

US00D648289S

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

(10) **Patent No.:** **US D648,289 S**
(45) **Date of Patent:** **** *Nov. 8, 2011**

(54) **ELECTROPLATING FLOW SHAPING PLATE HAVING OFFSET SPIRAL HOLE PATTERN**

(75) Inventors: **Steven T. Mayer**, Lake Oswego, OR (US); **David Porter**, Sherwood, OR (US); **Robert Rash**, Portland, OR (US)

(73) Assignee: **Novellus Systems, Inc.**, San Jose, CA (US)

(*) Notice: This patent is subject to a terminal disclaimer.

(**) Term: **14 Years**

(21) Appl. No.: **29/377,521**

(22) Filed: **Oct. 21, 2010**

(51) **LOC (9) Cl.** **13-03**

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

(58) **Field of Classification Search** D13/182;
205/82, 96, 157; 204/297.01, 297.05, 230.2,
204/252, 261, 273; 257/E21.175

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,304,641	A *	12/1981	Grandia et al.	.....	205/96
5,078,852	A *	1/1992	Yee et al.	.....	204/297.05
5,660,699	A *	8/1997	Saito et al.	.....	204/297.03
5,744,019	A *	4/1998	Ang	.....	205/96
6,004,440	A *	12/1999	Hanson et al.	.....	204/279
6,080,291	A *	6/2000	Woodruff et al.	.....	204/297.01
6,398,926	B1 *	6/2002	Mahneke	.....	204/224 R
6,497,801	B1 *	12/2002	Woodruff et al.	.....	204/230.2

(Continued)

OTHER PUBLICATIONS

U.S. Appl. No. 61/405,608, "Flow diverters and flow shaping plates for electroplating cells", Mayer et al., filed Oct. 21, 2010.

Primary Examiner — Selina Sikder

(74) *Attorney, Agent, or Firm* — Weaver Austin Villeneuve & Sampson LLP

(57) **CLAIM**

We claim the ornamental design for an electroplating flow shaping plate having offset spiral hole pattern, as shown and described.

DESCRIPTION

FIG. 1 is a front plan view of an electroplating flow shaping plate having offset spiral hole pattern showing an embodiment of our new design;

FIG. 2 is a bottom view thereof;

FIG. 3 is a right side elevational view thereof, the left, top and bottom side elevational views being identical images thereof;

FIG. 4 is a front perspective view thereof; and

FIG. 5 is a rear perspective view thereof.

FIG. 6 is a front plan view of an electroplating flow shaping plate having offset spiral hole pattern showing a second embodiment of our new design;

FIG. 7 is a bottom view thereof;

FIG. 8 is a right side elevational view thereof, the left, top and bottom side elevational views being identical images thereof;

FIG. 9 is a front perspective view thereof; and

FIG. 10 is a rear perspective view thereof.

FIG. 11 is a front plan view of an electroplating flow shaping plate having offset spiral hole pattern showing a third embodiment of our new design;

FIG. 12 is a bottom view thereof; and

FIG. 13 is a right side elevational view thereof, the left, top and bottom side elevational views being identical images thereof;

FIG. 14 is a front perspective view thereof; and

FIG. 15 is a rear perspective view thereof.

FIG. 16 is a front plan view of an electroplating flow shaping plate having offset spiral hole pattern showing a fourth embodiment of our new design;

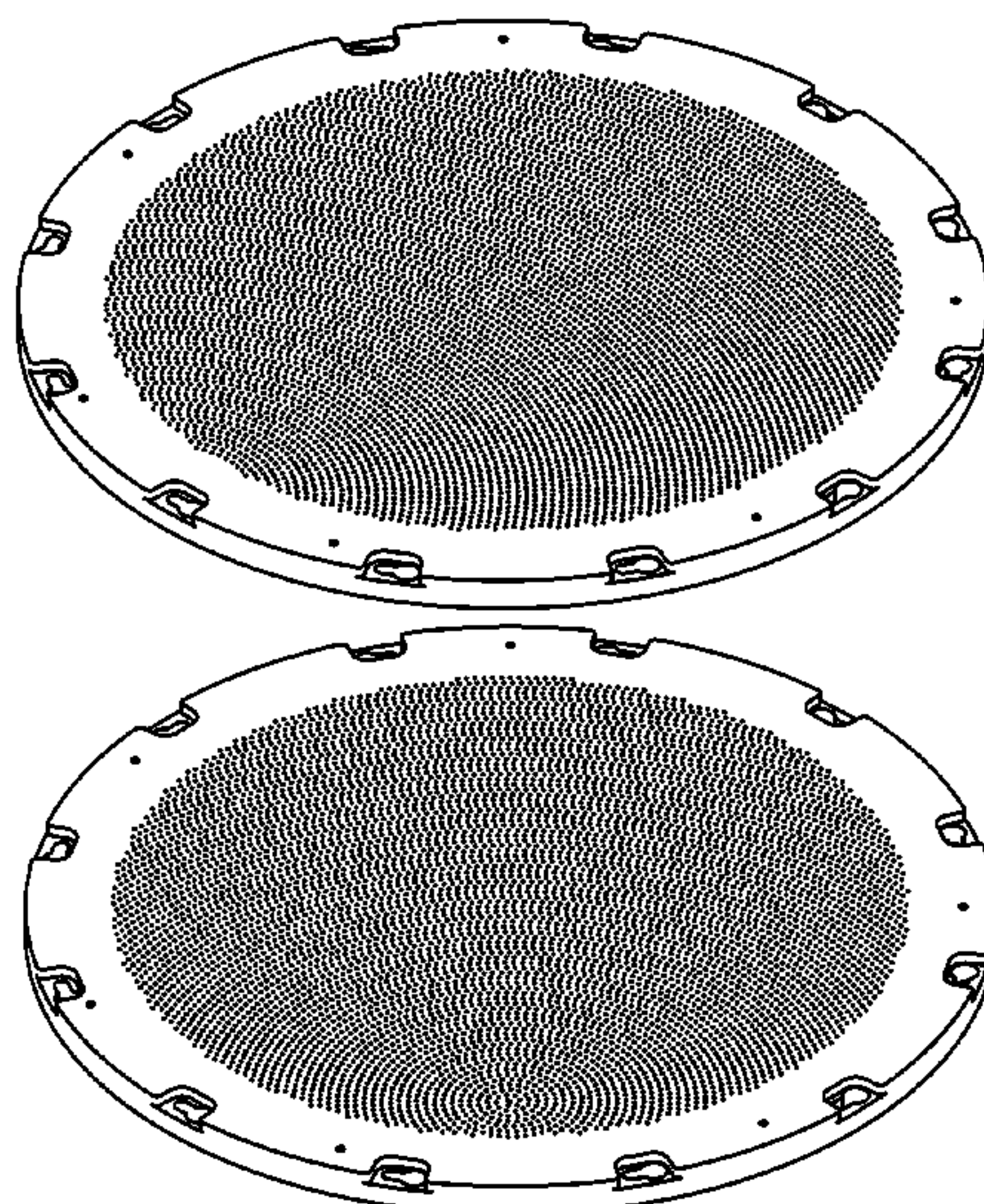
FIG. 17 is a bottom view thereof; and

FIG. 18 is a right side elevational view thereof, the left, top and bottom side elevational views being identical images thereof;

FIG. 19 is a front perspective view thereof; and,

FIG. 20 is a rear perspective view thereof.

1 Claim, 16 Drawing Sheets



US D648,289 S

Page 2

U.S. PATENT DOCUMENTS

6,521,102	B1 *	2/2003	Dordi	.....	204/252	7,641,776	B2 *	1/2010	Nagar et al.	.....	204/297.01
6,632,335	B2 *	10/2003	Dordi et al.	.....	204/230.2	D609,652	S *	2/2010	Nagasaka et al.	.....	D13/182
6,921,468	B2 *	7/2005	Graham et al.	.....	204/212	D609,655	S *	2/2010	Sugimoto	.....	D13/182
D544,452	S *	6/2007	Nakamura et al.	.....	D13/182	7,670,465	B2 *	3/2010	Yang et al.	.....	204/193
D548,705	S *	8/2007	Hayashi	.....	D13/182	D614,593	S *	4/2010	Lee et al.	.....	D13/182
D552,565	S *	10/2007	Nakamura et al.	.....	D13/182	7,935,240	B2 *	5/2011	Singh et al.	.....	205/83
D553,104	S *	10/2007	Oohashi et al.	.....	D13/182	2007/0068819	A1 *	3/2007	Singh et al.	.....	205/83
D587,222	S *	2/2009	Sasaki et al.	.....	D13/182	2011/0031112	A1 *	2/2011	Birang et al.	.....	204/229.8

* cited by examiner

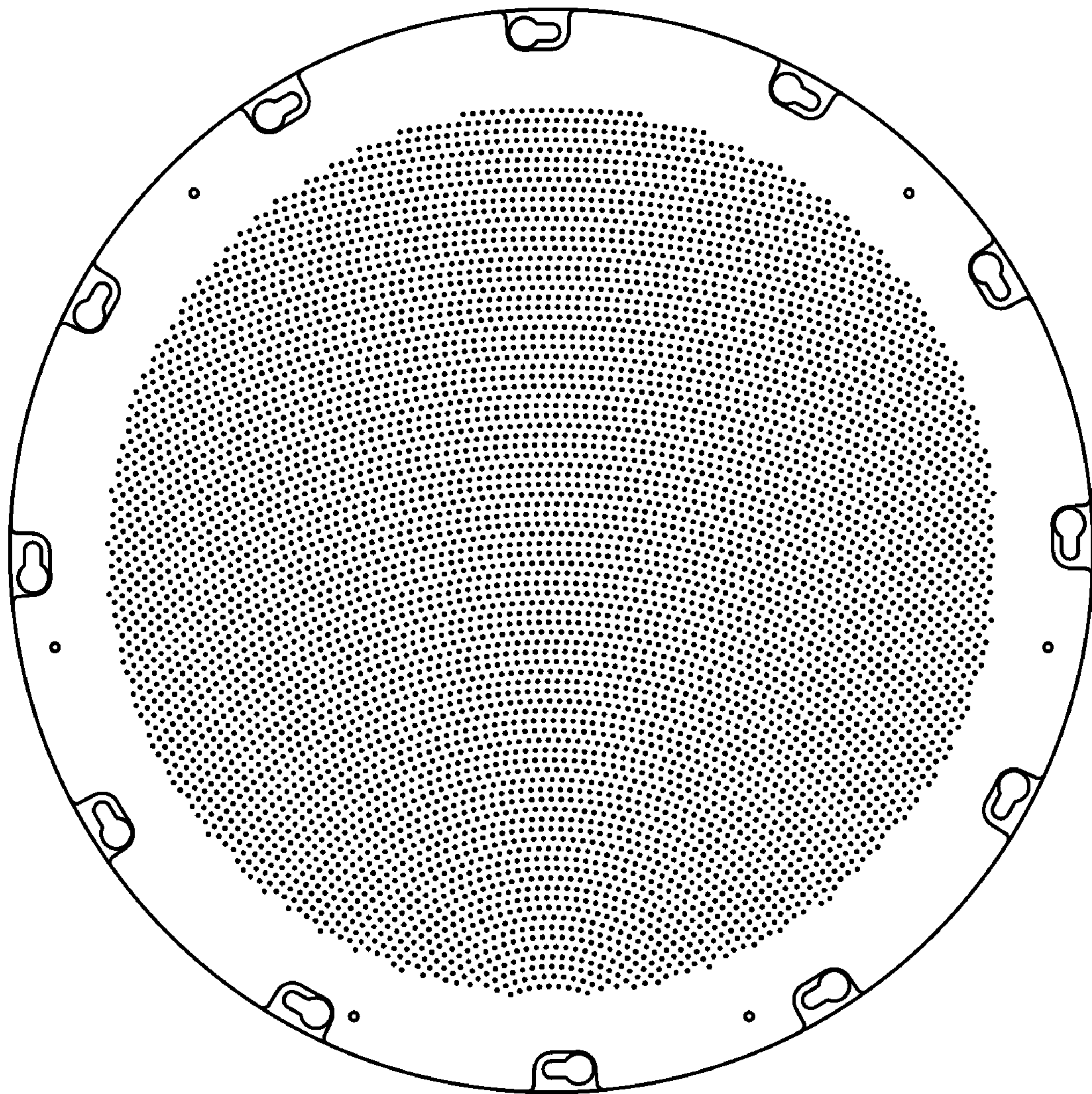


Fig. 1

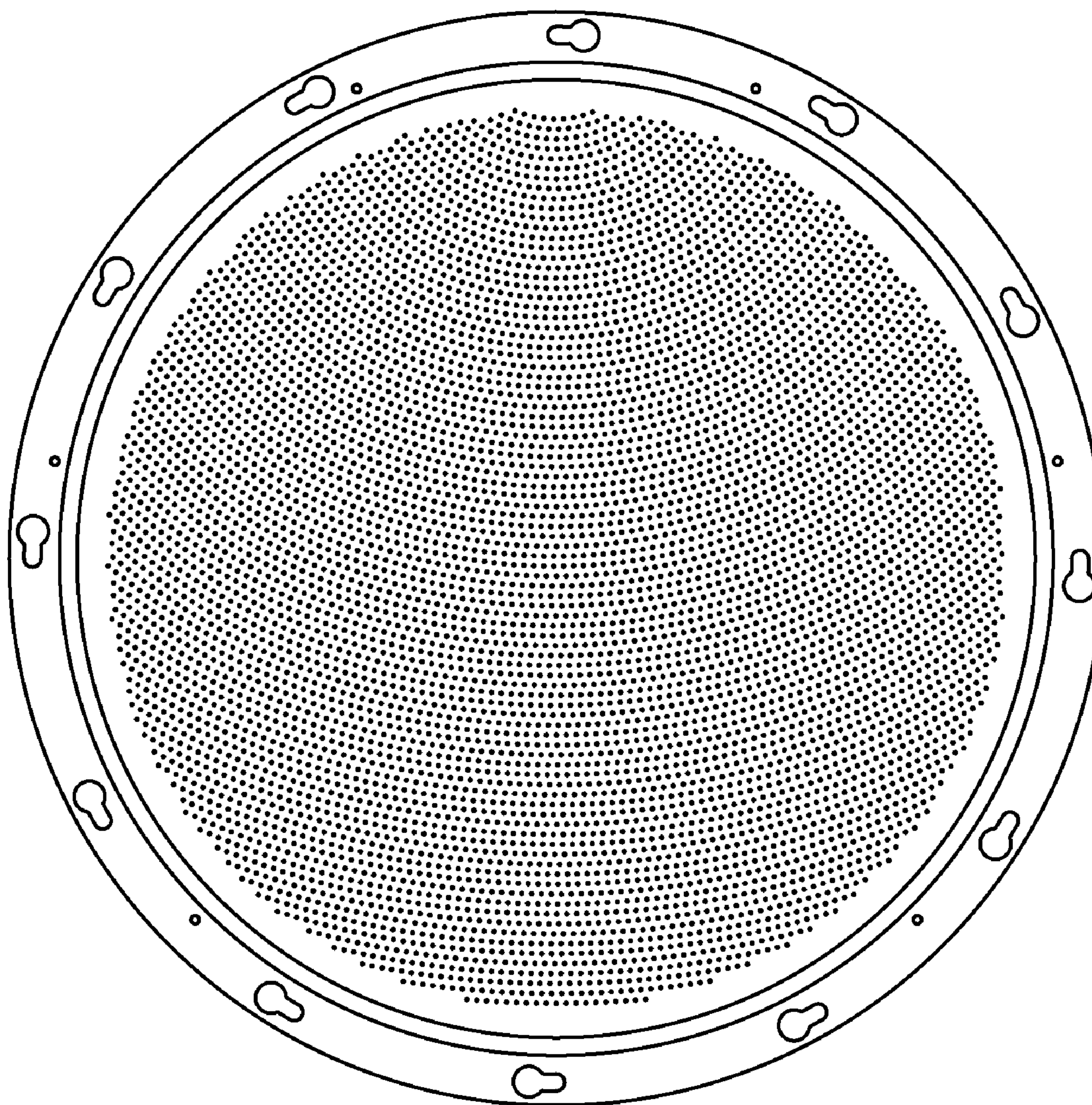


Fig. 2



Fig. 3

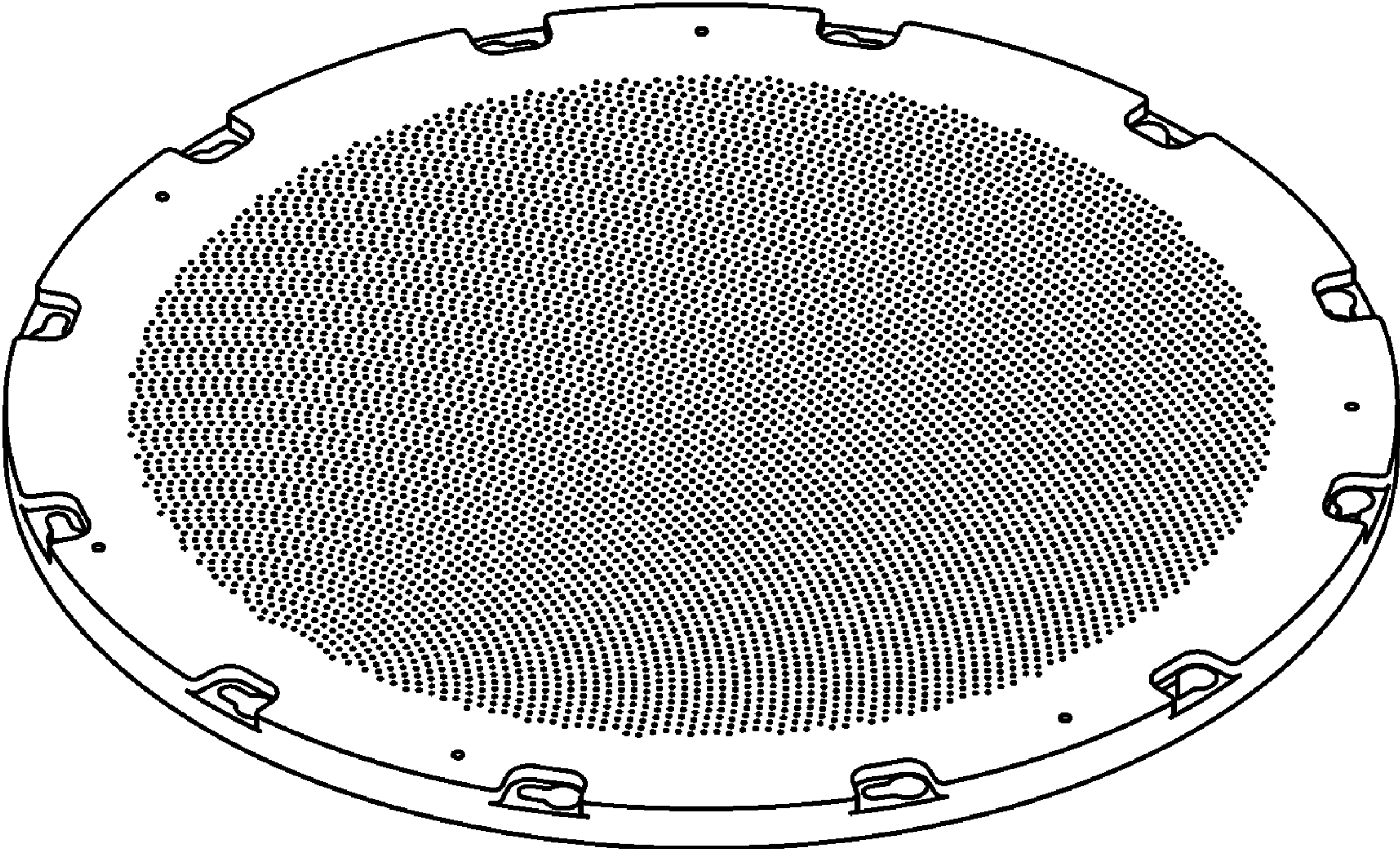


Fig. 4

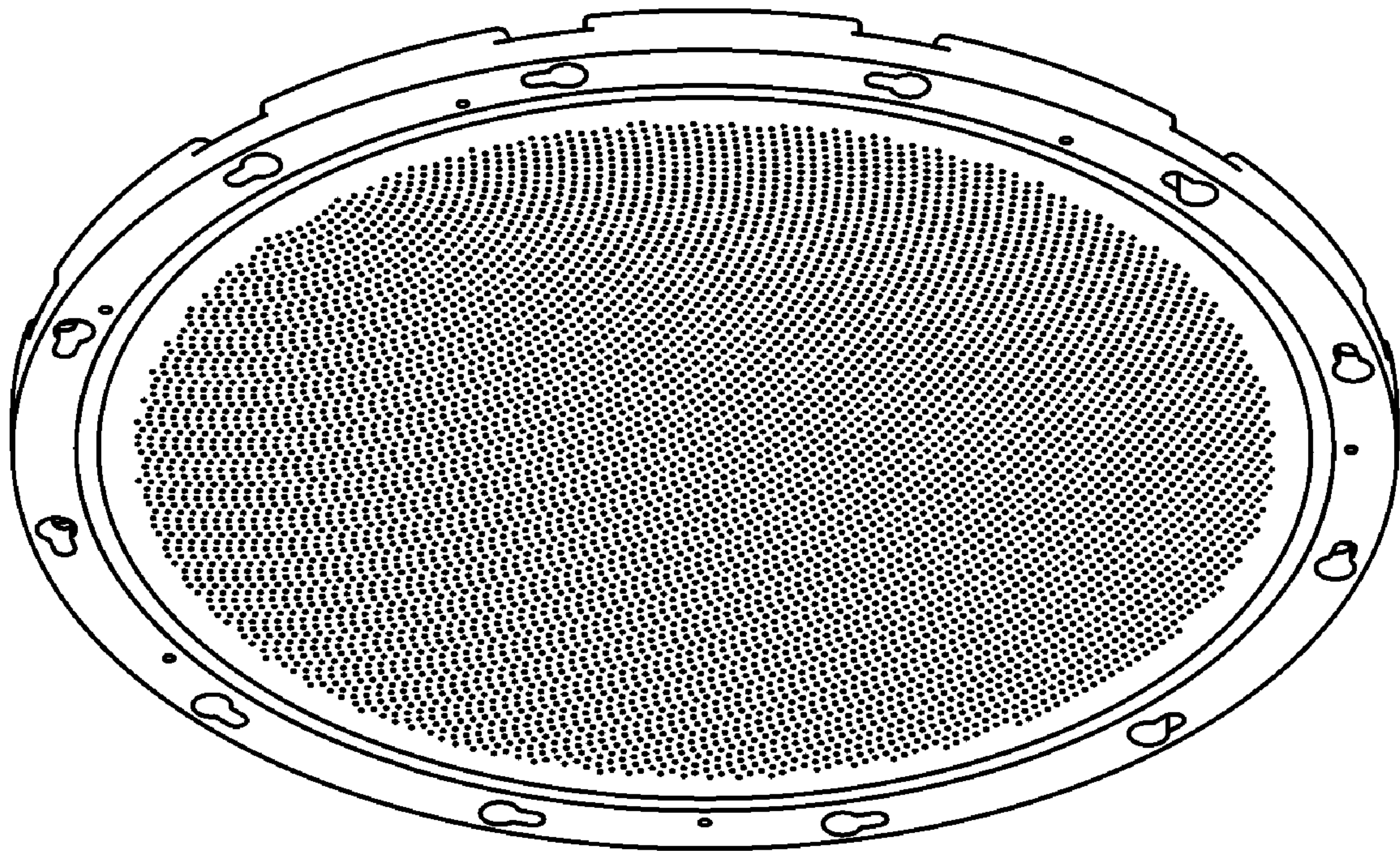


Fig. 5

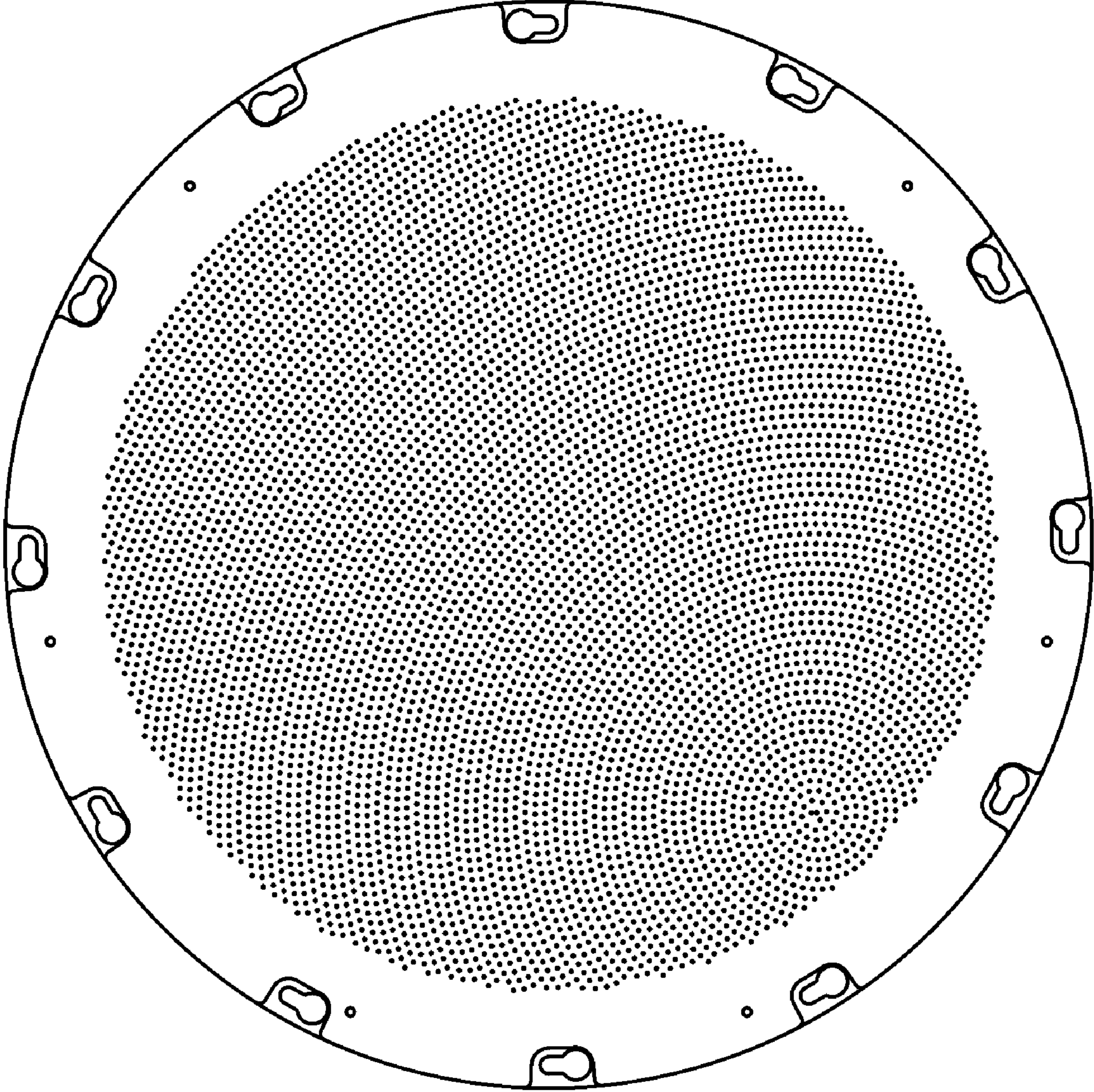


Fig. 6

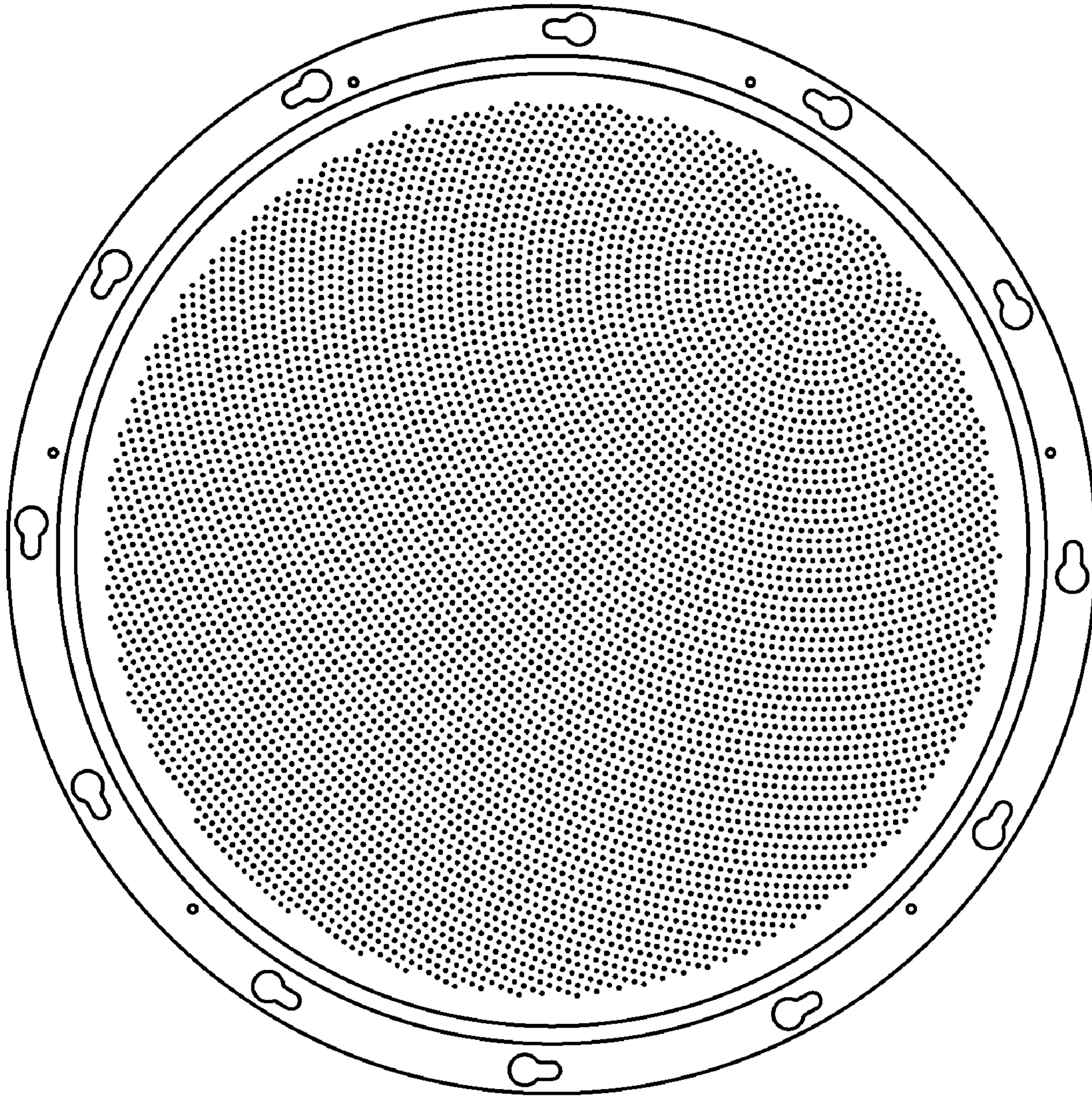


Fig. 7

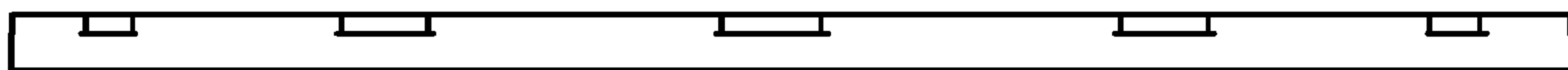


Fig. 8

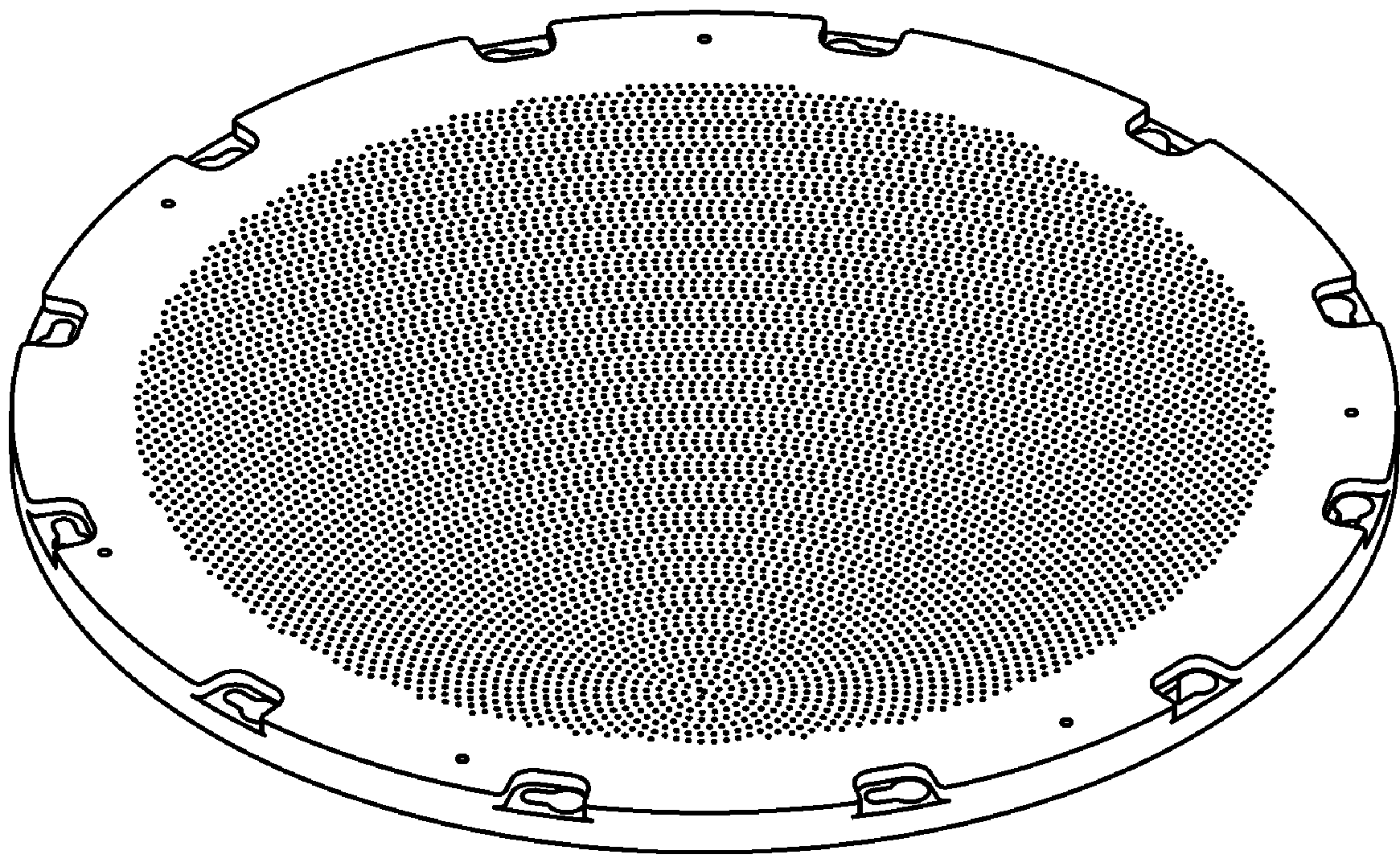


Fig. 9

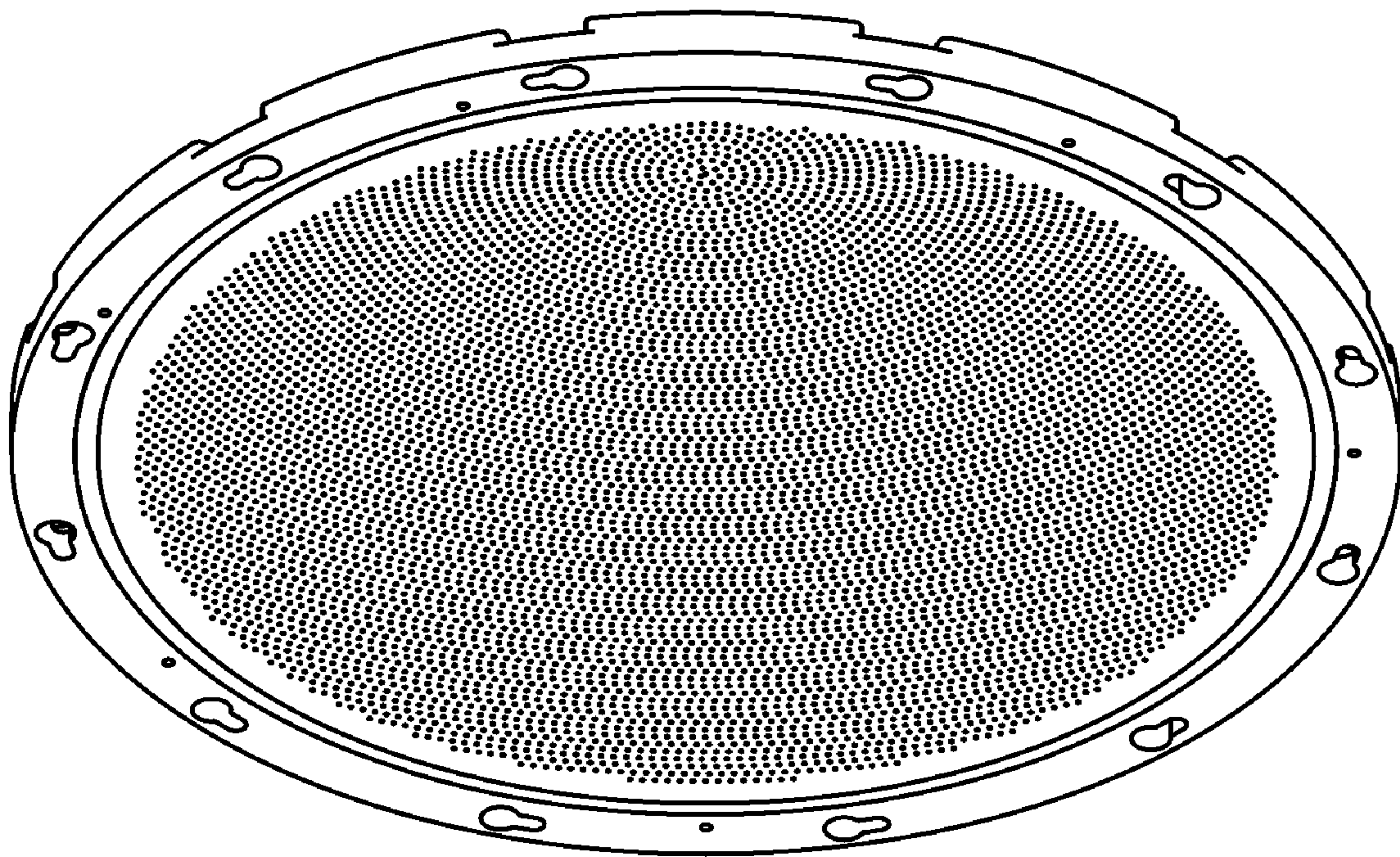


Fig. 10

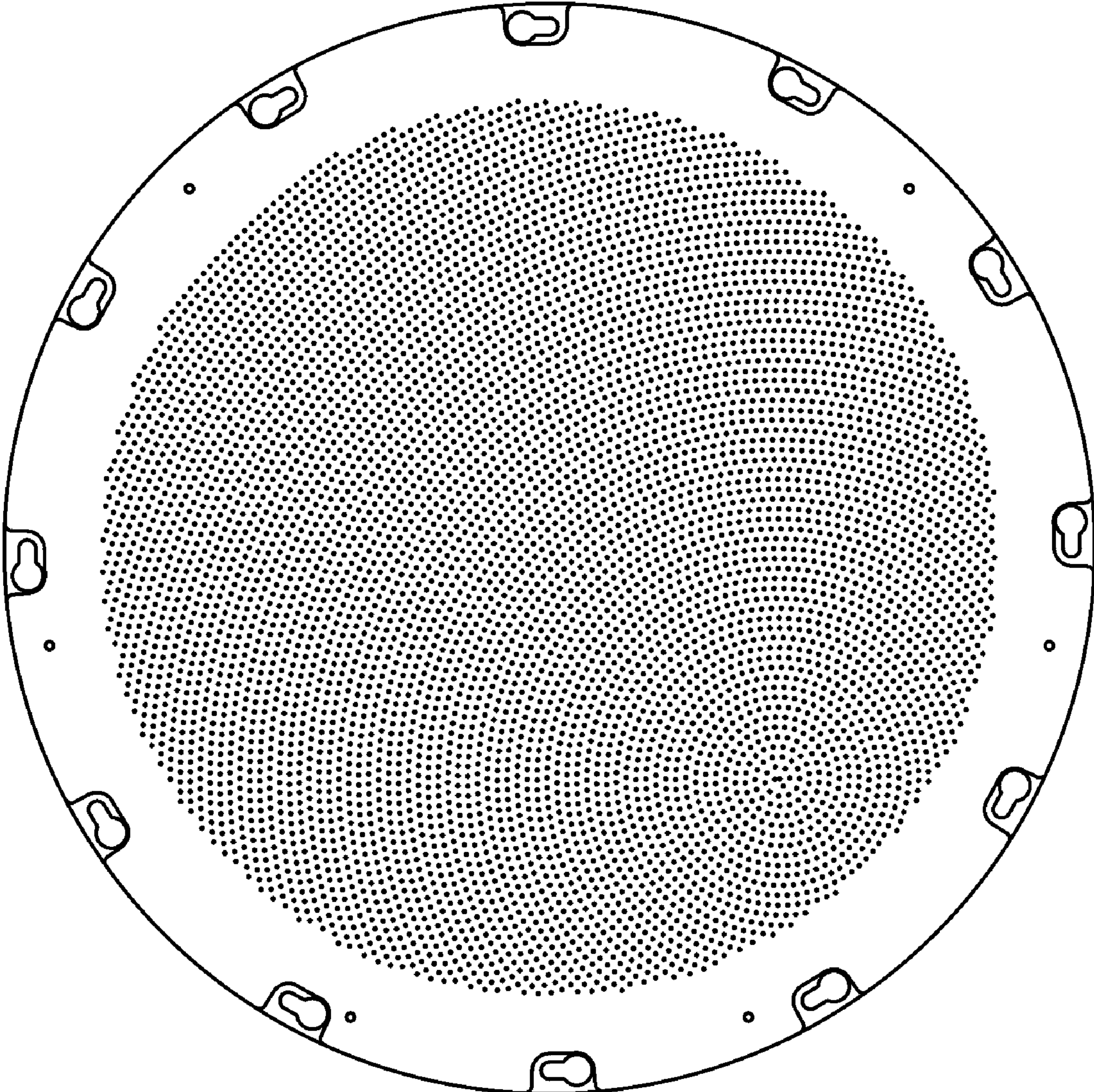


Fig. 11

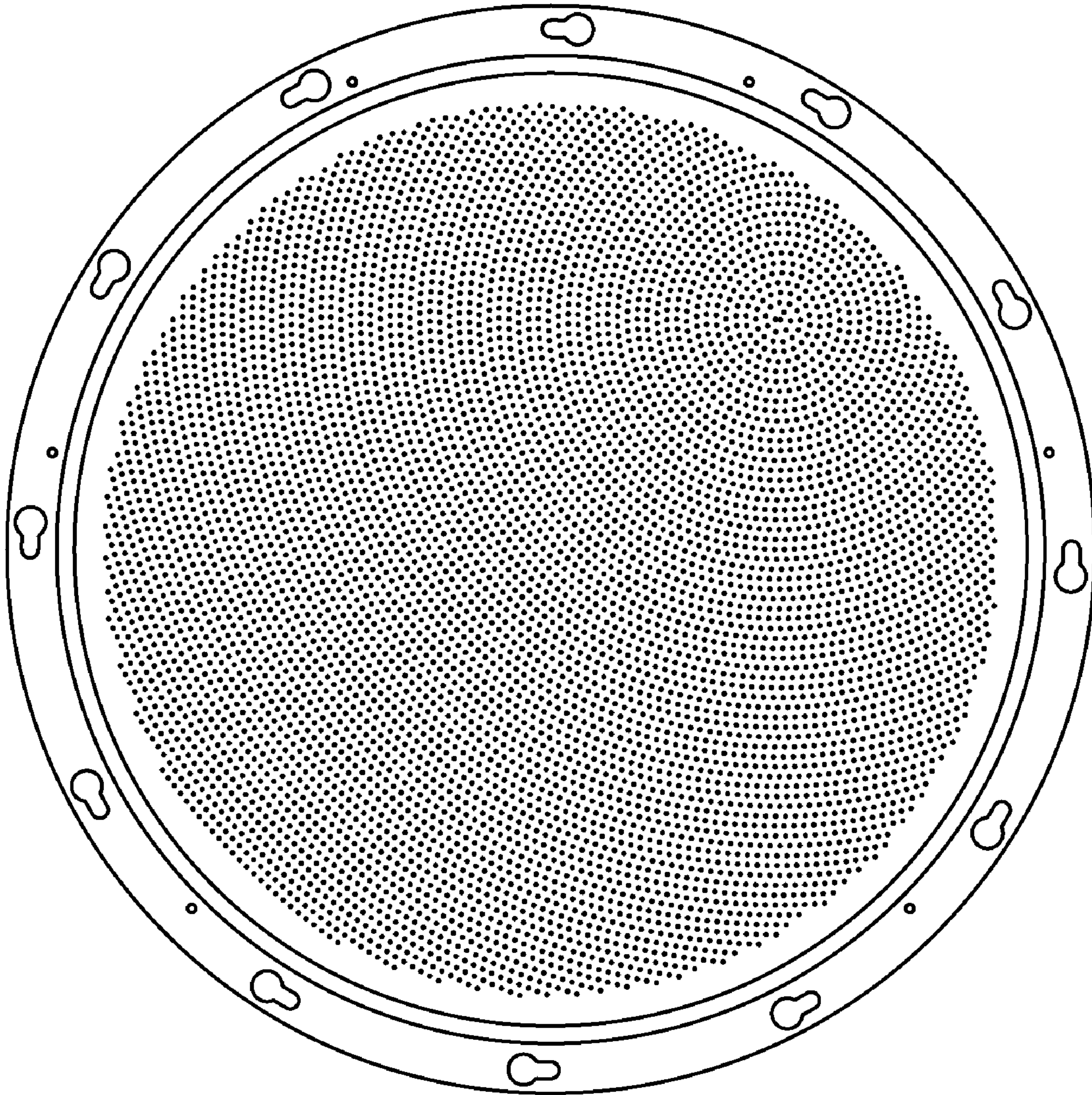


Fig. 12

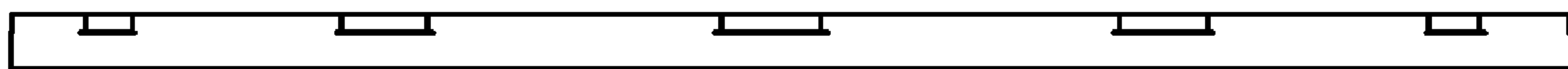


Fig. 13

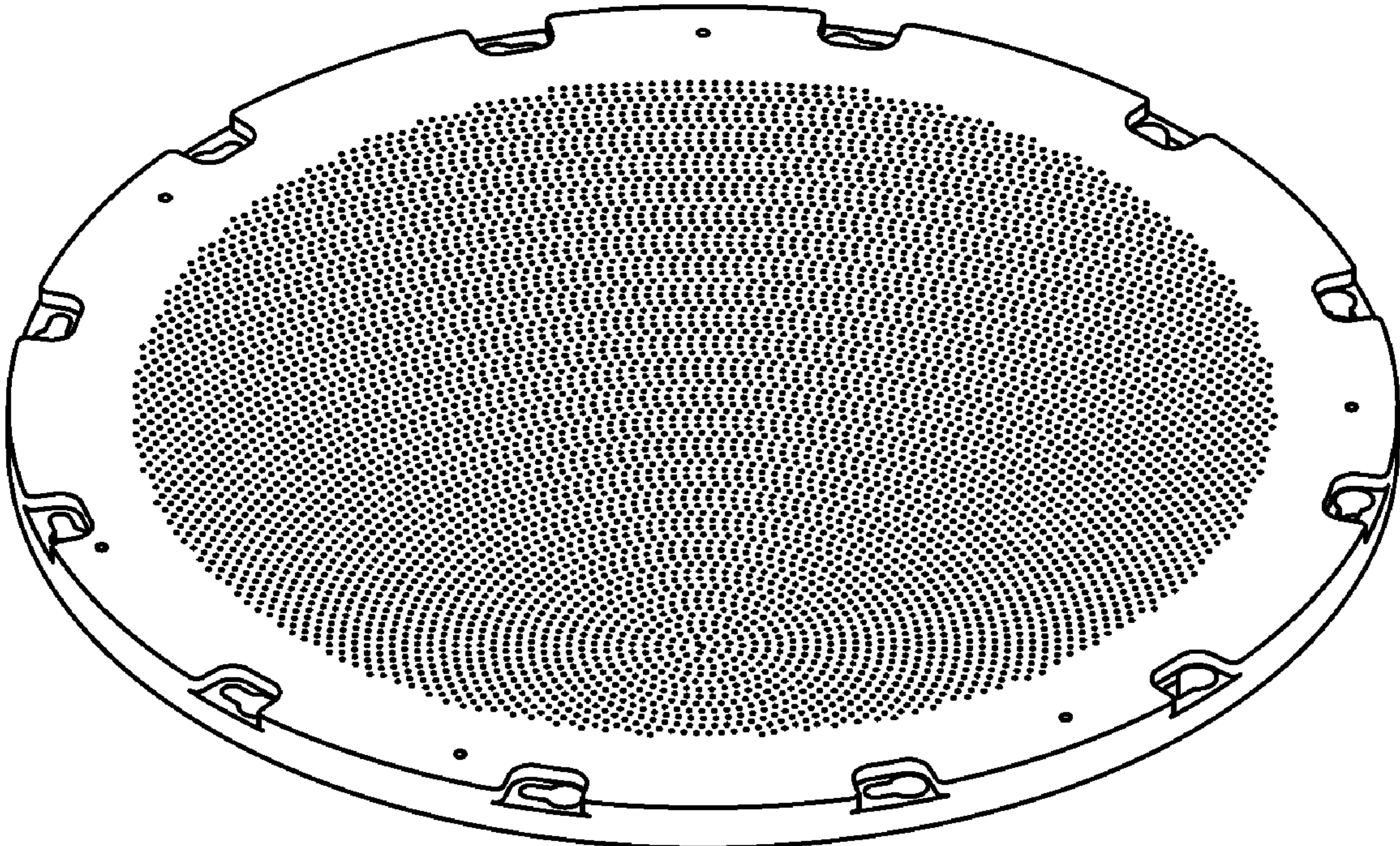


Fig. 14

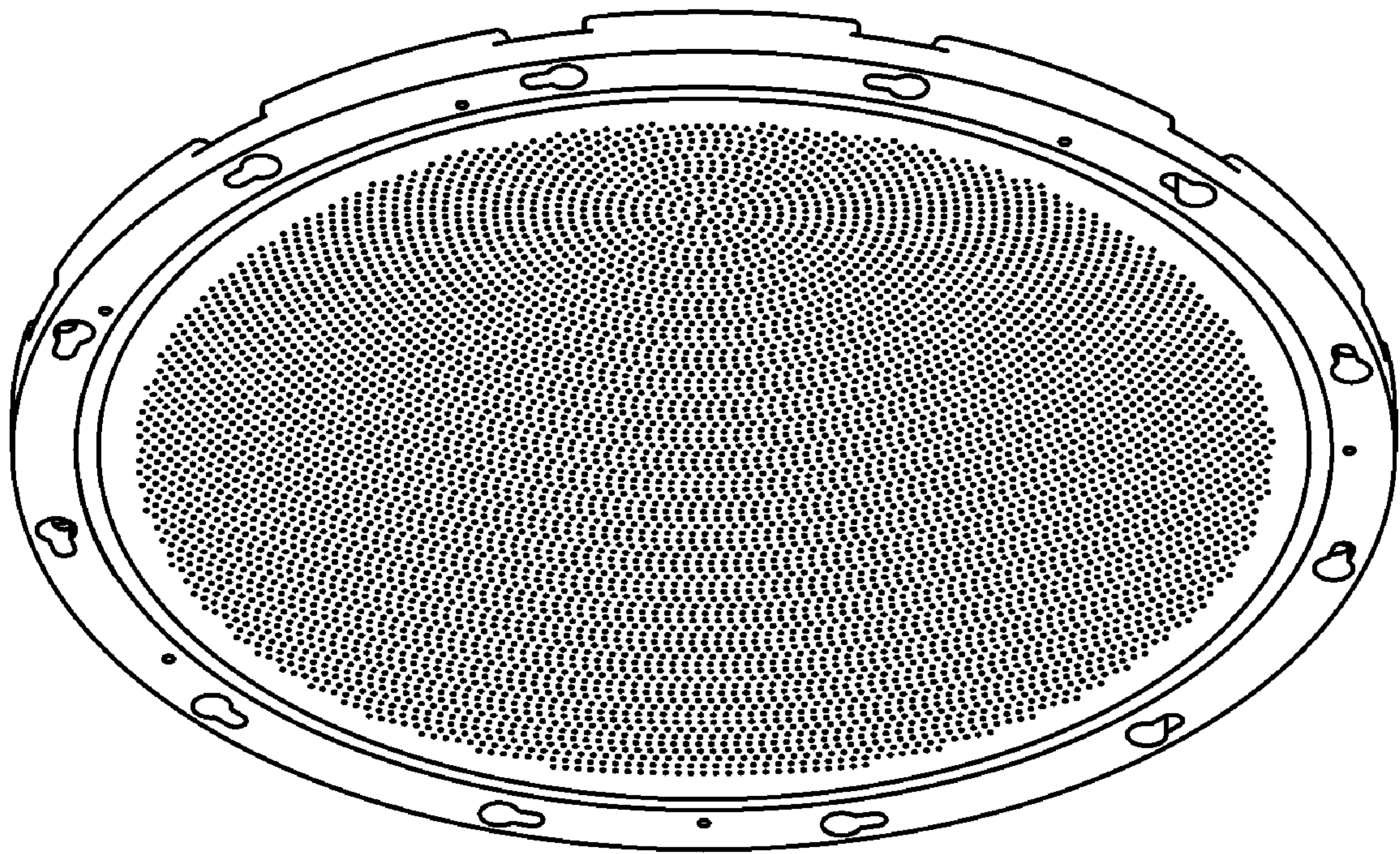


Fig. 15

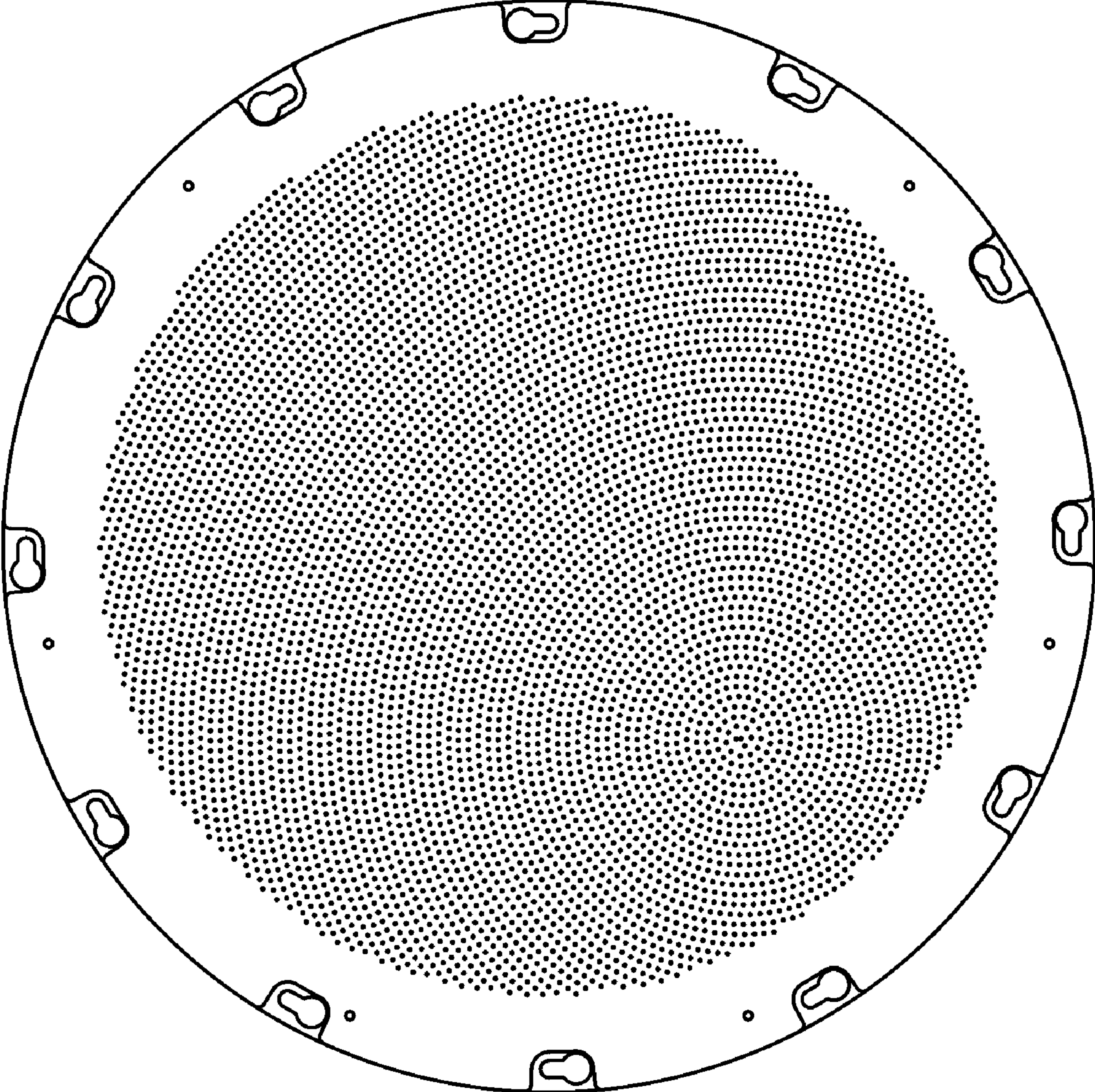


Fig. 16

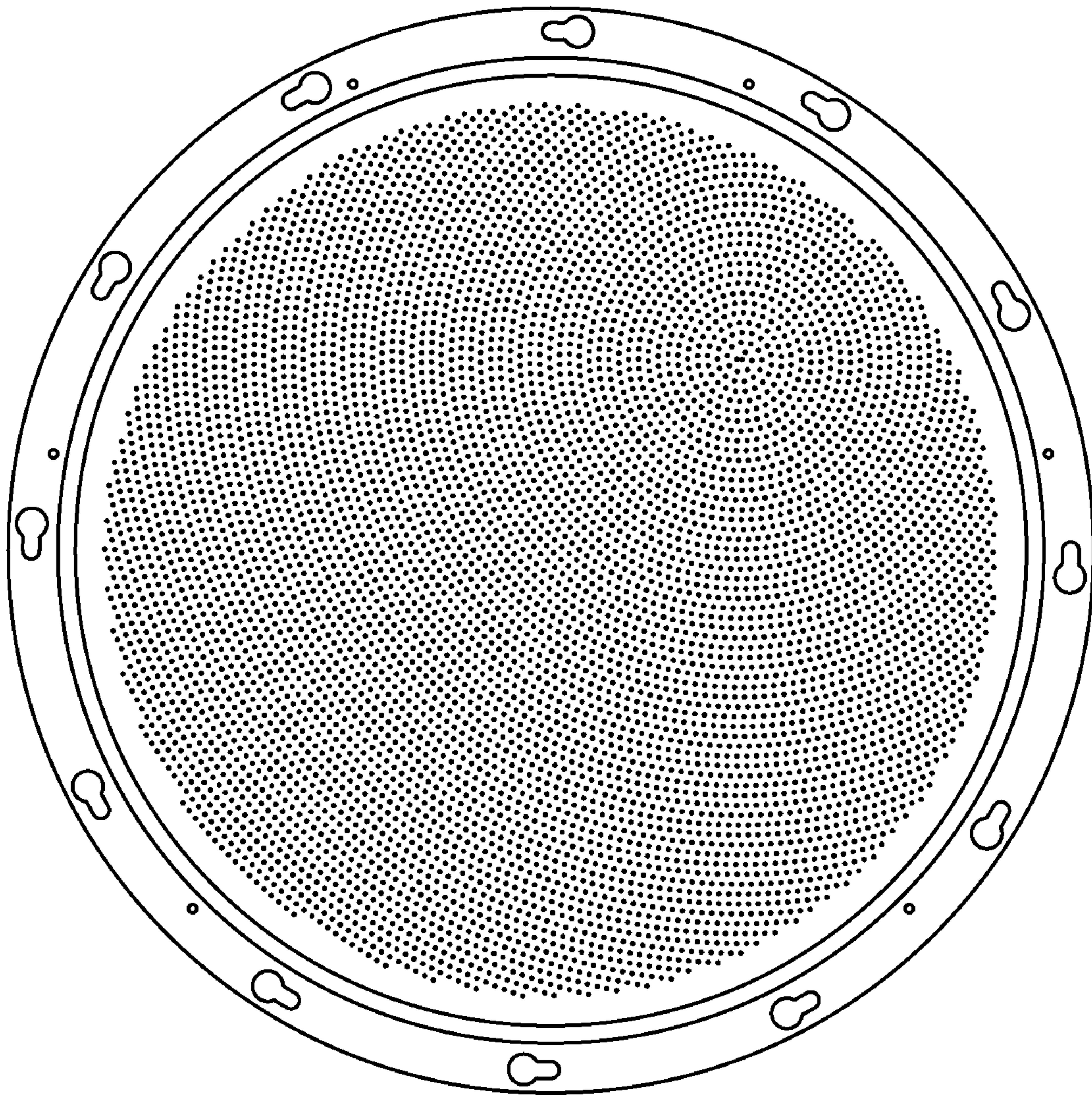


Fig. 17



Fig. 18

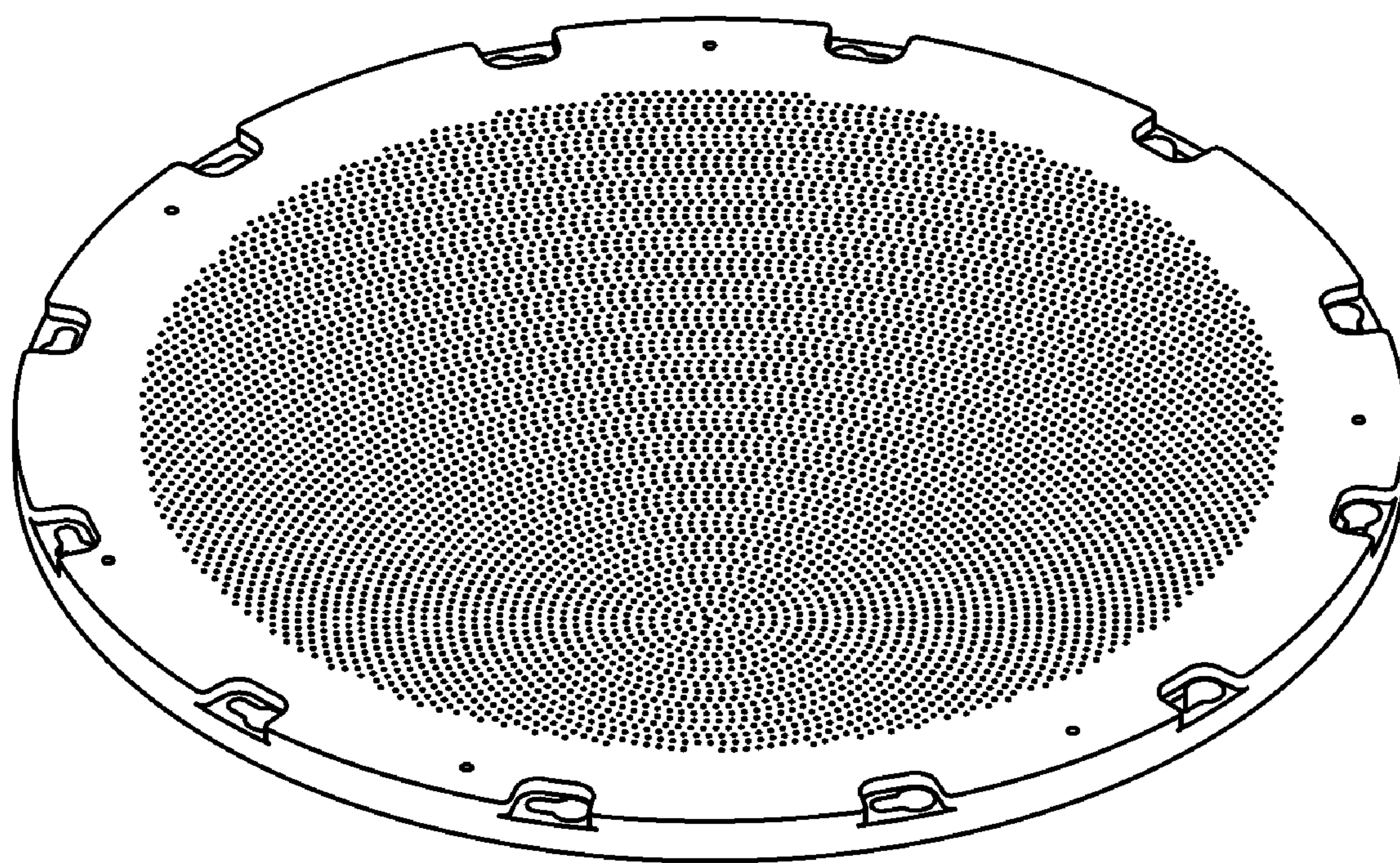


Fig. 19

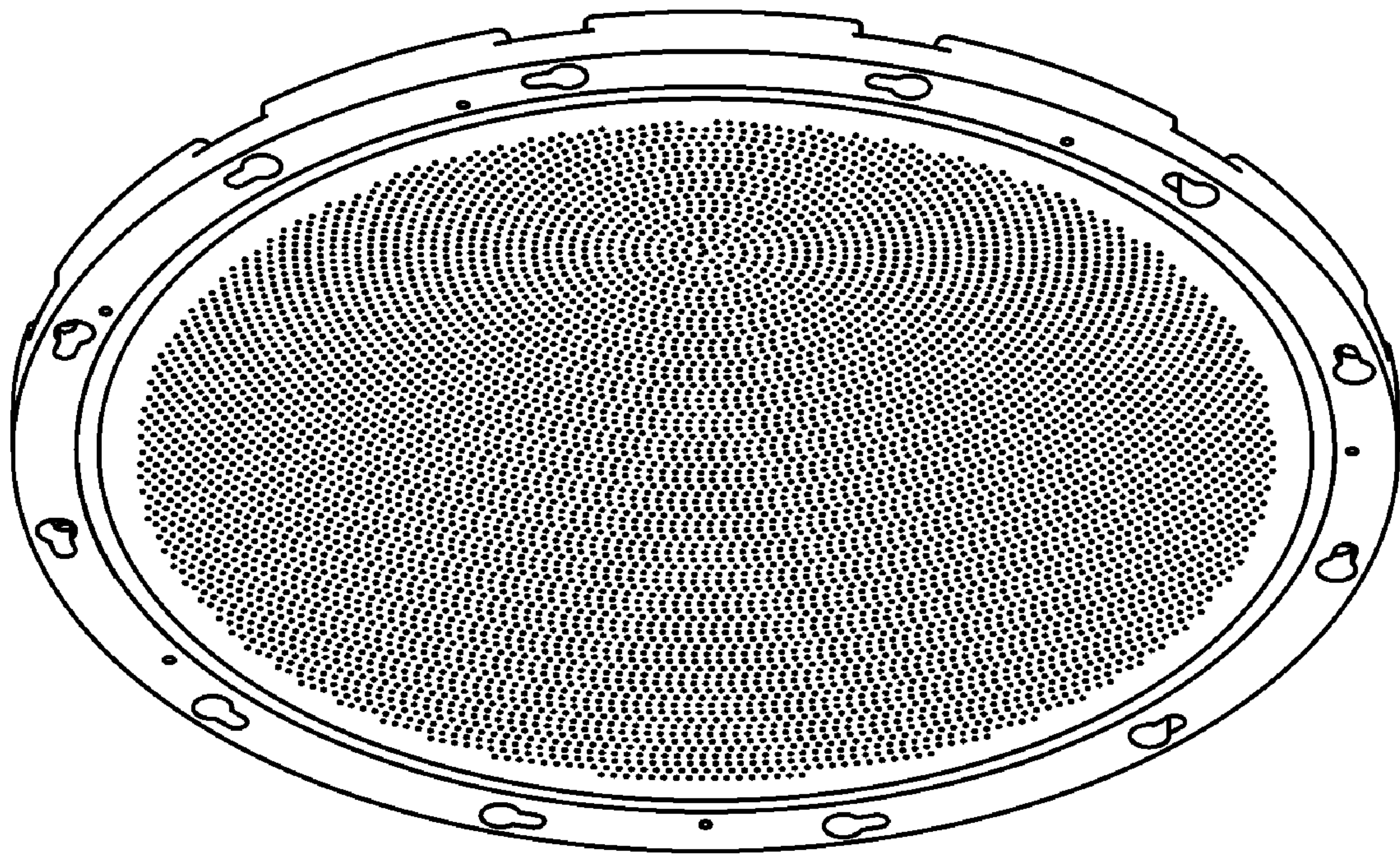


Fig. 20