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(54) **HIGHER TEMPERATURE VENTED SUSCEPTOR**

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

(52) **U.S. Cl.**
USPC **D13/182**

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CPC C23C 16/46; C23C 16/463; C23C 16/466; C23C 16/458; C23C 16/4581; C23C 16/4582; C23C 16/4583; C23C 16/4587; C23C 16/481; C23C 16/50; C23C 14/50; C23C 14/505; H01L 21/67005; H01L 21/67011; H01L 21/67063; H01L 21/67098; H01L 21/67103; H01L 21/67109; H01L 21/67115
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,407,783 A 10/1968 Capita
3,549,847 A 12/1970 Clark et al.
3,641,974 A 2/1972 Yamada et al.
3,796,182 A 3/1974 Rosler
4,499,354 A 2/1985 Hill et al.
4,522,149 A 12/1985 Garbis et al.
4,560,420 A 12/1985 Lord
4,710,428 A 12/1987 Tamamizu et al.
4,821,674 A 4/1989 deBoer et al.
4,958,061 A 12/1990 Wakabayashi et al.
(Continued)

FOREIGN PATENT DOCUMENTS

EP 0339279 11/1989
EP 0448346 3/1991
EP 0445596 9/1991
EP 0634785 1/1995
EP 0669640 8/1995
(Continued)

OTHER PUBLICATIONS

"Shaping the Future in Semiconductor Processing." Advertisement for Morton International, Inc., *Ceramic Solutions*. vol. 73, No. 7, Jul. 1994: advertisements (circa 1993).

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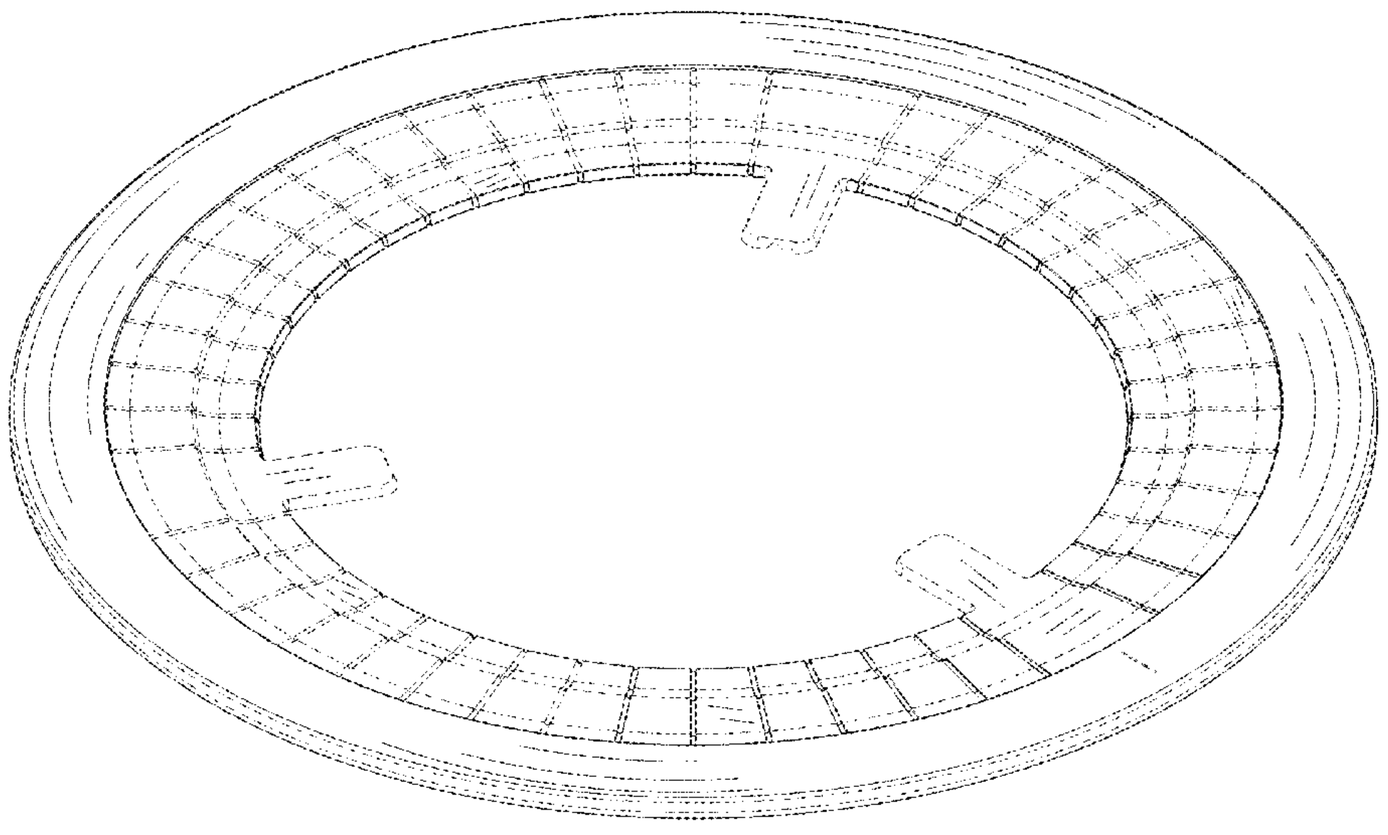
(57) **CLAIM**

The ornamental design for a higher temperature vented susceptor, as shown and described.

DESCRIPTION

FIG. **1** is a front perspective view of a higher temperature vented susceptor, showing our new design;
FIG. **2** is a back perspective view thereof;
FIG. **3** is a left side view thereof; and,
FIG. **4** is a right side view thereof.
The dash-dash lines in FIGS. **1-4** form no part of the claimed design.

1 Claim, 3 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

4,978,567	A	12/1990	Miller	
4,986,215	A	1/1991	Yamada et al.	
4,990,374	A	7/1991	Keeley et al.	
5,033,407	A	9/1991	Mizuno et al.	
5,044,943	A	9/1991	Bowman et al.	
5,071,670	A	12/1991	Kelly	
5,074,017	A	12/1991	Toya et al.	
5,098,198	A	3/1992	Nulman et al.	
5,108,792	A	4/1992	Anderson et al.	
5,119,540	A	6/1992	Kong et al.	
5,119,541	A	6/1992	Ohmi et al.	
5,121,531	A	6/1992	Severns et al.	
5,156,820	A	10/1992	Wong et al.	
5,188,501	A	2/1993	Tomita et al.	
5,199,483	A	4/1993	Bahng	
5,200,157	A	4/1993	Toya et al.	
5,242,501	A	9/1993	McDiarmid	
5,292,554	A	3/1994	Sinha et al.	
5,298,465	A	3/1994	Levy	
5,304,248	A	4/1994	Cheng et al.	
5,306,699	A	4/1994	Eddy	
5,308,645	A	5/1994	Zachman et al.	
5,332,442	A	7/1994	Kubodera et al.	
5,343,938	A	9/1994	Schmidt	
5,354,715	A	10/1994	Wang et al.	
5,356,486	A	10/1994	Sugarman et al.	
5,370,739	A	12/1994	Foster et al.	
5,383,971	A	1/1995	Selbrede	
5,393,349	A	2/1995	Ohkase	
5,403,401	A	4/1995	Haafkens et al.	
5,421,893	A	6/1995	Perlov	
5,427,620	A	6/1995	deBoer et al.	
5,444,217	A	8/1995	Moore et al.	
5,455,069	A	10/1995	Lee	
5,456,757	A	10/1995	Aruga et al.	
5,461,214	A	10/1995	Peck et al.	
5,467,220	A	11/1995	Xu	
5,492,566	A	2/1996	Sumnitsch	
5,514,439	A	5/1996	Sibley	
5,527,393	A	6/1996	Sato et al.	
5,549,756	A	8/1996	Sorensen et al.	
5,551,985	A	9/1996	Brors et al.	
5,558,717	A	9/1996	Zhao et al.	
5,584,936	A	12/1996	Pickering et al.	
5,588,827	A	12/1996	Muka	
5,620,525	A	4/1997	van de Ven et al.	
5,645,646	A	7/1997	Beinglass et al.	
5,656,093	A	8/1997	Burkhart et al.	
5,683,518	A	11/1997	Moore et al.	
5,690,742	A	11/1997	Ogata et al.	
5,700,725	A	12/1997	Hower et al.	
5,738,165	A	4/1998	Imai	
5,761,023	A	6/1998	Lue et al.	
5,800,622	A	9/1998	Takemi et al.	
5,803,977	A	9/1998	Tepman et al.	
5,834,737	A	11/1998	Hirose et al.	
D404,370	S	1/1999	Kimura	
5,895,530	A	4/1999	Shrotriya et al.	
5,938,850	A	8/1999	Arami et al.	
5,960,159	A	9/1999	Ikeda et al.	
6,001,183	A	12/1999	Gurary et al.	
6,020,212	A	2/2000	Mathis	
6,077,357	A	6/2000	Rossman et al.	
6,086,680	A	7/2000	Foster et al.	
6,090,212	A	7/2000	Mahawili	
6,093,252	A	7/2000	Wengert et al.	
6,167,834	B1	1/2001	Wang et al.	
6,293,749	B1	9/2001	Raaijmakers et al.	
6,325,858	B1	12/2001	Wengert et al.	
6,331,023	B1	12/2001	Goodwin et al.	
6,343,183	B1	1/2002	Halpin et al.	
6,394,797	B1	5/2002	Sugaya et al.	
6,402,850	B1	6/2002	Beinglass et al.	
6,464,790	B1	10/2002	Sherstinsky et al.	
6,608,287	B2	8/2003	Halpin et al.	
6,634,882	B2	10/2003	Goodman	
6,709,267	B1	3/2004	Hawkins et al.	
D496,008	S	9/2004	Takahashi et al.	
6,893,507	B2	5/2005	Goodman et al.	
7,033,445	B2	4/2006	Keeton et al.	
D525,127	S	7/2006	Cogley et al.	
D600,223	S	9/2009	Aggarwal et al.	
7,601,224	B2	10/2009	Foree	
7,602,224	B2	10/2009	Foree	
7,648,579	B2	1/2010	Goodman et al.	
7,722,441	B2 *	5/2010	Goela	H01L 21/67309 451/63
7,740,703	B2 *	6/2010	Hasegawa	C23C 16/46 118/715
8,088,225	B2	1/2012	Goodman et al.	
8,366,830	B2	2/2013	Nakamura et al.	
8,394,229	B2	3/2013	Aggarwal et al.	
8,801,857	B2	8/2014	Aggarwal et al.	
D743,357	S	11/2015	Vyne	
9,558,985	B2	1/2017	Wang et al.	
D784,276	S	4/2017	Tiner et al.	
9,633,889	B2	4/2017	Cuvalci et al.	
10,068,791	B2 *	9/2018	Parsey, Jr.	H01L 21/68735
D830,981	S	10/2018	Jeong et al.	
10,376,916	B2 *	8/2019	Ranish	H01L 21/67115
D864,134	S	10/2019	Watarai et al.	
D914,620	S *	3/2021	Rokkam	D13/182
11,018,047	B2	5/2021	Rokkam et al.	
D920,936	S *	6/2021	Rokkam	D13/182
2002/0011211	A1	1/2002	Halpin	
2002/0043337	A1	4/2002	Goodman et al.	
2003/0000472	A1	1/2003	Lim et al.	
2003/0049580	A1	3/2003	Goodman	
2004/0060512	A1	4/2004	Waldhauer et al.	
2004/0229002	A1	11/2004	Davis et al.	
2005/0092439	A1	5/2005	Keeton et al.	
2005/0284372	A1	12/2005	Murugesh et al.	
2006/0057826	A1	3/2006	De Boer	
2009/0280248	A1	11/2009	Goodman et al.	
2010/0031884	A1	2/2010	Aggarwal et al.	
2010/0107974	A1	5/2010	Givens et al.	
2013/0109192	A1	5/2013	Hawkins et al.	
2016/0133504	A1	5/2016	Chu et al.	
2018/0094350	A1	4/2018	Verghese et al.	
2019/0355612	A1	11/2019	Sakurai	
2020/0234996	A1	7/2020	Rokkam et al.	
2020/0373187	A1	11/2020	Singu et al.	
2021/0125853	A1	4/2021	Rathi et al.	

FOREIGN PATENT DOCUMENTS

EP	0766289		4/1997
EP	0840358		5/1998
GB	2181458		4/1987
JP	7-58039		3/1995
JP	2000-269310		9/2000
JP	2002-184843		6/2002
JP	2002-526915		8/2002
JP	2003-124167		4/2003
JP	2006-228802		8/2006
JP	2007-502022		2/2007
JP	D1422195		8/2014
JP	D1547357		4/2016
JP	D1570747		2/2018
JP	D1570748		2/2018
KR	10-1999-0069084		9/1999
KR	1999-0069091		9/1999
KR	100460338	B1	11/2004
KR	10-2007-0098025		10/2007
TW	D111900		7/2006
TW	D136587		8/2010
TW	D184695		8/2017
TW	D191199		6/2018
WO	WO 96/30713		10/1996
WO	WO 97/08743		3/1997
WO	WO 2010/016964		2/2010

* cited by examiner

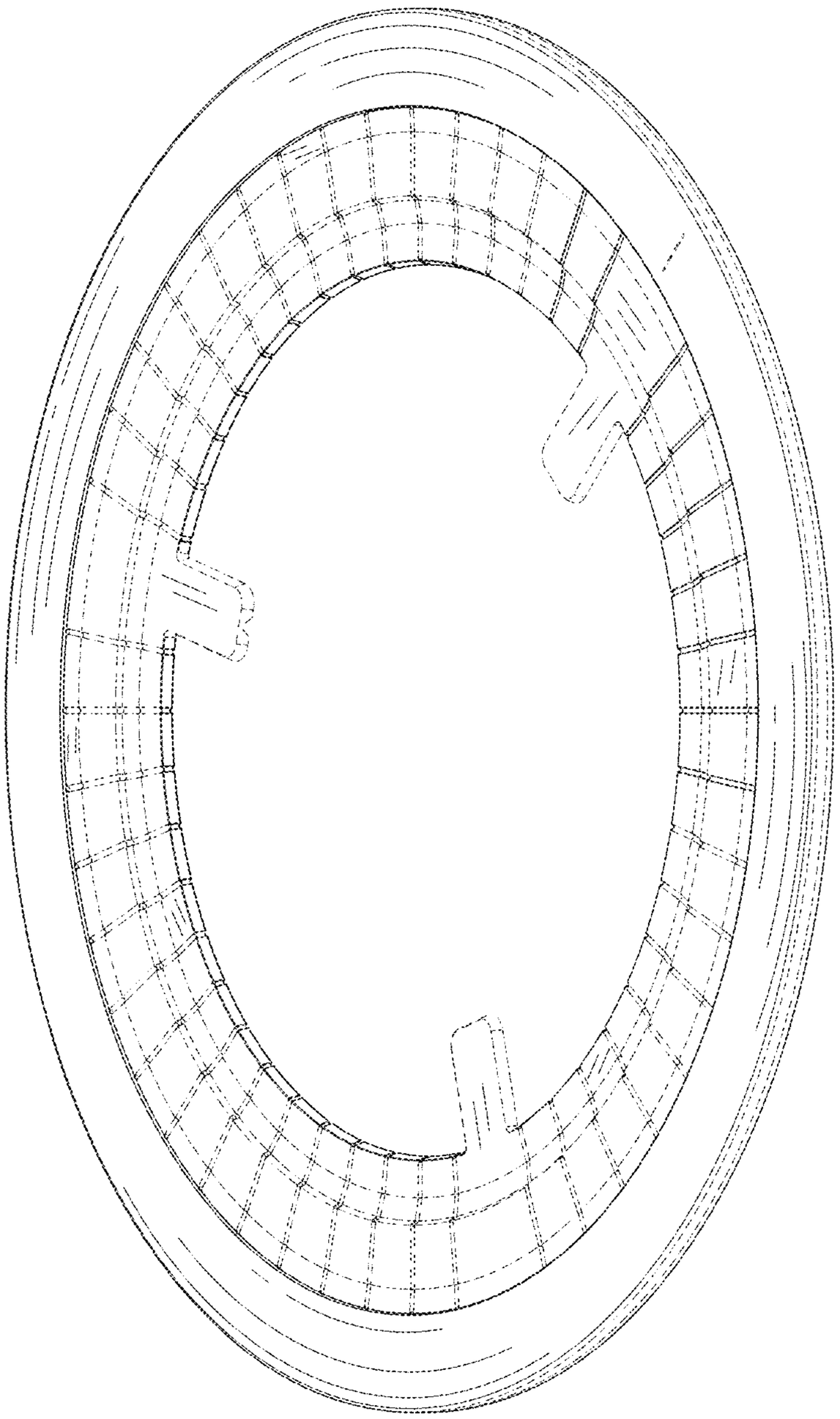


FIG. 1

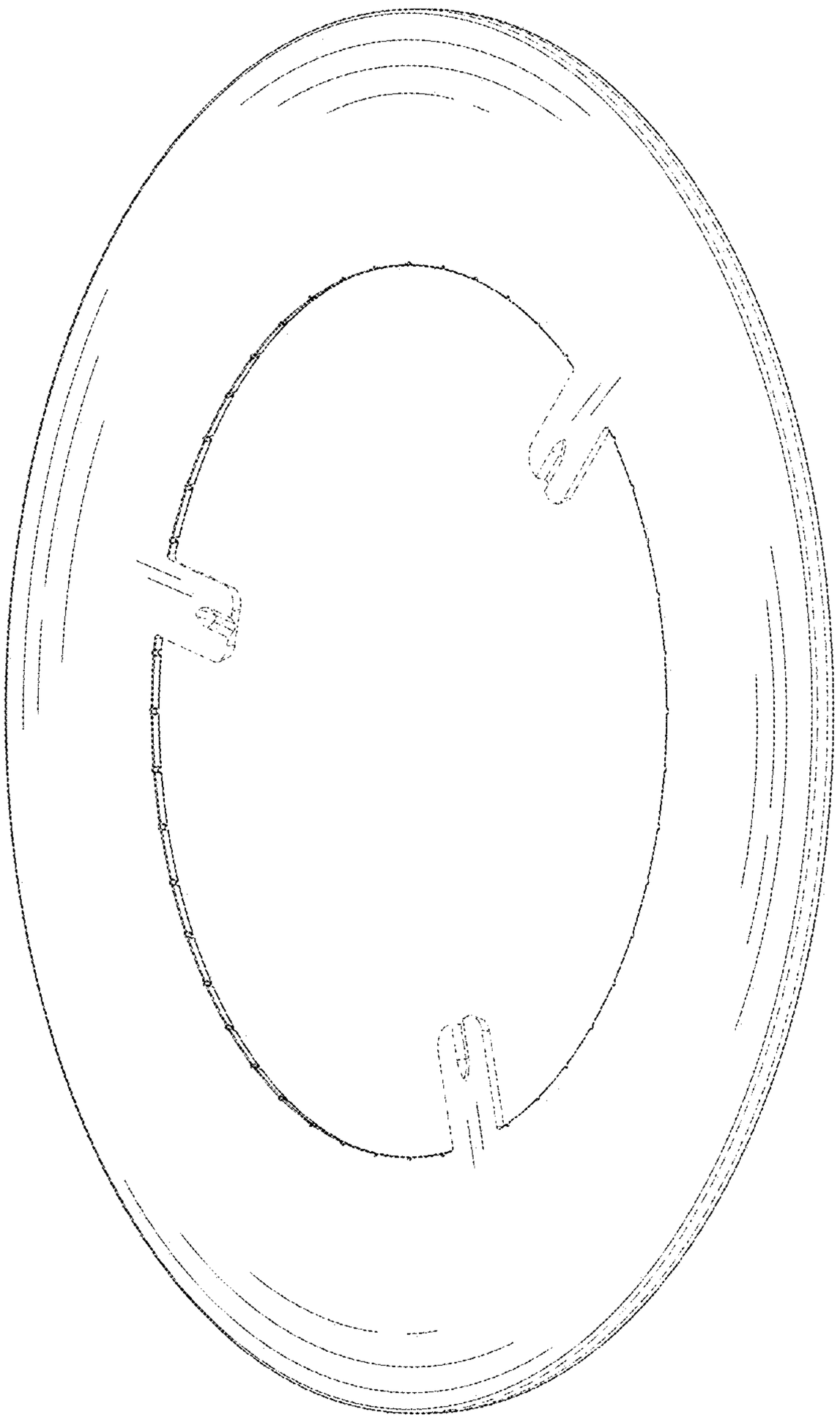


FIG. 2

FIG. 3

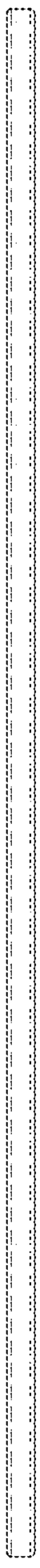


FIG. 4