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Cole et al.

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(54) **END EFFECTOR FOR A SURGICAL DEVICE**

5,667,480 A 9/1997 Knight et al.
5,669,907 A 9/1997 Platt, Jr. et al.
5,674,220 A 10/1997 Fox et al.

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(Continued)

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FOREIGN PATENT DOCUMENTS

WO 2012/044606 A2 4/2012
WO 2015/163930 A1 10/2015

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OTHER PUBLICATIONS

U.S. Food & Drug Administration, "Class 2 Device Recall Ethicon," accessed on Mar. 14, 2021, accessed at: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfRes/res.cfm?id=173260>, 6 pages.

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(52) **U.S. Cl.**
USPC **D24/148**

(57) **CLAIM**

(58) **Field of Classification Search**
USPC D24/148, 133, 143, 146, 147; D8/52, 57, D8/58

The ornamental design for an end effector for a surgical device, as shown and described.

CPC A61B 17/28; A61B 17/122; A61B 17/282; A61B 17/295; A61B 17/1285; A61B 17/2841; A61B 2017/29; A61B 2017/2808; A61B 2017/2825; A61B 2017/2905; A61B 2017/2926; A61B 18/1442; A61B 18/1445; A61B 2018/1455

DESCRIPTION

See application file for complete search history.

FIG. 1 is a top perspective view of the claimed design; FIG. 2 is a bottom perspective view of the claimed design; FIG. 3 is a right side view of the claimed design; FIG. 4 is a left side view of the claimed design; FIG. 5 is a top view of the claimed design; FIG. 6 is a bottom view of the claimed design; FIG. 7 is a front view of the claimed design; and, FIG. 8 is a back view of the claimed design.

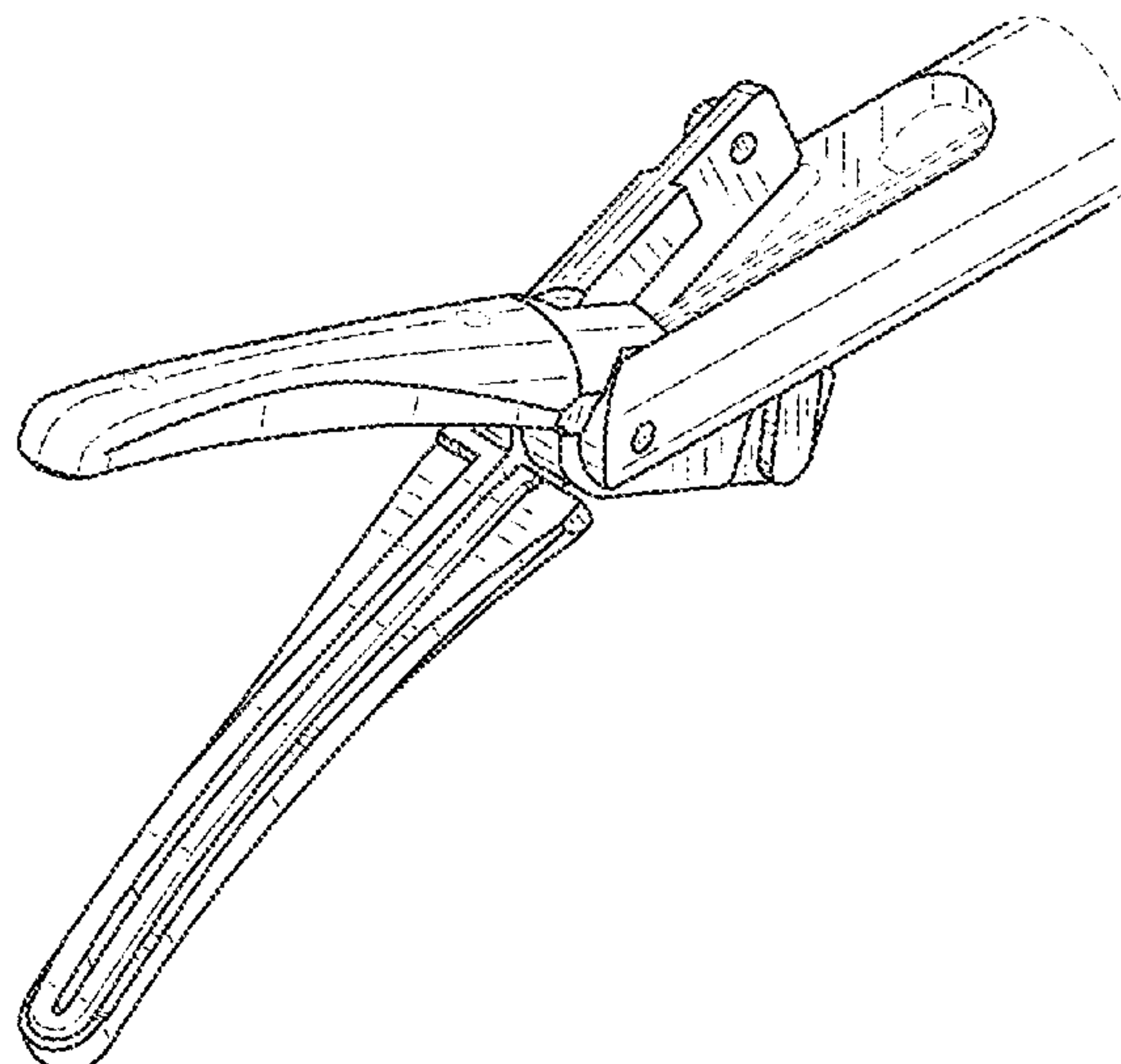
The figures illustrate an end effector for a surgical device. Features of the article that are not shown are disclaimed. Additionally, any features shown in broken lines are for illustrative purposes only and form no part of the claimed design.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,611,808 A 3/1997 Hossain et al.
5,624,452 A 4/1997 Yates
5,637,111 A 6/1997 Sutcu et al.
5,647,869 A 7/1997 Goble et al.
5,666,035 A 9/1997 Basire et al.

1 Claim, 7 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

5,688,270	A	11/1997	Yates et al.	6,740,102	B2	5/2004	Hess et al.
5,693,051	A	12/1997	Schulze et al.	6,743,229	B2	6/2004	Buysse et al.
5,697,949	A	12/1997	Giurtino et al.	6,755,827	B2	6/2004	Mulier et al.
5,709,680	A	1/1998	Yates et al.	6,767,349	B2	7/2004	Ouchi
5,716,366	A	2/1998	Yates	6,770,072	B1	8/2004	Truckai et al.
5,722,934	A	3/1998	Knight et al.	6,773,409	B2	8/2004	Truckai et al.
5,725,479	A	3/1998	Knight et al.	6,773,434	B2	8/2004	Ciarrocca
5,735,848	A	4/1998	Yates et al.	6,773,435	B2	8/2004	Schulze et al.
5,735,849	A	4/1998	Baden et al.	6,776,780	B2	8/2004	Mulier et al.
5,738,648	A	4/1998	Lands et al.	6,790,217	B2	9/2004	Schulze et al.
5,743,906	A	4/1998	Parins et al.	6,796,981	B2	9/2004	Wham et al.
5,766,170	A	6/1998	Eggers	6,832,998	B2	12/2004	Goble
5,769,849	A	6/1998	Eggers	6,835,195	B2	12/2004	Schulze et al.
5,776,128	A	7/1998	Eggers	6,843,789	B2	1/2005	Goble
5,776,130	A	7/1998	Buysse et al.	6,855,142	B2	2/2005	Harano et al.
H1745	H	8/1998	Paraschac	6,887,240	B1	5/2005	Lands et al.
5,797,938	A	8/1998	Paraschac et al.	6,905,497	B2	6/2005	Truckai et al.
5,800,449	A	9/1998	Wales	6,923,805	B1	8/2005	LaFontaine et al.
5,807,392	A	9/1998	Eggers	6,926,716	B2	8/2005	Baker et al.
5,807,393	A	9/1998	Williamson, IV et al.	6,929,641	B2	8/2005	Goble et al.
5,810,805	A	9/1998	Sutcu et al.	6,929,644	B2	8/2005	Truckai et al.
5,810,808	A	9/1998	Eggers	6,942,662	B2	9/2005	Goble et al.
5,810,811	A	9/1998	Yates et al.	6,960,209	B2	11/2005	Clague et al.
5,817,093	A	10/1998	Williamson, IV et al.	6,960,210	B2	11/2005	Lands et al.
5,827,271	A	10/1998	Buysse et al.	6,984,231	B2	1/2006	Goble et al.
5,833,690	A	11/1998	Yates et al.	7,160,299	B2	1/2007	Baily
5,860,975	A	1/1999	Goble et al.	7,166,106	B2	1/2007	Bartel et al.
5,871,024	A	2/1999	Vanderminden, Sr.	7,207,990	B2	4/2007	Lands et al.
5,876,401	A	3/1999	Schulze et al.	7,220,951	B2	5/2007	Truckai et al.
5,891,141	A	4/1999	Rydell	7,232,440	B2	6/2007	Dumbauld et al.
5,891,142	A	4/1999	Eggers	7,311,709	B2	12/2007	Truckai et al.
5,902,301	A	5/1999	Olig	7,322,975	B2	1/2008	Goble et al.
5,902,328	A	5/1999	LaFontaine et al.	7,326,202	B2	2/2008	McGaffigan
5,908,420	A	6/1999	Parins et al.	7,326,209	B2	2/2008	Kidooka
5,911,719	A	6/1999	Eggers	7,329,256	B2	2/2008	Johnson et al.
5,921,984	A	7/1999	Sutcu et al.	7,354,440	B2	4/2008	Truckai et al.
5,928,135	A	7/1999	Knight et al.	7,364,577	B2	4/2008	Wham et al.
5,928,138	A	7/1999	Knight et al.	7,367,976	B2	5/2008	Lawes et al.
6,024,741	A	2/2000	Williamson, IV et al.	7,377,920	B2	5/2008	Buysse et al.
6,024,744	A	2/2000	Kese et al.	7,381,209	B2	6/2008	Truckai et al.
6,030,384	A	2/2000	Nezhat	7,384,421	B2	6/2008	Hushka
6,033,399	A	3/2000	Gines	7,442,194	B2	10/2008	Dumbauld et al.
6,039,733	A	3/2000	Buysse et al.	7,445,621	B2	11/2008	Dumbauld et al.
6,050,996	A	4/2000	Schmaltz et al.	7,473,253	B2	1/2009	Dycus et al.
6,063,086	A	5/2000	Benecke et al.	7,481,810	B2	1/2009	Dumbauld et al.
6,425,896	B1	7/2002	Baltschun et al.	7,491,199	B2	2/2009	Goble
6,500,176	B1	12/2002	Truckai et al.	7,491,202	B2	2/2009	Odom et al.
6,511,480	B1	1/2003	Tetzlaff et al.	7,510,556	B2	3/2009	Nguyen et al.
6,514,252	B2	2/2003	Nezhat et al.	7,513,898	B2	4/2009	Johnson et al.
6,527,771	B1	3/2003	Weadock et al.	7,553,312	B2	6/2009	Tetzlaff et al.
6,547,786	B1	4/2003	Goble	7,582,087	B2	9/2009	Tetzlaff et al.
6,554,829	B2	4/2003	Schulze et al.	7,594,916	B2	9/2009	Weinberg
6,558,384	B2	5/2003	Mayenberger	7,621,910	B2	11/2009	Sugi
6,572,615	B2	6/2003	Schulze et al.	7,628,791	B2	12/2009	Garrison et al.
6,582,427	B1	6/2003	Goble et al.	7,632,269	B2	12/2009	Truckai et al.
6,585,735	B1	7/2003	Frazier et al.	7,648,499	B2	1/2010	Orszulak et al.
6,592,582	B2	7/2003	Hess et al.	7,686,804	B2	3/2010	Johnson et al.
6,592,604	B2	7/2003	Hess et al.	7,708,735	B2	5/2010	Chapman et al.
6,607,529	B1	8/2003	Jones et al.	7,717,910	B2	5/2010	Goble
6,610,060	B2	8/2003	Mulier et al.	7,722,602	B2	5/2010	Mihori
6,613,048	B2	9/2003	Mulier et al.	D618,798	S	6/2010	Olson et al.
6,616,656	B2	9/2003	Brommersma	7,740,159	B2	6/2010	Shelton, IV et al.
6,616,662	B2	9/2003	Scholer et al.	7,744,615	B2	6/2010	Couture
6,620,161	B2	9/2003	Schulze et al.	7,753,909	B2	7/2010	Chapman et al.
6,623,482	B2	9/2003	Pendekanti et al.	7,828,798	B2	11/2010	Buysse et al.
6,652,521	B2	11/2003	Schulze	7,857,812	B2	12/2010	Dycus et al.
6,656,176	B2	12/2003	Hess et al.	7,871,423	B2	1/2011	Livneh
6,656,177	B2	12/2003	Truckai et al.	7,938,779	B2	5/2011	Sakurai et al.
6,667,685	B2	12/2003	Wasaki et al.	7,951,150	B2	5/2011	Johnson et al.
6,669,696	B2	12/2003	Bacher et al.	7,972,328	B2	7/2011	Wham et al.
6,679,892	B2	1/2004	Guido et al.	8,016,827	B2	9/2011	Chojin
6,682,528	B2	1/2004	Frazier et al.	D648,434	S	11/2011	Uyama
6,695,840	B2	2/2004	Schulze	D649,247	S	11/2011	Uyama
6,726,686	B2	4/2004	Buysse et al.	8,114,119	B2	2/2012	Spivey et al.
6,736,813	B2	5/2004	Yamauchi et al.	8,128,624	B2	3/2012	Couture et al.
				8,133,219	B2	3/2012	Sato
				8,147,485	B2	4/2012	Wham et al.
				8,162,973	B2	4/2012	Cunningham
				8,241,284	B2	8/2012	Dycus et al.

(56)

References Cited

U.S. PATENT DOCUMENTS							
8,241,320	B2	8/2012	Lyons et al.	2003/0018329	A1	1/2003	Hooven
8,246,618	B2	8/2012	Bucciaglia et al.	2003/0018332	A1	1/2003	Schmaltz et al.
8,257,352	B2	9/2012	Lawes et al.	2003/0073987	A1	4/2003	Sakurai et al.
8,267,935	B2	9/2012	Couture et al.	2003/0109875	A1	6/2003	Tetzlaff et al.
8,273,085	B2	9/2012	Park et al.	2003/0114874	A1	6/2003	Craig et al.
8,277,446	B2	10/2012	Heard	2003/0139741	A1	7/2003	Goble et al.
8,317,787	B2	11/2012	Hanna	2003/0181910	A1	9/2003	Dycus et al.
8,323,310	B2	12/2012	Kingsley	2003/0195544	A1	10/2003	Hess et al.
8,469,956	B2	6/2013	McKenna et al.	2004/0006340	A1	1/2004	Latterell et al.
8,475,455	B2	7/2013	McClurken et al.	2004/0015163	A1	1/2004	Buysse et al.
8,480,671	B2	7/2013	Mueller	2004/0092927	A1	5/2004	Podhajsky et al.
8,512,371	B2	8/2013	Kerr et al.	2004/0097921	A1	5/2004	Hess et al.
8,968,316	B2	3/2015	Roy et al.	2004/0122423	A1	6/2004	Dycus et al.
9,149,325	B2	10/2015	Worrell et al.	2004/0143263	A1	7/2004	Schechter et al.
9,161,806	B2	10/2015	Brandt et al.	2004/0147925	A1	7/2004	Buysse et al.
9,168,052	B2	10/2015	Garrison et al.	2004/0186492	A1	9/2004	Hess et al.
9,192,434	B2	11/2015	Twomey et al.	2004/0225288	A1	11/2004	Buysse et al.
9,198,716	B2	12/2015	Masuda et al.	2004/0230262	A1	11/2004	Sartor et al.
9,237,900	B2	1/2016	Boudreaux et al.	2004/0236326	A1	11/2004	Schulze et al.
9,265,561	B2	2/2016	Kennedy et al.	2004/0249374	A1	12/2004	Tetzlaff et al.
9,318,691	B2	4/2016	Horner et al.	2005/0010212	A1	1/2005	McClurken et al.
9,333,003	B2	5/2016	Kappel et al.	2005/0101945	A1	5/2005	Sakurai et al.
9,351,788	B2	5/2016	Batross et al.	2005/0101952	A1	5/2005	Lands et al.
9,352,173	B2	5/2016	Yamada et al.	2005/0113823	A1	5/2005	Reschke et al.
9,364,247	B2	6/2016	Bucciaglia et al.	2005/0134324	A1	6/2005	Boyer et al.
9,375,227	B2	6/2016	Garrison et al.	2005/0137592	A1	6/2005	Nguyen et al.
9,375,263	B2	6/2016	Allen, IV et al.	2005/0203504	A1	9/2005	Wham et al.
9,381,066	B2	7/2016	Hancock	2005/0203507	A1	9/2005	Truckai et al.
9,408,660	B2	8/2016	Strobl et al.	2005/0240179	A1	10/2005	Buysse et al.
9,421,060	B2	8/2016	Monson et al.	2005/0261676	A1	11/2005	Hall et al.
9,439,717	B2	9/2016	Orszulak et al.	2005/0261677	A1	11/2005	Hall et al.
9,456,863	B2	10/2016	Moua	2005/0267464	A1	12/2005	Truckai et al.
9,456,864	B2	10/2016	Witt et al.	2006/0030848	A1	2/2006	Craig et al.
9,468,490	B2	10/2016	Twomey et al.	2006/0047275	A1	3/2006	Goble
9,474,569	B2	10/2016	Manzo et al.	2006/0224155	A1	10/2006	Schmaltz
9,510,906	B2	12/2016	Boudreaux et al.	2006/0235440	A1	10/2006	Huitema et al.
9,526,563	B2	12/2016	Twomey	2006/0235441	A1	10/2006	Huitema et al.
9,526,564	B2	12/2016	Rusin	2006/0235442	A1	10/2006	Huitema et al.
9,549,775	B2	1/2017	Dumbauld et al.	2006/0235443	A1	10/2006	Huitema et al.
9,554,845	B2	1/2017	Arts	2006/0235444	A1	10/2006	Huitema et al.
9,554,846	B2	1/2017	Boudreaux	2006/0235468	A1	10/2006	Huitema et al.
9,566,062	B2	2/2017	Boudreaux	2006/0259036	A1	11/2006	Tetzlaff et al.
9,566,110	B2	2/2017	McFarland	2006/0264929	A1	11/2006	Goble et al.
9,572,622	B2	2/2017	Shelton, IV et al.	2006/0271042	A1	11/2006	Latterekk et al.
9,579,146	B2	2/2017	Johnson et al.	2007/0016235	A1	1/2007	Tanaka et al.
9,579,147	B2	2/2017	Miller et al.	2007/0038209	A1	2/2007	Buysse et al.
9,585,714	B2	3/2017	Livneh	2007/0062017	A1	3/2007	Dycus et al.
9,585,715	B2	3/2017	Strobl	2007/0093810	A1	4/2007	Sartor et al.
9,610,113	B2	4/2017	Lau et al.	2007/0118115	A1	5/2007	Artale et al.
9,615,877	B2	4/2017	Tyrrell et al.	2007/0118163	A1	5/2007	Boudreaux et al.
9,636,163	B2	5/2017	Lau et al.	2007/0142832	A1	6/2007	Sartor et al.
9,655,673	B2	5/2017	McCullough, Jr. et al.	2007/0146113	A1	6/2007	Truckai et al.
9,655,675	B2	5/2017	Olson et al.	2007/0149987	A1	6/2007	Wellman et al.
D788,917	S *	6/2017	Lautemann D24/143	2007/0149998	A1	6/2007	Wicks et al.
9,668,808	B2	6/2017	Ourada	2007/0150002	A1	6/2007	Szabo et al.
9,687,264	B2	6/2017	Takabayashi et al.	2007/0156140	A1	7/2007	Szabo et al.
9,687,293	B2	6/2017	Jadhav	2007/0173803	A1	7/2007	Baily
9,687,294	B2	6/2017	Jadhav	2007/0173804	A1	7/2007	Wham et al.
9,687,295	B2	6/2017	Joseph	2007/0173813	A1	7/2007	Wham et al.
9,707,030	B2	7/2017	Davison et al.	2007/0191712	A1	8/2007	Odom
9,724,116	B2	8/2017	Kerr et al.	2007/0203488	A1	8/2007	Messerly et al.
9,737,300	B2	8/2017	Parihar et al.	2007/0208339	A1	9/2007	Fleming et al.
9,737,321	B2	8/2017	Kappel et al.	2007/0213712	A1	9/2007	Arts et al.
D888,951	S *	6/2020	Renner D24/144	2007/0219549	A1	9/2007	Buysse et al.
D904,611	S *	12/2020	Kuchta B22F 10/20 D24/144	2007/0271038	A1	9/2007	Marshall et al.
D912,250	S *	3/2021	Merz A61B 18/085 D24/143	2007/0273340	A1	11/2007	Mathiszik et al.
2001/0037109	A1	11/2001	Yamauchi et al.	2007/0299439	A1	11/2007	Miller et al.
2001/0037110	A1	11/2001	Schmaltz et al.	2008/0004639	A1	12/2007	Laterell et al.
2002/0082596	A1	6/2002	Buysse et al.	2008/0009849	A1	1/2008	Huitema et al.
2002/0115997	A1	8/2002	Truckai et al.	2008/0009850	A1	1/2008	Goble et al.
2002/0173787	A1	11/2002	Buysse et al.	2008/0015615	A1	1/2008	Goble et al.
2003/0014052	A1	1/2003	Buysse et al.	2008/0027465	A1	1/2008	Molitor et al.
2003/0014053	A1	1/2003	Nguyen et al.	2008/0027466	A1	1/2008	Vitali et al.
				2008/0045942	A1	1/2008	Vitali et al.
				2008/0077131	A1	2/2008	Truckai et al.
				2008/0132888	A1	3/2008	Yates et al.
				2008/0132893	A1	6/2008	Iida et al.
				2008/0147062	A1	6/2008	D'Amelio et al.
						6/2008	Truckai et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2008/0188851 A1 8/2008 Truckai et al.
 2008/0215051 A1 9/2008 Buysse et al.
 2008/0287948 A1 11/2008 Newton et al.
 2008/0294156 A1 11/2008 Newton et al.
 2009/0012516 A1 1/2009 Curtis et al.
 2009/0043304 A1 2/2009 Tetzlaff et al.
 2009/0076506 A1 3/2009 Baker
 2009/0093804 A1 4/2009 Newton
 2009/0125014 A1 5/2009 Bouthillier et al.
 2009/0171353 A1 7/2009 Johnson et al.
 2009/0171354 A1 7/2009 Deville et al.
 2009/0182323 A1 7/2009 Eder et al.
 2009/0234355 A1 9/2009 Edwards et al.
 2009/0248021 A1 10/2009 McKenna
 2009/0259224 A1 10/2009 Wham et al.
 2009/0306660 A1 12/2009 Johnson et al.
 2009/0318915 A1 12/2009 Hosier et al.
 2010/0042093 A9 2/2010 Wham et al.
 2010/0082026 A1 4/2010 Curtis
 2010/0114090 A1 5/2010 Hosier
 2010/0130971 A1 5/2010 Baily
 2011/0071523 A1 3/2011 Dickhans
 2011/0184404 A1 7/2011 Walberg et al.
 2011/0319882 A1 12/2011 Kennedy et al.
 2012/0283731 A1 11/2012 Unger et al.
 2013/0041370 A1 2/2013 Unger
 2013/0131651 A1 5/2013 Strobl et al.
 2014/0031819 A1 1/2014 Dycus et al.
 2014/0058381 A1 2/2014 Wham et al.
 2014/0257284 A1 9/2014 Artale et al.
 2014/0257285 A1 9/2014 Moua
 2014/0276731 A1 9/2014 Voegele et al.
 2015/0250531 A1 9/2015 Dycus et al.
 2015/0282823 A1 10/2015 Trees et al.
 2015/0282870 A1 10/2015 Keller et al.
 2015/0297288 A1 10/2015 Joseph
 2015/0374428 A1 12/2015 Sobajima et al.
 2016/0030105 A1* 2/2016 Mayer B22F 10/20
 606/52
 2016/0045770 A1 2/2016 Yamada
 2016/0100882 A1 4/2016 Boudreaux et al.
 2016/0135872 A1 5/2016 Minnelli et al.
 2016/0157922 A1 6/2016 Lee et al.
 2016/0157923 A1 6/2016 Ding
 2016/0206336 A1 7/2016 Frushour
 2016/0287318 A1 10/2016 Allen, IV et al.
 2017/0000556 A1 1/2017 Morisaki
 2017/0035493 A1 2/2017 Brandt et al.
 2017/0119426 A1 5/2017 Akagane
 2017/0119459 A1 5/2017 Schechter et al.
 2017/0196636 A1 7/2017 McCullough, Jr. et al.
 2017/0296258 A1 10/2017 Bucciaglia et al.

2017/0311967 A1 11/2017 Kappel et al.
 2019/0105100 A1* 4/2019 Bucciaglia A61B 18/085
 2019/0133675 A1 5/2019 Jones

OTHER PUBLICATIONS

Medtronic, "LigaSure Maryland Jaw Open and Laparoscopic Sealer/Divider with Nano-coating," accessed at: <https://www.medtronic.com/covidien/en-us/products/vessel-sealing/ligasure-maryland-jaw-sealer-divider.html>, accessed on: Mar. 14, 2021, 8 pages.
 Johnson & Johnson, "Ethicon Enseal G2 Curved and Straight Tissue Sealer," accessed at: <https://www.injmedicaldevices.com/en-US/product/enseal-g2-curved-and-straight-tissue-sealer>, accessed on: Mar. 14, 2021, 5 pages.
 Intuitive, "Da Vinci Vessel Sealer Extend," accessed at: <https://www.intuitive.com/en-us/products-and-services/da-vinci/energy/vessel-sealer-extend>, Accessed on: Mar. 14, 2021, 6 pages.
 Applied Medical, "Voyant Maryland Fusion," accessed at: <https://www.appliedmedical.com/Products/Voyant/MarylandFusion>, accessed on: Mar. 14, 2021, 7 pages.
 KLS Martin Group, "marSeal5 plus Maryland," accessed at: <https://www.klsmartin.com/en/products/electrosurgery/vessel-sealing/marseal5-plus-maryland/>, accessed on: Mar. 14, 2021, 3 pages.
 Aesculap, "Advanced Energy Vessel Sealer, The Caiman Vessel Sealer Advantage," accessed at: <https://www.aesculapusa.com/en/healthcare-professionals/or-solutions/or-solutions-advanced-energy.html>, accessed: Mar. 14, 2021, 5 pages.
 Medtronic, "LigaSure Blunt Tip Open and Laparoscopic Sealer/Divider with nano-coating," <https://www.medtronic.com/covidien/en-us/products/vessel-sealing/ligasure-blunt-tip-sealer-divider.html>, accessed on: Mar. 14, 2021, 7 pages.
 Medtronic, "LigaSure Dolphin Tip Laparoscopic Sealer/Divider," accessed at: <https://www.medtronic.com/covidien/en-us/products/vessel-sealing/ligasure-dolphin-tip.html>, accessed on: Mar. 14, 2021, 4 pages.
 Johnson & Johnson, "Ethicon Harmonic Ace +7 Shears with Advanced Hemostasis," accessed at: <https://www.injmedicaldevices.com/en-US/product/harmonic-ace-7-shears-laparoscopic-surgery>, accessed on: Mar. 14, 2021, 12 pages.
 Olympus, "Advanced Energy Thunderbeat Type S," accessed at: <https://medical.olympusamerica.com/products/thunderbeat-type-s>, accessed on: Mar. 14, 2021, 3 pages.
 Bowa, "ERGO 315R," accessed at: <https://www.bowa-medical.com/shop/en/ligation/ergo-315r/ergo-315r.html>, accessed on: Mar. 14, 2021, 3 pages.
 Bowa, "ERGO 310D laparoscopic ligation instrument," accessed at: <https://www.bowa-medical.com/shop/en/ligation/ergo-310d/ergo-310d-laparoscopic-ligation-instrument.html?&&artfilter=775-000>, accessed on: Mar. 14, 2021, 3 pages.
 Erbe, "BiCision," accessed at: <https://de.erbe-med.com/de-en/products/thermofusion/detail/s/bicision/>, accessed on: Mar. 14, 2021, 3 pages.

* cited by examiner

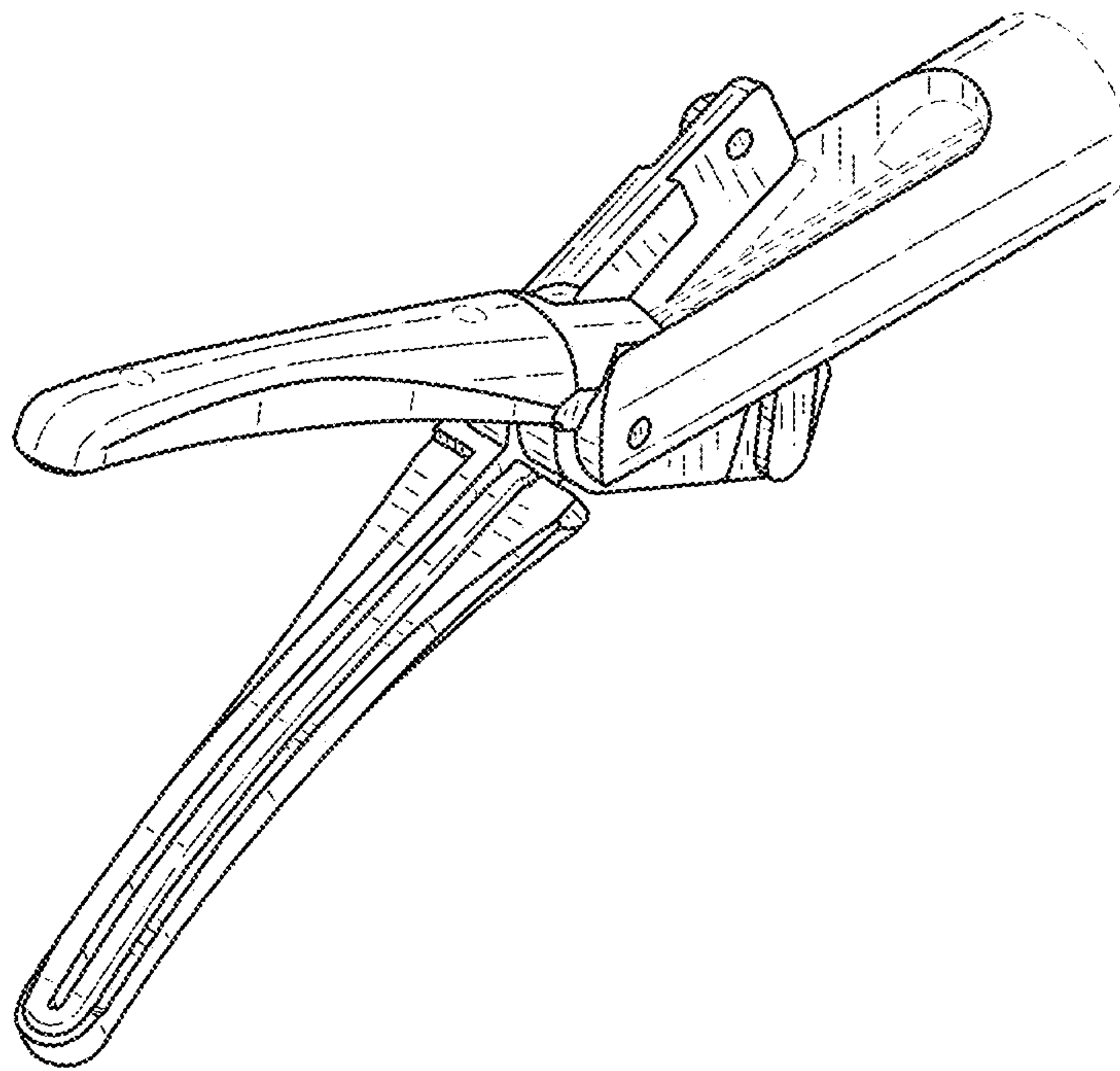


FIG.1

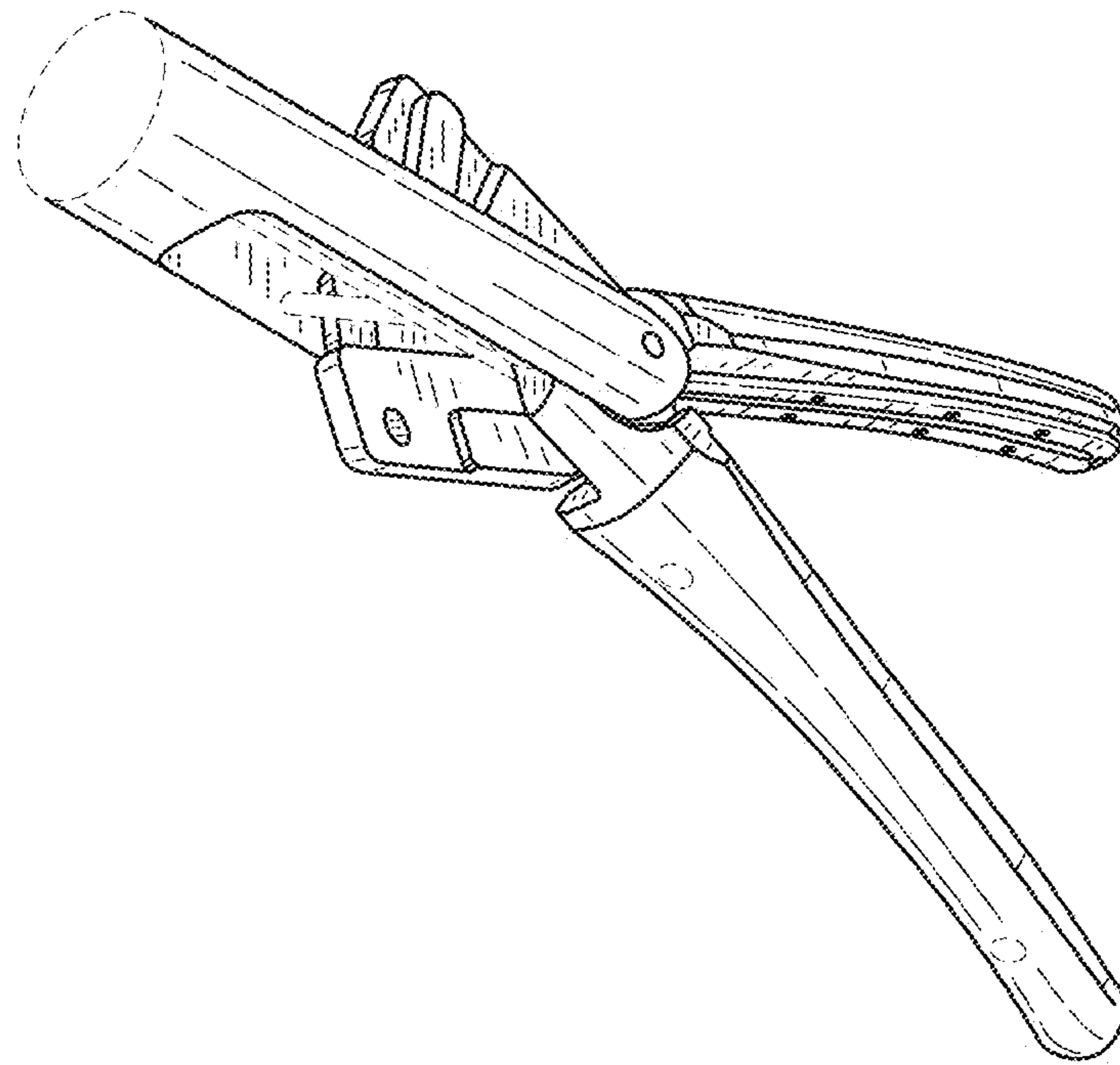


FIG.2

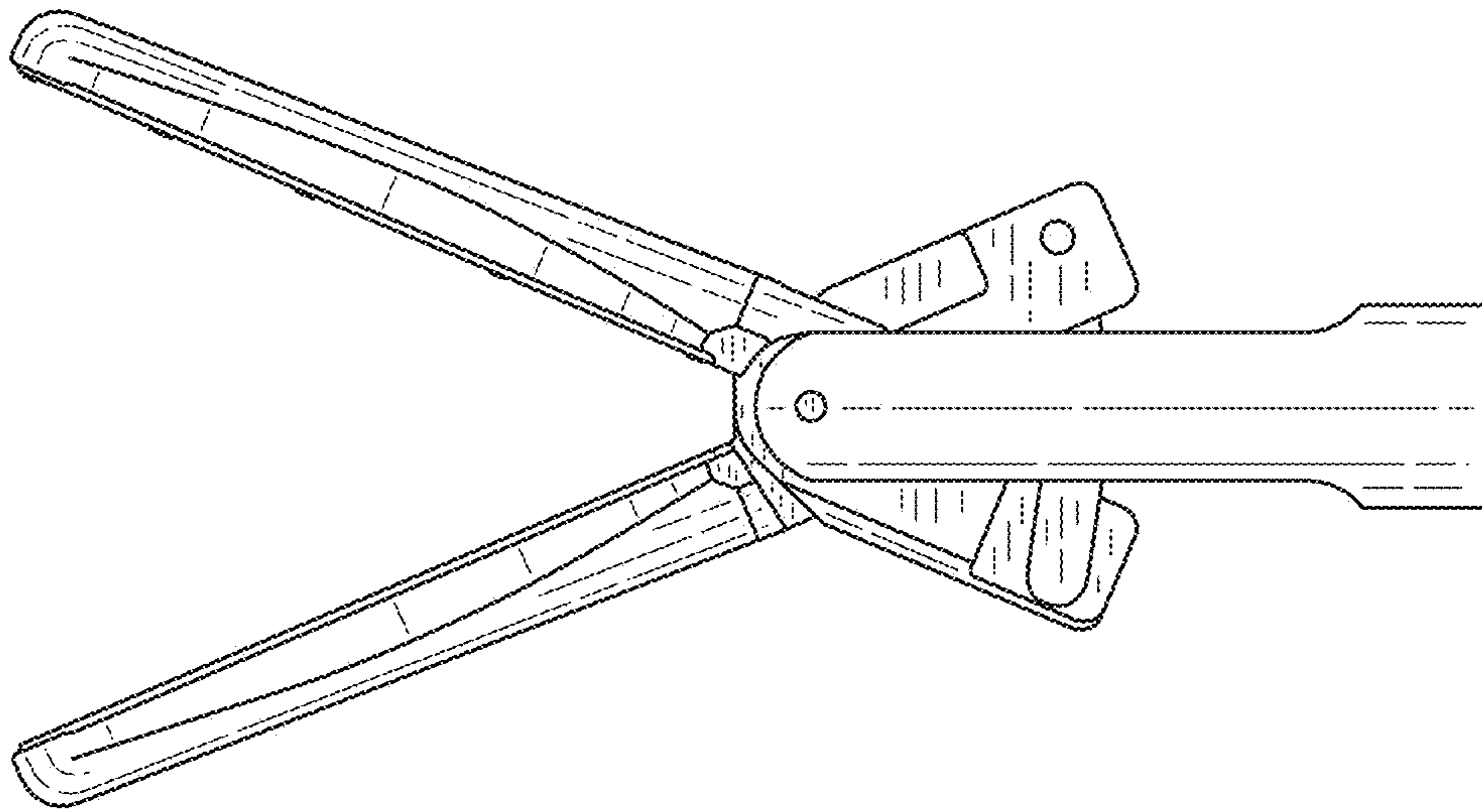


FIG.3

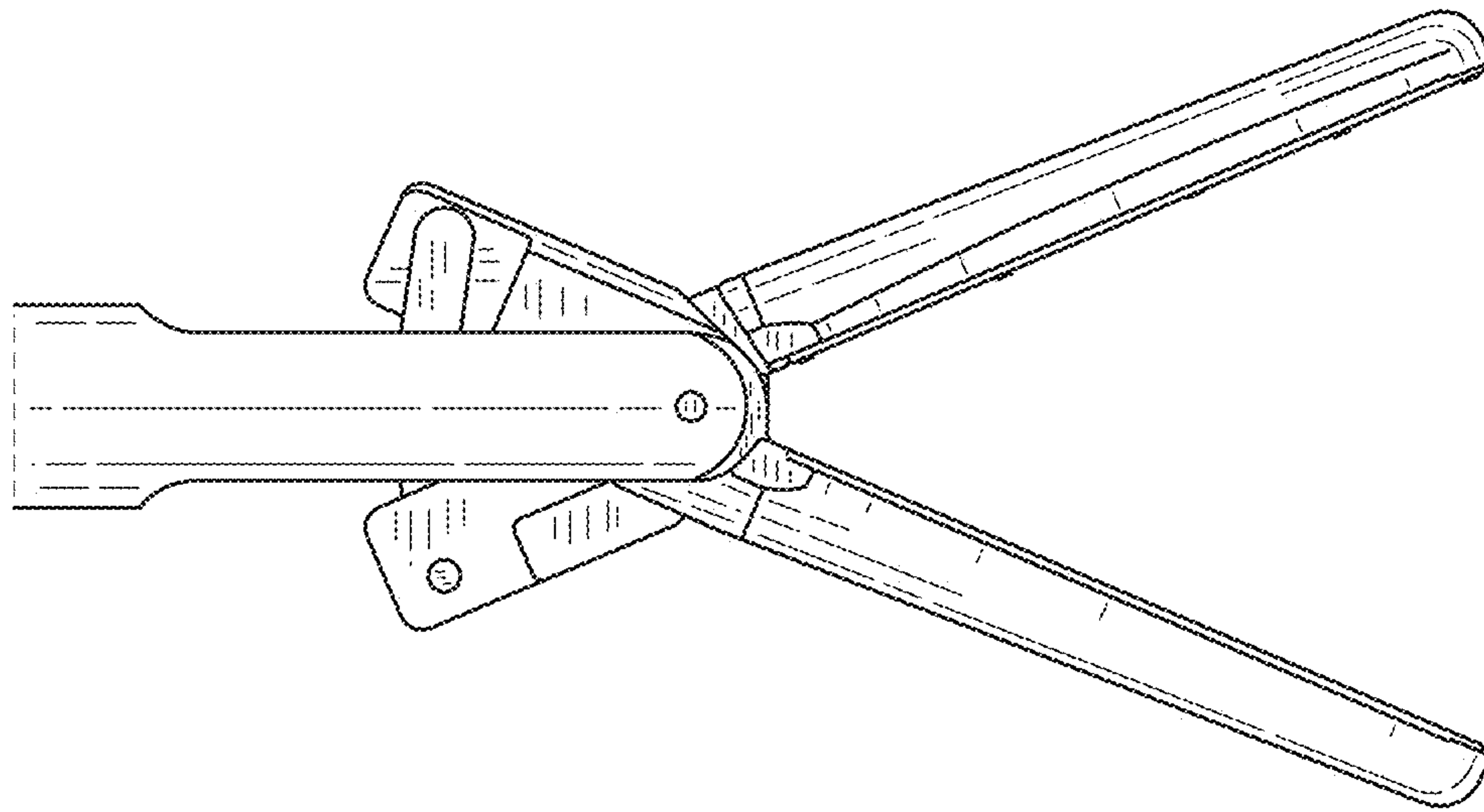


FIG.4

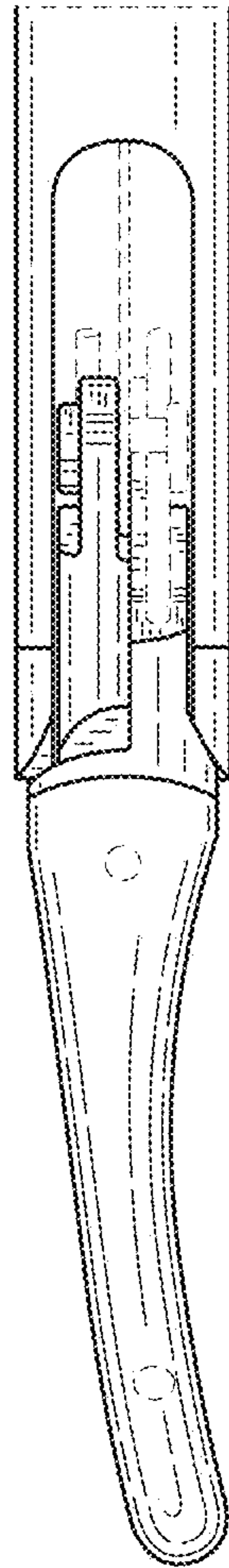


FIG.5

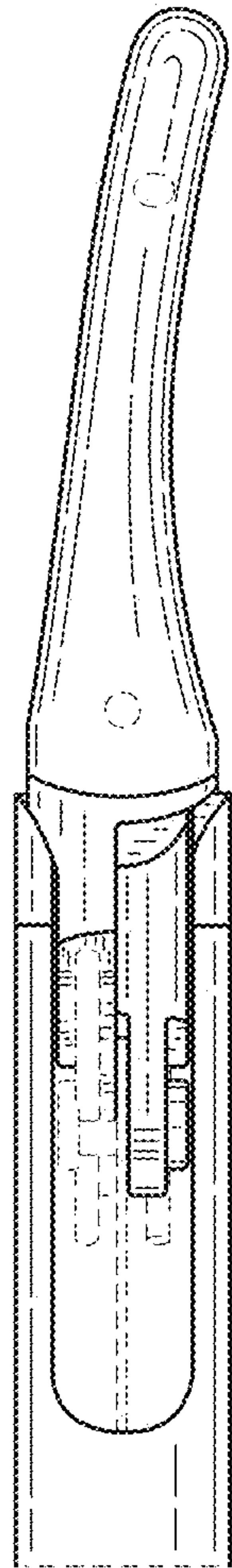


FIG.6

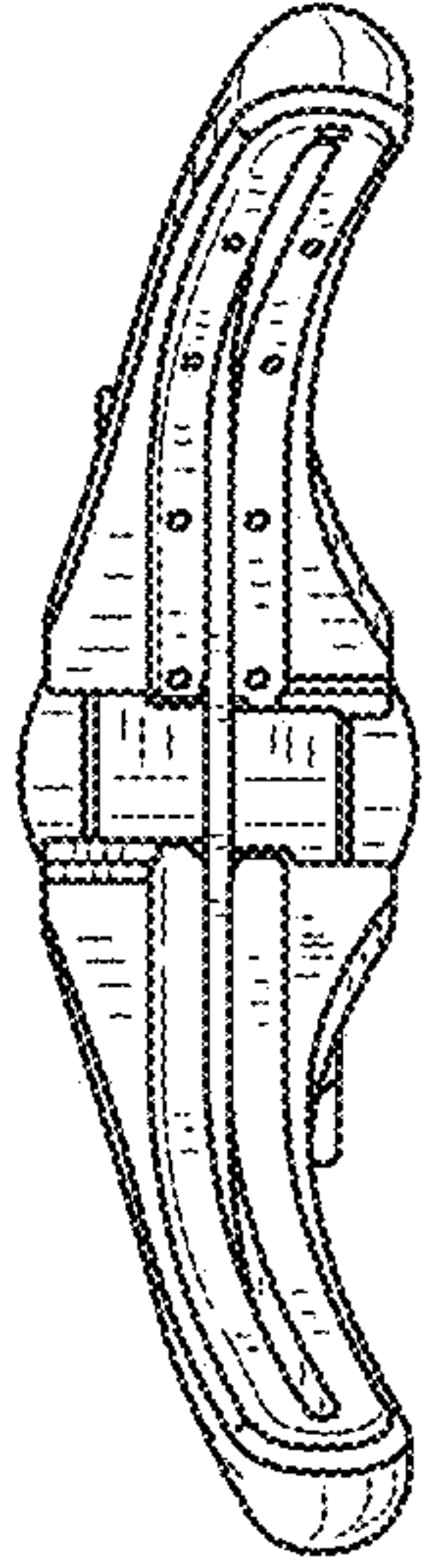


FIG. 7

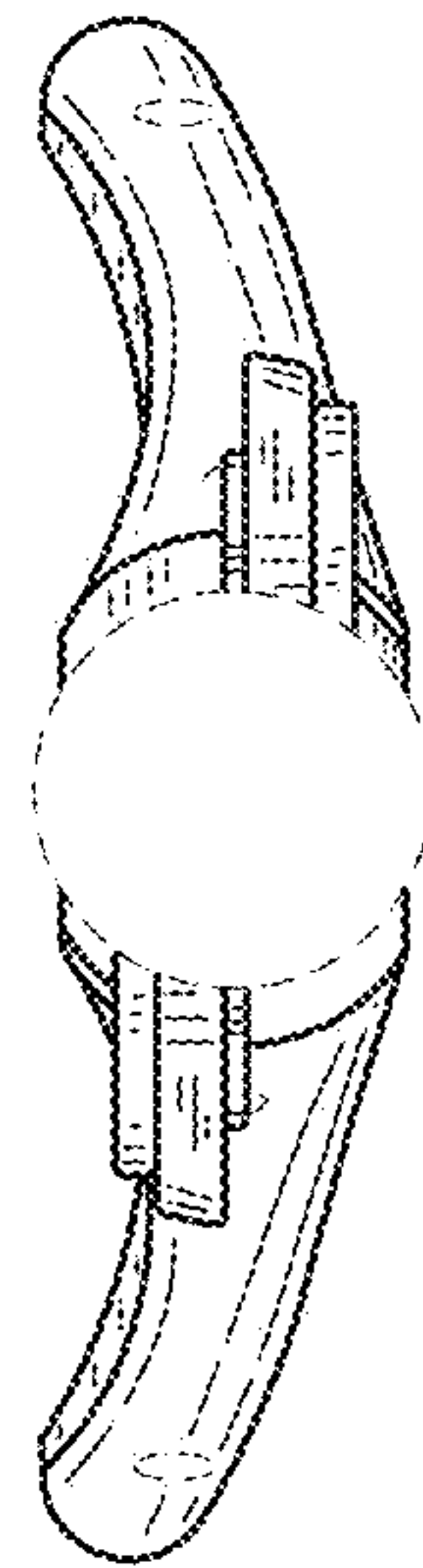


FIG. 8