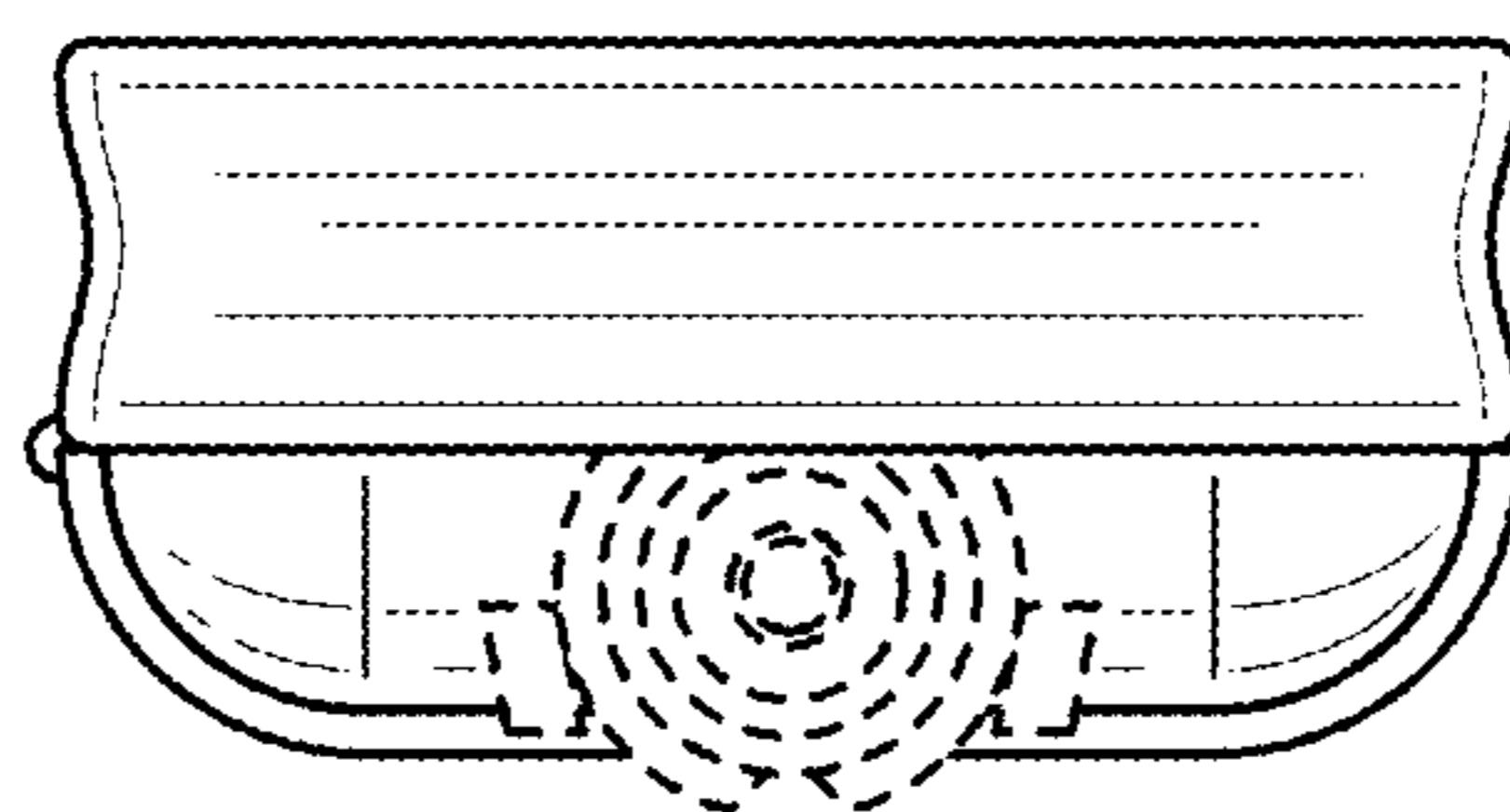


FIG. 7

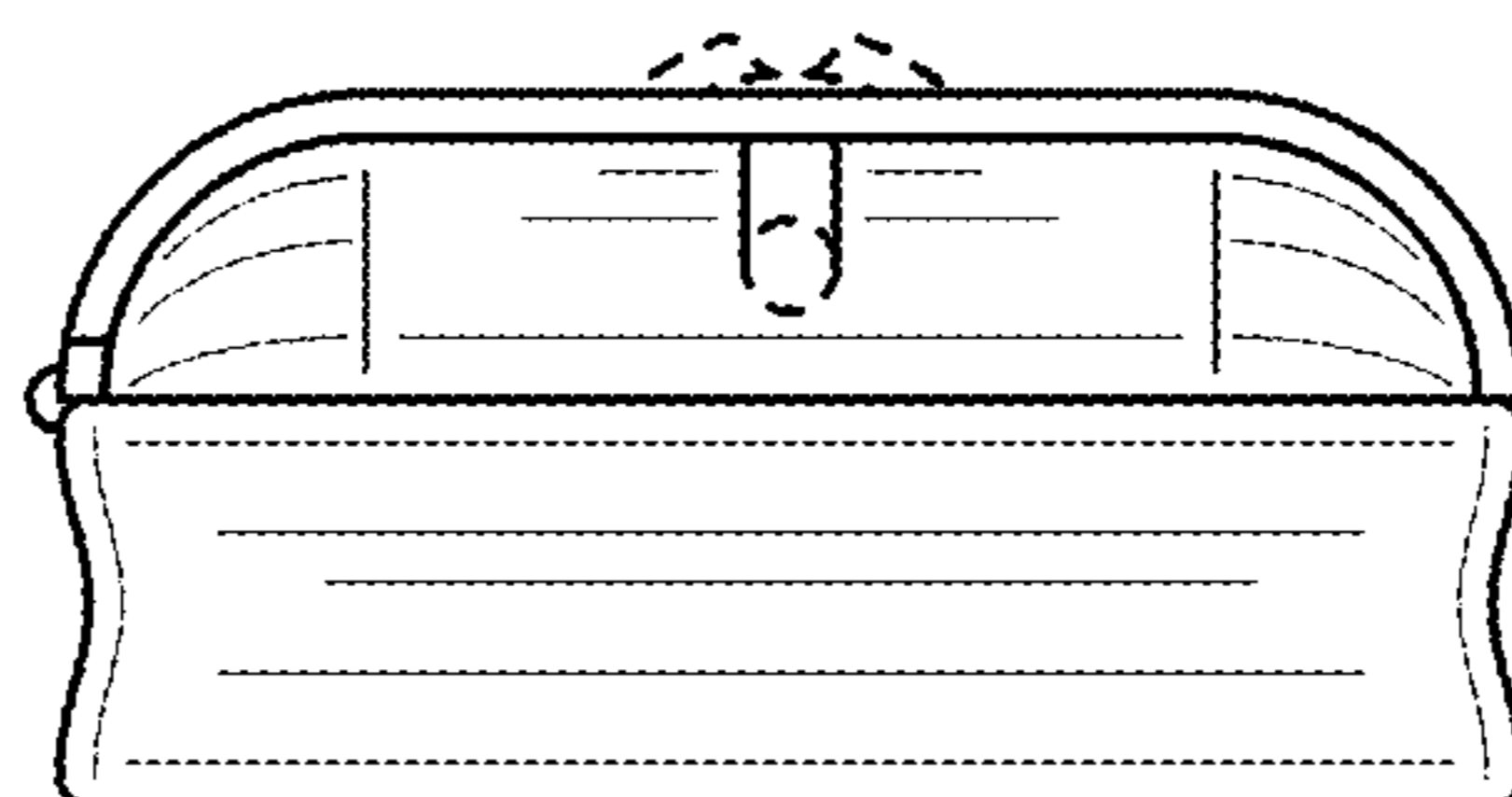


FIG. 8

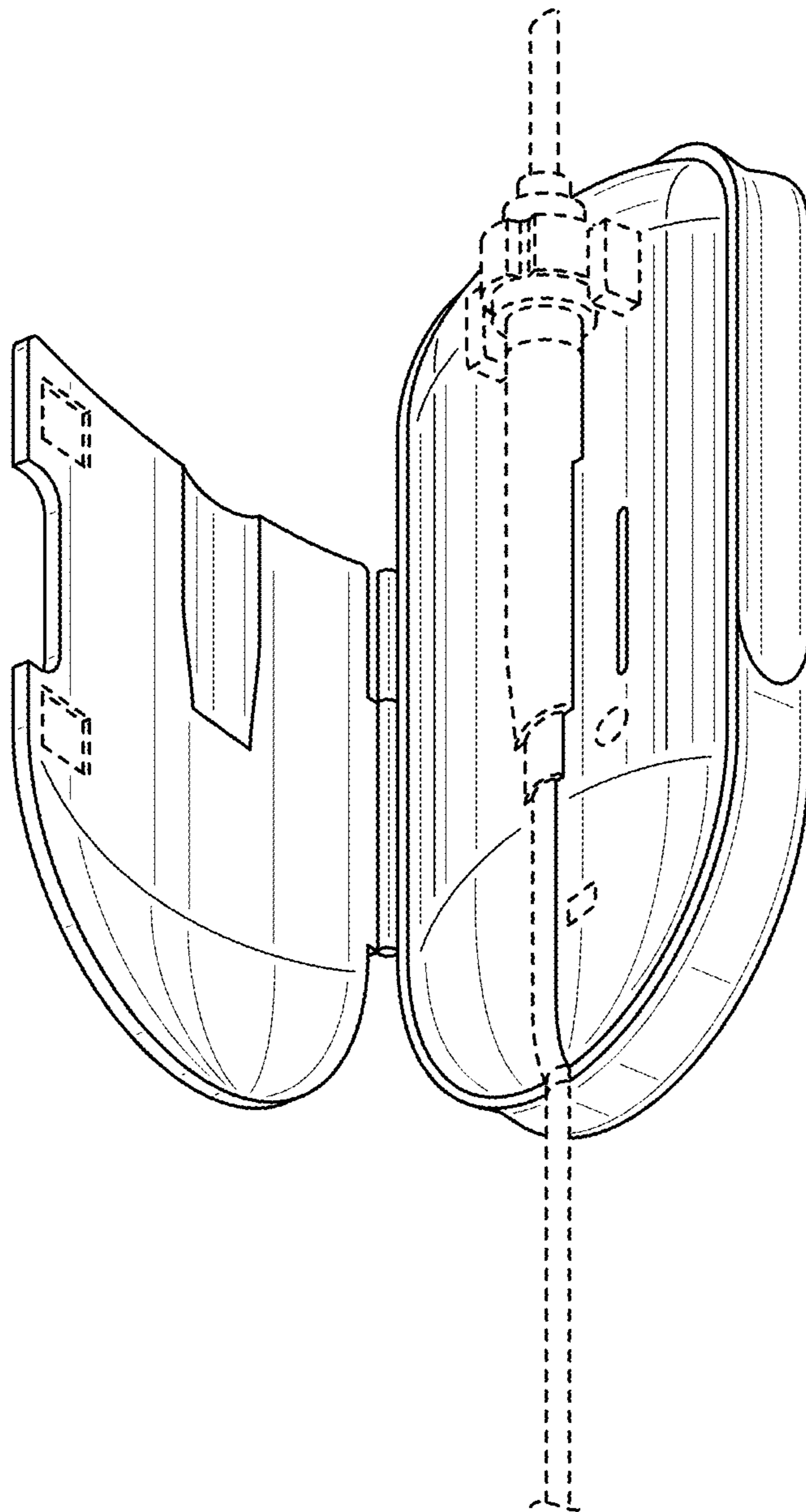


FIG. 9