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(12) **United States Design Patent**  
**Riker et al.**

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(45) **Date of Patent:** **\*\* Sep. 3, 2019**

(54) **COLLIMATOR FOR A PHYSICAL VAPOR DEPOSITION CHAMBER**

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

(21) Appl. No.: **29/640,787**

(22) Filed: **Mar. 16, 2018**

(51) **LOC (12) Cl.** ..... **13-03**

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

(58) **Field of Classification Search**  
USPC ..... D13/182; D15/144, 144.1, 138; D7/667;  
204/298.11

(Continued)

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,401,675 A \* 3/1995 Lee ..... C23C 14/044  
257/E21.585  
5,624,536 A \* 4/1997 Wada ..... C23C 14/34  
204/192.12

(Continued)

**FOREIGN PATENT DOCUMENTS**

TW M267462 6/2005  
TW D117576 6/2007

(Continued)

**OTHER PUBLICATIONS**

U.S. Appl. No. 29/640,788, filed Mar. 16, 2018, Riker et al.

(57) **CLAIM**

The ornamental design for a collimator for a physical vapor deposition chamber, as shown and described.

**DESCRIPTION**

FIG. 1 is a top perspective view of a first embodiment of a collimator for a physical vapor deposition chamber, showing our new design;

FIG. 2 is a bottom perspective view thereof;

FIG. 3 is a top plan view thereof;

FIG. 4 is a bottom plan view thereof;

FIG. 5 is a right side elevation view thereof;

FIG. 6 is a left side elevation view thereof;

FIG. 7 is a front elevation view thereof;

FIG. 8 is a back elevation view thereof;

FIG. 9 is a cross sectional view taken along line 9-9 in FIG. 3;

FIG. 10 is a cross sectional view taken along line 10-10 in FIG. 3;

FIG. 11 is a top perspective view of a second embodiment of a collimator for a physical vapor deposition chamber, showing our new design;

FIG. 12 is a bottom perspective view thereof;

FIG. 13 is a top plan view thereof;

FIG. 14 is a bottom plan view thereof;

FIG. 15 is a right side elevation view thereof;

FIG. 16 is a left side elevation view thereof;

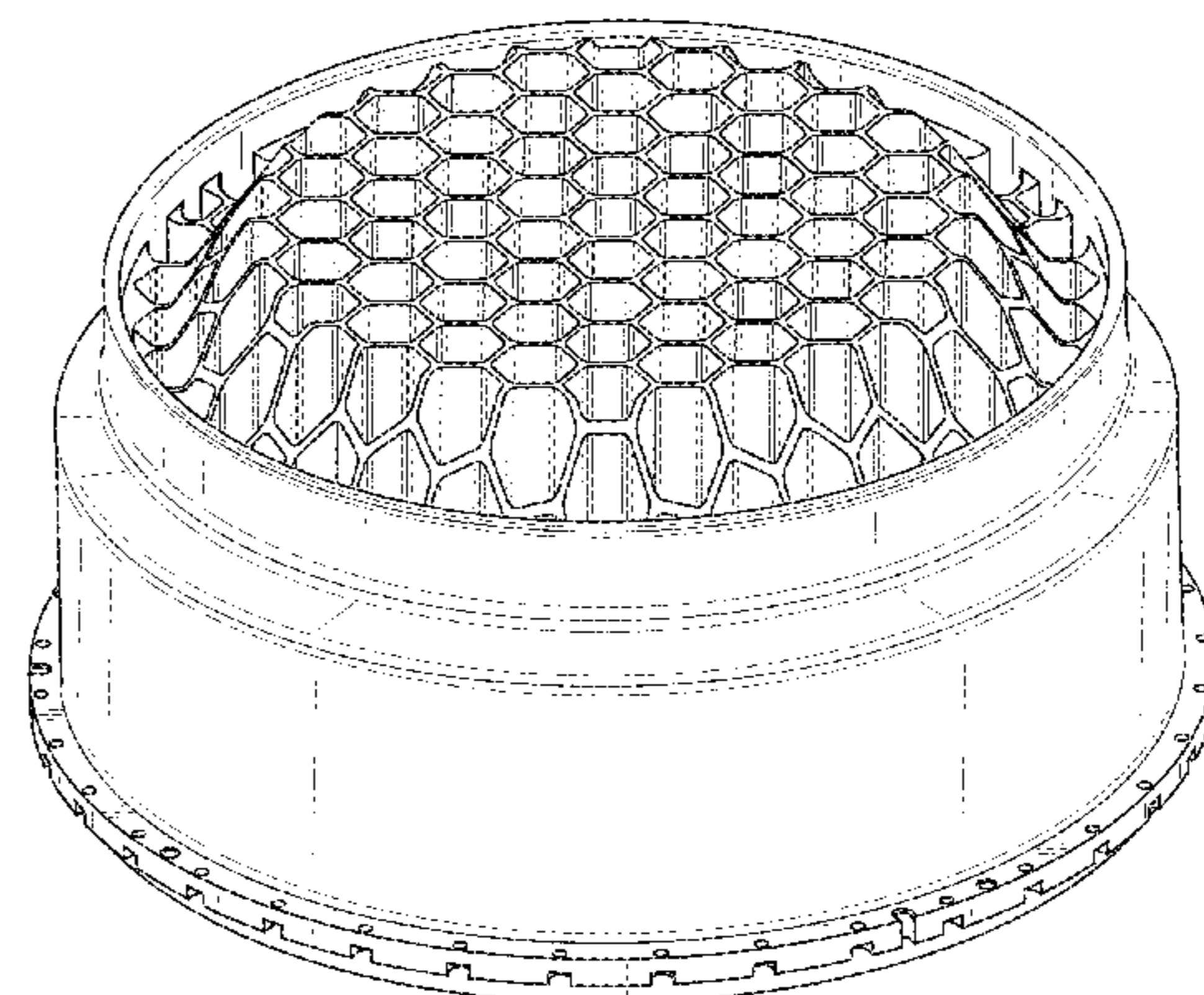
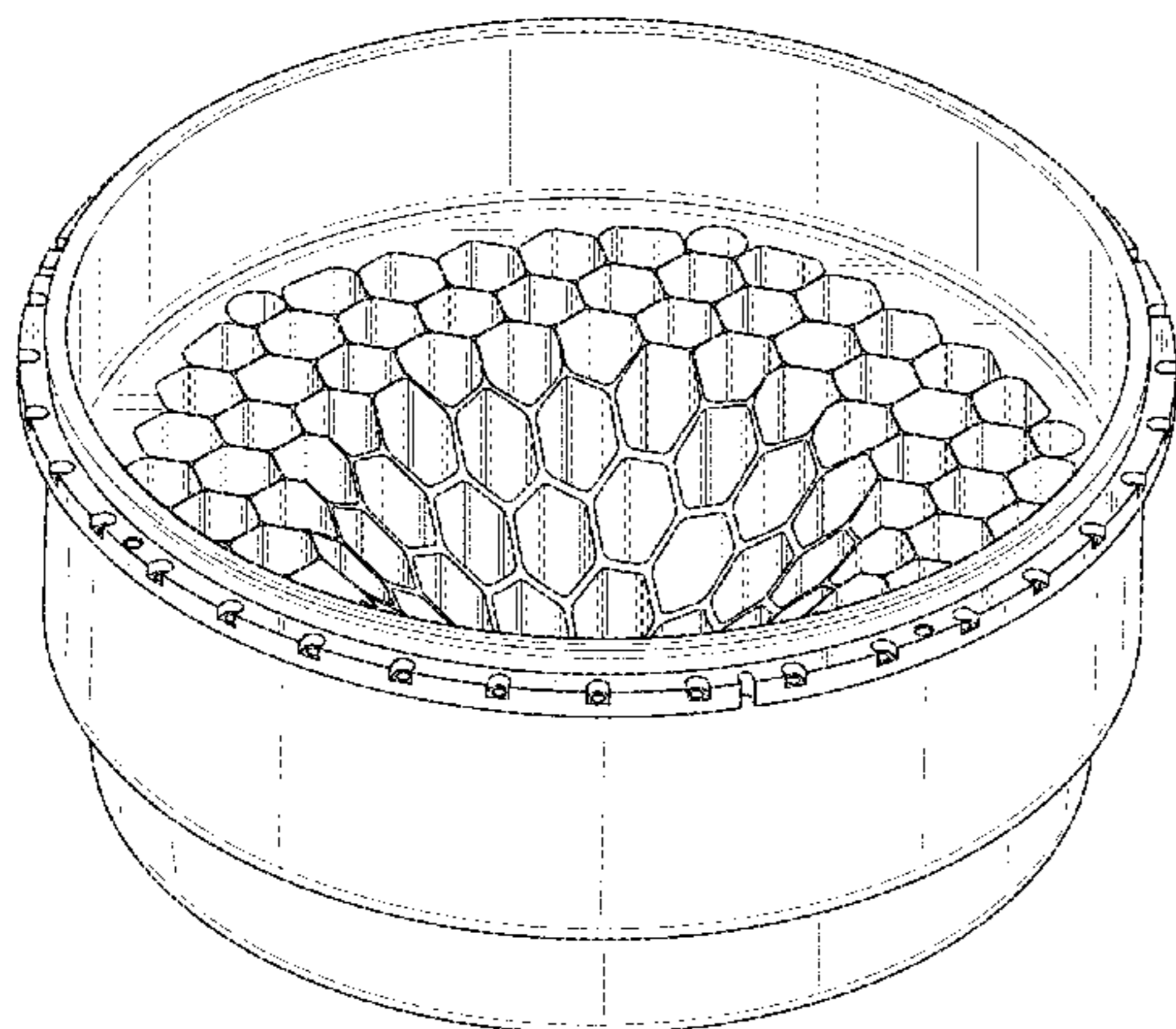
FIG. 17 is a front elevation view thereof;

FIG. 18 is a back elevation view thereof;

FIG. 19 is a cross sectional view taken along line 19-19 in FIG. 13; and,

FIG. 20 is a cross sectional view taken along line 20-20 in FIG. 13.

(Continued)



The dashed lines in the drawings represent unclaimed environment and form no part of the claimed design.

**1 Claim, 20 Drawing Sheets**

**(58) Field of Classification Search**

CPC .... H01J 37/3441; H01J 37/3447; H01J 37/34;  
 C23C 14/34; C23C 14/04; C23C 14/042;  
 C23C 14/044; C23C 14/046; C23C 14/35;  
 C23C 14/3471; C23C 14/22

See application file for complete search history.

**(56) References Cited**

U.S. PATENT DOCUMENTS

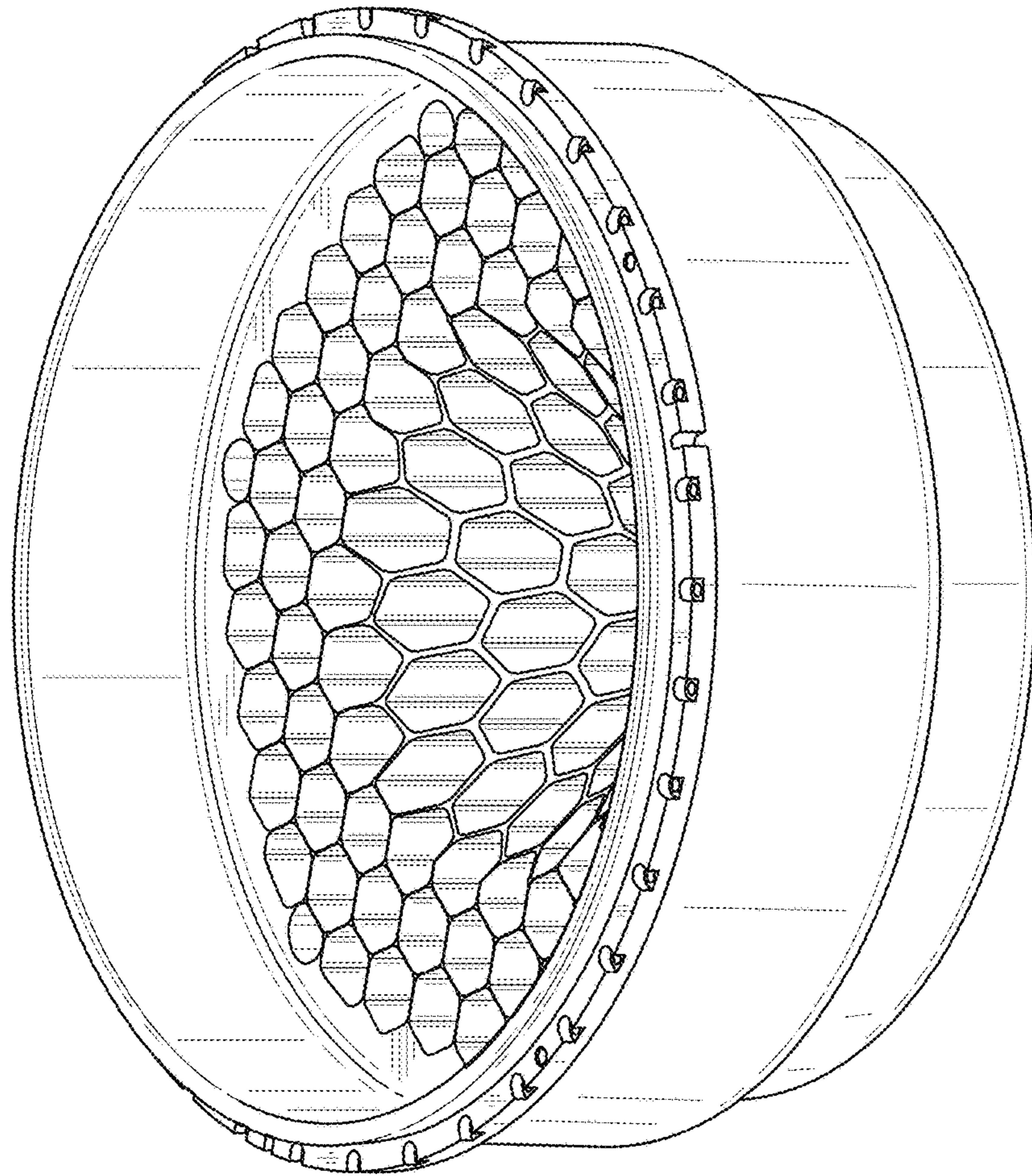
5,643,428	A *	7/1997	Krivokapic	.....	H01J 37/34
					204/192.12
5,702,573	A *	12/1997	Biberger	.....	C23C 14/355
					204/192.12
5,705,042	A *	1/1998	Leiphart	.....	C23C 14/046
					204/192.12
5,958,193	A *	9/1999	Brugge	.....	H01J 37/3447
					204/192.12
6,362,097	B1 *	3/2002	Demaray	.....	C23C 14/34
					257/E21.091
D598,717	S *	8/2009	Jalet	.....	D7/667
D660,645	S *	5/2012	Zandona	.....	D7/400
D722,298	S *	2/2015	Saito	.....	D13/182
D741,823	S *	10/2015	Tateno	.....	D13/182
D746,647	S *	1/2016	Roaks	.....	D7/667
D753,449	S *	4/2016	Liebowitz	.....	D7/667
D759,603	S *	6/2016	Saito	.....	D13/182
9,543,126	B2	1/2017	Riker		
9,892,890	B2 *	2/2018	Bluck	.....	H01J 37/32779
9,960,024	B2 *	5/2018	Riker	.....	H01J 37/3447
D821,039	S *	6/2018	Owens, III	.....	D30/129
D821,140	S *	6/2018	Mirchandani	.....	D7/409
2003/0015421	A1 *	1/2003	Cha	.....	H01J 37/3408
					204/298.19

2003/0029715	A1 *	2/2003	Yu	.....	C23C 14/566
					204/192.2
2004/0211665	A1 *	10/2004	Yoon	.....	H01L 21/28518
					204/298.01
2006/0249369	A1 *	11/2006	Marangon	.....	C23C 14/046
					204/192.1
2007/0228302	A1 *	10/2007	Norman, Jr.	.....	H01J 37/34
					250/505.1
2008/0121620	A1 *	5/2008	Guo	.....	C23C 14/3464
					216/67
2009/0308732	A1 *	12/2009	Cao	.....	C23C 14/046
					204/192.12
2009/0308739	A1 *	12/2009	Riker	.....	H01J 37/34
					204/298.11
2015/0114823	A1 *	4/2015	Lee	.....	C23C 14/3471
					204/192.12
2017/0117121	A1	4/2017	Riker et al.		

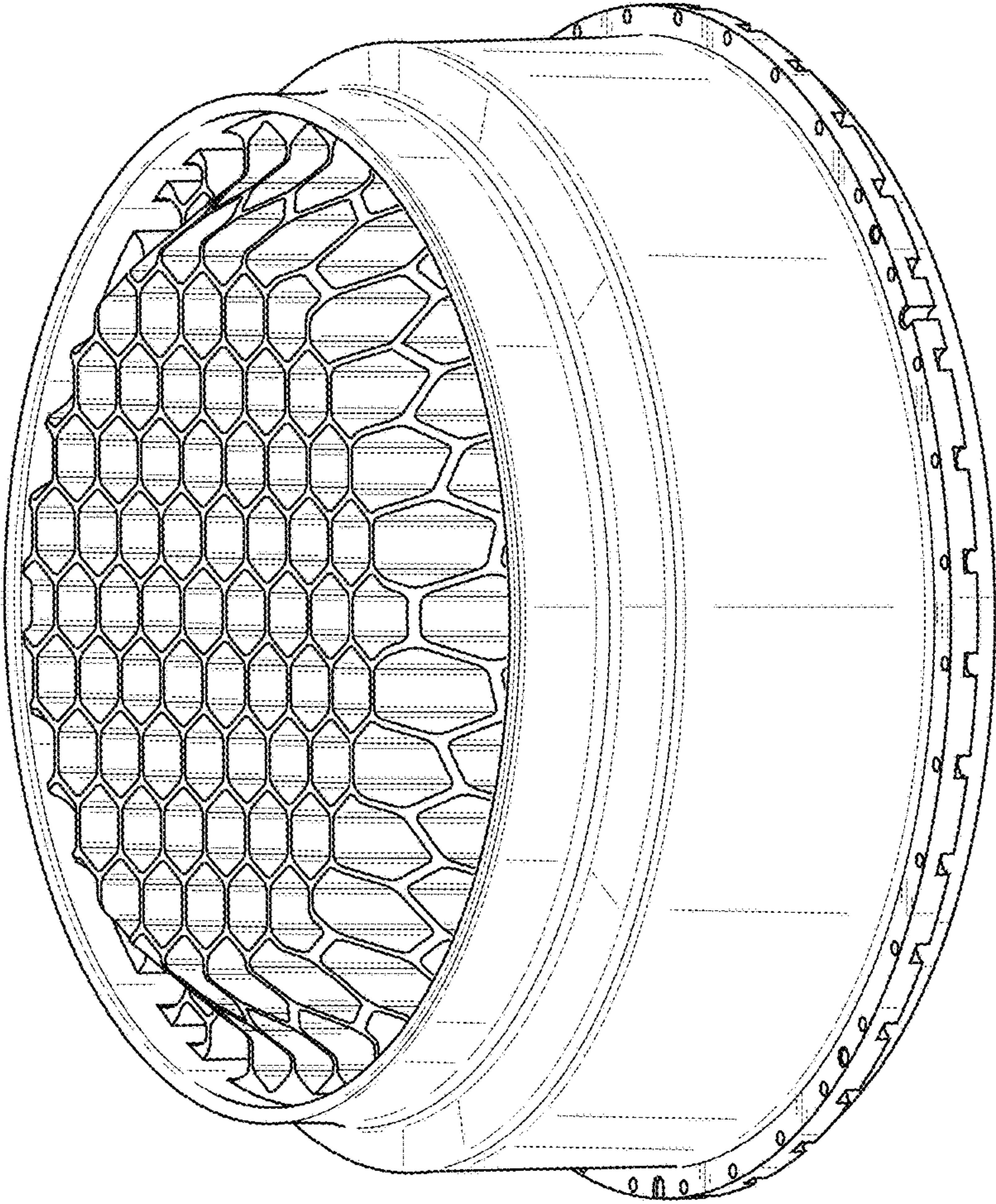
FOREIGN PATENT DOCUMENTS

TW	D122892	5/2008
TW	M346018	12/2008
TW	D129207	6/2009
TW	200938890	9/2009
TW	D137192	10/2010
TW	D153743	5/2013
TW	D159673	4/2014
TW	D159674	4/2014
TW	D159675	4/2014
TW	D159676	4/2014
TW	D166552	3/2015
TW	D169790	8/2015
TW	D174341	3/2016
TW	D174342	3/2016
TW	D175852	5/2016
TW	D175853	5/2016
TW	D175855	5/2016
TW	D176440	6/2016
TW	D178898	10/2016
TW	D180288	12/2016

\* cited by examiner



**FIG. 1**



**FIG. 2**

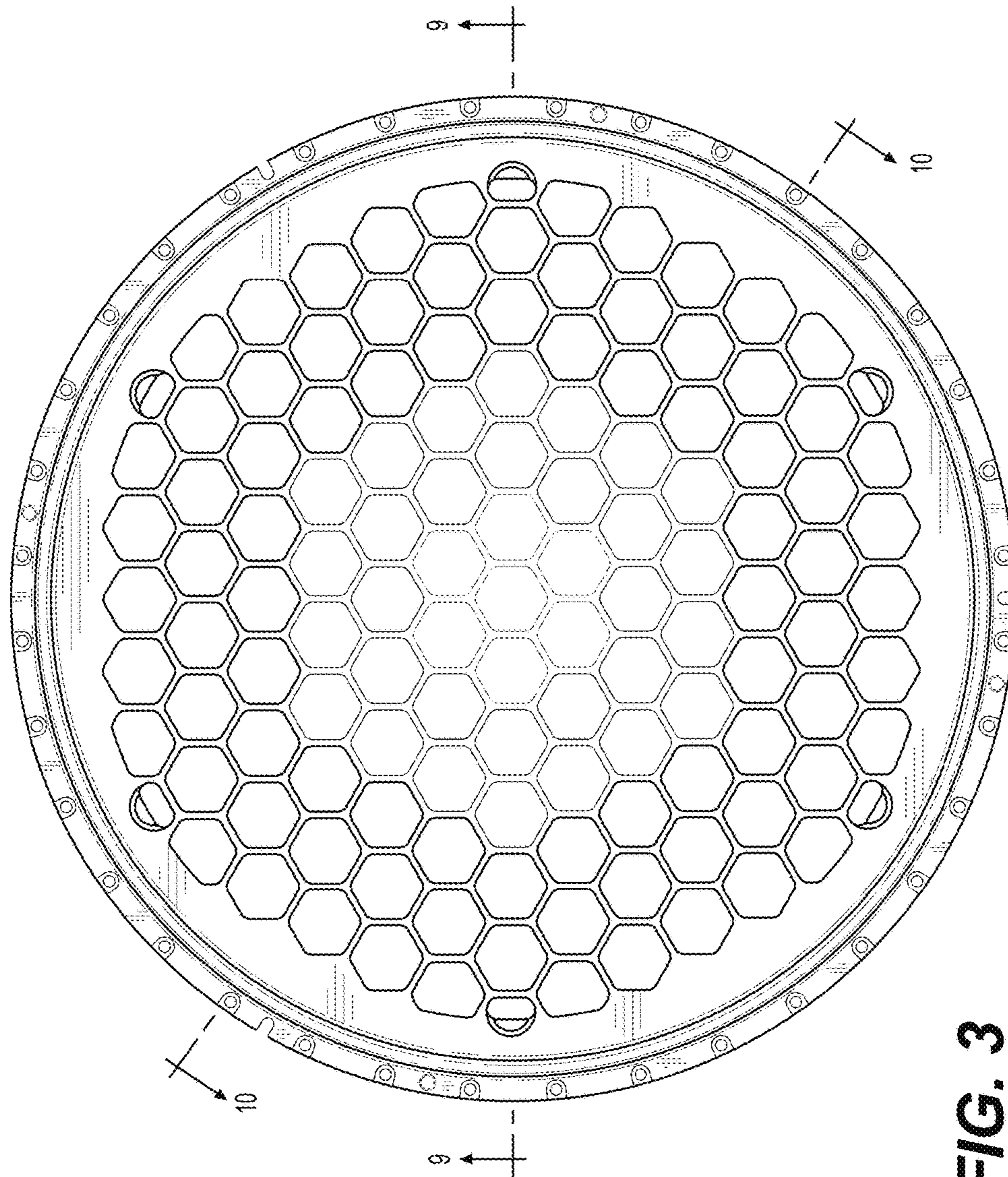
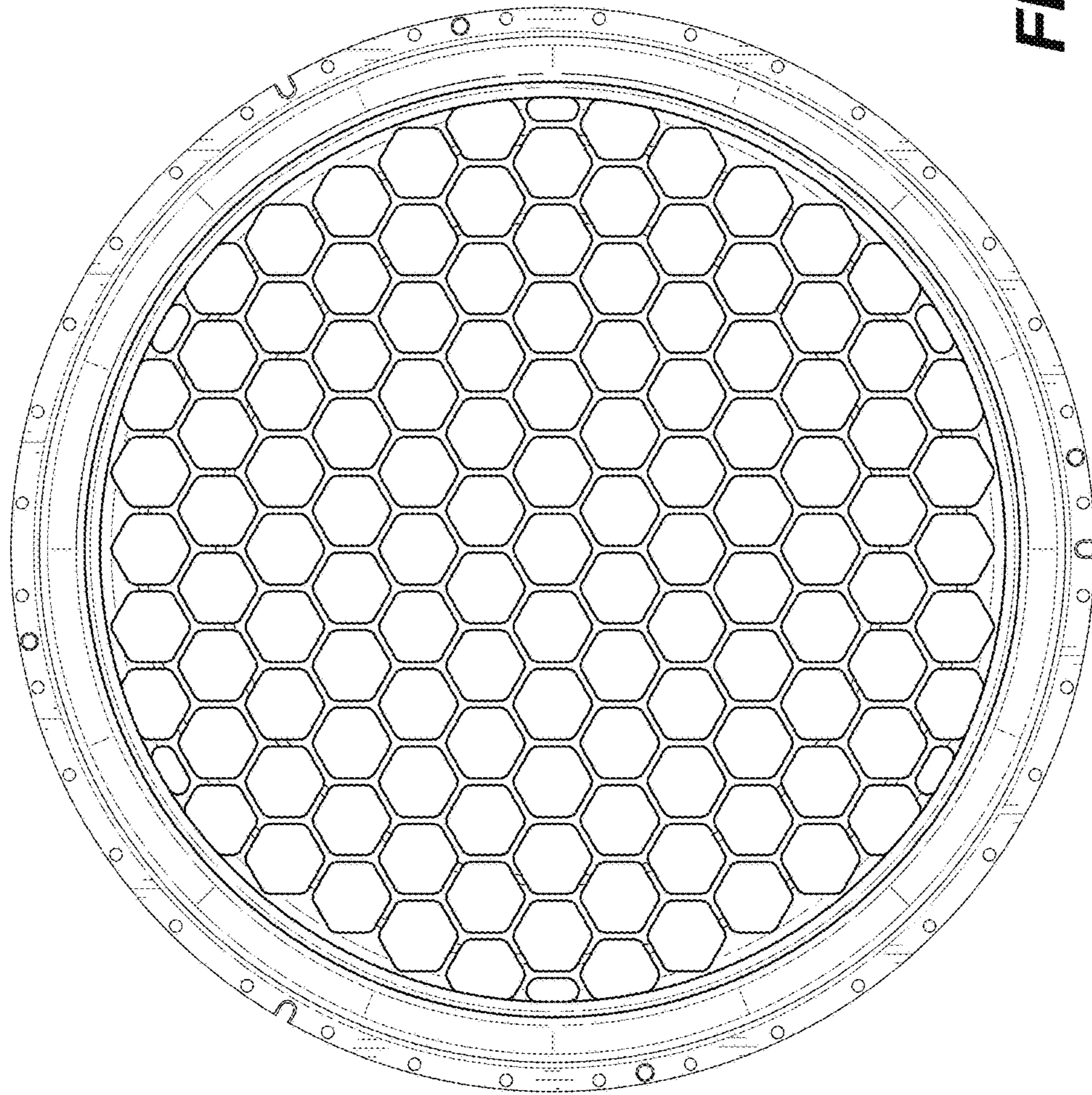
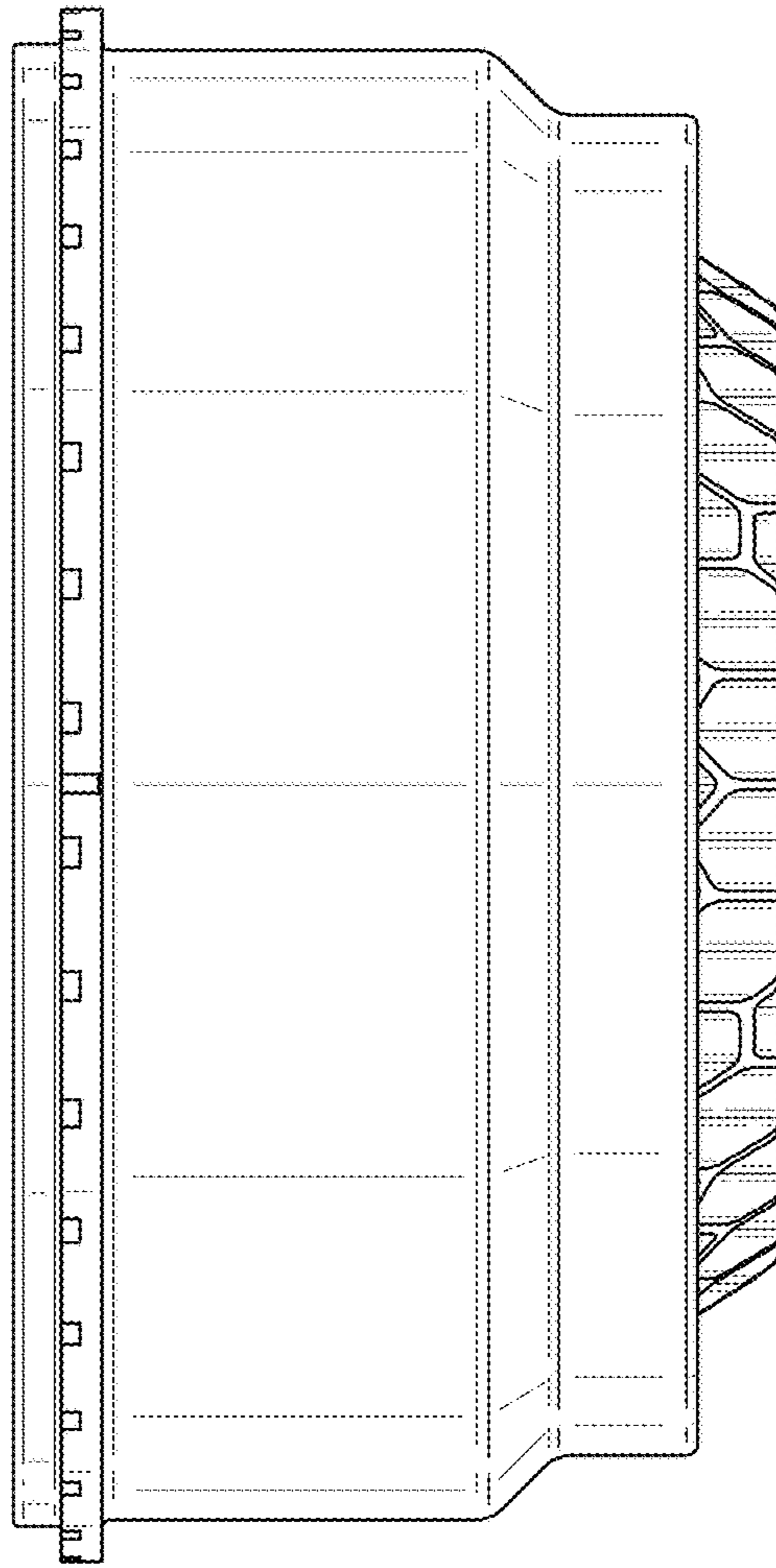


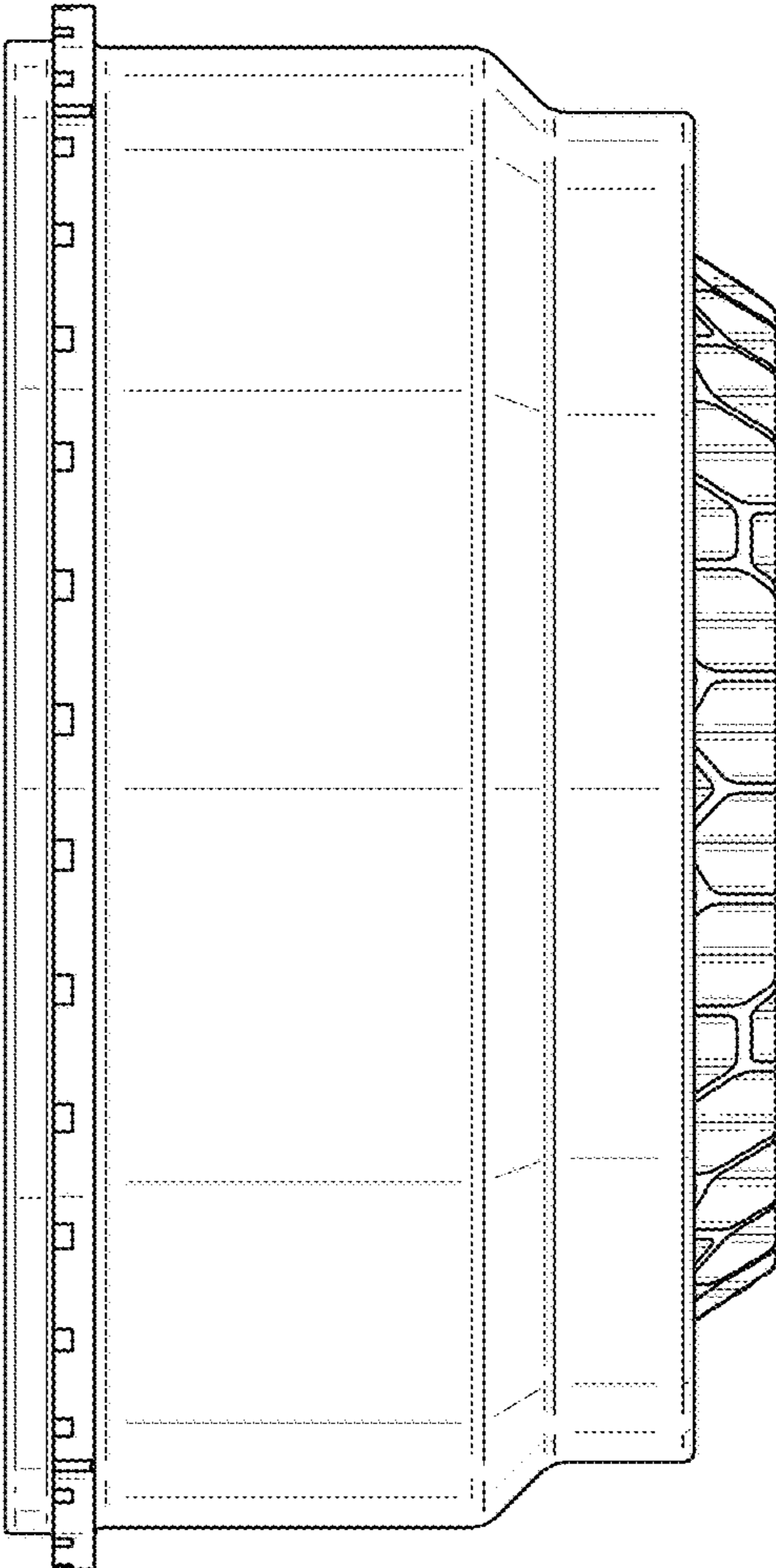
FIG. 3



**FIG. 4**



**FIG. 5**



**FIG. 6**



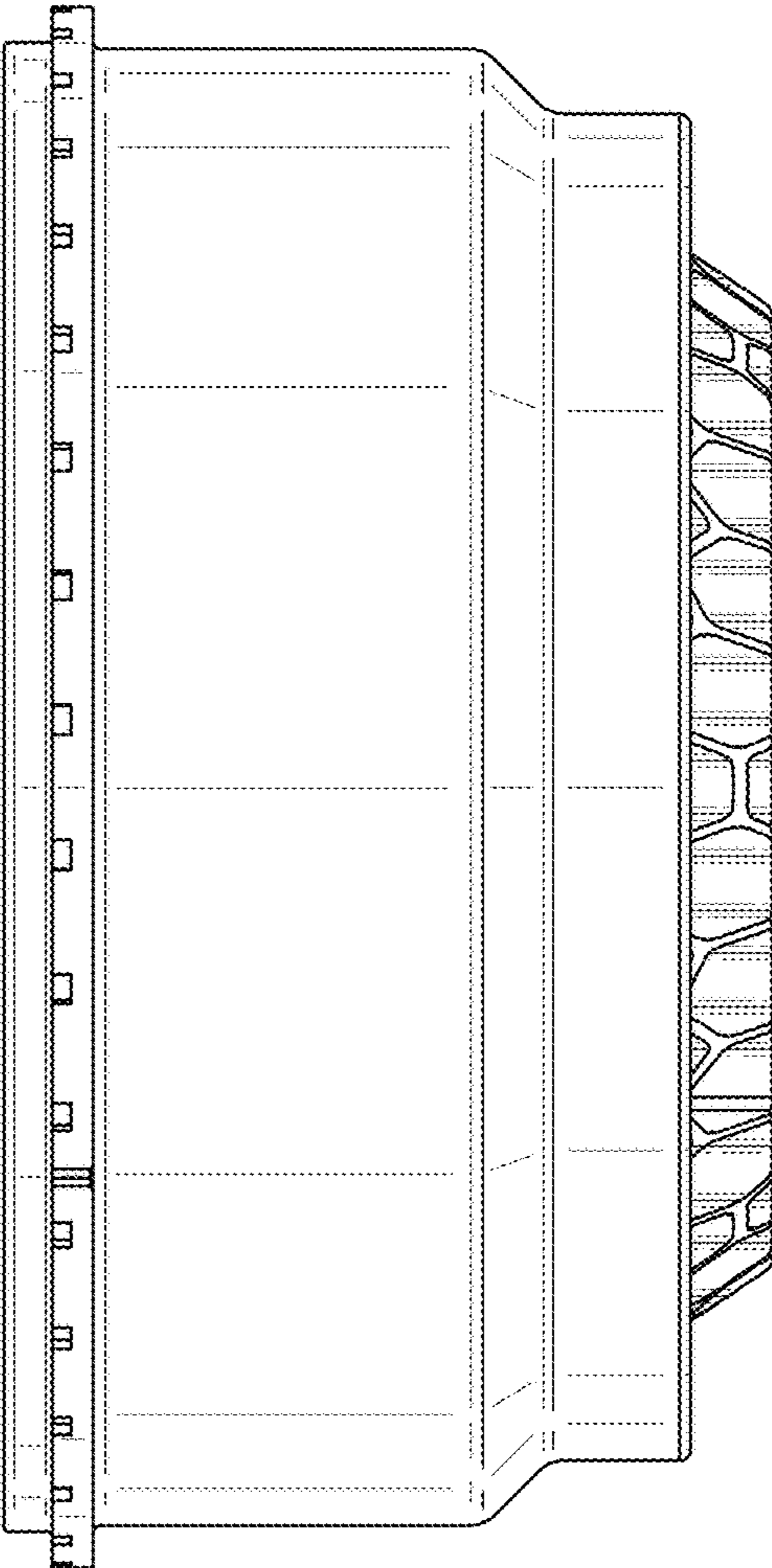


FIG. 7

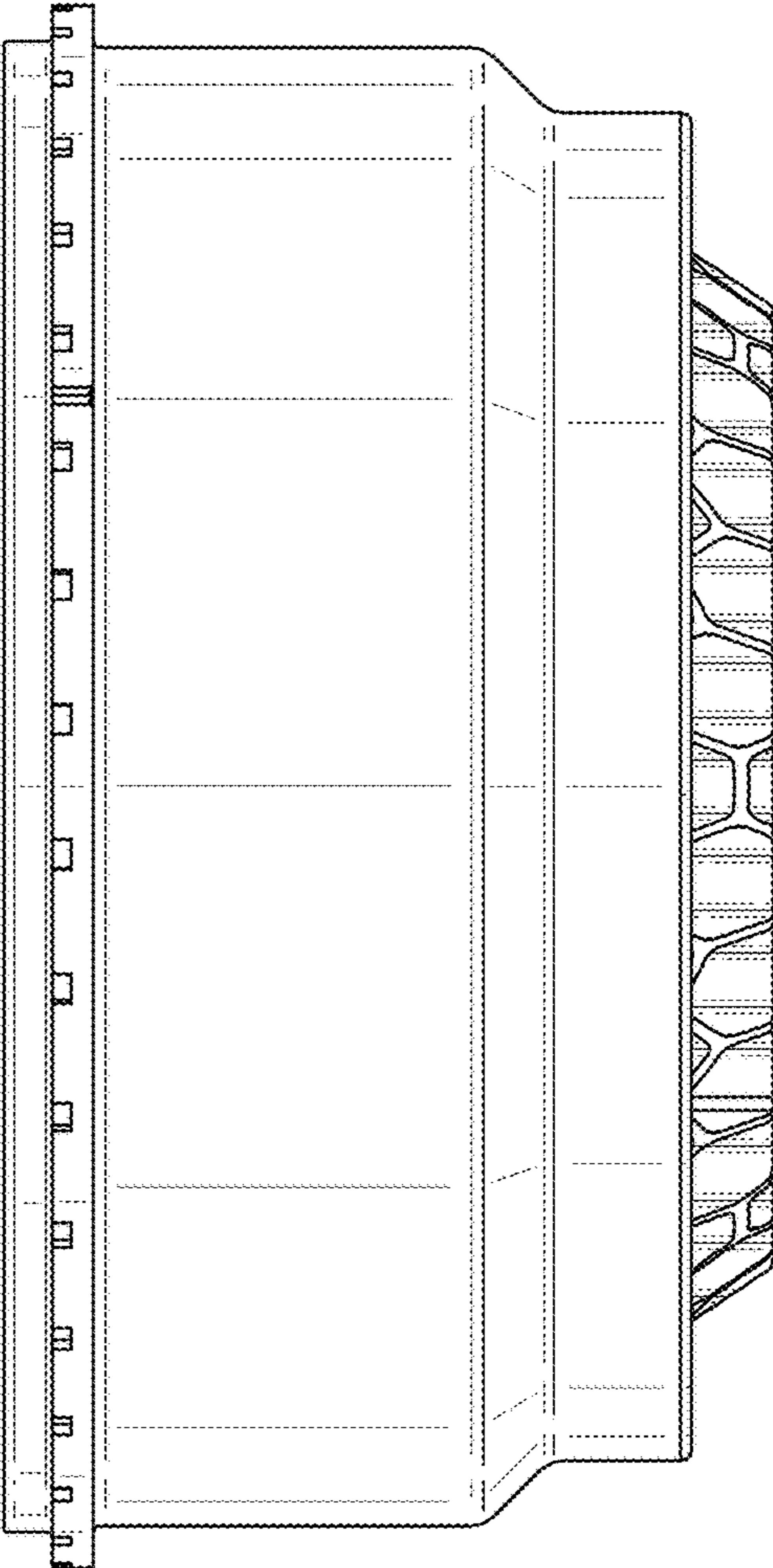


FIG. 8

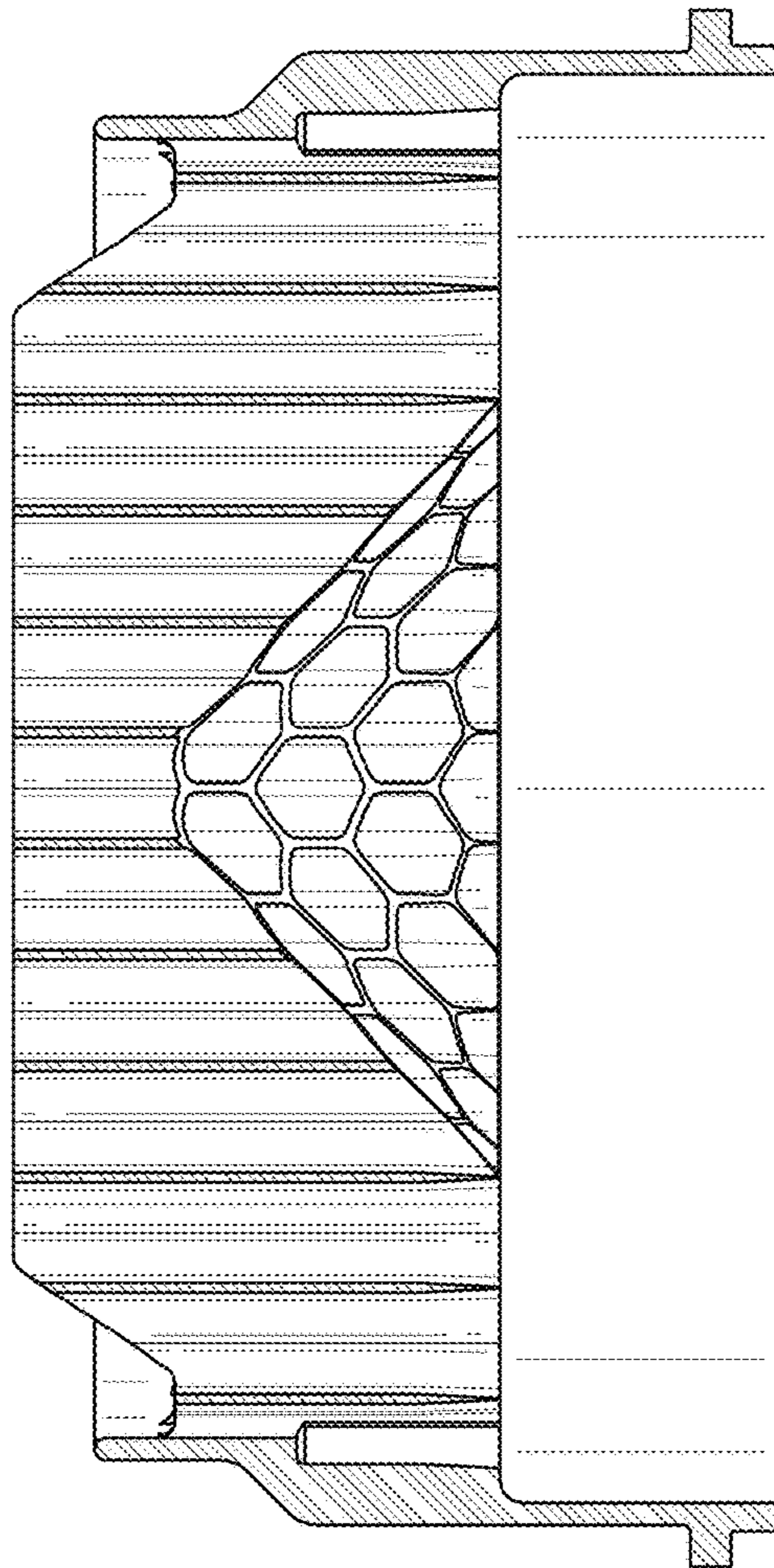
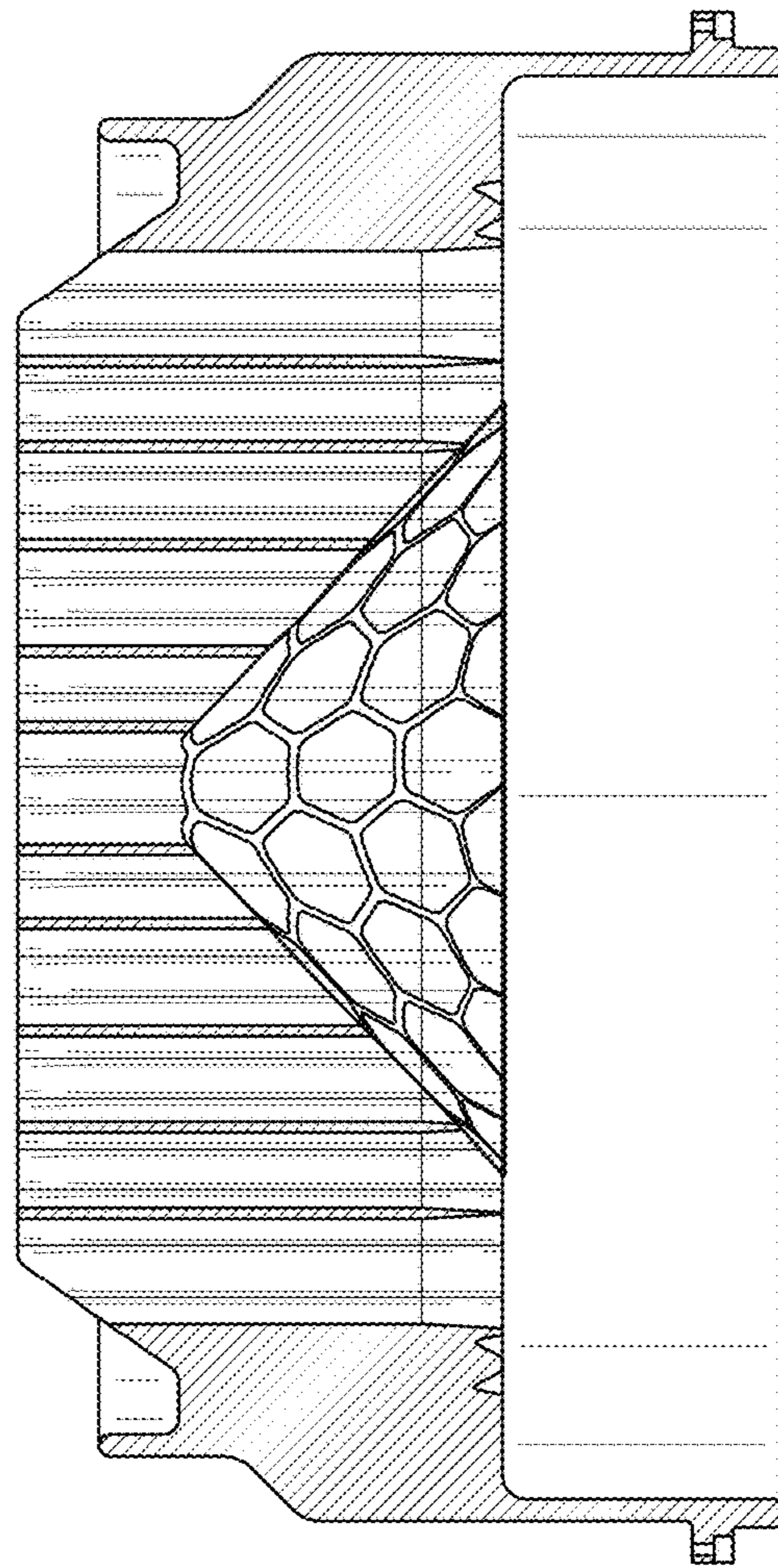
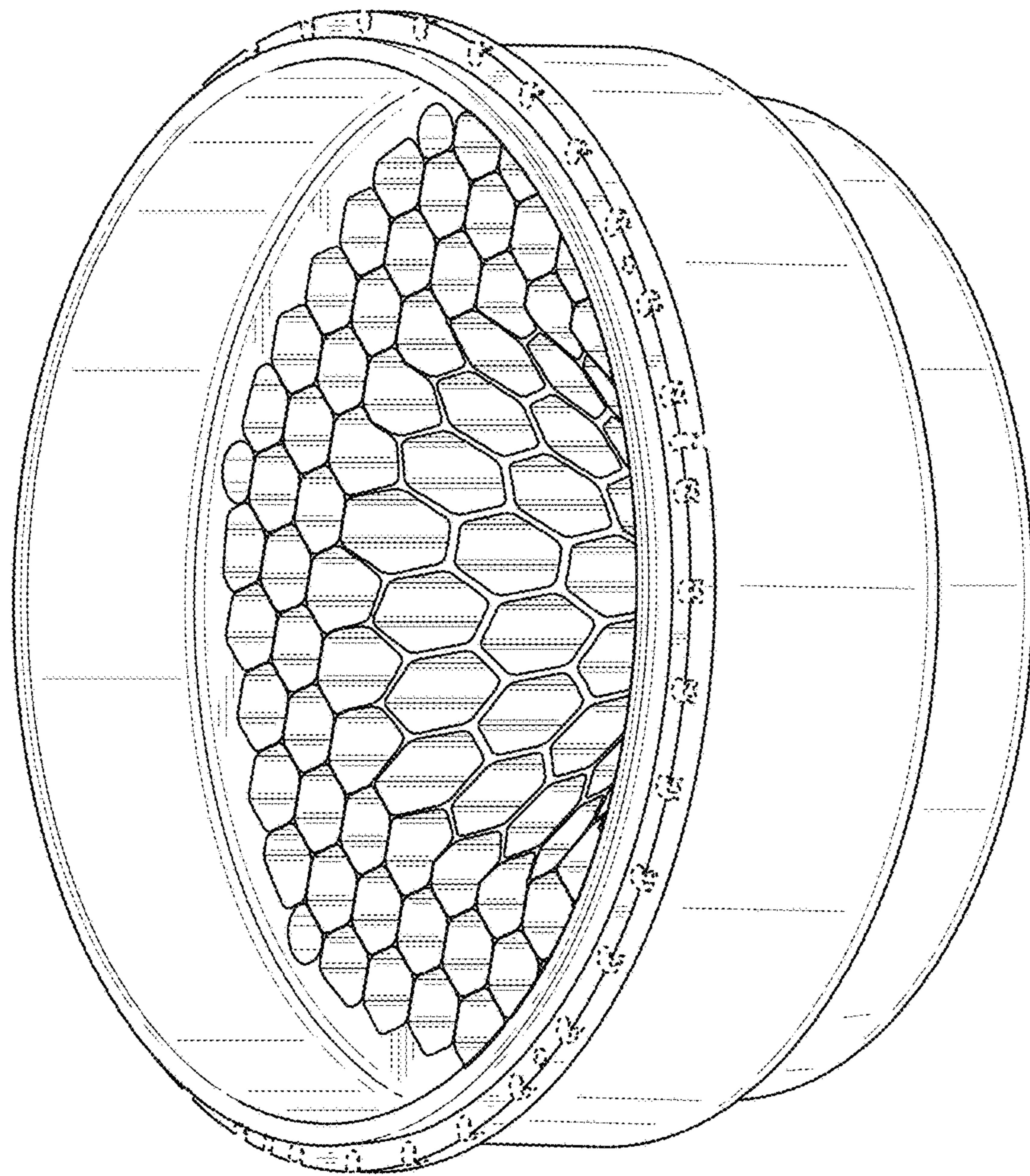


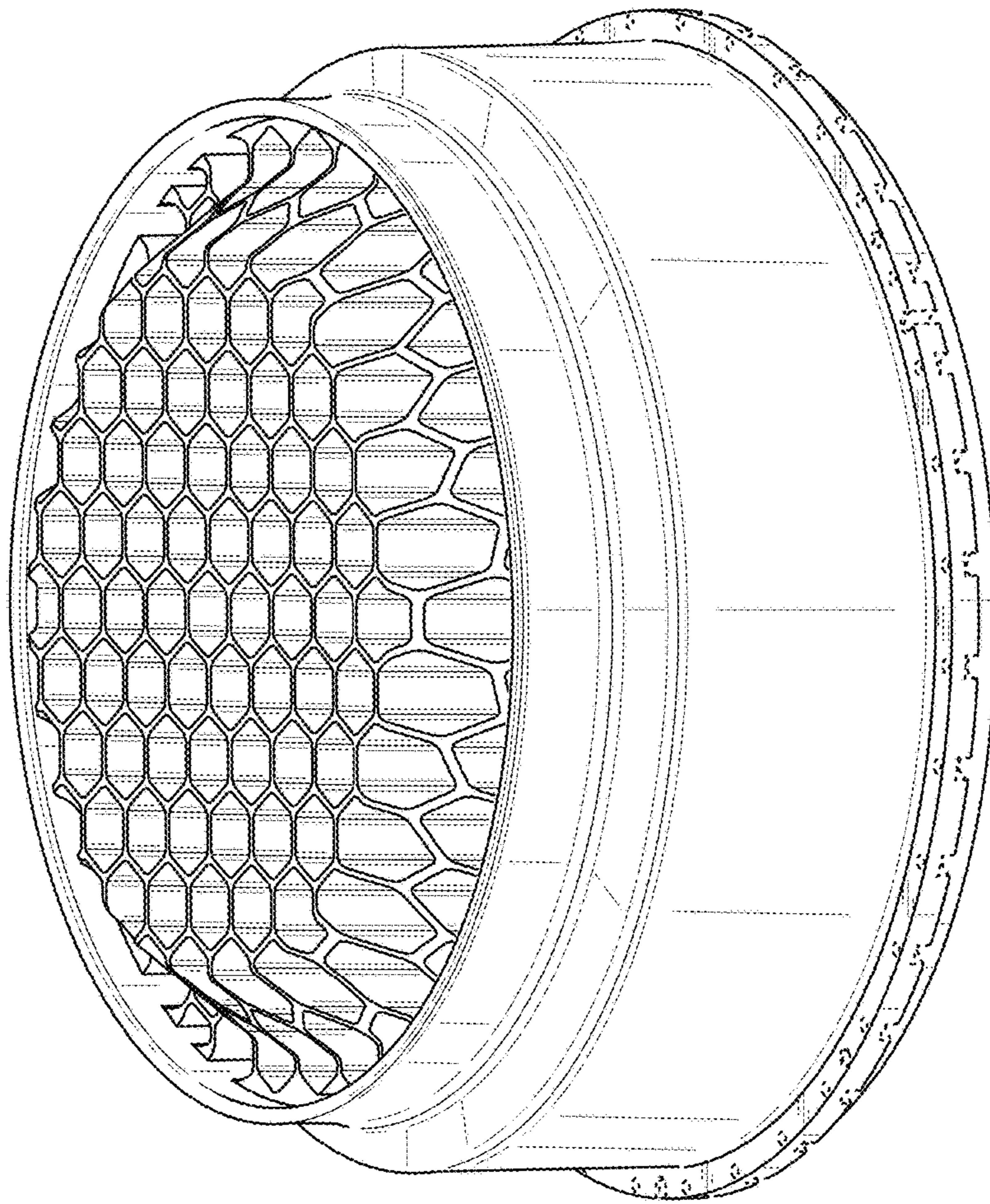
FIG. 9



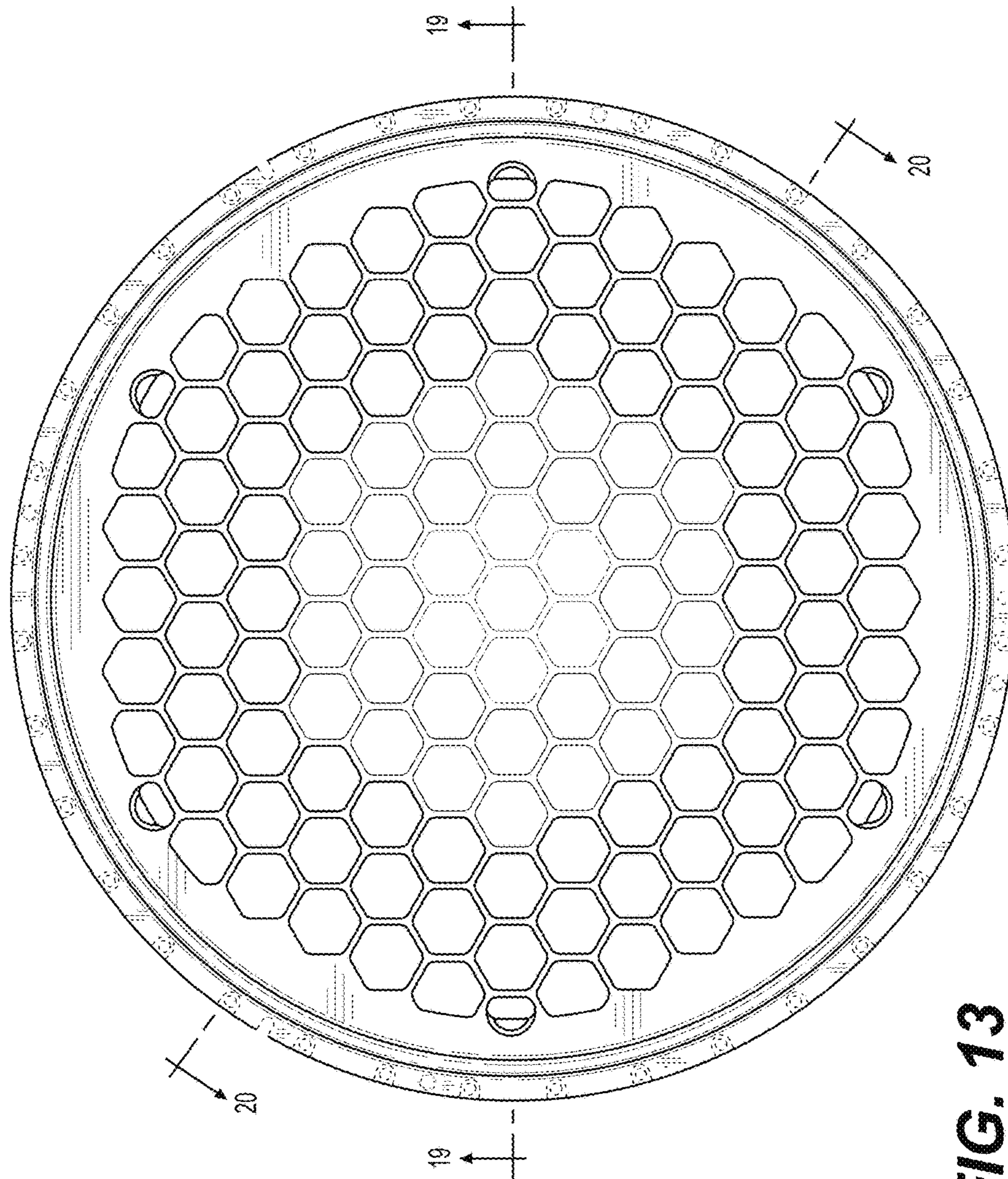
**FIG. 10**



**FIG. 11**



**FIG. 12**



**FIG. 13**

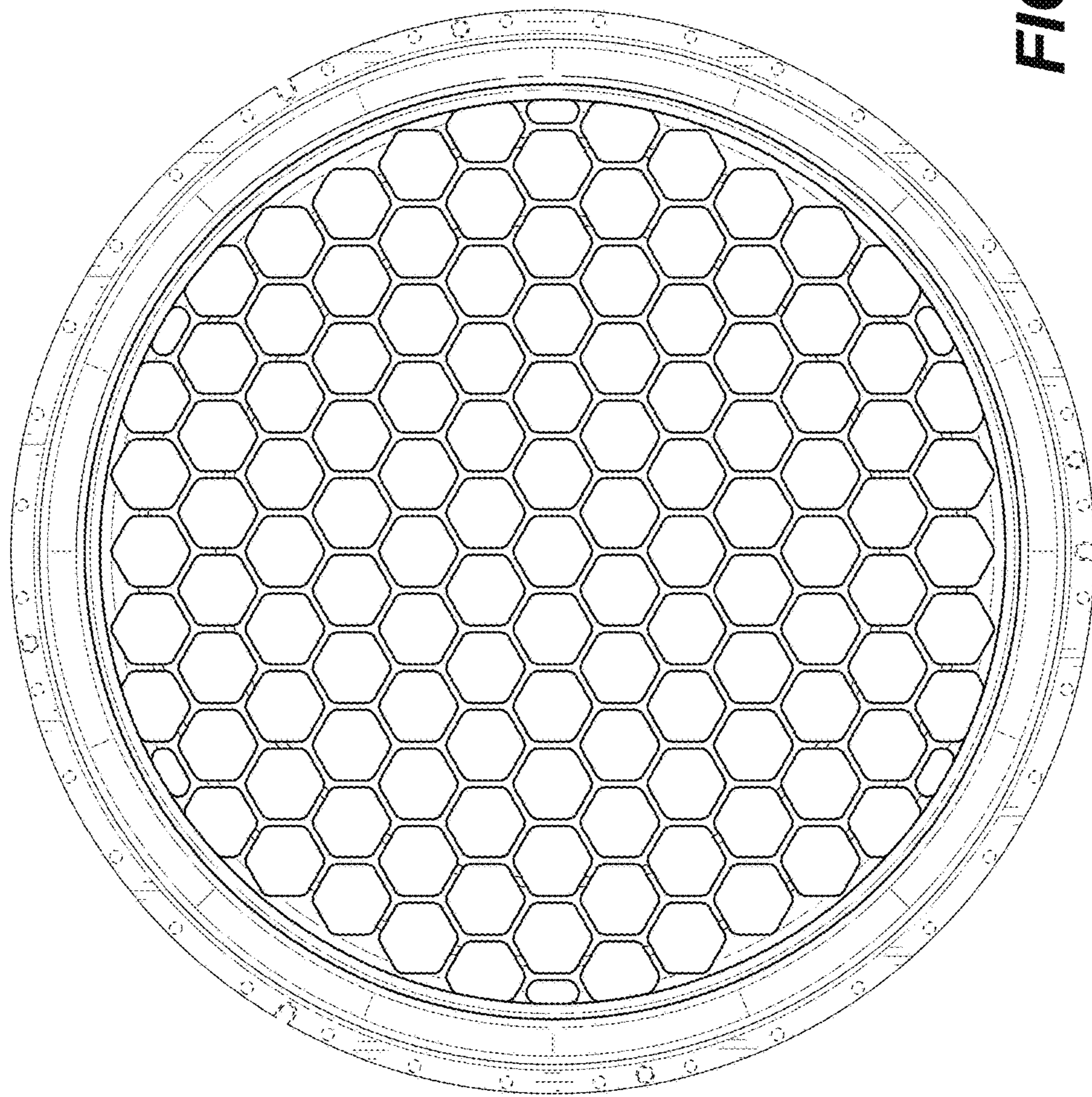
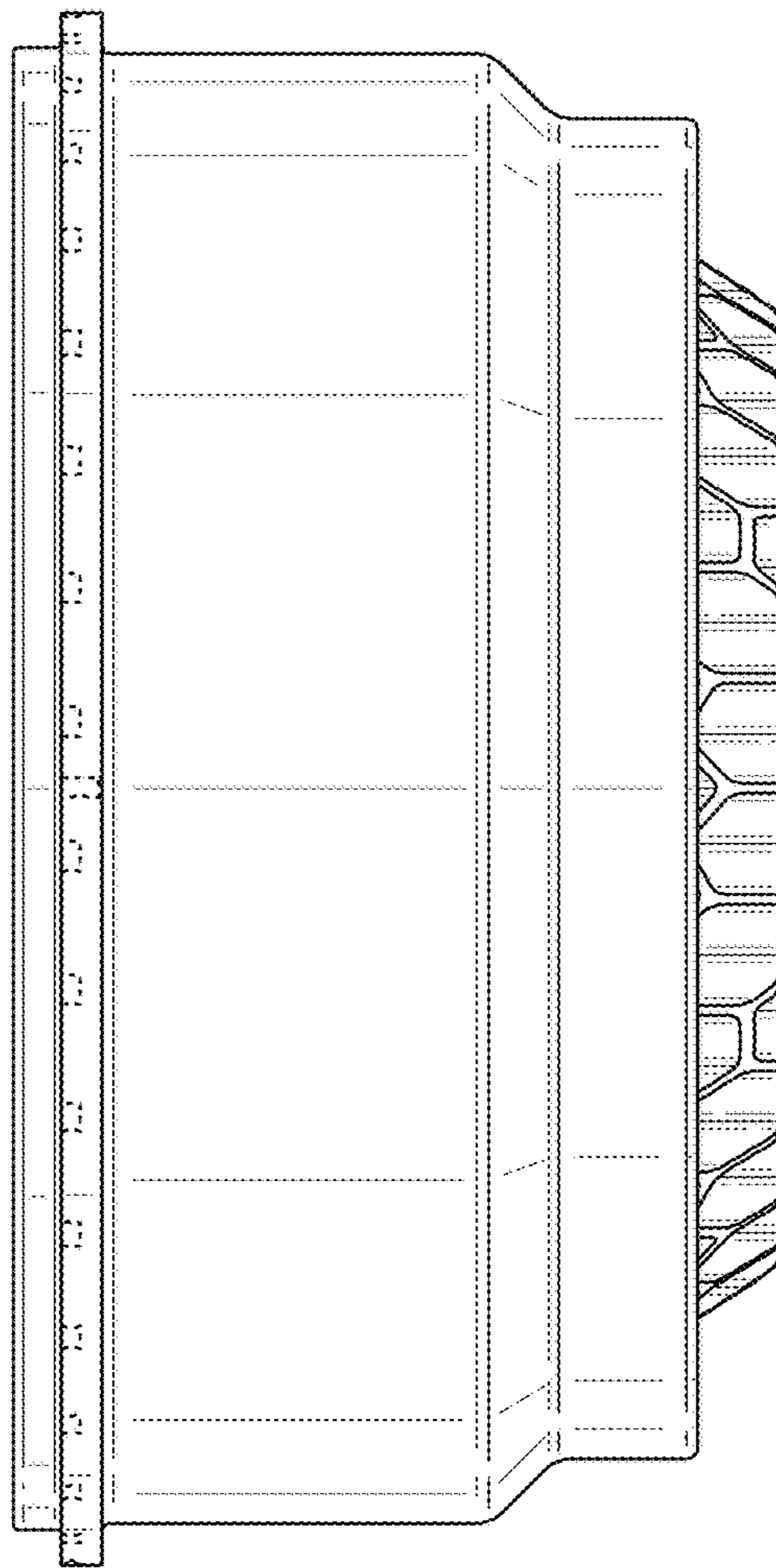
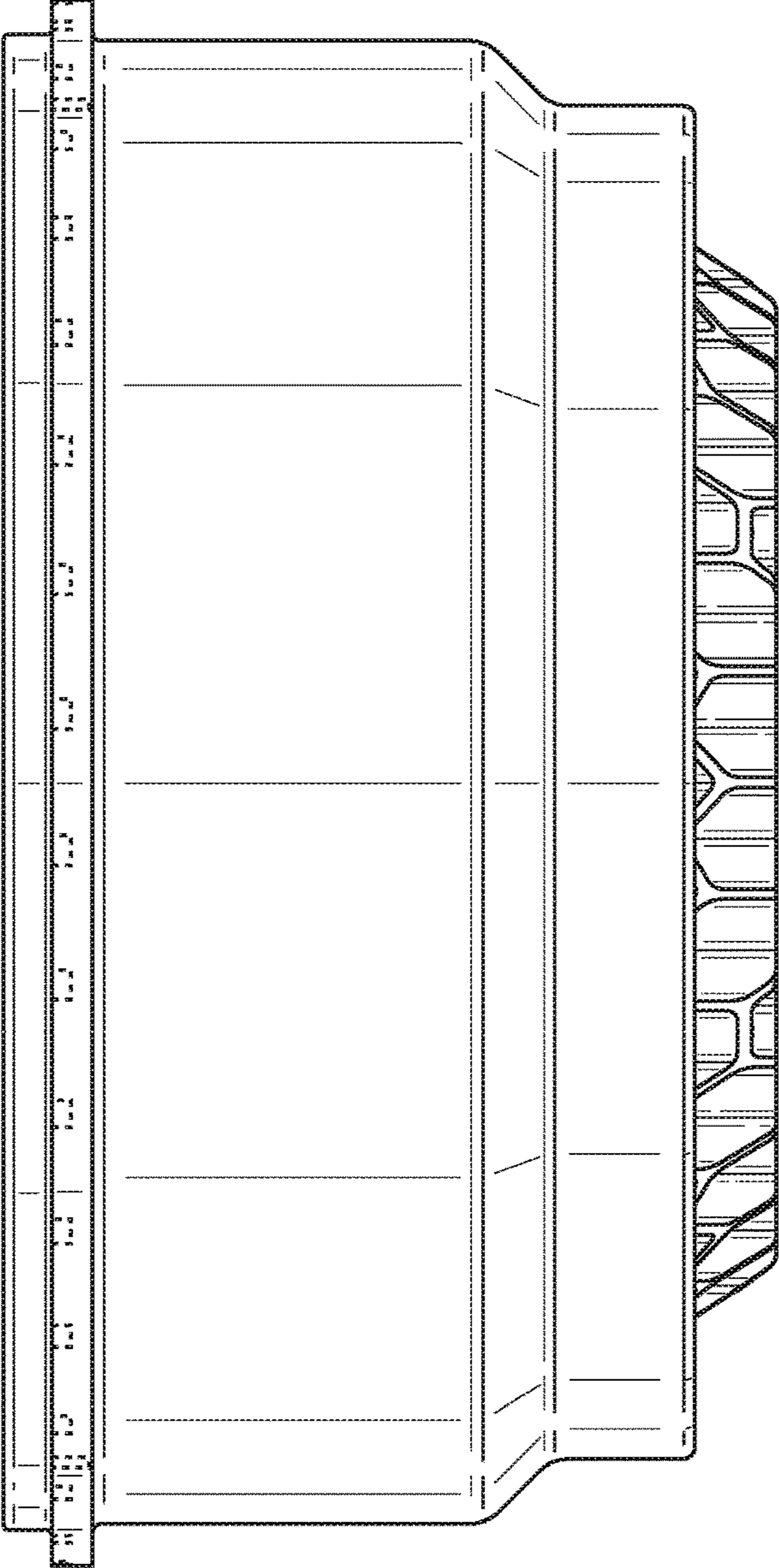


FIG. 14

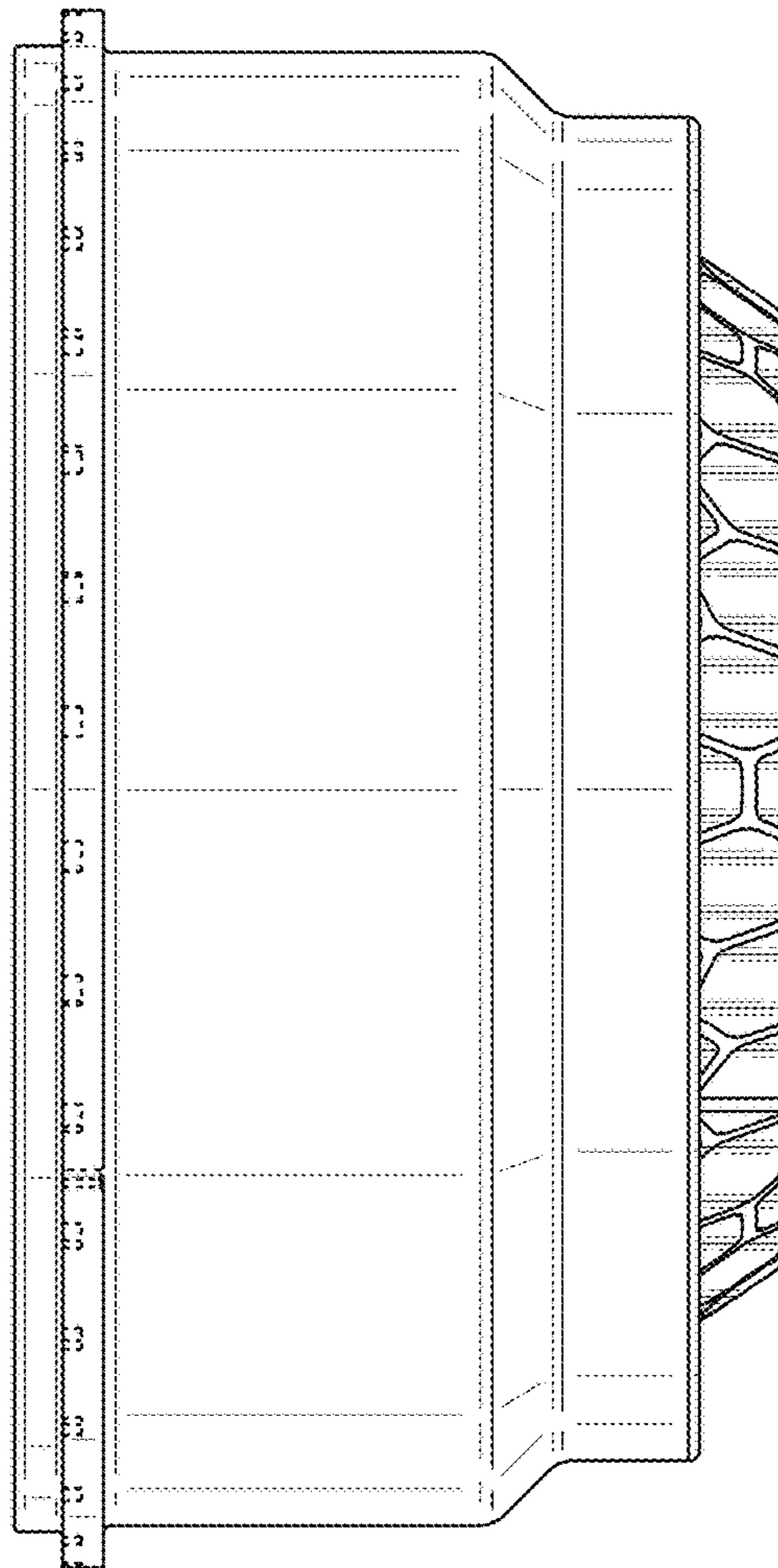




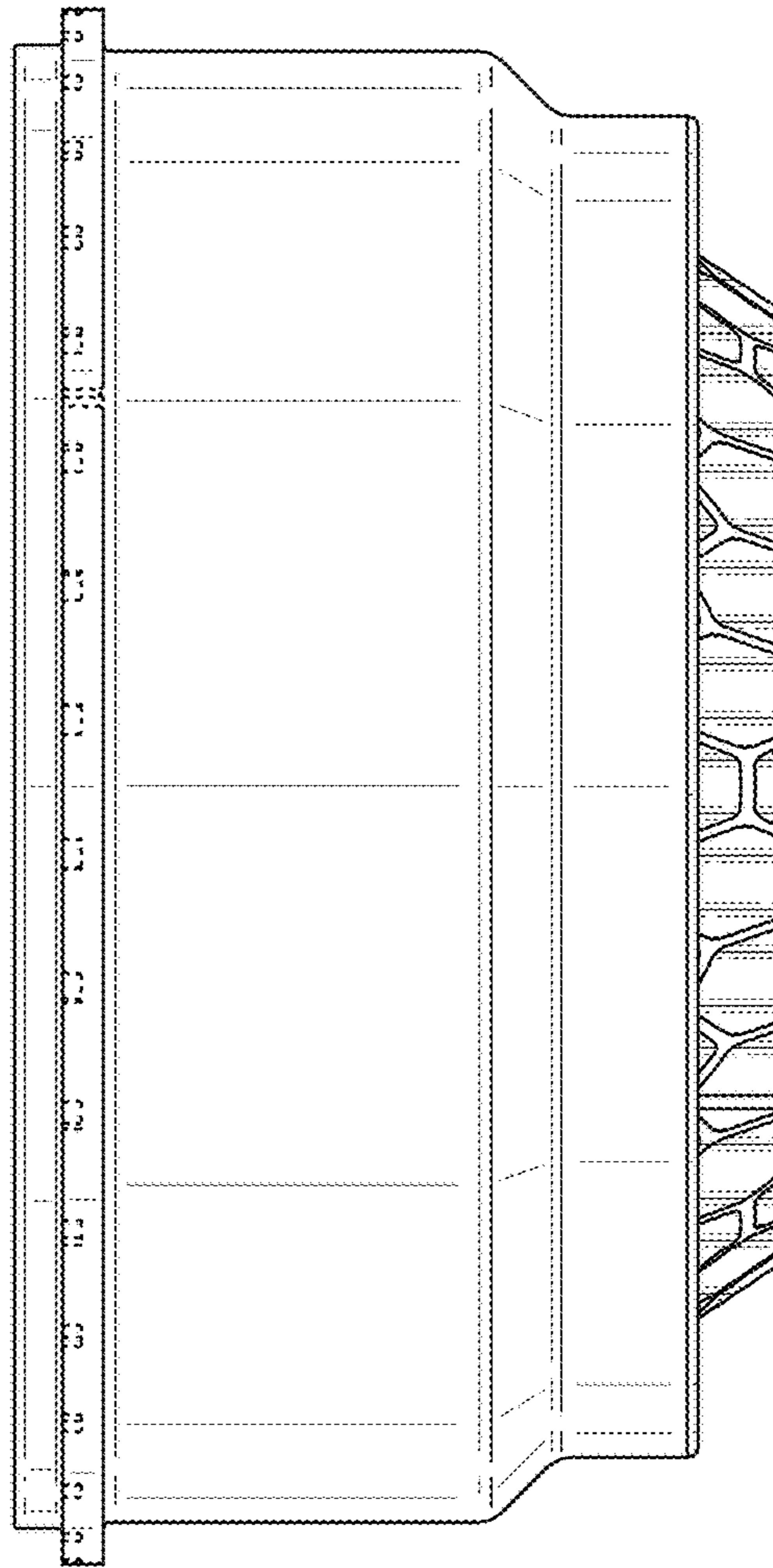
**FIG. 15**



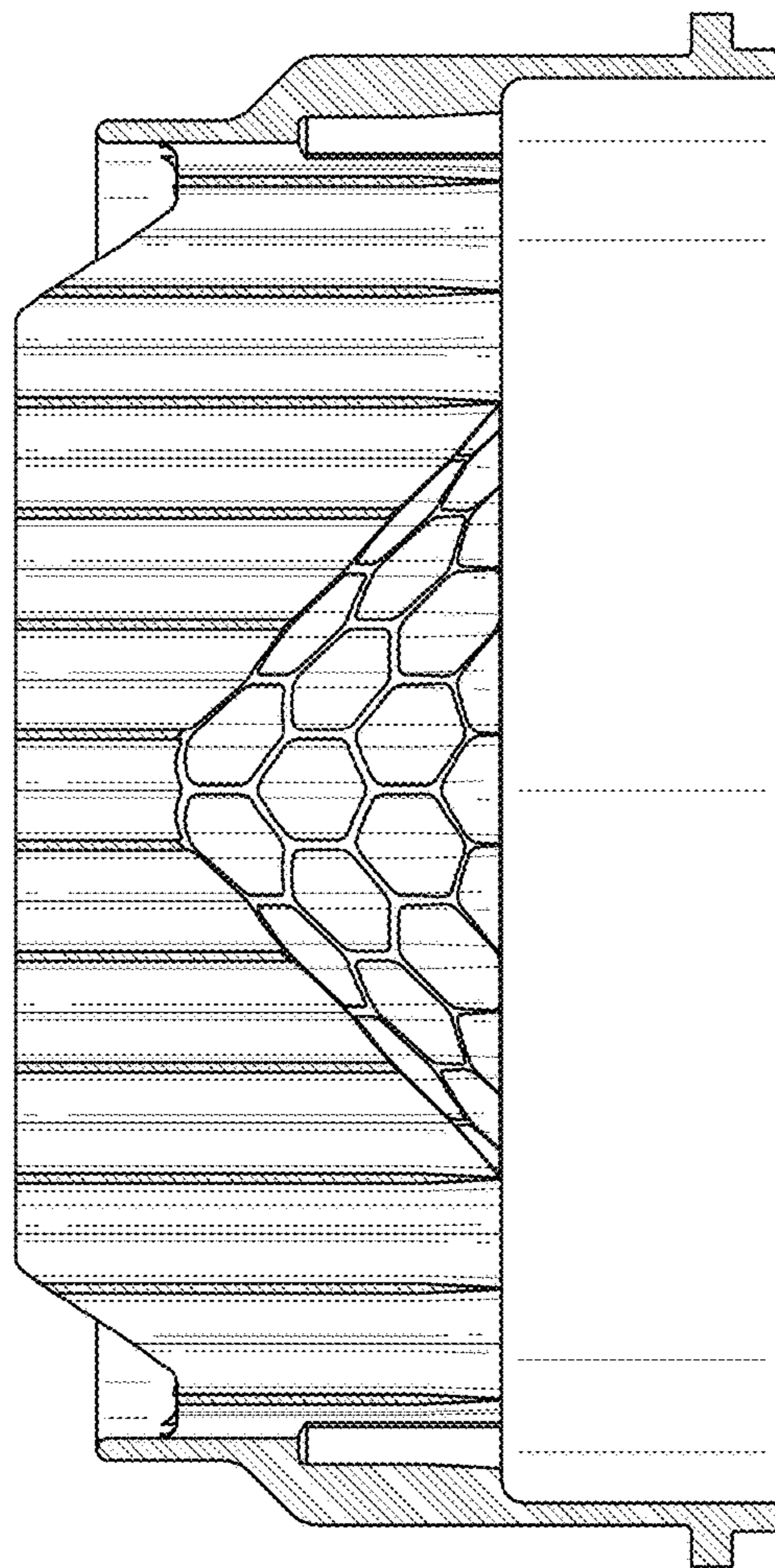
**FIG. 16**



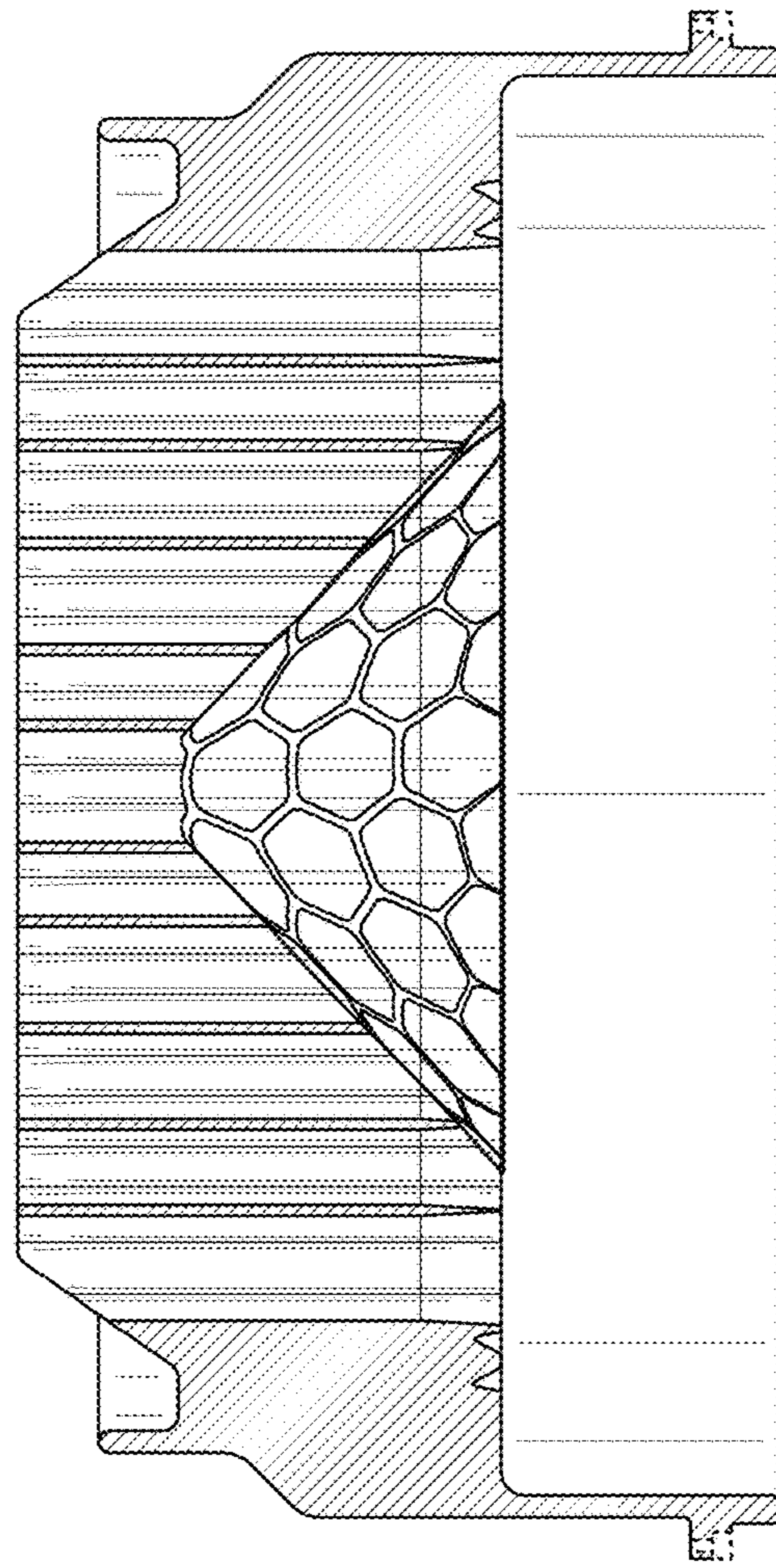
**FIG. 17**



**FIG. 18**



**FIG. 19**



**FIG. 20**