



US00D784432S

(12) **United States Design Patent** (10) **Patent No.:** **US D784,432 S**
Yamaguchi et al. (45) **Date of Patent:** **** Apr. 18, 2017**

- (54) **PLASMA TORCH ELECTRODE** 5,266,776 A 11/1993 Boisvert et al.
5,514,848 A * 5/1996 Ross H05H 1/34
219/119
- (71) Applicants: **KOMATSU LTD.**, Tokyo (JP);
KOMATSU INDUSTRIES CORP.,
Kanazawa-shi, Ishikawa (JP) 5,540,046 A 7/1996 Sankovic et al.
5,856,647 A 1/1999 Luo
5,893,985 A 4/1999 Luo et al.
5,965,040 A 10/1999 Luo et al.
- (72) Inventors: **Yoshihiro Yamaguchi**, Nomi (JP);
Keita Kondo, Nomi (JP); **Shigeo**
Morimoto, Hiratsuka (JP); **Katsuo**
Saio, Hiratsuka (JP) 6,163,008 A 12/2000 Roberts et al.
D446,530 S 8/2001 Kuraoka et al.
6,559,407 B2 5/2003 Chancey et al.
D492,709 S 7/2004 Horner-Richardson et al.
D499,620 S 12/2004 Horner-Richardson et al.
(Continued)
- (73) Assignees: **KOMATSU LTD.**, Tokyo (JP);
KOMATSU INDUSTRIES CORP.,
Kanazawa-Shi, Ishikawa (JP)

- (**) Term: **15 Years**
- (21) Appl. No.: **29/534,303**
- (22) Filed: **Jul. 28, 2015**

- (30) **Foreign Application Priority Data**
Jan. 30, 2015 (JP) 2015-001796
- (51) **LOC (10) Cl.** **15-00**
- (52) **U.S. Cl.**
USPC **D15/144**
- (58) **Field of Classification Search**
USPC D8/14, 14.1, 29.1, 30; D15/122, 144,
D15/144.1, 144.2; 219/75, 121.5, 121.45,
219/121.48, 1, 121.51; 313/231.41
See application file for complete search history.

- (56) **References Cited**
U.S. PATENT DOCUMENTS
3,294,953 A * 12/1966 Spies, Jr. H05H 1/34
219/121.36
D231,834 S 6/1974 Gulrich
3,909,581 A 9/1975 Stone et al.
D269,519 S 6/1983 Braun
4,686,687 A 8/1987 Mure et al.

OTHER PUBLICATIONS

Office Actions from U.S. Appl. No. 29/534,306 dated Oct. 19, 2016;
10 pages; vacated and reissued on Dec. 7, 2016.

Primary Examiner — Patricia Palasik
(74) *Attorney, Agent, or Firm* — Fox Rothschild LLP

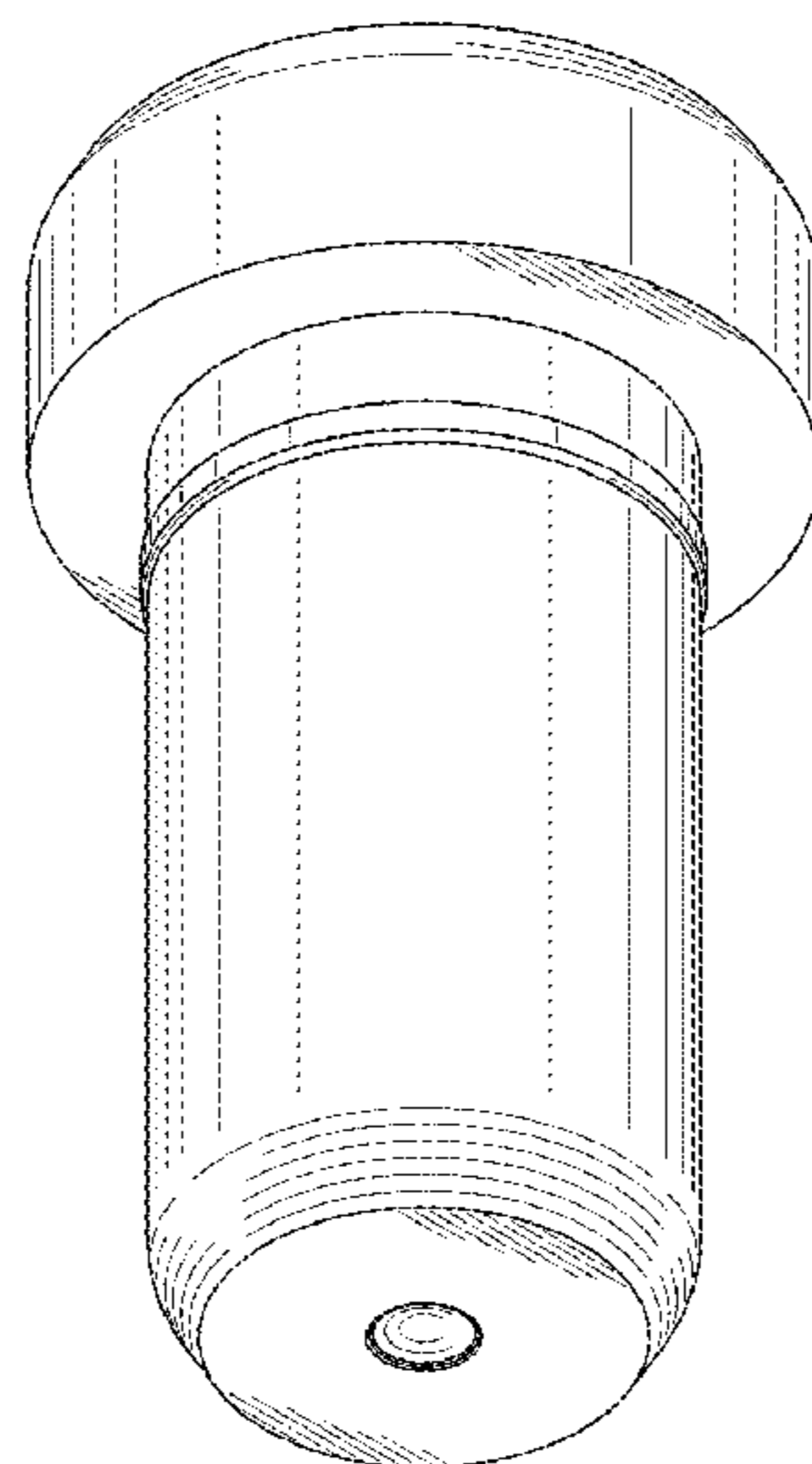
(57) **CLAIM**

The ornamental design for a plasma torch electrode, as shown and described.

DESCRIPTION

FIG. 1 is a front perspective view of a plasma torch electrode showing our new design;
FIG. 2 is a front view thereof, the rear view, the right side view and the left side view being identical to FIG. 2;
FIG. 3 is a top plan view thereof;
FIG. 4 is a bottom plan view thereof;
FIG. 5 is a cross-sectional view taken along line 5-5 in FIG. 2; and,
FIG. 6 is a cross-sectional view showing the article installed in a plasma torch.
The features shown in broken lines in the drawings depict environmental subject matter only and form no part of the claimed design.

1 Claim, 6 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

D504,142 S	4/2005	Horner-Richardson et al.
D511,280 S	11/2005	Horner-Richardson et al.
D517,577 S	3/2006	Conway et al.
7,500,590 B2	3/2009	Mironescu et al.
7,544,913 B2	6/2009	Helenius et al.
7,605,340 B2	10/2009	Duan
8,105,325 B2	1/2012	Suslov
8,338,740 B2	12/2012	Liebold et al.
9,101,041 B2	8/2015	Reinke et al.
9,426,874 B2	8/2016	Crowe et al.

* cited by examiner

FIG. 1

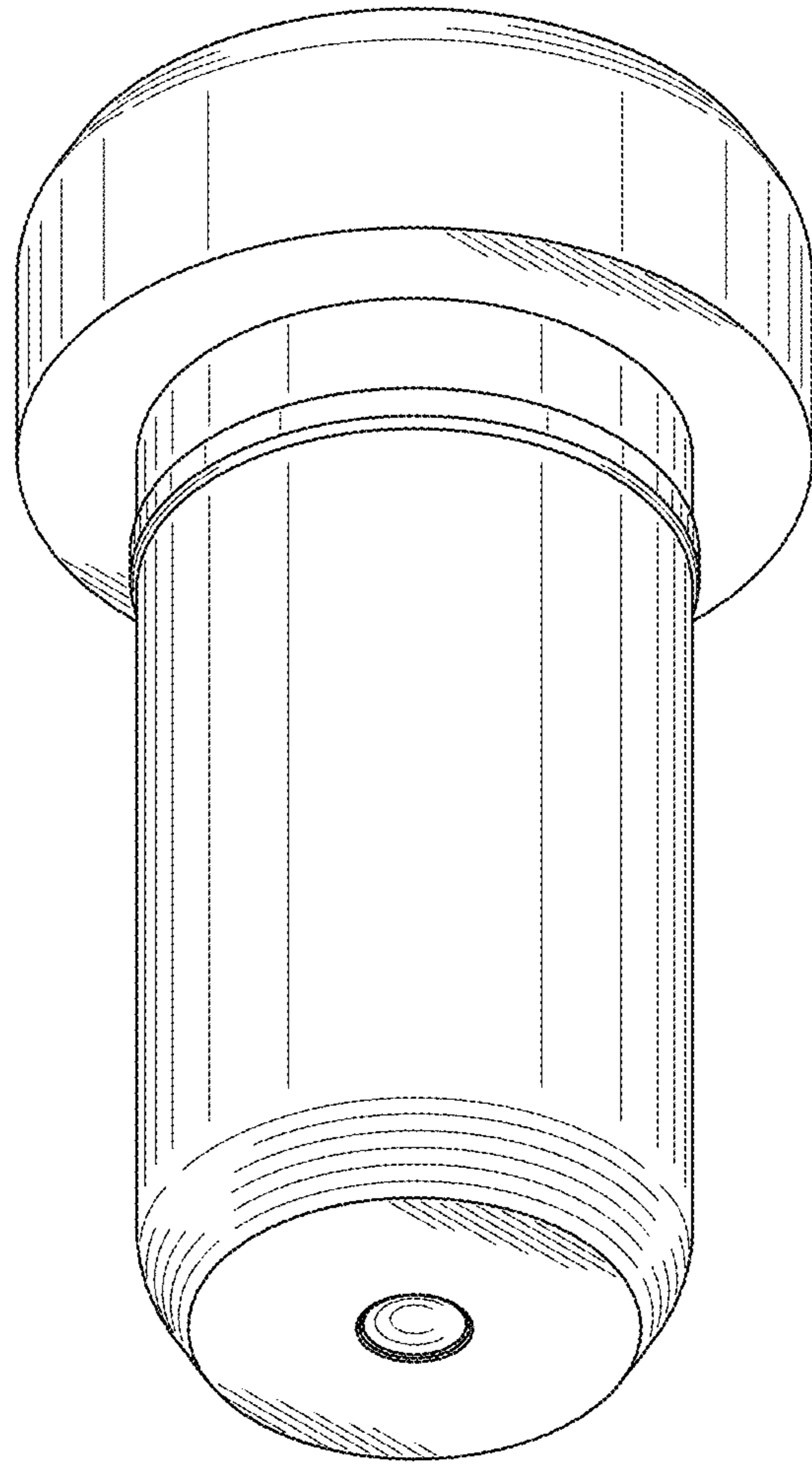
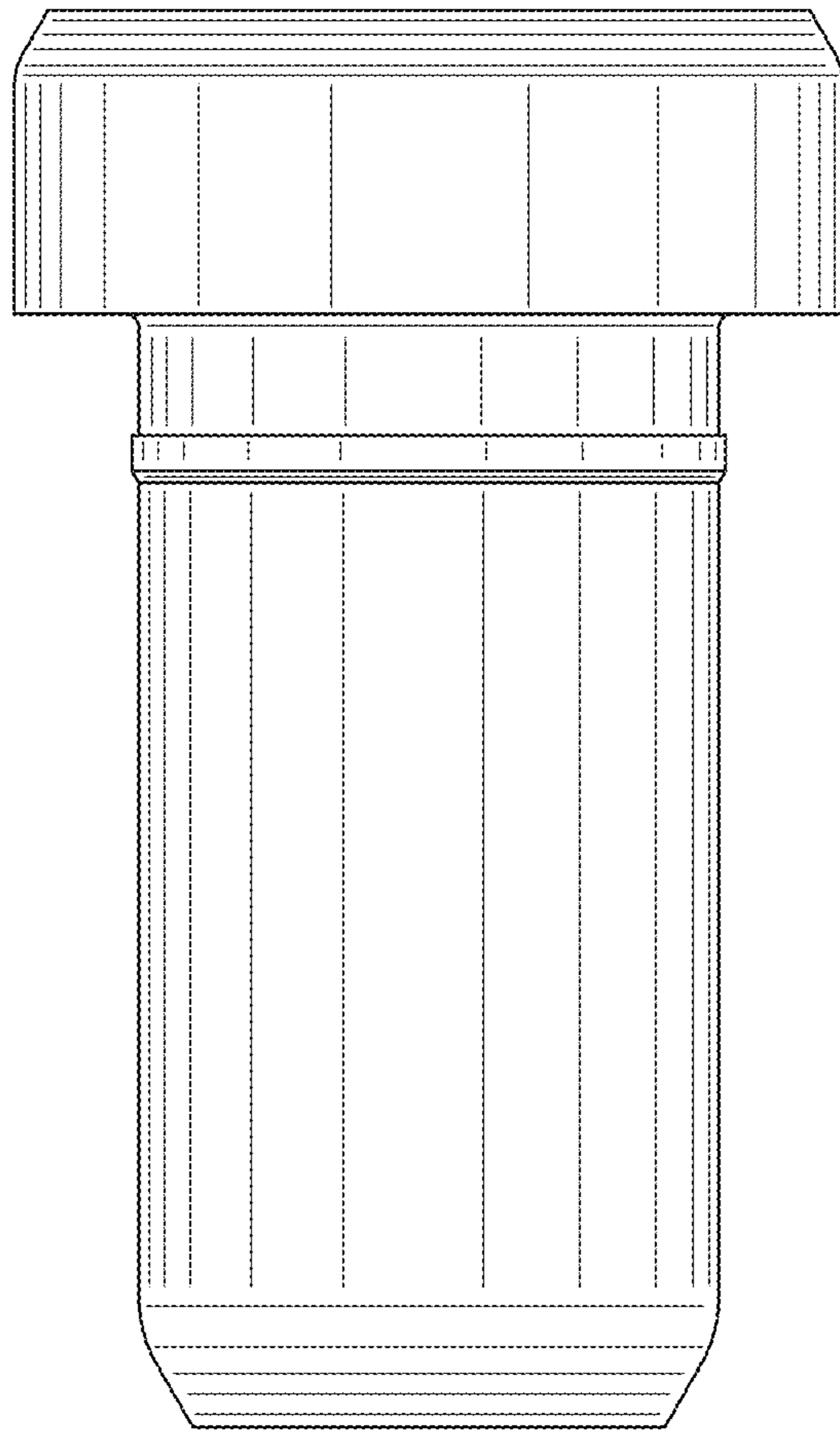


FIG. 2

5 ←



5 ←

FIG. 3

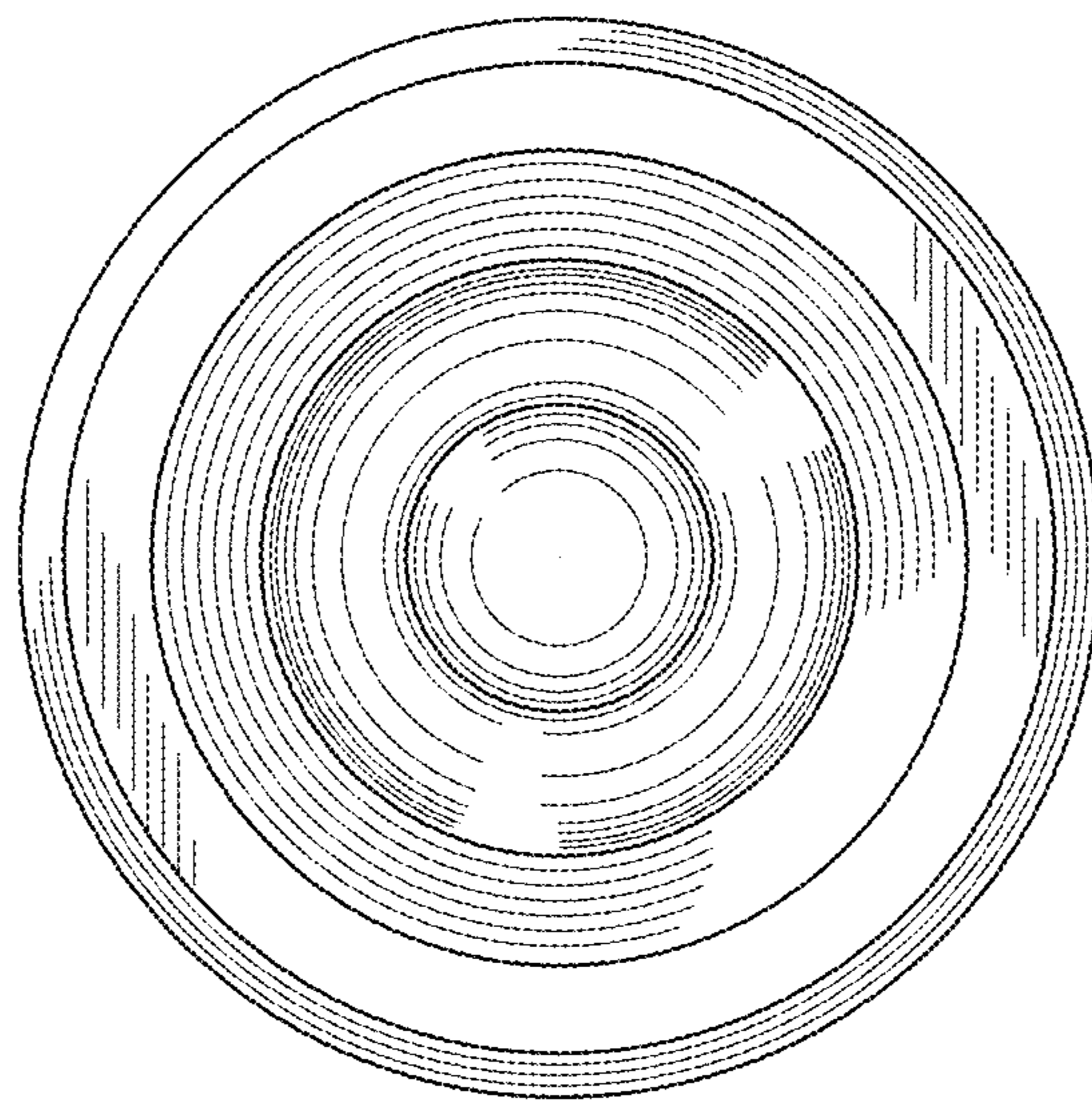


FIG. 4

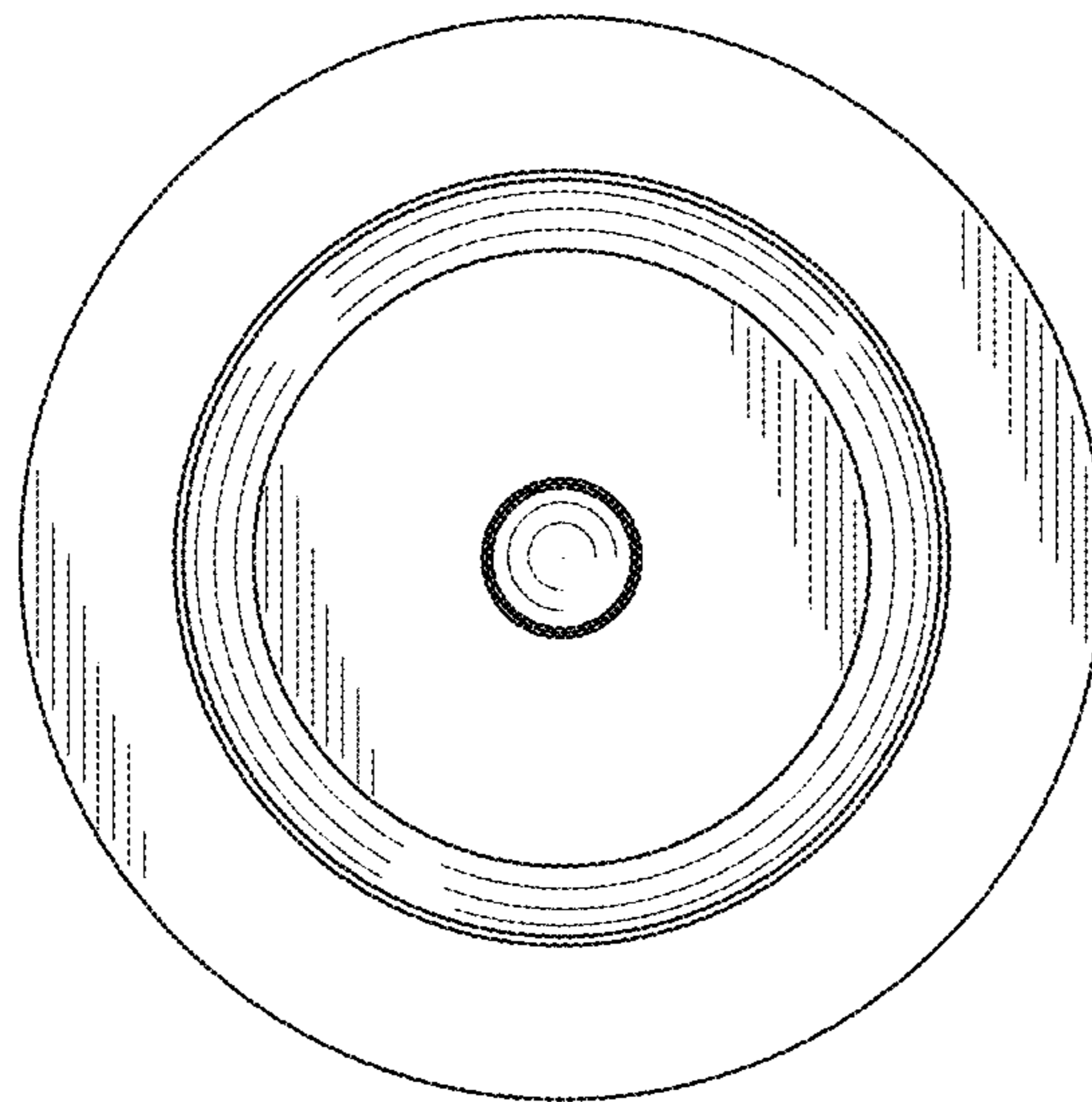


FIG. 5

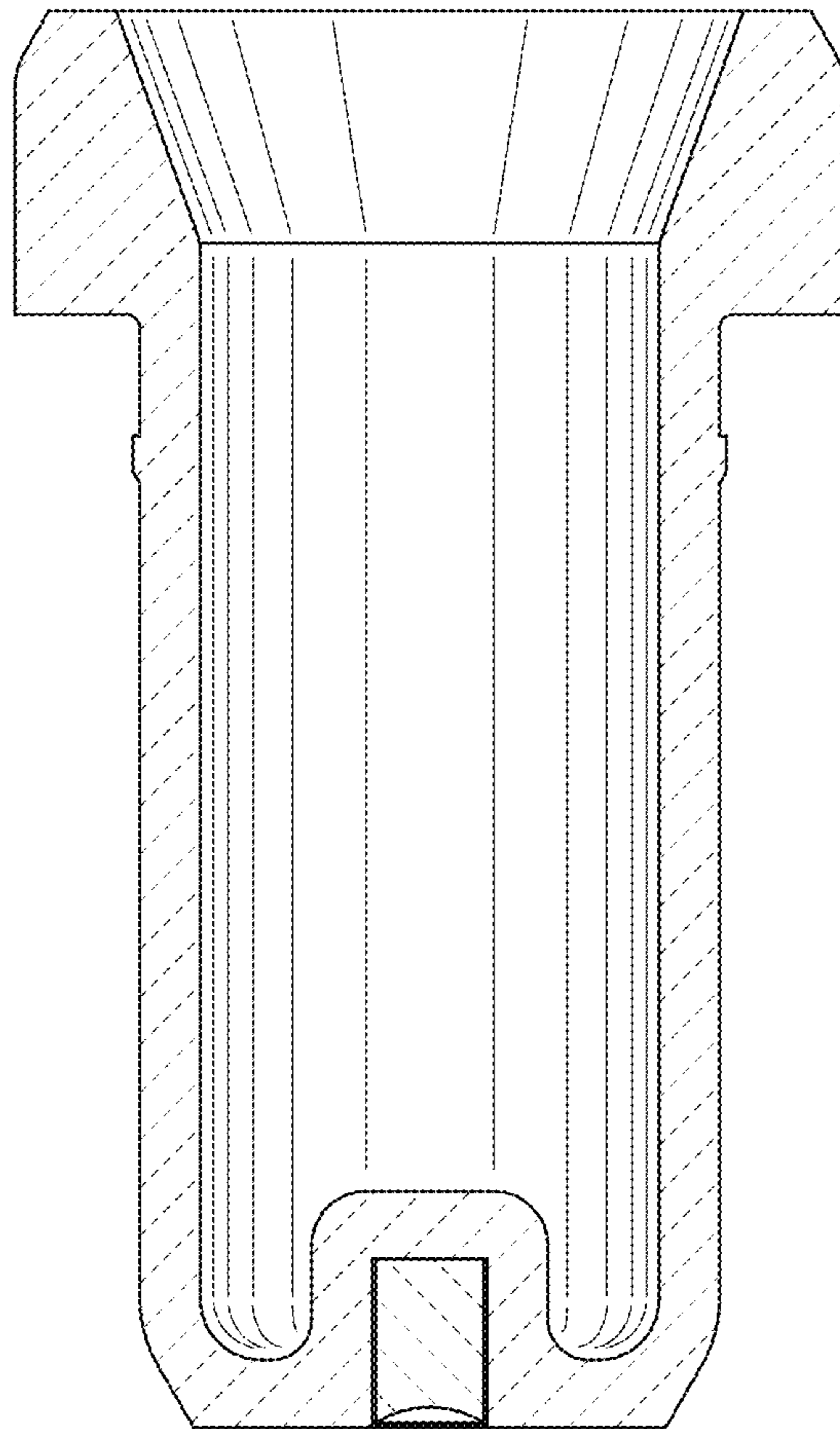


FIG. 6

