



US00D880694S

(12) **United States Design Patent** (10) **Patent No.:** **US D880,694 S**
Ng et al. (45) **Date of Patent:** **** Apr. 7, 2020**

(54) **NASAL AIRWAY MEDICAL INSTRUMENT**
(71) Applicant: **AERIN MEDICAL, INC.**, Sunnyvale, CA (US)
(72) Inventors: **Gregory Ng**, San Lorenzo, CA (US); **Curtis Anderson**, Loudon, TN (US); **Robert Gatehouse**, Pleasanton, CA (US)

5,707,349 A 1/1998 Edwards
5,718,702 A 2/1998 Edwards
5,728,094 A 3/1998 Edwards
5,730,719 A 3/1998 Edwards
5,733,280 A 3/1998 Avitall
5,738,114 A 4/1998 Edwards
5,743,870 A 4/1998 Edwards
5,743,904 A 4/1998 Edwards

(Continued)

(73) Assignee: **AERIN MEDICAL, INC.**, Sunnyvale, CA (US)

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

(21) Appl. No.: **29/602,518**

(22) Filed: **May 1, 2017**

(51) **LOC (12) Cl.** **24-02**

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

(58) **Field of Classification Search**
USPC D24/138, 137, 133, 145, 146, 147, 108, D24/113, 127
CPC . A61B 18/1206; A61B 18/1815; A61B 18/14; A61B 5/08; A61B 18/16; A61B 18/1477; A61B 18/1445; A61B 18/02; A61B 18/06; A61B 18/1485; A61B 17/2816; A61B 18/1442; A61B 18/20; A61B 5/01; A61B 18/085; A61F 5/56; A61F 7/10; A61N 7/022; A61N 5/025; A61N 5/0625; A61N 5/0603; A61N 1/403

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,834,757 A * 5/1989 Brantigan A61B 17/1604 623/17.11
4,887,605 A 12/1989 Angelsen et al.
5,348,008 A 9/1994 Bornn et al.
5,533,499 A 7/1996 Johnson
5,542,916 A 8/1996 Hirsch et al.
5,624,439 A 4/1997 Edwards et al.
5,674,191 A 10/1997 Edwards et al.

FOREIGN PATENT DOCUMENTS

CN 101325919 12/2008
WO 199907299 2/1999

(Continued)

OTHER PUBLICATIONS

Buckley et al., "High-resolution spatial mapping of shear properties in cartilage," J Biomech., Mar. 3, 2010;43(4):796-800, Epub Nov. 5, 2009.

(Continued)

Primary Examiner — Eliza Z Bennett-Hattan

(74) *Attorney, Agent, or Firm* — Merchant & Gould P.C.

(57) **CLAIM**

The ornamental design for a nasal airway medical instrument, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of the nasal airway medical instrument.

FIG. 2 is another perspective view thereof.

FIG. 3 is a front view thereof.

FIG. 4 is a rear view thereof.

FIG. 5 is a right side view thereof.

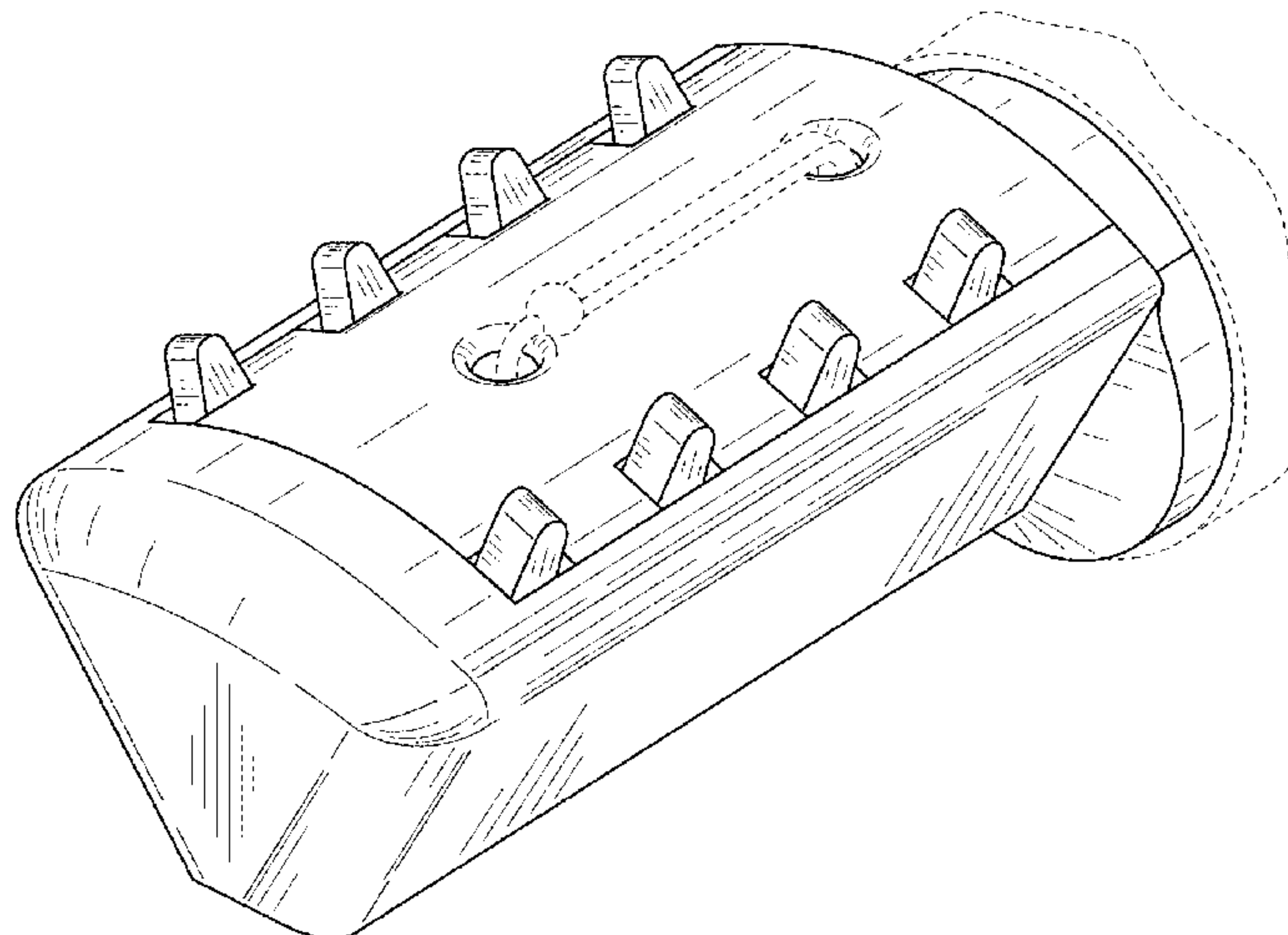
FIG. 6 is a left side view thereof.

FIG. 7 is a top view thereof; and,

FIG. 8 is a bottom view thereof.

The broken lines represent portions of the nasal airway medical instrument that form no part of the claimed design.

1 Claim, 6 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

5,746,224	A	5/1998	Edwards	9,452,010	B2	9/2016	Wolf et al.
5,800,429	A	9/1998	Edwards	9,486,278	B2	11/2016	Wolf et al.
5,807,306	A	9/1998	Shapland et al.	9,526,571	B2	12/2016	Wolf et al.
5,816,095	A	10/1998	Nordell, II et al.	D780,919	S *	3/2017	Sasayama D24/146
5,817,049	A	10/1998	Edwards	D782,676	S *	3/2017	Fink D24/146
5,820,580	A	10/1998	Edwards et al.	D783,166	S *	4/2017	Champ D24/147
5,823,197	A	10/1998	Edwards	D784,538	S *	4/2017	Georgi D24/146
5,827,277	A	10/1998	Edwards	9,687,288	B2	6/2017	Saadat
5,843,021	A	12/1998	Edwards et al.	9,687,296	B2	6/2017	Wolf et al.
5,843,077	A	12/1998	Edwards	9,763,723	B2	9/2017	Saadat
5,846,235	A	12/1998	Pasricha et al.	9,763,743	B2	9/2017	Lin
5,879,349	A	3/1999	Edwards	9,788,886	B2	10/2017	Wolf et al.
5,938,659	A	8/1999	Tu	9,801,752	B2	10/2017	Wolf et al.
5,980,522	A *	11/1999	Koros A61F 2/4455 606/60	9,888,957	B2	2/2018	Wolf et al.
6,045,549	A	4/2000	Smethers et al.	D813,390	S *	3/2018	Austria D24/147
6,096,033	A	8/2000	Tu et al.	9,913,682	B2	3/2018	Wolf et al.
6,102,907	A	8/2000	Smethers et al.	9,943,361	B2	4/2018	Wolf et al.
6,109,268	A	8/2000	Thapliyal et al.	10,028,780	B2	7/2018	Wolf et al.
6,126,657	A	10/2000	Edwards et al.	10,028,781	B2	7/2018	Saadat
6,131,579	A	10/2000	Thorson et al.	10,265,115	B2	4/2019	Wolf et al.
6,139,546	A	10/2000	Koenig et al.	10,335,221	B2	7/2019	Wolf
6,152,143	A	11/2000	Edwards	10,376,300	B2	8/2019	Wolf
6,165,173	A	12/2000	Kamdar et al.	10,398,489	B2	9/2019	Wolf et al.
6,179,803	B1	1/2001	Edwards et al.	10,456,185	B2	10/2019	Wolf et al.
6,210,355	B1	4/2001	Edwards et al.	10,456,186	B1	10/2019	Wolf et al.
6,228,079	B1	5/2001	Koenig	10,470,814	B2	11/2019	Wolf et al.
6,231,569	B1	5/2001	Bek et al.	10,485,603	B2	11/2019	Wolf et al.
6,293,941	B1	9/2001	Strul et al.	2002/0016588	A1	2/2002	Wong et al.
6,309,386	B1	10/2001	Bek	2002/0049464	A1	4/2002	Donofrio et al.
6,371,926	B1	4/2002	Thorson et al.	2002/0087155	A1	7/2002	Underwood et al.
6,383,181	B1	5/2002	Johnston et al.	2002/0128641	A1	9/2002	Underwood et al.
6,391,028	B1	5/2002	Fanton et al.	2003/0144659	A1	7/2003	Edwards
6,416,491	B1	7/2002	Edwards et al.	2003/0208194	A1	11/2003	Hovda et al.
6,425,151	B2	7/2002	Barnett	2003/0225403	A1	12/2003	Woloszko et al.
6,431,174	B1	8/2002	Knudson et al.	2004/0193238	A1	9/2004	Mosher
6,451,013	B1	9/2002	Bays et al.	2004/0220644	A1	11/2004	Shalev et al.
6,502,574	B2	1/2003	Stevens	2005/0020901	A1	1/2005	Belson
6,551,310	B1	4/2003	Ganz et al.	2005/0119643	A1	6/2005	Sobol et al.
6,562,036	B1	5/2003	Ellman et al.	2005/0222565	A1	10/2005	Manstein
6,575,969	B1	6/2003	Rittman et al.	2005/0234439	A1	10/2005	Underwood
6,589,235	B2	7/2003	Wong et al.	2005/0240147	A1	10/2005	Makower et al.
6,659,106	B1	12/2003	Hovda et al.	2005/0288665	A1	12/2005	Woloszko et al.
6,659,106	B1	12/2003	Hovda et al.	2006/0129238	A1 *	6/2006	Paltzer A61F 2/447 623/17.11
6,911,027	B1	6/2005	Edwards et al.	2006/0235377	A1	10/2006	Earley
6,978,781	B1	12/2005	Jordan	2006/0253117	A1	11/2006	Hovda et al.
7,055,523	B1	6/2006	Brown	2006/0276817	A1	12/2006	Vassallo et al.
7,097,641	B1	8/2006	Arless et al.	2007/0049999	A1	3/2007	Esch
7,114,495	B2	10/2006	Lockwood, Jr.	2007/0066944	A1	3/2007	Nyte
D545,432	S *	6/2007	Watanabe D24/143	2007/0073282	A1	3/2007	McGarrigan et al.
7,322,993	B2	1/2008	Metzger et al.	2007/0093710	A1	4/2007	Maschke
7,361,168	B2	4/2008	Makower	2007/0219600	A1	9/2007	Gertner et al.
7,416,550	B2	8/2008	Protsenko et al.	2008/0027423	A1	1/2008	Choi et al.
7,442,191	B2	10/2008	Hovda et al.	2008/0027480	A1	1/2008	van der Burg et al.
7,655,243	B2	2/2010	Deem et al.	2008/0082090	A1	4/2008	Manstein
D612,050	S *	3/2010	Baynham D24/133	2008/0125626	A1	5/2008	Chang et al.
7,678,069	B1	3/2010	Baker et al.	2008/0154237	A1	6/2008	Chang
7,780,730	B2	8/2010	Saidi	2008/0183251	A1	7/2008	Azar
7,824,394	B2	11/2010	Manstein	2008/0312644	A1	12/2008	Fourkas et al.
7,850,683	B2	12/2010	Elkins et al.	2009/0018485	A1	1/2009	Krespi et al.
7,997,278	B2	8/2011	Utley	2009/0124958	A1	5/2009	Li
8,114,062	B2	2/2012	Muni	2009/0143821	A1	6/2009	Stupak
8,128,617	B2	3/2012	Bencini et al.	2009/0192505	A1	7/2009	Askew
8,137,345	B2	3/2012	McNall, III et al.	2009/0292358	A1	11/2009	Saidi
8,317,781	B2	11/2012	Owens et al.	2010/0144996	A1	6/2010	Kennedy et al.
8,317,782	B1	11/2012	Ellman et al.	2010/0152730	A1	6/2010	Makower et al.
8,936,594	B2	1/2015	Wolf et al.	2010/0174283	A1	7/2010	McNall
8,986,301	B2	3/2015	Wolf et al.	2010/0204560	A1	8/2010	Salahieh
9,072,597	B2	7/2015	Wolf et al.	2010/0241112	A1	9/2010	Watson
9,125,677	B2	9/2015	Sobol	2010/0260703	A1	10/2010	Yankelson
9,179,964	B2	11/2015	Wolf et al.	2011/0009737	A1	1/2011	Manstein
9,179,967	B2	11/2015	Wolf et al.	2011/0118726	A1	5/2011	De La Rama
9,237,924	B2	1/2016	Wolf et al.	2011/0282268	A1	11/2011	Baker et al.
9,452,087	B2	1/2016	Holm et al.	2012/0039954	A1	2/2012	Cupit et al.
9,415,194	B2	8/2016	Wolf et al.	2012/0078377	A1	3/2012	Gonzales et al.
9,433,463	B2	9/2016	Wolf et al.	2012/0298105	A1	11/2012	Osorio
				2012/0316473	A1	12/2012	Bonutti et al.
				2012/0316557	A1	12/2012	Sartor et al.
				2012/0323227	A1	12/2012	Wolf et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2012/0323232	A1	12/2012	Wolf et al.	
2013/0158536	A1	6/2013	Bloom	
2013/0218158	A1	8/2013	Danek et al.	
2014/0088463	A1	3/2014	Wolf et al.	
2014/0114233	A1	4/2014	Deem et al.	
2015/0202003	A1	7/2015	Wolf et al.	
2016/0045277	A1	2/2016	Lin	
2016/0121112	A1	5/2016	Azar	
2016/0287315	A1	10/2016	Wolf et al.	
2017/0095288	A1	4/2017	Wolf et al.	
2017/0209199	A1	7/2017	Wolf et al.	
2017/0231651	A1	8/2017	Dinger et al.	
2017/0245924	A1	8/2017	Wolf et al.	
2017/0252089	A1	9/2017	Hester	
2017/0252100	A1	9/2017	Wolf et al.	
2017/0360495	A1	12/2017	Wolf et al.	
2018/0000535	A1	1/2018	Wolf et al.	
2018/0042618	A1*	2/2018	Victor	A61B 17/1615
2018/0177542	A1	6/2018	Wolf et al.	
2018/0177546	A1	6/2018	Dinger et al.	
2018/0185085	A1	7/2018	Wolf et al.	
2018/0228533	A1	8/2018	Wolf et al.	
2018/0263678	A1	9/2018	Saadat	
2018/0317997	A1	11/2018	Dinger et al.	
2018/0344378	A1	12/2018	Wolf et al.	
2019/0076185	A1	3/2019	Dinger et al.	
2019/0151005	A1	5/2019	Wolf et al.	
2019/0175242	A1	6/2019	Wolf et al.	
2019/0201069	A1	7/2019	Wolf	
2019/0231409	A1	8/2019	Wolf	
2019/0282289	A1	9/2019	Wolf et al.	
2019/0328406	A1*	10/2019	Lu	A61B 17/1617
2019/0336196	A1	11/2019	Wolf et al.	
2019/0343577	A1	11/2019	Wolf et al.	

FOREIGN PATENT DOCUMENTS

WO	2001043653	6/2001
WO	WO 2003024349	3/2003
WO	2007037895	4/2007
WO	2007134005	11/2007
WO	2010077980	7/2010
WO	2012174161	12/2012
WO	2013028998	A2 2/2013
WO	2015047863	4/2015
WO	2015048806	4/2015
WO	2015153696	10/2015

OTHER PUBLICATIONS

Buckley et al., "Mapping the depth dependence of shear properties in articular cartilage," J Biomech., 41(11):2430-2437, Epub Jul. 10, 2008.

Cole, "Biophysics of nasal airflow: a review," Am J Rhinol., 14(4):245-249, Jul.-Aug. 2000.

Cole, "The four components of the nasal valve," Am J Rhinol., 17(2):107-110, Mar.-Apr. 2003.

Griffin et al., "Effects of enzymatic treatments on the depth-dependent viscoelastic shear properties of articular cartilage," J Orthop Res., 32(12):1652-1657, Epub Sep. 5, 2014.

Kjaergaard et al., "Relation of nasal air flow to nasal cavity dimensions," Arch Otolaryngol Head Neck Surg., 135(6):565-570, Jun. 2009.

Silverberg et al., "Structure-function relations and rigidity percolation in the shear properties of articular cartilage," Biophys J., 107(7):1721-1730, Oct. 7, 2014.

Stewart et al., "Development and validation of the Nasal Obstruction Symptom Evaluation (Nose) scale," Otolaryngol Head Neck Surg., 130(2):157-163, Feb. 2004.

Stupak, "Endonasal repositioning of the upper lateral cartilage and the internal nasal valve," Ann Otol Rhinol Laryngol., 120(2):88-94, Feb. 2011.

Stupak, MD, H.D., A Perspective on the Nasal Valve, Dept. of Otorhinolaryngology, Albert Einstein College of Medicine, Nov. 6, 2009.

Chen et al., China Journal of Endoscopy, vol. 11, No. 3. pp. 239-243, Mar. 2005, [English Translation of Title] "Radiofrequency treatment of nasal posterior-under nerve ethmoidal nerve and infratubinal for perennial allergic rhinitis under nasal endoscope," [also translated as] "Preliminary exploration of radiofrequency thermocoagulation of the posterior inferior nasal nerve, anterior ethmoidal nerve, and inferior nasal concha under nasal endoscopy in the treatment of perennial allergic rhinitis." 9 pages.

Fang et al., J First Mil Med Univ, vol. 25 No. 7, pp. 876-877, 2005, [English translation of title] "Nasal endoscopy combined with multiple radiofrequency for perennial allergic rhinitis" [also translated as] "Nasal Endoscopic Surgery Combined with Multisite Radiofrequency Technology for Treating Perennial Allergic Rhinitis," 4 pages.

Kong et al., Journal of Clinical Otorhinolaryngology, 2005. "Clinical observation on radiofrequency ablation treatment in perennial allergic rhinitis," Retrieved from the Internet: <URL:http://en.cnki.com.cn/Article_en/CJFDTOTAL-LCEH200505015.htm>, 1 page.

Liu et al., China Journal of Endoscopy, vol. 14, No. 11, pp. 1127-1130, Nov. 2008, [English Translation of Title] "Impact of treatment of perennial rhinitis by radiofrequency thermocoagulations to vidian and anterior ethmoidal nerves on mucociliary clearance," [also translated as] "Impact of radiofrequency thermocoagulation of bilateral vidian and anterior ethmoidal nerve cluster regions on nasal mucociliary transport function in perennial allergic rhinitis and vasomotor rhinitis." 12 pages.

* cited by examiner

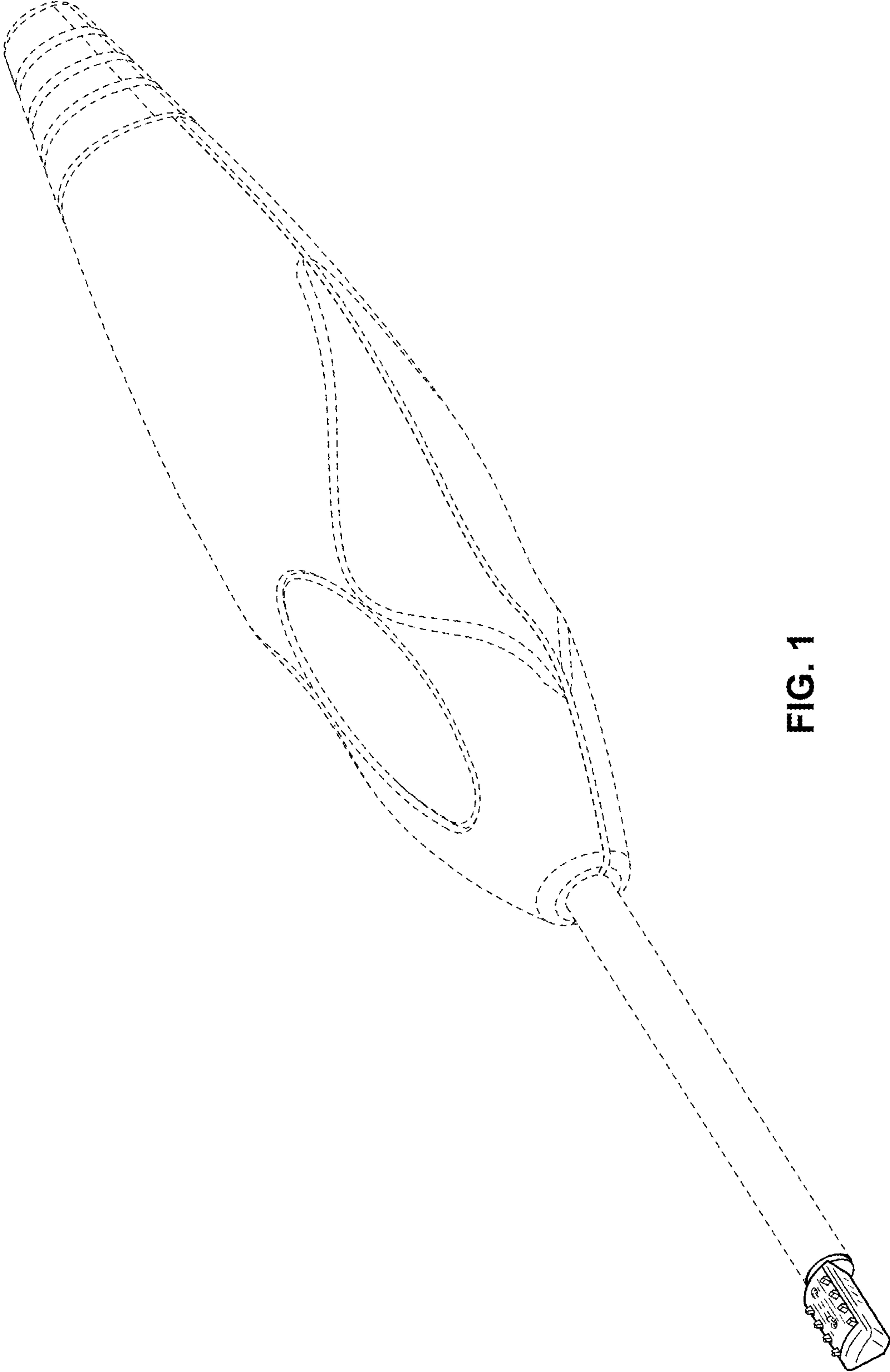


FIG. 1

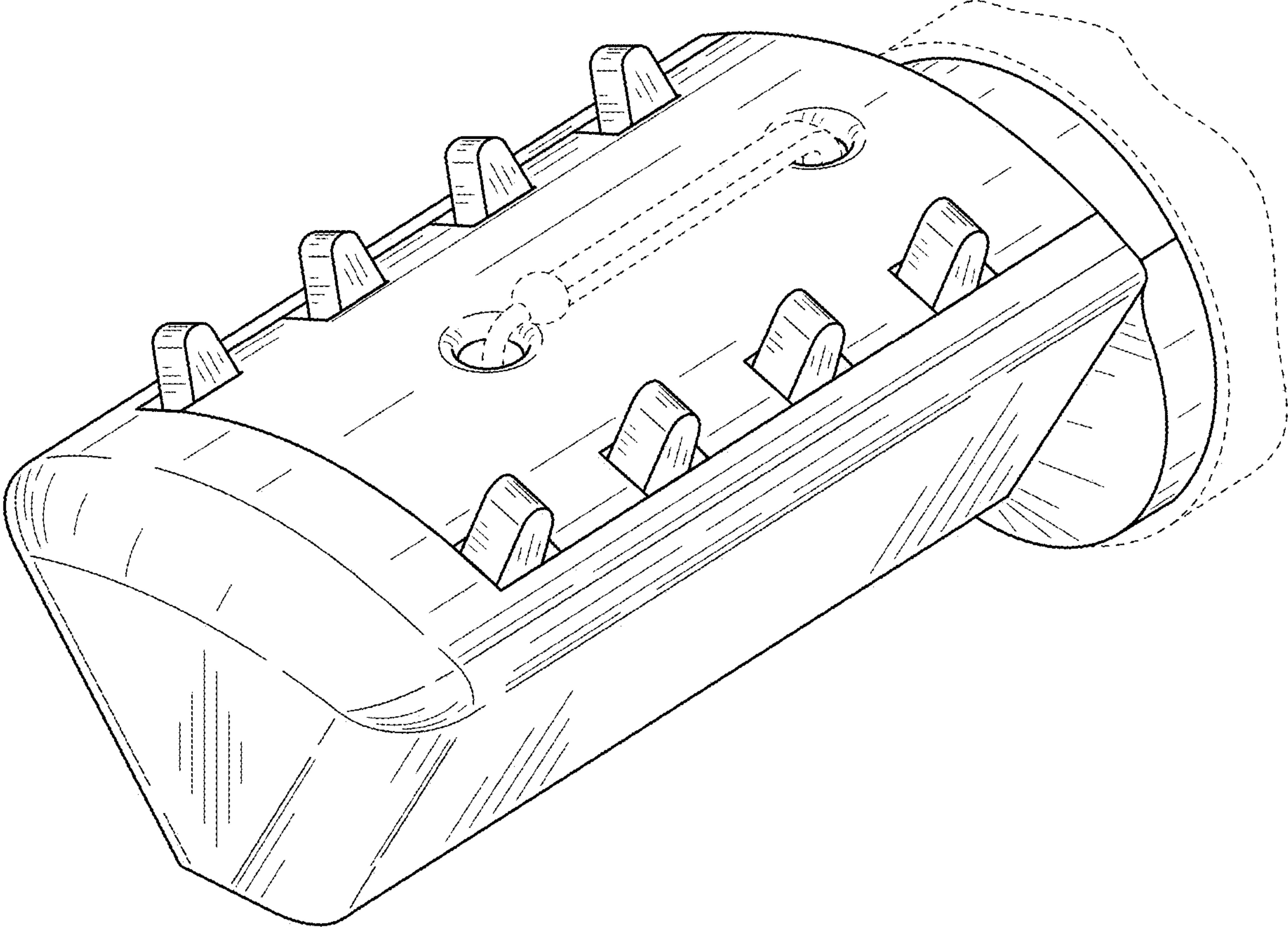


FIG. 2

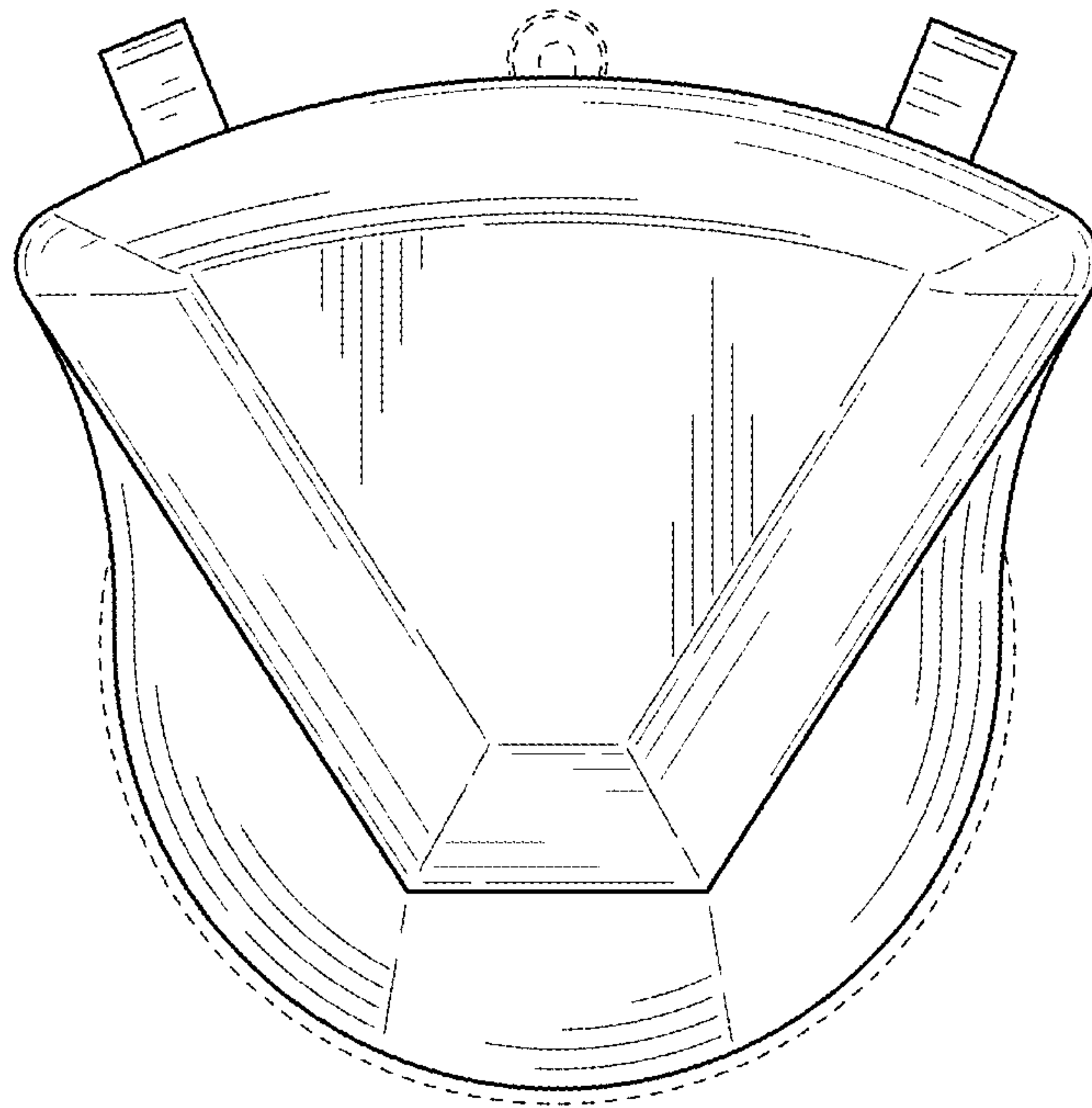


FIG. 3

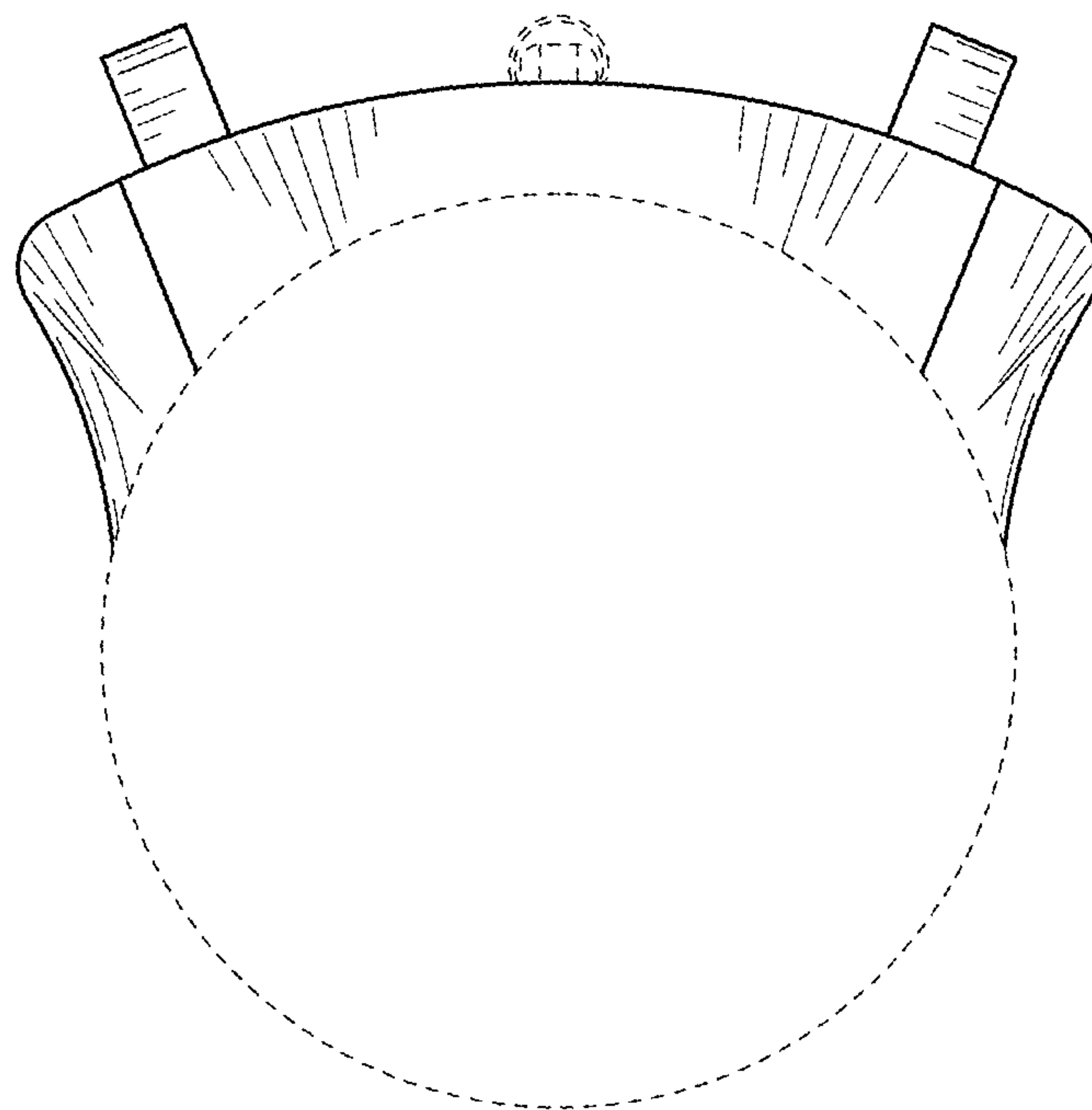


FIG. 4

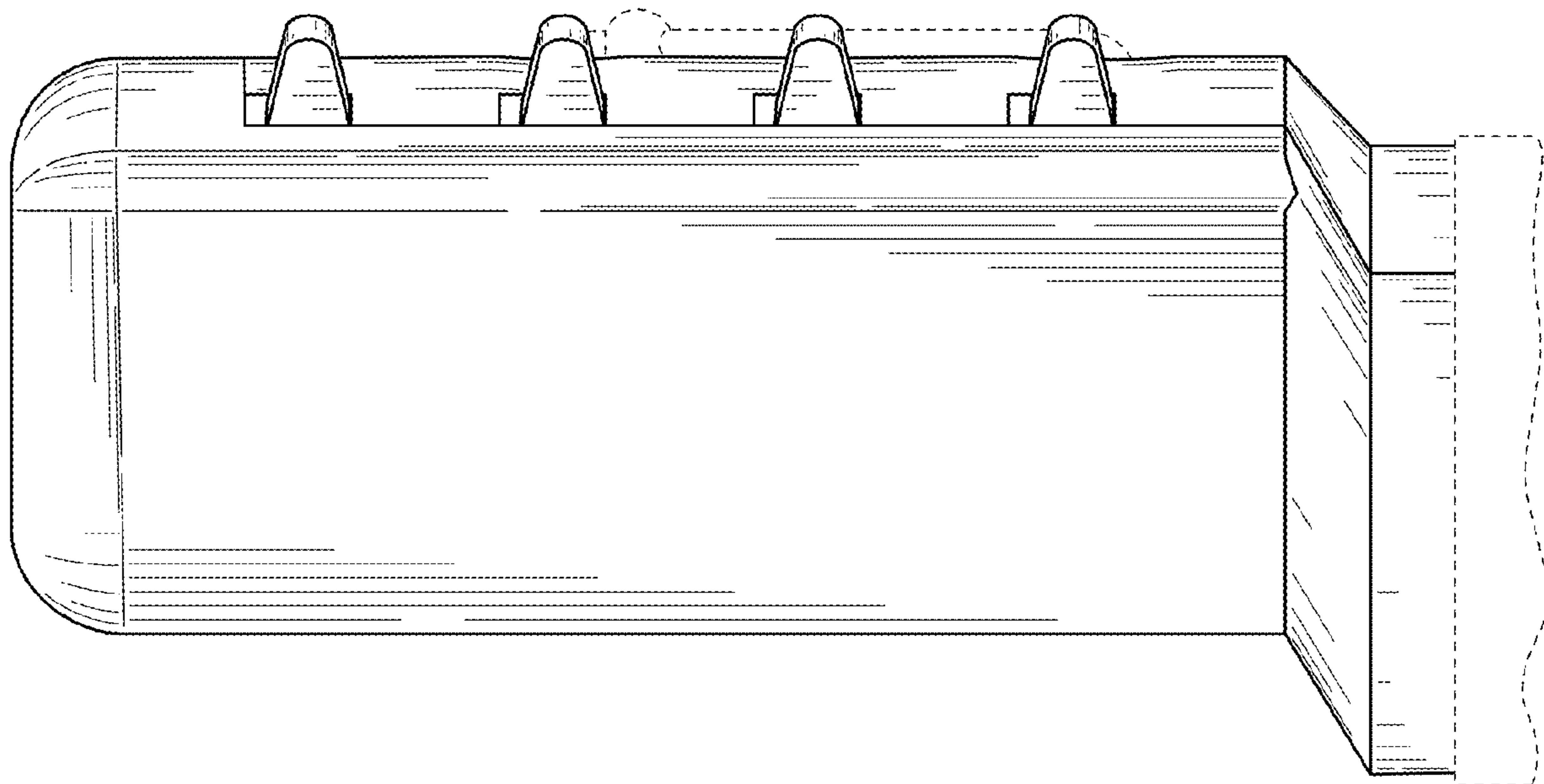


FIG. 5

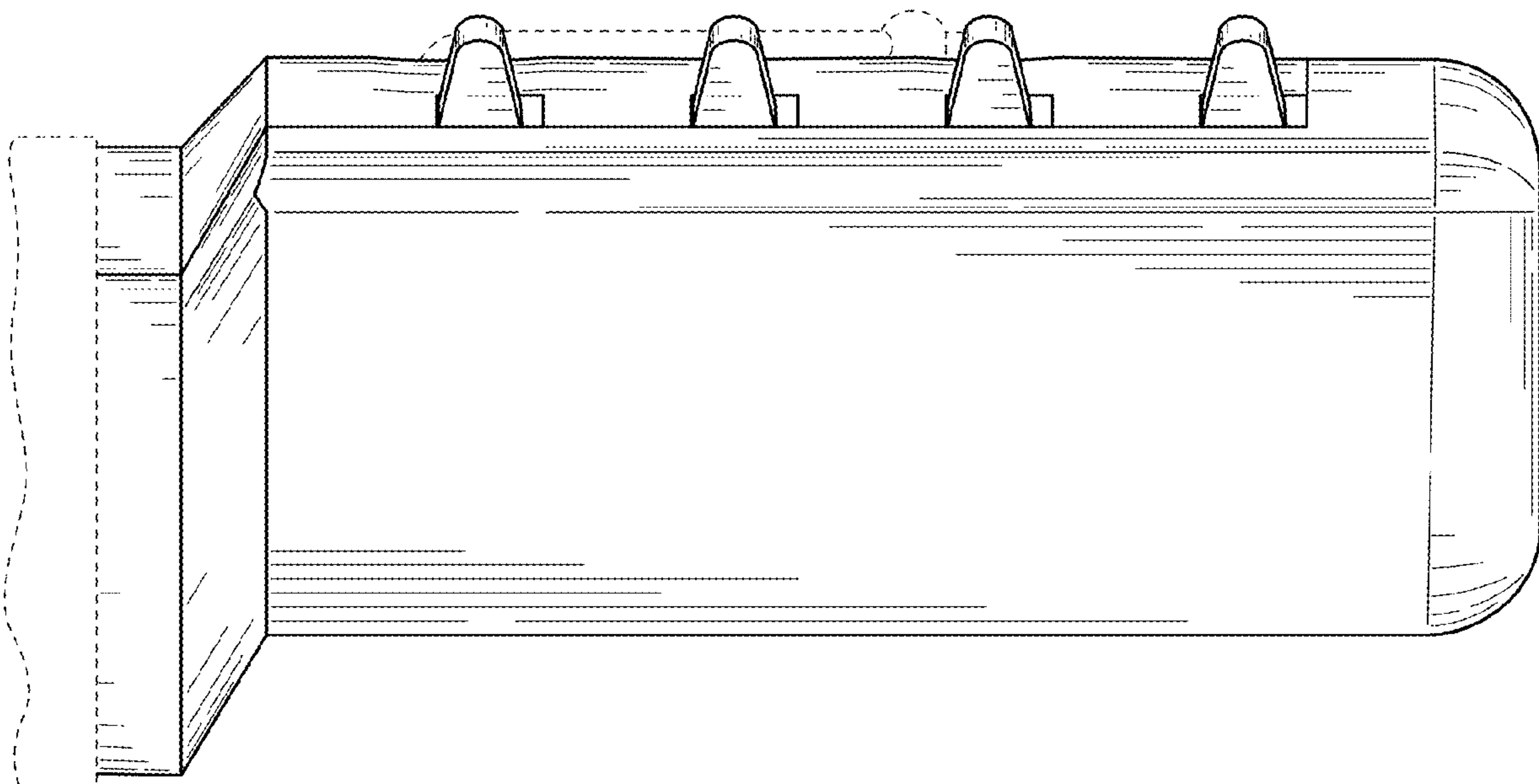


FIG. 6

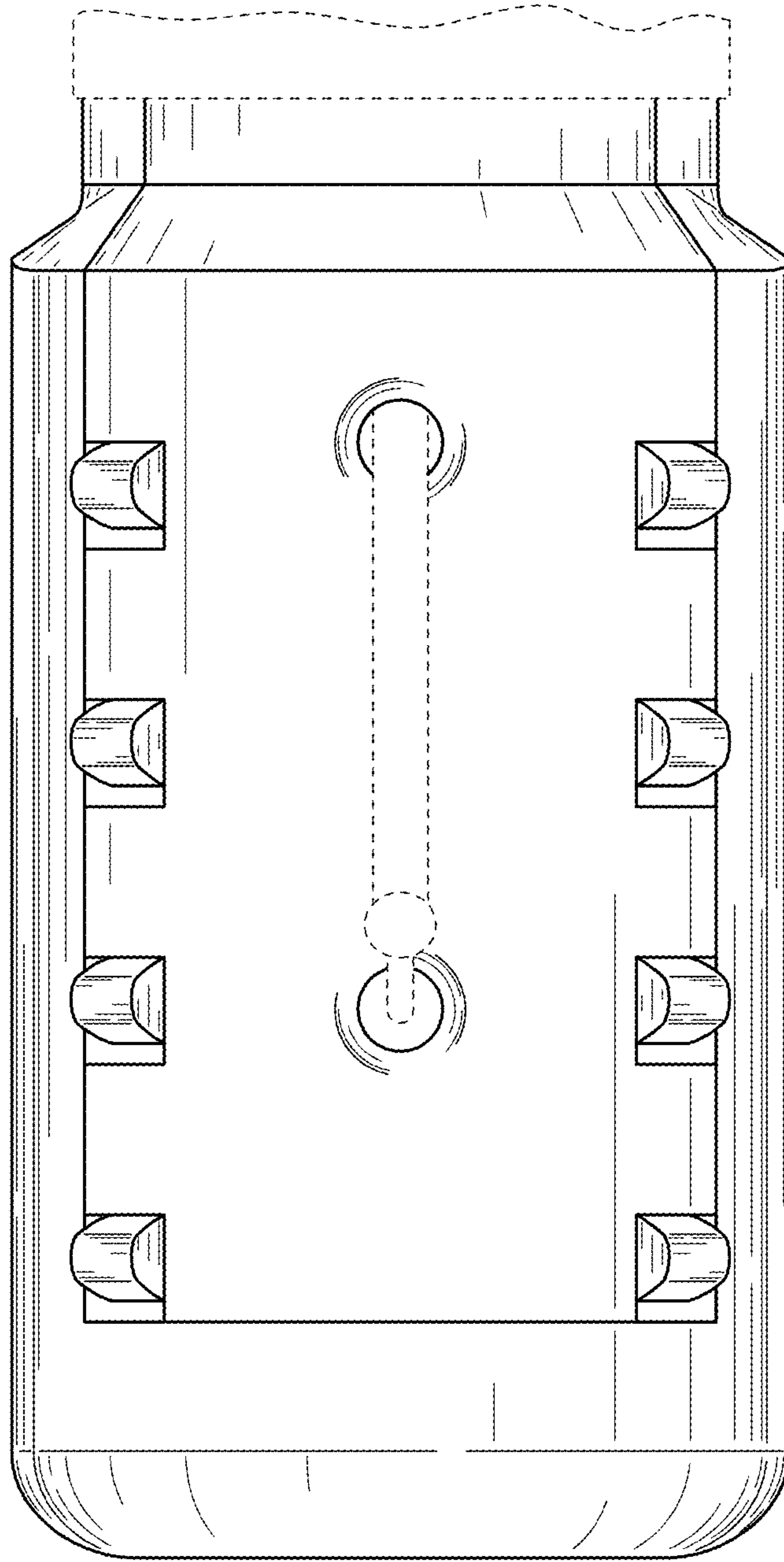


FIG. 7

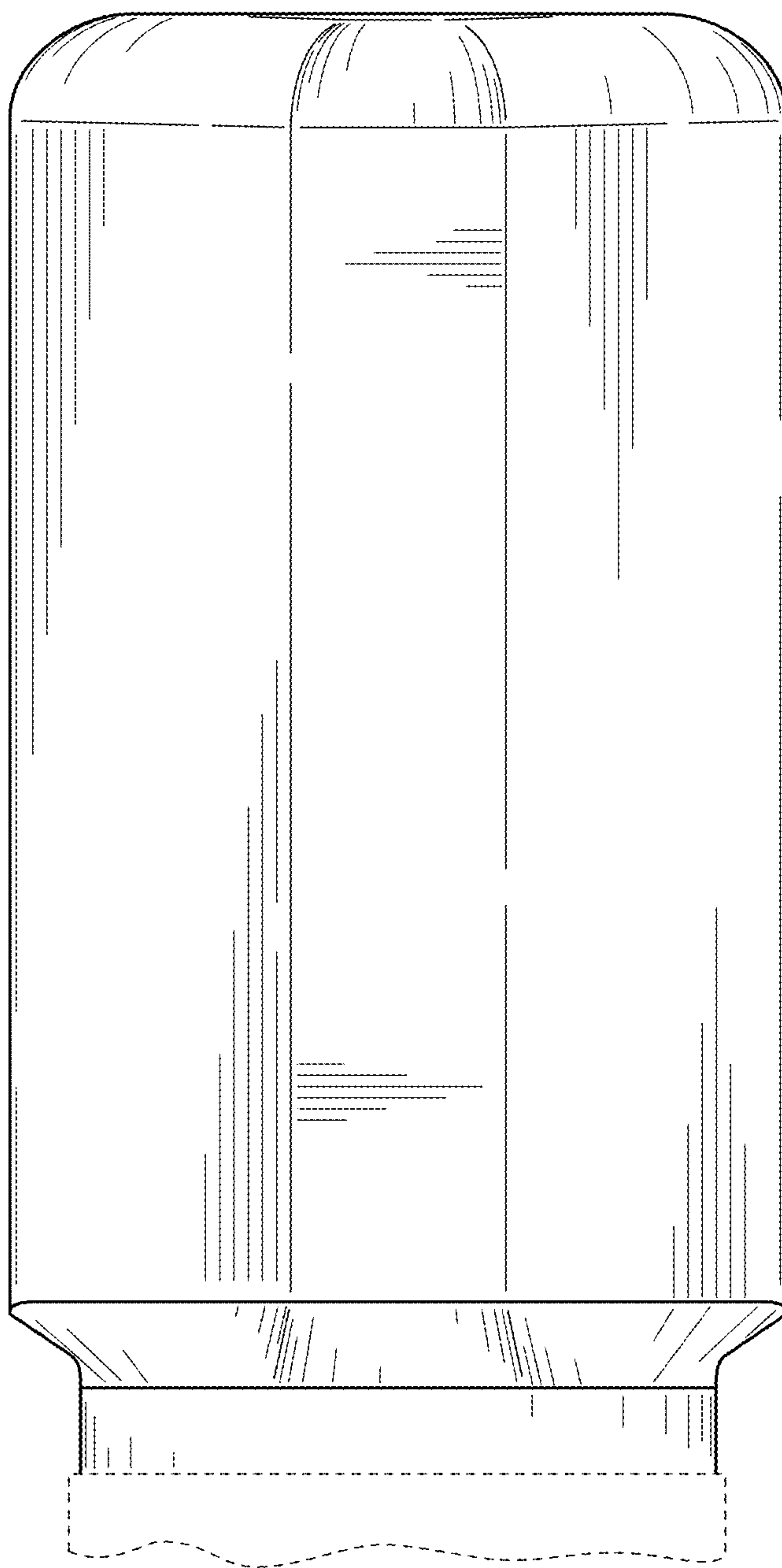


FIG. 8