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(12) United States Design Patent

Herrmann et al.

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(54) **FACE GEAR**

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(73) Assignee: **Eaton Corporation**, Cleveland, OH (US)

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

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Related U.S. Application Data

(63) Continuation-in-part of application No. 13/737,713, filed on Jan. 9, 2013, which is a continuation-in-part of application No. 12/760,988, filed on Apr. 15, 2010, now Pat. No. 8,353,800, and a continuation-in-part of application No. 12/814,905, filed on Jun. 14, 2010, now abandoned.

(51) **LOC (10) Cl.** **15-09**
(52) **U.S. Cl.**
USPC **D15/148**
(58) **Field of Classification Search**
USPC D15/126, 138, 148–149; 74/411, 572.1, 74/572.2, 573.1–573.13, 574.1–574.4, 74/571.21; 464/34, 73, 74, 76, 81–887, 464/894
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,487,073 A 3/1924 Nogrady
1,988,183 A 1/1935 Preston
3,154,969 A 11/1964 Saari

(Continued)

FOREIGN PATENT DOCUMENTS

DE 102004062379 B3 2/2006
DE 102005050794 A1 4/2007

(Continued)

OTHER PUBLICATIONS

Radzevich, S.P., "Kinetic Geometry of Surface Machining," CRC Press, Boca Raton, FL. 2008, 508p.

(Continued)

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(57) **CLAIM**

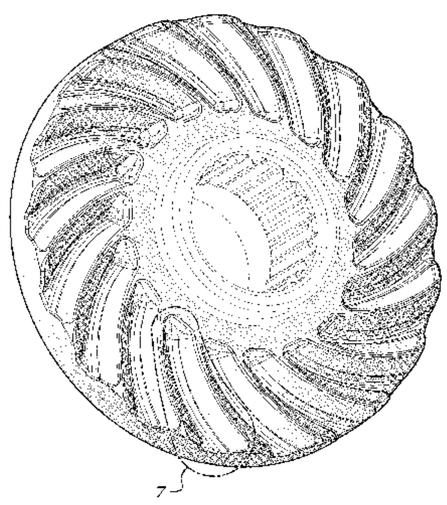
The ornamental design for a face gear, as shown and described.

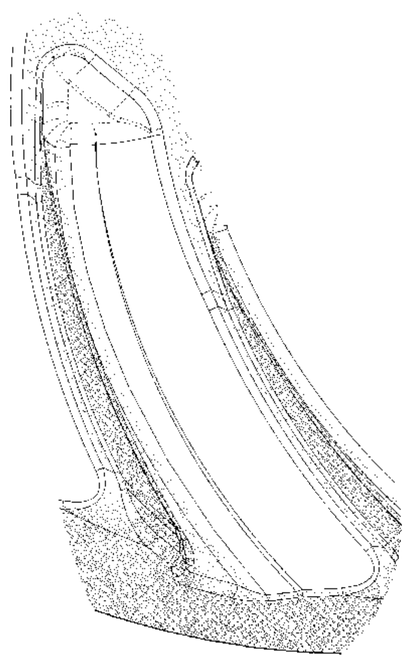
DESCRIPTION

FIG. **1** is a front perspective view of a first embodiment of a face gear showing our new design;
FIG. **2** is a rear perspective view thereof;
FIG. **3** is a front plan view thereof;
FIG. **4** is a rear plan view thereof;
FIG. **5** is a right side view thereof, the left side view being a mirror image thereof;
FIG. **6** is a top view thereof, the bottom view being a mirror image thereof; and,
FIG. **7** is an enlarged view of the portion illustrated in circle **7** in FIG. **1**.

The broken lines shown in the drawings are included for illustrative purposes only and form no part of the claimed design.

1 Claim, 6 Drawing Sheets





(56) **References Cited**

U.S. PATENT DOCUMENTS

3,237,483	A	3/1966	Kelley et al.	
3,253,483	A	5/1966	McCaw	
3,706,239	A	12/1972	Myers	
3,918,314	A	11/1975	Osipyan	
4,248,105	A	2/1981	Downing et al.	
D262,033	S *	11/1981	Totsu	D15/138
4,791,832	A	12/1988	McCaw	
5,030,185	A	7/1991	Kawamura	
5,232,415	A	8/1993	Brewer	
5,472,385	A	12/1995	Vu	
5,984,823	A	11/1999	Gage	
6,592,487	B2	7/2003	Gassmann	
6,599,217	B2	7/2003	Caringella et al.	
D498,777	S *	11/2004	Hu	D15/148
D498,778	S *	11/2004	Hu	D15/148
D579,296	S *	10/2008	Popov	D8/70
8,133,146	B2	3/2012	Radzevich et al.	
D660,888	S *	5/2012	Piliguian	D15/126
8,353,800	B2 *	1/2013	Kumar et al.	475/226
D702,269	S *	4/2014	Eisenblatter	D15/126
2008/0022798	A1 *	1/2008	Zeise	74/424.5
2009/0019966	A1	1/2009	Valente	
2010/0317480	A1 *	12/2010	Cochren et al.	475/220
2012/0227529	A1 *	9/2012	Fischer et al.	74/434
2013/0042711	A1 *	2/2013	Napau et al.	74/417
2013/0302144	A1 *	11/2013	Demtroder et al.	415/124.2
2014/0271010	A1 *	9/2014	Napau et al.	409/12

FOREIGN PATENT DOCUMENTS

DE	102006046096	A1	4/2008
EP	0227152	A1	7/1987

OTHER PUBLICATIONS

Litvin, et al., Face Gear Drive with Helical Involute Pinion: Geometry, Generation by a Shaper and a Worm, Avoidance of Singularities and Stress Analysis, Feb. 2005, 62 pgs.

* cited by examiner

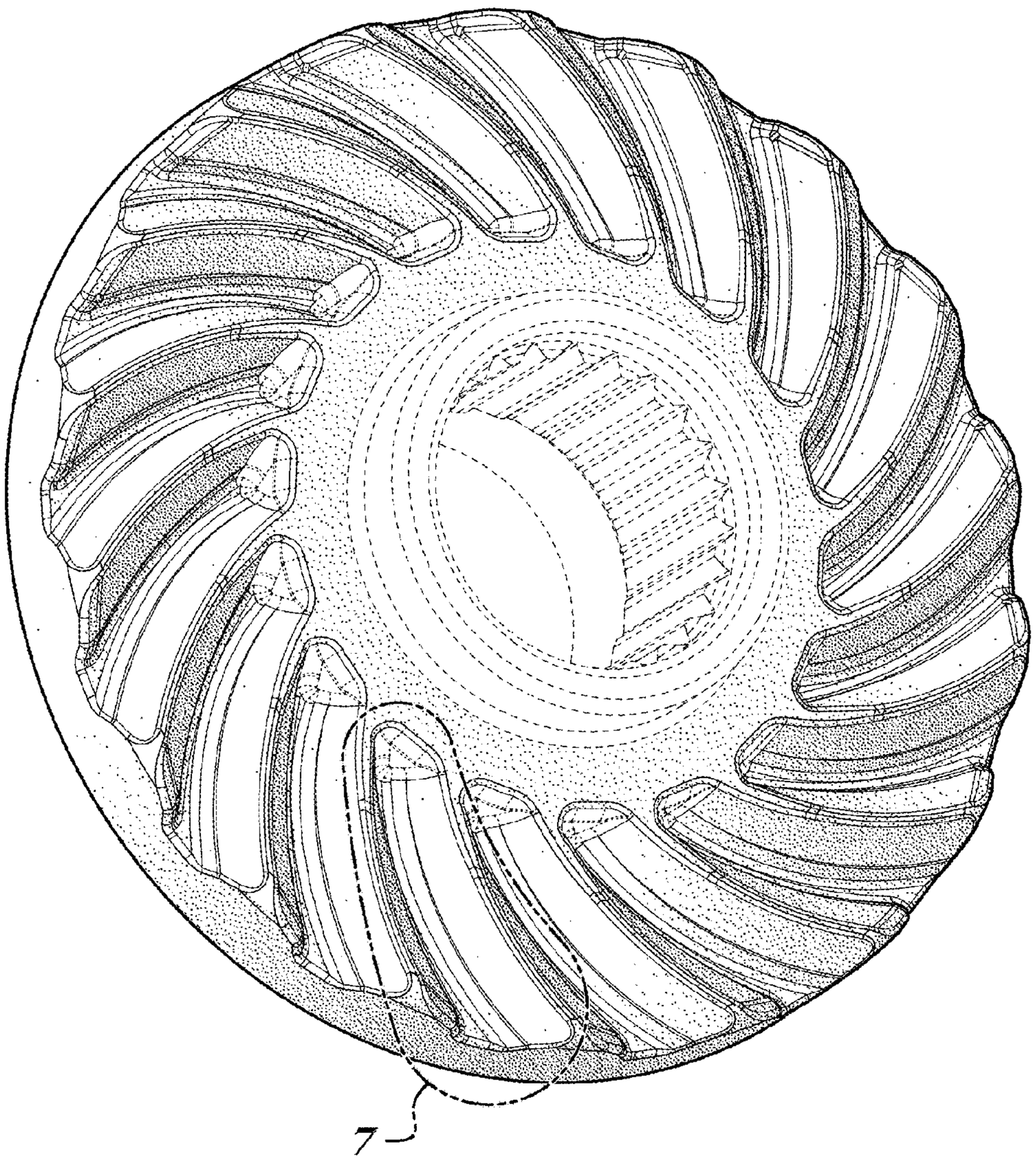


FIG.1

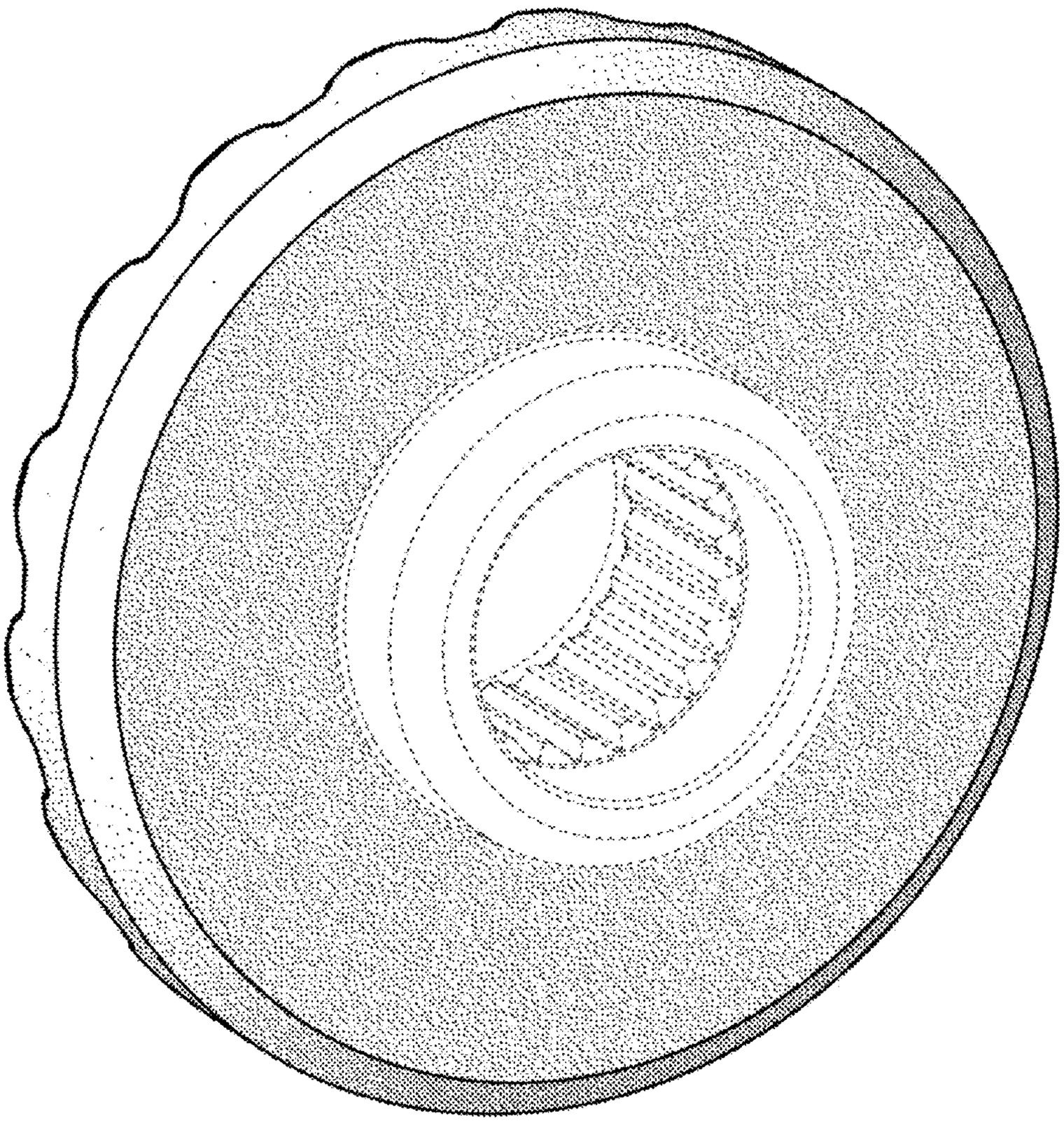


FIG.2

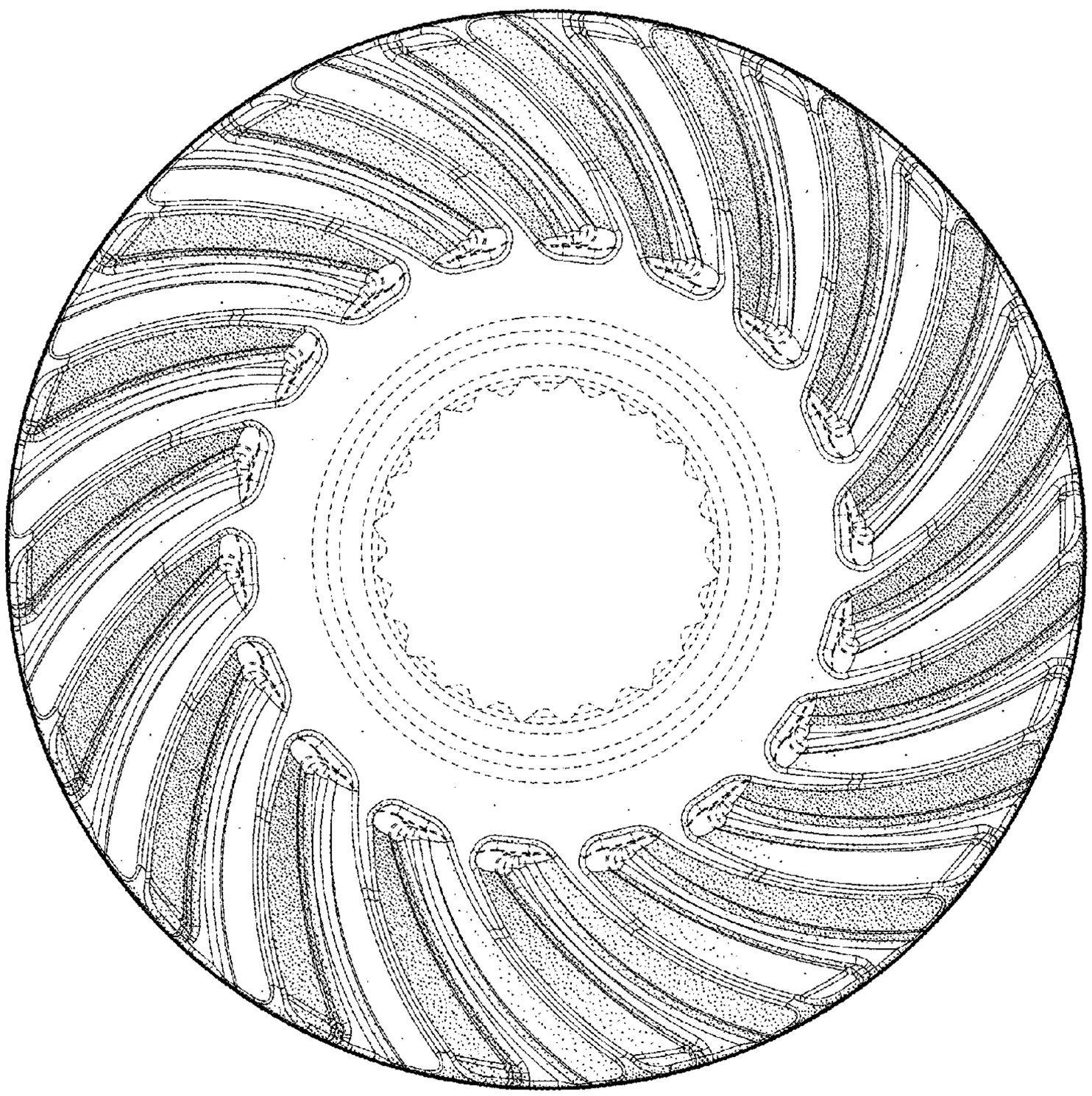


FIG.3

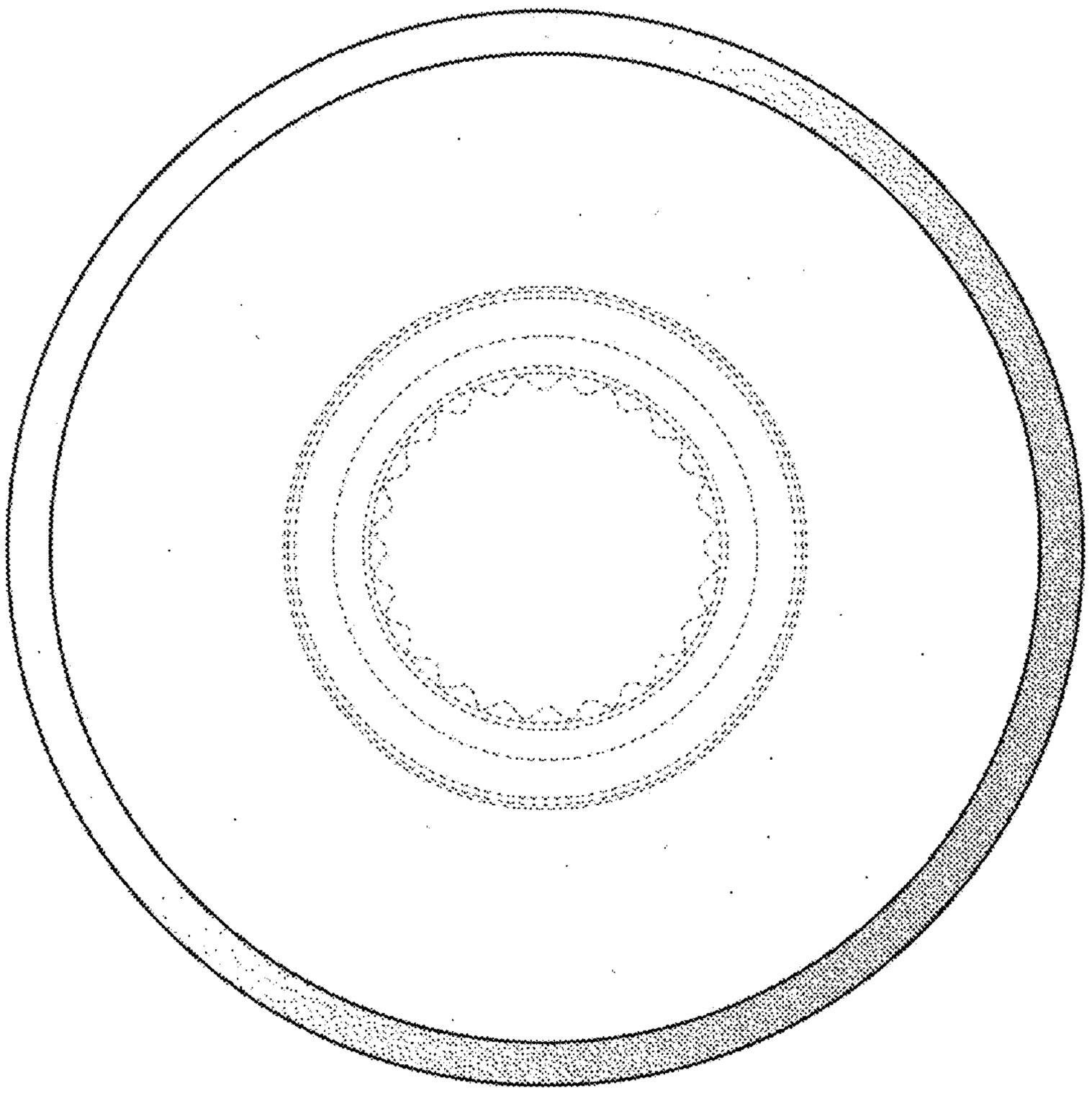


FIG.4

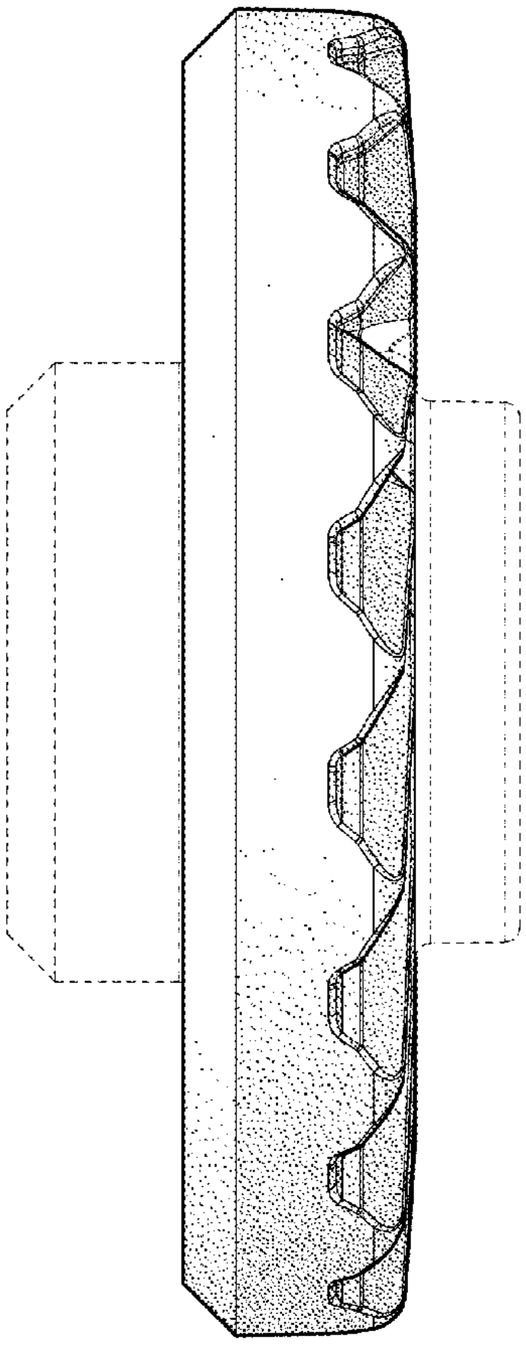


FIG.5

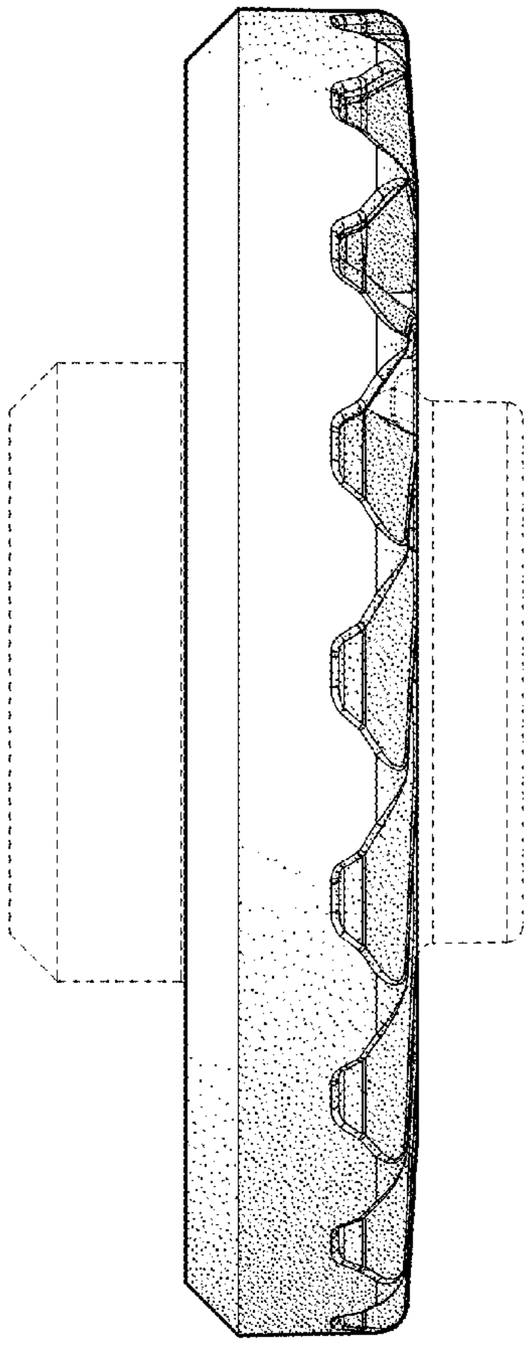


FIG.6

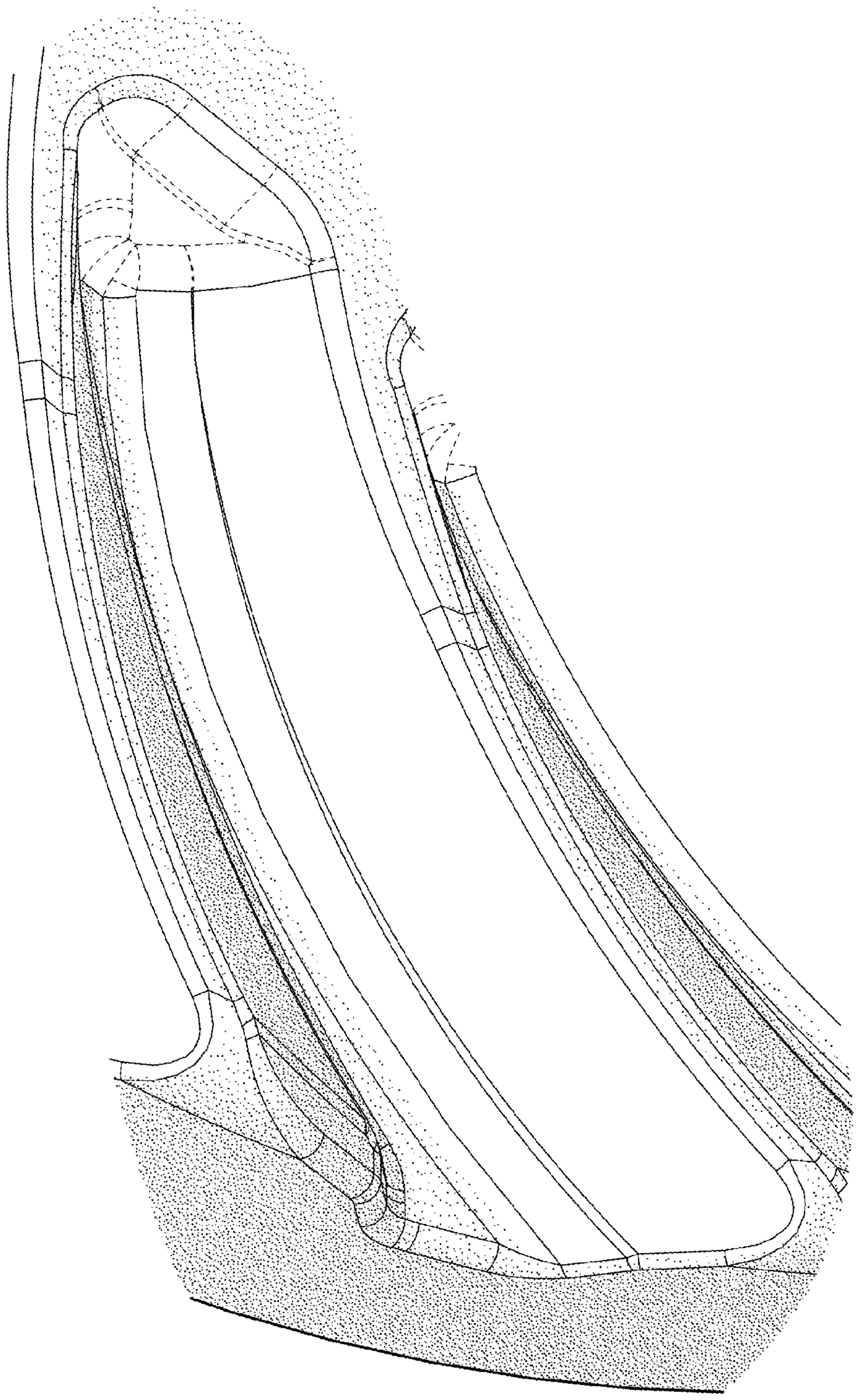


FIG. 7