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Campbell

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(54) **EXPANDED HEART VALVE STENT**

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

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(51) **LOC (13) Cl.** **24-03**

(52) **U.S. Cl.**
USPC **D24/155**

(58) **Field of Classification Search**
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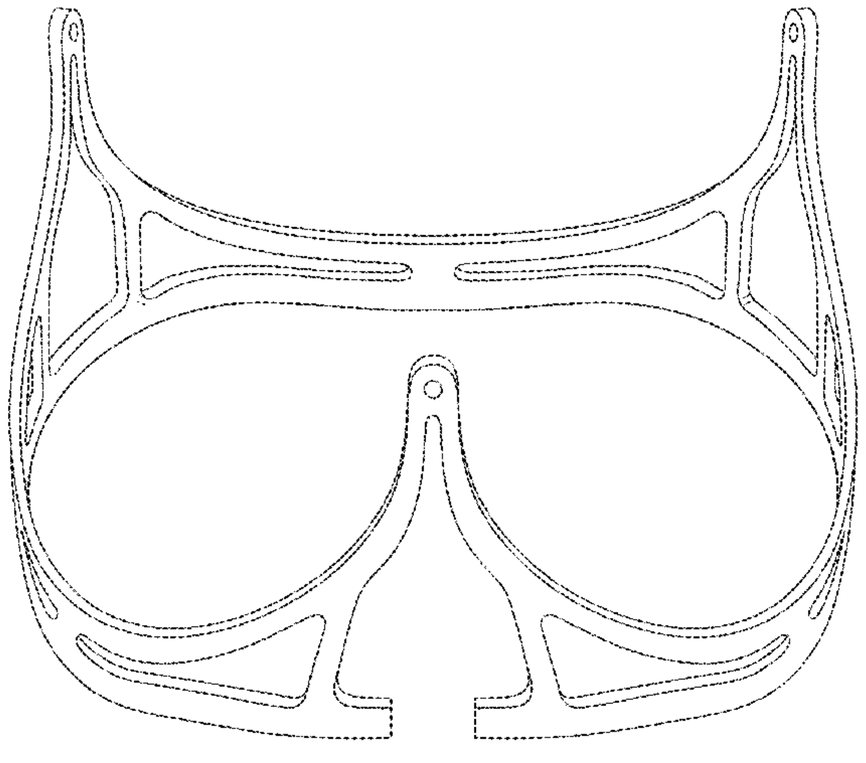
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,656,185	A		4/1972	Carpentier
4,055,861	A		11/1977	Carpentier et al.
4,164,046	A		8/1979	Cooley
4,217,665	A		8/1980	Bex et al.
4,602,911	A		7/1986	Ahmadi et al.
5,041,130	A		8/1991	Cosgrove et al.
5,061,277	A		10/1991	Carpentier et al.
5,064,431	A		11/1991	Gilbertson et al.
5,104,407	A		4/1992	Lam et al.
5,147,391	A		9/1992	Lane
5,201,880	A		4/1993	Wright et al.
5,258,021	A		11/1993	Duran
5,306,296	A		4/1994	Wright et al.
5,450,860	A		9/1995	O'Connor
5,489,298	A	*	2/1996	Love A61F 2/2472 623/2.14
5,496,336	A		3/1996	Cosgrove et al.
5,593,435	A		1/1997	Carpentier et al.
5,607,471	A		3/1997	Seguin et al.
5,674,279	A		10/1997	Wright et al.
5,697,382	A		12/1997	Love et al.
5,716,417	A		2/1998	Girard et al.
5,776,189	A		7/1998	Khalid
5,824,066	A		10/1998	Gross
5,888,240	A		3/1999	Carpentier et al.
D410,543	S	*	6/1999	Reif D24/155
5,935,163	A	*	8/1999	Gabbay A61F 2/2409 623/2.14
5,972,030	A		10/1999	Garrison et al.
5,984,973	A		11/1999	Girard et al.
6,102,945	A		8/2000	Campbell
D430,935	S	*	9/2000	Yang D24/155
6,143,024	A		11/2000	Campbell et al.
6,159,240	A		12/2000	Sparer et al.
6,183,512	B1		2/2001	Howanec, Jr. et al.
6,187,040	B1		2/2001	Wright
6,217,610	B1		4/2001	Carpentier et al.
6,231,602	B1		5/2001	Carpentier et al.
6,250,308	B1		6/2001	Cox
6,258,122	B1		7/2001	Tweden et al.
6,332,893	B1		12/2001	Mortier et al.
6,348,068	B1		2/2002	Campbell et al.
6,391,054	B2		5/2002	Carpentier et al.
6,406,493	B1		6/2002	Tu et al.
6,419,696	B1		7/2002	Ortiz et al.
6,425,916	B1		7/2002	Garrison et al.
D471,981	S	*	3/2003	Reif A61F 2/2409 D24/155
6,602,288	B1		8/2003	Cosgrove et al.
6,602,289	B1		8/2003	Colvin et al.
6,619,291	B2		9/2003	Hlavka et al.
6,709,456	B2		3/2004	Langberg et al.
6,718,985	B2		4/2004	Hlavka et al.
6,719,786	B2		4/2004	Ryan et al.
6,726,717	B2		4/2004	Alfieri et al.
6,764,510	B2		7/2004	Vidlund et al.
6,797,002	B2		9/2004	Spence et al.
6,800,090	B2		10/2004	Alferness et al.
6,802,860	B2		10/2004	Cosgrove et al.
6,805,710	B2		10/2004	Bolling et al.
6,805,711	B2		10/2004	Quijano et al.
6,858,039	B2		2/2005	McCarthy
6,918,917	B1		7/2005	Nguyen et al.
6,921,407	B2		7/2005	Nguyen et al.
6,942,694	B2		9/2005	Liddicoat et al.
6,955,689	B2		10/2005	Ryan et al.
6,966,924	B2		11/2005	Holmberg



6,986,775	B2	1/2006	Morales et al.	
7,101,395	B2	9/2006	Tremulis et al.	
7,118,595	B2	10/2006	Ryan et al.	
7,125,421	B2	10/2006	Tremulis et al.	
7,137,184	B2 *	11/2006	Schreck	A61F 2/2412 29/447
7,166,126	B2	1/2007	Spence et al.	
7,166,127	B2	1/2007	Spence et al.	
7,261,732	B2	8/2007	Justino	
7,276,084	B2	10/2007	Yang et al.	
7,294,148	B2	11/2007	McCarthy	
7,381,218	B2	6/2008	Schreck	
7,393,360	B2	7/2008	Spenser et al.	
7,399,315	B2	7/2008	Iobbi	
7,452,376	B2	11/2008	Lim et al.	
7,462,191	B2	12/2008	Spenser et al.	
7,470,285	B2	12/2008	Nugent et al.	
7,510,575	B2	3/2009	Spenser et al.	
7,524,330	B2	4/2009	Berreklouw	
7,534,261	B2	5/2009	Friedman	
7,556,646	B2	7/2009	Yang et al.	
7,585,321	B2	9/2009	Cribier	
7,625,403	B2	12/2009	Krivoruchko	
7,758,640	B2	7/2010	Vesely	
7,780,723	B2	8/2010	Taylor	
7,806,927	B2	10/2010	Styrc	
7,871,436	B2	1/2011	Ryan et al.	
8,034,104	B2	10/2011	Carpentier et al.	
8,226,707	B2	7/2012	White	
8,236,045	B2	8/2012	Benichou et al.	
8,246,677	B2	8/2012	Ryan	
8,246,762	B2	8/2012	Janko et al.	
8,496,700	B2	7/2013	Edoga et al.	
8,500,802	B2	8/2013	Lane et al.	
8,888,836	B2	11/2014	Berglund	
9,968,443	B2 *	5/2018	Bruchman	A61F 2/2412
D867,594	S *	11/2019	Chang	D24/155
D893,031	S *	8/2020	Chang	D24/155
D926,322	S *	7/2021	Bennett	D24/155
2001/0021874	A1	9/2001	Carpentier et al.	
2002/0062150	A1	5/2002	Campbell et al.	
2003/0033009	A1	2/2003	Gabbay	
2003/0040793	A1	2/2003	Marquez	
2003/0055496	A1 *	3/2003	Cai	A61F 2/2412 623/2.19
2003/0167089	A1 *	9/2003	Lane	A61F 2/2412 623/2.14
2003/0199971	A1	10/2003	Tower et al.	
2004/0122514	A1	6/2004	Fogarty et al.	
2004/0210305	A1	10/2004	Shu et al.	
2004/0249452	A1	12/2004	Adams et al.	
2004/0249453	A1	12/2004	Cartledge et al.	
2005/0096739	A1	5/2005	Cao	
2005/0131533	A1	6/2005	Alfieri et al.	
2005/0240200	A1	10/2005	Bergheim	
2005/0251251	A1	11/2005	Cribier	
2005/0256567	A1	11/2005	Lim et al.	
2005/0256568	A1	11/2005	Lim et al.	
2005/0267572	A1	12/2005	Schoon et al.	
2005/0278022	A1	12/2005	Lim	
2006/0008497	A1 *	1/2006	Gabbay	A61L 27/34 424/422
2006/0015178	A1	1/2006	Moaddeb et al.	
2006/0015179	A1	1/2006	Bulman-Fleming et al.	
2006/0020336	A1	1/2006	Liddicoat	
2006/0025858	A1	2/2006	Alameddine	
2006/0030885	A1	2/2006	Hyde	
2006/0052867	A1	3/2006	Revuelta et al.	
2006/0095125	A1 *	5/2006	Chinn	A61F 2/2409 623/2.4
2006/0241748	A1	10/2006	Lee et al.	
2006/0287719	A1 *	12/2006	Rowe	A61F 2/90 623/2.18
2007/0016287	A1	1/2007	Cartledge et al.	
2007/0067029	A1	3/2007	Gabbay	
2007/0100441	A1	5/2007	Kron et al.	
2007/0142907	A1	6/2007	Moaddeb et al.	
2007/0162111	A1	7/2007	Fukamachi et al.	
2007/0203575	A1 *	8/2007	Forster	A61F 2/243 623/2.11
2007/0244546	A1	10/2007	Francis	
2007/0265701	A1 *	11/2007	Gurskis	A61F 2/2439 623/2.1
2008/0027483	A1	1/2008	Cartledge et al.	
2008/0097575	A1	4/2008	Cottone	
2008/0114452	A1	5/2008	Gabbay	
2008/0161910	A1	7/2008	Revuelta et al.	
2008/0161911	A1	7/2008	Revuelta et al.	
2008/0183273	A1	7/2008	Mesana et al.	
2008/0183285	A1	7/2008	Shaoulian et al.	
2008/0200980	A1	8/2008	Robin et al.	
2008/0208327	A1	8/2008	Rowe	
2008/0208329	A1	8/2008	Bishop et al.	
2008/0215144	A1	9/2008	Ryan et al.	
2008/0228263	A1	9/2008	Ryan	
2008/0243246	A1	10/2008	Ryan et al.	
2008/0269878	A1	10/2008	Iobbi	
2008/0275549	A1	11/2008	Rowe	
2009/0005863	A1	1/2009	Goetz et al.	
2009/0082857	A1	3/2009	Lashinski et al.	
2009/0093876	A1	4/2009	Nitzan et al.	
2009/0192602	A1	7/2009	Kuehn	
2009/0192603	A1	7/2009	Kuehn	
2009/0192604	A1	7/2009	Gloss	
2009/0192606	A1	7/2009	Gloss et al.	
2009/0216322	A1	8/2009	Le et al.	
2009/0264989	A1	10/2009	Bonhoeffer et al.	
2009/0281609	A1	11/2009	Benichou et al.	
2010/0076548	A1	3/2010	Konno	
2010/0076549	A1	3/2010	Keidar et al.	
2010/0185277	A1 *	7/2010	Braido	A61F 2/2409 623/2.18
2011/0137409	A1	6/2011	Yang et al.	
2011/0137410	A1	6/2011	Hacohen	
2011/0166636	A1	7/2011	Rowe	
2011/0178597	A9	7/2011	Navia et al.	
2011/0224781	A1	9/2011	White	
2011/0230956	A1	9/2011	White	
2011/0245918	A1	10/2011	White	
2011/0257739	A1 *	10/2011	Corbett	A61F 2/2412 623/2.18
2011/0264207	A1	10/2011	Bonhoeffer et al.	
2011/0288629	A1	11/2011	White	
2011/0288632	A1	11/2011	White	
2012/0277854	A1	11/2012	Ryan	
2012/0283820	A1	11/2012	Tseng et al.	
2012/0303113	A1	11/2012	Benichou et al.	
2015/0088250	A1 *	3/2015	Zeng	A61F 2/2409 623/2.12
2015/0366664	A1 *	12/2015	Guttenberg	A61F 2/2412 623/2.17
2016/0175096	A1 *	6/2016	Dienno	A61F 2/2418 623/2.13
2019/0091015	A1 *	3/2019	Dienno	A61F 2/2433

FOREIGN PATENT DOCUMENTS

EP	0338994	A1	10/1989
EP	1034753	A1	9/2000
EP	1755459	A2	2/2007
EP	1804726	A1	7/2007
EP	1958598	A1	8/2008
EP	2094194	B1	9/2015
WO	0041649	A1	7/2000
WO	2004006810	A1	1/2004
WO	2012018779	A2	2/2012

* cited by examiner

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(74) *Attorney, Agent, or Firm* — Guy Cumberbatch

(57) **CLAIM**

The ornamental design for an expanded heart-valve stent, as shown and described.

DESCRIPTION

FIG. **1** is a perspective view of a first embodiment of an expanded heart-valve stent of the present application;
FIG. **2** is a front elevational view of the first embodiment of the expanded heart-valve stent;
FIG. **3** is a rear elevational view of the first embodiment of the expanded heart-valve stent;
FIG. **4** is a top plan view of the first embodiment of the expanded heart-valve stent;
FIG. **5** is a bottom plan view of the first embodiment of the expanded heart-valve stent;
FIG. **6** is a left side elevational view of the first embodiment of the expanded heart-valve stent;
FIG. **7** is a right side elevational view of the first embodiment of the expanded heart-valve stent;
FIG. **8** is a perspective view of a second embodiment of an expanded heart-valve stent of the present application;
FIG. **9** is a front elevational view of the second embodiment of the expanded heart-valve stent;
FIG. **10** is a rear elevational view of the second embodiment of the expanded heart-valve stent;
FIG. **11** is a top plan view of the second embodiment of the expanded heart-valve stent;
FIG. **12** is a bottom plan view of the second embodiment of the expanded heart-valve stent;
FIG. **13** is a left side elevational view of the second embodiment of the expanded heart-valve stent;
FIG. **14** is a right side elevational view of the second embodiment of the expanded heart-valve stent;
FIG. **15** is a perspective view of a third embodiment of an expanded heart-valve stent of the present application;
FIG. **16** is a front elevational view of the third embodiment of the expanded heart-valve stent;
FIG. **17** is a rear elevational view of the third embodiment of the expanded heart-valve stent;
FIG. **18** is a top plan view of the third embodiment of the expanded heart-valve stent;
FIG. **19** is a bottom plan view of the third embodiment of the expanded heart-valve stent;
FIG. **20** is a left side elevational view of the third embodiment of the expanded heart-valve stent;
FIG. **21** is a right side elevational view of the third embodiment of the expanded heart-valve stent;
FIG. **22** is a perspective view of a fourth embodiment of an expanded heart-valve stent of the present application;
FIG. **23** is a front elevational view of the fourth embodiment of the expanded heart-valve stent;
FIG. **24** is a rear elevational view of the fourth embodiment of the expanded heart-valve stent;
FIG. **25** is a top plan view of the fourth embodiment of the expanded heart-valve stent;
FIG. **26** is a bottom plan view of the fourth embodiment of the expanded heart-valve stent;
FIG. **27** is a left side elevational view of the fourth embodiment of the expanded heart-valve stent;
FIG. **28** is a right side elevational view of the fourth embodiment of the expanded heart-valve stent;
FIG. **29** is a perspective view of a fifth embodiment of an expanded heart-valve stent of the present application;
FIG. **30** is a front elevational view of the fifth embodiment of the expanded heart-valve stent;
FIG. **31** is a rear elevational view of the fifth embodiment of the expanded heart-valve stent;
FIG. **32** is a top plan view of the fifth embodiment of the expanded heart-valve stent;
FIG. **33** is a bottom plan view of the fifth embodiment of the expanded heart-valve stent;
FIG. **34** is a left side elevational view of the fifth embodiment of the expanded heart-valve stent;
FIG. **35** is a right side elevational view of the fifth embodiment of the expanded heart-valve stent;
FIG. **36** is a perspective view of a sixth embodiment of an expanded heart-valve stent of the present application;
FIG. **37** is a front elevational view of the sixth embodiment of the expanded heart-valve stent;
FIG. **38** is a rear elevational view of the sixth embodiment of the expanded heart-valve stent;
FIG. **39** is a top plan view of the sixth embodiment of the expanded heart-valve stent;
FIG. **40** is a bottom plan view of the sixth embodiment of the expanded heart-valve stent;
FIG. **41** is a left side elevational view of the sixth embodiment of the expanded heart-valve stent; and,
FIG. **42** is a right side elevational view of the sixth embodiment of the expanded heart-valve stent.

1 Claim, 12 Drawing Sheets

Fig. 2

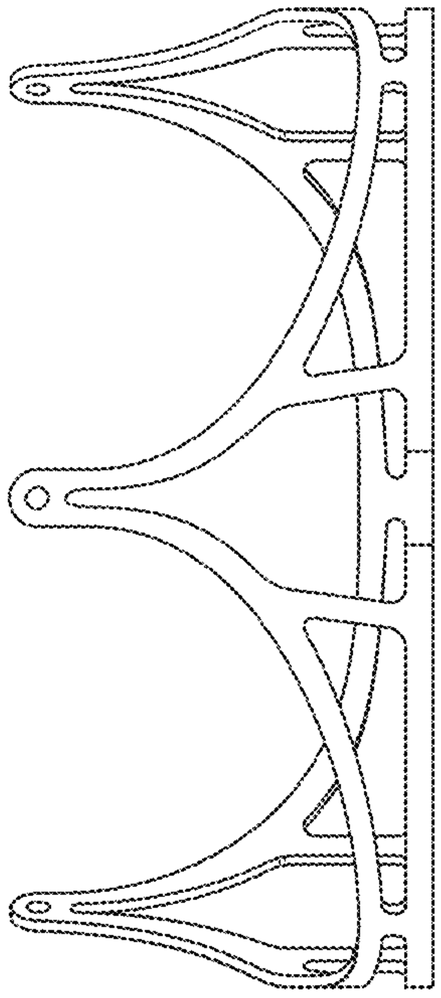


Fig. 3

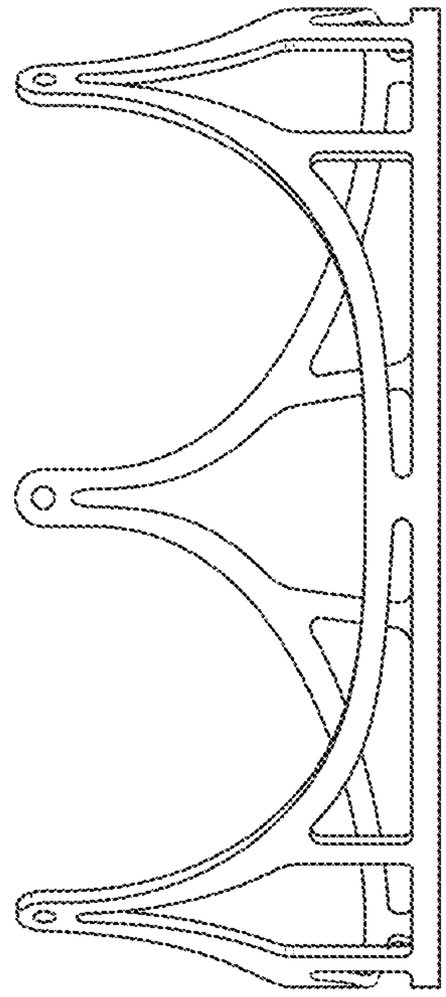
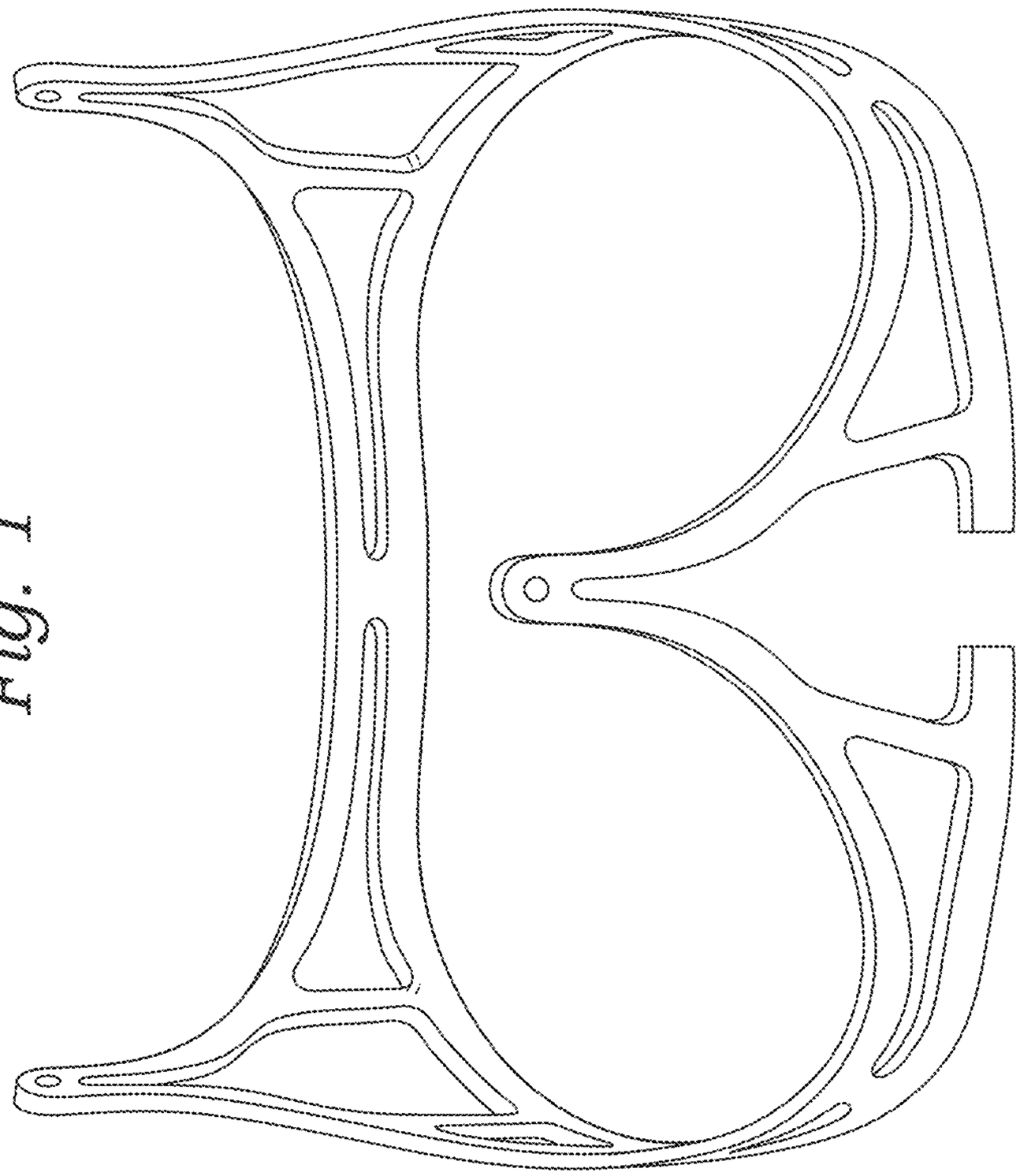


Fig. 1



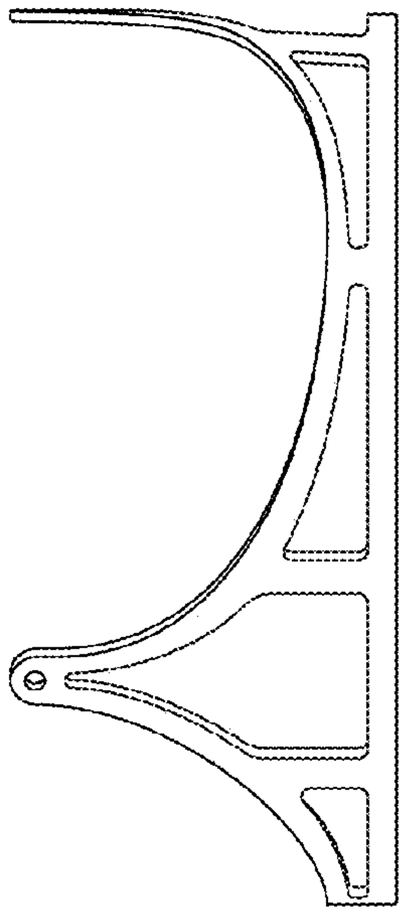


Fig. 6

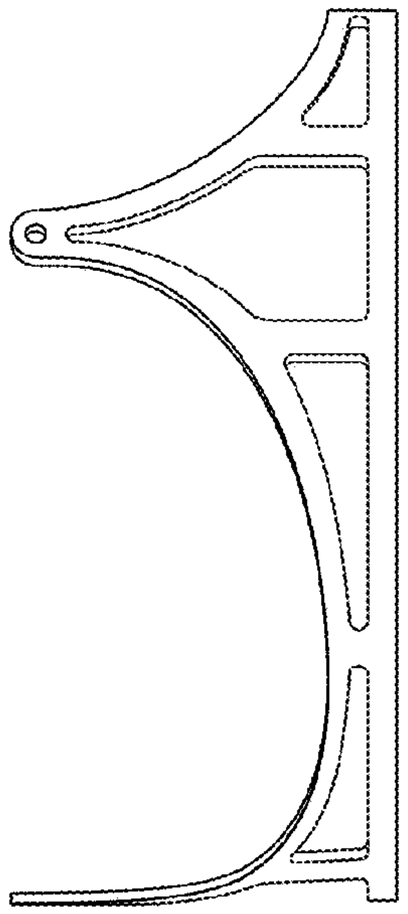


Fig. 7

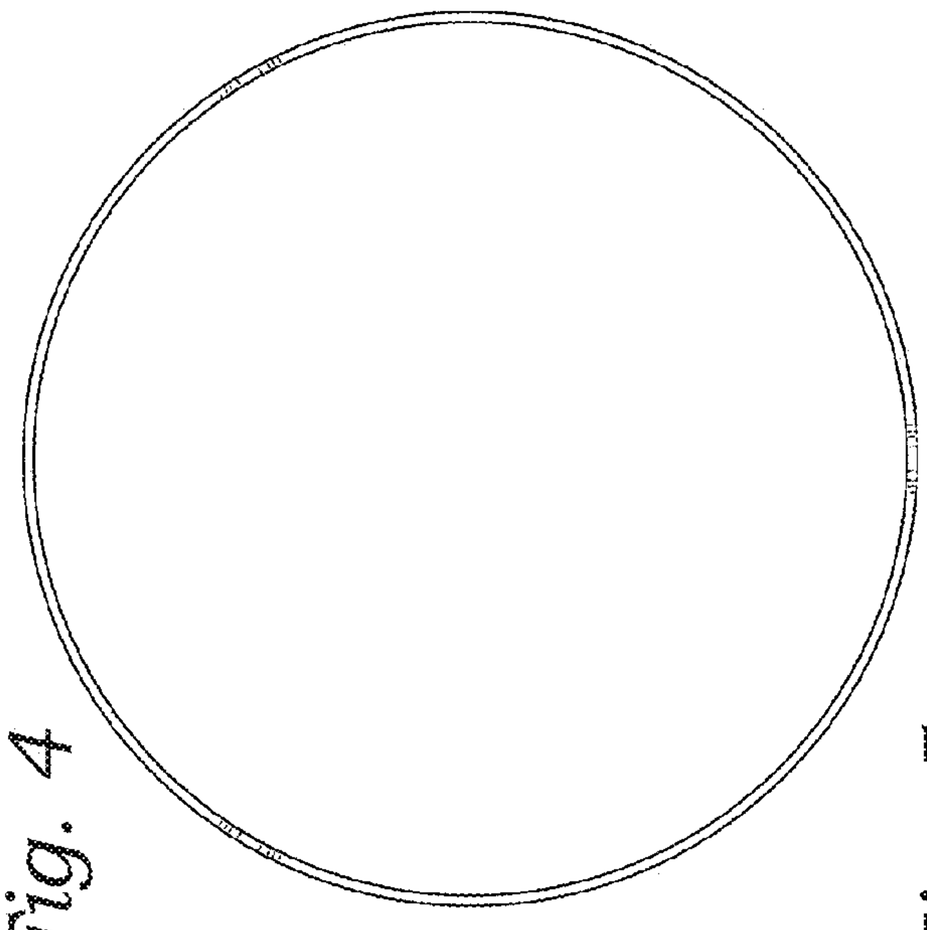


Fig. 4

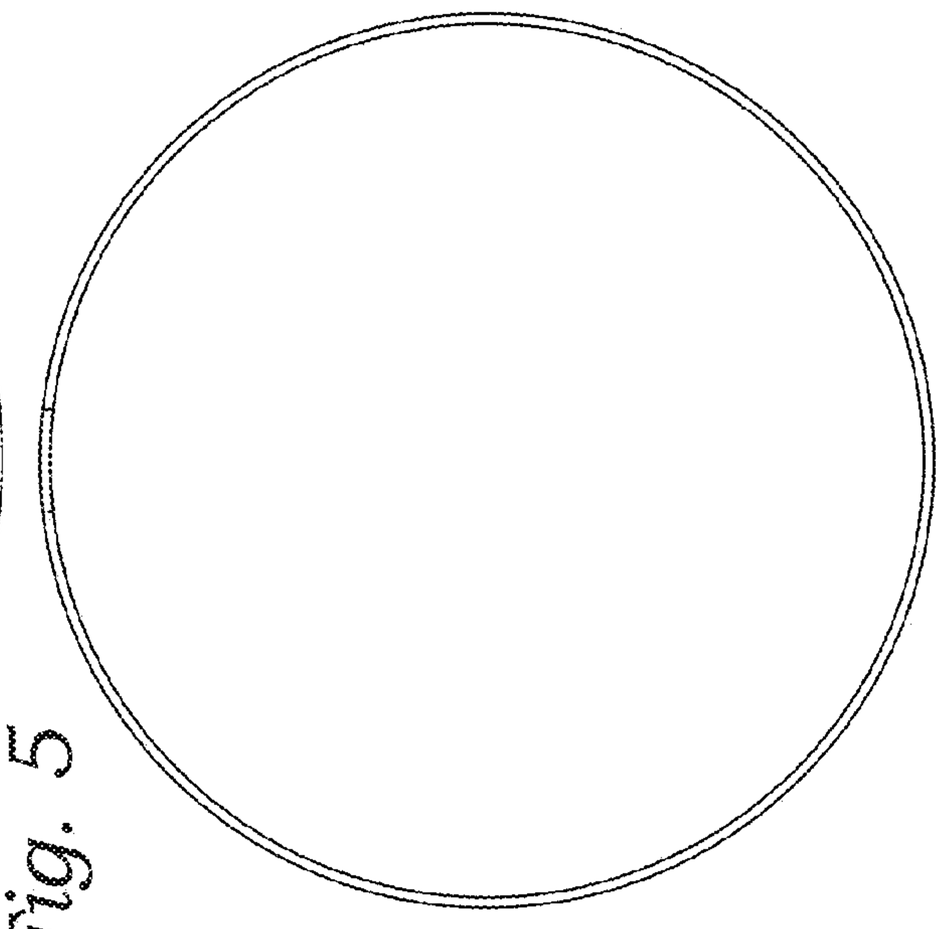


Fig. 5

Fig. 9

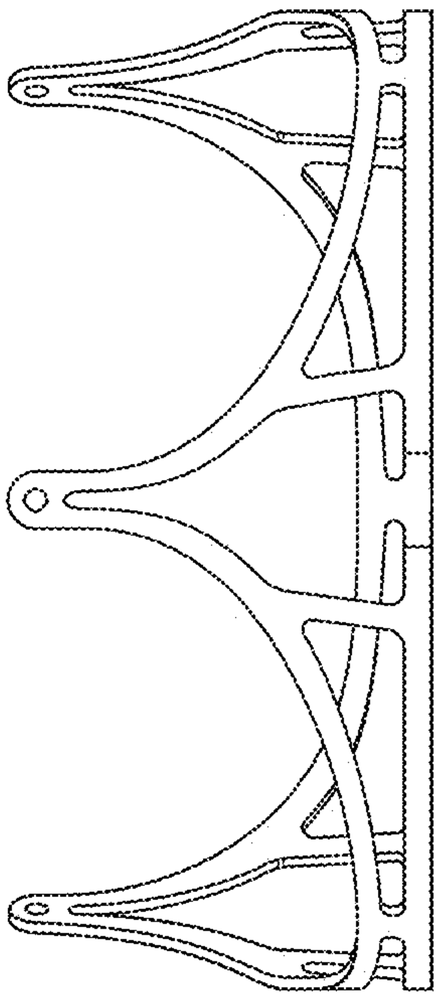
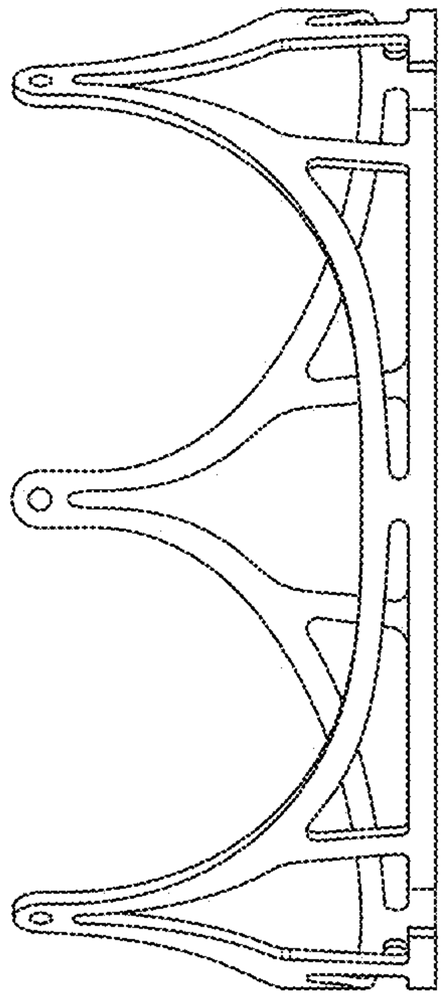


Fig. 10



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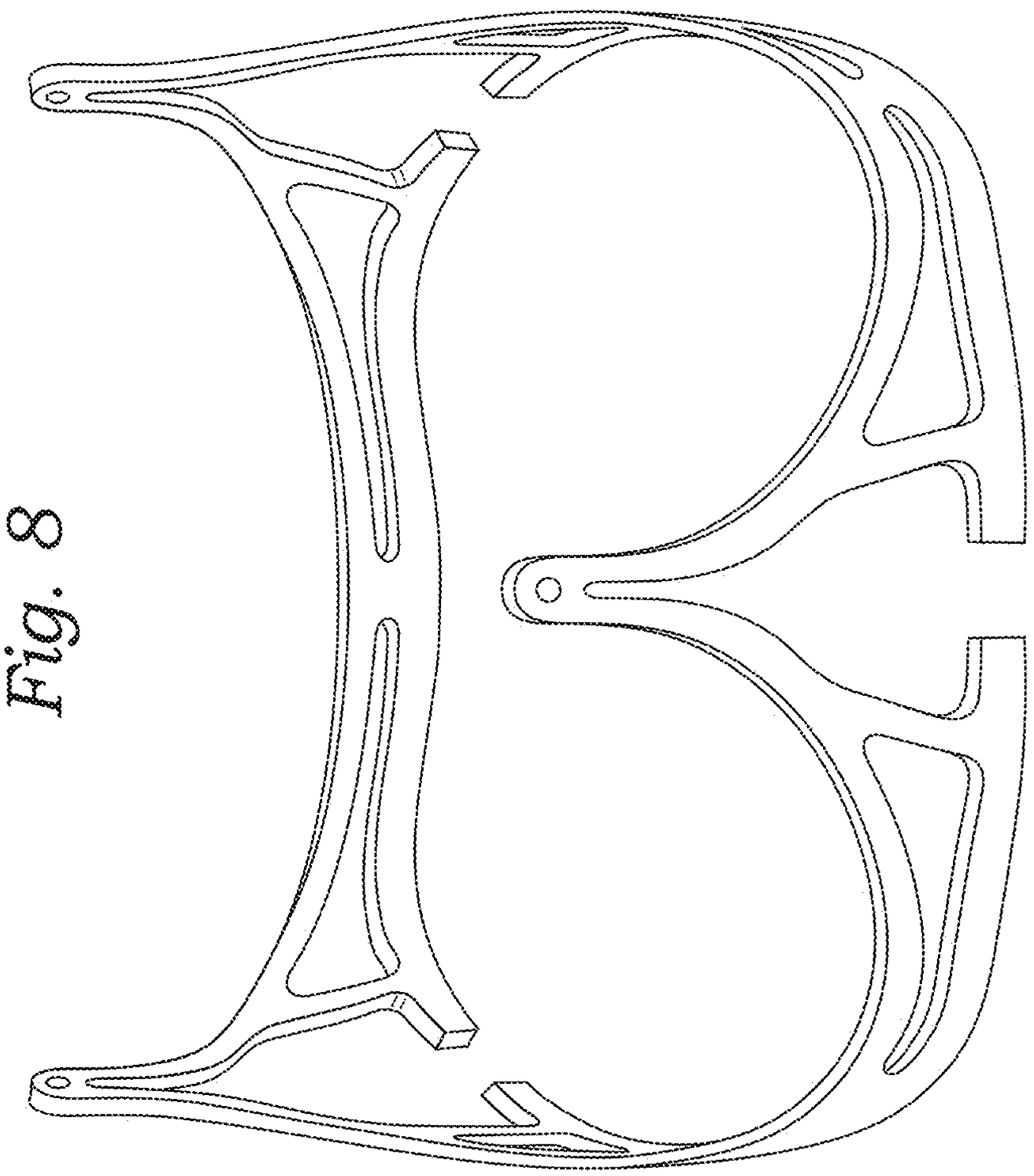


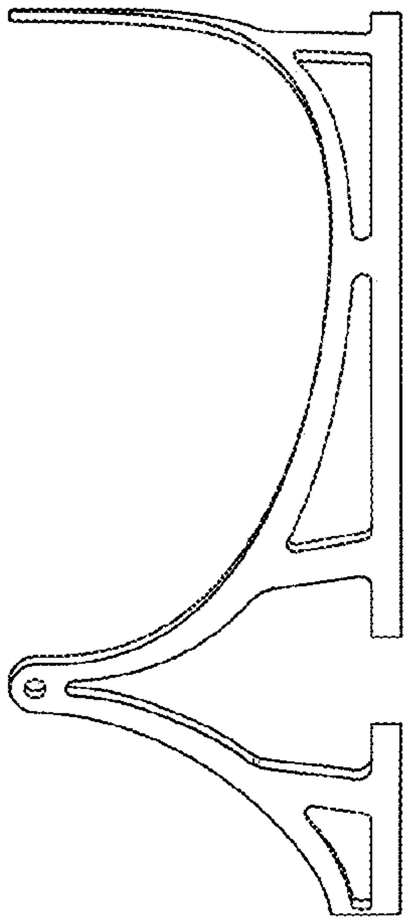


Fig. 13

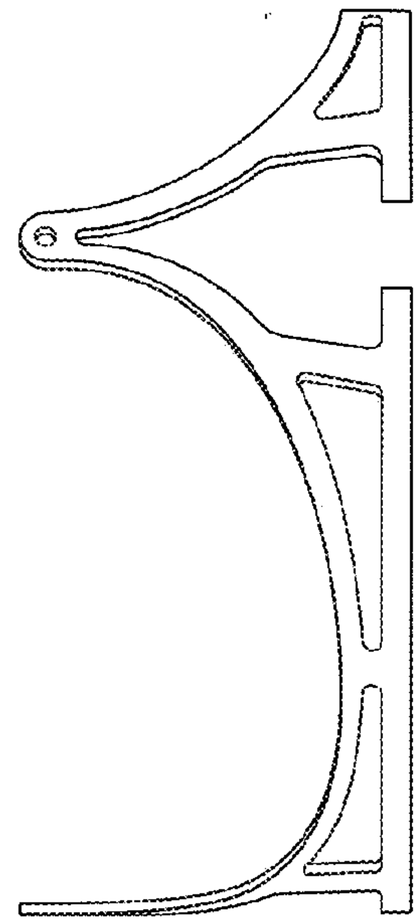


Fig. 14

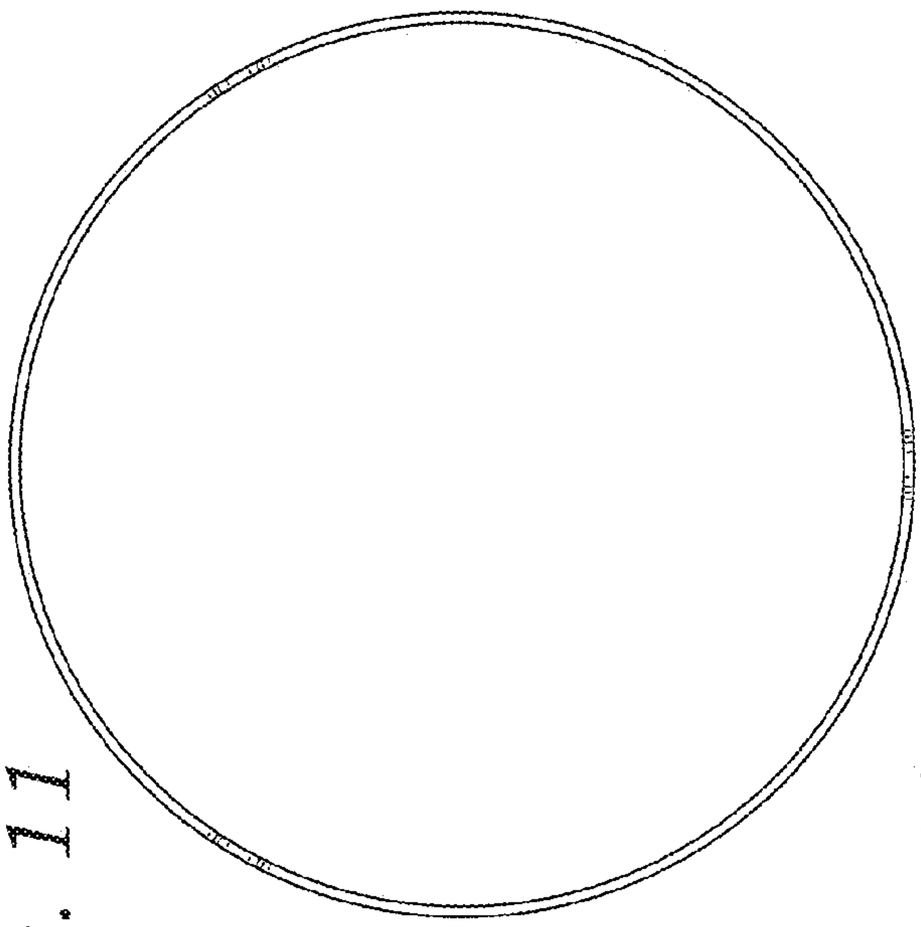


Fig. 11

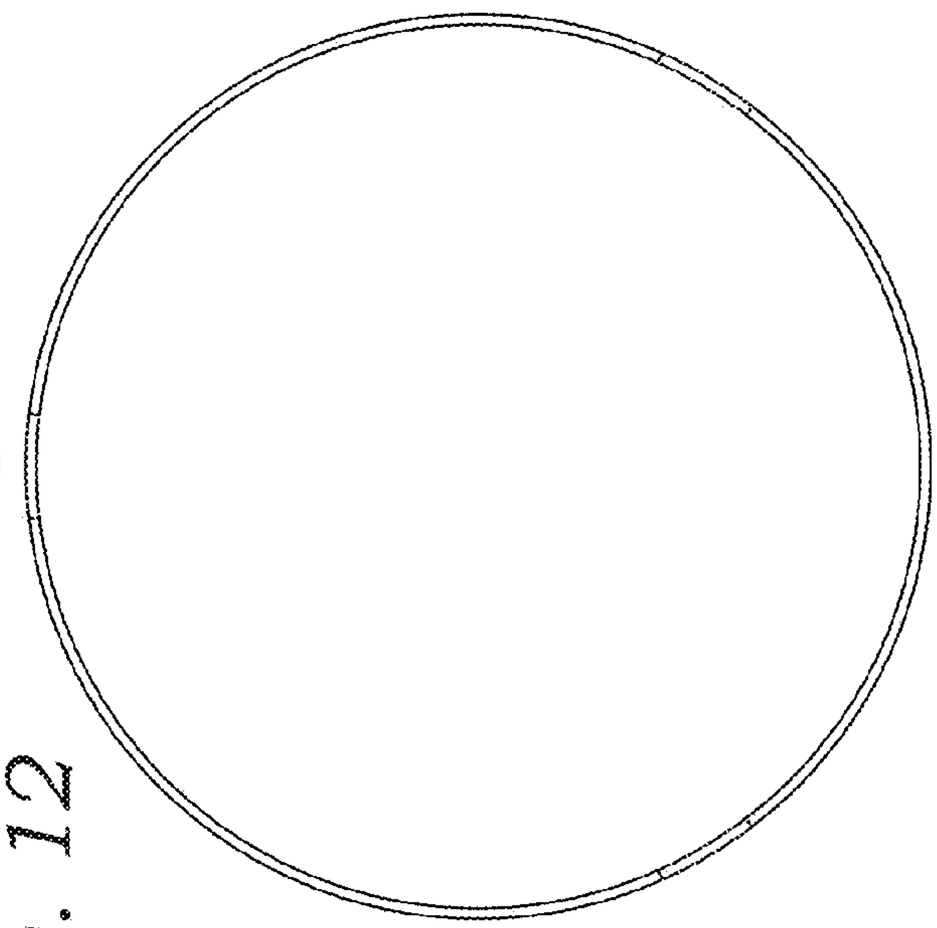


Fig. 12

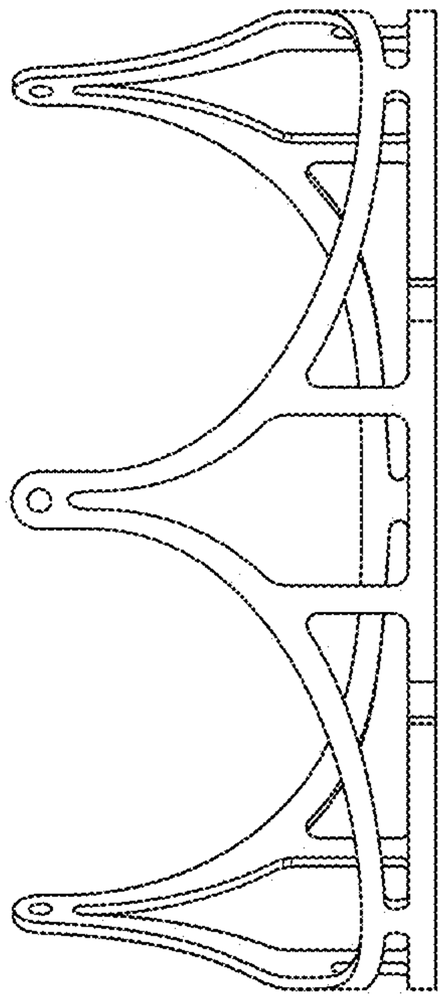


Fig. 16

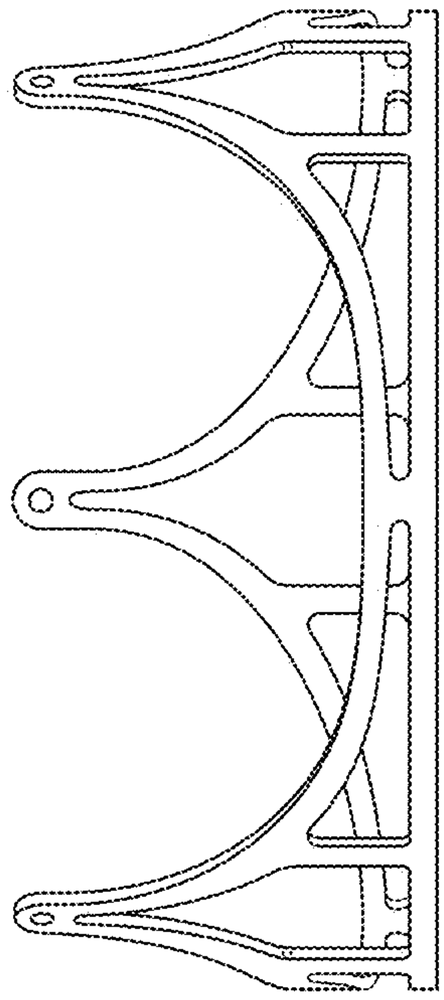


Fig. 17

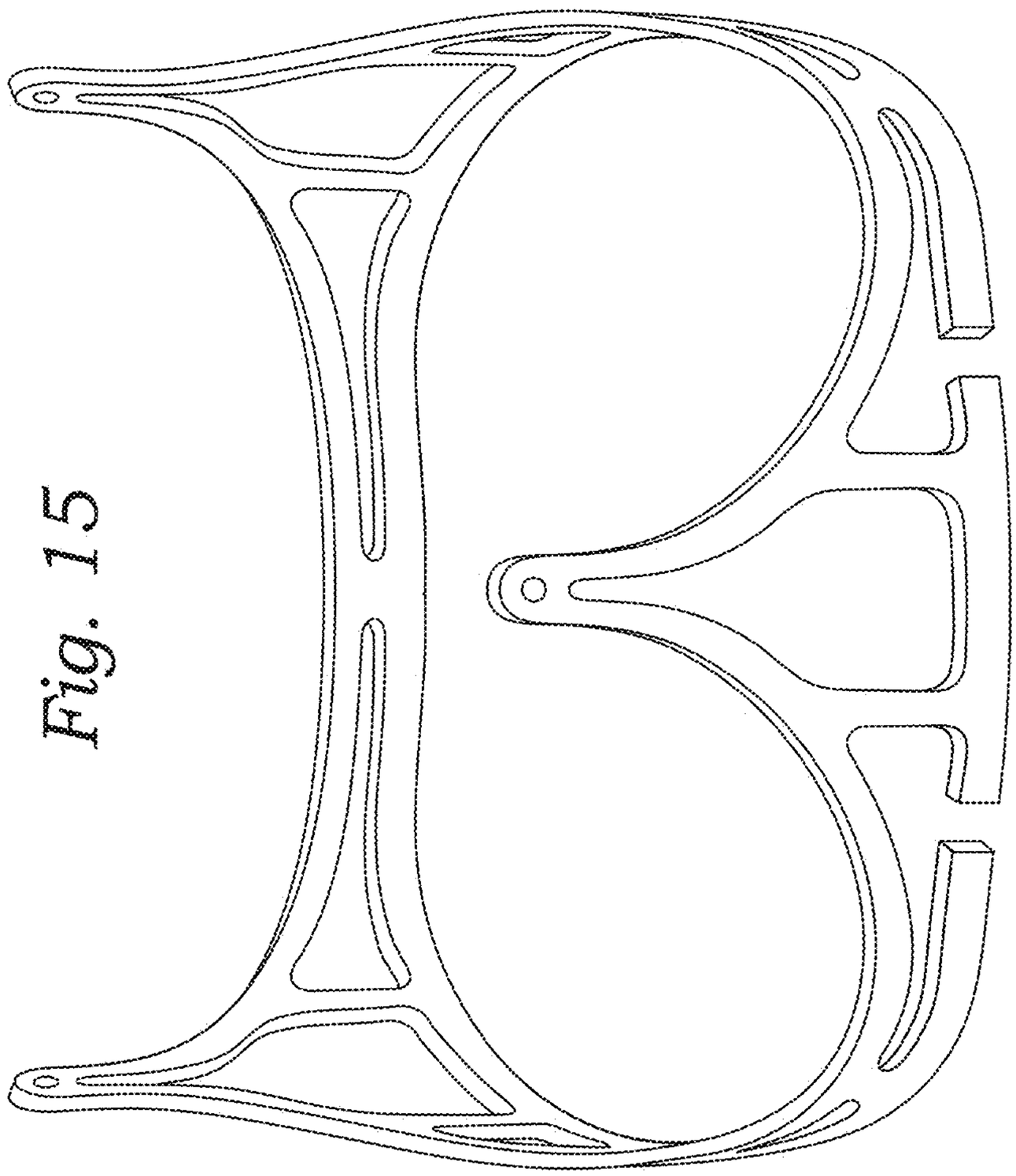


Fig. 15

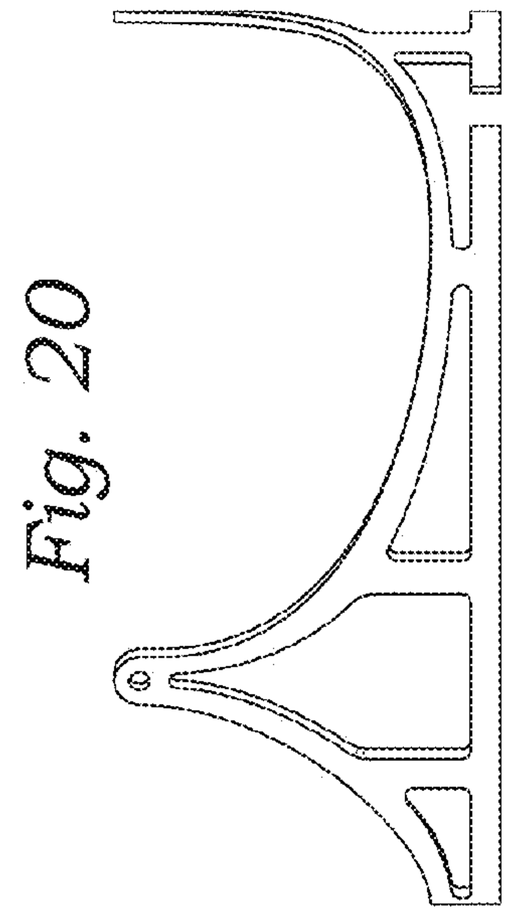


Fig. 20

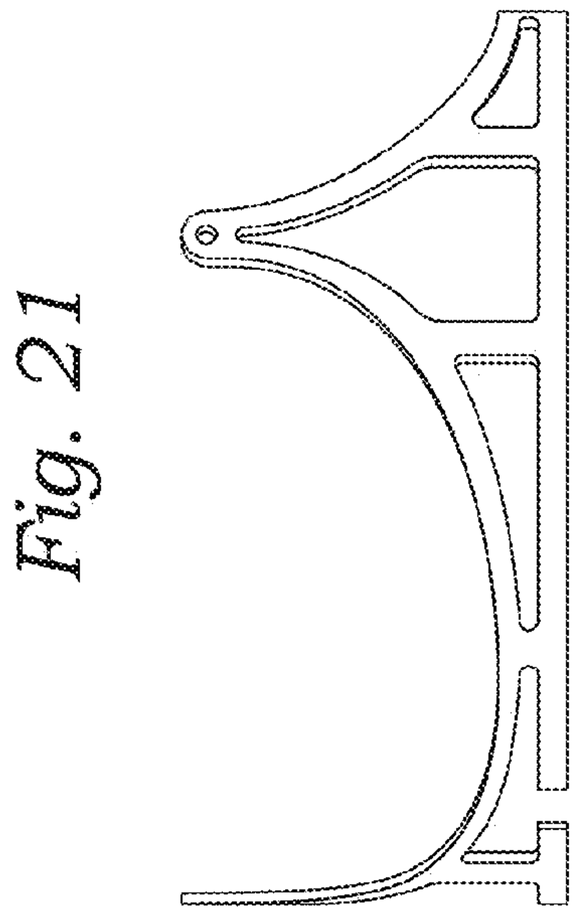


Fig. 21

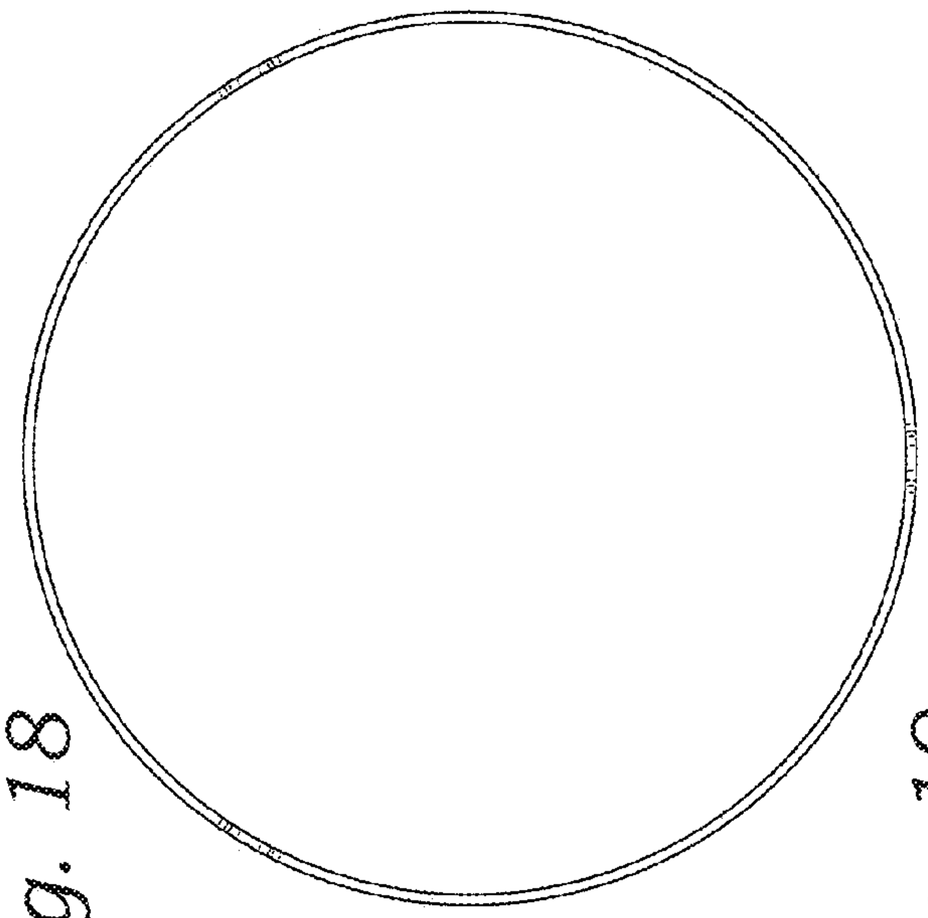


Fig. 18

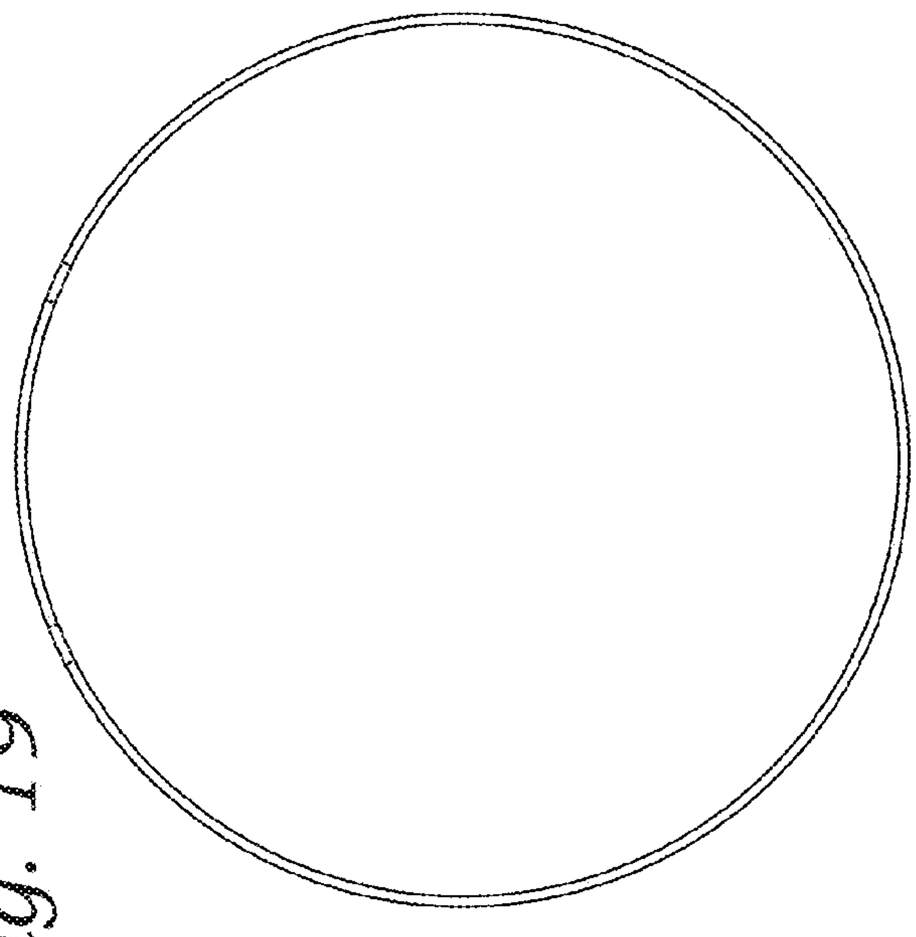


Fig. 19

Fig. 23

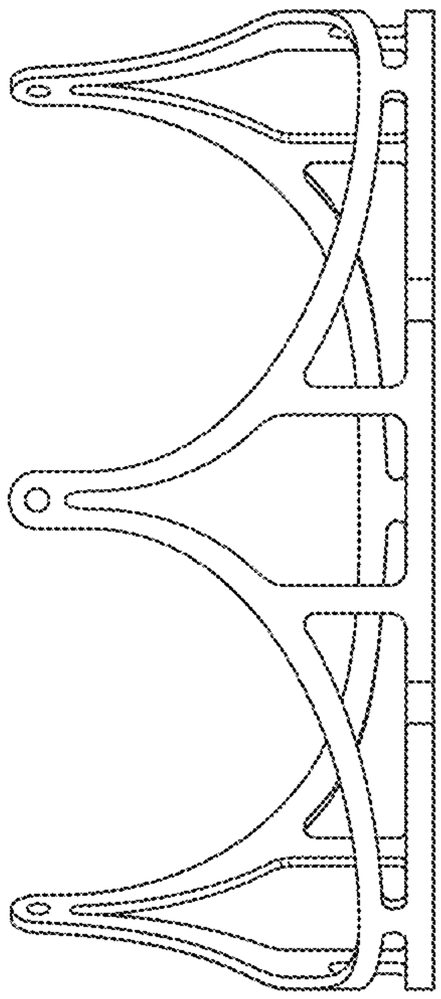


Fig. 24

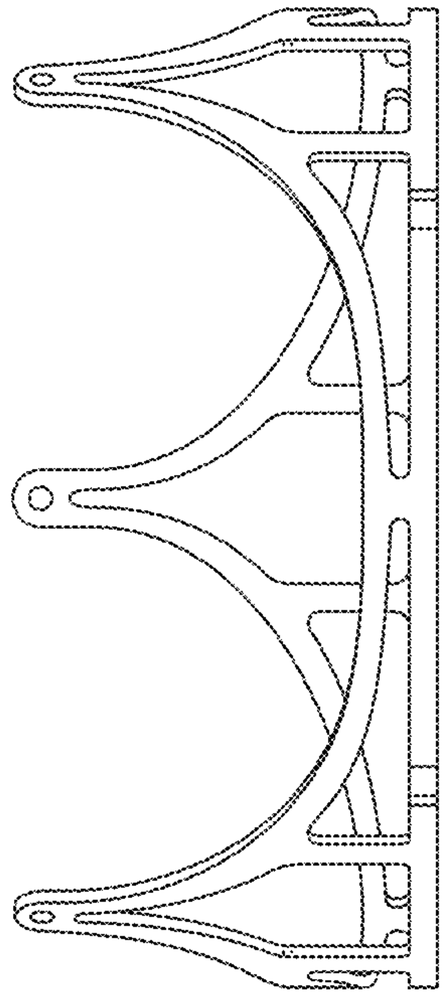
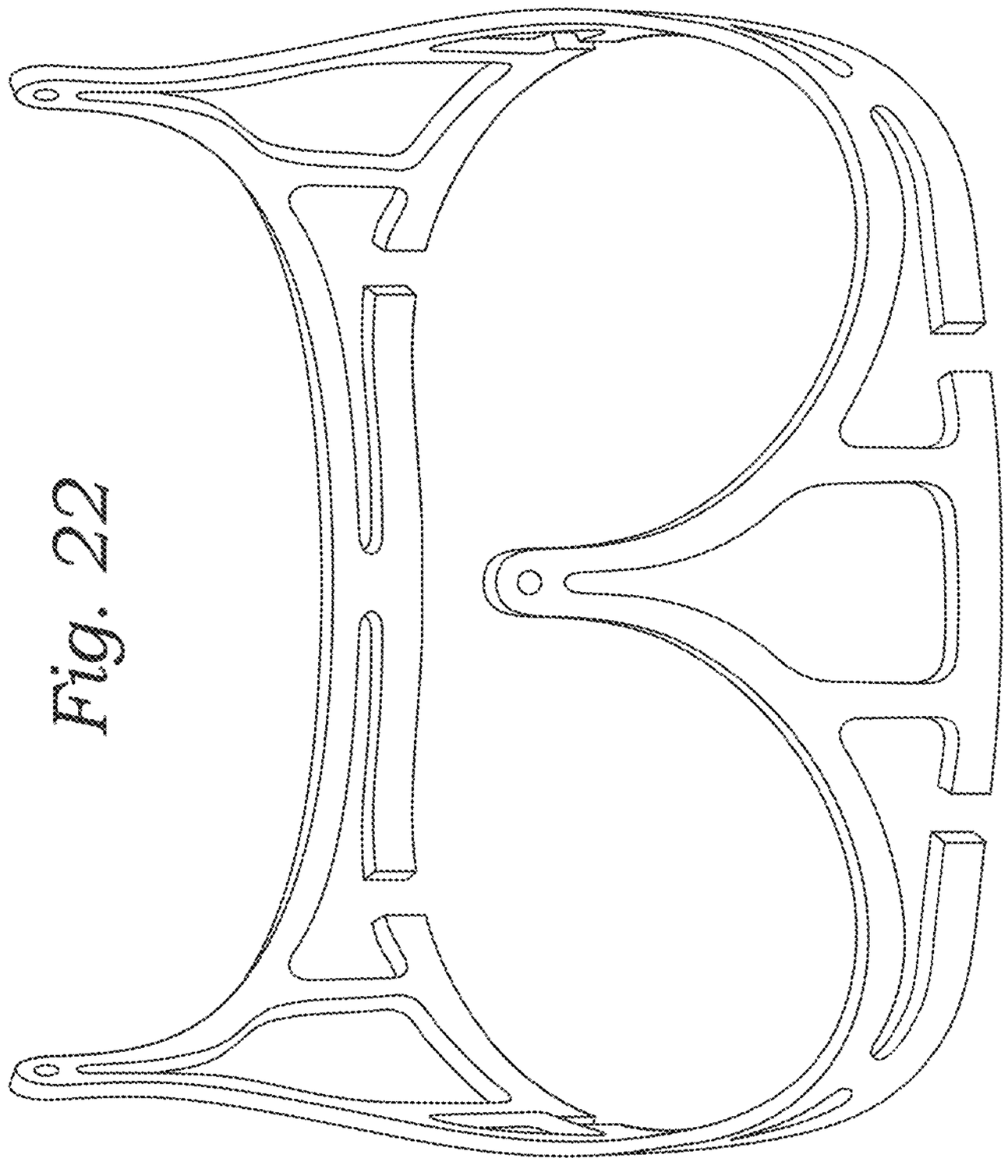


Fig. 22



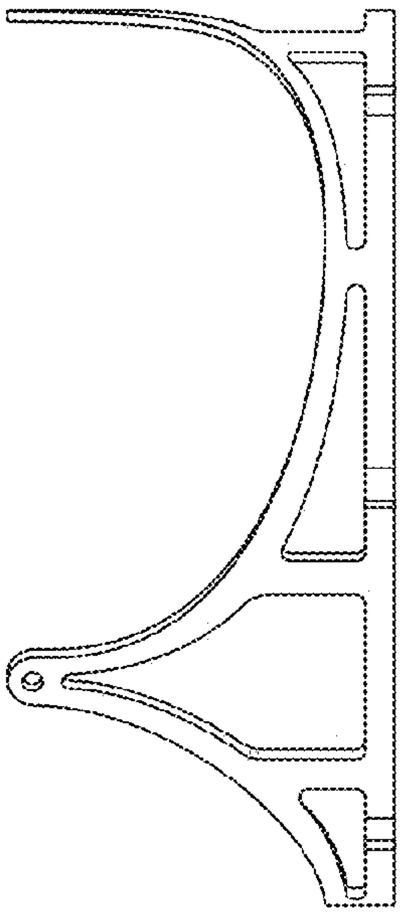


Fig. 27

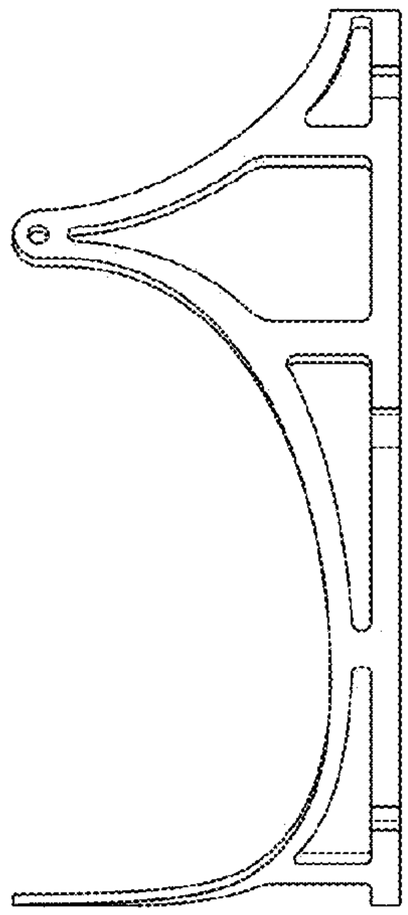


Fig. 28

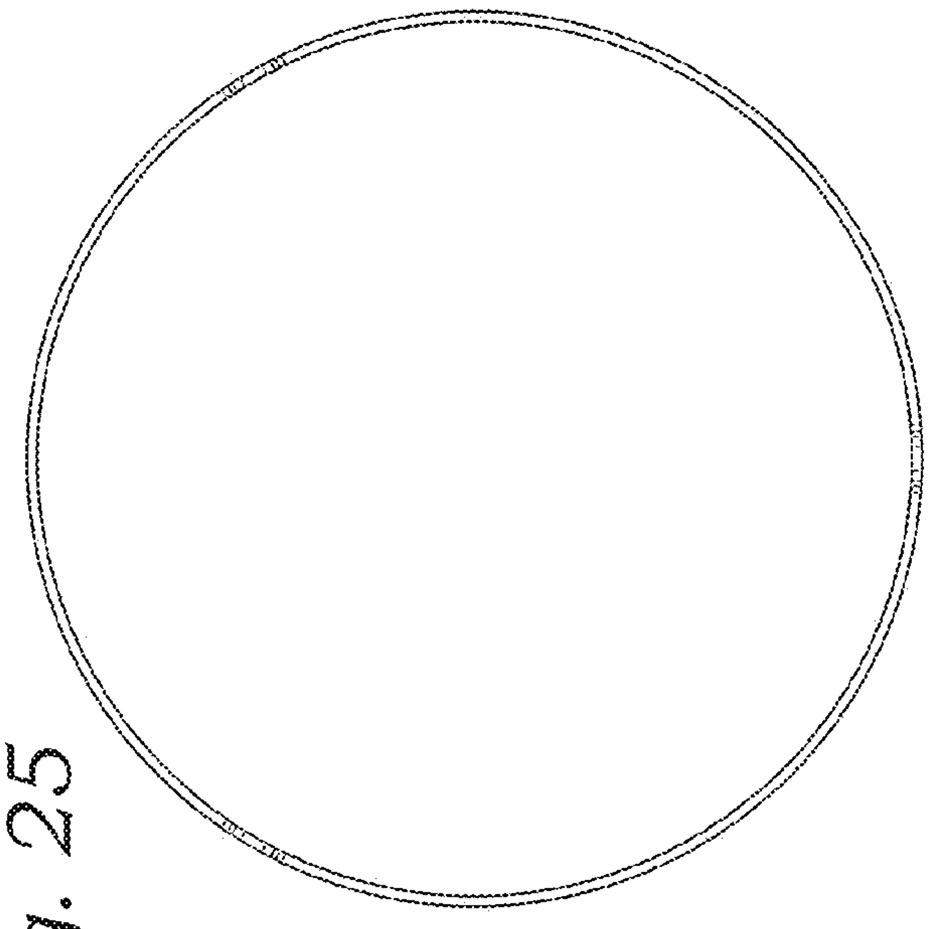


Fig. 25

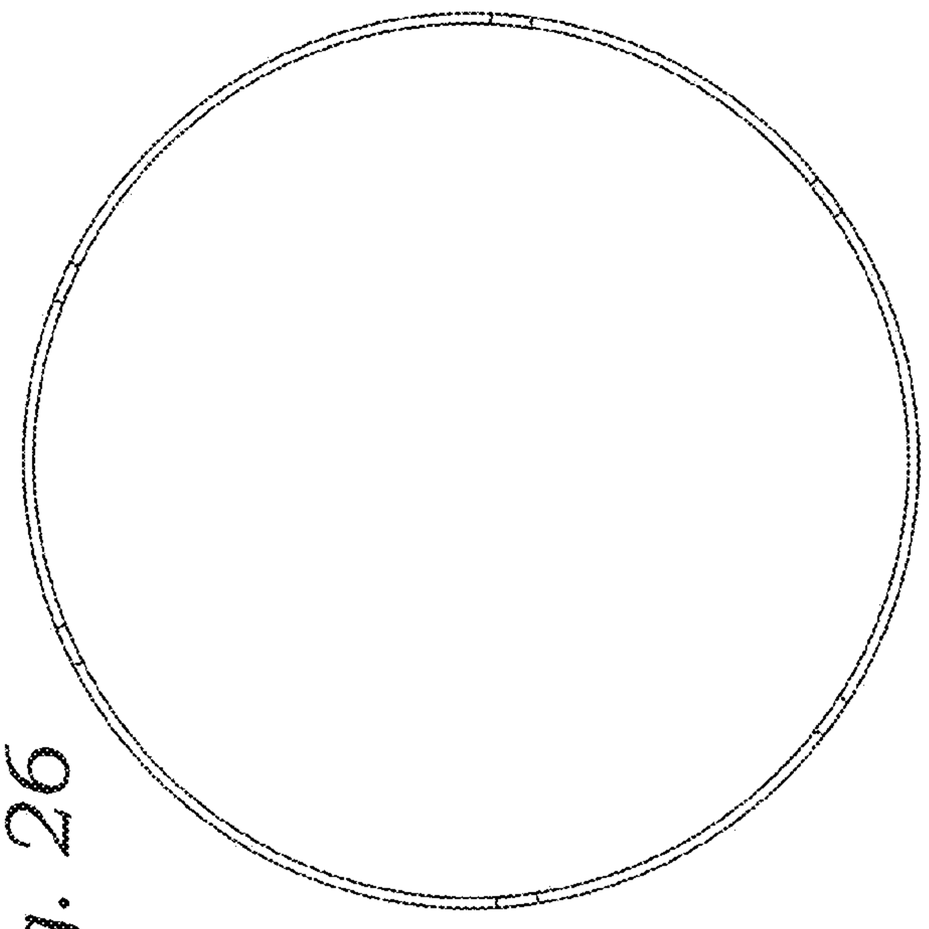


Fig. 26

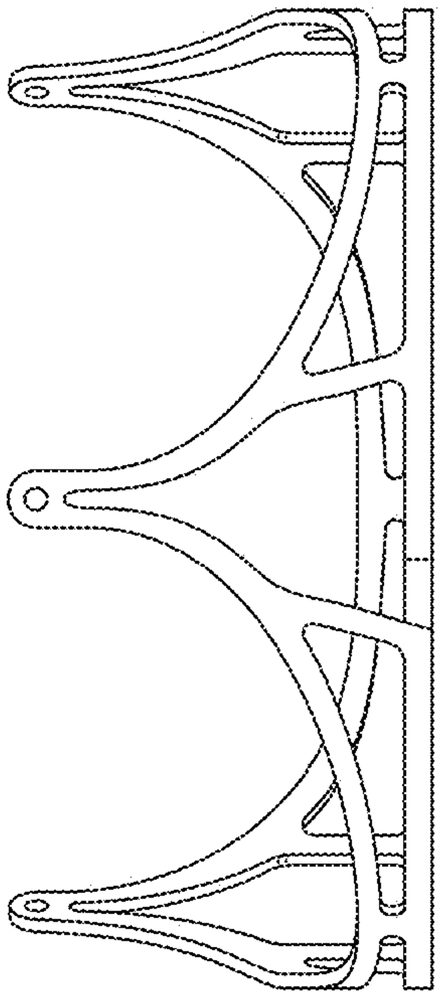


Fig. 30

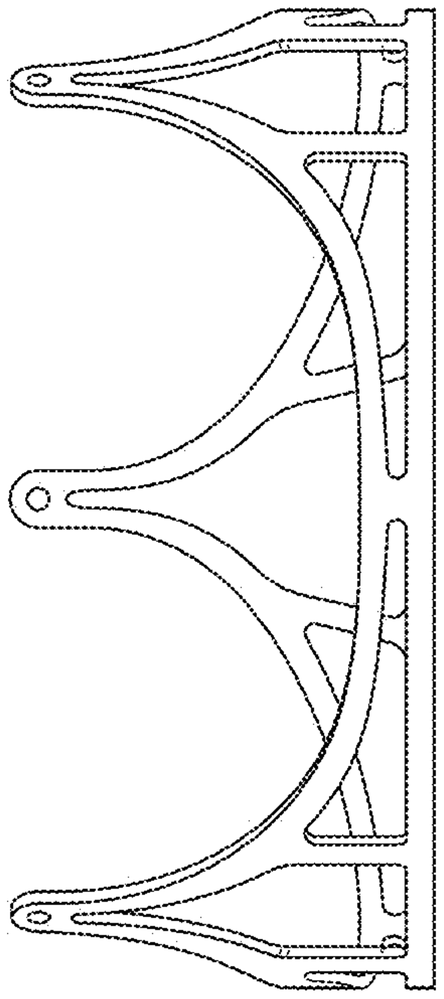


Fig. 31

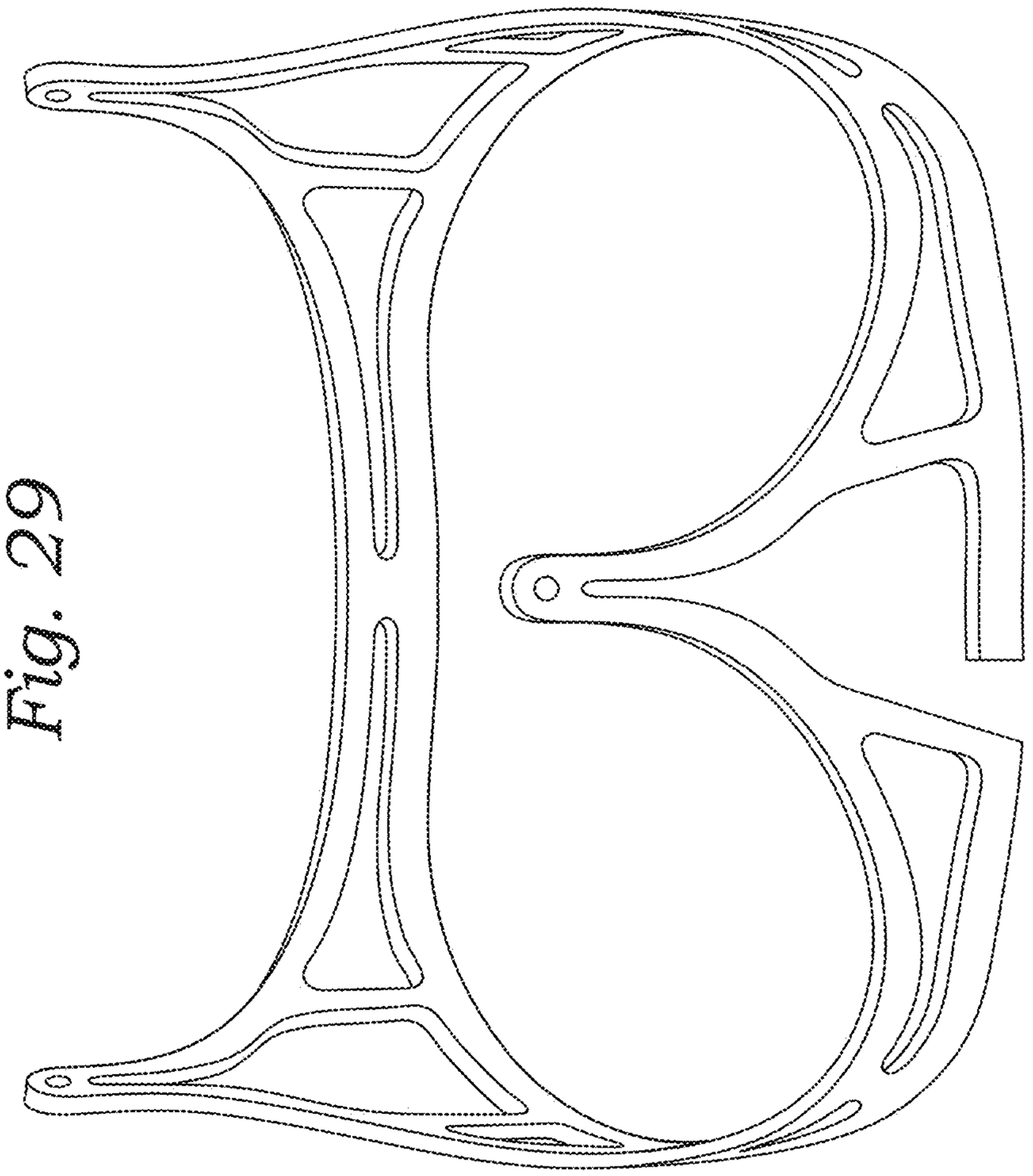


Fig. 29

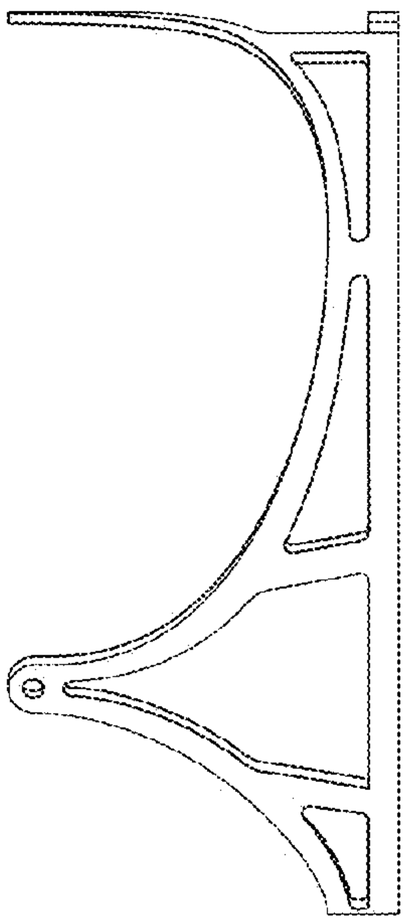


Fig. 34

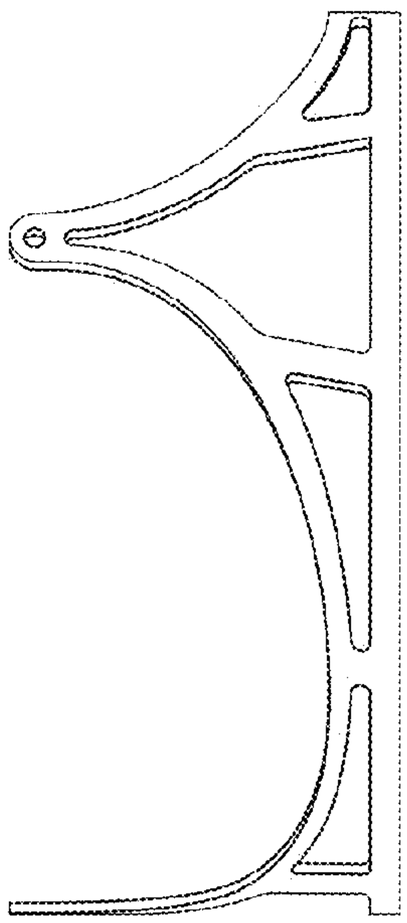


Fig. 35

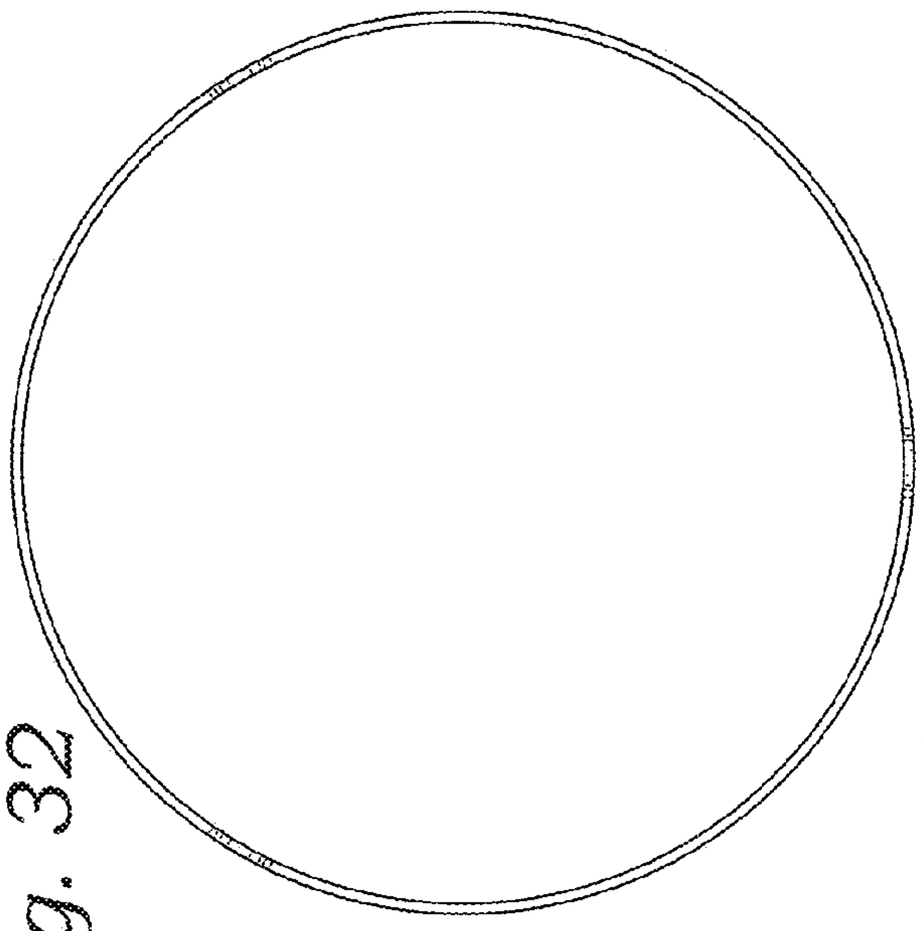


Fig. 32

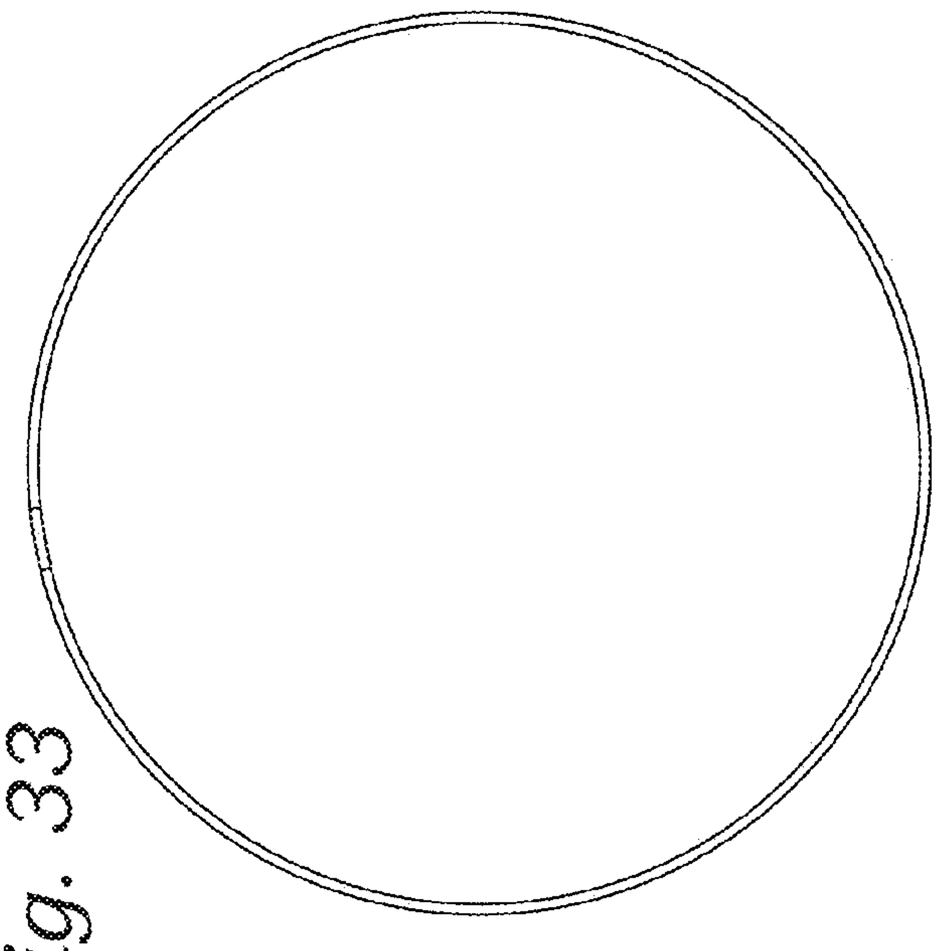


Fig. 33

Fig. 37

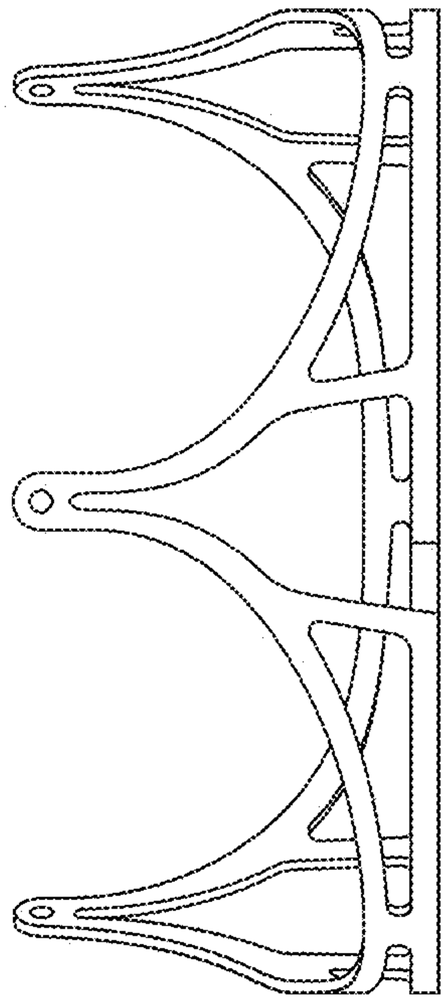


Fig. 38

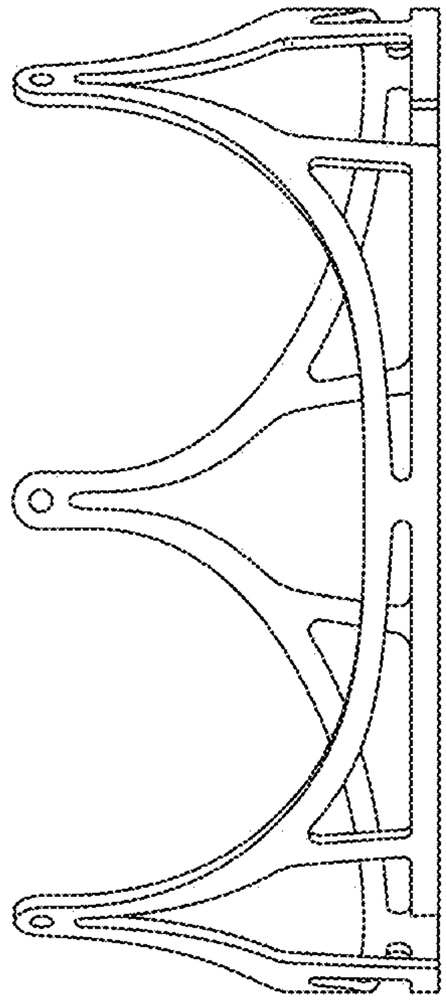
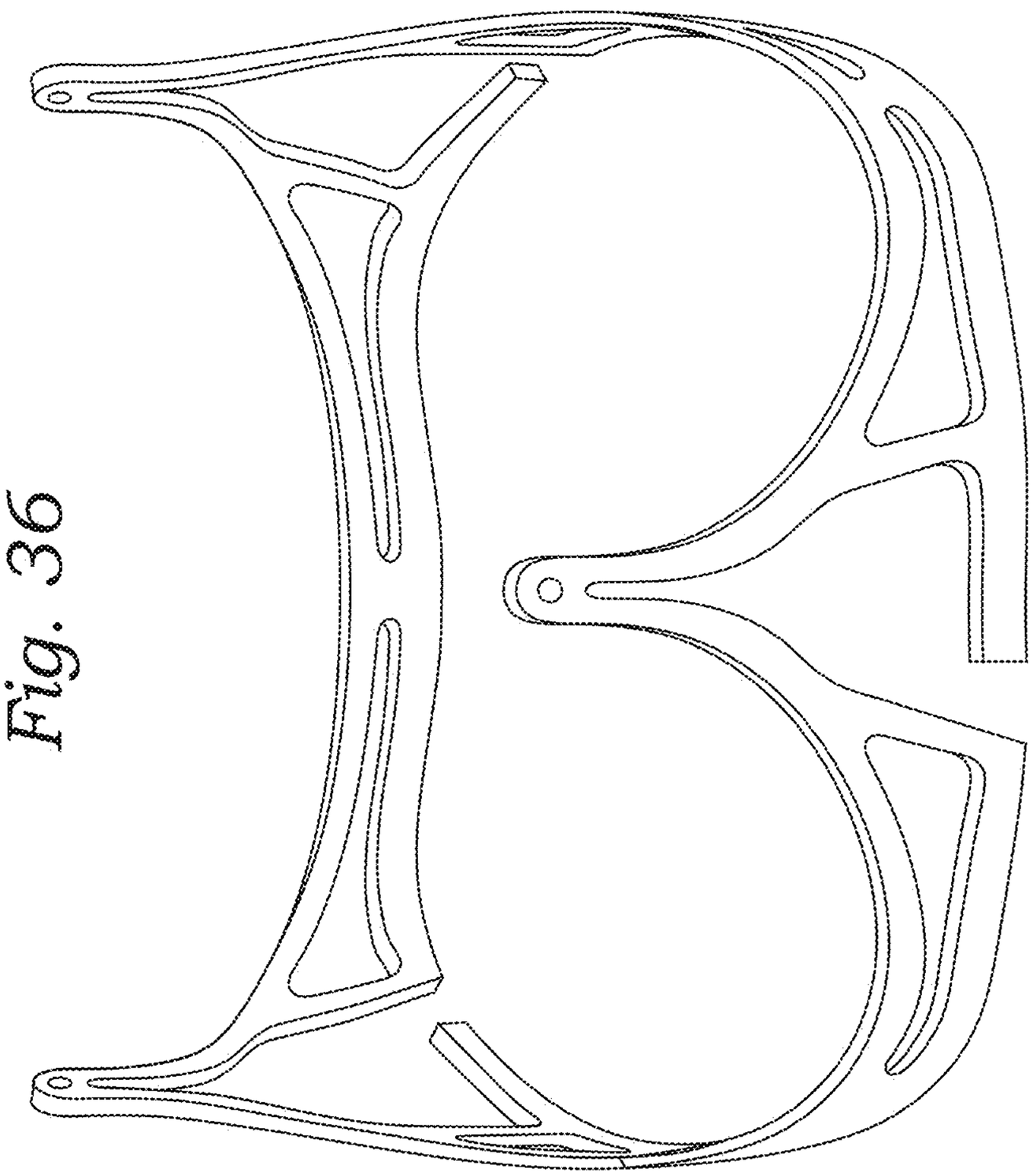


Fig. 36



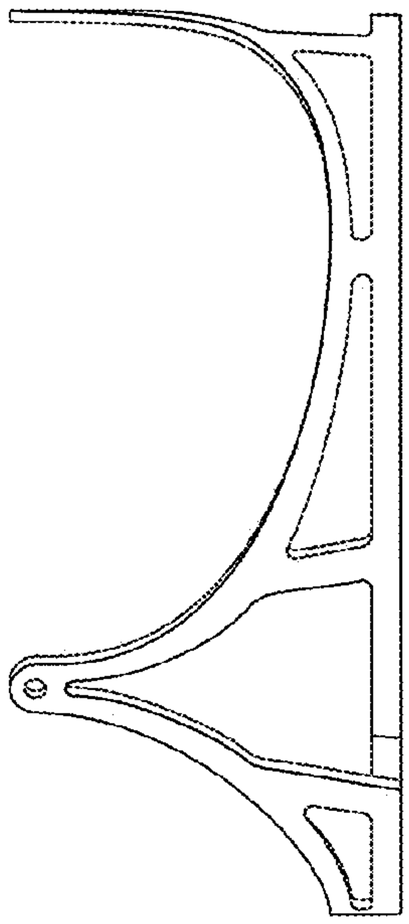


Fig. 41

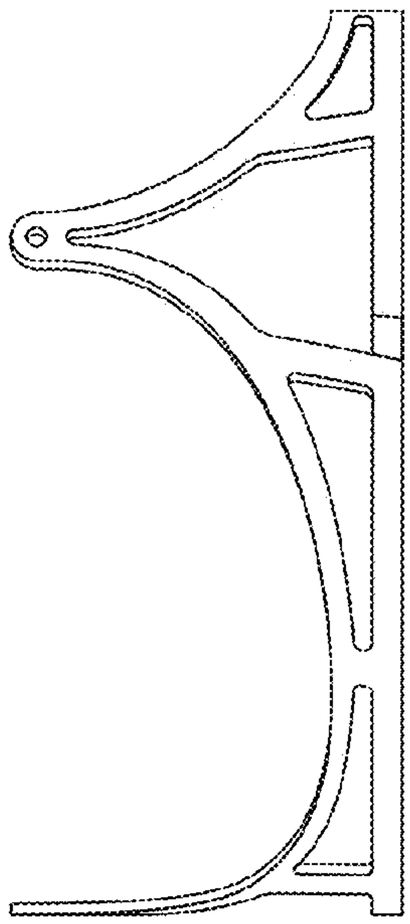


Fig. 42

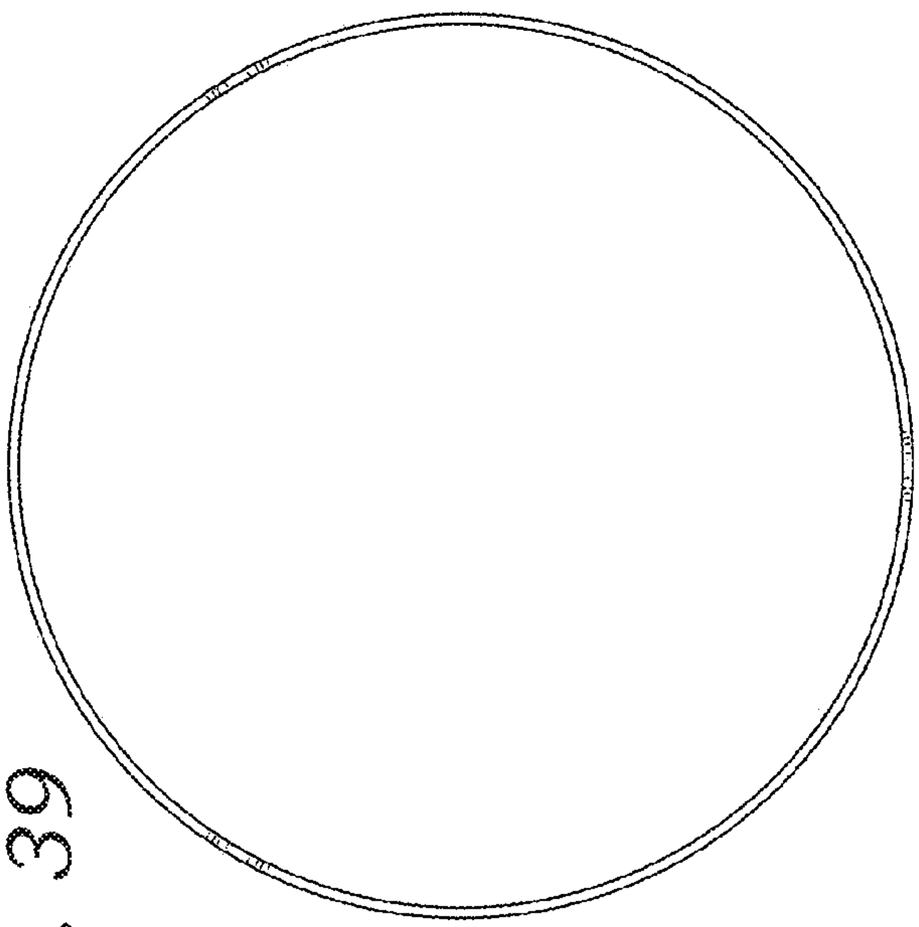


Fig. 39

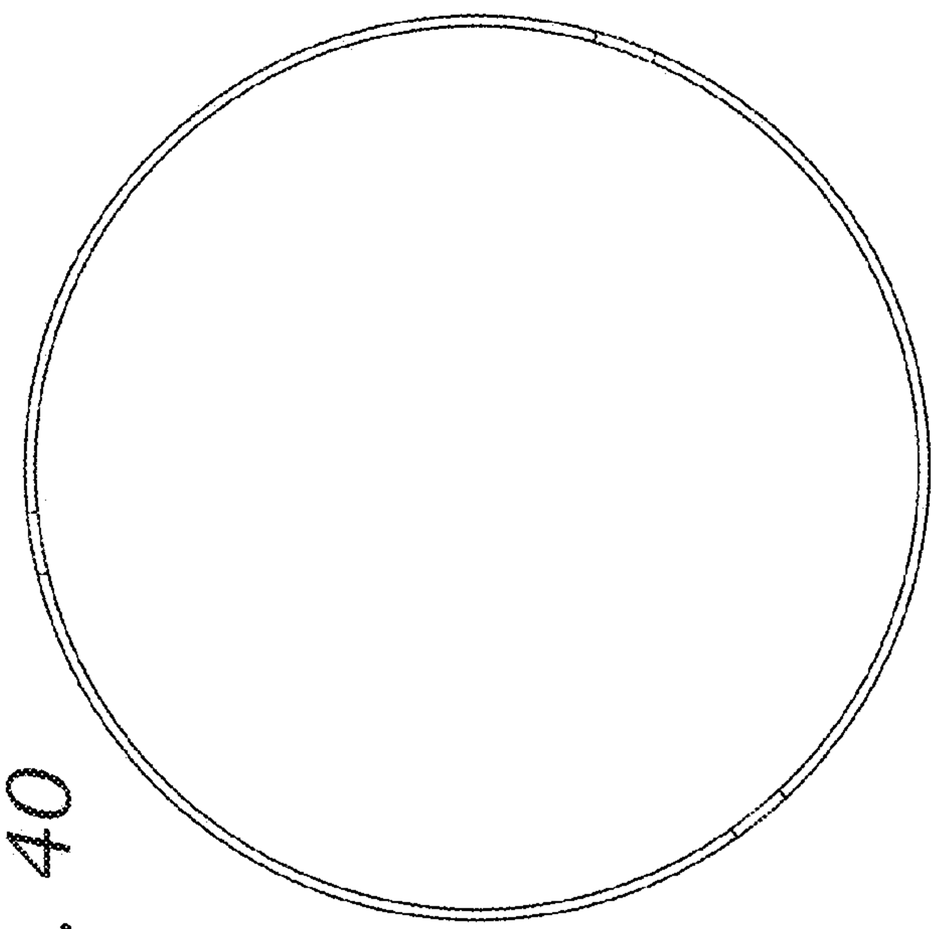


Fig. 40