



US00D777926S

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

(10) **Patent No.:** **US D777,926 S**
(45) **Date of Patent:** **** Jan. 31, 2017**

(54) **INTRA-CARDIAC PROCEDURE DEVICE**

- (71) Applicant: **Kardium Inc.**, Burnaby, CA (US)
- (72) Inventors: **Fernando Luis de Souza Lopes**, Delta (CA); **Saar Moisa**, Vancouver (CA); **Peter Josiah Hawes**, Burnaby (CA)
- (73) Assignee: **KARDIUM INC.**, Burnaby (CA)
- (**) Term: **14 Years**
- (21) Appl. No.: **29/509,636**
- (22) Filed: **Nov. 19, 2014**

Related U.S. Application Data

- (63) Continuation-in-part of application No. 13/793,076, filed on Mar. 11, 2013, and a continuation-in-part of (Continued)
- (51) **LOC (10) Cl.** **24-01**
- (52) **U.S. Cl.**
USPC **D24/167**
- (58) **Field of Classification Search**
USPC D24/165-169, 186, 107, 133, 155
(Continued)

References Cited

U.S. PATENT DOCUMENTS

- 4,114,202 A 9/1978 Roy et al.
 - 4,164,046 A 8/1979 Cooley
- (Continued)

FOREIGN PATENT DOCUMENTS

- CN 101797181 A 8/2010
 - EP 0723467 B1 4/2002
- (Continued)

OTHER PUBLICATIONS

Extended European Search Report issued in EP15188407.9, mailed Jan. 21, 2016.

(Continued)

Primary Examiner — Anhdao Doan

(74) *Attorney, Agent, or Firm* — Rossi, Kimms & McDowell LLP

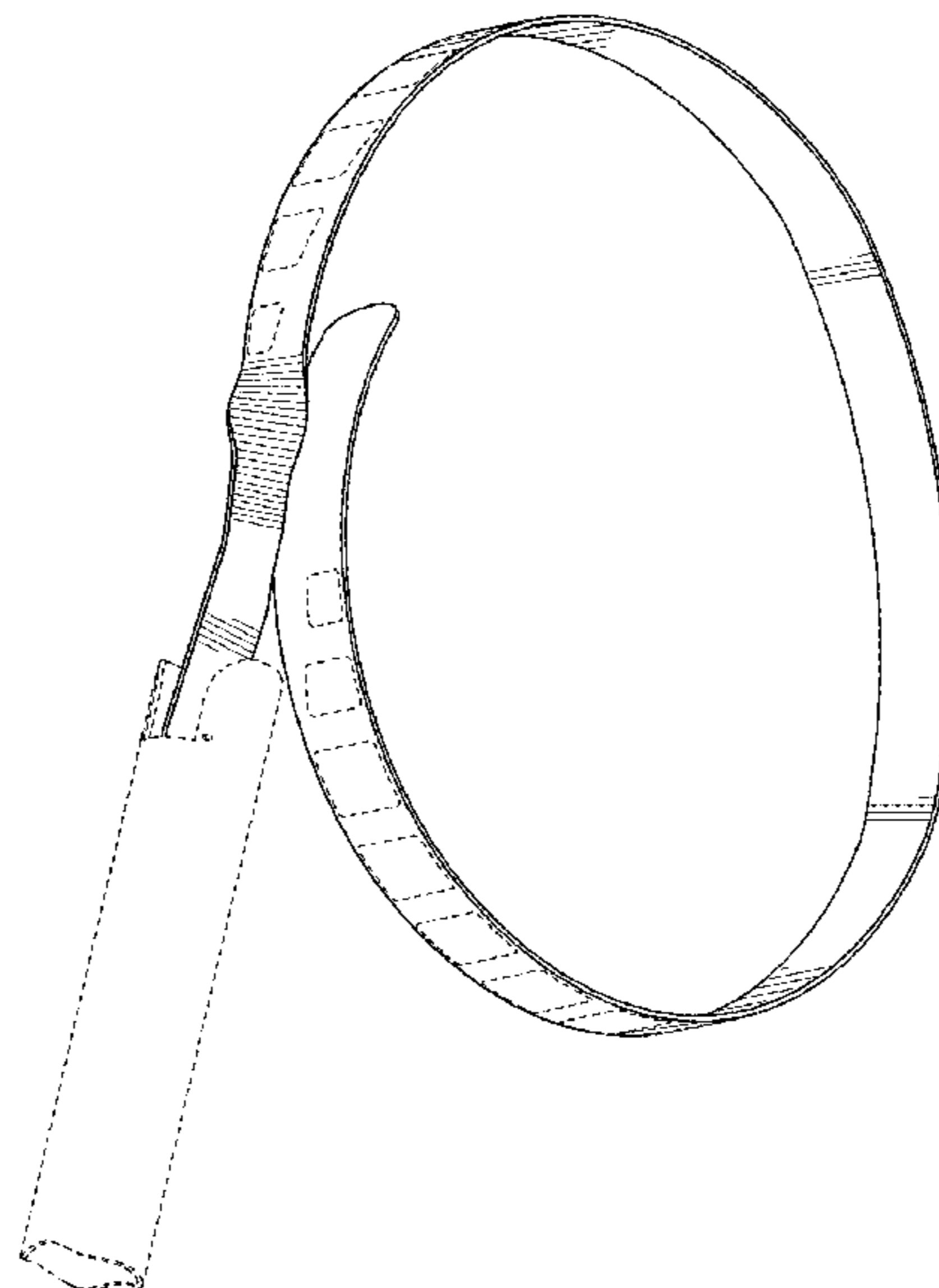
(57) **CLAIM**

The ornamental design for an intra-cardiac procedure device, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a elongate member of an intra-cardiac procedure device;
 FIG. 2 is a top view of the elongate member of FIG. 1;
 FIG. 3 is a bottom view of the elongate member of FIG. 1;
 FIG. 4 is a left side view of the elongate member of FIG. 1;
 FIG. 5 is a right side view of the elongate member of FIG. 1;
 FIG. 6 is a front view of the elongate member of FIG. 1;
 FIG. 7 is a back view of the elongate member of FIG. 1;
 FIG. 8 is another perspective view of the elongate member of FIG. 1, shown in relation to certain additional environmental features;
 FIG. 9 is a top view of the elongate member of FIG. 8;
 FIG. 10 is a bottom view of the elongate member of FIG. 8;
 FIG. 11 is a left side view of the elongate member of FIG. 8;
 FIG. 12 is a right side view of the elongate member of FIG. 8;
 FIG. 13 is a front view of the elongate member of FIG. 8;
 and,
 FIG. 14 is a back view of the elongate member of FIG. 8.
 The broken lines showing on the outer surface of the elongate member illustrate the bounds of the claim. The broken lines showing the shaft and other elongate members illustrate the environmental structures. The broken lines form no part of the claimed design.

1 Claim, 12 Drawing Sheets



Related U.S. Application Data

application No. PCT/US2012/022061, filed on Jan. 20, 2012, said application No. 13/793,076 is a continuation-in-part of application No. PCT/US2012/022062, filed on Jan. 20, 2012.

(58) **Field of Classification Search**

CPC A61B 18/1492; A61B 17/00234;
A61B 2017/0243; A61B
2018/00214; A61B 2018/00351

See application file for complete search history.

(56)

References Cited

U.S. PATENT DOCUMENTS

4,225,148 A 9/1980 Andersson
4,240,441 A 12/1980 Khalil
4,263,680 A 4/1981 Reul et al.
4,273,128 A 6/1981 Lary
4,411,266 A 10/1983 Cosman
4,490,859 A 1/1985 Black et al.
4,543,090 A 9/1985 McCoy
4,699,147 A 10/1987 Chilson et al.
4,770,187 A 9/1988 Lash et al.
4,787,369 A 11/1988 Allred, III et al.
4,794,912 A 1/1989 Lia
4,850,957 A 7/1989 Summers
4,887,613 A 12/1989 Farr et al.
4,890,602 A 1/1990 Hake
4,890,612 A 1/1990 Kensey
4,893,613 A 1/1990 Hake
4,895,166 A 1/1990 Farr et al.
4,905,667 A 3/1990 Foerster et al.
4,921,499 A 5/1990 Hoffman et al.
4,940,064 A 7/1990 Desai
4,942,788 A 7/1990 Farr et al.
4,979,514 A 12/1990 Sekii et al.
4,998,933 A 3/1991 Eggers et al.
5,026,384 A 6/1991 Farr et al.
5,047,047 A 9/1991 Yoon
5,122,137 A 6/1992 Lennox
5,127,902 A 7/1992 Fischell
5,156,151 A 10/1992 Imran
5,174,299 A 12/1992 Nelson
5,176,693 A 1/1993 Pannek, Jr.
5,178,620 A 1/1993 Eggers et al.
5,192,291 A 3/1993 Pannek, Jr.
5,195,505 A 3/1993 Josefsen
5,201,316 A 4/1993 Pomeranz et al.
5,228,442 A 7/1993 Imran
5,242,386 A 9/1993 Holzer
5,245,987 A 9/1993 Redmond et al.
5,255,679 A 10/1993 Imran
5,279,299 A 1/1994 Imran
5,293,869 A 3/1994 Edwards et al.
5,312,435 A 5/1994 Nash et al.
5,317,952 A 6/1994 Immega
5,324,284 A 6/1994 Imran
5,327,889 A 7/1994 Imran
5,341,807 A 8/1994 Nardella
5,345,936 A 9/1994 Pomeranz et al.
5,351,679 A 10/1994 Mayzels et al.
5,366,443 A 11/1994 Eggers et al.
5,370,679 A 12/1994 Atlee, III
5,379,773 A 1/1995 Hornsby
5,397,321 A 3/1995 Houser et al.
5,419,767 A 5/1995 Eggers et al.
5,450,860 A 9/1995 O'Connor
5,465,717 A 11/1995 Imran et al.
5,478,353 A 12/1995 Yoon
5,496,267 A 3/1996 Drasler et al.
5,499,981 A 3/1996 Kordis
5,531,760 A 7/1996 Alwafaie
5,545,193 A 8/1996 Fleischman et al.
5,555,883 A 9/1996 Avitall
5,557,967 A 9/1996 Renger

5,575,810 A 11/1996 Swanson et al.
5,593,424 A 1/1997 Northrup, III
5,598,848 A 2/1997 Swanson et al.
5,599,345 A 2/1997 Edwards et al.
5,620,481 A 4/1997 Desai et al.
5,637,090 A 6/1997 McGee et al.
5,662,587 A 9/1997 Grundfest et al.
5,681,308 A 10/1997 Edwards et al.
5,681,336 A 10/1997 Clement et al.
5,687,723 A 11/1997 Avitall
5,687,737 A 11/1997 Branham et al.
5,697,285 A 12/1997 Nappi et al.
5,713,896 A 2/1998 Nardella
5,713,942 A 2/1998 Stern et al.
5,716,397 A 2/1998 Myers
5,720,726 A 2/1998 Marcadis et al.
5,728,114 A 3/1998 Evans et al.
5,730,127 A 3/1998 Avitall
5,762,066 A 6/1998 Law et al.
5,769,846 A 6/1998 Edwards et al.
5,782,239 A 7/1998 Webster, Jr.
5,782,879 A 7/1998 Rosborough et al.
5,800,495 A 9/1998 Machek et al.
5,823,189 A 10/1998 Kordis
5,824,066 A 10/1998 Gross
5,836,947 A 11/1998 Fleischman et al.
5,836,990 A 11/1998 Li
5,853,422 A * 12/1998 Huebsch A61B 17/0057
606/157
5,868,755 A 2/1999 Kanner et al.
5,876,343 A 3/1999 Teo
5,881,727 A 3/1999 Edwards
5,885,278 A 3/1999 Fleischman
5,891,136 A 4/1999 McGee et al.
5,904,711 A 5/1999 Flom et al.
5,916,163 A 6/1999 Panescu et al.
5,919,207 A 7/1999 Taheri
5,921,924 A 7/1999 Avitall
5,935,075 A 8/1999 Casscells et al.
5,935,079 A 8/1999 Swanson et al.
5,941,251 A 8/1999 Panescu et al.
5,944,715 A 8/1999 Goble et al.
5,961,440 A 10/1999 Schweich, Jr. et al.
5,968,040 A 10/1999 Swanson et al.
5,984,950 A 11/1999 Cragg et al.
6,001,069 A 12/1999 Tachibana et al.
6,001,093 A 12/1999 Swanson et al.
6,014,581 A 1/2000 Wayne et al.
6,030,382 A 2/2000 Fleischman et al.
6,036,689 A 3/2000 Tu et al.
6,063,082 A 5/2000 DeVore et al.
6,071,282 A 6/2000 Fleischman
6,104,944 A 8/2000 Martinelli
6,106,522 A 8/2000 Fleischman et al.
6,123,702 A 9/2000 Swanson et al.
6,138,043 A 10/2000 Avitall
6,142,993 A 11/2000 Wayne et al.
6,156,046 A 12/2000 Passafaro et al.
6,210,432 B1 4/2001 Solem et al.
6,216,043 B1 4/2001 Swanson et al.
6,217,573 B1 4/2001 Webster
6,241,747 B1 6/2001 Ruff
6,248,124 B1 6/2001 Pedros et al.
6,258,258 B1 7/2001 Sartori
6,266,550 B1 7/2001 Selmon et al.
6,304,769 B1 10/2001 Arenson et al.
6,306,135 B1 10/2001 Ellmam et al.
6,308,091 B1 10/2001 Avitall
6,319,249 B1 11/2001 Tollner
6,322,559 B1 11/2001 Daulton et al.
6,330,478 B1 12/2001 Lee et al.
6,346,105 B1 2/2002 Tu et al.
6,350,263 B1 2/2002 Wetzig et al.
6,358,258 B1 3/2002 Arcia et al.
6,383,151 B1 5/2002 Diederich et al.
6,389,311 B1 5/2002 Wayne et al.
6,391,024 B1 5/2002 Sun et al.
6,391,048 B1 5/2002 Ginn et al.
6,391,054 B2 5/2002 Carpentier et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

6,402,781 B1	6/2002	Langberg et al.	7,530,980 B2	5/2009	Hooven
6,436,052 B1	8/2002	Nikolic et al.	7,736,388 B2	6/2010	Goldfarb et al.
6,475,223 B1	11/2002	Werp et al.	7,738,967 B2	6/2010	Salo
6,485,409 B1	11/2002	Voloshin et al.	8,103,338 B2	1/2012	Harlev et al.
6,485,482 B1	11/2002	Belef	D654,588 S *	2/2012	Taube D24/133
6,485,489 B2	11/2002	Teirstein et al.	8,118,853 B2	2/2012	Grewe
6,506,210 B1	1/2003	Kanner	8,150,499 B2	4/2012	Gelbart et al.
6,514,249 B1	2/2003	Maguire et al.	D660,967 S *	5/2012	Braido D24/155
6,529,756 B1	3/2003	Phan et al.	8,224,432 B2	7/2012	MacAdam et al.
6,537,198 B1	3/2003	Vidlund et al.	D717,954 S *	11/2014	Hjelle D24/167
6,537,314 B2	3/2003	Langberg et al.	2001/0003158 A1	6/2001	Kensey et al.
6,540,670 B1	4/2003	Hirata et al.	2001/0005787 A1	6/2001	Oz et al.
6,551,312 B2	4/2003	Zhang et al.	2001/0018611 A1	8/2001	Solem et al.
6,569,160 B1	5/2003	Goldin et al.	2001/0020126 A1	9/2001	Swanson et al.
6,569,198 B1	5/2003	Wilson et al.	2001/0021867 A1	9/2001	Kordis et al.
6,575,971 B2	6/2003	Hauck et al.	2002/0002329 A1	1/2002	Avitall
6,589,208 B2	7/2003	Ewers et al.	2002/0016628 A1	2/2002	Langberg et al.
6,616,684 B1 *	9/2003	Vidlund A61B 17/00234 606/213	2002/0087156 A1	7/2002	Maguire et al.
6,626,930 B1	9/2003	Allen et al.	2002/0087173 A1	7/2002	Alferness et al.
6,632,238 B2	10/2003	Ginn et al.	2002/0099415 A1	7/2002	Panescu et al.
6,635,056 B2	10/2003	Kadhiresan et al.	2002/0107478 A1	8/2002	Wendlandt
6,640,119 B1	10/2003	Budd et al.	2002/0107511 A1	8/2002	Collins et al.
6,662,034 B2	12/2003	Segner et al.	2002/0107530 A1	8/2002	Saucer et al.
D484,979 S *	1/2004	Fontaine D24/155	2002/0115941 A1	8/2002	Whayne et al.
6,704,590 B2	3/2004	Haldeman	2002/0115944 A1	8/2002	Mendes et al.
6,723,038 B1	4/2004	Schroeder et al.	2002/0169504 A1	11/2002	Alferness et al.
6,726,716 B2	4/2004	Marquez	2002/0177782 A1	11/2002	Penner
6,760,616 B2	7/2004	Hoey et al.	2002/0183836 A1	12/2002	Liddicoat et al.
6,780,197 B2	8/2004	Roe et al.	2002/0183841 A1	12/2002	Cohn et al.
6,788,969 B2	9/2004	Dupree et al.	2002/0188170 A1	12/2002	Santamore et al.
6,797,001 B2	9/2004	Mathis et al.	2003/0028118 A1	2/2003	Dupree et al.
6,800,090 B2	10/2004	Alferness et al.	2003/0028183 A1	2/2003	Sanchez et al.
6,824,562 B2	11/2004	Mathis et al.	2003/0050685 A1	3/2003	Nikolic et al.
6,837,886 B2	1/2005	Collins et al.	2003/0055420 A1	3/2003	Kadhiresan et al.
6,852,076 B2	2/2005	Nikolic et al.	2003/0069570 A1	4/2003	Witzel et al.
6,855,143 B2	2/2005	Davison et al.	2003/0069636 A1	4/2003	Solem et al.
6,890,353 B2	5/2005	Cohn et al.	2003/0078465 A1	4/2003	Pai et al.
6,892,091 B1	5/2005	Ben-Haim et al.	2003/0078671 A1	4/2003	Lesniak et al.
6,899,674 B2	5/2005	Viebach et al.	2003/0105384 A1	6/2003	Sharkey et al.
6,907,297 B2	6/2005	Wellman et al.	2003/0105520 A1	6/2003	Alferness et al.
6,908,478 B2	6/2005	Alferness et al.	2003/0109770 A1	6/2003	Sharkey et al.
6,913,576 B2	7/2005	Bowman	2003/0176810 A1	9/2003	Maahs et al.
6,918,903 B2	7/2005	Bass	2003/0181819 A1	9/2003	Desai
6,926,669 B1	8/2005	Stewart et al.	2003/0229395 A1	12/2003	Cox
6,942,657 B2	9/2005	Sinofsky et al.	2004/0002626 A1	1/2004	Feld et al.
6,949,122 B2	9/2005	Adams et al.	2004/0054279 A1	3/2004	Hanley
6,960,206 B2	11/2005	Keane	2004/0133220 A1	7/2004	Lashinski et al.
6,960,229 B2	11/2005	Mathis et al.	2004/0133273 A1	7/2004	Cox
6,986,775 B2	1/2006	Morales et al.	2004/0138744 A1	7/2004	Lashinski et al.
6,989,010 B2	1/2006	Francischelli et al.	2004/0153146 A1	8/2004	Lashinski et al.
6,989,028 B2	1/2006	Lashinski et al.	2004/0158321 A1	8/2004	Reuter et al.
6,994,093 B2	2/2006	Murphy et al.	2004/0176797 A1	9/2004	Opolski
6,997,951 B2	2/2006	Solem et al.	2004/0181139 A1	9/2004	Falwell et al.
7,001,383 B2	2/2006	Keidar	2004/0186566 A1	9/2004	Hindrichs et al.
7,025,776 B1	4/2006	Houser et al.	2004/0215232 A1	10/2004	Belhe et al.
7,048,734 B1	5/2006	Fleischman et al.	2004/0243170 A1	12/2004	Suresh et al.
7,050,848 B2	5/2006	Hoey et al.	2004/0249408 A1	12/2004	Murphy et al.
7,052,487 B2	5/2006	Cohn et al.	2004/0249453 A1	12/2004	Cartledge et al.
7,068,867 B2	6/2006	Adoram et al.	2004/0267358 A1	12/2004	Reitan
7,141,019 B2	11/2006	Pearlman	2005/0004668 A1	1/2005	Aklog et al.
7,144,363 B2	12/2006	Pai et al.	2005/0015109 A1	1/2005	Lichtenstein
7,166,127 B2	1/2007	Spence et al.	2005/0054938 A1	3/2005	Wehman et al.
7,177,677 B2	2/2007	Kaula et al.	2005/0055089 A1	3/2005	Macoviak et al.
7,186,210 B2	3/2007	Feld et al.	2005/0060030 A1	3/2005	Lashinski et al.
7,187,964 B2	3/2007	Khoury	2005/0064665 A1	3/2005	Han
7,189,202 B2	3/2007	Lau et al.	2005/0065420 A1	3/2005	Collins et al.
7,255,695 B2	8/2007	Falwell et al.	2005/0065504 A1	3/2005	Melsky et al.
7,276,044 B2	10/2007	Ferry et al.	2005/0080402 A1	4/2005	Santamore et al.
7,279,007 B2	10/2007	Nikolic et al.	2005/0096047 A1	5/2005	Haberman et al.
7,300,435 B2	11/2007	Wham et al.	2005/0096647 A1	5/2005	Steinke et al.
7,303,526 B2	12/2007	Sharkey et al.	2005/0107723 A1	5/2005	Wehman et al.
7,335,196 B2	2/2008	Swanson et al.	2005/0107871 A1	5/2005	Realyvasquez et al.
7,481,808 B2	1/2009	Koyfman et al.	2005/0125030 A1	6/2005	Forsberg et al.
7,507,252 B2	3/2009	Lashinski et al.	2005/0148892 A1	7/2005	Desai
			2005/0149014 A1	7/2005	Hauck et al.
			2005/0149159 A1	7/2005	Andreas et al.
			2005/0154252 A1	7/2005	Sharkey et al.
			2005/0182365 A1	8/2005	Hennemann
			2005/0187620 A1	8/2005	Pai et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2005/0197593 A1 9/2005 Burbank et al.
 2005/0197692 A1 9/2005 Pai et al.
 2005/0197693 A1 9/2005 Pai et al.
 2005/0197694 A1 9/2005 Pai et al.
 2005/0203558 A1 9/2005 Maschke
 2005/0209636 A1 9/2005 Widomski et al.
 2005/0216054 A1 9/2005 Widomski et al.
 2005/0240249 A1 10/2005 Tu et al.
 2005/0251116 A1 11/2005 Steinke et al.
 2005/0251132 A1 11/2005 Oral et al.
 2005/0256521 A1 11/2005 Kozel
 2005/0261580 A1 11/2005 Willis et al.
 2005/0267458 A1 12/2005 Paul et al.
 2005/0267574 A1 12/2005 Cohn et al.
 2006/0009755 A1 1/2006 Sra
 2006/0009756 A1 1/2006 Francischelli et al.
 2006/0014998 A1 1/2006 Sharkey et al.
 2006/0015002 A1 1/2006 Moaddeb et al.
 2006/0015003 A1 1/2006 Moaddes et al.
 2006/0015038 A1 1/2006 Weymarn-Scharli
 2006/0015096 A1 1/2006 Hauck et al.
 2006/0025800 A1 2/2006 Suresh
 2006/0030881 A1 2/2006 Sharkey et al.
 2006/0085049 A1 4/2006 Cory et al.
 2006/0089637 A1 4/2006 Werneth et al.
 2006/0100618 A1 5/2006 Chan et al.
 2006/0106298 A1 5/2006 Ahmed et al.
 2006/0135968 A1 6/2006 Schaller
 2006/0135970 A1 6/2006 Schaller
 2006/0184242 A1 8/2006 Lichtenstein
 2006/0199995 A1 9/2006 Vijay
 2006/0229491 A1 10/2006 Sharkey et al.
 2006/0235286 A1 10/2006 Stone et al.
 2006/0235314 A1 10/2006 Migliuolo et al.
 2006/0264980 A1 11/2006 Khairkhahan et al.
 2006/0281965 A1 12/2006 Khairkhahan et al.
 2006/0293698 A1 12/2006 Douk
 2006/0293725 A1 12/2006 Rubinsky et al.
 2007/0016068 A1 1/2007 Grunwald et al.
 2007/0027533 A1 2/2007 Douk
 2007/0038208 A1 2/2007 Kefer
 2007/0083193 A1 4/2007 Werneth et al.
 2007/0083195 A1 4/2007 Werneth et al.
 2007/0088362 A1 4/2007 Bonutti et al.
 2007/0115390 A1 5/2007 Makara et al.
 2007/0118215 A1 5/2007 Moaddeb
 2007/0129717 A1 6/2007 Brown, III et al.
 2007/0161846 A1 7/2007 Nikolic et al.
 2007/0198058 A1 8/2007 Gelbart et al.
 2007/0213578 A1 9/2007 Khairkhahan et al.
 2007/0213815 A1 9/2007 Khairkhahan et al.
 2007/0232858 A1 10/2007 MacNamara et al.
 2007/0249999 A1 10/2007 Sklar et al.
 2007/0270688 A1 11/2007 Gelbart et al.
 2007/0299343 A1 12/2007 Waters
 2008/0004534 A1 1/2008 Gelbart et al.
 2008/0004643 A1 1/2008 To et al.
 2008/0004697 A1 1/2008 Lichtenstein et al.
 2008/0045778 A1 2/2008 Lichtenstein et al.
 2008/0071298 A1 3/2008 Khairkhahan et al.
 2008/0262337 A1 10/2008 Falwell et al.
 2008/0281322 A1 11/2008 Sherman et al.
 2008/0312713 A1 12/2008 Wilfley et al.
 2009/0018617 A1 1/2009 Skelton et al.
 2009/0024138 A1 1/2009 Saleh
 2009/0069704 A1 3/2009 MacAdam et al.
 2009/0131930 A1 5/2009 Gelbart et al.
 2009/0157058 A1 6/2009 Ferren et al.
 2009/0171274 A1 7/2009 Harlev et al.
 2009/0192441 A1 7/2009 Gelbart et al.
 2009/0270737 A1 10/2009 Thornton
 2009/0287271 A1 11/2009 Blum et al.
 2009/0287304 A1 11/2009 Dahlgren et al.
 2010/0121147 A1 5/2010 Oskin et al.
 2010/0211052 A1 8/2010 Brown et al.

2010/0249771 A1 9/2010 Pearson et al.
 2010/0268059 A1 10/2010 Ryu et al.
 2011/0125172 A1 5/2011 Gelbart et al.
 2011/0172658 A1 7/2011 Gelbart et al.
 2011/0282491 A1 11/2011 Prisco et al.
 2012/0158016 A1 6/2012 Gelbart et al.
 2012/0165829 A1 6/2012 Chen et al.
 2012/0271135 A1 10/2012 Burke et al.
 2013/0165916 A1 6/2013 Mathur et al.
 2013/0172883 A1 7/2013 Lopes et al.
 2013/0178850 A1 7/2013 Lopes et al.
 2013/0178851 A1 7/2013 Lopes et al.
 2013/0184705 A1 7/2013 Gelbart et al.
 2013/0184706 A1 7/2013 Gelbart et al.
 2013/0190587 A1 7/2013 Lopes et al.
 2013/0197513 A1 8/2013 Lopes et al.
 2013/0241929 A1 9/2013 Massarwa et al.
 2013/0304065 A1 11/2013 Lopes et al.
 2013/0310828 A1 11/2013 Reinders et al.
 2014/0114307 A1 4/2014 Moisa et al.
 2014/0350552 A1 11/2014 Highsmith
 2015/0126993 A1 5/2015 Gelbart et al.
 2015/0157400 A1 6/2015 Gelbart et al.

FOREIGN PATENT DOCUMENTS

WO 95/10320 A1 4/1995
 WO 95/20349 A1 8/1995
 WO 97/17892 A1 5/1997
 WO 0108575 A2 2/2001
 WO 02/087437 A1 11/2002
 WO 03/015611 A2 2/2003
 WO 03/077800 A1 9/2003
 WO 2004/012629 A1 2/2004
 WO 2004/047679 A1 6/2004
 WO 2004/084746 A2 10/2004
 WO 2004/100803 A1 11/2004
 WO 2005/070330 A1 8/2005
 WO 2005/102181 A1 11/2005
 WO 2006/017809 A2 2/2006
 WO 2006/105121 A2 10/2006
 WO 2006/135747 A2 12/2006
 WO 2006/135749 A2 12/2006
 WO 2007/021647 A2 2/2007
 WO 2007/115390 A1 10/2007
 WO 2008/002606 A2 1/2008
 WO 2009011721 A1 1/2009
 WO 2009/065042 A2 5/2009
 WO 2012/100184 A2 7/2012
 WO 2012/100185 A2 7/2012
 WO 2013173917 A1 11/2013

OTHER PUBLICATIONS

Lopes et al. "Enhanced Medical Device for Use in Bodily Cavities, for Example an Atrium", Office Action mailed Jan. 25, 2016 for U.S. Appl. No. 13/782,867, 49 pages.
 Notice of Allowance issued in U.S. Appl. No. 13/793,076, dated Feb. 10, 2016.
 International Search Report mailed Mar. 10, 2015, for International Application PCT/CA2014/051144; 10 pages.
 Written Opinion mailed Mar. 10, 2015, for International Application PCT/CA2014/051144; 4 pages.
 Biotronik's "AlCath Flutter Gold Cath for Atrial Flutter Available in EU", Sep. 19, 2013, medGadget, 3 pgs, <http://www.medgadget.com/2013/09/biotroniks-alcath-flutter-gold-cath-for-atrial-flutter-unveiled-in-europe.html> [Jun. 24, 2014 2:37:09 PM].
 Non-final Office Action issued in co-pending U.S. Appl. No. 13/782,867, dated Apr. 15, 2015.
 Non-final Office Action issued in co-pending U.S. Appl. No. 13/782,903, dated Apr. 28, 2015.
 Office Action issued in U.S. Appl. No. 13/782,889, mailed Dec. 18, 2015.
 Office Action issued in U.S. Appl. No. 13/782,903, mailed Dec. 18, 2015.

(56)

References Cited

OTHER PUBLICATIONS

- Lopes et al., "High-Density Electrode-Based Medical Device System", Office Action mailed Jul. 10, 2015 for U.S. Appl. No. 13/793,076, 98 pages.
- Lopes et al., "High-Density Electrode-Based Medical Device System", Office Action mailed Jul. 9, 2015 for U.S. Appl. No. 13/793,213, 99 pages.
- Gelbart et al., "Apparatus and Method for Intra-Cardiac Mapping and Ablation", Office Action mailed Aug. 5, 2015 for U.S. Appl. No. 13/785,910, 79 pages.
- Lopes et al., "Enhanced Medical Device for Use in Bodily Cavities, for Example an Atrium", Amendment filed Aug. 24, 2015 for U.S. Appl. No. 13/782,889, 21 pages.
- Lopes et al., "Enhanced Medical Device for Use in Bodily Cavities, for Example an Atrium", Amendment filed Aug. 28, 2015 for U.S. Appl. No. 13/782,903, 19 pages.
- Lopes et al., "Enhanced Medical Device for Use in Bodily Cavities, for Example an Atrium", Amendment filed Sep. 14, 2015 for U.S. Appl. No. 13/782,867, 25 pages.
- Lopes et al., "High-Density Electrode-Based Medical Device System", Amendment filed Oct. 9, 2015 for U.S. Appl. No. 13/793,213, 26 pages.
- Lopes et al., "High-Density Electrode-Based Medical Device System", Amendment filed Oct. 9, 2015 for U.S. Appl. No. 13/793,076, 14 pages.
- Examination Report issued in EP13172848.7, mailed Sep. 21, 2015.
- Extended European Search Report issued in EP13793216.6, mailed Oct. 30, 2015.
- Becker, et al., "Ablation of Atrial Fibrillation: Energy Sources and Navigation Tools: A Review", *Journal of Electrocardiology*, vol. 37, Supplement 2004, pp. 55-62.
- Buchbinder, Maurice, "Dynamic Mitral Valve Annuloplasty: A Reshapable Ring for Residual and Recurring MR", *Foundation for Cardiovascular Medicine*, May 24, 2007.
- Calkins, Hugh, "Electrophysiology: Radiofrequency Catheter Ablation of Supraventricular Arrhythmias", *Heart*, 2001; 85; pp. 594-600.
- De Ponti, et al., "Non-Fluoroscopic Mapping Systems for Electrophysiology: the Tool or Toy Dilemma After 10 Years", *European Heart Journal*, 2006; 27, pp. 1134-1136.
- Gabriel, et al., "The Dielectric Properties of Biological Tissues: I. Literature Survey", *Phys. Med. Biol.*; 41, 1996, pp. 2231-2249.
- Konings, et al., "Development of an Intravascular Impedance Catheter for Detection of Fatty Lesions in Arteries", *IEEE Transactions on Medical Imaging*, vol. 16, No. 4, Aug. 1997, pp. 439-446.
- Mack, Michael J., "New Techniques for Percutaneous Repair of the Mitral Valve", *Heart Fail Rev*, 2006; 11, pp. 259-268.
- Otasevic, et al., "First-in-Man Implantation of Left Ventricular Partitioning Device in a Patient With Chronic Heart Failure: Twelve-Month Follow-Up", *Journal of Cardiac Failure*, vol. 13, No. 7, 2007, pp. 517-520.
- Sharkey, et al., "Left Ventricular Apex Occluder. Description of a Ventricular Partitioning Device", *EuroIntervention*, 2006, pp. 125-127.
- Stiles, et al., "Simulated Characterization of Atherosclerotic Lesions in the Coronary Arteries by Measurement of Bioimpedance", *IEEE Transactions on Biomedical Engineering*, vol. 50, No. 7, Jul. 2003, pp. 916-921.
- Tanaka, et al., "Artificial SMA Valve for Treatment of Urinary Incontinence: Upgrading of Valve and Introduction of Transcutaneous Transformer", *Bio-Medical Materials and Engineering*; vol. 9, 1999, pp. 97-112.
- Timek, et al., "Septal-Lateral Annular Cinching Abolishes Acute Ischemic Mitral Regurgitation", *Journal of Thoracic and Cardiovascular Surgery*, vol. 123, No. 5, May 2002, pp. 881-888.
- Timek, et al., "Septal-Lateral Annular Cinching (SLAC) Reduces Mitral Annular Size Without Perturbing Normal Annular Dynamics", *Journal of Heart Valve Disease*, vol. 11, No. 1, Jan. 2002.
- Valvano, et al., "Thermal Conductivity and Diffusivity of Biomaterials Measured with Self-Heated Thermistors", *International Journal of Thermophysics*, vol. 6, No. 3, 1985, pp. 301-311.
- Prosecution Documents for U.S. Appl. No. 11/436,584, now abandoned.
- Prosecution Documents for U.S. Appl. No. 11/941,819, now published as US 2009-0131930 A1.
- Prosecution Documents for U.S. Appl. No. 12/010,458, now published as US 2009-0192441 A1.
- Prosecution Documents for U.S. Appl. No. 12/950,871, now patented as U.S. Pat. No. 8,150,499.
- Specification and Drawings of U.S. Appl. No. 10/690,131.
- International Search Report, mailed Dec. 5, 2007 for PCT/US2007/014902, 5 pages.
- International Search Report, mailed Dec. 2, 2009 for PCT/US2008/083644, 5 pages.
- International Preliminary Report on Patentability, issued Jan. 6, 2009 for PCT/US2007/014902, 8 pages.
- Written Opinion, mailed Dec. 5, 2007, for PCT/US2007/014902, 7 pages.
- Written Opinion, mailed Dec. 2, 2009, for PCT/US2008/083644, 9 pages.
- Ensite System Instructions for use, 54-06154-001 Rev02, Chapter 7 Waveforms and Segments, pp. 85-90.
- International Search Report and Written Opinion mailed Aug. 2, 2013 issued in PCT/CA2013/050350.
- International Search Report and Written Opinion mailed Sep. 17, 2013 issued in PCT/US2013/039982.
- International Search Report and Written Opinion mailed Sep. 27, 2013 issued in PCT/US2013/039977.
- Extended European Search Report issued in EP 12736677.1, mail date Mar. 28, 2014.
- Extended European Search Report issued in EP 12736962.7, mail date Mar. 28, 2014.
- Gelbart et al., "Apparatus and Method for Intra-Cardiac Mapping and Ablation", Notice of Allowance dated Oct. 23, 2014 for co-pending U.S. Appl. No. 11/475,950, 10 pgs.
- Gelbart et al., "Medical Device for use in Bodily Lumens, for Example an Atrium", Supplemental Notice of Allowance dated Oct. 6, 2014 for co-pending U.S. Appl. No. 11/941,819, 4 pgs.
- Gelbart et al., "Medical Device for Use in Bodily Lumens, for Example an Atrium", Amendment filed Sep. 22, 2014, for co-pending U.S. Appl. No. 13/070,215, 18 pgs.
- Gelbart et al., "Medical Device for Use in Bodily Lumens, for Example an Atrium", Notice of Allowance mailed Nov. 13, 2014 for U.S. Appl. No. 13/070,215, 54 pages.
- "Phased RF Catheter Ablation System", 2014 Medtronic Inc., 2 pgs, <http://www.medtronic.eu/your-health/atrial-fibrillation/about-the-therapy/our-phased-rf-ablation-system/>[Jun. 24, 2014 2:38:05 PM].
- "ThermoCool® Irrigated Tip Catheter", Brochure, Biosense Webster, 4 pgs, Biosense Webster, Inc. 3333 Diamond Canyon Road Diamond Bar, CA 91765, USA, ©Biosense Webster, Inc. 2009 All rights reserved. 1109003.0.
- Biotronik's "AICath Flutter Gold Cath for Atrial Flutter Available in EU", medGadget, 3 pgs, <http://www.medgadget.com/2013/09/biotroniks-alcath-flutter-gold-cath-for-atrial-flutter-unveiled-in-europe.html>[Jun. 24, 2014 2:37:09 PM].
- Extended European Search Report mailed Aug. 20, 2013 issued in EP Patent Application No. 13172848.7.
- Gelbart et al., "Intra-Cardiac Mapping and Ablation Method", Pre Amend filed Aug. 29, 2007 for U.S. Appl. No. 11/475,950, 42 pgs.
- Gelbart et al., "Automatic Atherectomy System", Amendment filed Oct. 25, 2010 for U.S. Appl. No. 11/436,584, 9 pgs.
- Gelbart et al., "Automatic Atherectomy System", Amendment filed Mar. 30, 2010 for U.S. Appl. No. 11/436,584, 20 pgs.
- Gelbart et al., "Automatic Atherectomy System", Amendment filed Aug. 4, 2009 for U.S. Appl. No. 11/436,584, 35 pgs.
- Gelbart et al., "Automatic Atherectomy System", Amendment filed Sep. 15, 2011 for U.S. Appl. No. 12/950,871, 21 pgs.
- Gelbart et al., "Automatic Atherectomy System", Office Action mailed Jun. 15, 2011 for U.S. Appl. No. 12/950,871, 16 pgs.
- Gelbart et al., "Automatic Atherectomy System", Office Action mailed Dec. 1, 2009 for U.S. Appl. No. 11/436,584, 8 pgs.

(56)

References Cited

OTHER PUBLICATIONS

Gelbart et al., "Automatic Atherectomy System", Office Action mailed Dec. 14, 2010 for U.S. Appl. No. 11/436,584, 12 pgs.

Gelbart et al., "Automatic Atherectomy System", Office Action mailed Mar. 4, 2009 for U.S. Appl. No. 11/436,584, 6 pgs.

Bard, "HD Mesh Ablator Catheter", Brochure, 2008, 4 pgs, Bard Electrophysiology Division, C.R. Bard Inc., 55 Technology Drive Lowell, MA 01851 USA.

"Constellation Mapping Catheters", Brochure, Boston Scientific Corp., 2 pgs, ©2007 Boston Scientific Corporation.

Written opinion dated Jul. 30, 2012 for PCT/US2012/022062, 5 pgs.

Written opinion dated Aug. 22, 2012 for PCT/US2012/022061, 6 pgs.

International Search Report dated Aug. 22, 2012 for PCT/US2012/022061, 5 pgs.

International Search Report dated Jul. 30, 2012 for PCT/US2012/022062, 5 pgs.

Gelbart et al., "Medical Device for Use in Bodily Lumens, for Example an Atrium", Office Action mailed Jul. 25, 2011 for U.S. Appl. No. 11/941,819, now published as US 2009-0131930 A1.

Gelbart et al., "Liposuction System", Amendment filed Jun. 10, 2011 for U.S. Appl. No. 12/010,458, 10 pgs.

Gelbart et al., "Liposuction System", Amendment filed Dec. 7, 2011 for U.S. Appl. No. 12/010,458, 15 pgs.

Gelbart et al., "Liposuction System", Office Action mailed Mar. 16, 2011 for U.S. Appl. No. 12/010,458, 12 pgs.

Gelbart et al., "Liposuction System", Office Action mailed Sep. 14, 2011 for U.S. Appl. No. 12/010,458, 9 pgs.

"Waveforms and Segments", Ensile System Instructions for use, 54-06154-001 Rev02, Chapter 7, pp. 85-90 © 2007 St. Jude Medical.

Gelbart et al., "Intra-Cardiac Mapping and Ablation Method", Amendment filed Feb. 23, 2011 for U.S. Appl. No. 11/475,950, 28 pgs.

Gelbart et al., "Intra-Cardiac Mapping and Ablation Method", Amendment filed Mar. 5, 2008 for U.S. Appl. No. 11/475,950, 11 pgs.

Gelbart et al., "Intra-Cardiac Mapping and Ablation Method", Amendment filed Aug. 16, 2010 for U.S. Appl. No. 11/475,950, 22 pgs.

Gelbart et al., "Intra-Cardiac Mapping and Ablation Method", Office Action mailed Nov. 23, 2010 for U.S. Appl. No. 11/475,950, 25 pgs.

Gelbart et al., "Intra-Cardiac Mapping and Ablation Method", Office Action mailed Jun. 23, 2010 for U.S. Appl. No. 11/475,950, 18 pgs.

Gelbart et al., "Apparatus and Method for Intra-Cardiac Mapping and Ablation", Amendment filed Apr. 10, 2014; Supplemental Amendment filed Feb. 12, 2013 for co-pending U.S. Appl. No. 11/475,950, 21 pgs.

Gelbart et al., "Apparatus and Method for Intra-Cardiac Mapping and Ablation", Preliminary Amendment filed Aug. 22, 2014; Preliminary Amendment filed Mar. 5, 2013 for co-pending U.S. Appl. No. 13/785,910, 10 pgs.

Gelbart et al., "Apparatus and Method for Intra-Cardiac Mapping and Ablation", Preliminary Amendment filed Aug. 22, 2014; Preliminary Amendment filed Mar. 5, 2013 for co-pending U.S. Appl. No. 13/785,931, 10 pgs.

Lopes et al., "Enhanced Medical Device for Use in Bodily Cavities, for Example an Atrium", Preliminary Amendment filed Oct. 22, 2013 for co-pending U.S. Appl. No. 13/942,354, 13 pgs.

Lopes et al., "Enhanced Medical Device for Use in Bodily Cavities, for Example an Atrium", Preliminary Amendment filed Aug. 20, 2014 for co-pending U.S. Appl. No. 13/782,889, 11 pgs.

Lopes et al., "Enhanced Medical Device for Use in Bodily Cavities, for Example an Atrium", Preliminary Amendment filed Mar. 14, 2013 for co-pending U.S. Appl. No. 13/782,867, 8 pgs.

Gelbart et al., "Medical Device for Use in Bodily Lumens, for Example an Atrium", Amendment filed Jul. 3, 2014; Amendment filed Apr. 2, 2012; Amendment filed Mar. 1, 2012; Amendment filed Nov. 23, 2011; Replacement drawings filed Feb. 13, 2008 for U.S. Appl. No. 11/941,819, 155 pgs.

Gelbart et al., "Medical Device for Use in Bodily Lumens, for Example an Atrium", Preliminary Amendment filed May 12, 2014; Preliminary Amendment filed May 2, 2014 for U.S. Appl. No. 14/229,305, 12 pgs.

Gelbart et al., "Medical Device for Use in Bodily Lumens, for Example an Atrium", Preliminary Amendment filed May 12, 2014; Preliminary Amendment filed May 2, 2014 for U.S. Appl. No. 14/229,250, 10 pgs.

Gelbart et al., "Apparatus and Method for Intra-Cardiac Mapping and Ablation", Office Action dated Dec. 13, 2013; Notice of Allowance dated Jul. 25, 2014 for co-pending U.S. Appl. No. 11/475,950, 19 pgs.

Gelbart et al., "Medical Device for Use in Bodily Lumens, for Example an Atrium", Office Action dated Jan. 3, 2012; Office Action dated Apr. 3, 2014; Notice of Allowance dated Aug. 26, 2014 for co-pending U.S. Appl. No. 11/941,819, 35 pgs.

Gelbart et al., Medical Device for Use in Bodily Lumens, for Example an Atrium, Office Action dated Jun. 20, 2014, for co-pending U.S. Appl. No. 13/070,215, 8 pgs.

Moisa et al., "Catheter System", Office Action mailed Nov. 16, 2015 for U.S. Appl. No. 14/136,946, 92 pages.

Official Action issued in CN201280004400.9, mailed Dec. 3, 2014.

* cited by examiner

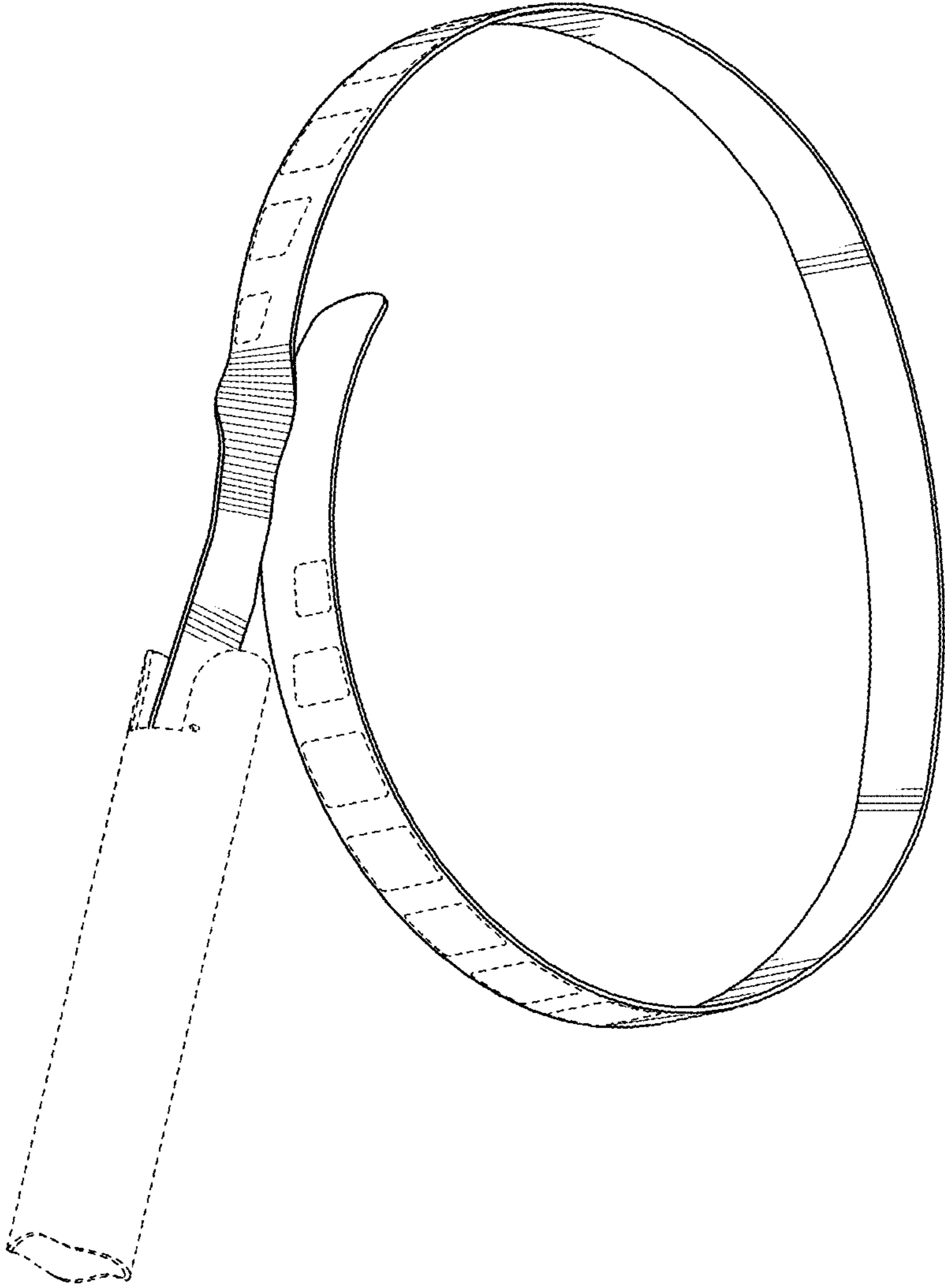


FIG. 1

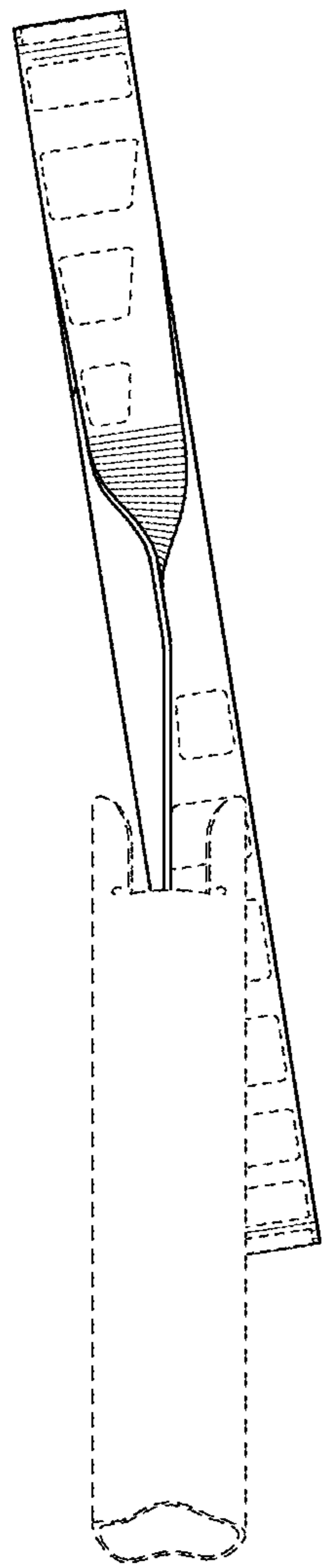


FIG. 2

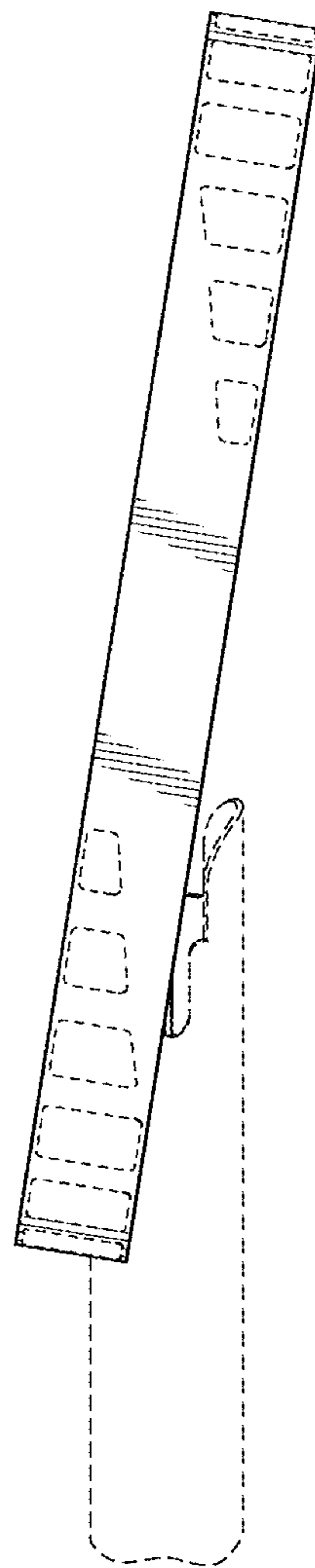


FIG. 3

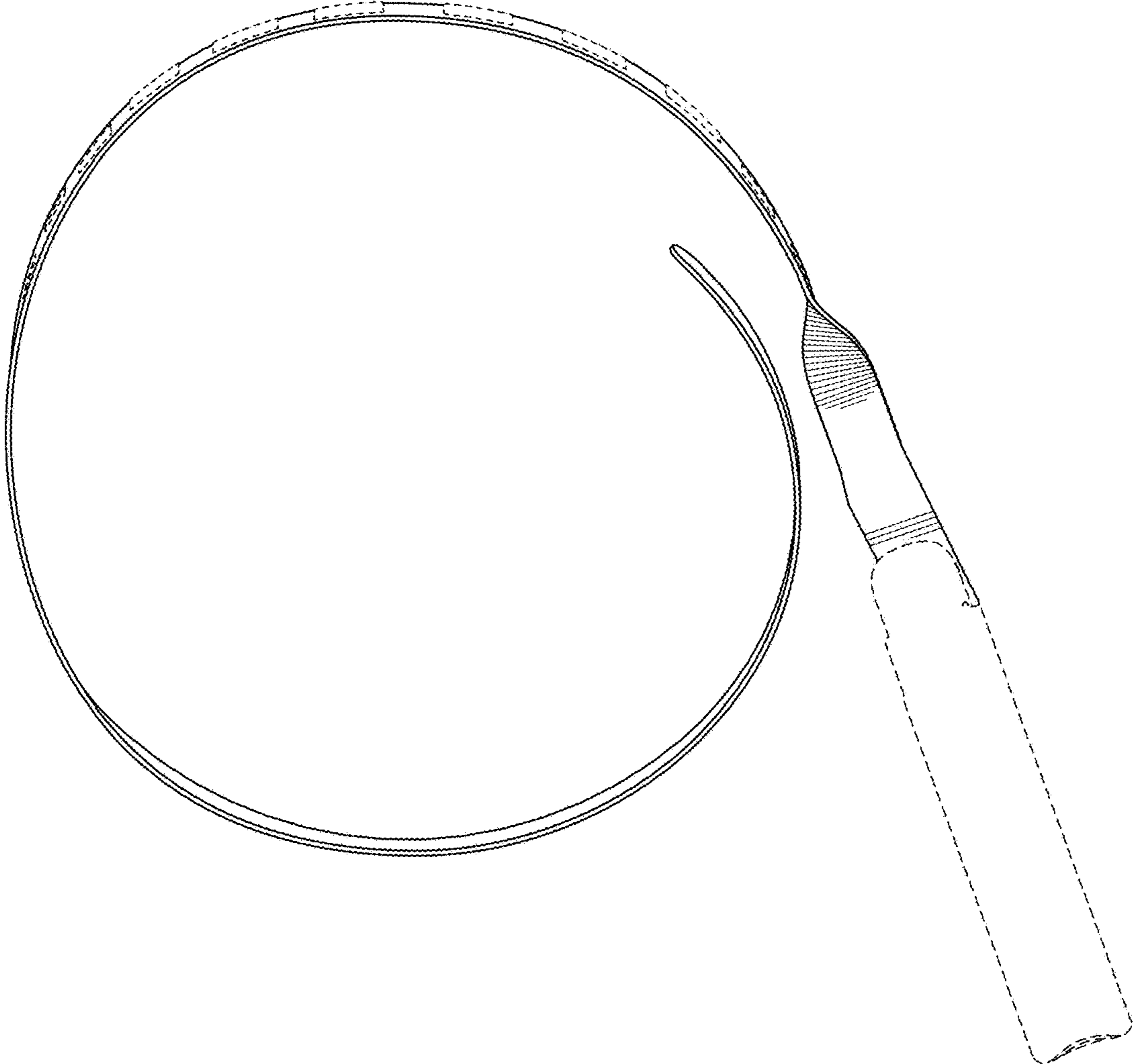


FIG. 4

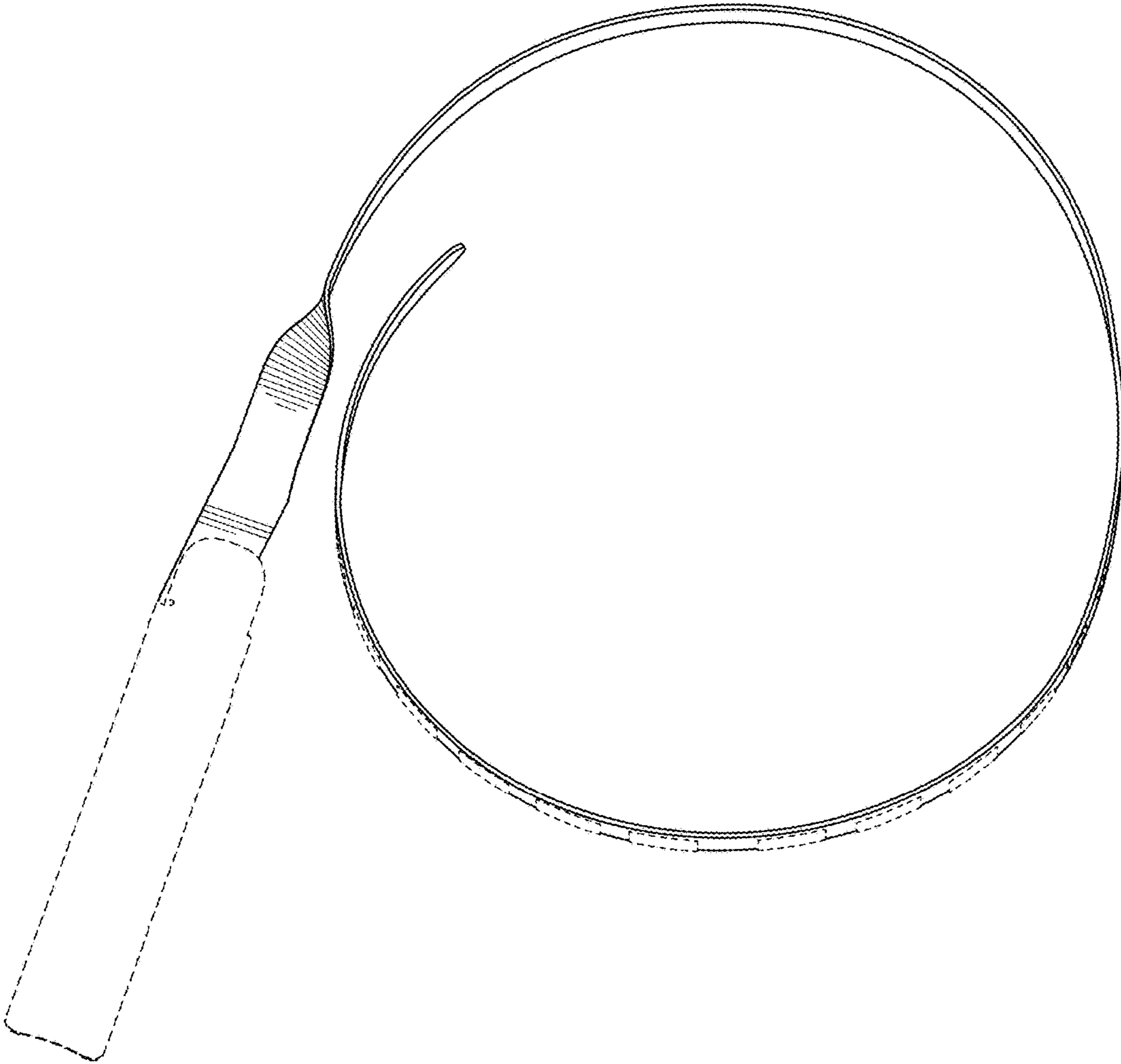


FIG. 5

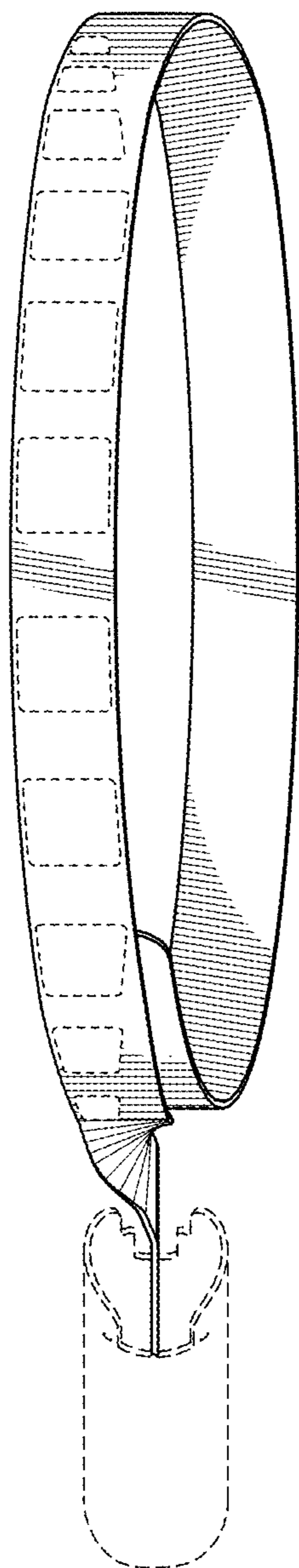


FIG. 6

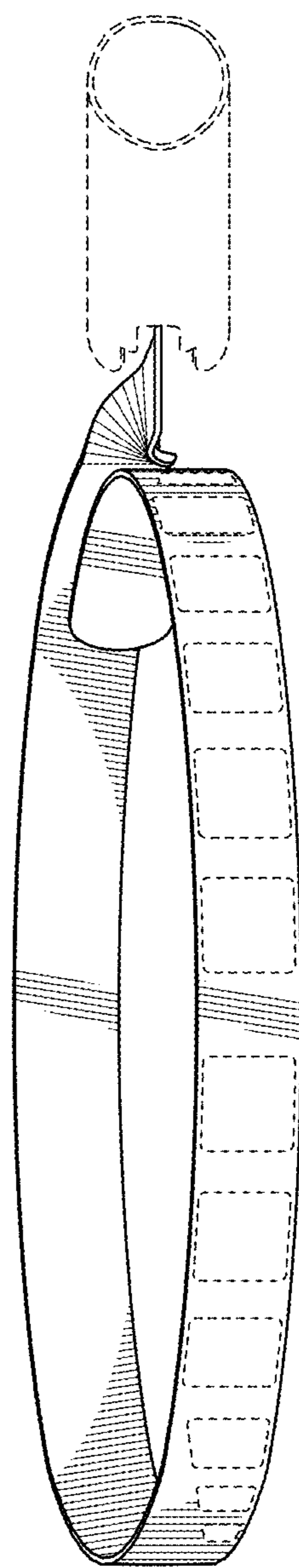


FIG. 7

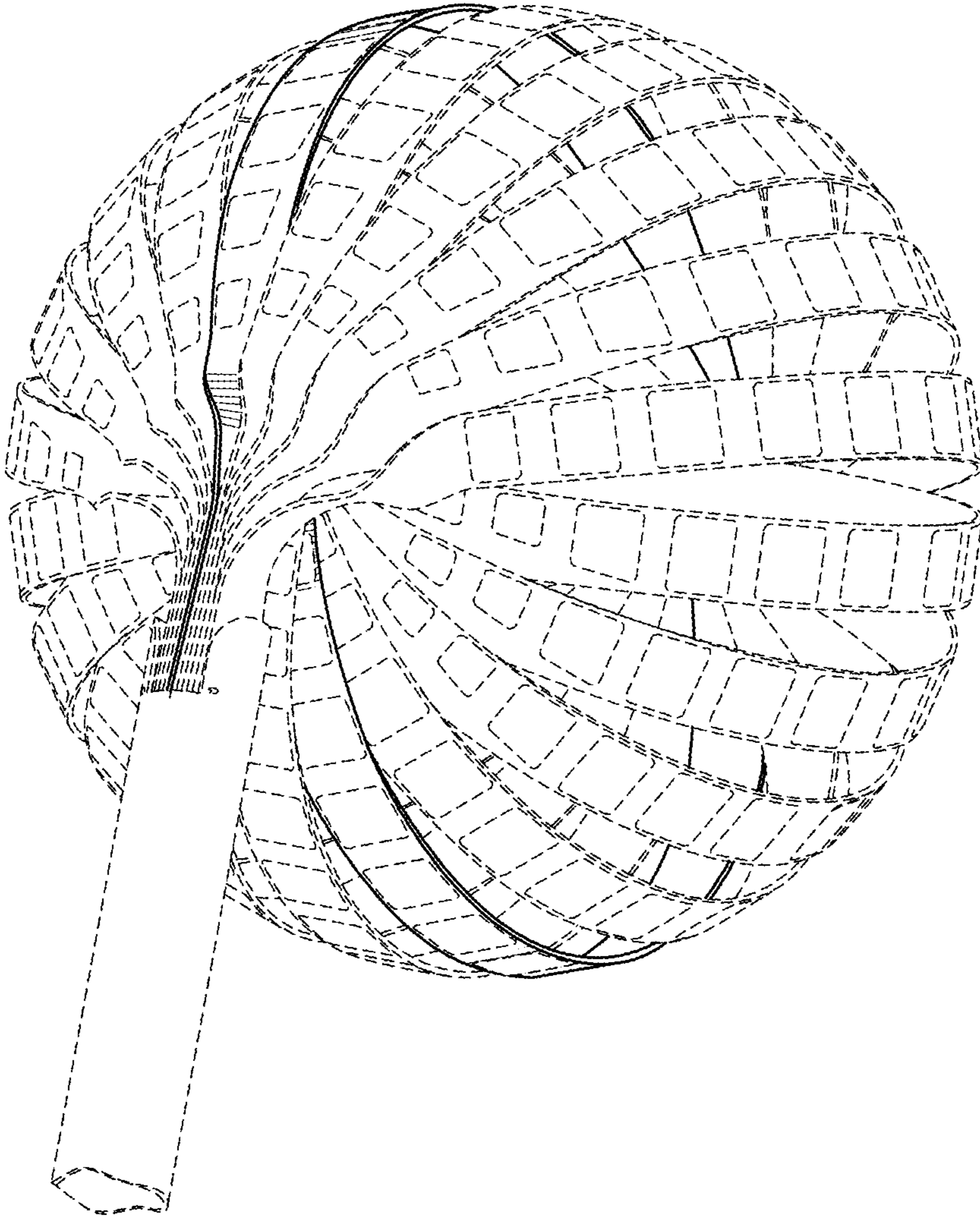


FIG. 8

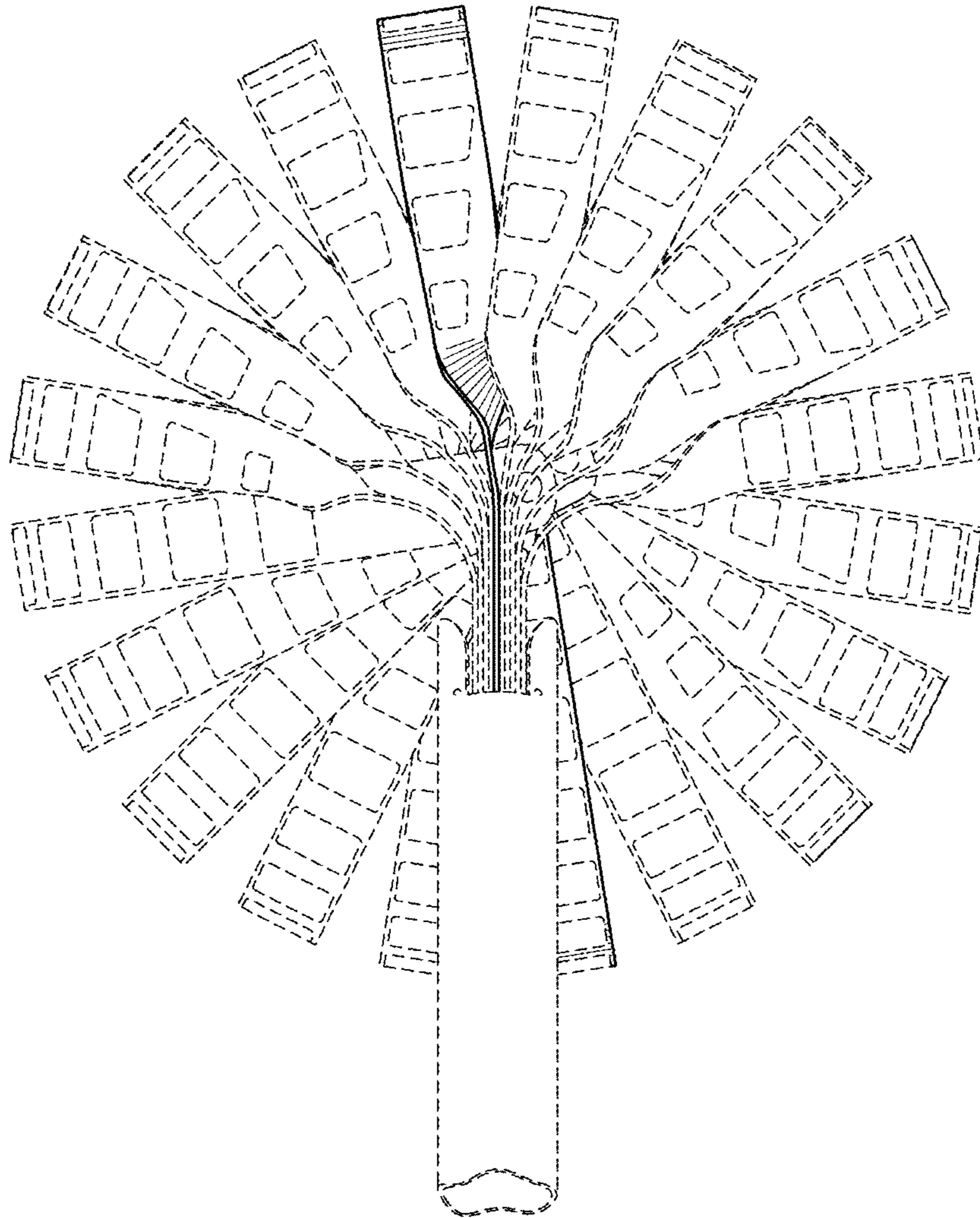


FIG. 9

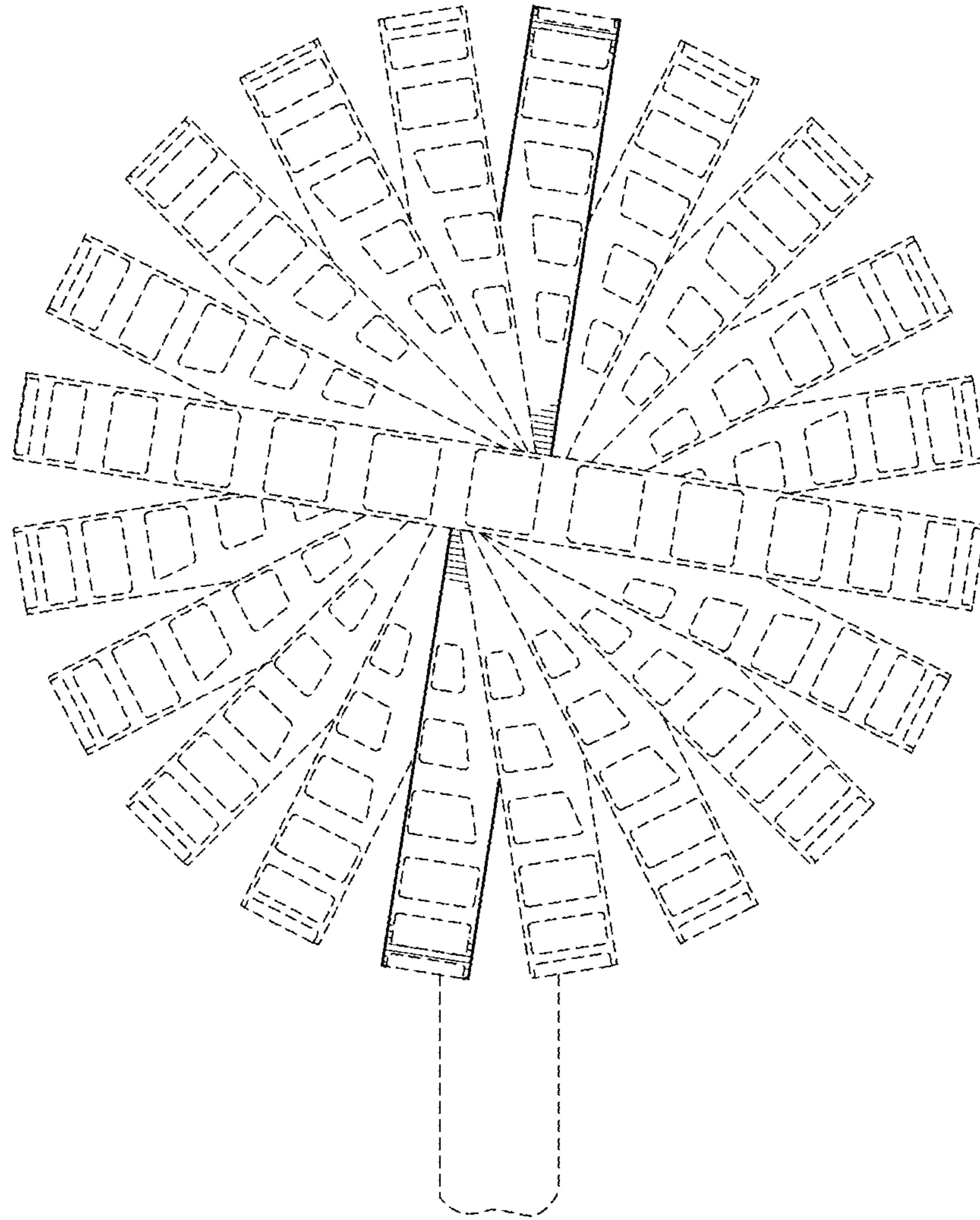


FIG. 10

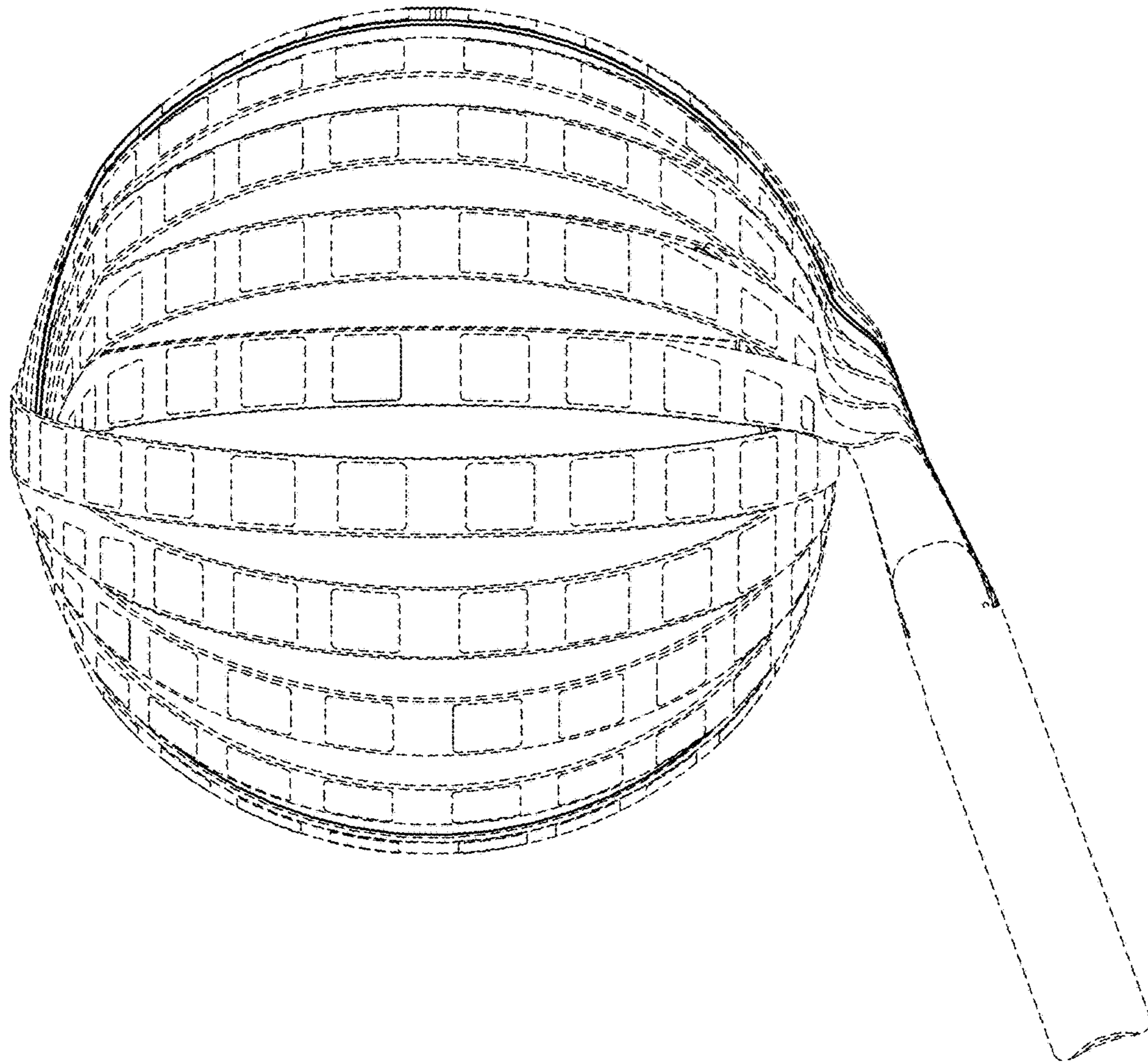


FIG. 11

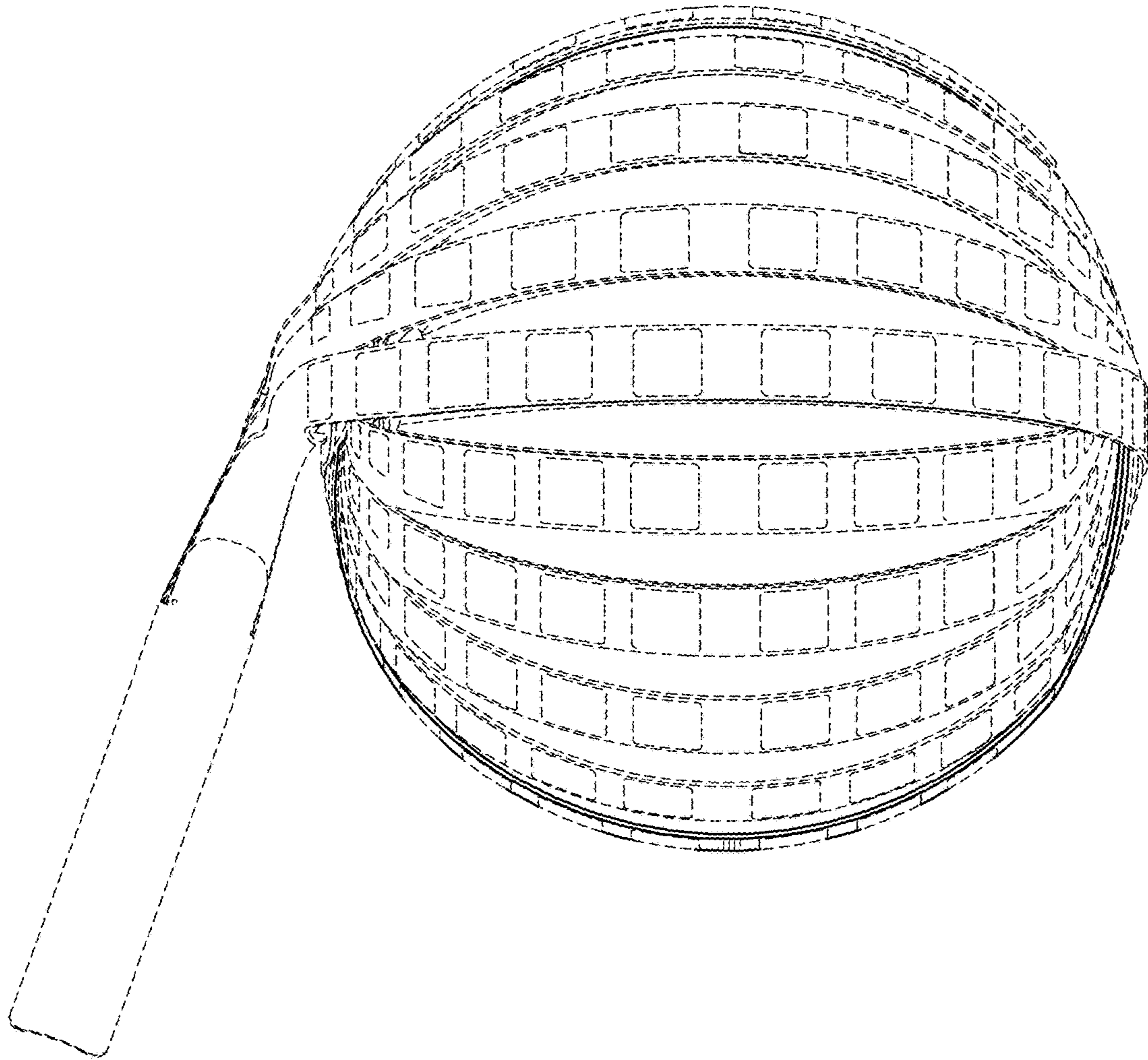


FIG. 12

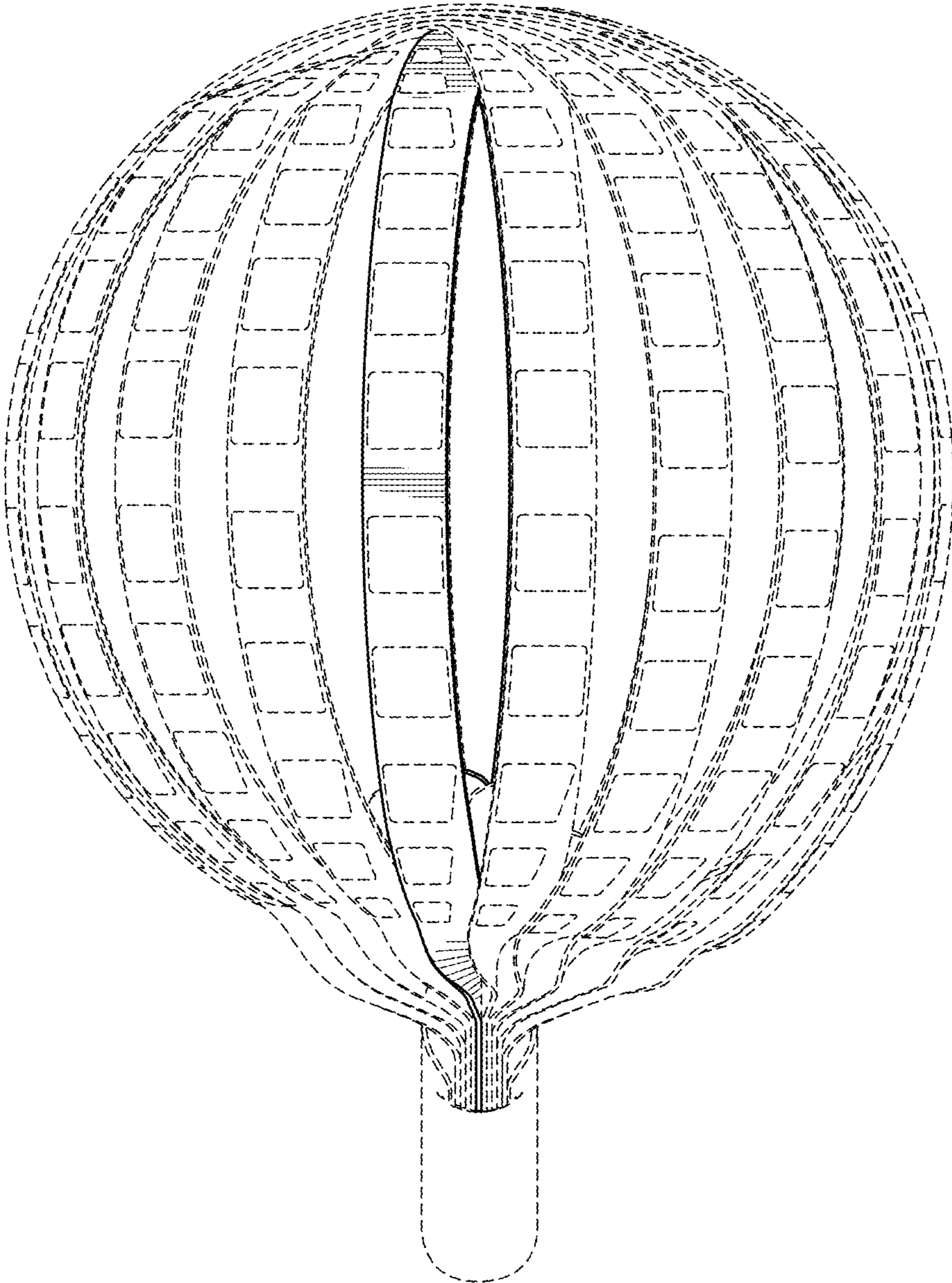


FIG. 13

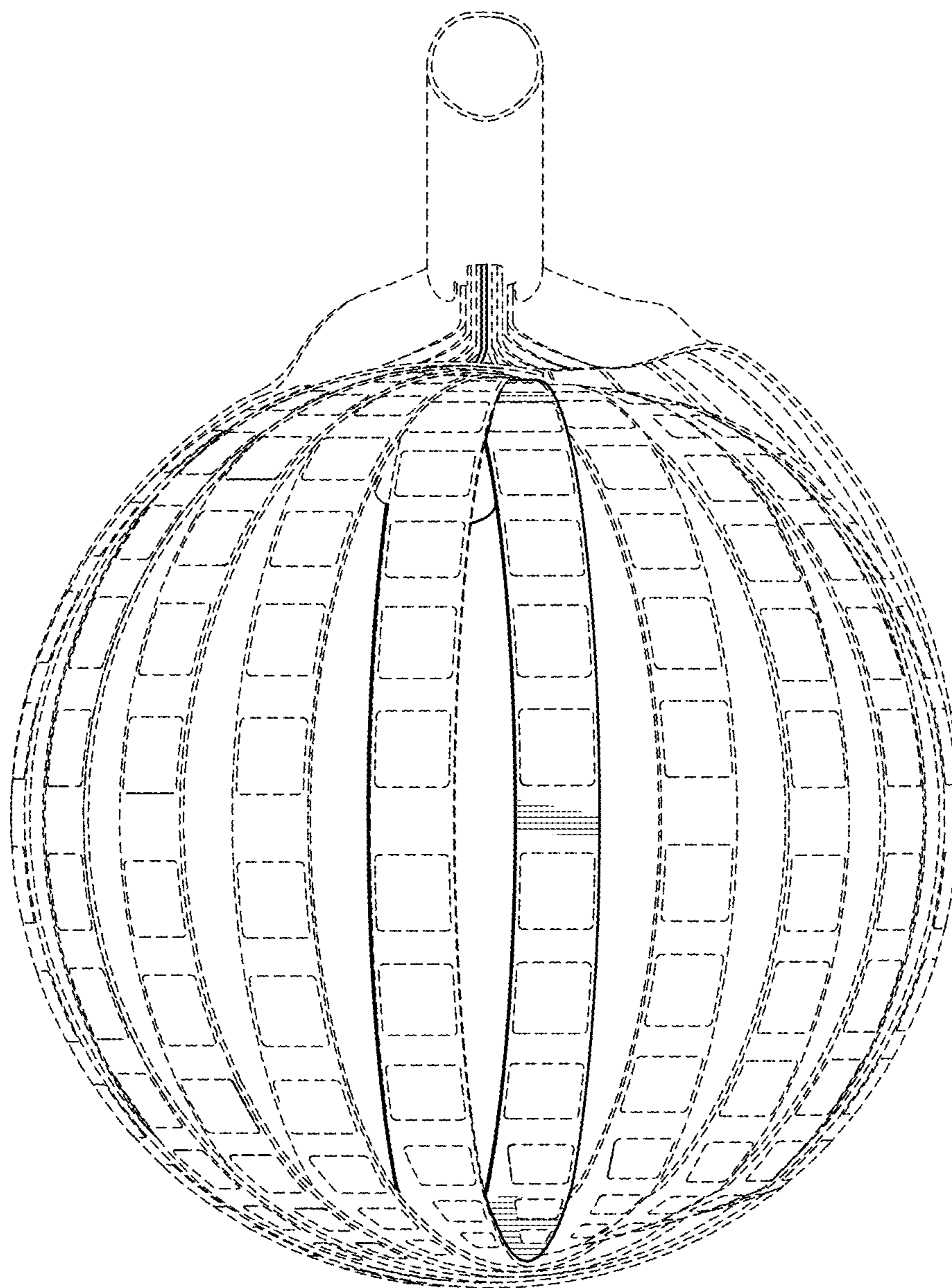


FIG. 14