



US0D1104265S

(12) **United States Design Patent** (10) **Patent No.:** **US D1,104,265 S**
Lemaitre et al. (45) **Date of Patent:** **** Dec. 2, 2025**

- (54) **CONTROL ELECTRODE FOR AN X-RAY TUBE CATHODE**
- (71) Applicant: **GE Precision Healthcare LLC**,
Wauwatosa, WI (US)
- (72) Inventors: **Sergio Lemaitre**, Whitefish Bay, WI
(US); **Kevin Kruse**, Muskego, WI (US)
- (73) Assignee: **GE PRECISION HEALTHCARE LLC**, Wauwatosa, WI (US)
- (**) Term: **15 Years**
- (21) Appl. No.: **29/790,932**
- (22) Filed: **Dec. 21, 2021**
- (51) **LOC (15) Cl.** **24-01**
- (52) **U.S. Cl.**
USPC **D24/158**
- (58) **Field of Classification Search**
USPC D24/158, 159; D13/110, 121, 180, 181,
D13/184

(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 1,986,466 A * 1/1935 Ehrke H01J 35/066
378/138
D117,611 S * 11/1939 Eddy D24/158
(Continued)

FOREIGN PATENT DOCUMENTS

- JP 2001297725 A 10/2001
JP 5242842 B1 7/2013

OTHER PUBLICATIONS

Neculaes, V. et al., "Design and characterization of electron beam focusing for X-ray generation in novel medical imaging architecture," *Physics of Plasmas*, vol. 21, No. 5, May 2014, 9 pages.

Primary Examiner — T Chase Nelson
Assistant Examiner — Kelly L Gross
(74) *Attorney, Agent, or Firm* — McCoy Russell LLP

(57) **CLAIM**

The ornamental design for a control electrode for an X-ray tube cathode as shown and described.

DESCRIPTION

FIG. 1 is a top-front perspective view of a control electrode for an X-ray tube cathode according to a first embodiment the claimed design.

FIG. 2 is a top-rear perspective view thereof.

FIG. 3 is a front view thereof.

FIG. 4 is a rear view thereof.

FIG. 5 is a right side view thereof.

FIG. 6 is a left side view thereof.

FIG. 7 is a top view thereof.

FIG. 8 is a bottom view thereof.

FIG. 9 is a top-front perspective view of the control electrode for an X-ray tube cathode of FIG. 1 within a cathode assembly shown in environment.

FIG. 10 is a sectional view of control electrode for an X-ray tube cathode of FIG. 1 along line 10-10 in FIG. 7.

FIG. 11 is a sectional view of the control electrode for an X-ray tube cathode of FIG. 1 along line 11-11 in FIG. 3.

FIG. 12 is a sectional view of the control electrode for an X-ray tube cathode of FIG. 1 along line 12-12 in FIG. 3.

FIG. 13 is a sectional view of the control electrode for an X-ray tube cathode of FIG. 1 along line 13-13 in FIG. 3.

FIG. 14 is a top-front perspective view of a control electrode for an X-ray tube cathode with electron emitter filaments according to a second embodiment the claimed design.

FIG. 15 is a top-rear perspective view thereof.

FIG. 16 is a front view thereof.

FIG. 17 is a rear view thereof.

FIG. 18 is a right side view thereof.

FIG. 19 is a left side view thereof.

FIG. 20 is a top view thereof.

FIG. 21 is a bottom view thereof.

(Continued)

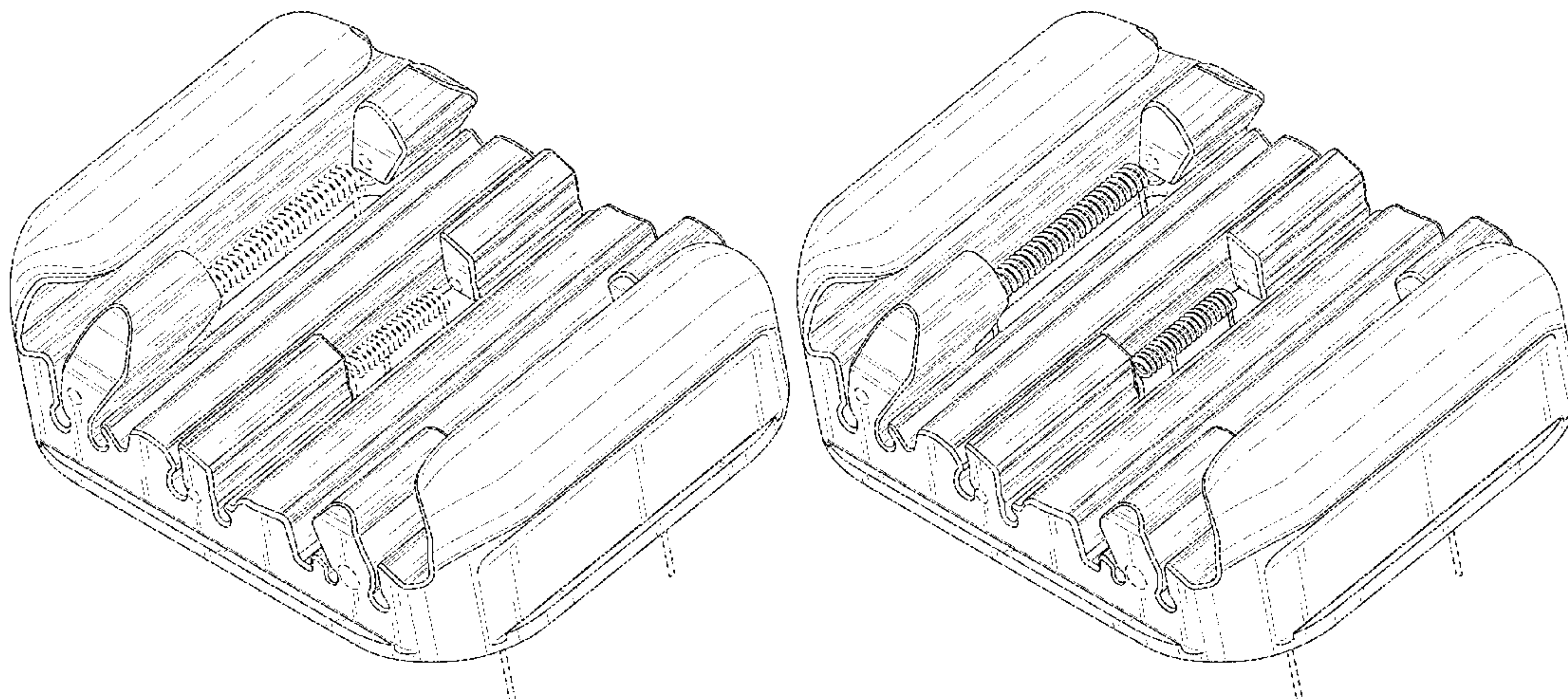


FIG. 22 is a top-front perspective view of the control electrode for an X-ray tube cathode with electron emitter filaments of FIG. 14 with a radiography device shown in environment.

FIG. 23 is a sectional view of control electrode for an X-ray tube cathode with electron emitter filaments of FIG. 14 along line 23-23 in FIG. 20.

FIG. 24 is a sectional view of the control electrode for an X-ray tube cathode with electron emitter filaments of FIG. 14 along line 24-24 in FIG. 16.

FIG. 25 is a sectional view of the control electrode for an X-ray tube cathode with electron emitter filaments of FIG. 14 along line 25-25 in FIG. 16; and,

FIG. 26 is a sectional view of the control electrode for an X-ray tube cathode with electron emitter filaments of FIG. 14 along line 26-26 in FIG. 16.

The dash-dash broken lines in the drawings illustrate portions of the control electrode for an X-ray tube cathode, electron emitter filaments, and environmental subject matter that form no part of the claimed design.

The dash-dot-dash broken lines showing the sectional lines form no part of the claimed design.

The oblique broken line shading illustrates interior portions of the control electrode for an X-ray tube cathode that form no part of the claimed design.

1 Claim, 26 Drawing Sheets

(58) **Field of Classification Search**
CPC H01J 35/066; H01J 35/14; H01J 3/027;
H01J 9/04; H01J 1/20; H01J 37/075;
H01J 2235/068
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS

4,868,842 A 9/1989 Dowd
5,515,413 A * 5/1996 Knudsen H01J 35/066
378/138

5,623,530 A 4/1997 Lu et al.
6,480,572 B2 11/2002 Harris et al.
6,785,359 B2 8/2004 Lemaitre
6,968,039 B2 11/2005 Lemaitre et al.
7,327,829 B2 * 2/2008 Chidester H01J 35/066
378/136
7,352,846 B2 4/2008 Kuribayashi et al.
7,576,481 B2 * 8/2009 Lemaitre H01J 9/04
313/352
D603,965 S * 11/2009 Verma D24/158
7,924,983 B2 * 4/2011 Moore H01J 1/15
378/136
8,358,741 B2 1/2013 Grasruck et al.
8,451,976 B2 * 5/2013 Canfield H01J 35/147
378/138
D726,920 S * 4/2015 Ishihara D24/158
D727,508 S * 4/2015 Ishihara D24/158
D742,011 S * 10/2015 Sul D24/158
D786,438 S * 5/2017 Sul D24/158
D843,580 S * 3/2019 Eckert D24/158
D843,581 S * 3/2019 Eckert D24/158
D912,822 S * 3/2021 Hugon D24/158
D929,939 S * 9/2021 Menci D13/110
D930,584 S * 9/2021 Xiang D13/110
D1,006,012 S * 11/2023 Ren D13/184
D1,006,749 S * 12/2023 Wang D13/110
D1,031,991 S * 6/2024 Ono D24/158
D1,034,579 S * 7/2024 Lovegrove D13/184
12,046,441 B2 * 7/2024 Lemaitre H01J 3/14
D1,054,559 S * 12/2024 Kruse D24/145
12,183,536 B2 * 12/2024 Kruse H01J 9/04
D1,058,525 S * 1/2025 Kruse D24/158
D1,063,842 S * 2/2025 Zhao D13/110
D1,066,251 S * 3/2025 Xu D13/110
2003/0095632 A1 * 5/2003 Kautz H01J 35/066
378/137
2004/0081282 A1 * 4/2004 Schaefer H01J 35/066
378/136
2010/0079053 A1 * 4/2010 Andrews H01J 3/027
313/326
2013/0182825 A1 * 7/2013 Boye H01J 35/147
378/136
2016/0217965 A1 * 7/2016 Canfield H01J 35/045
2023/0146425 A1 * 5/2023 Ganter B23K 26/1482
219/76.1
2024/0339284 A1 * 10/2024 Kruse G01N 23/04
2024/0339285 A1 * 10/2024 Kruse H01J 35/066

* cited by examiner

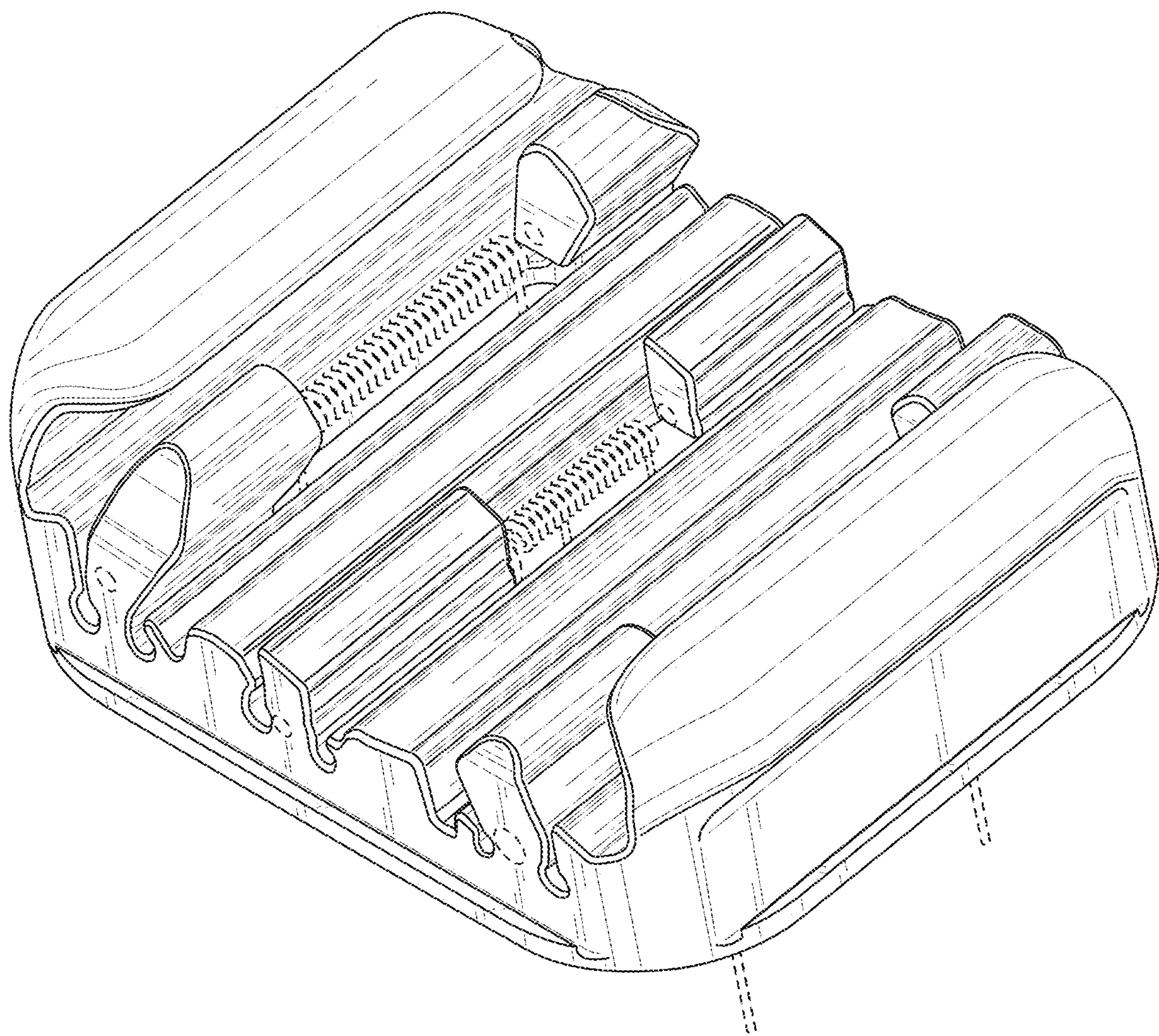


FIG. 1

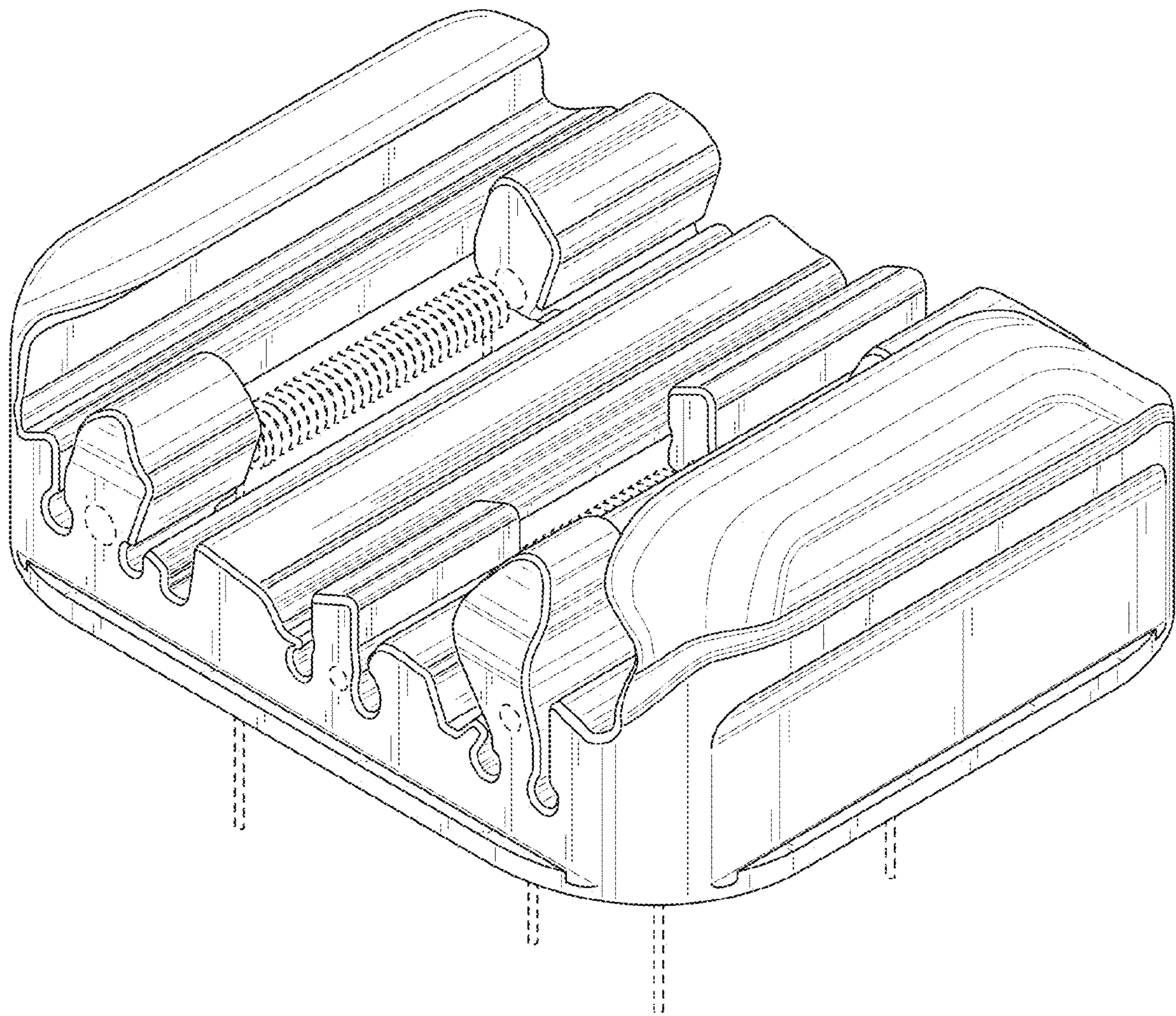


FIG. 2

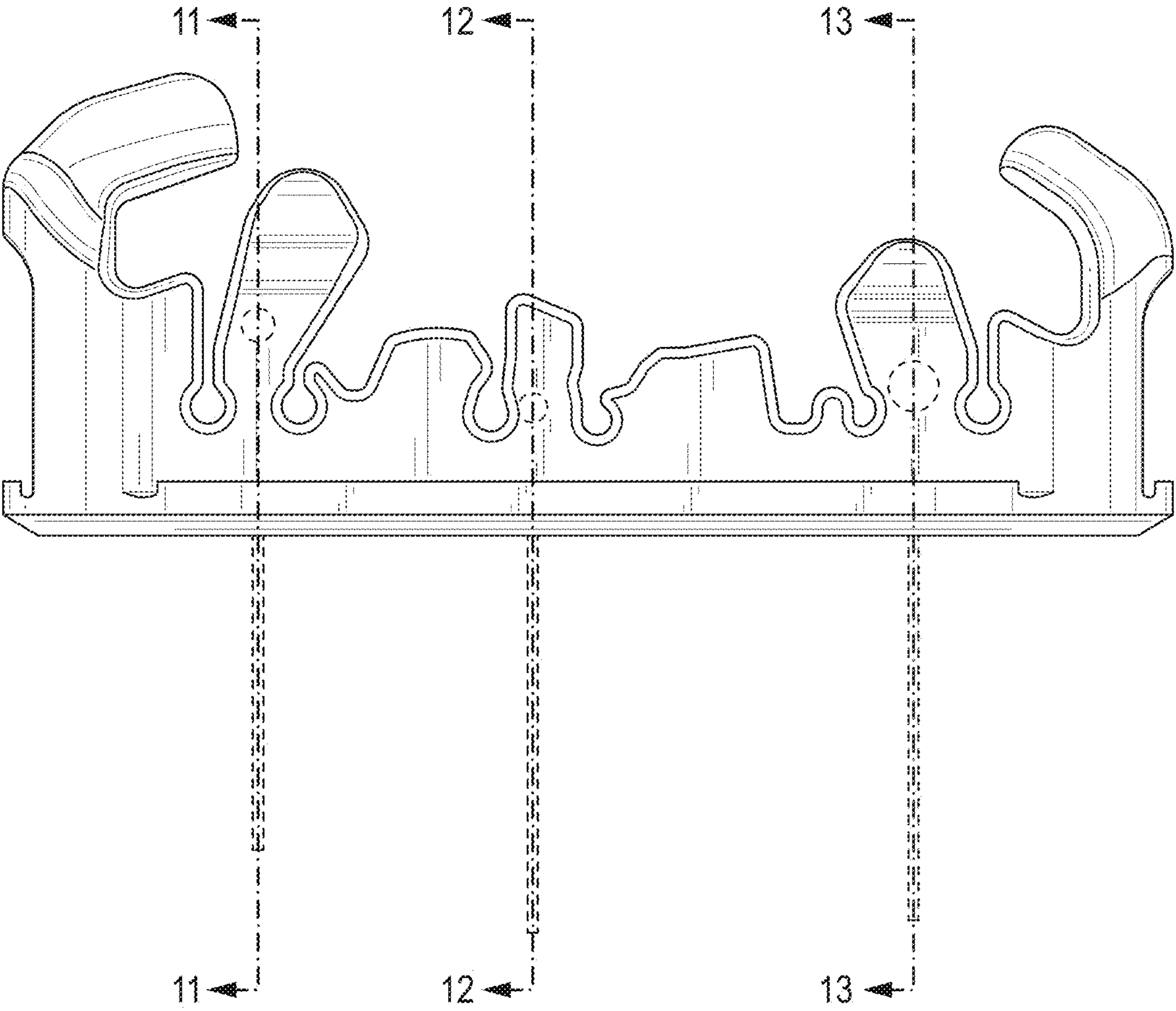


FIG. 3

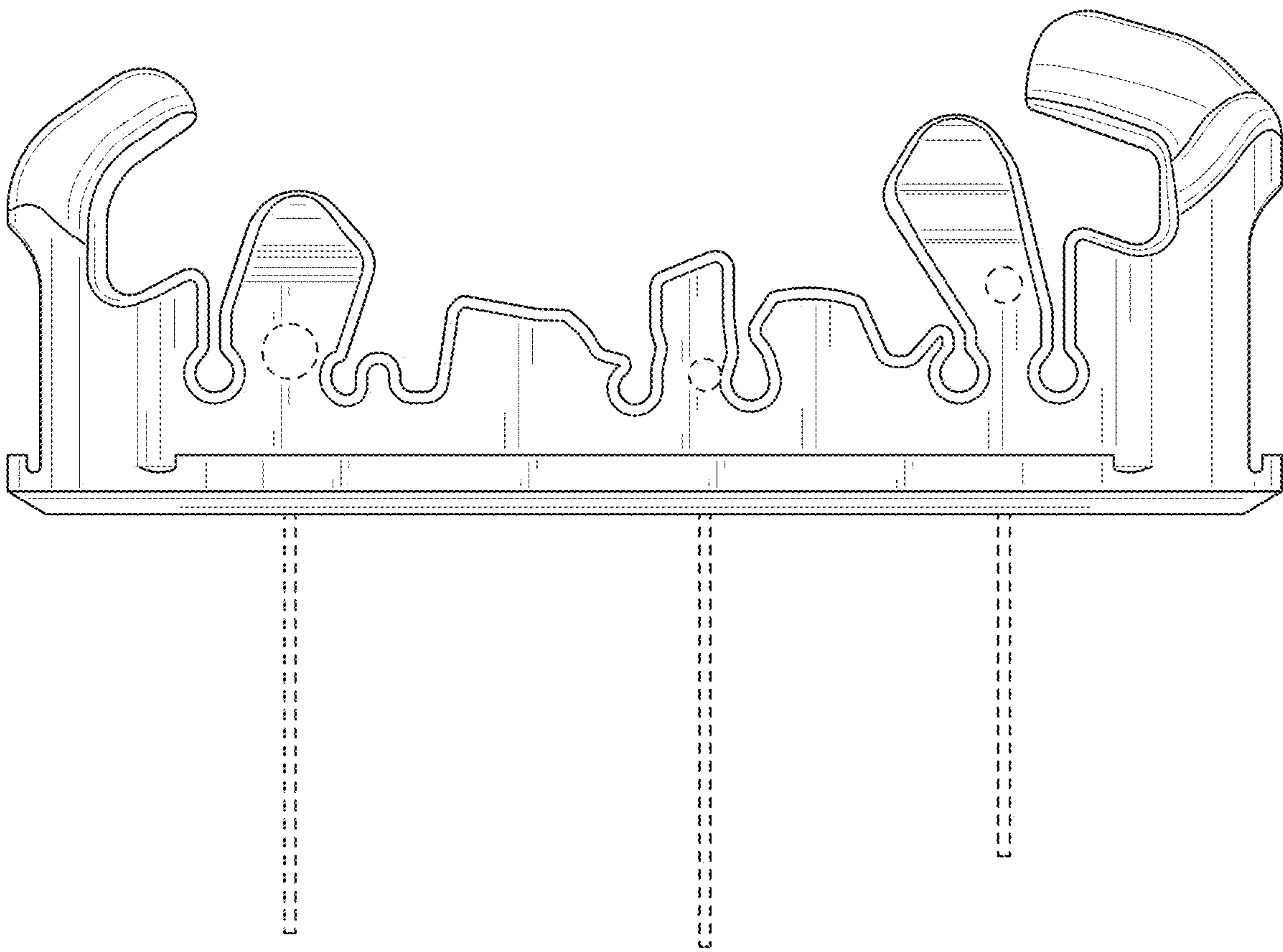


FIG. 4

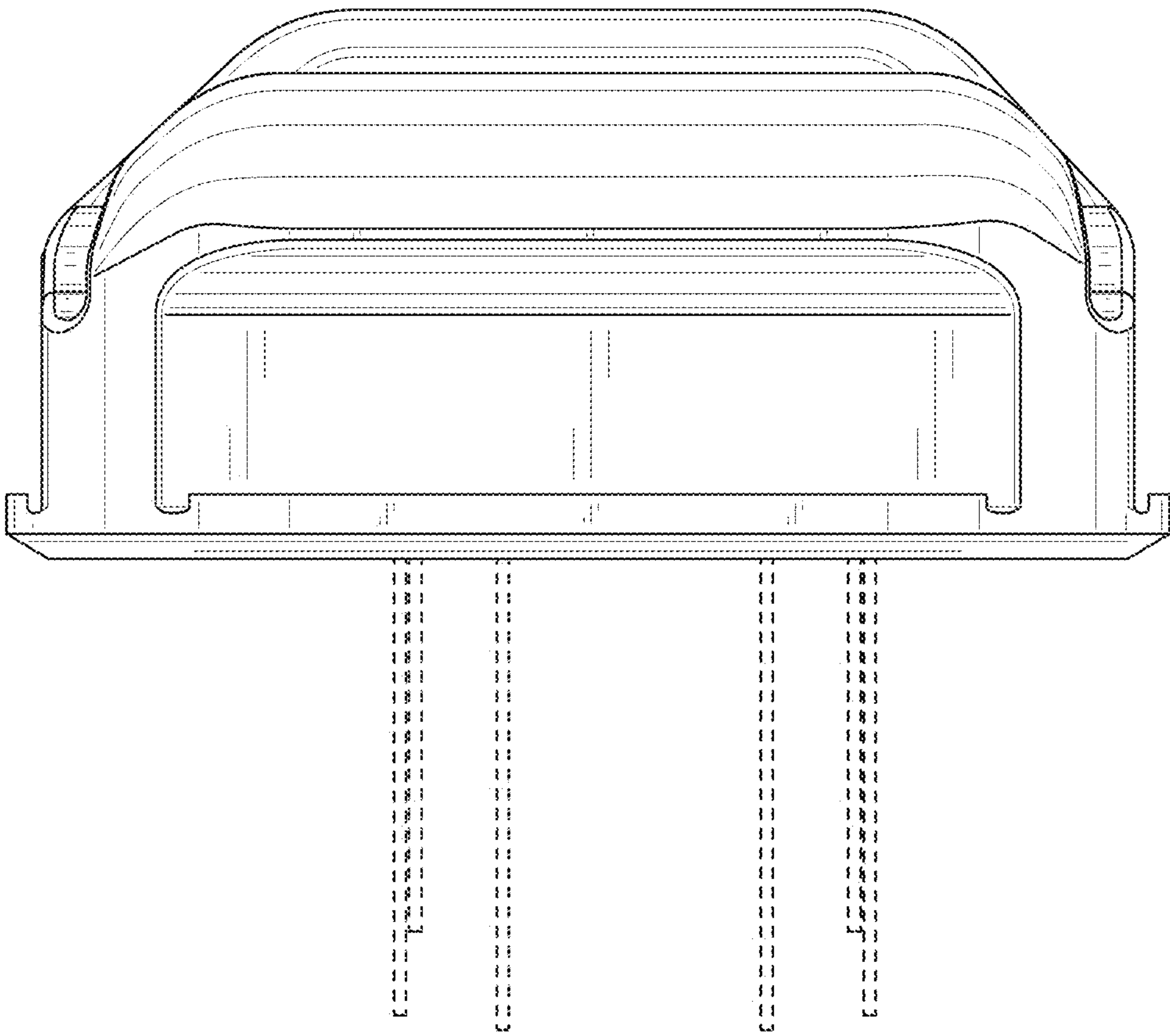


FIG. 5

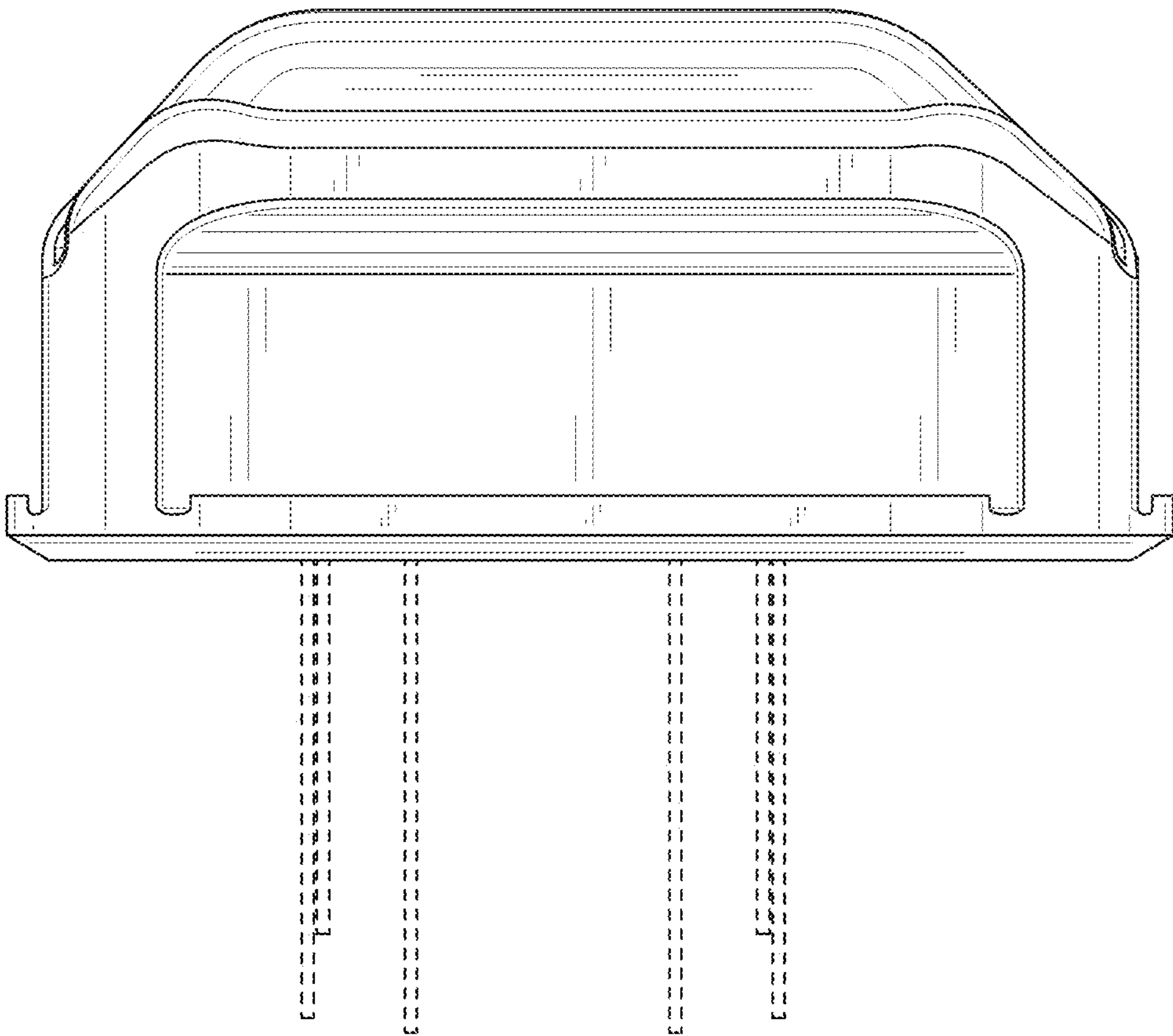


FIG. 6

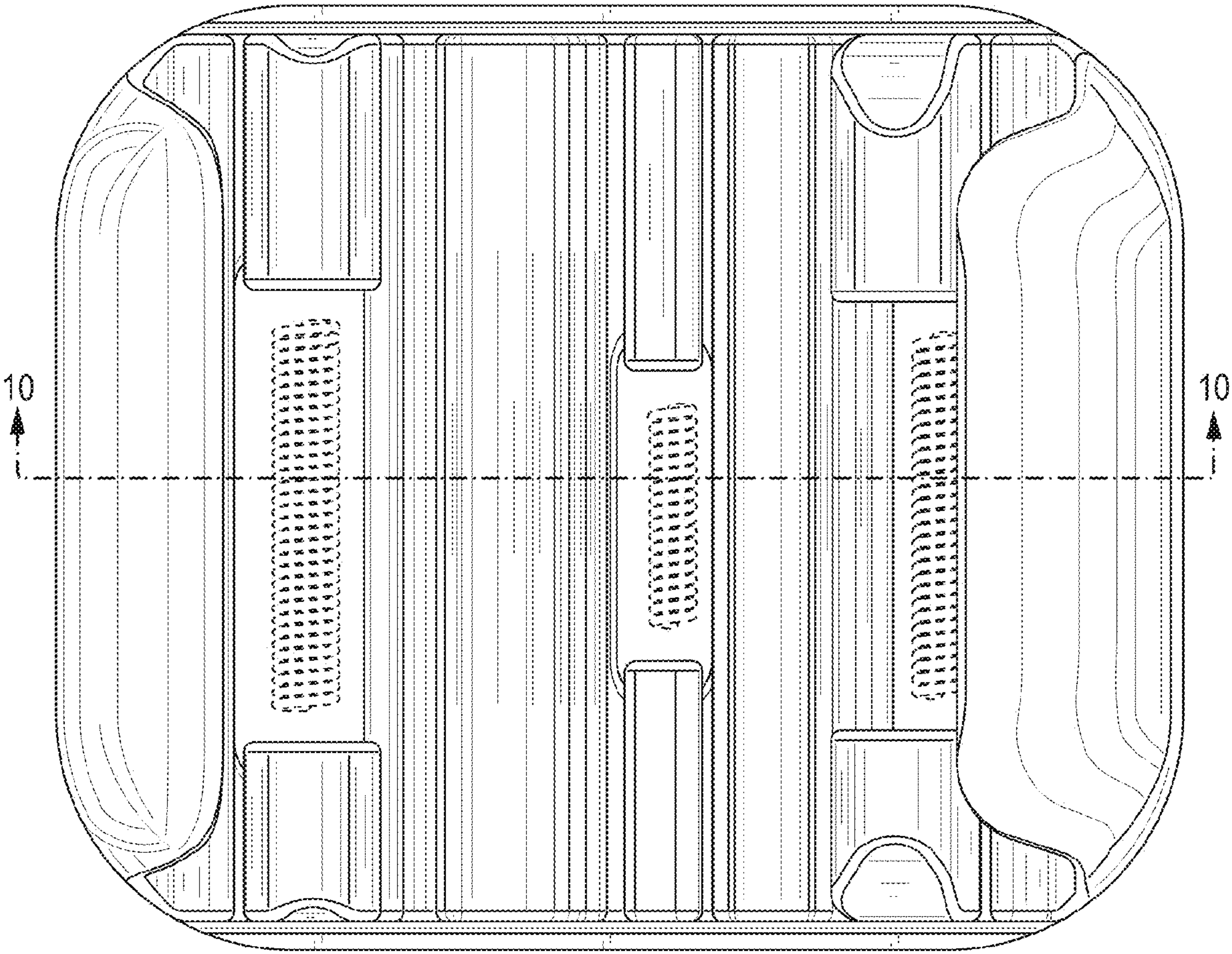


FIG. 7

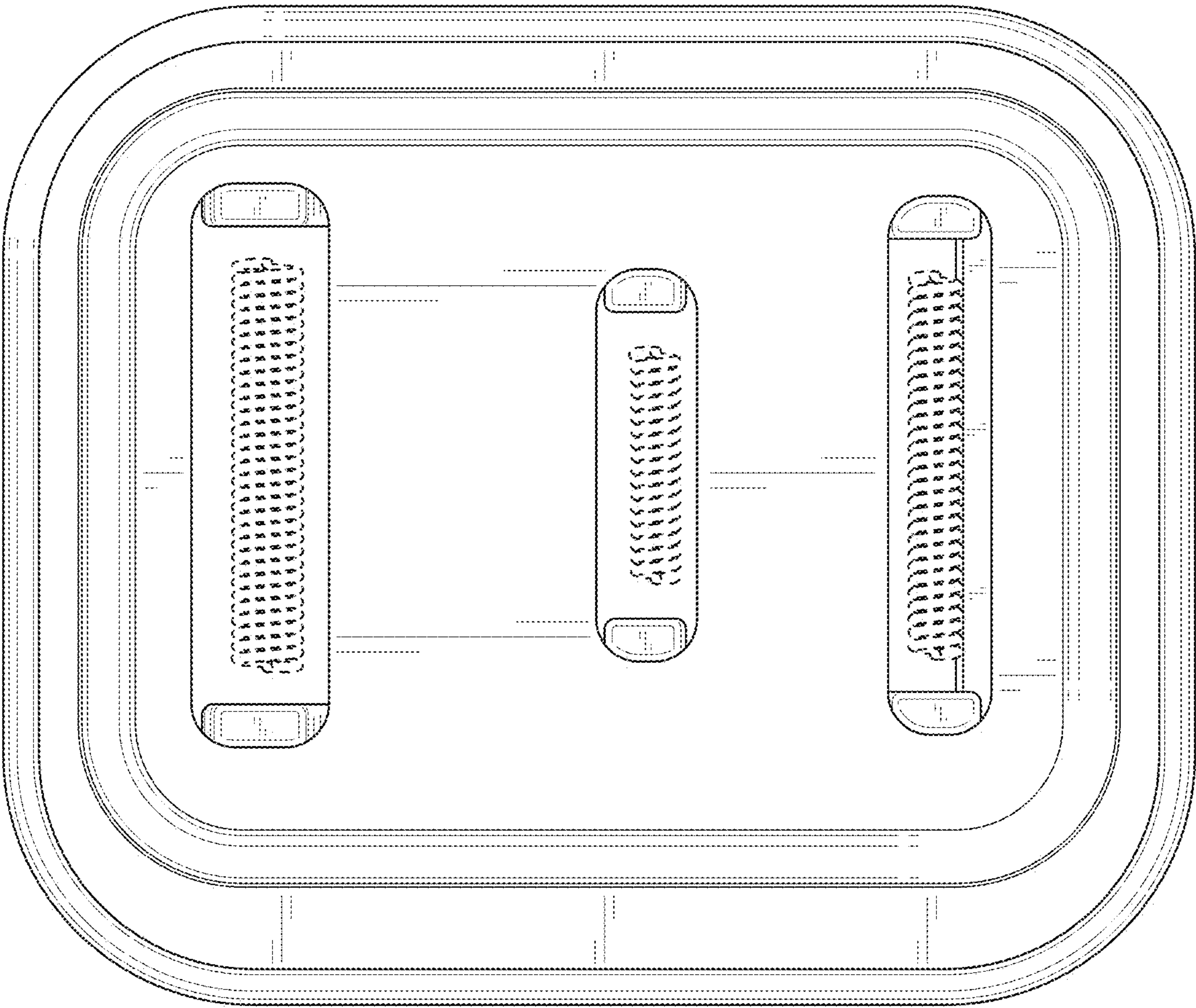


FIG. 8

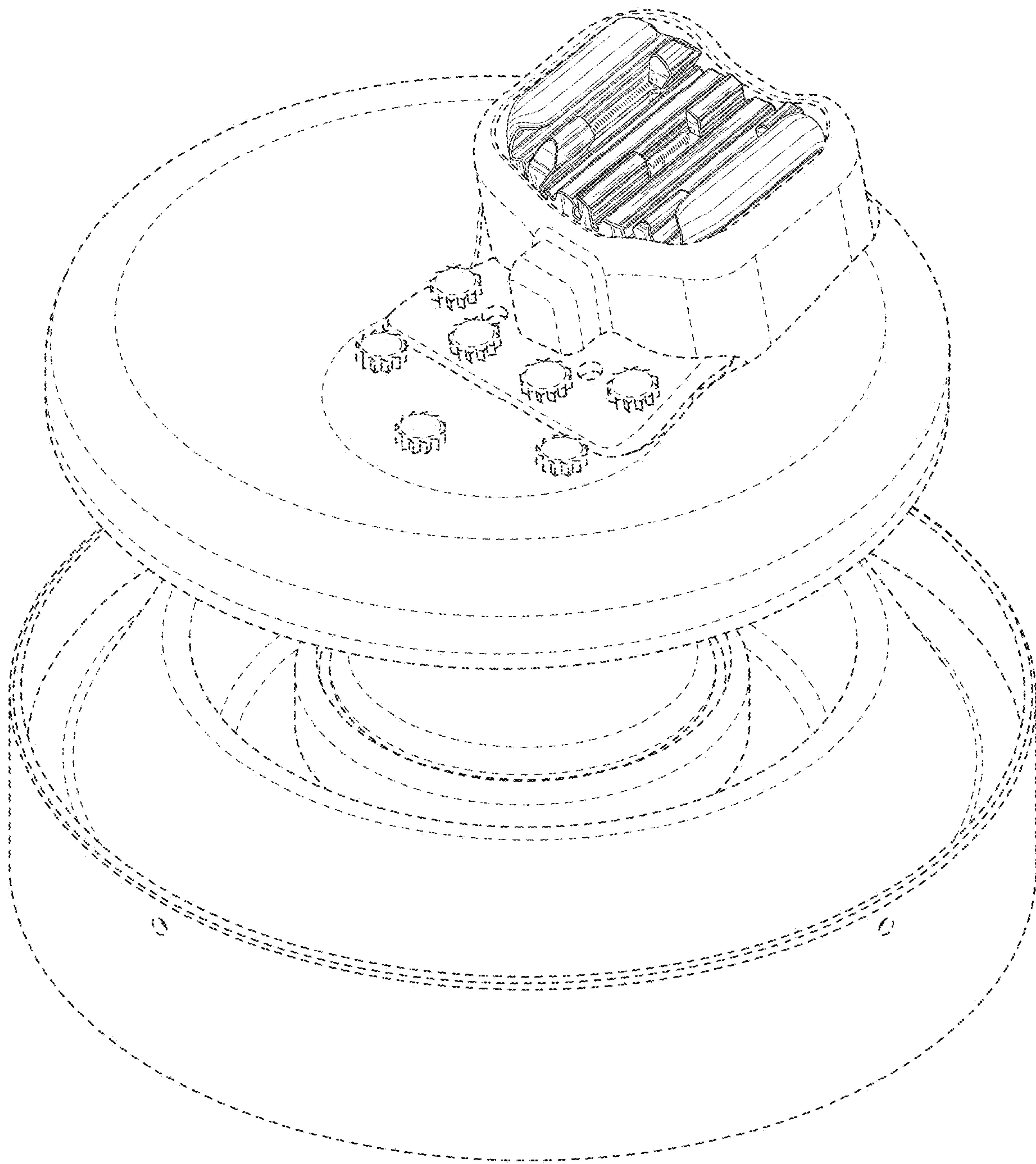


FIG. 9

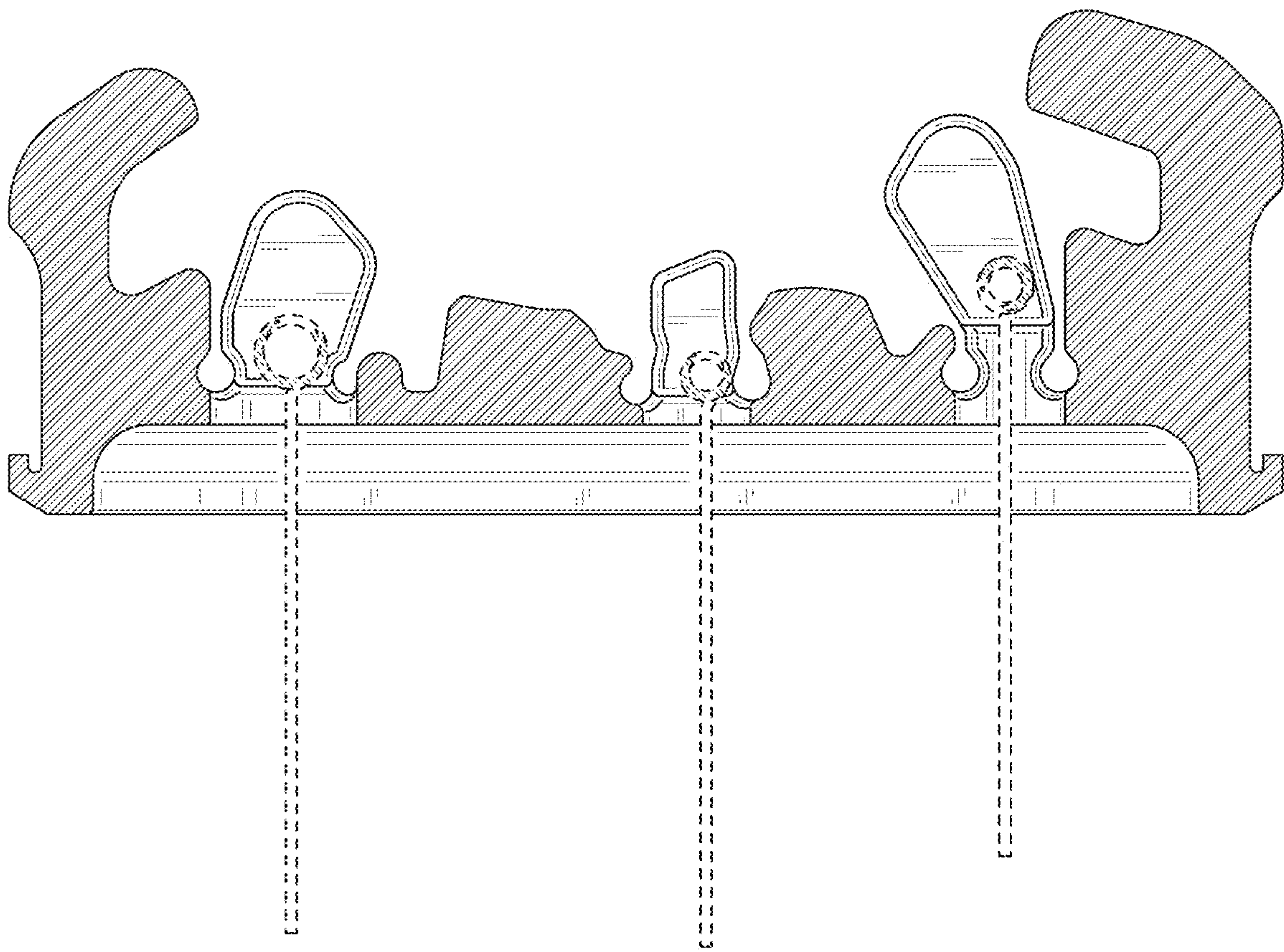


FIG. 10

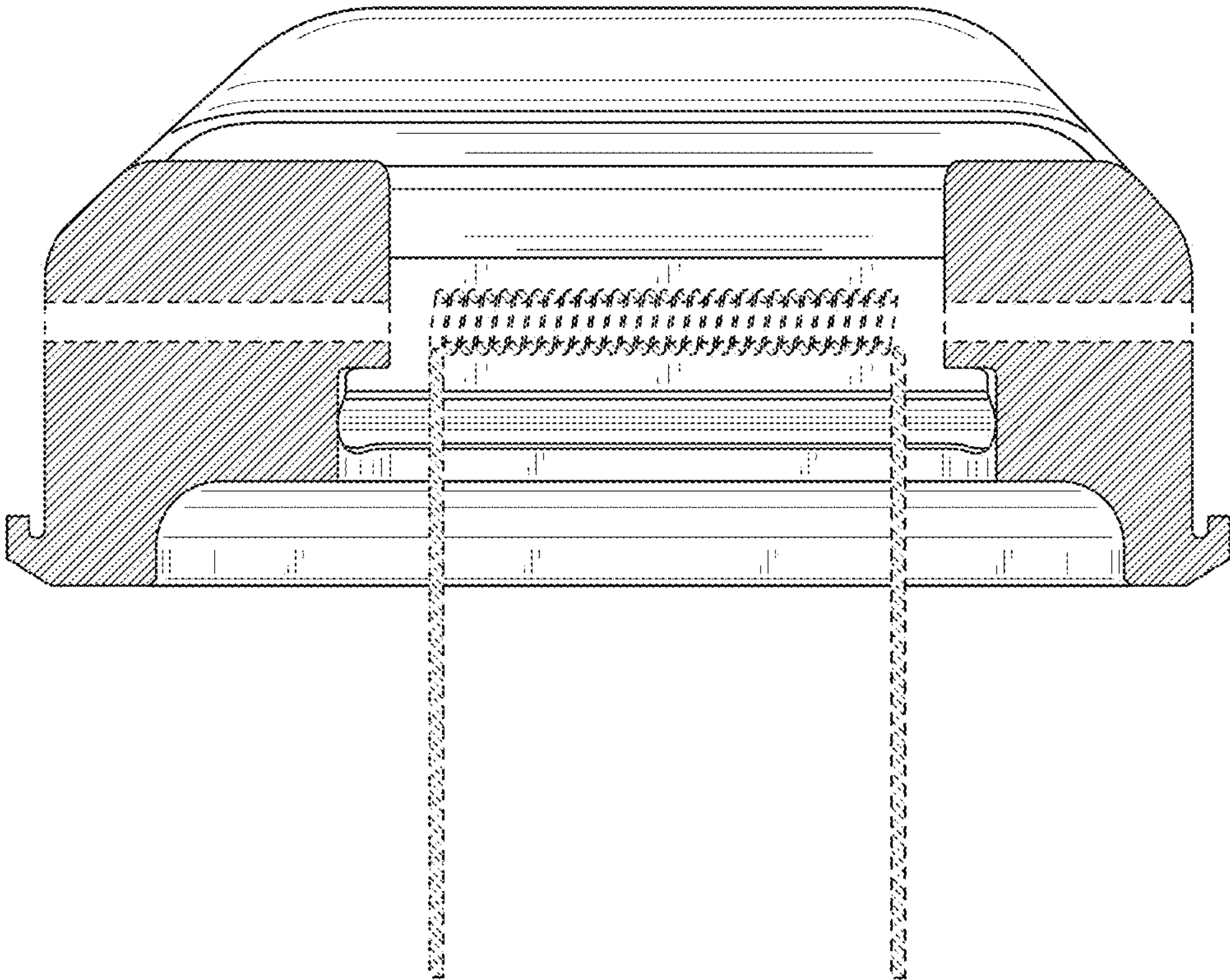


FIG. 11

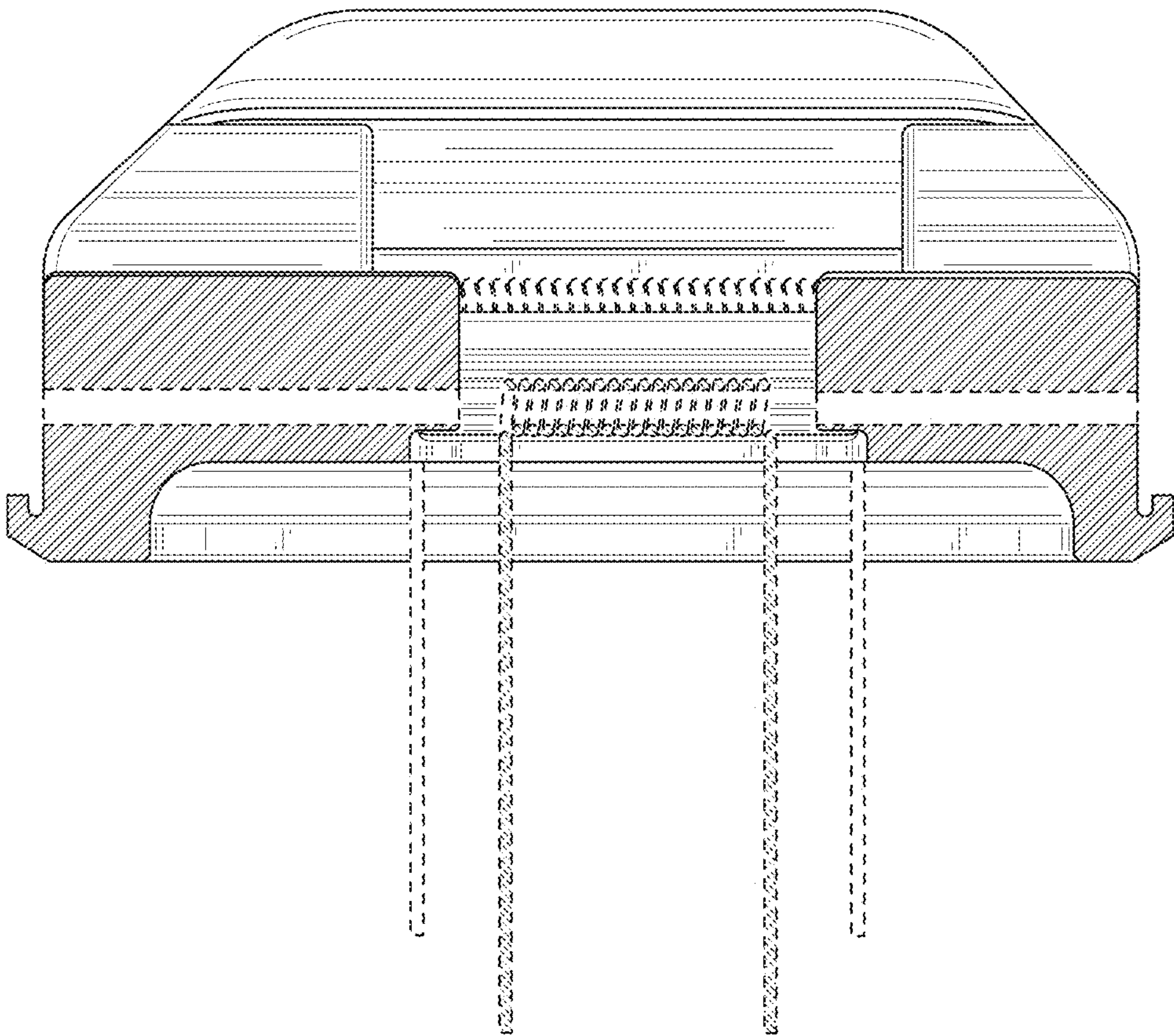


FIG. 12

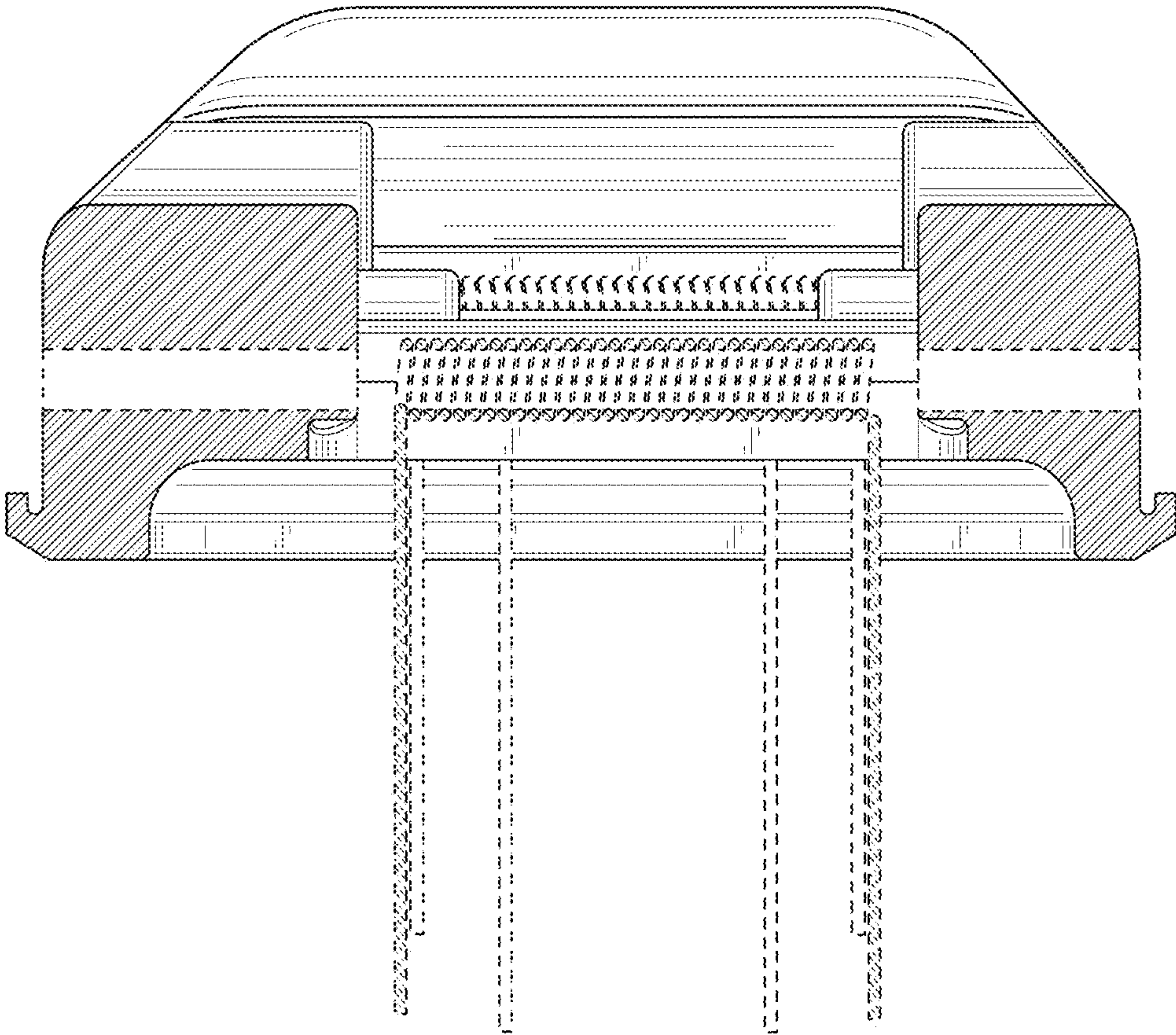


FIG. 13

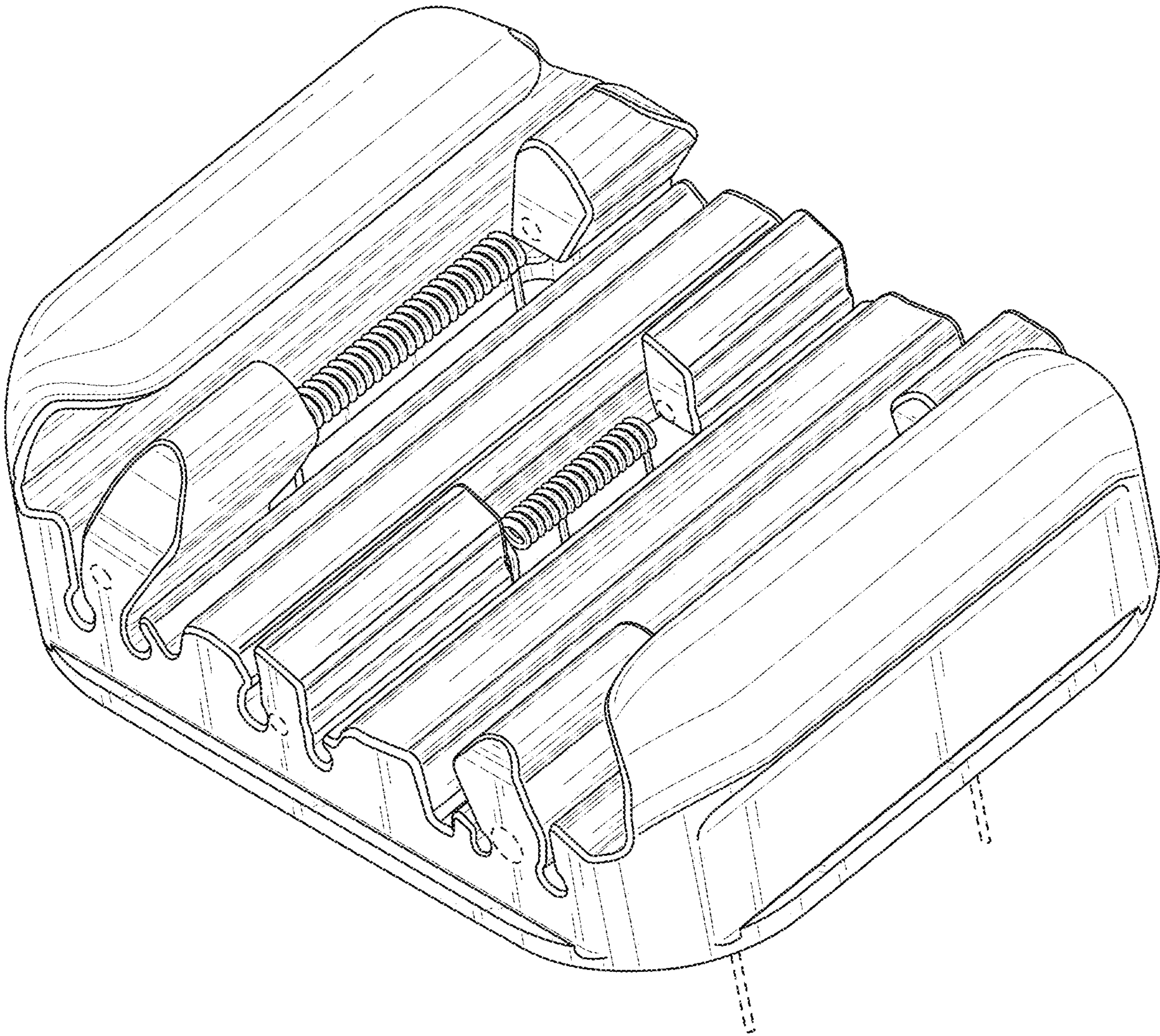


FIG. 14

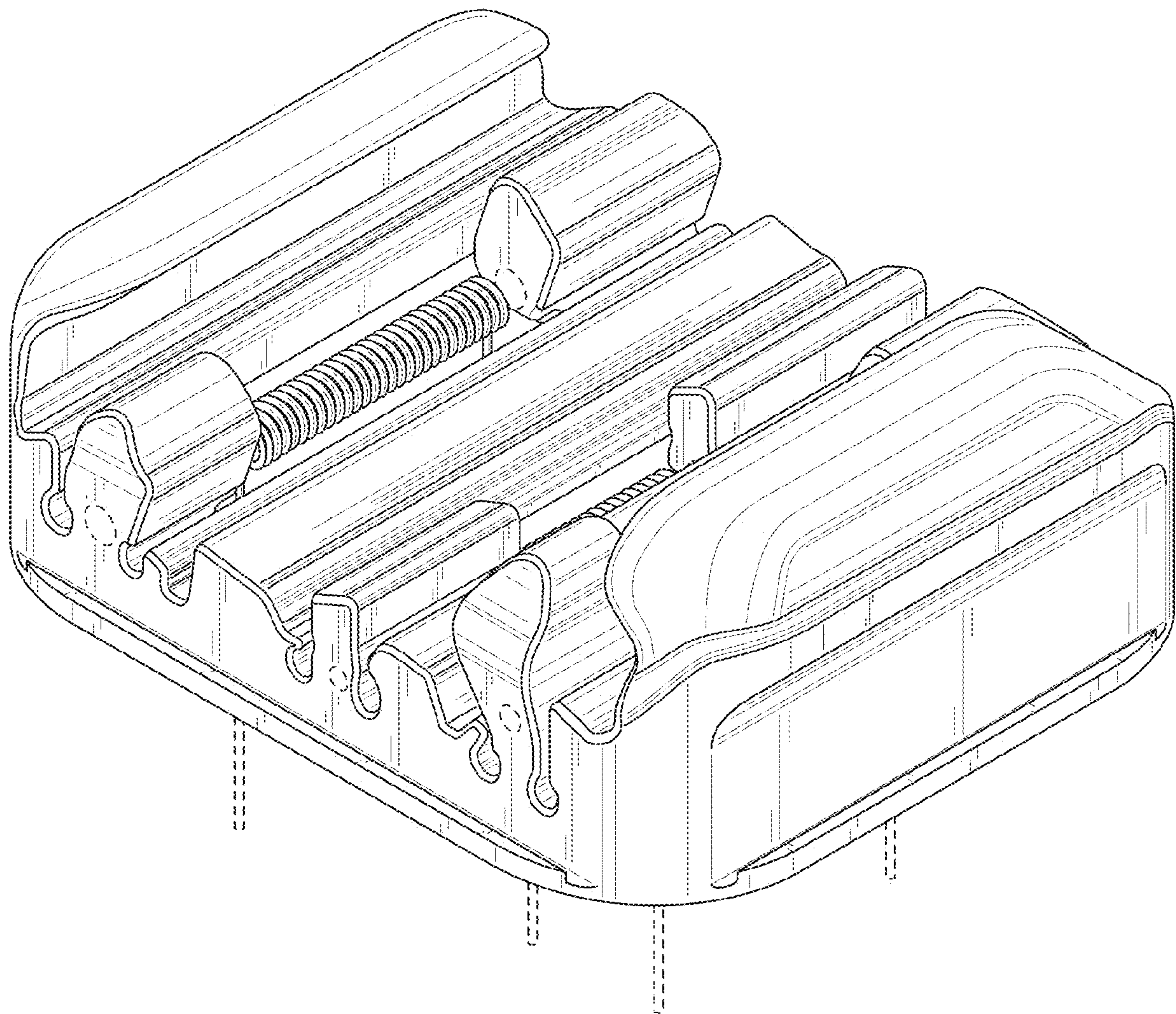


FIG. 15

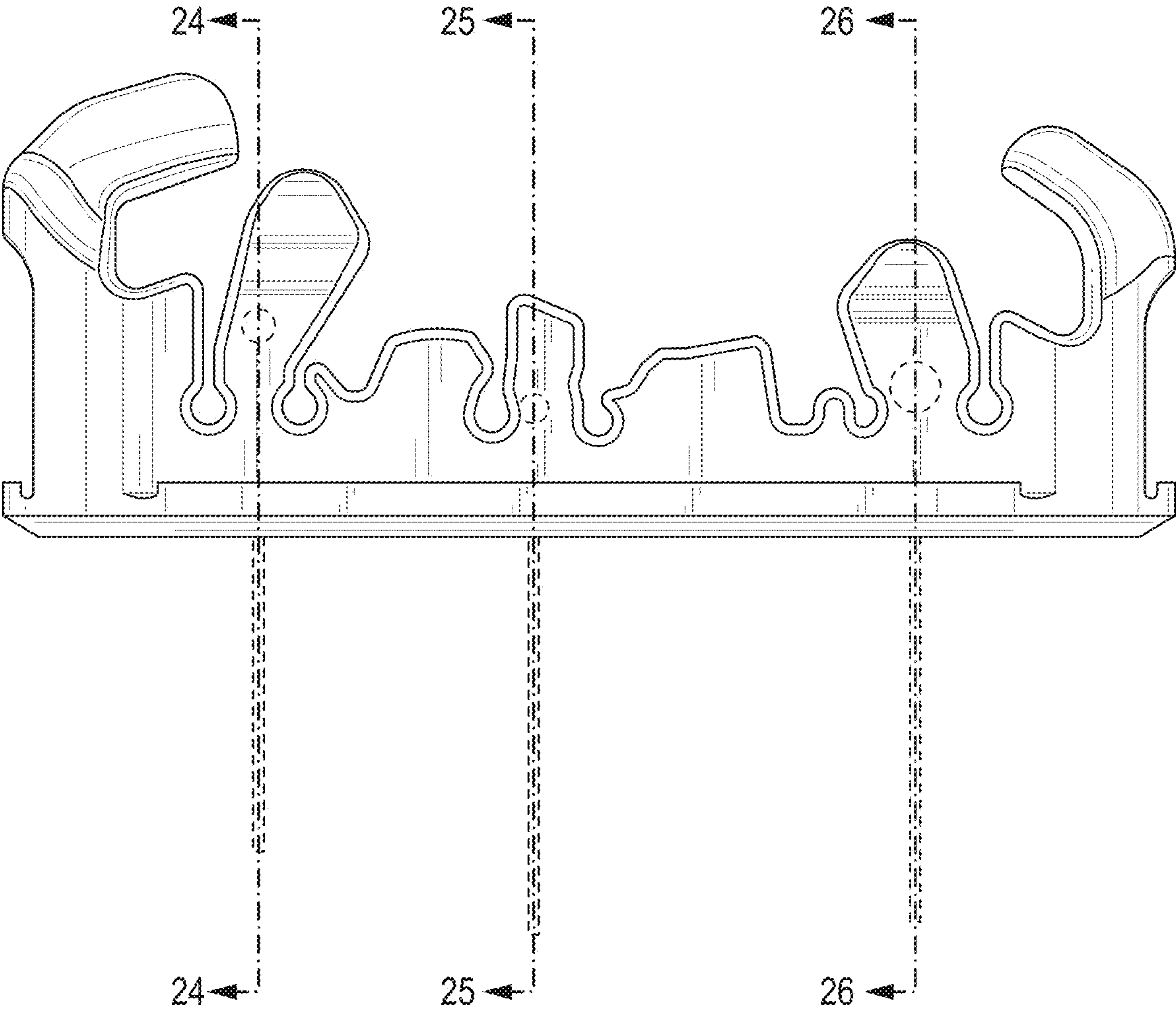


FIG. 16

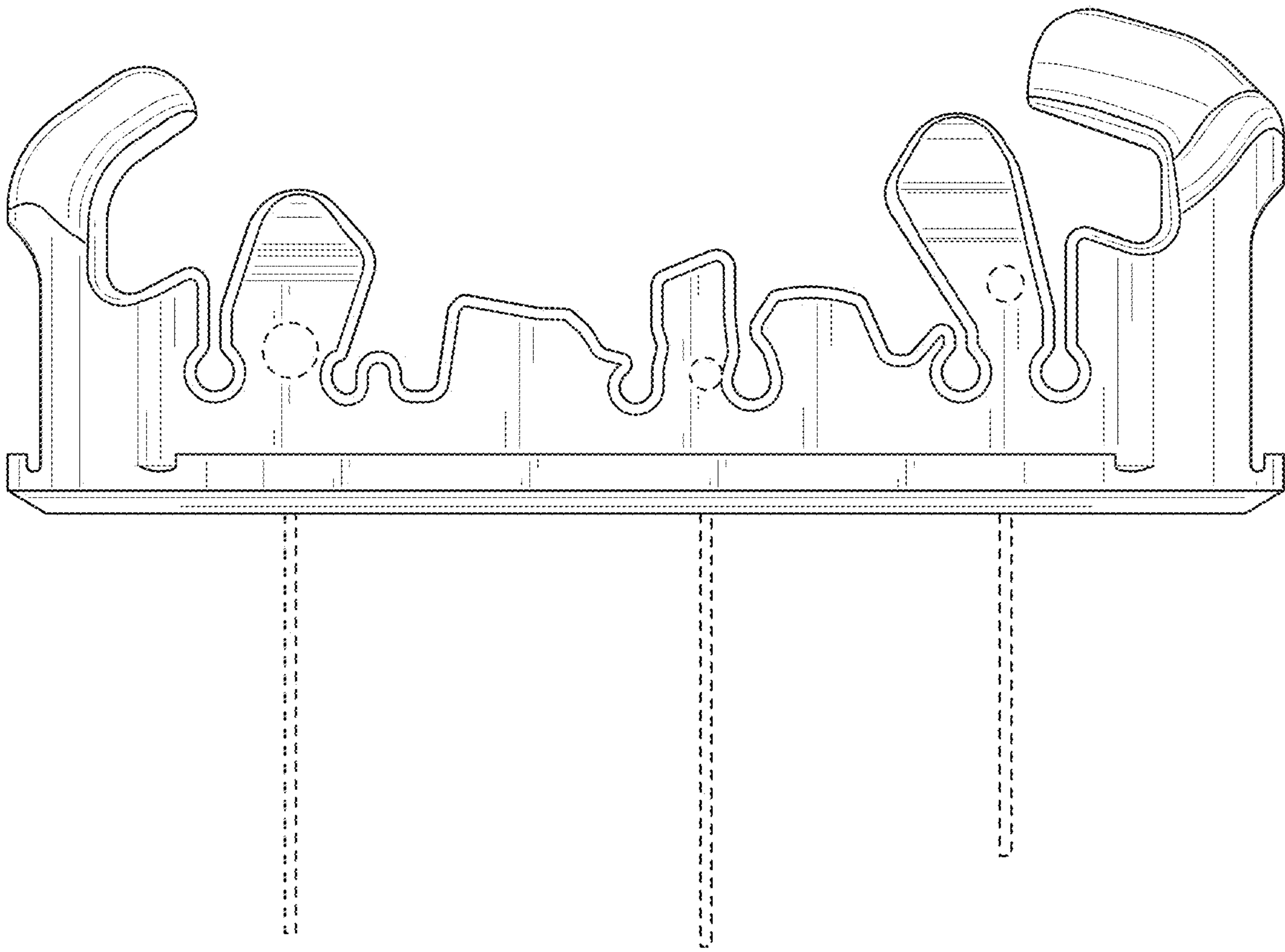


FIG. 17

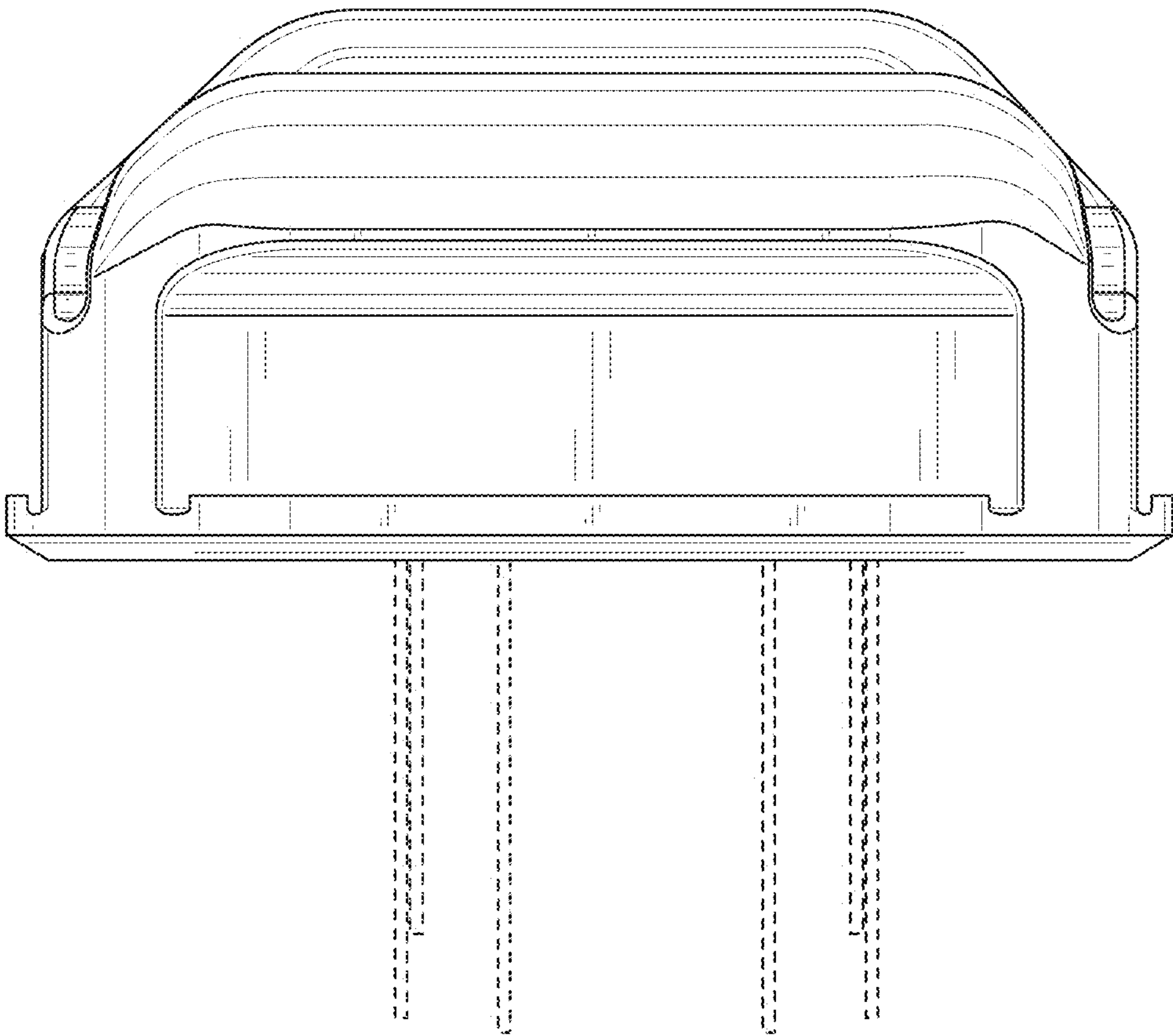


FIG. 18

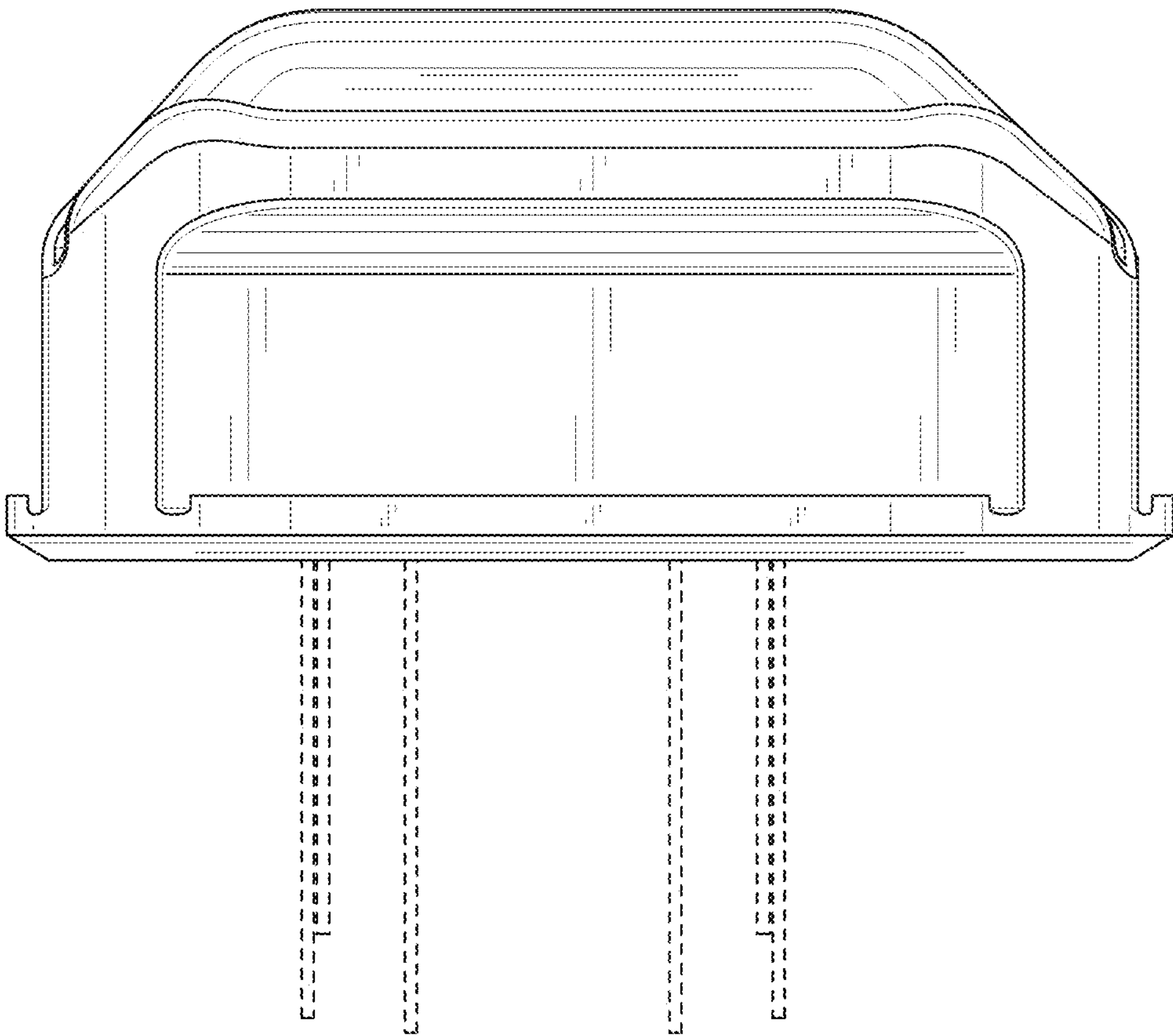


FIG. 19

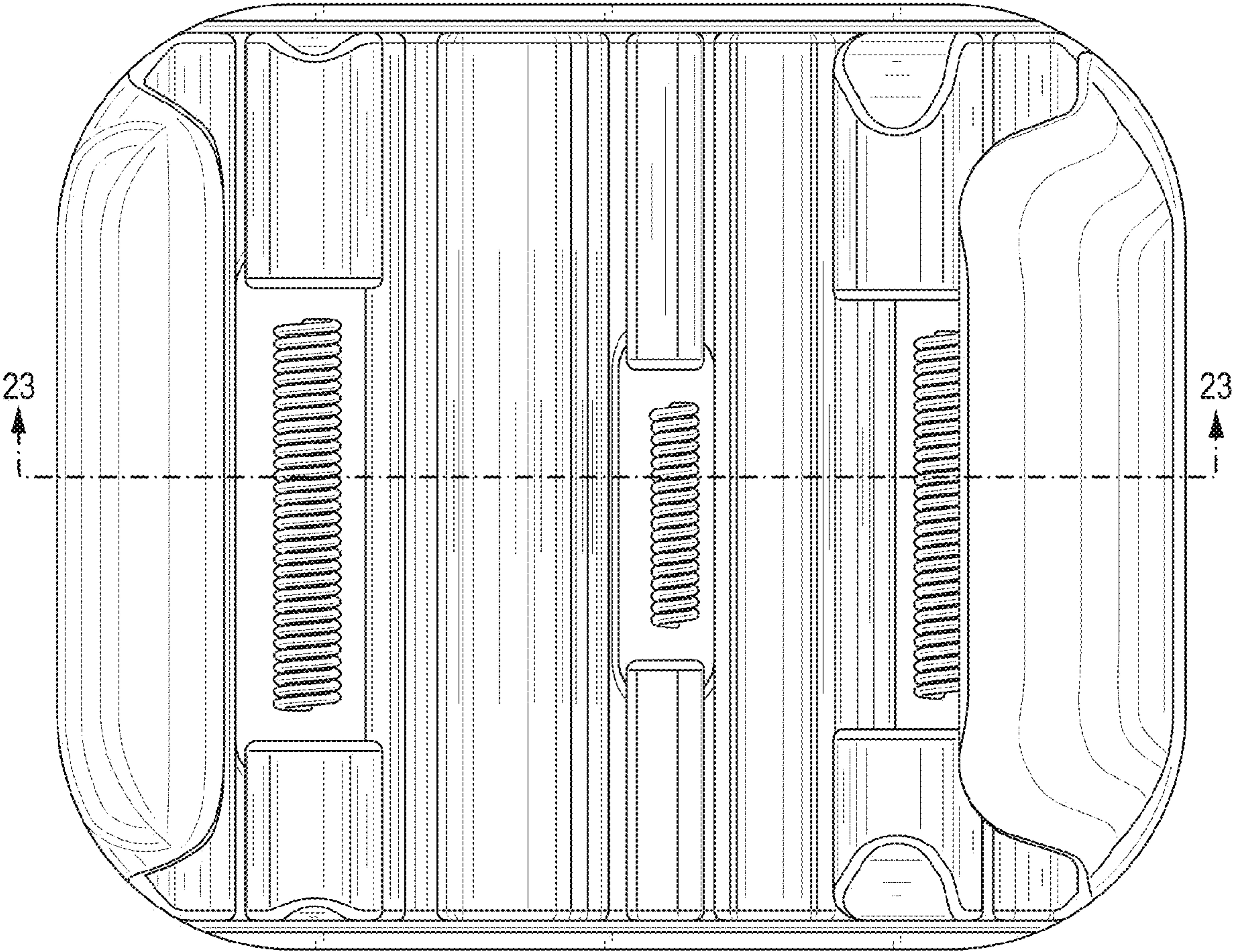


FIG. 20

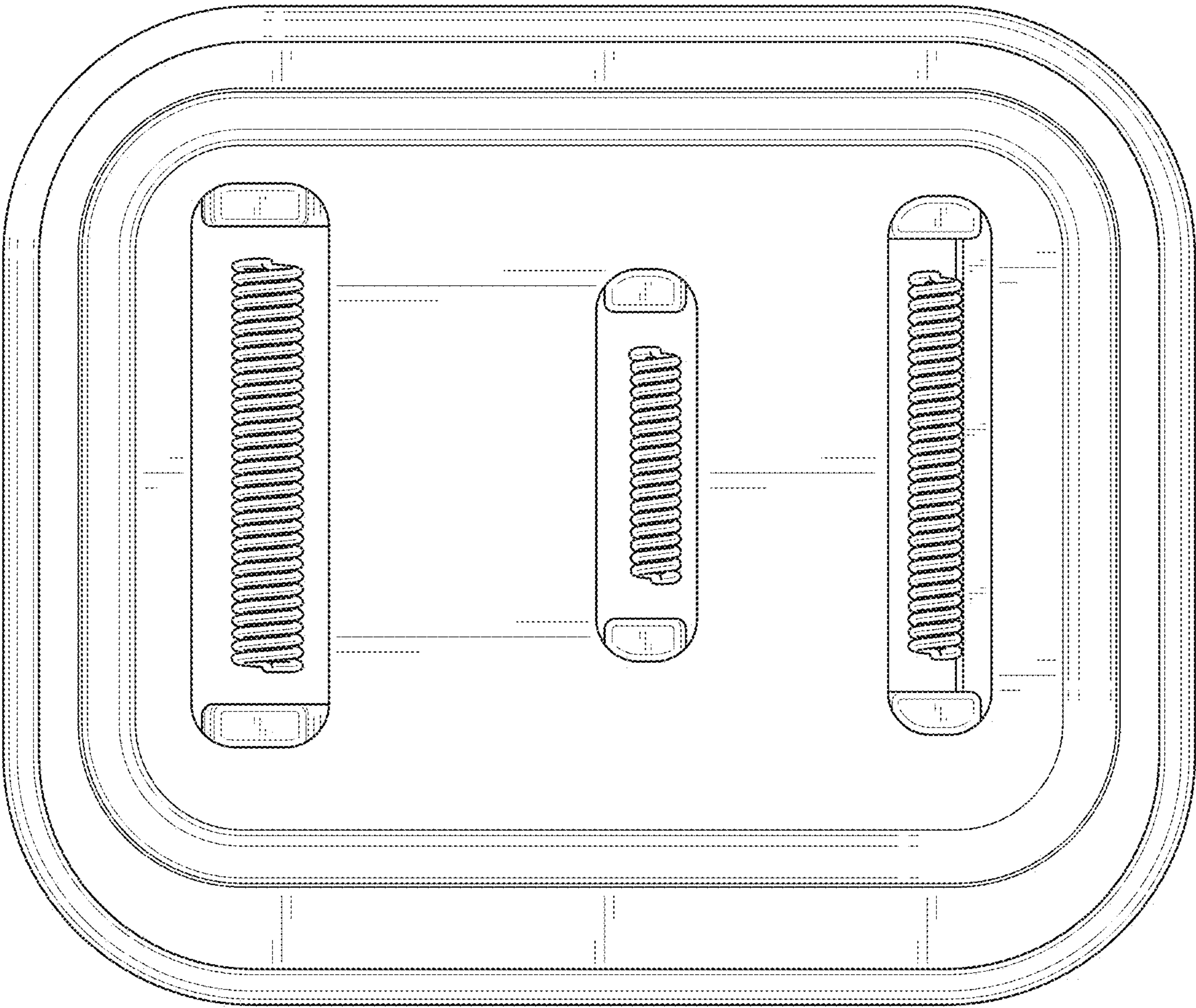


FIG. 21

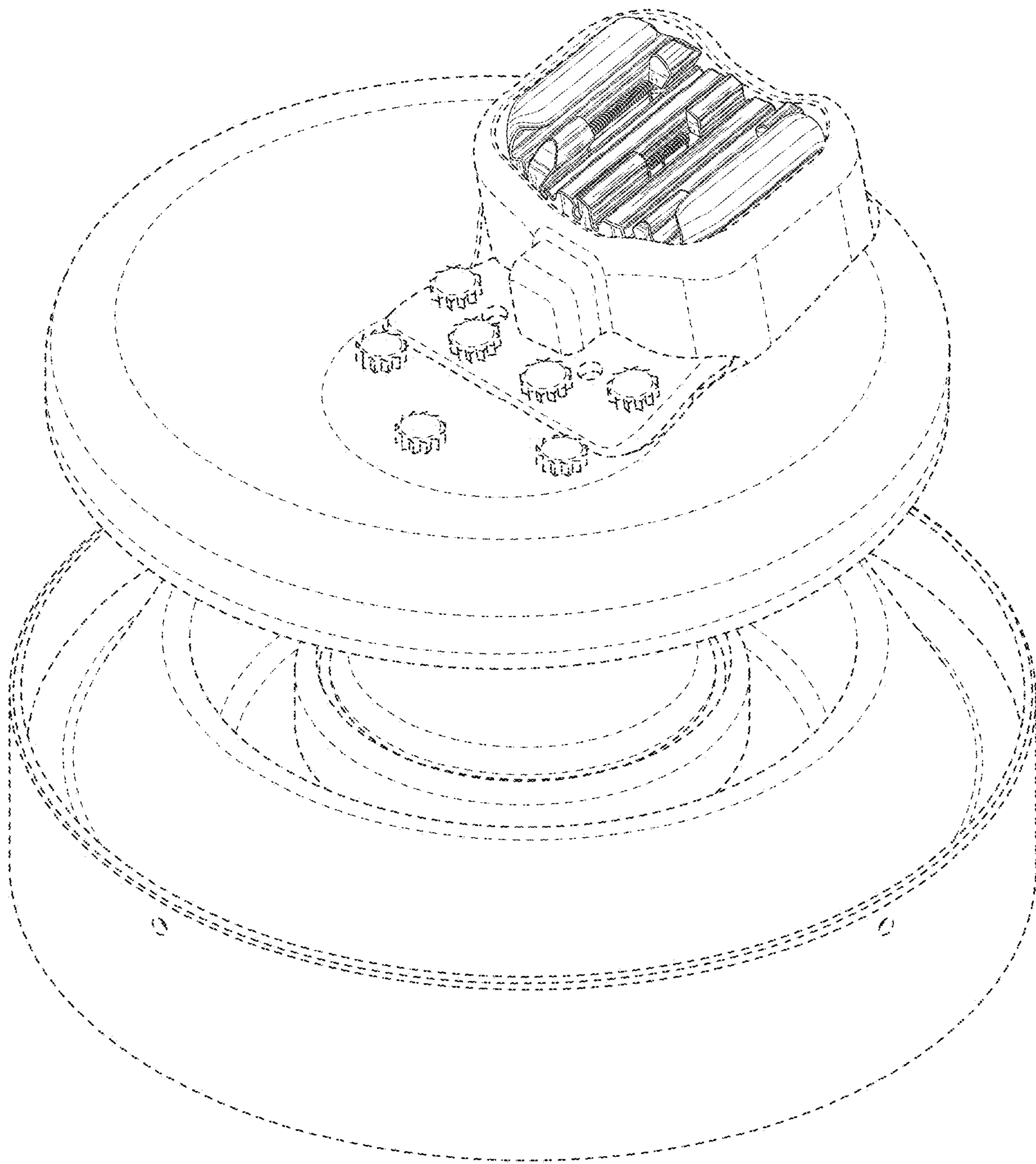


FIG. 22

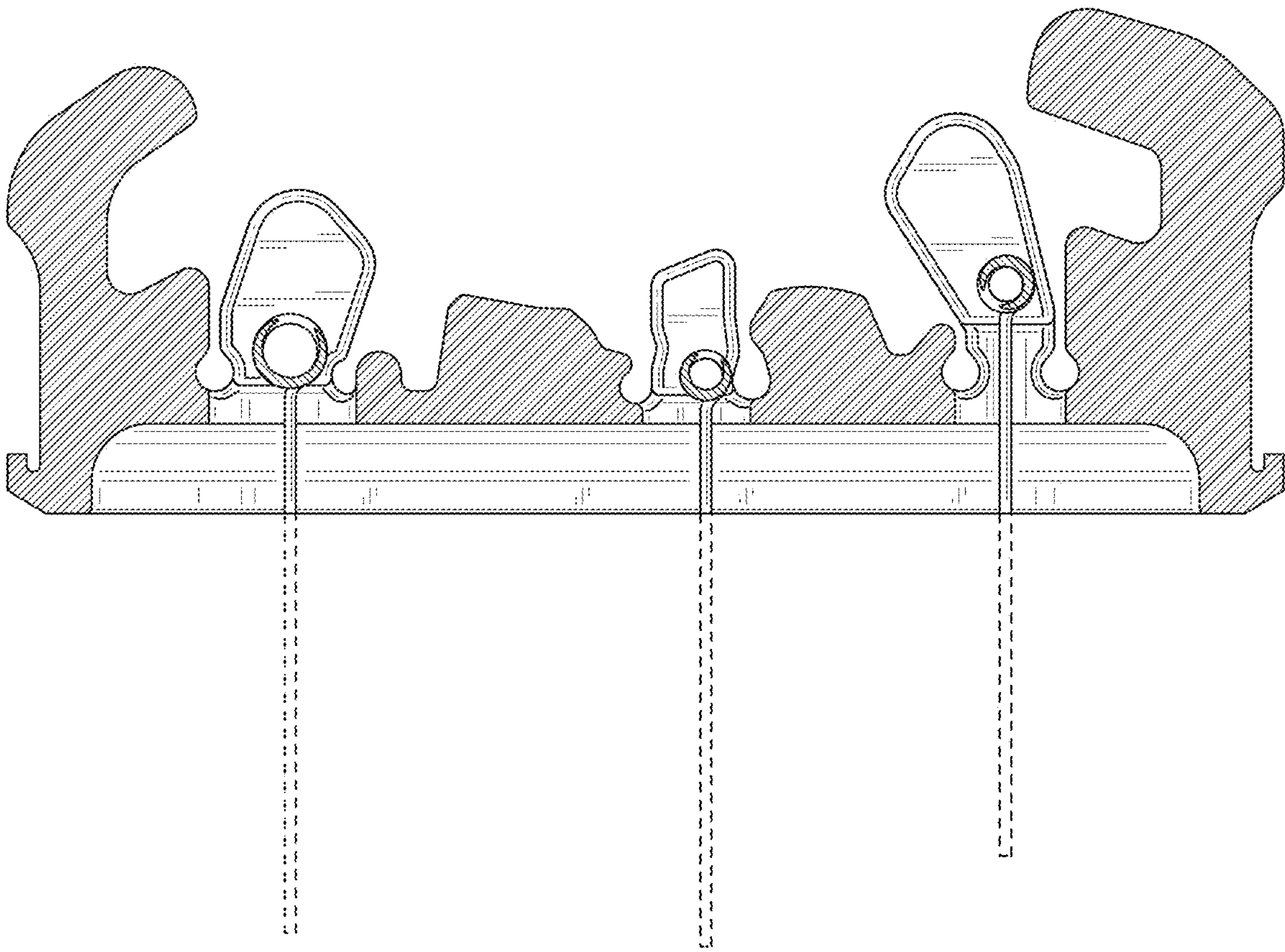


FIG. 23

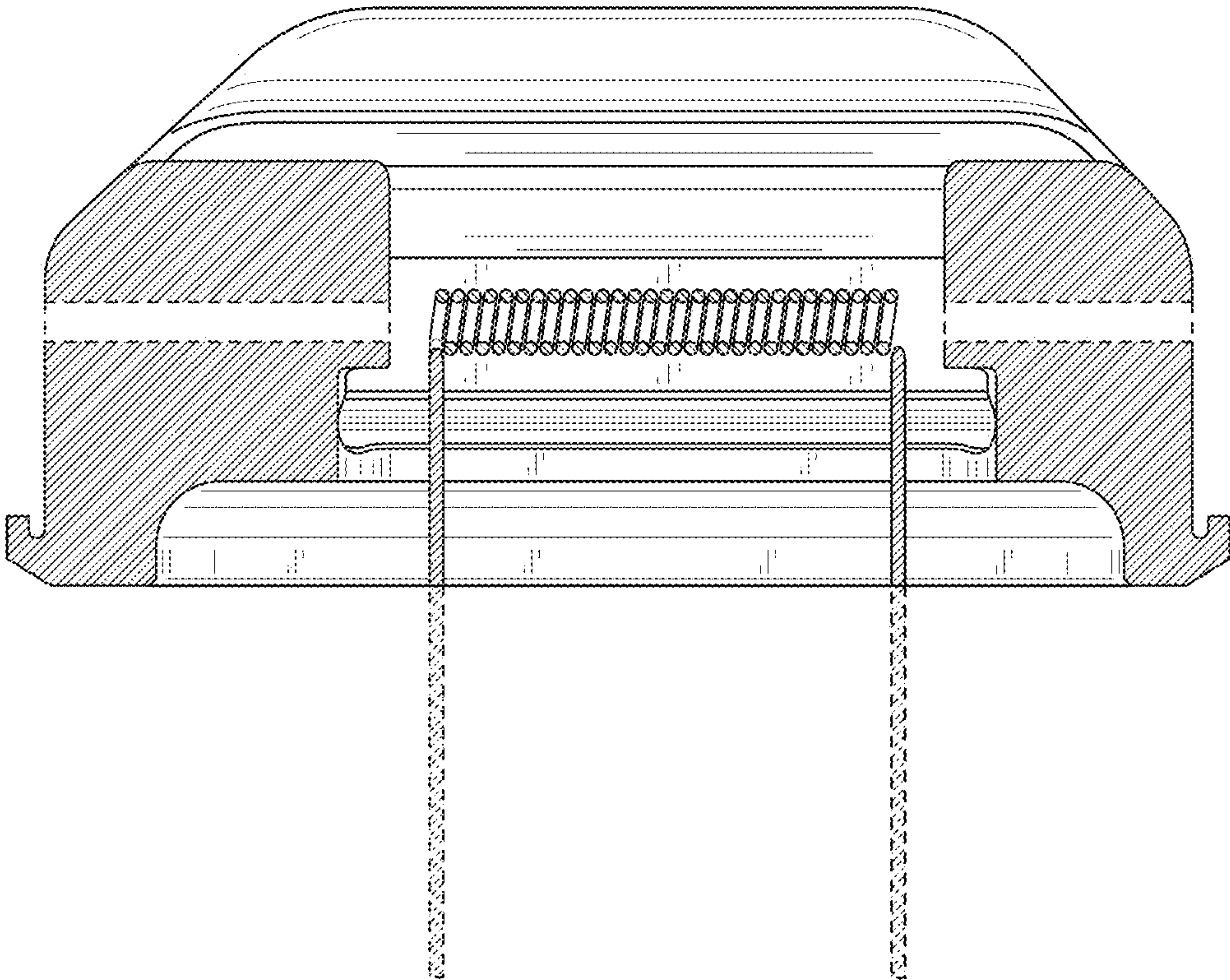


FIG. 24

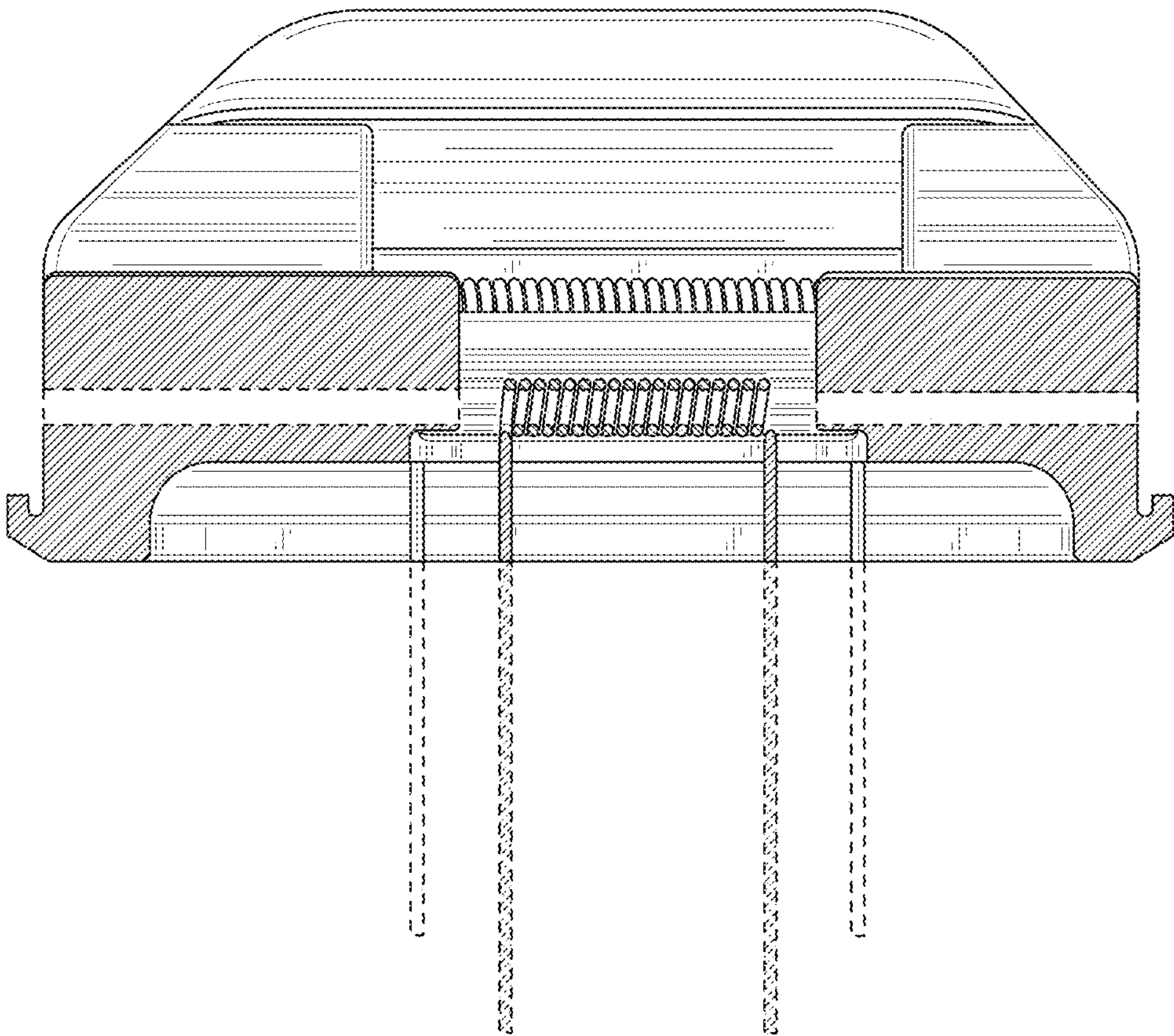


FIG. 25

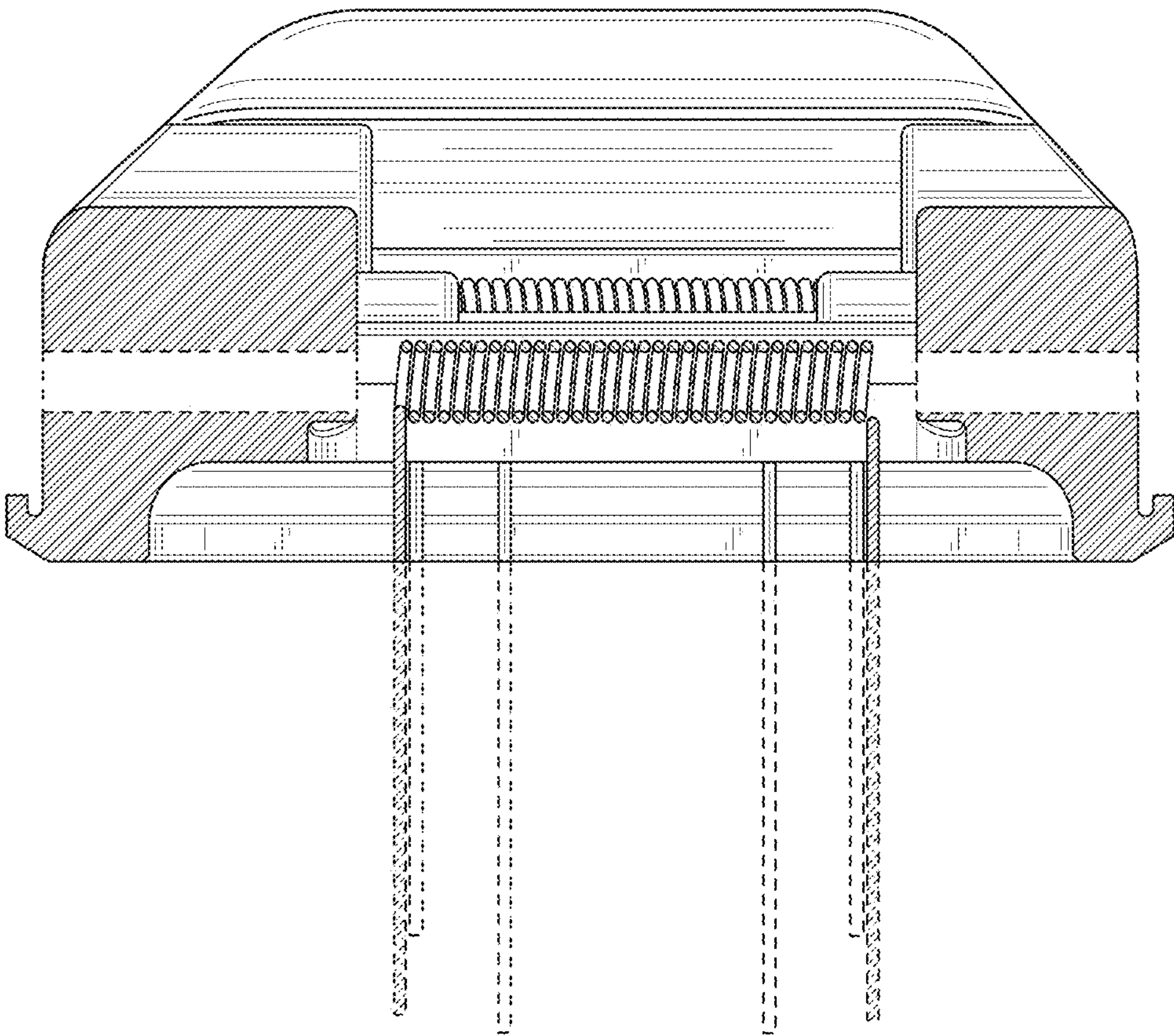


FIG. 26