



US00D858593S

(12) **United States Design Patent** (10) **Patent No.:** **US D858,593 S**  
**Sharivker et al.** (45) **Date of Patent:** **\*\* Sep. 3, 2019**

(54) **SOLID END MILL**

FOREIGN PATENT DOCUMENTS

(71) Applicant: **Kennametal Inc.**, Latrobe, PA (US)

DE 20310713 10/2003  
DE 10225481 A1 12/2003

(72) Inventors: **Leonid Boris Sharivker**, Nahariya (IL); **Sergei Vladimir Boulakhov**, Nahariya (IL)

(Continued)

(73) Assignee: **KENNAMETAL INC.**, Latrobe, PA (US)

Oct. 12, 2018 Non-Final OA.

(Continued)

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

*Primary Examiner* — Khawaja Anwar

(74) *Attorney, Agent, or Firm* — Matthew S. Bedsole

(21) Appl. No.: **29/608,360**

(22) Filed: **Jun. 21, 2017**

(57) **CLAIM**

We claim the ornamental design for a solid end mill, as shown and described.

(30) **Foreign Application Priority Data**

**DESCRIPTION**

Dec. 20, 2016 (IL) ..... 249676

(51) **LOC (12) Cl.** ..... **15-03**

(52) **U.S. Cl.**  
USPC ..... **D15/139**

(58) **Field of Classification Search**  
USPC ..... D15/21, 138, 139; D8/1, 3, 8, 98  
CPC ..... B23K 26/032; B23K 11/0026; B23K 11/062; B23K 11/066; B23K 11/0873; B23K 11/0876; B23K 11/115; B23K 11/24; B23K 11/248; B23K 11/252; B23K 11/257; B23K 11/3018; B23K 11/3054; B23K 11/36; B23K 15/0013; B23K 15/02; B23K 15/08; B23K 15/085; B23K 1/0014; B23K 1/0018; B23K 1/0056; B23K 20/12;

(Continued)

FIG. 1 is a perspective top view of a solid end mill showing the first embodiment of our new design;  
FIG. 2 is a side view of the solid end mill of FIG. 1;  
FIG. 3 is a top view of the solid end mill of FIG. 1;  
FIG. 4 is a bottom view of the cutting insert and bolster of FIG. 1;  
FIG. 5 is a perspective top view of a solid end mill showing the second embodiment of our new design;  
FIG. 6 is a side view of the solid end mill of FIG. 5;  
FIG. 7 is a top view of the solid end mill of FIG. 5;  
FIG. 8 is a bottom view of the cutting insert and bolster of FIG. 5;  
FIG. 9 is a perspective top view of a solid end mill showing the third embodiment our new design;  
FIG. 10 is a side view of the solid end mill of FIG. 9;  
FIG. 11 is a top view of the solid end mill of FIG. 9; and,  
FIG. 12 is a bottom view of the cutting insert and bolster of FIG. 9.

The broken line showings of FIGS. 1-12 are included for the purposes of illustrating portions of the solid end mill and form no part of the claimed design.

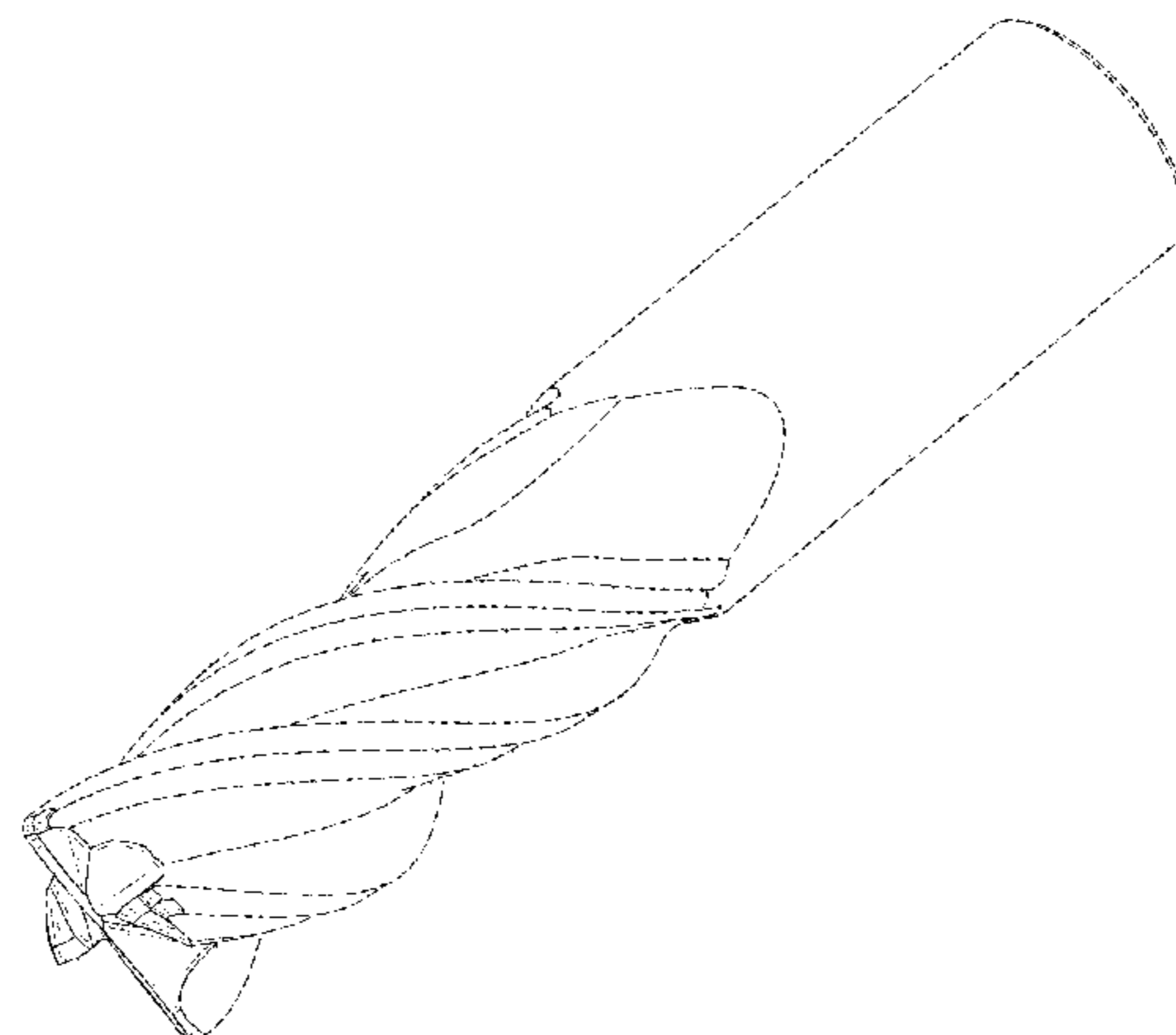
(56) **References Cited**

U.S. PATENT DOCUMENTS

4,963,059 A 10/1990 Hiyama  
5,049,009 A 9/1991 Beck

(Continued)

**1 Claim, 9 Drawing Sheets**



(58) **Field of Classification Search**

CPC ..... B23K 20/1215; B23K 2201/001; B23K 2201/04; B23K 2201/125; B23K 2203/04; B23K 2203/10; B23K 2203/16; B23K 2203/26; B23K 2203/42; B23K 2203/52; B23K 26/03; B23K 26/034; B23K 26/044; B23K 26/0619; B23K 26/123; B23K 26/1429; B23K 26/20; B23K 26/28; B23K 26/362; B23K 26/38; B23K 26/382; B23K 31/02; B23K 31/12; B23K 35/0222; B23K 35/0244; B23K 35/025; B23K 35/0261; B23K 35/286; B23K 35/3006; B23K 35/3013; B23K 35/302; B23K 35/3033; B23K 35/3046; B23K 35/327; B23K 35/36; B23K 35/3603; B23K 35/3605; B23K 35/3613; B23K 35/365; B23K 37/04; B23K 9/02; B23K 9/073; B23K 9/091; B23K 9/092; B23K 9/095; B23K 9/0956; B23K 9/1006

See application file for complete search history.

2005/0084352	A1*	4/2005	Borschert .....	B23B 51/02 408/226
2007/0154272	A1	7/2007	Wells et al.	
2007/0286691	A1	12/2007	Glimpel	
2010/0054881	A1*	3/2010	Thomas .....	B23B 51/02 408/1 BD
2010/0143052	A1	6/2010	Aoki	
2010/0272529	A1*	10/2010	Rozzi .....	B23C 5/207 408/56
2010/0322723	A1*	12/2010	Danielsson .....	B23B 51/02 407/114
2011/0150583	A1	6/2011	Engstrom	
2012/0003057	A1*	1/2012	Leyba .....	B23B 31/005 408/226
2012/0034043	A1*	2/2012	Krieg .....	B23B 51/02 408/230
2012/0087753	A1*	4/2012	Kataoka .....	B23B 51/02 408/1 R
2012/0201619	A1*	8/2012	Olsson .....	B23B 51/02 408/230
2013/0266389	A1*	10/2013	Hecht .....	B23B 51/02 408/229
2014/0003873	A1	1/2014	Han	
2014/0133926	A1	5/2014	Budda et al.	
2014/0193220	A1*	7/2014	Tamura .....	B23B 51/02 408/230
2015/0210910	A1	7/2015	Hejtmann et al.	
2016/0303664	A1	10/2016	Azegami	

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,322,394	A	6/1994	Okanishi	
5,622,462	A *	4/1997	Gakhar .....	B23B 51/02 408/230
6,899,494	B2	5/2005	Walrath	
6,991,409	B2	1/2006	Noland	
6,997,651	B2	2/2006	Kawai	
8,807,882	B2	8/2014	Volokh	
9,364,904	B2	6/2016	Osawa	
D774,573	S	12/2016	Sharivker	
D792,489	S	7/2017	Sharivker	
D793,460	S	8/2017	Sharivker	
D798,921	S *	10/2017	Frota de Souza Filho ..	D15/139
D814,536	S *	4/2018	Kawakami .....	D15/139
D815,672	S *	4/2018	Shikama .....	D15/139
2004/0105729	A1	6/2004	Giessler et al.	

FOREIGN PATENT DOCUMENTS

DE	112011102667	T5	7/2013
DE	102014106886	A1	12/2014
DE	102016104158	A1	9/2016
WO	WO2015068824	A1	5/2015
WO	WO2016056266	A1	4/2016

OTHER PUBLICATIONS

Sep. 24, 2018 Foreign OA.  
 Aug. 12, 2018 Foreign OA.  
 Feb. 7, 2019 Non-Final OA.

\* cited by examiner

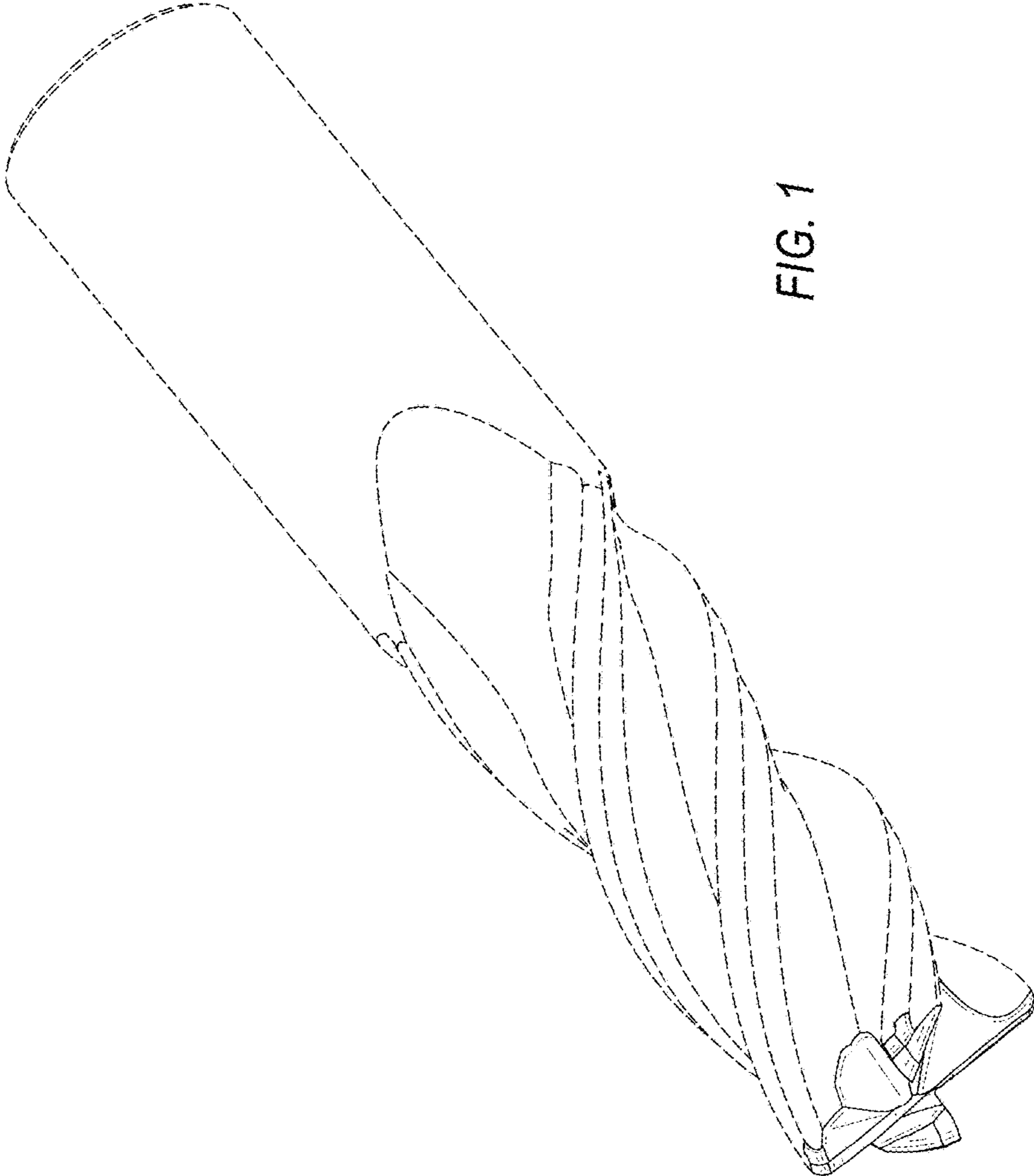


FIG. 1

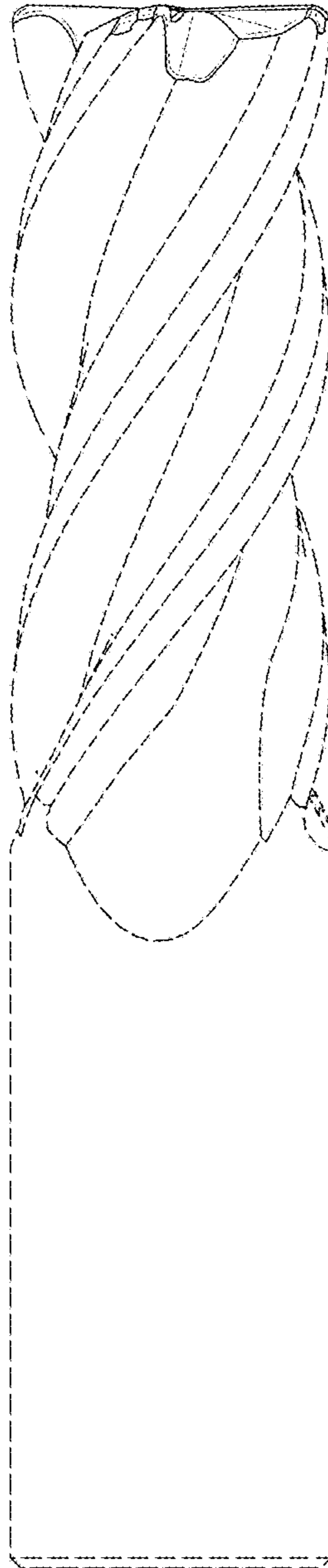


FIG. 2

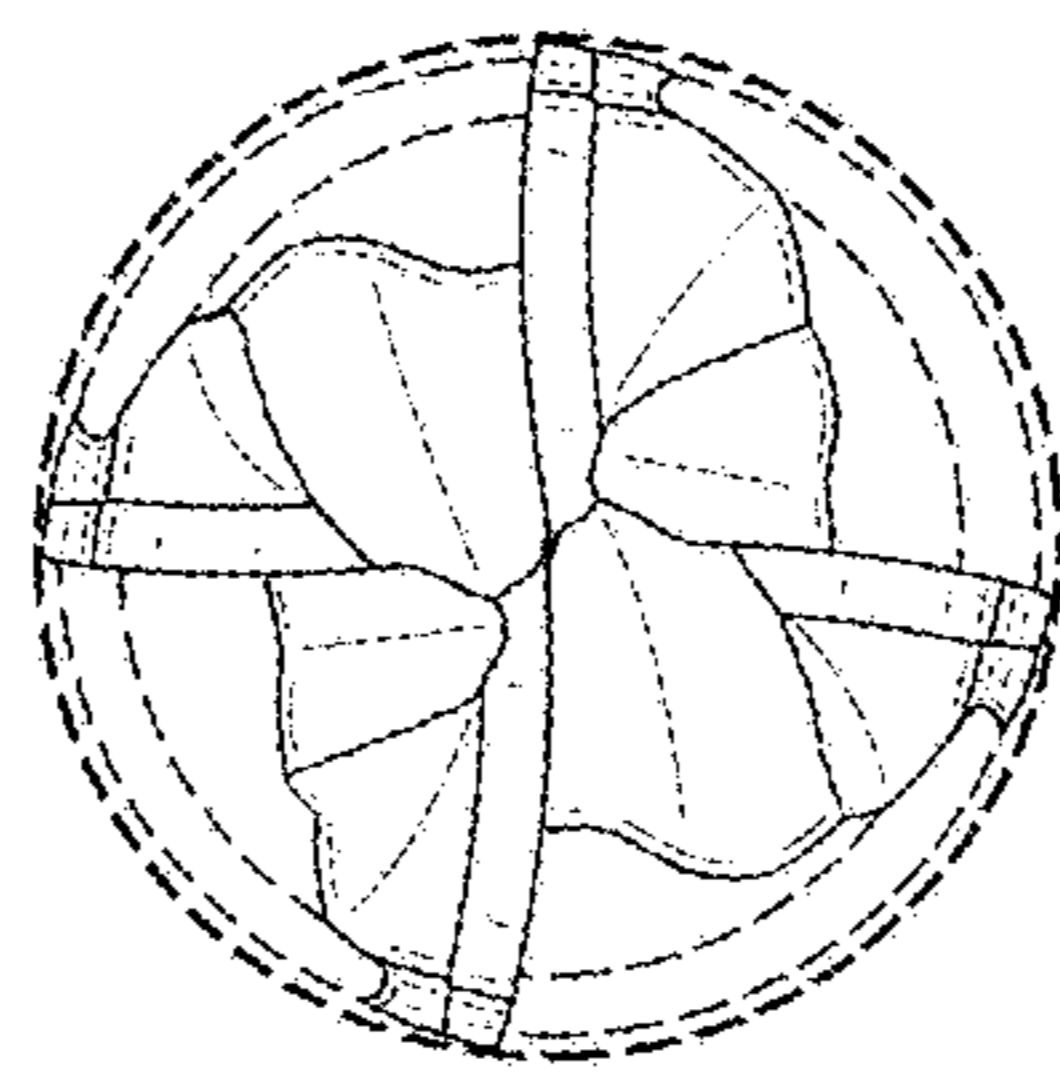


FIG. 3

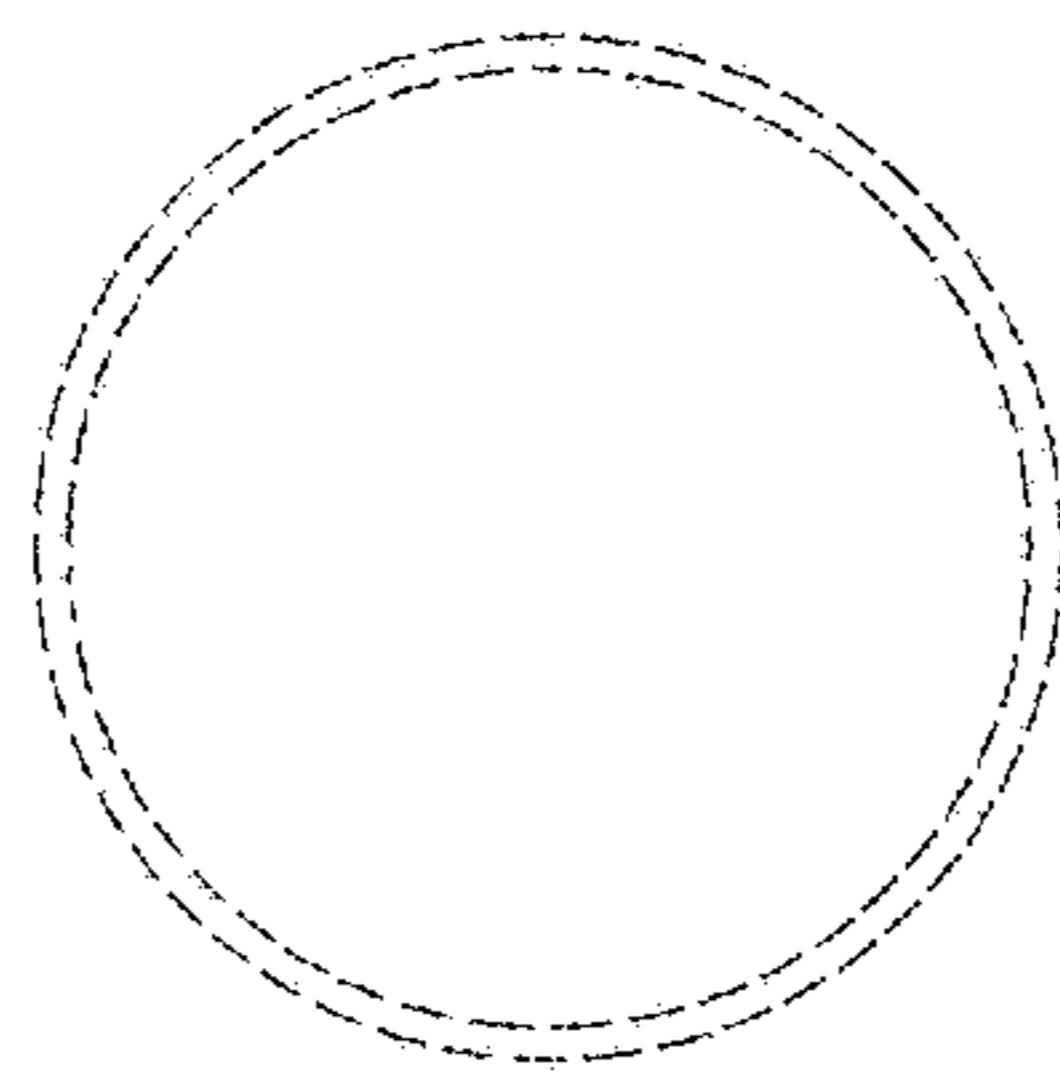


FIG. 4



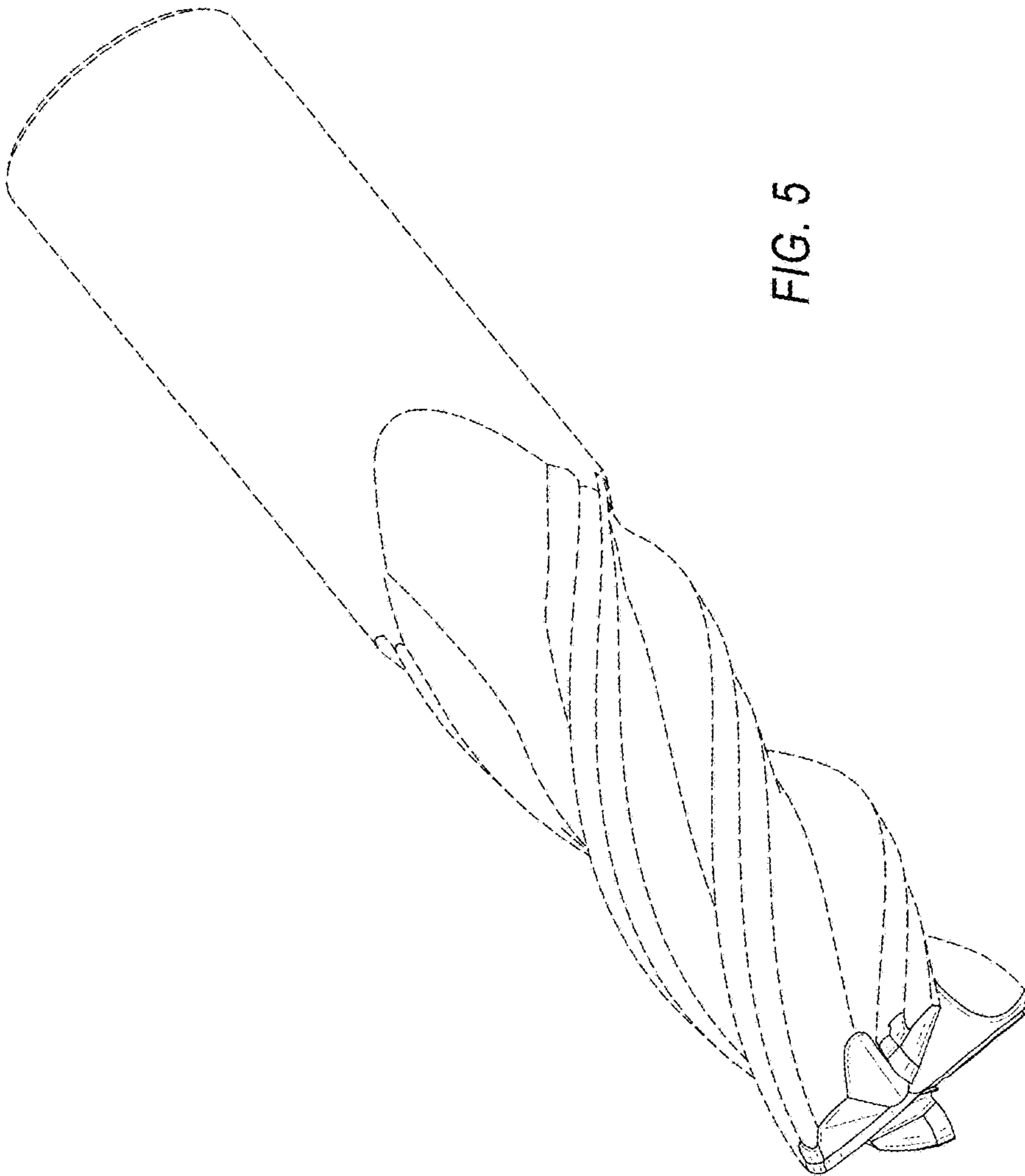


FIG. 5

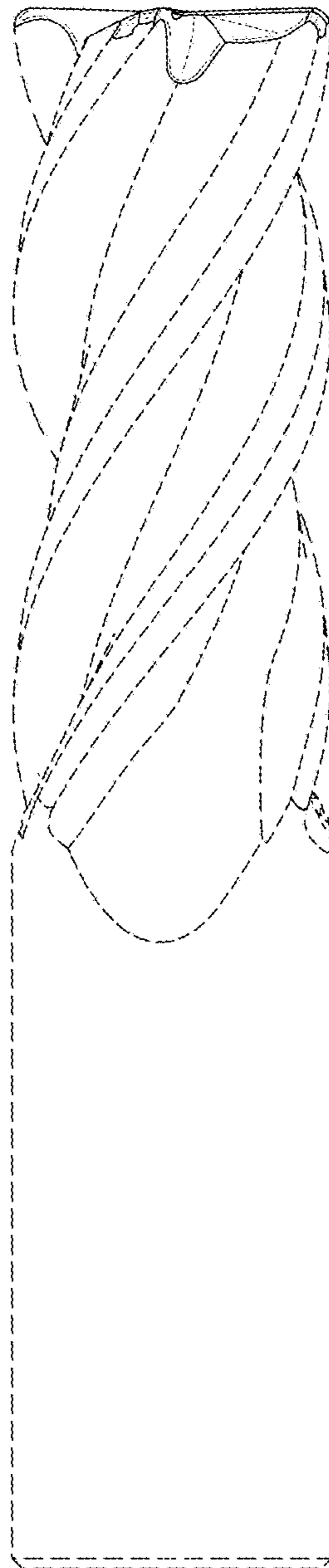


FIG. 6

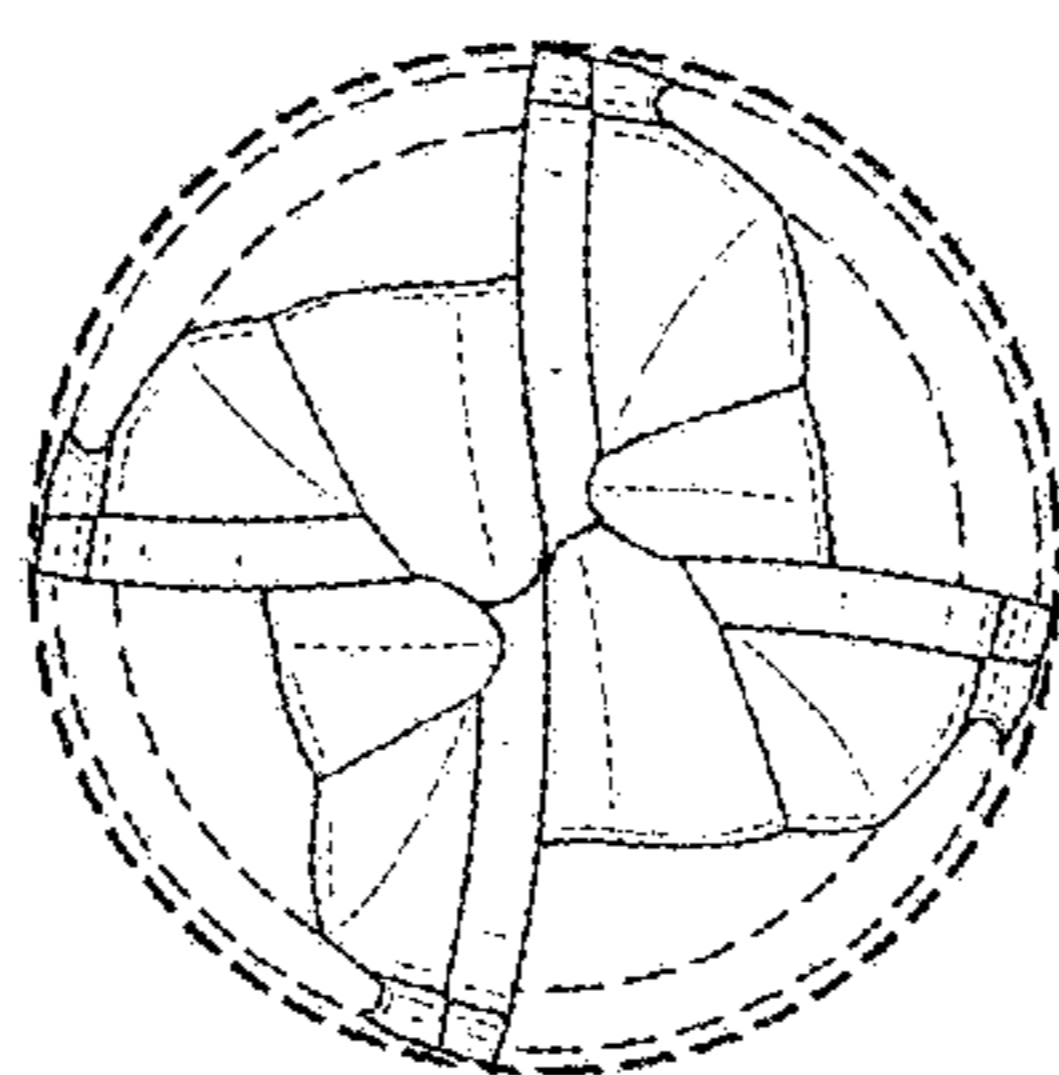


FIG. 7

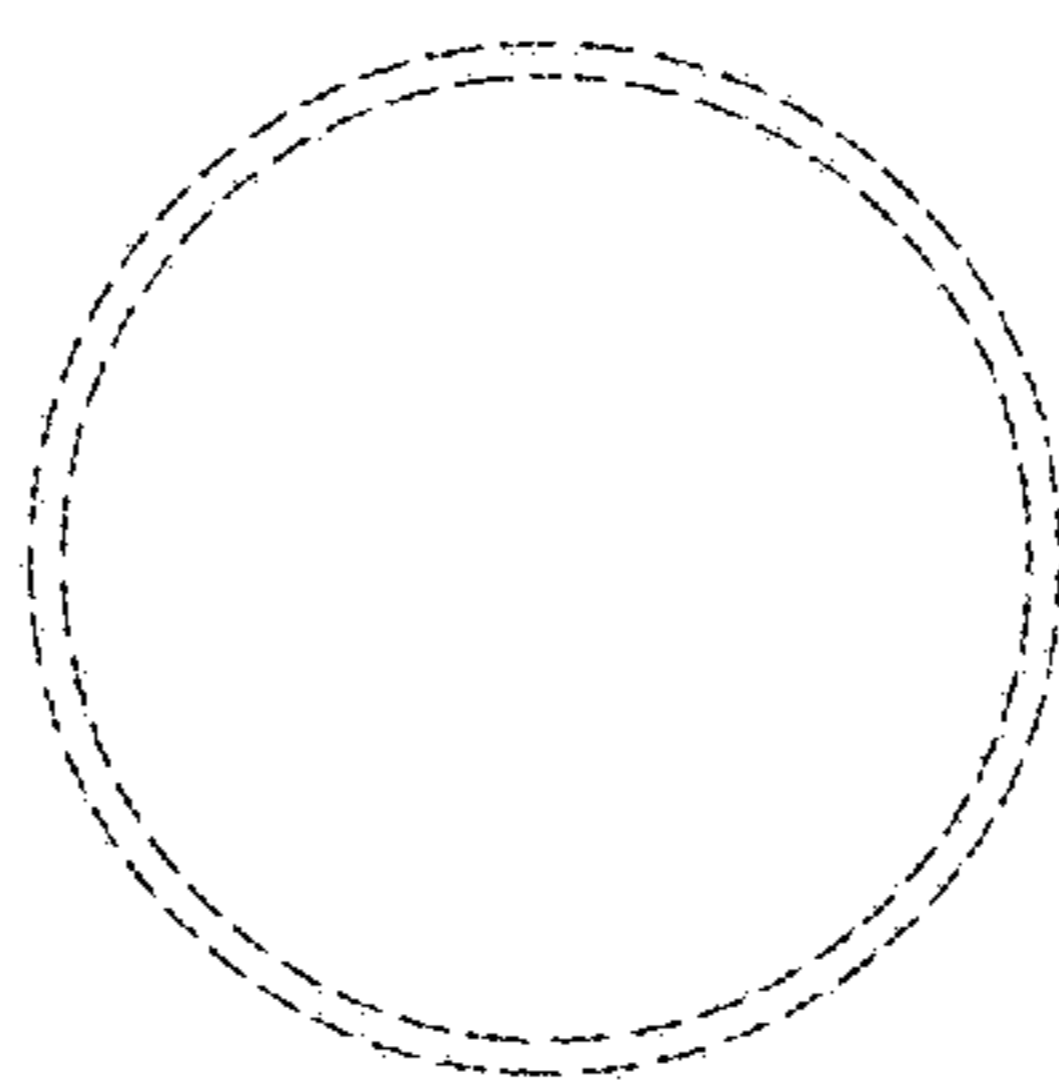


FIG. 8



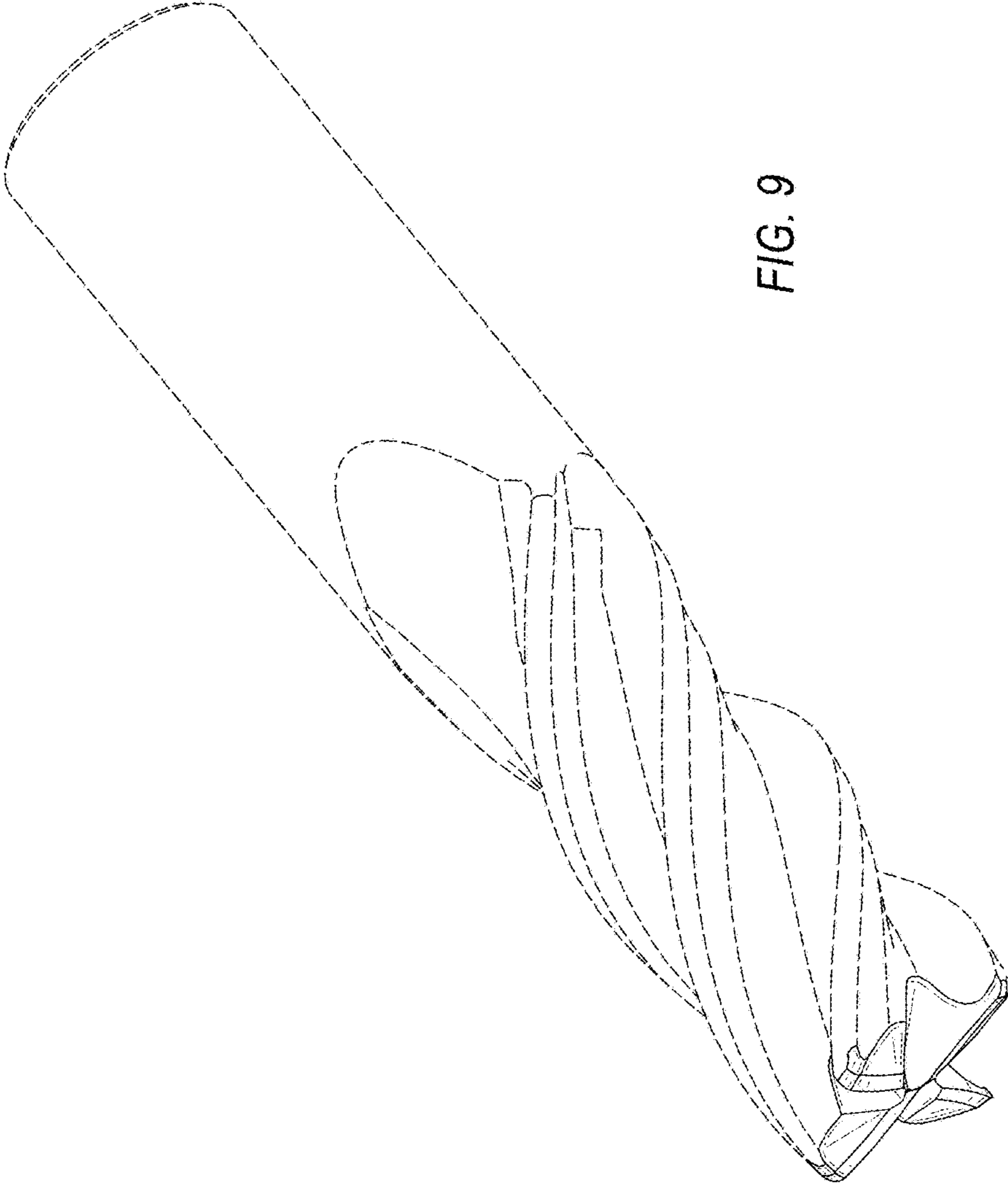


FIG. 9

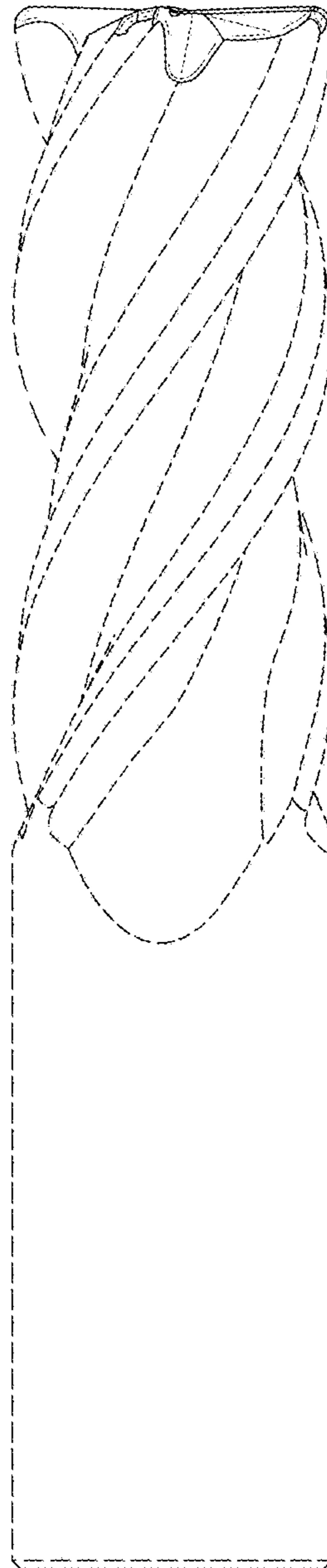


FIG. 10

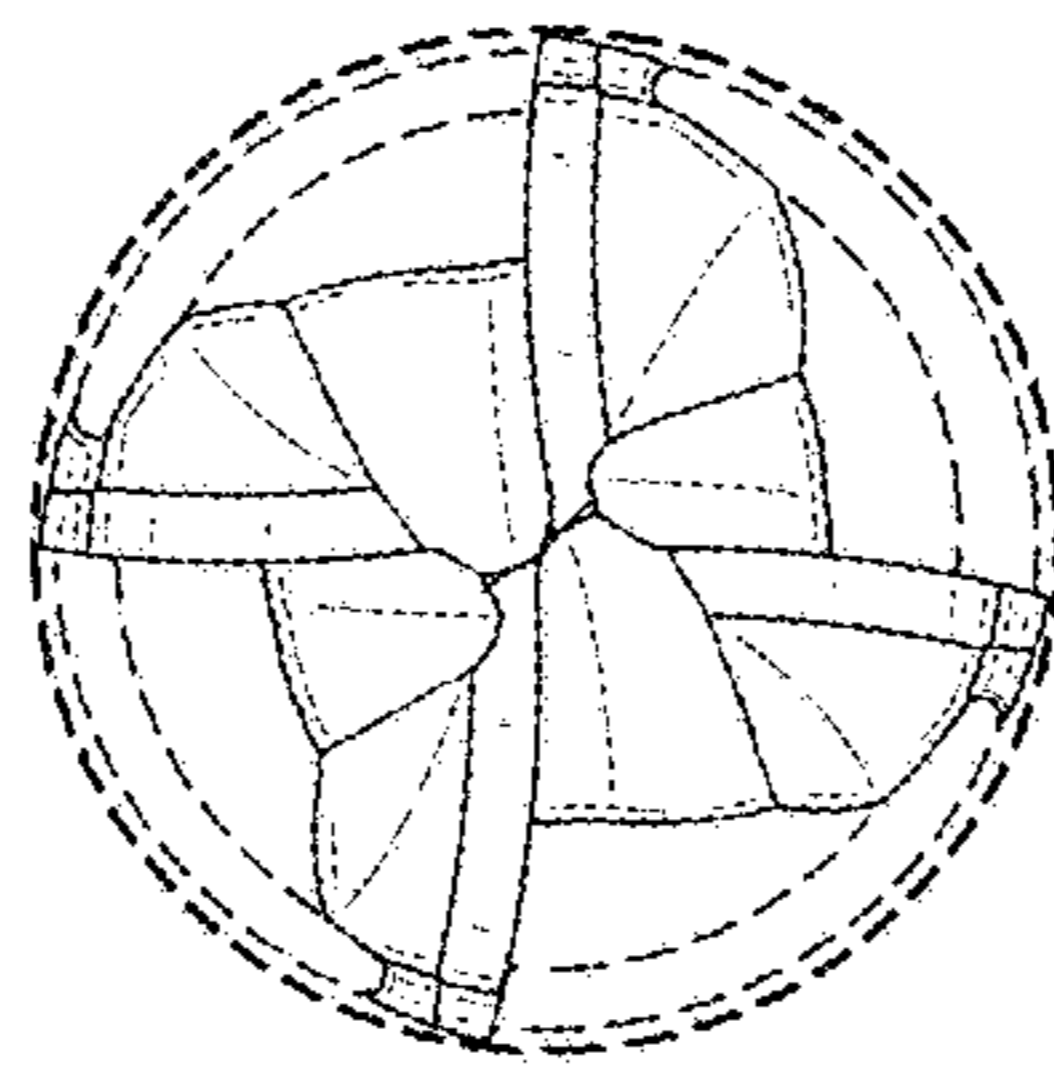


FIG. 11

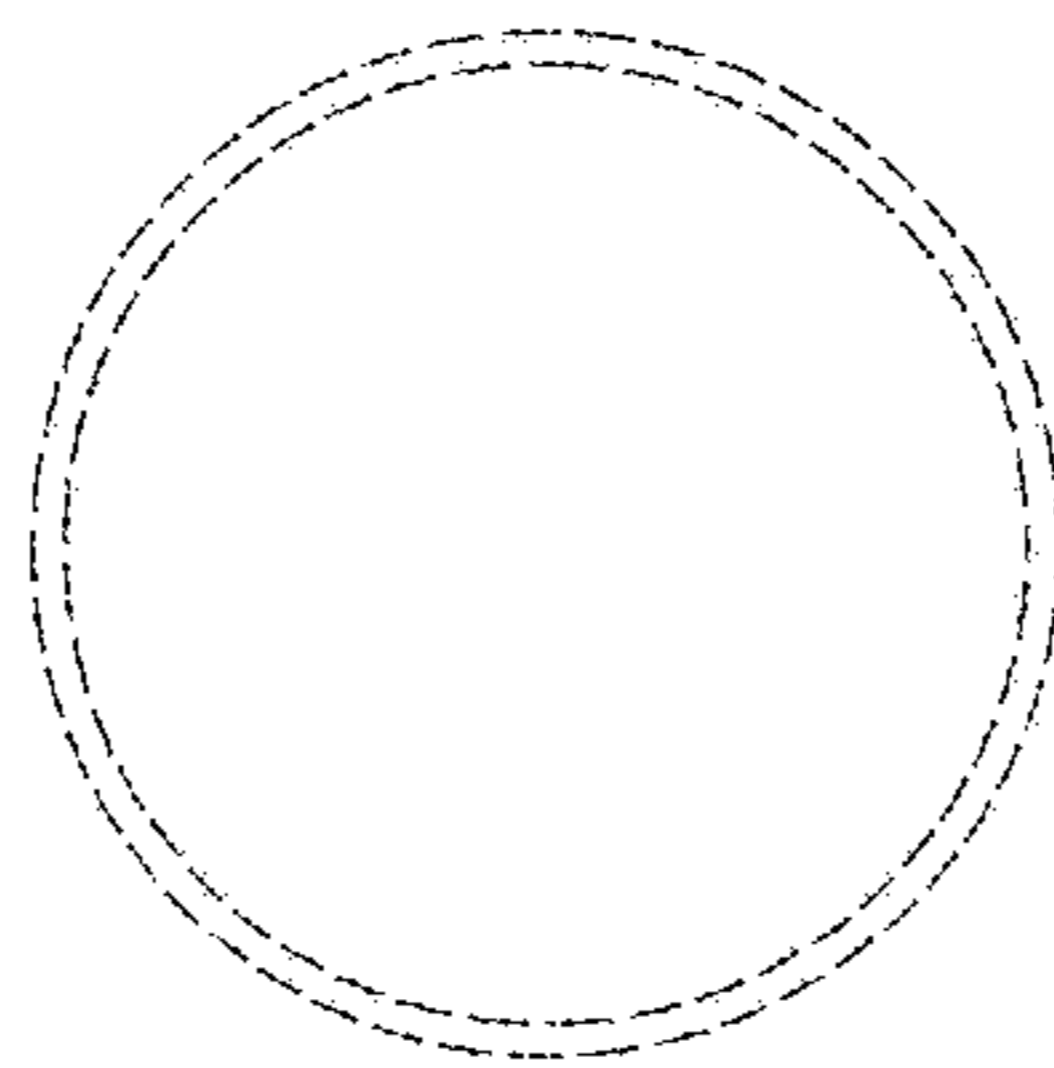


FIG. 12