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

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(54) **END EFFECTOR TIP WITH UNDERCUT TOP JAW**

(75) Inventors: **John Twomey**, Superior, CO (US);  
**Jeffrey R. Unger**, Longmont, CO (US);  
**Dylan R. Kingsley**, Broomfield, CO  
(US); **Steven P. Buysse**, Longmont, CO  
(US); **Pierre Gherardi**, Longmont, CO  
(US)

(73) Assignee: **TYCO Healthcare Group LP**, Boulder,  
CO (US)

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(52) **U.S. Cl.** ..... **D24/146**

(58) **Field of Classification Search** ..... D24/133,  
D24/143, 144, 146; 606/51, 50; D8/98  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,600,007 A 7/1986 Lahodny et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CA 2104423 2/1994

(Continued)

OTHER PUBLICATIONS

U.S. Appl. No. 12/336,970, filed Dec. 17, 2008.

(Continued)

*Primary Examiner*—Lisa P Lichtenstein

(57) **CLAIM**

The ornamental design for an end effector tip with undercut top jaw, as shown and described.

**DESCRIPTION**

FIG. 1 is a front, perspective view of an end effector tip with undercut top jaw in accordance with an embodiment of the present design;

FIG. 2 is a front, perspective view of a top portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 3 is a front, elevation view of the top portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 4 is a rear, elevation view of the top portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 5 is a top, plan view of the top portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 6 is a bottom, plan view of the top portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 7 is a right, side elevational view of the top portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 8 is a left, side elevational view of the top portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 9 is a front, perspective view of a bottom portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 10 is a front, elevation view of the bottom portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 11 is a rear, elevation view of the bottom portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 12 is a top, plan view of the bottom portion of the end effector tip with undercut top jaw of FIG. 1;

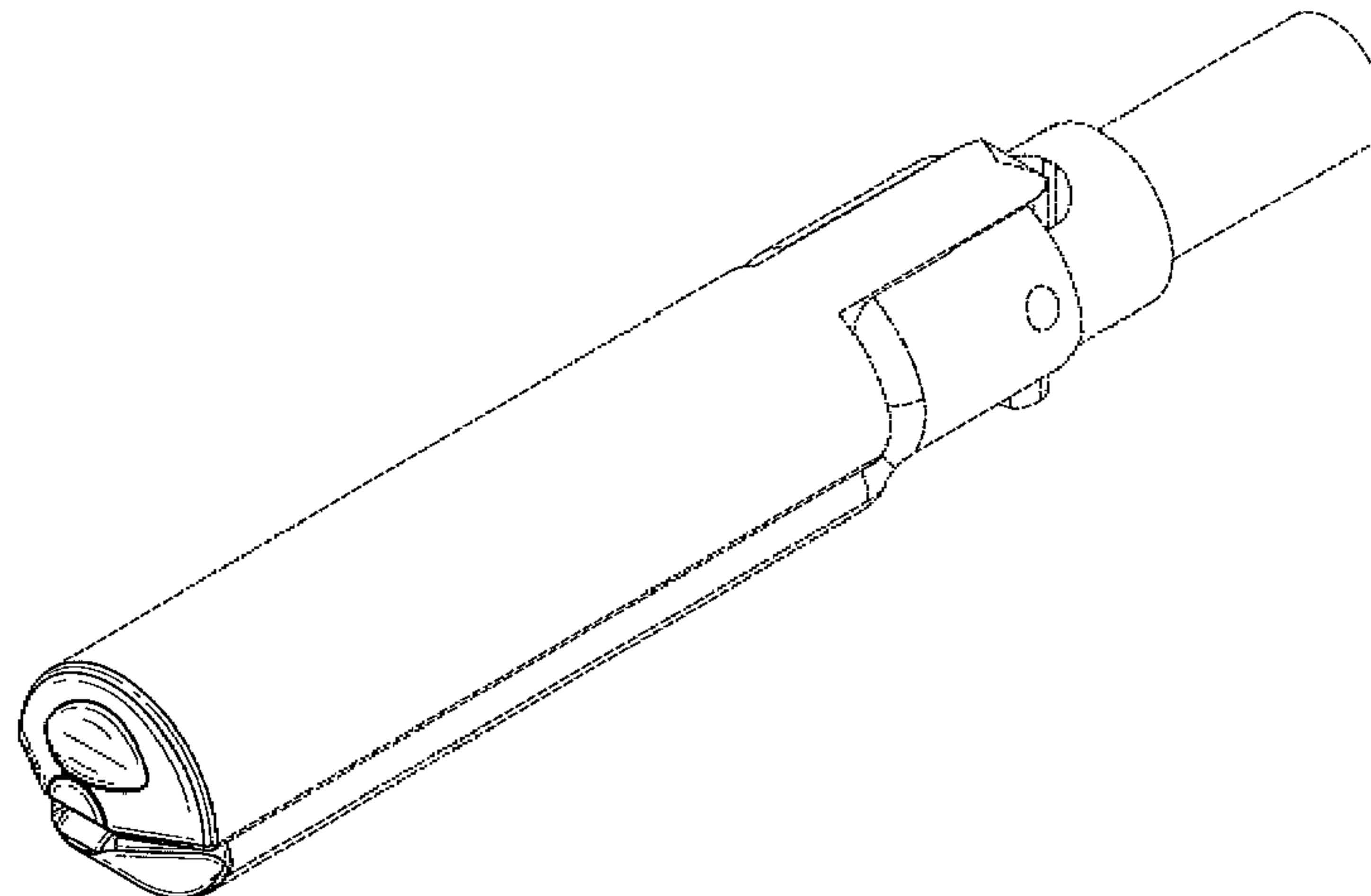
FIG. 13 is a bottom, plan view of the bottom portion of the end effector tip with undercut top jaw of FIG. 1;

FIG. 14 is a right, side elevational view of the bottom portion of the end effector tip with undercut top jaw of FIG. 1; and,

FIG. 15 is a left, side elevational view of the bottom portion of the end effector tip with undercut top jaw of FIG. 1.

The broken line showing of portions of an end effector tip with undercut top jaw is included for the purpose of illustrating environmental structure and forms no part of the claimed design.

**1 Claim, 8 Drawing Sheets**



# US D617,902 S

## U.S. PATENT DOCUMENTS

5,403,312	A *	4/1995	Yates et al. ....	606/50
5,403,342	A	4/1995	Tovey et al.	
5,454,823	A	10/1995	Richardson et al.	
5,620,415	A	4/1997	Lucey et al.	
5,643,294	A	7/1997	Tovey et al.	
5,693,051	A	12/1997	Schulze et al.	
5,755,717	A	5/1998	Yates et al.	
5,876,401	A	3/1999	Schulze et al.	
5,984,938	A	11/1999	Yoon	
5,984,939	A	11/1999	Yoon	
6,053,933	A	4/2000	Balazs et al.	
6,083,223	A	7/2000	Baker	
6,099,550	A	8/2000	Yoon	
6,113,598	A	9/2000	Baker	
6,126,658	A	10/2000	Baker	
6,273,887	B1	8/2001	Yamauchi et al.	
6,334,860	B1	1/2002	Dorn	
	H2037	H	7/2002	Yates et al.
6,626,901	B1	9/2003	Treat et al.	
6,695,840	B2	2/2004	Schulze	
6,733,501	B2 *	5/2004	Levine .....	606/45
6,964,662	B2	11/2005	Kidooka	
7,011,657	B2	3/2006	Truckai et al.	
7,033,356	B2	4/2006	Latterell et al.	
7,070,597	B2	7/2006	Truckai et al.	
D545,432	S *	6/2007	Watanabe .....	D24/143
7,276,068	B2 *	10/2007	Johnson et al. ....	606/51
7,473,253	B2	1/2009	Dycus et al.	
7,481,810	B2	1/2009	Dumbauld et al.	
D590,944	S	4/2009	Watanabe	
2002/0107517	A1	8/2002	Witt et al.	
2006/0064086	A1	3/2006	Odom	
2007/0062017	A1	3/2007	Dycus et al.	
2007/0106295	A1	5/2007	Garrison et al.	
2008/0319442	A1	12/2008	Unger et al.	
2009/0048596	A1	2/2009	Shields et al.	

## FOREIGN PATENT DOCUMENTS

DE	2415263	10/1975
DE	2514501	10/1976
DE	2627679	1/1977
DE	3612646	4/1987
DE	8712328	3/1988
DE	4303882	8/1994
DE	4403252	8/1995
DE	19515914	7/1996
DE	29616210	1/1997
DE	19608716	4/1997
DE	19751106	5/1998
DE	19751108	5/1999
DE	19738457	1/2009
EP	0875209	11/1998
EP	0878169	11/1998
EP	1159926	12/2001
GB	623316	5/1949
GB	1490585	11/1977
GB	2214430	A 6/1989
GB	2213416	A 8/1989
JP	61-501068	9/1984
JP	65-502328	3/1992
JP	5-5106	1/1993
JP	5-40112	2/1993
JP	06343644	12/1994
JP	07265328	10/1995
JP	08056955	3/1996
JP	08252263	10/1996
JP	09010223	1/1997
JP	11244298	9/1999
JP	2000-342599	12/2000
JP	2000-350732	12/2000

JP	2001-008944	1/2001
JP	2001-029356	2/2001
JP	2001-128990	5/2001
SU	401367	11/1974
WO	WO 02/080796	10/2002

## OTHER PUBLICATIONS

U.S. Appl. No. 12/399,614, filed Mar. 6, 2009.  
 U.S. Appl. No. 12/195,624, filed Aug. 21, 2008.  
 U.S. Appl. No. 12/367,791, filed Feb. 9, 2009.  
 U.S. Appl. No. 12/361,367, filed Jan. 28, 2009.  
 U.S. Appl. No. 12/361,375, filed Jan. 28, 2009.  
 U.S. Appl. No. 12/400,901, filed Mar. 10, 2009.  
 U.S. Appl. No. 12/176,679, filed Jul. 21, 2008.  
 U.S. Appl. No. 12/237,515, filed Sep. 25, 2008.  
 U.S. Appl. No. 12/204,976, filed Sep. 5, 2008.  
 U.S. Appl. No. 12/192,170, filed Aug. 15, 2008.  
 U.S. Appl. No. 12/233,157, filed Sep. 18, 2008.  
 U.S. Appl. No. 12/237,582, filed Sep. 25, 2008.  
 U.S. Appl. No. 12/210,598, filed Sep. 15, 2008.  
 U.S. Appl. No. 12/200,154, filed Aug. 28, 2008.  
 U.S. Appl. No. 12/211,205, filed Sep. 16, 2008.  
 U.S. Appl. No. 12/244,873, filed Oct. 3, 2008.  
 U.S. Appl. No. 12/246,553, filed Oct. 7, 2008.  
 U.S. Appl. No. 12/248,115, filed Oct. 9, 2008.  
 U.S. Appl. No. 12/353,474, filed Jan. 14, 2009.  
 U.S. Appl. No. 12/353,470, filed Jan. 14, 2009.  
 U.S. Appl. No. 12/352,942, filed Jan. 13, 2009.  
 U.S. Appl. No. 12/237,556, filed Sep. 25, 2008.  
 U.S. Appl. No. 12/411,542, filed Mar. 26, 2009.  
 U.S. Appl. No. 12/248,104, filed Oct. 9, 2008.  
 U.S. Appl. No. 12/254,123, filed Oct. 20, 2008.  
 U.S. Appl. No. 12/200,246, filed Aug. 28, 2008.  
 U.S. Appl. No. 12/200,396, filed Aug. 28, 2008.  
 U.S. Appl. No. 12/200,526, filed Aug. 28, 2008.  
 U.S. Appl. No. 12/236,666, filed Sep. 24, 2008.  
 U.S. Appl. No. 12/192,189, filed Aug. 15, 2008.  
 U.S. Appl. No. 12/192,243, filed Aug. 15, 2008.  
 U.S. Appl. No. 12/331,643, filed Dec. 10, 2008.  
 U.S. Appl. No. 12/353,466, filed Jan. 14, 2009.  
 U.S. Appl. No. 12/363,086, filed Jan. 30, 2009.  
 U.S. Appl. No. 12/419,729, filed Apr. 7, 2009.  
 Michael Choti, "Abdominoperineal Resection with the LigaSure Vessel Sealing System and LigaSure Atlas 20 cm Open Instrument"; Innovations That Work, Jun. 2003.  
 Chung et al., "Clinical Experience of Sutureless Closed Hemorrhoidectomy with LigaSure" Diseases of the Colon & Rectum Vol. 46, No. 1 Jan. 2003.  
 Carbonell et al., "Comparison of the Gyrus PlasmaKinetic Sealer and the Valleylab LigaSure Device in the Hemostasis of Small, Medium, and Large-Sized Arteries" Carolinas Laparoscopic and Advanced Surgery Program, Carolinas Medical Center, Charlotte, NC; Date: Aug. 2003.  
 Peterson et al. "Comparison of Healing Process Following Ligation with Sutures and Bipolar Vessel Sealing" Surgical Technology International (2001).  
 "Electrosurgery: a Historical Overview" Innovations in Electrosurgery; Sales/Product Literature; Dec. 31, 2000.  
 Johnson et al. "Evaluation of a Bipolar Electrothermal Vessel Sealing Device in Hemorrhoidectomy" Sales/Product Literature; Jan. 2004.  
 E. David Crawford "Evaluation of a New Vessel Sealing Device in Urologic Cancer Surgery" Sales/Product Literature 2000.  
 Johnson et al. "Evaluation of the LigaSure Vessel Sealing System in Hemorrhoidectomy" American College of Surgeons (ACS) Clinical Congress Poster (2000).  
 Muller et al., "Extended Left Hemicolectomy Using the LigaSure Vessel Sealing System" Innovations That Work, Sep. 1999.  
 Kennedy et al. "High-burst-strength, feedback-controlled bipolar vessel sealing" Surgical Endoscopy (1998) 12: 876-878.  
 Carus et al., "Initial Experience With The LigaSure Vessel Sealing System in Abdominal Surgery" Innovations That Work, Jun. 2002.



- Heniford et al. "Initial Research and Clinical Results with an Electrothermal Bipolar Vessel Sealer" Oct. 1999.
- Heniford et al. "Initial Results with an Electrothermal Bipolar Vessel Sealer" *Surgical Endoscopy* (2000) 15:799-801.
- Herman et al., "Laparoscopic Intestinal Resection With the LigaSure Vessel Sealing System: A Case Report"; *Innovations That Work*, Feb. 2002.
- Koyle et al., "Laparoscopic Palomo Varicocele Ligation in Children and Adolescents" *Pediatric Endosurgery & Innovative Techniques*, Vol. 6, No. 1, 2002.
- W. Scott Helton, "LigaSure Vessel Sealing System: Revolutionary Hemostasis Product for General Surgery"; *Sales/Product Literature* 1999.
- LigaSure Vessel Sealing System, the Seal of Confidence in General, Gynecologic, Urologic, and Laparoscopic Surgery; *Sales/Product Literature*; Apr. 2002.
- Joseph Ortenberg "LigaSure System Used in Laparoscopic 1st and 2nd Stage Orchiopexy" *Innovations That Work*, Nov. 2002.
- Sigel et al. "The Mechanism of Blood Vessel Closure by High Frequency Electrocoagulation" *Surgery Gynecology & Obstetrics*, Oct. 1965 pp. 823-831.
- Sampayan et al, "Multilayer Ultra-High Gradient Insulator Technology" *Discharges and Electrical Insulation in Vacuum*, 1998. Netherlands Aug. 17-21, 1998; vol. 2, pp. 740-743.
- Paul G. Horgan, "A Novel Technique for Parenchymal Division During Hepatectomy" *The American Journal of Surgery*, vol. 181, No. 3, Apr. 2001 pp. 236-237.
- Olsson et al. "Radical Cystectomy in Females" *Current Surgical Techniques in Urology*, vol. 14, Issue 3, 2001.
- Palazzo et al. "Randomized clinical trial of Ligasure versus open haemorrhoidectomy" *British Journal of Surgery* 2002, 89, 154-157.
- Levy et al. "Randomized Trial of Suture Versus Electrosurgical Bipolar Vessel Sealing in Vaginal Hysterectomy" *Obstetrics & Gynecology*, vol. 102, No. 1, Jul. 2003.
- "Reducing Needlestick Injuries in the Operating Room" *Sales/Product Literature* 2001.
- Bergdahl et al. "Studies on Coagulation and the Development of an Automatic Computerized Bipolar Coagulator" *J.Neurosurg*, vol. 75, Jul. 1991, pp. 148-151.
- Strasberg et al. "A Phase I Study of the LigaSure Vessel Sealing System in Hepatic Surgery" Section of HPB Surger, Washington University School of Medicine, St. Louis Mo, Presented at AHPBA, Feb. 2001.
- Sayfan et al. "Sutureless Closed Hemorrhoidectomy: A New Technique" *Annals of Surgery* vol. 234 No. 1 Jul. 2001; pp. 21-24.
- Levy et al., "Update on Hysterectomy—New Technologies and Techniques" *OBG Management*, Feb. 2003.
- Dulemba et al. "Use of a Bipolar Electrothermal Vessel Sealer in Laparoscopically Assisted Vaginal Hysterectomy" *Sales/Product Literature*; Jan. 2004.
- Strasberg et al., "Use of a Bipolar Vessel-Sealing Device for Parenchymal Transection During Liver Surgery" *Journal of Gastrointestinal Surgery*, vol. 6, No. 4, Jul./Aug. 2002 pp. 569-574.
- Sengupta et al., "Use of a Computer-Controlled Bipolar Diathermy System in Radical Prostatectomies and Other Open Urological Surgery" *ANZ Journal of Surgery* (2001) 71.9 pp. 538-540.
- Rothenberg et al. "Use of the LigaSure Vessel Sealing System in Minimally Invasive Surgery in Children" *Int'l Pediatric Endosurgery Group (IPEG)* 2000.
- Crawford et al. "Use of the LigaSure Vessel Sealing System in Urologic Cancer Surgery" *Grand Rounds in Urology* 1999 vol. 1 Issue 4 pp. 10-17.
- Craig Johnson, "Use of the LigaSure Vessel Sealing System in Bloodless Hemorrhoidectomy" *Innovations That Work*, Mar. 2000.
- Levy et al. "Use of a New Energy-based Vessel Ligation Device During Vaginal Hysterectomy" *Int'l Federation of Gynecology and Obstetrics (Figo) World Congress* 1999.
- Barbara Levy, "Use of a New Vessel Ligation Device During Vaginal Hysterectomy" *Figo* 2000, Washington, D.C.
- E. David Crawford "Use of a Novel Vessel Sealing Technology in Management of the Dorsal Venous Complex" *Sales/Product Literature* 2000.
- Jarrett et al., "Use of the LigaSure Vessel Sealing System for Perihilar Vessels in Laparoscopic Nephrectomy" *Sales/Product Literature* 2000.
- Crouch et al. "A Velocity-Dependent Model for Needle Insertion in Soft Tissue" *MICCAI* 2005; LNCS 3750 pp. 624-632, Dated: 2005.
- McLellan et al. "Vessel Sealing for Hemostasis During Pelvic Surgery" *Int'l Federation of Gynecology and Obstetrics Figo World Congress* 2000, Washington, D.C.
- McLellan et al. "Vessel Sealing for Hemostasis During Gynecologic Surgery" *Sales/Product Literature* 1999.
- Int'l Search Report EP 98944778.4 dated Oct. 31, 2000.
- Int'l Search Report EP 98957771 dated Aug. 9, 2001.
- Int'l Search Report EP 98958575.7 dated Sep. 20, 2002.
- Int'l Search Report EP 04013772.1 dated Apr. 1, 2005.
- Int'l Search Report EP 04027314.6 dated Mar. 10, 2005.
- Int'l Search Report EP 04027479.7 dated Mar. 8, 2005.
- Int'l Search Report EP 04027705.5 dated Feb. 3, 2005.
- Int'l Search Report EP 04752343.6 dated Jul. 20, 2007.
- Int'l Search Report EP 05002671.5 dated Dec. 22, 2008.
- Int'l Search Report EP 05002674.9 dated Jan. 16, 2009.
- Int'l Search Report EP 05013463.4 dated Oct. 7, 2005.
- Int'l Search Report EP 05013895.7 dated Oct. 21, 2005.
- Int'l Search Report EP 05016399.7 dated Jan. 13, 2006.
- Int'l Search Report EP 05017281.6 dated Nov. 24, 2005.
- Int'l Search Report EP 05019130.3 dated Oct. 27, 2005.
- Int'l Search Report EP 05019429.9 dated May 6, 2008.
- Int'l Search Report EP 05020665.5 dated Feb. 27, 2006.
- Int'l Search Report EP 05020666.3 dated Feb. 27, 2006.
- Int'l Search Report EP 05021197.8 dated Feb. 20, 2006.
- Int'l Search Report EP 05021779.3 dated Feb. 2, 2006.
- Int'l Search Report EP 05021780.1 dated Feb. 23, 2006.
- Int'l Search Report EP 05021937.7 dated Jan. 23, 2006.
- Int'l Search Report—extended- EP 05021937.7 dated Mar. 15, 2006.
- Int'l Search Report EP 05023017.6 dated Feb. 24, 2006.
- Int'l Search Report EP 06002279.5 dated Mar. 30, 2006.
- Int'l Search Report EP 06005185.1 dated May 10, 2006.
- Int'l Search Report EP 06006716.2 dated Aug. 4, 2006.
- Int'l Search Report EP 06008515.6 dated Jan. 8, 2009.
- Int'l Search Report EP 06008779.8 dated Jul. 13, 2006.
- Int'l Search Report EP 06014461.5 dated Oct. 31, 2006.
- Int'l Search Report EP 06020574.7 dated Oct. 2, 2007.
- Int'l Search Report EP 06020583.8 dated Feb. 7, 2007.
- Int'l Search Report EP 06020584.6 dated Feb. 1, 2007.
- Int'l Search Report EP 06020756.0 dated Feb. 16, 2007.
- Int'l Search Report EP 06 024122.1 dated Apr. 16, 2007.
- Int'l Search Report EP 06024123.9 dated Mar. 6, 2007.
- Int'l Search Report EP 07 001480.8 dated Apr. 19, 2007.
- Int'l Search Report EP 07 001488.1 dated Jun. 5, 2007.
- Int'l Search Report EP 07 009026.1 dated Oct. 8, 2007.
- Int'l Search Report Extended- EP 07 009029.5 dated Jul. 20, 2007.
- Int'l Search Report EP 07 009321.6 dated Aug. 28, 2007.
- Int'l Search Report EP 07 010672.9 dated Oct. 16, 2007.
- Int'l Search Report EP 07 013779.9 dated Oct. 26, 2007.
- Int'l Search Report EP 07 014016 dated Jan. 28, 2008.
- Int'l Search Report EP 07 015191.5 dated Jan. 23, 2008.
- Int'l Search Report EP 07 015601.3 dated Jan. 4, 2008.
- Int'l Search Report EP 07 020283.3 dated Feb. 5, 2008.
- Int'l Search Report EP 07 021646.0 dated Jul. 9, 2008.
- Int'l Search Report EP 07 021647.8 dated May 2, 2008.
- Int'l Search Report EP 08 002692.5 dated Dec. 12, 2008.
- Int'l Search Report EP 08 004655.0 dated Jun. 24, 2008.
- Int'l Search Report EP 08 006732.5 dated Jul. 29, 2008.
- Int'l Search Report EP 08 006917.2 dated Jul. 3, 2008.
- Int'l Search Report EP 08 016539.2 dated Jan. 8, 2009.
- Int'l Search Report EP 09 152267.2 dated Jun. 15, 2009.
- Int'l Search Report EP 09 152898.4 dated Jun. 10, 2009.
- Int'l Search Report PCT/US98/18640 dated Jan. 29, 1999.
- Int'l Search Report PCT/US98/23950 dated Jan. 14, 1999.
- Int'l Search Report PCT/US98/24281 dated Feb. 22, 1999.
- Int'l Search Report PCT/US99/24869 dated Feb. 3, 2000.
- Int'l Search Report PCT/US01/11218 dated Aug. 14, 2001.
- Int'l Search Report PCT/US01/11224 dated Nov. 13, 2001.
- Int'l Search Report PCT/US01/11340 dated Aug. 16, 2001.

# US D617,902 S

Page 4

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Int'l Search Report PCT/US01/11420 dated Oct. 16, 2001.  
Int'l Search Report PCT/US02/01890 dated Jul. 25, 2002.  
Int'l Search Report PCT/US02/11100 dated Jul. 16, 2002.  
Int'l Search Report PCT/US03/28534 dated Dec. 19, 2003.  
Int'l Search Report PCT/US04/03436 dated Mar. 3, 2005.  
Int'l Search Report PCT/US04/13273 dated Dec. 15, 2004.

Int'l Search Report PCT/US04/15311 dated Jan. 12, 2005.  
Int'l Search Report PCT/US07/021438 dated Apr. 1, 2008.  
Int'l Search Report PCT/US07/021440 dated Apr. 8, 2008.  
Int'l Search Report PCT/US08/61498 dated Sep. 22, 2008.  
Int'l Search Report PCT/US09/032690 dated Jun. 16, 2009.

\* cited by examiner



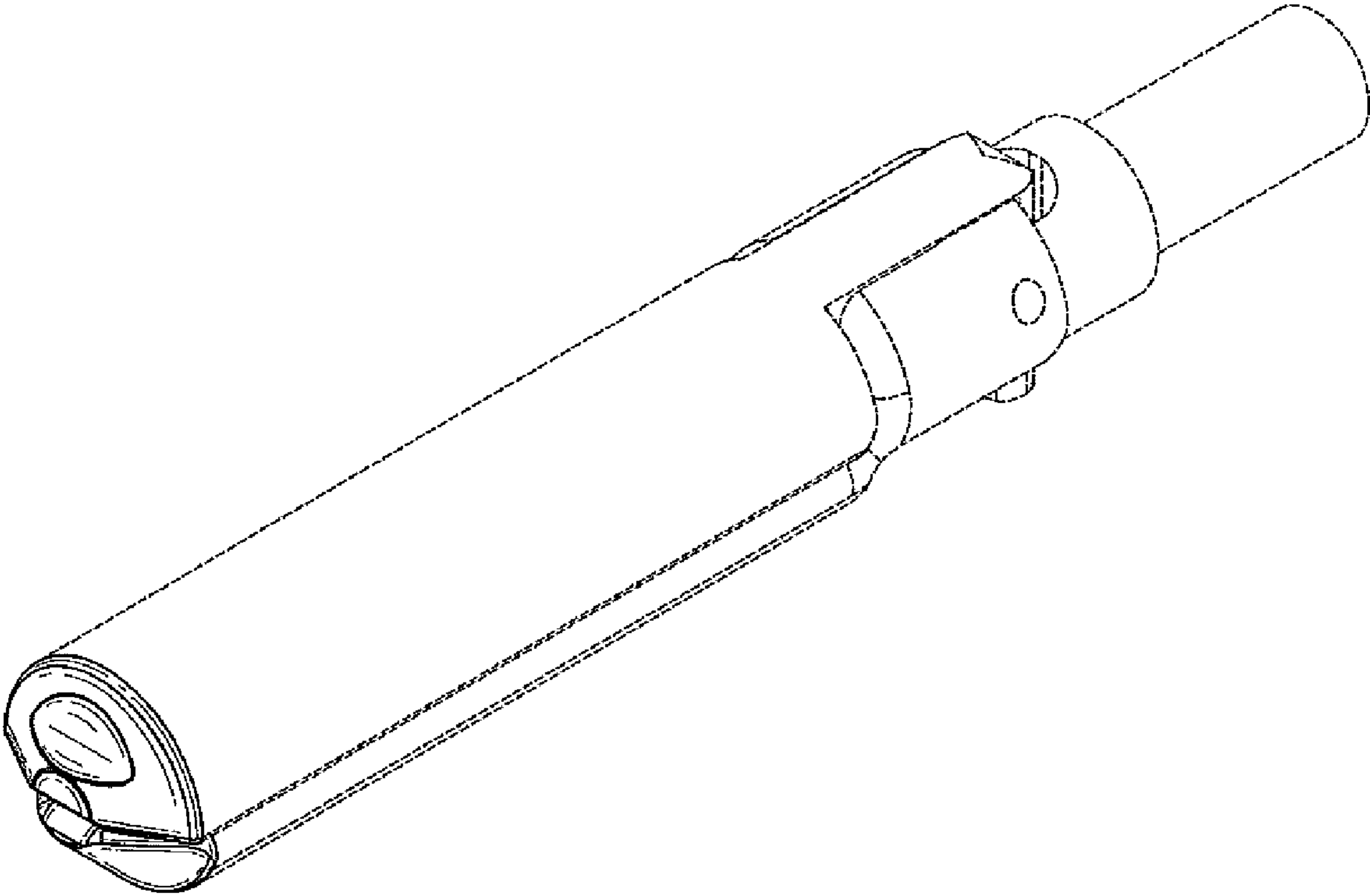


FIG. 1

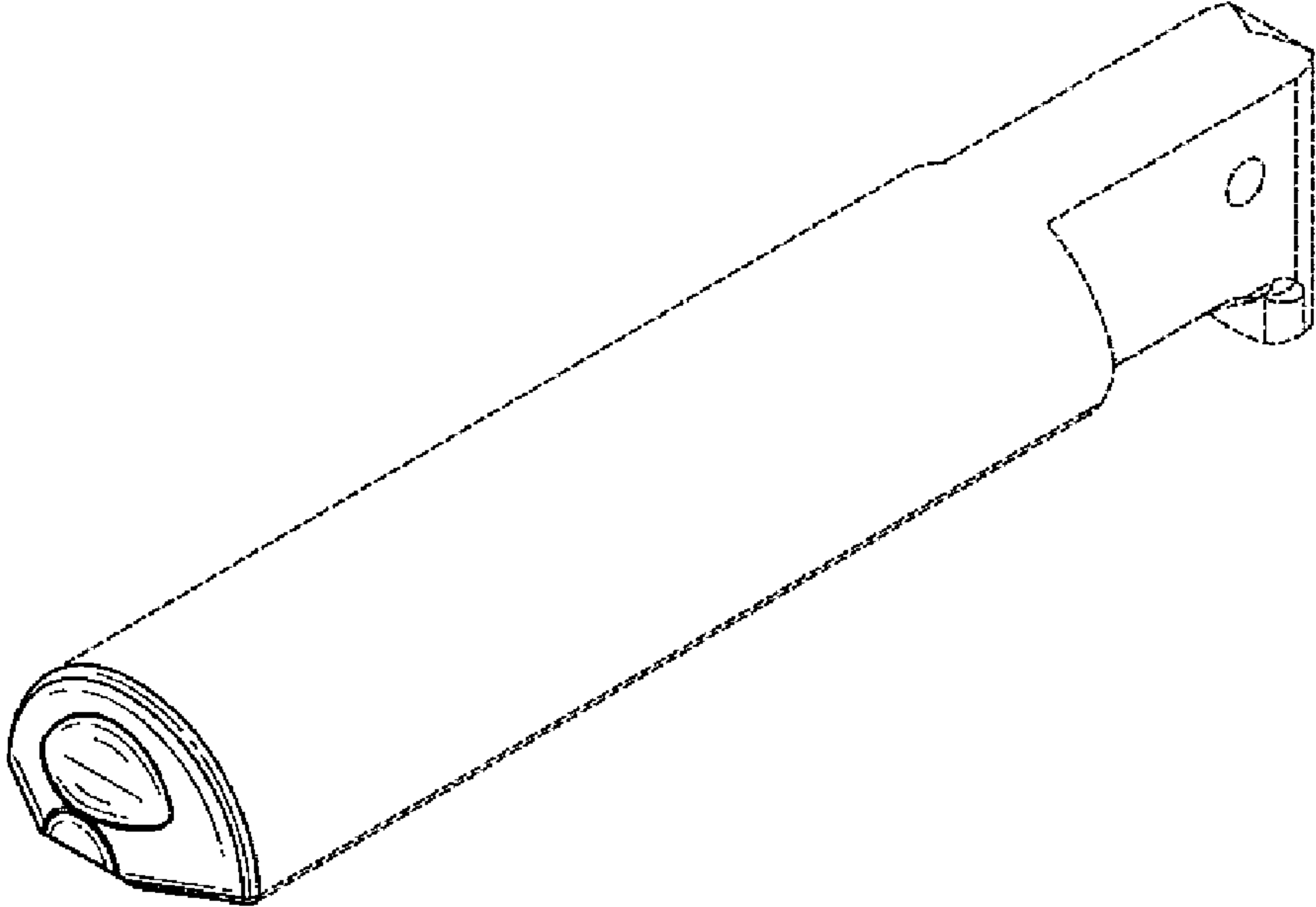
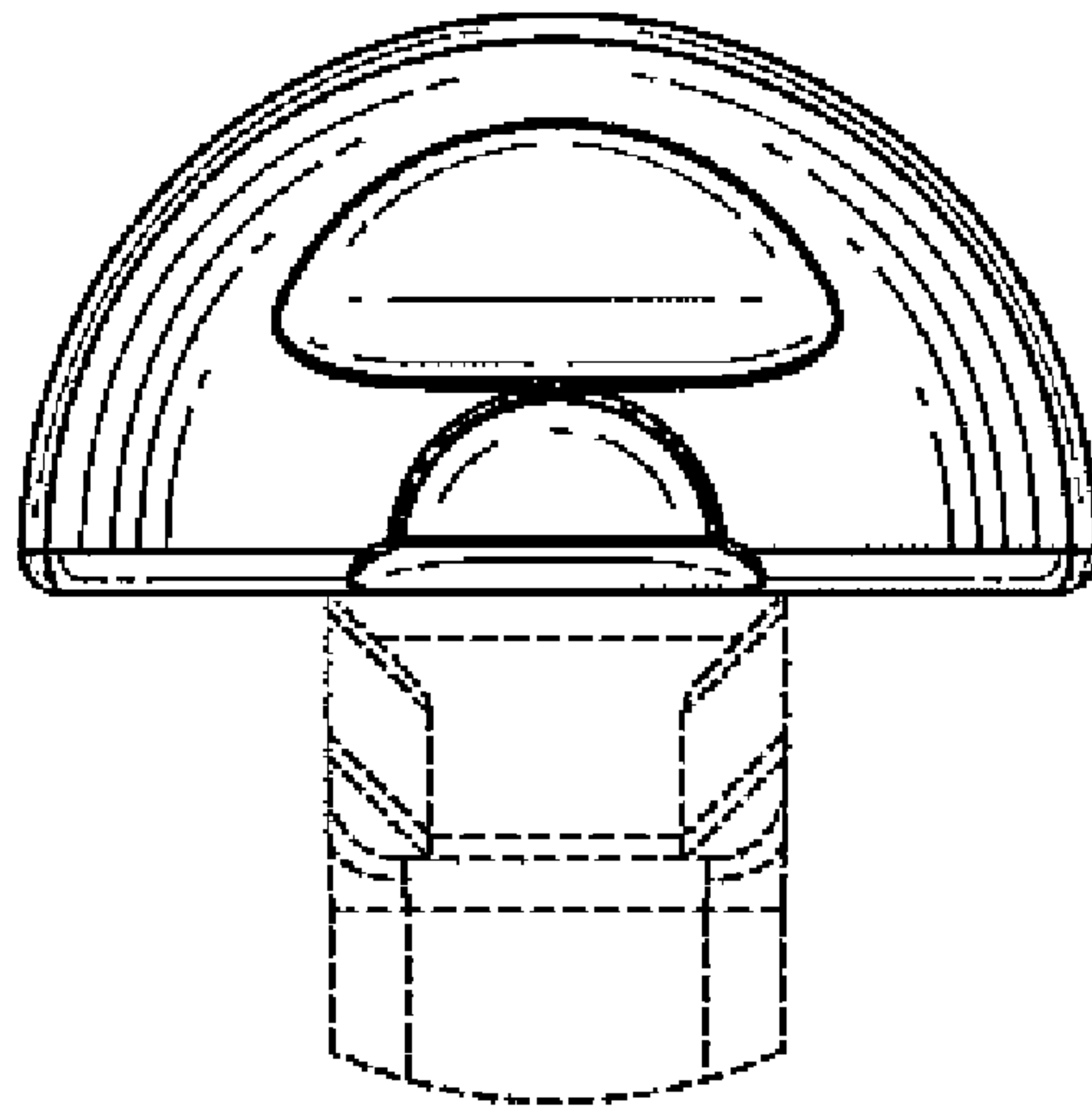
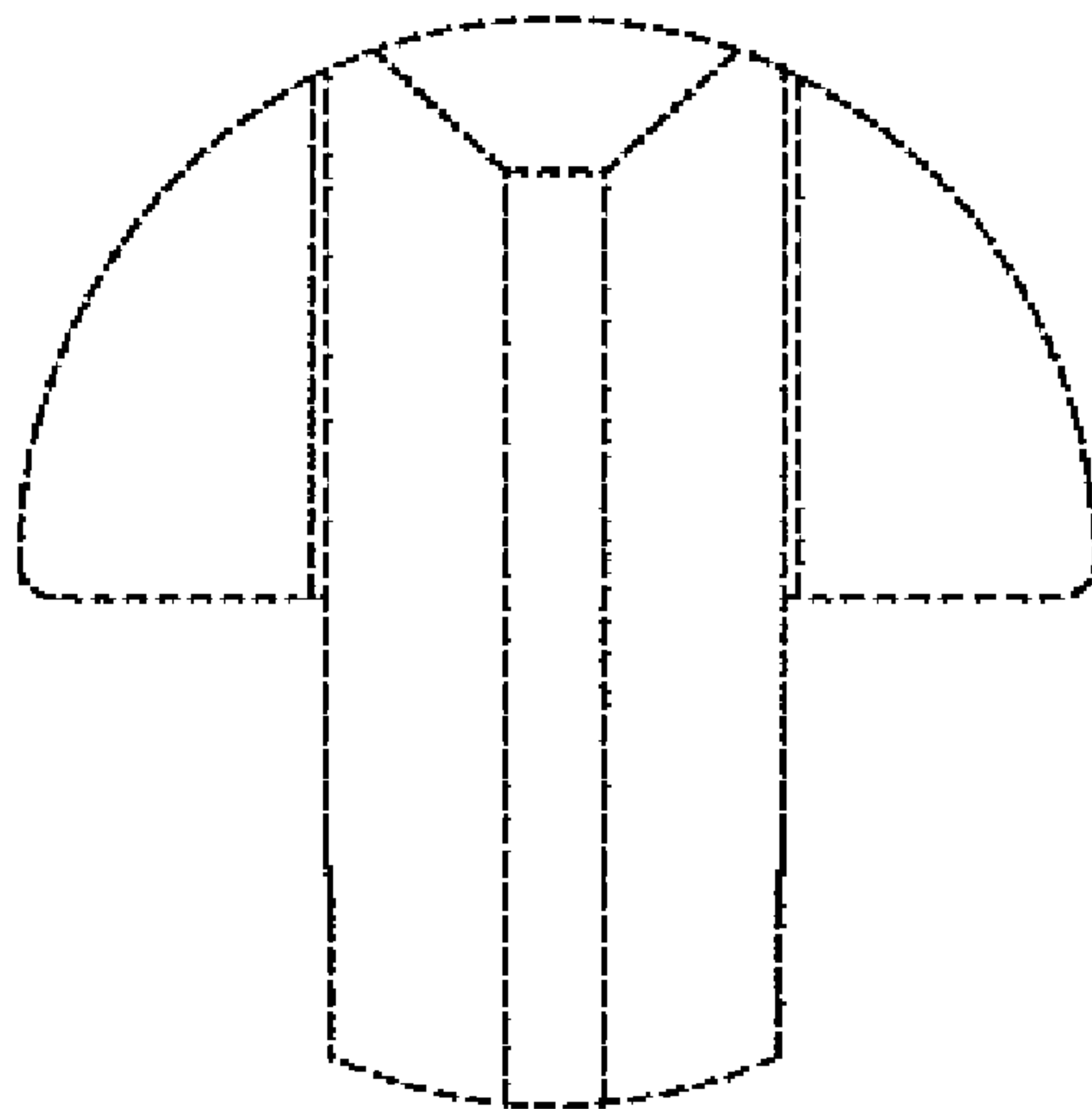


FIG. 2



**FIG. 3**



**FIG. 4**



FIG. 5



FIG. 6

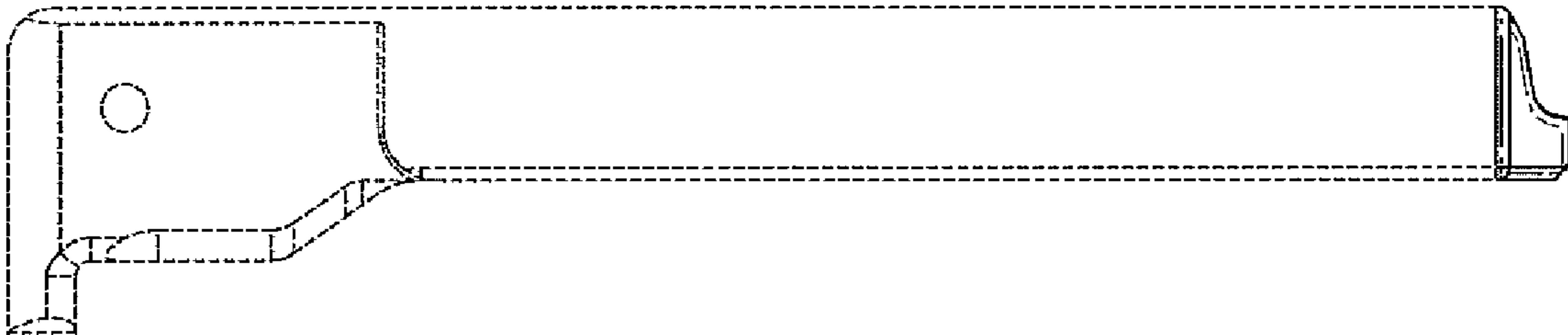


FIG. 7

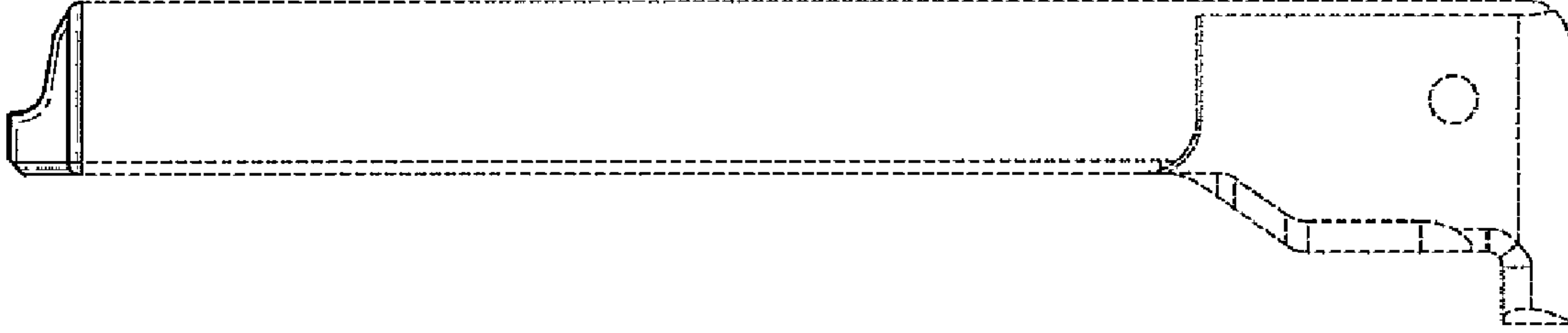


FIG. 8



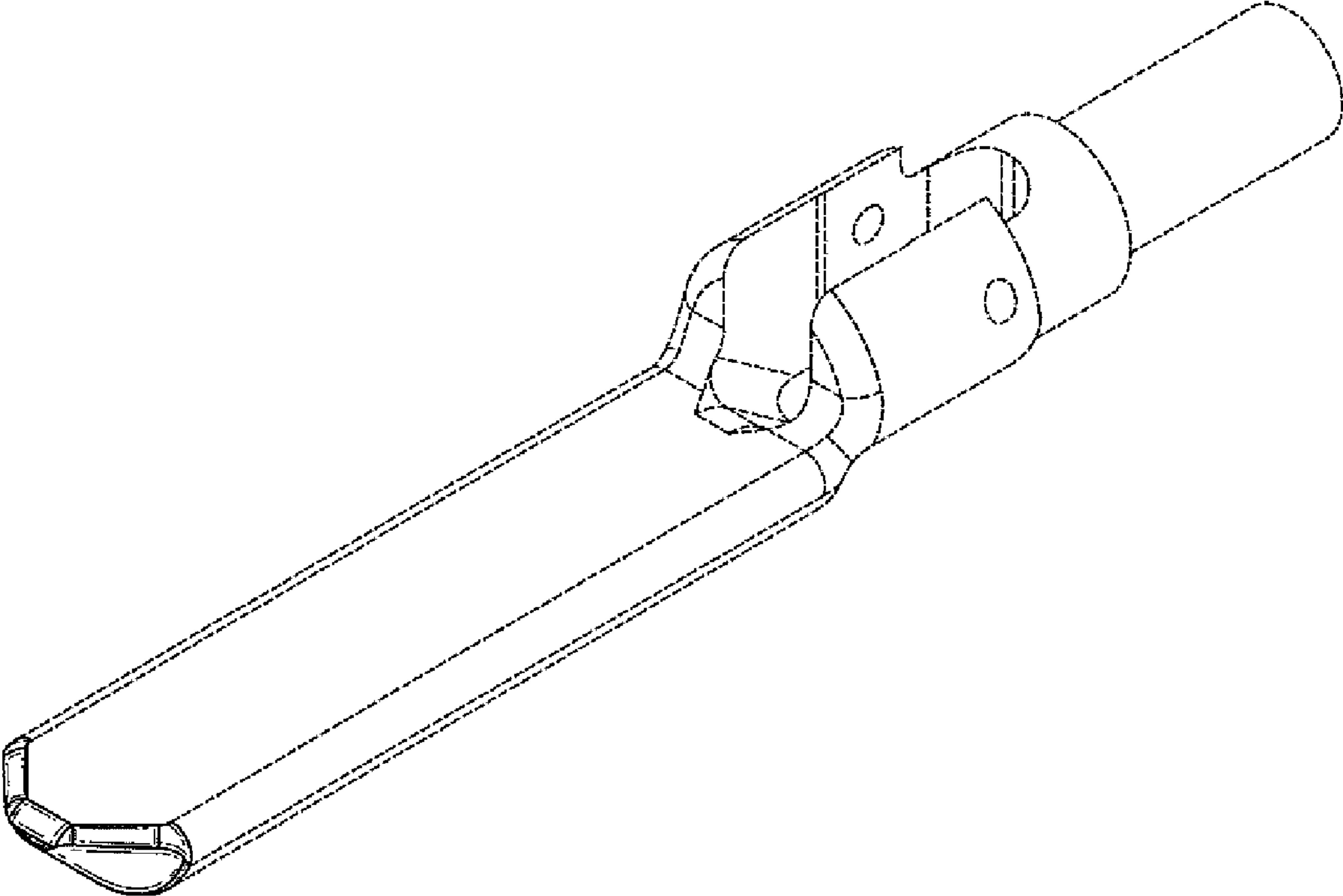
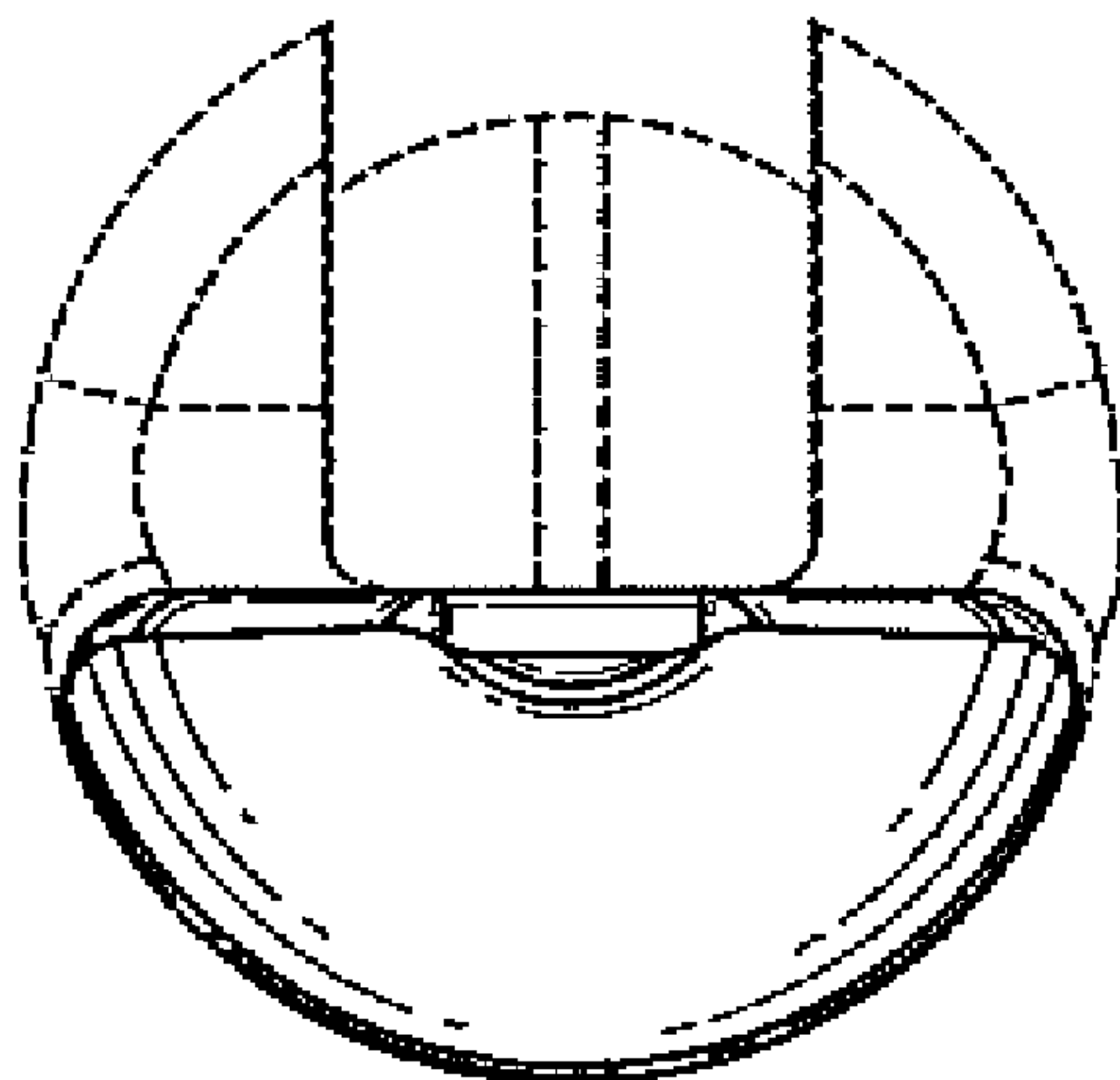
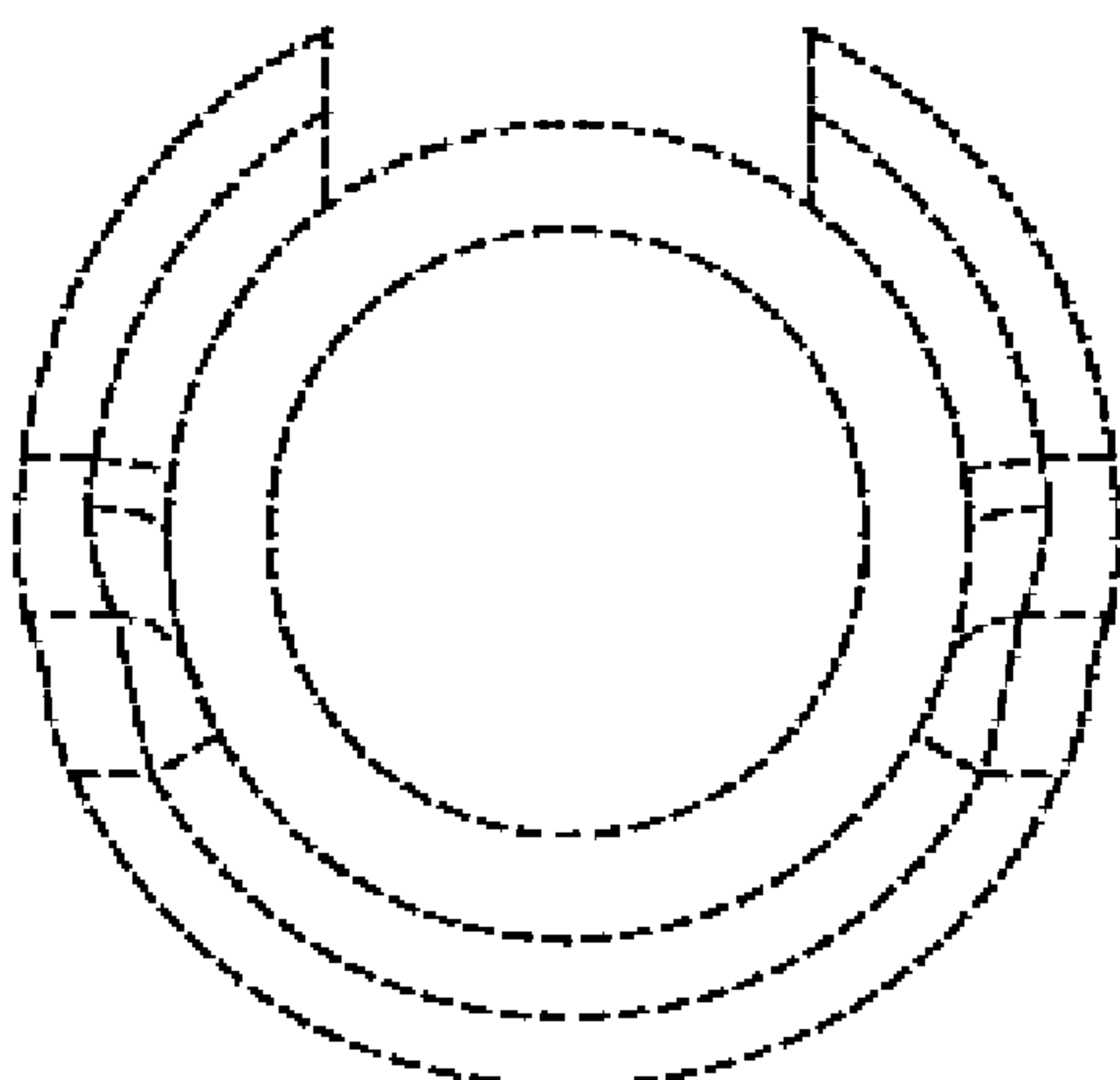


FIG. 9



**FIG. 10**



**FIG. 11**

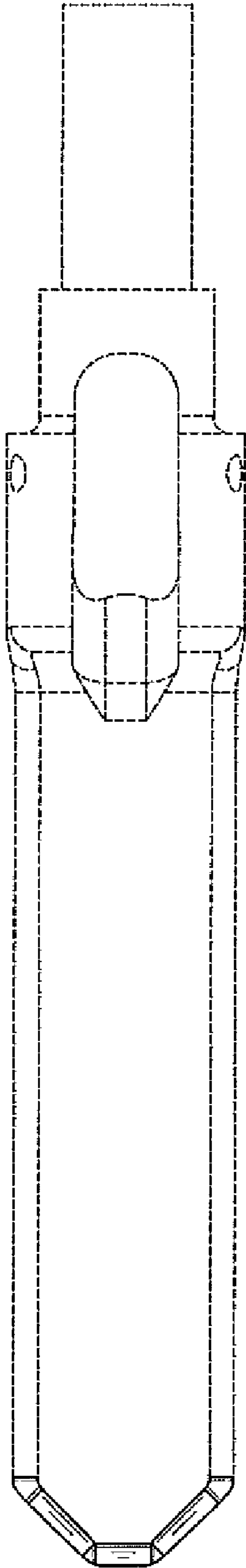


FIG. 12

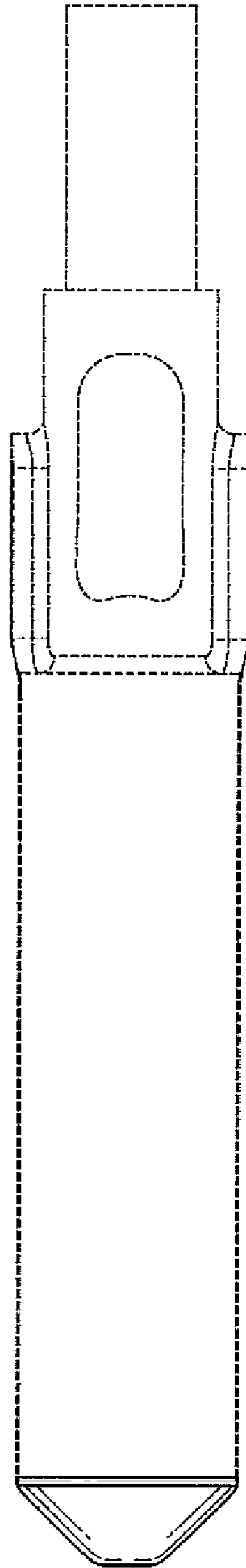


FIG. 13





FIG. 14

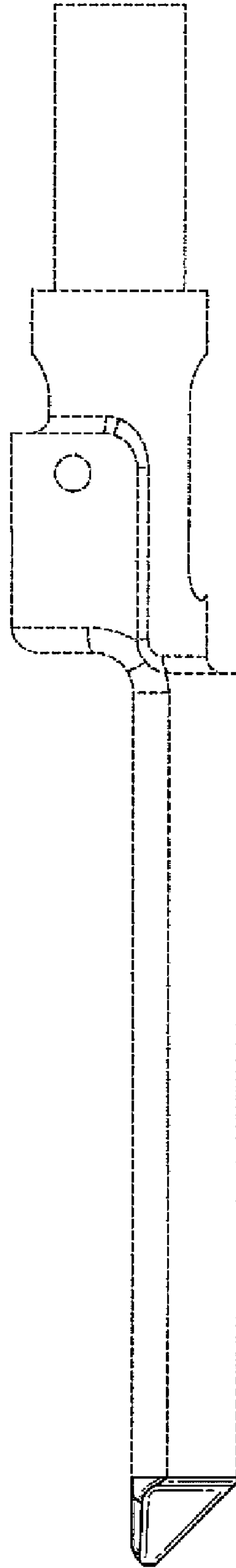


FIG. 15