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(54) **SPUTTER TARGET FOR A PHYSICAL VAPOR DEPOSITION CHAMBER**

(56) **References Cited**

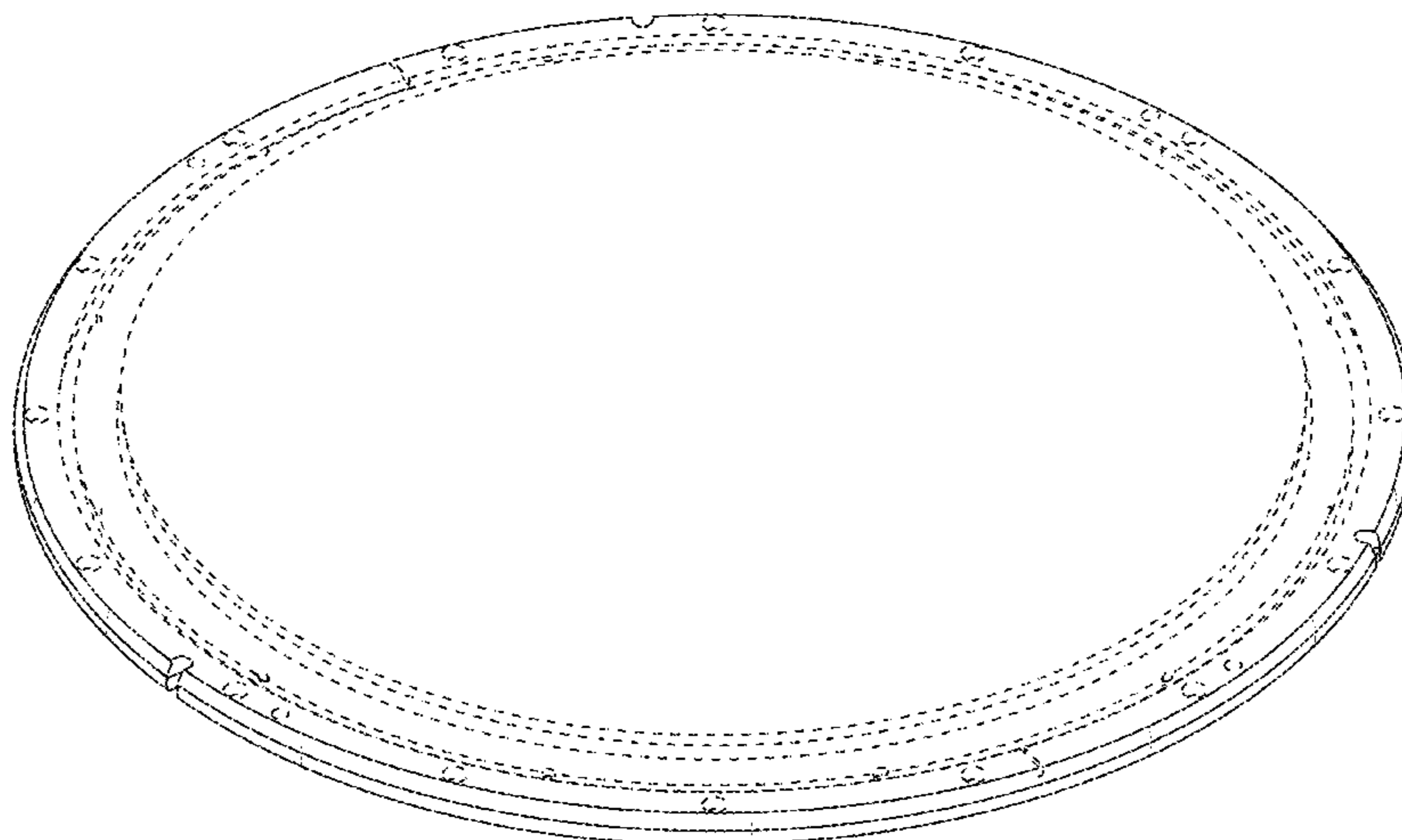
U.S. PATENT DOCUMENTS

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5,320,728 A	6/1994	Tepman	
D351,450 S	10/1994	Maryska	
D363,464 S	10/1995	Fukasawa et al.	
D376,744 S	12/1996	Eisenblatter	
D381,030 S *	7/1997	Tepman	D15/144
D395,483 S *	6/1998	Maryska	D22/100
D423,026 S	4/2000	Shimazu	
D425,919 S *	5/2000	Burkhart	D15/140
6,086,725 A	7/2000	Abhuri et al.	
6,114,216 A	9/2000	Yieh et al.	
D446,231 S	8/2001	Kuraoka et al.	
6,390,905 B1	5/2002	Korovin et al.	
6,659,850 B2	12/2003	Korovin et al.	
D487,254 S	3/2004	Suenaga	
D496,951 S	10/2004	Brasseur et al.	
6,815,352 B1	11/2004	Tamura et al.	
D503,729 S	4/2005	Leeuw et al.	
D553,104 S	10/2007	Oohashi et al.	
D557,226 S	12/2007	Uchino	
D559,066 S	1/2008	Tano et al.	
D559,993 S	1/2008	Nagakubo et al.	
D559,994 S	1/2008	Nagakubo et al.	
D562,856 S	2/2008	Hawley et al.	
D570,310 S	6/2008	Sasaki et al.	
D571,383 S	6/2008	Ota et al.	
D571,831 S	6/2008	Ota et al.	
D571,833 S	6/2008	Ota et al.	
D572,733 S	7/2008	Ota et al.	
7,402,098 B2	7/2008	Severson et al.	
D582,949 S	12/2008	Yamashita	
D584,591 S	1/2009	Tano et al.	
D592,029 S	5/2009	Tano et al.	
D592,030 S	5/2009	Tano et al.	
D600,660 S	9/2009	Sato	
D600,989 S	9/2009	Tano et al.	
D614,593 S	4/2010	Lee et al.	
D616,389 S	5/2010	Takahashi	
D616,390 S	5/2010	Sato	
D633,452 S	3/2011	Namiki et al.	
D649,126 S	11/2011	Takahashi	
D669,509 S	10/2012	Krink et al.	
8,371,904 B2	2/2013	Jindal et al.	
D678,745 S	3/2013	Nguyen	
8,398,833 B2	3/2013	Lee et al.	
D683,806 S	6/2013	Dueck	
D687,790 S	8/2013	Krishnan et al.	
D687,791 S	8/2013	Krishnan et al.	
D691,974 S	10/2013	Osada	
D694,790 S	12/2013	Matsumoto et al.	

Related U.S. Application Data

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- (52) **U.S. Cl.**
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- (58) **Field of Classification Search**
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See application file for complete search history.



D703,162 S 4/2014 Tamaso
D716,742 S 11/2014 Jang et al.
D724,553 S 3/2015 Choi et al.
D732,094 S 6/2015 Jussel et al.
D741,823 S 10/2015 Tateno et al.
D741,921 S 10/2015 Jarvius et al.
D750,728 S 3/2016 Kremer
D754,468 S * 4/2016 Nason D7/368
D767,234 S 9/2016 Kirkland et al.
D769,200 S 10/2016 Fukushima et al.
9,475,996 B2 10/2016 Mandle
D770,992 S 11/2016 Tauchi et al.
D790,039 S 6/2017 Hawrylchak et al.
D790,041 S * 6/2017 Jang D23/259
D793,572 S 8/2017 Kozuka et al.
D794,753 S 8/2017 Miller
D795,208 S 8/2017 Sasaki et al.
D796,458 S 9/2017 Jang et al.
D797,067 S 9/2017 Zhang et al.
D797,691 S 9/2017 Joubert et al.
D798,248 S 9/2017 Hanson et al.
D801,942 S 11/2017 Riker et al.
D804,230 S * 12/2017 Allan D6/716
D808,349 S 1/2018 Fukushima et al.
D810,705 S 2/2018 Krishnan et al.
D813,181 S * 3/2018 Okajima D13/182
D819,580 S * 6/2018 Krishnan D13/182
D825,504 S 8/2018 Zhang et al.
D825,505 S 8/2018 Hanson et al.
D830,435 S 10/2018 Wakisaka et al.
D830,981 S * 10/2018 Jeong D13/182
D836,572 S 12/2018 Riker et al.
D837,755 S 1/2019 Riker et al.
D839,224 S 1/2019 Yamaki et al.
D846,514 S 4/2019 Yoshida et al.
D851,613 S 6/2019 Johanson et al.
10,442,056 B2 10/2019 Namiki et al.
D868,124 S * 11/2019 Riker D15/144
D869,409 S * 12/2019 Riker D13/182
D877,101 S 3/2020 Johanson et al.
10,662,520 B2 5/2020 West
D888,903 S 6/2020 Gunther et al.
D891,382 S 7/2020 Koppa et al.
D893,441 S 8/2020 Rao et al.
D894,137 S * 8/2020 Johanson D13/184
10,811,232 B2 10/2020 Srikantaiah et al.
D902,165 S * 11/2020 Johanson D13/182
D908,645 S * 1/2021 Savandaiah D13/182
D913,979 S * 3/2021 Babu D13/182
D913,980 S * 3/2021 Lee D13/182
D933,725 S * 10/2021 Koppa D15/138
D933,726 S * 10/2021 Savandaiah D15/138
D937,329 S * 11/2021 Riker D15/138
D940,765 S * 1/2022 Gunther D15/138
D941,371 S * 1/2022 Lavitsky D15/138
D946,638 S * 3/2022 Riker D15/138
2004/0149567 A1 8/2004 Kosyachkov
2005/0152089 A1 7/2005 Matsuda et al.
2005/0193952 A1 9/2005 Goodman et al.
2007/0076345 A1 4/2007 Bang
2008/0173541 A1 7/2008 Lee et al.
2008/0308416 A1 12/2008 Allen et al.
2009/0260982 A1 10/2009 Riker et al.
2010/0096261 A1 4/2010 Hoffman et al.
2010/0108500 A1 5/2010 Hawrylchak et al.
2010/0170786 A1 7/2010 Wang et al.
2012/0033340 A1 2/2012 Roy et al.
2012/0263569 A1 * 10/2012 Priddy C30B 23/02
414/800
2013/0316628 A1 11/2013 Jang et al.
2014/0261180 A1 9/2014 Yoshidome et al.
2015/0170888 A1 6/2015 Riker et al.
2015/0357169 A1 * 12/2015 Yuan B23K 35/24
204/298.13

2016/0002776 A1 1/2016 Nal et al.
2016/0002788 A1 1/2016 Nal et al.
2016/0035547 A1 2/2016 Johanson et al.
2017/0009367 A1 * 1/2017 Harris C25D 17/06

FOREIGN PATENT DOCUMENTS

CN 206573738 U 10/2017
JP D1420846 8/2011
JP D1421157 8/2011
JP D1422692 9/2014
TW 223429 5/1994
TW 223430 5/1994
TW D146490 4/2012
TW D 197321 5/2019
TW D 197827 6/2019
TW D 202101 1/2020

OTHER PUBLICATIONS

Search Report for Taiwan Design Application No. 106301373 dated Jun. 20, 2017.
Search Report for Taiwan Design Application No. 107305358 dated Feb. 21, 2019.
Search Report for Taiwan Design Application No. 1077303086 dated Jul. 6, 2018.
Sputtering Targets, posted at Angstrom Sciences, posting date May 5, 2016. Site visited Apr. 1, 2019. URL: <<https://web.archive.org/web/20160505015447/https://www.angstromsciences.com/sputtering-targets>> (Year: 2016).
Sputtering Targets for LSis, posted at JX Nippon Mining & Metals, posting date Mar. 22, 2016. Site visited Apr. 1, 2019. URL: <[https://web.archive.org/web/20160322055046/http://www.nmm.jx-group.co.jp/english/products/04 supa/target adv.html](https://web.archive.org/web/20160322055046/http://www.nmm.jx-group.co.jp/english/products/04%20supa/target%20adv.html)> (Year: 2016).
Search Report for Taiwan Design Application No. 110302622 dated May 21, 2021.

* cited by examiner

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(57) CLAIM

We claim the ornamental design for a sputter target for a physical vapor deposition chamber, as shown and described.

DESCRIPTION

FIG. 1 is a top isometric view of a sputter target for a physical vapor deposition chamber, according to our novel design.
FIG. 2 is a top plan view thereof.
FIG. 3 is a bottom plan view thereof.
FIG. 4 is a right elevation view thereof.
FIG. 5 is a left elevation view thereof.
FIG. 6 is a front elevation view thereof.
FIG. 7 is a back elevation view thereof; and,
FIG. 8 is an enlarged cross-sectional view taken along line 8-8 in FIG. 2.
The dashed lines in FIGS. 1-8 represent unclaimed environment and form no part of the claimed design.

1 Claim, 5 Drawing Sheets

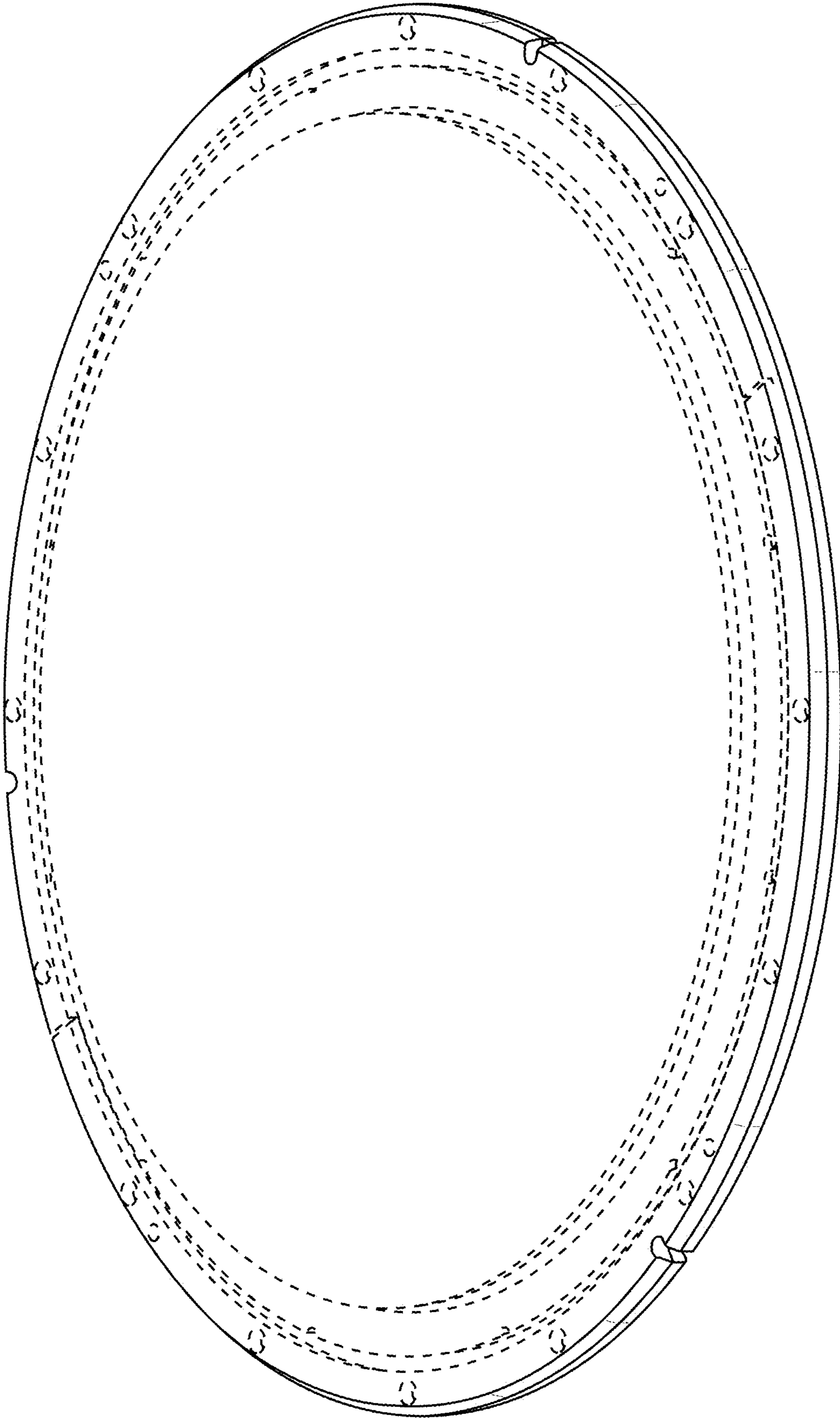


FIG. 1

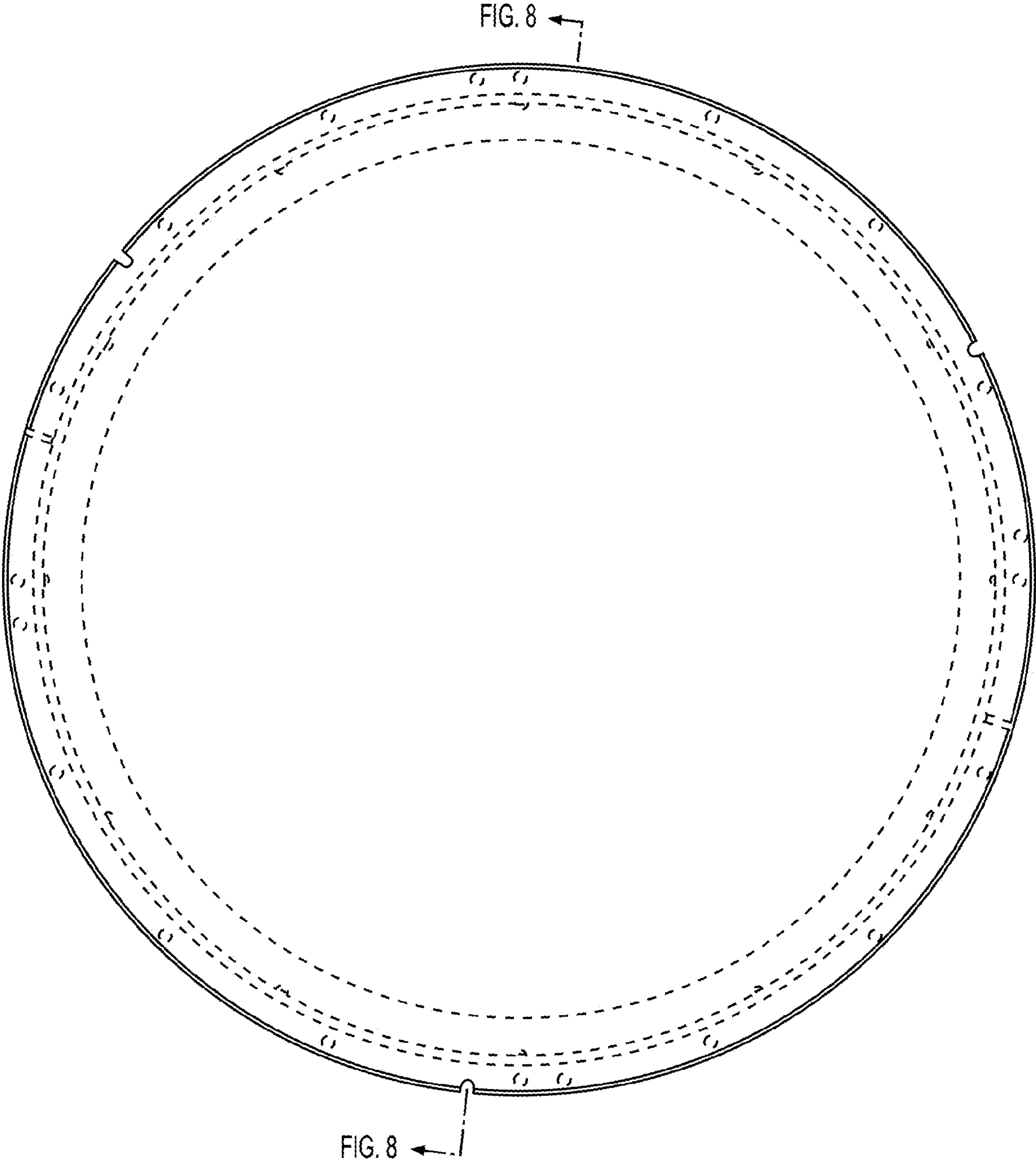


FIG. 2

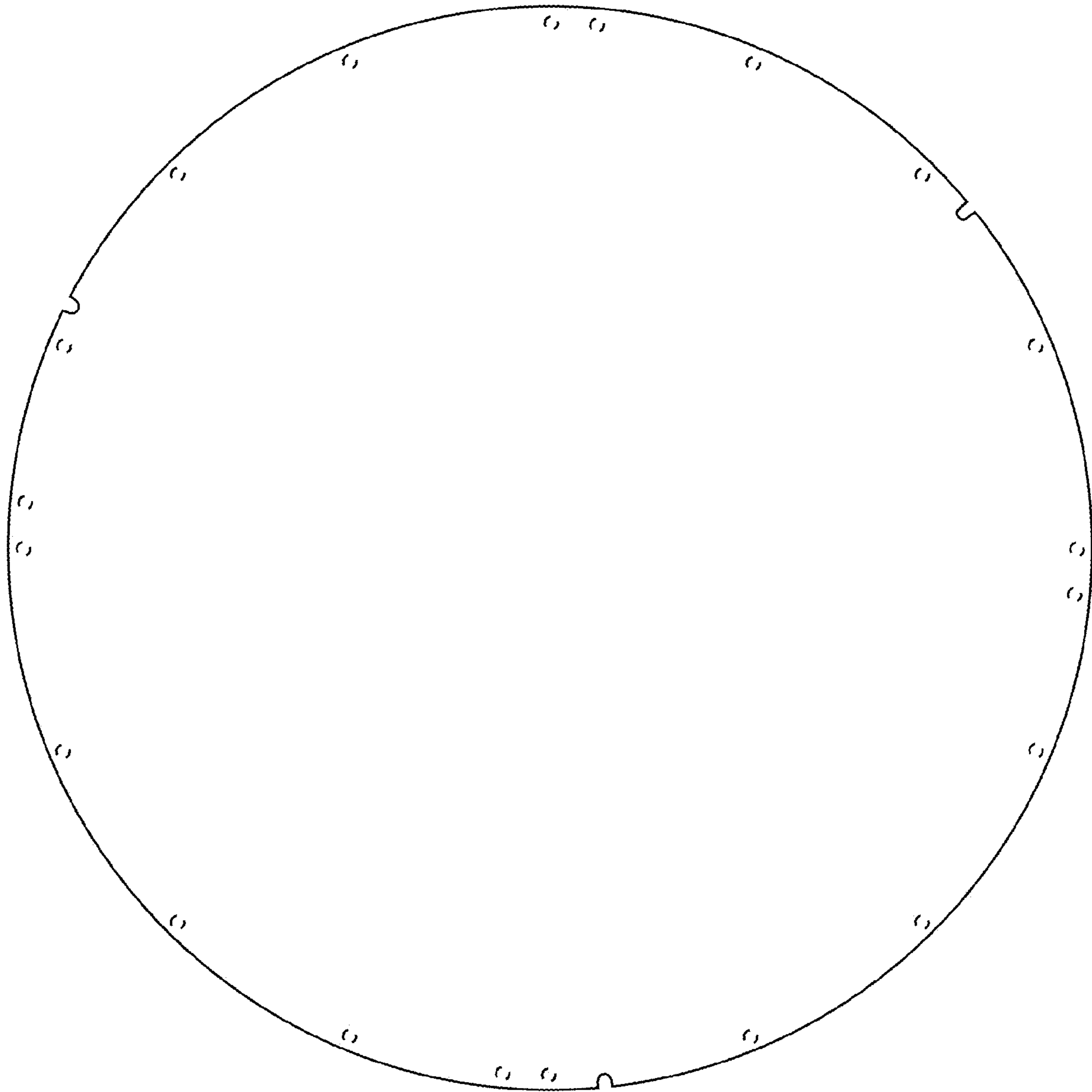


FIG. 3

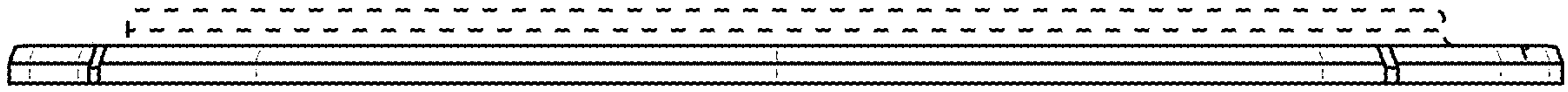


FIG. 4

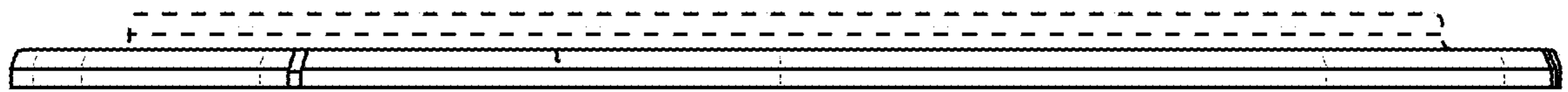


FIG. 5

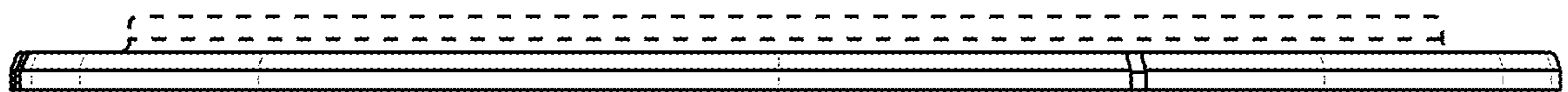


FIG. 6

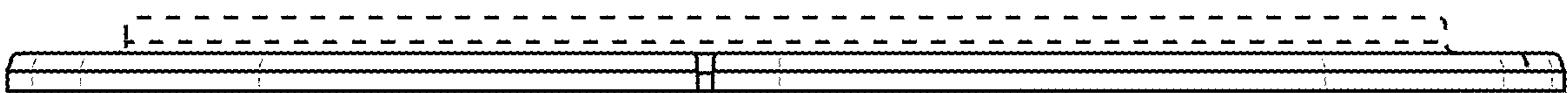


FIG. 7

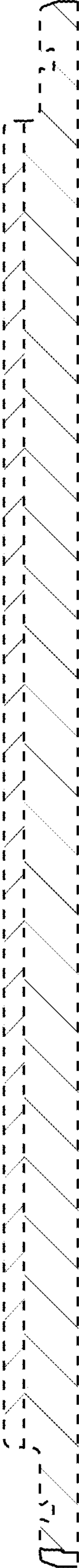


FIG. 8