

US00D892894S

(12) **United States Design Patent** (10) **Patent No.:** **US D892,894 S**
Suzuki (45) **Date of Patent:** **** Aug. 11, 2020**

- (54) **LASER BEAM REFLECTOR**
- (71) Applicant: **HAMAMATSU PHOTONICS K.K.**,
Hamamatsu-shi, Shizuoka (JP)
- (72) Inventor: **Daiki Suzuki**, Hamamatsu (JP)
- (73) Assignee: **HAMAMATSU PHOTONICS K.K.**,
Hamamatsu-shi, Shizuoka (JP)
- (**) Term: **15 Years**
- (21) Appl. No.: **29/668,526**
- (22) Filed: **Oct. 31, 2018**
- (30) **Foreign Application Priority Data**
- May 1, 2018 (JP) 2018-009726
- (51) **LOC (12) Cl.** **16-99**
- (52) **U.S. Cl.**
USPC **D16/130**
- (58) **Field of Classification Search**
USPC D16/130, 131, 136, 221, 223, 225, 232,
D16/235, 248, 250; D10/46, 46.2, 47,
(Continued)
- (56) **References Cited**
- U.S. PATENT DOCUMENTS
- D175,401 S * 8/1955 Gottshalk D16/235
D271,208 S * 11/1983 Daggett D16/230
(Continued)

OTHER PUBLICATIONS

Ushiro, Kosuke, et al., "Development and Verification for Next Generation System of Surrounding Environment Recognition Technology—Third Report: System Architecture of MEMS Scanning

3D Range Sensor—(Exhibit 1)", http://www.jari.or.jp/Portals/0/resource/JRJ_q/JRJ20171103_q.pdf, Nov. 3, 2017.

(Continued)

Primary Examiner — Mark A Goodwin
Assistant Examiner — Benjamin M Weeks
(74) *Attorney, Agent, or Firm* — Faegre Drinker Biddle & Reath LLP

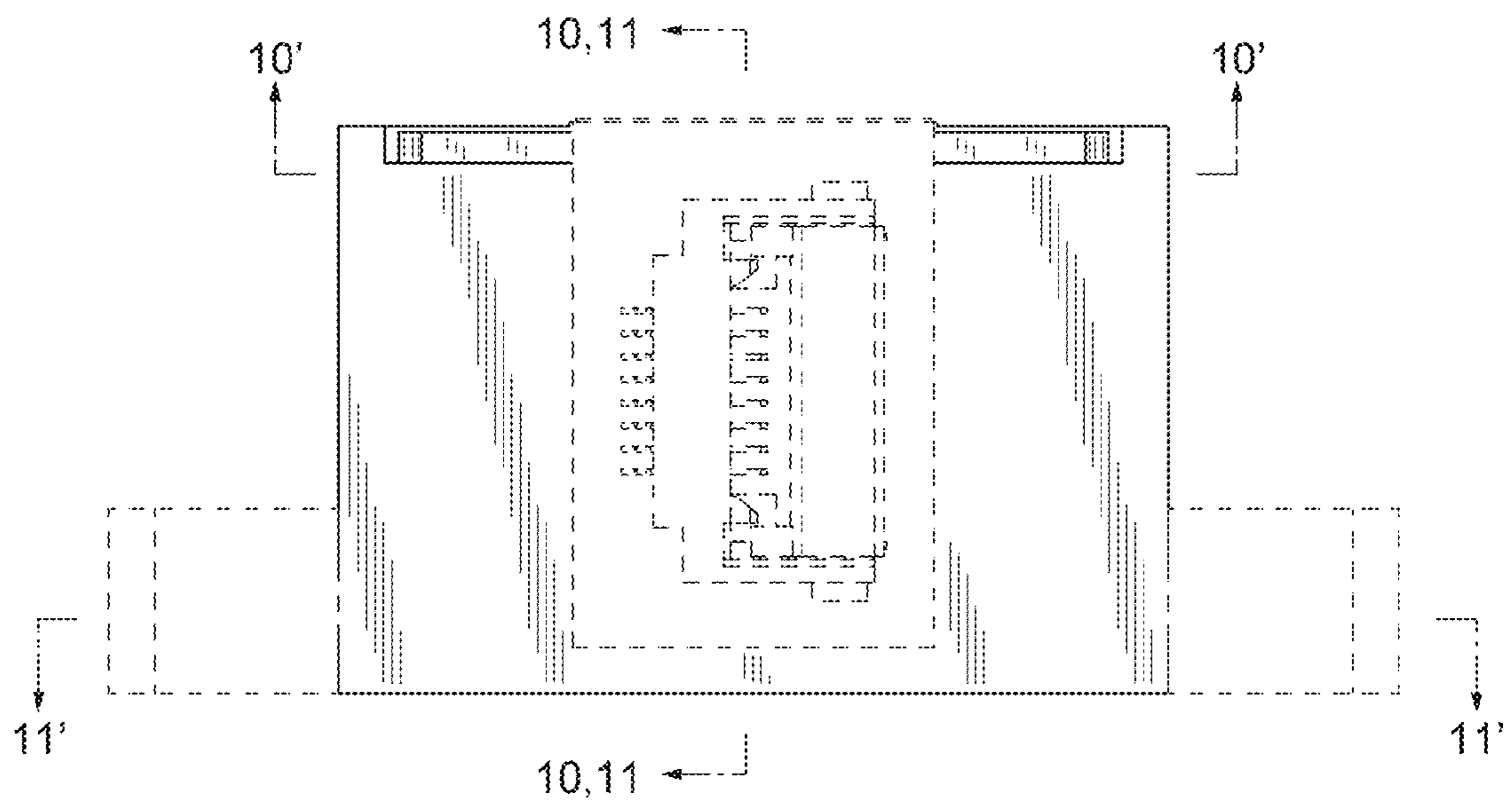
(57) **CLAIM**
The ornamental design for a laser beam reflector, as shown and described.

DESCRIPTION

FIG. 1 is a front view of a laser beam reflector of the present invention;
FIG. 2 is a rear view thereof;
FIG. 3 is a top plan view thereof;
FIG. 4 is a bottom plan view thereof;
FIG. 5 is a right side view thereof;
FIG. 6 is a left side view thereof;
FIG. 7 is a front, top plan and left side perspective view thereof;
FIG. 8 is a rear, top plan and right side perspective view thereof;
FIG. 9 is a cross-sectional view along the line 9-9 in FIG. 3;
FIG. 10 is an enlarged cross-sectional view along the line 10-10 in FIG. 1, in the area designated by 10'-10' in FIG. 1 and 10"-10" in FIG. 3;
FIG. 11 is an enlarged cross-sectional view along the line 11-11 in FIG. 1, in the area designated by 11'-11' in FIG. 1 and 11"-11" in FIG. 3; and,
FIG. 12 is a front, top plan and left side perspective view thereof in the state of use.

The features shown in evenly-dashed broken lines depict environmental subject matter only and form no part of the claimed design. The dot-dash broken lines in the drawings represent the bounds of the claimed subject matter, the dot-dash broken lines, themselves forming no part thereof.

1 Claim, 12 Drawing Sheets



- (58) **Field of Classification Search**
 USPC D10/50, 57, 72, 74, 76, 78, 80, 100, 102,
 D10/103, 124, 125; D24/133, 137, 138,
 D24/127, 113; D13/180, 134
 CPC . F16B 2/06; F16B 2/10; F01D 21/003; G02B
 26/085
 See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

D276,240 S * 11/1984 Bonnefoy D16/225
 4,859,029 A * 8/1989 Durell G02B 5/3066
 359/629
 D304,952 S * 12/1989 Fukuda D16/225
 5,132,509 A 7/1992 Hayakawa
 5,629,790 A * 5/1997 Neukermans G02B 26/0841
 250/234
 6,002,507 A * 12/1999 Floyd G02B 26/0833
 359/201.1
 6,122,089 A * 9/2000 Minamoto G02B 26/105
 359/198.1
 6,128,122 A * 10/2000 Drake G02B 7/1821
 359/198.1
 6,154,522 A 11/2000 Cumings
 6,232,861 B1 * 5/2001 Asada B81B 3/0062
 335/222
 6,426,013 B1 * 7/2002 Neukermans B82Y 15/00
 216/24
 6,528,887 B2 * 3/2003 Daneman B81B 3/0008
 257/731
 RE38,437 E * 2/2004 Floyd G02B 26/0833
 359/201.1
 6,781,732 B2 * 8/2004 Cho B81B 3/0021
 359/224.1
 6,791,731 B2 * 9/2004 Ryu G02B 26/085
 359/200.7
 6,803,938 B2 * 10/2004 Turner B41J 2/471
 347/237
 D502,953 S * 3/2005 Kerrod D16/130
 6,897,990 B2 * 5/2005 Yagi G02B 26/085
 359/199.3
 6,900,925 B2 * 5/2005 Kato G02B 26/085
 348/E5.141
 6,903,818 B2 6/2005 Cerni et al.
 6,924,915 B2 * 8/2005 Hirose B81B 3/0018
 310/36
 6,949,996 B2 * 9/2005 Matsumoto B81B 3/0062
 200/181
 7,012,737 B2 * 3/2006 Iwasaki G02B 26/085
 359/224.1
 D528,997 S * 9/2006 Jung D13/180
 7,224,507 B2 * 5/2007 Kamiya G02B 26/0833
 359/200.7
 7,230,743 B2 * 6/2007 Matsuo G02B 26/085
 359/200.7
 7,256,926 B2 * 8/2007 Kamiya G02B 26/0833
 359/224.1
 7,391,222 B2 * 6/2008 Nishio G02B 26/085
 324/658
 7,408,690 B2 * 8/2008 Mizoguchi G02B 26/085
 310/36

7,605,965 B2 10/2009 Tani et al.
 D689,209 S * 9/2013 Donofrio D13/180
 D725,051 S * 3/2015 Kao D13/180
 D740,240 S * 10/2015 Chen D13/180
 9,258,486 B2 * 2/2016 Hu H04N 5/2328
 9,322,654 B2 4/2016 Bockem
 D762,183 S * 7/2016 Kim D13/180
 9,453,721 B2 9/2016 Akita et al.
 9,477,078 B2 * 10/2016 Murata H02K 33/16
 9,482,864 B2 * 11/2016 Shimizu G02B 26/085
 D777,121 S * 1/2017 Panaccione D13/180
 9,547,170 B2 * 1/2017 Hino G02B 26/105
 D778,849 S * 2/2017 Maruyama D13/180
 D782,425 S * 3/2017 Ko D13/180
 9,632,309 B2 * 4/2017 Yasuda G02B 26/085
 9,681,015 B2 * 6/2017 Mizoguchi H04N 1/036
 D791,963 S 7/2017 Orcutt
 9,729,038 B2 * 8/2017 Takimoto G02B 26/0816
 9,798,135 B2 * 10/2017 Erlich G02B 26/0833
 9,846,076 B2 * 12/2017 Shibayama G01J 3/26
 D807,945 S * 1/2018 Otsuka D16/235
 D813,692 S * 3/2018 Dugarry D10/46
 9,952,158 B2 * 4/2018 Ito G01N 21/658
 9,953,729 B2 * 4/2018 Watari G21B 3/006
 10,054,439 B2 8/2018 Jensen et al.
 D829,580 S * 10/2018 Hirose D10/81
 D841,590 S * 2/2019 Otsuka D13/134
 D846,512 S * 4/2019 Nishio D13/180
 10,295,852 B2 * 5/2019 Wada G02F 1/1333
 10,330,923 B2 * 6/2019 Hino G02B 26/101
 D871,412 S 12/2019 Aprile et al.
 D876,525 S * 2/2020 Sun D16/237
 10,549,981 B2 * 2/2020 Takimoto B81B 3/001
 10,589,985 B2 * 3/2020 Takimoto B81B 7/0006
 10,591,719 B2 * 3/2020 Byeman H04N 9/3129

OTHER PUBLICATIONS

“Autonomous driving & ADAS (Exhibit 2)”, http://www.hamamatsu.com/eu/en/community/optical_sensors/applications/autonomous_driving_adas/index.html, Nov. 22, 2017.
 “Products (Exhibit 3)”, http://www.hamamatsu.com/us/en/community/optical_sensors/photonics_west/products/index.html, Dec. 16, 2017.
 “Photograph (Exhibit 4-1)”, Hamamatsu Photonics K.K., Jan. 30 to Feb. 1, 2018.
 “Photonics West 2018 Technical Program (Exhibit 4-2)”, SPIE, Jan. 27 to Feb. 1, 2018.
 “Product Flyer MEMS mirror S13124-02H (Exhibit 4-3)”, Hamamatsu Photonics K.K., Jan. 30 to Feb. 1, 2018.
 “Product Flyer MEMS mirror S13989-01H (Exhibit 4-4)”, Hamamatsu Photonics K.K., Jan. 30 to Feb. 1, 2018.
 Sadaharo Takimoto, “Optical MEMS (MOEMS) Technology of Hamamatsu (Exhibit 5-1)”, Hamamatsu Photonics K.K., Apr. 25, 2018.
 “Photograph (Exhibit 5-2)”, Hamamatsu Photonics K.K., Apr. 25, 2018.
 “10th Anniversary MEMS Engineer Forum (MEF) 2018 Smart Society Driven by MEMS (Exhibit 5-3)”, MEMS 2018, Apr. 25 to 26, 2018.
 Office Action dated May 4, 2020 in related U.S. Appl. No. 29/668,518.

* cited by examiner

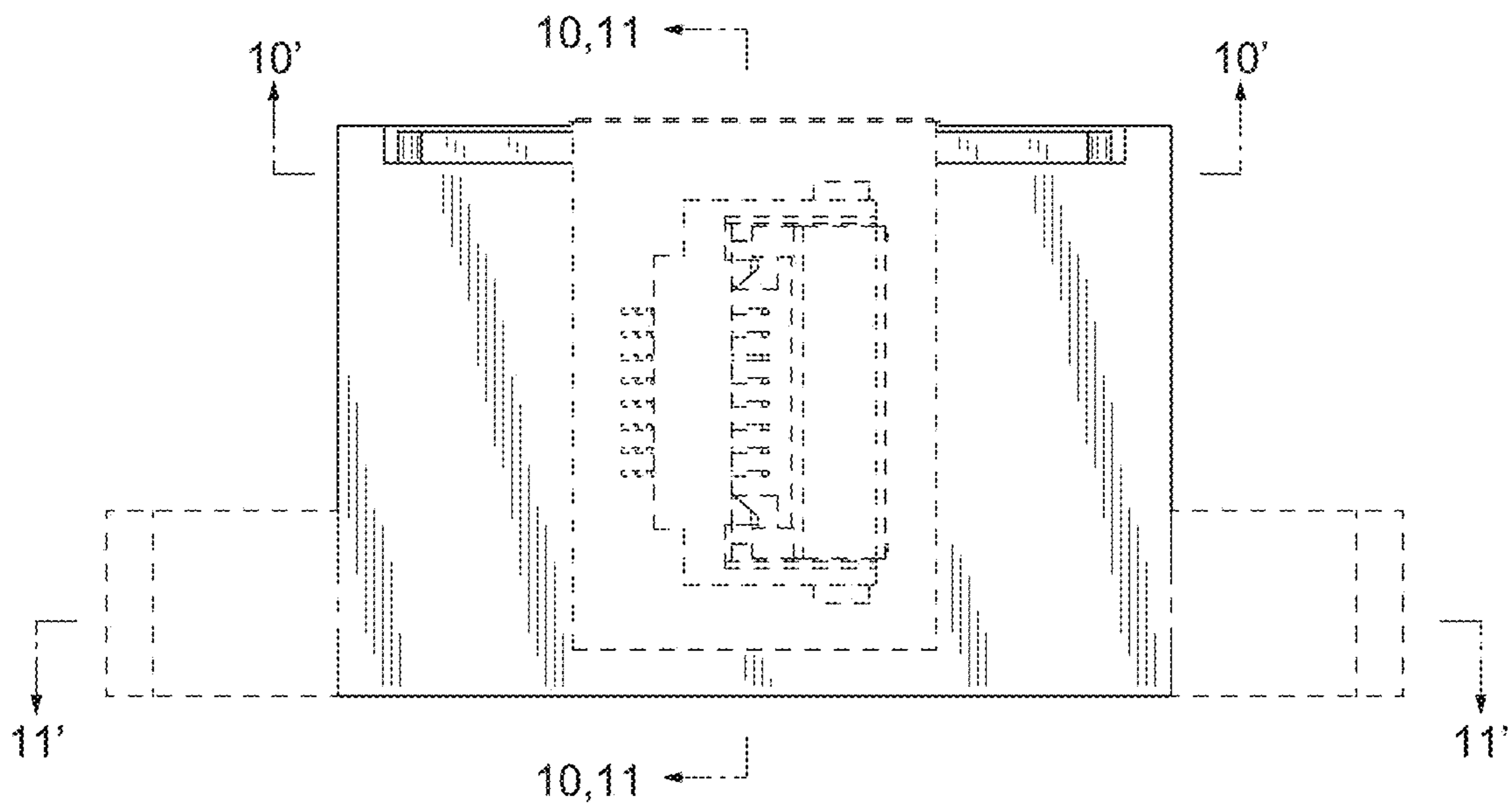


FIG. 1

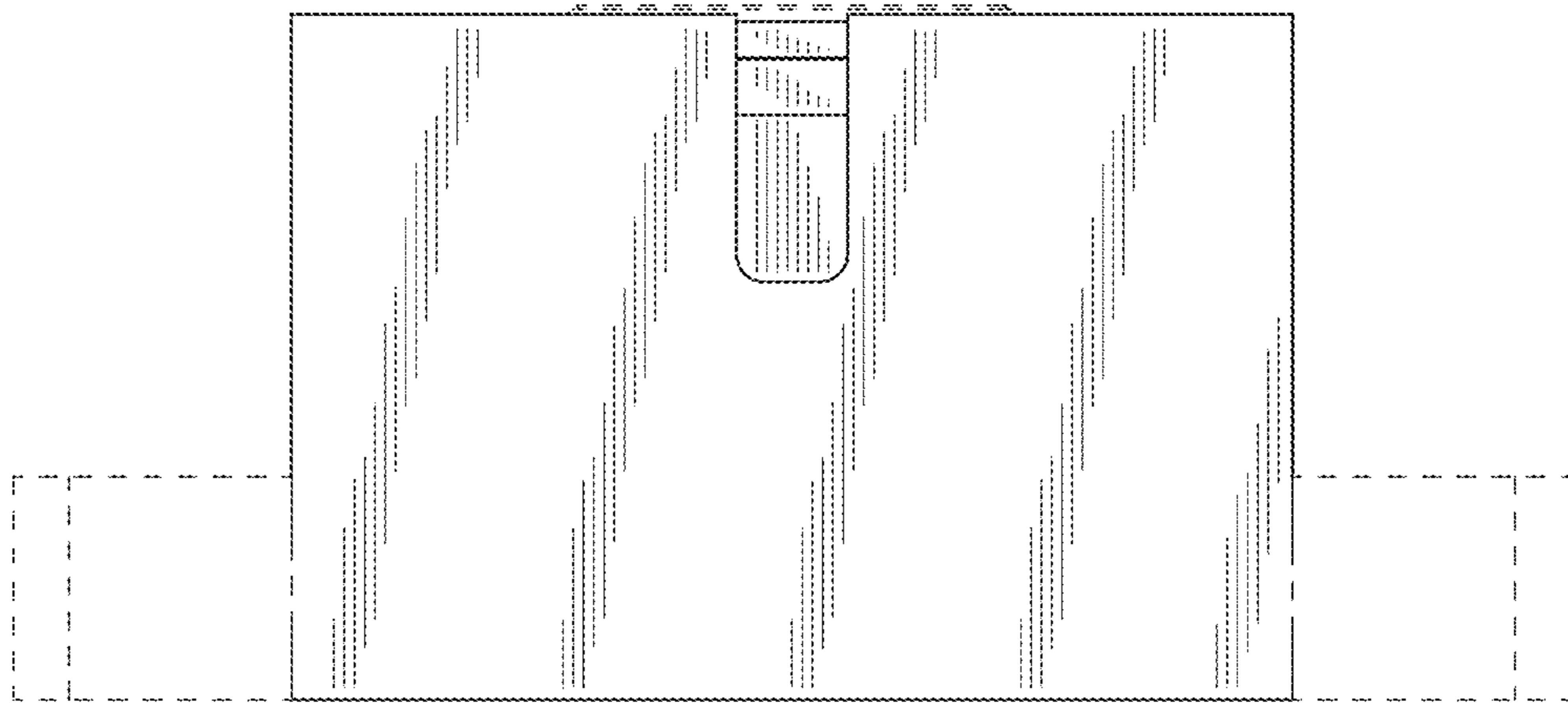


FIG. 2

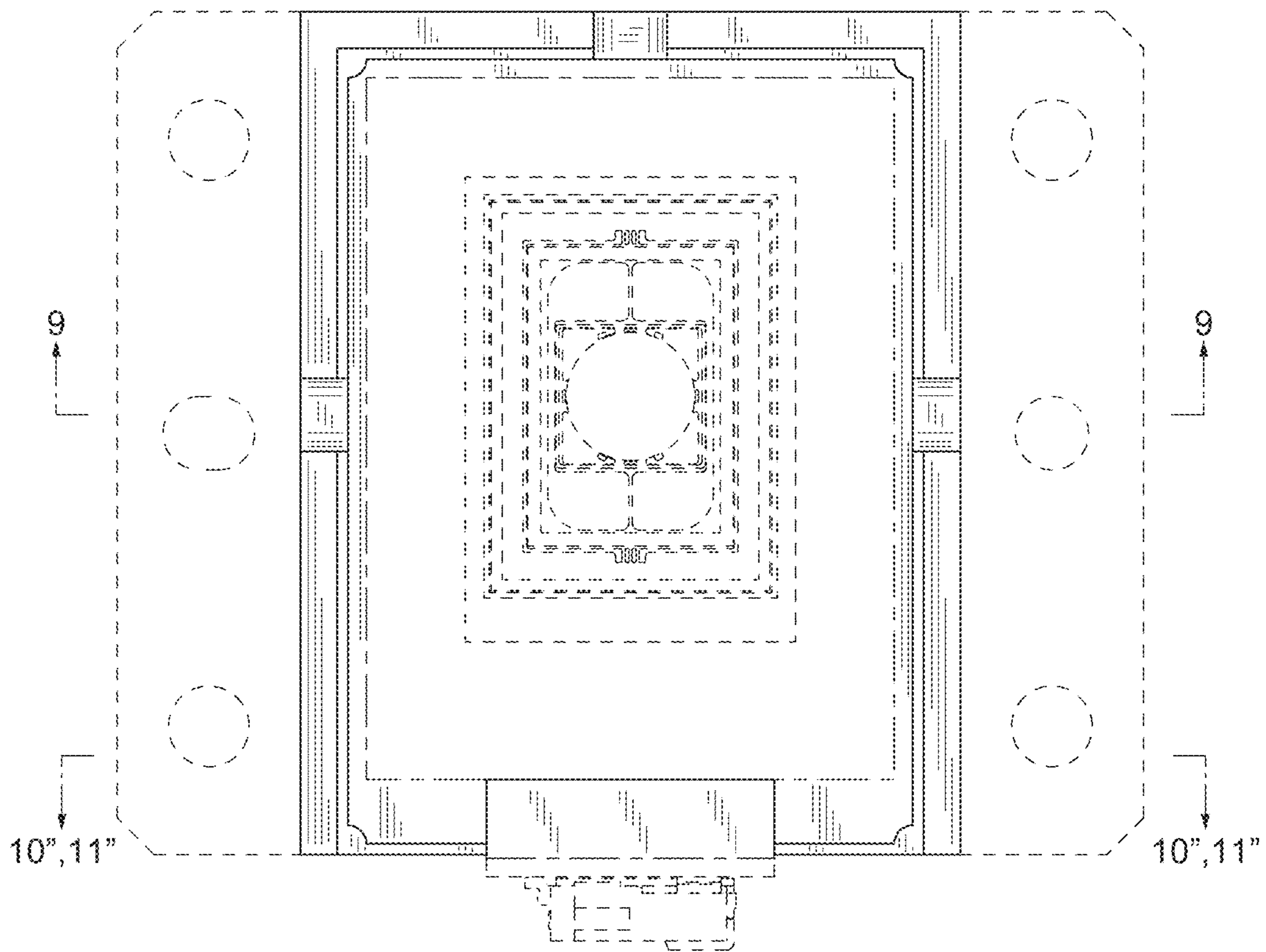


FIG. 3

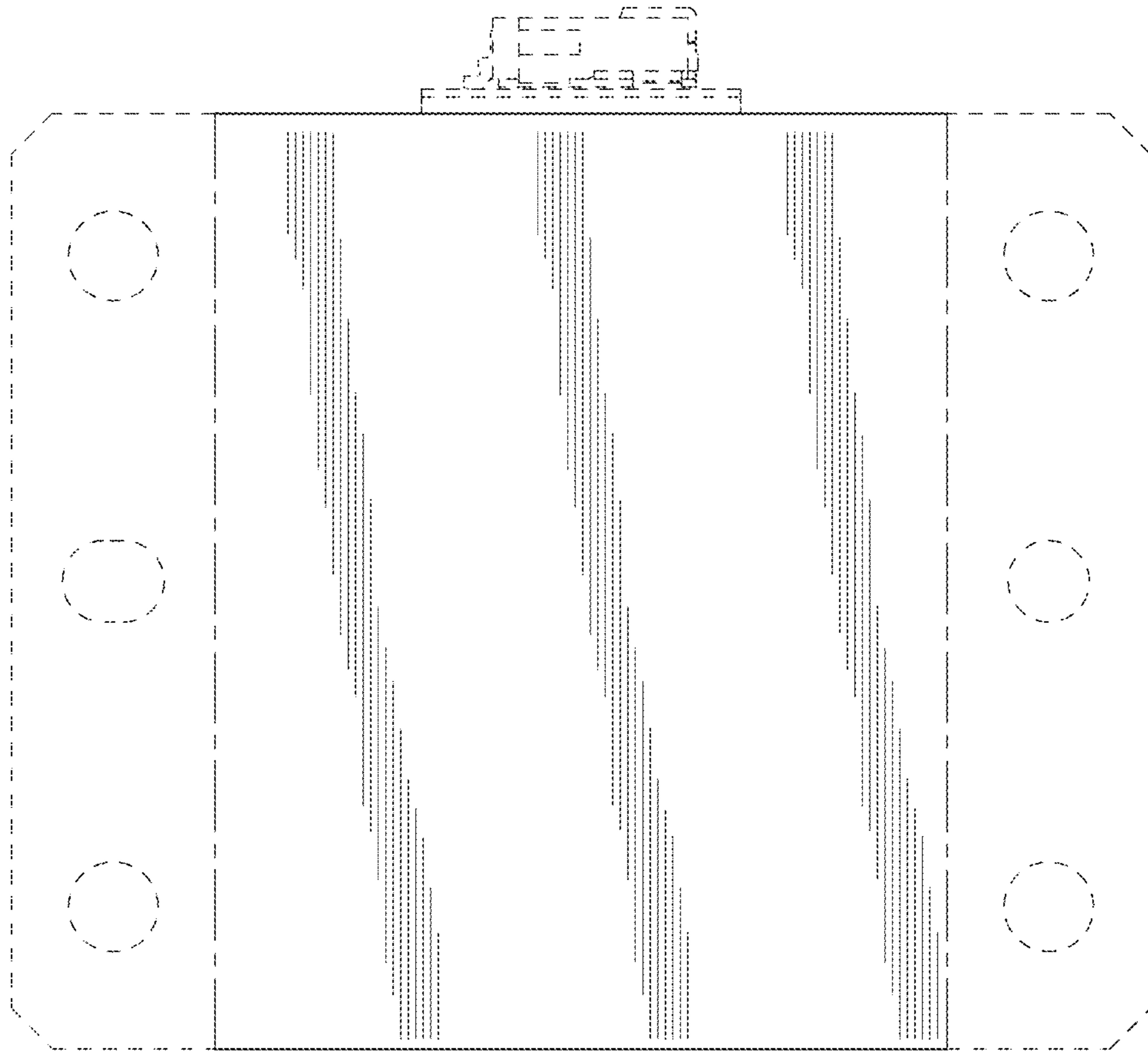


FIG. 4

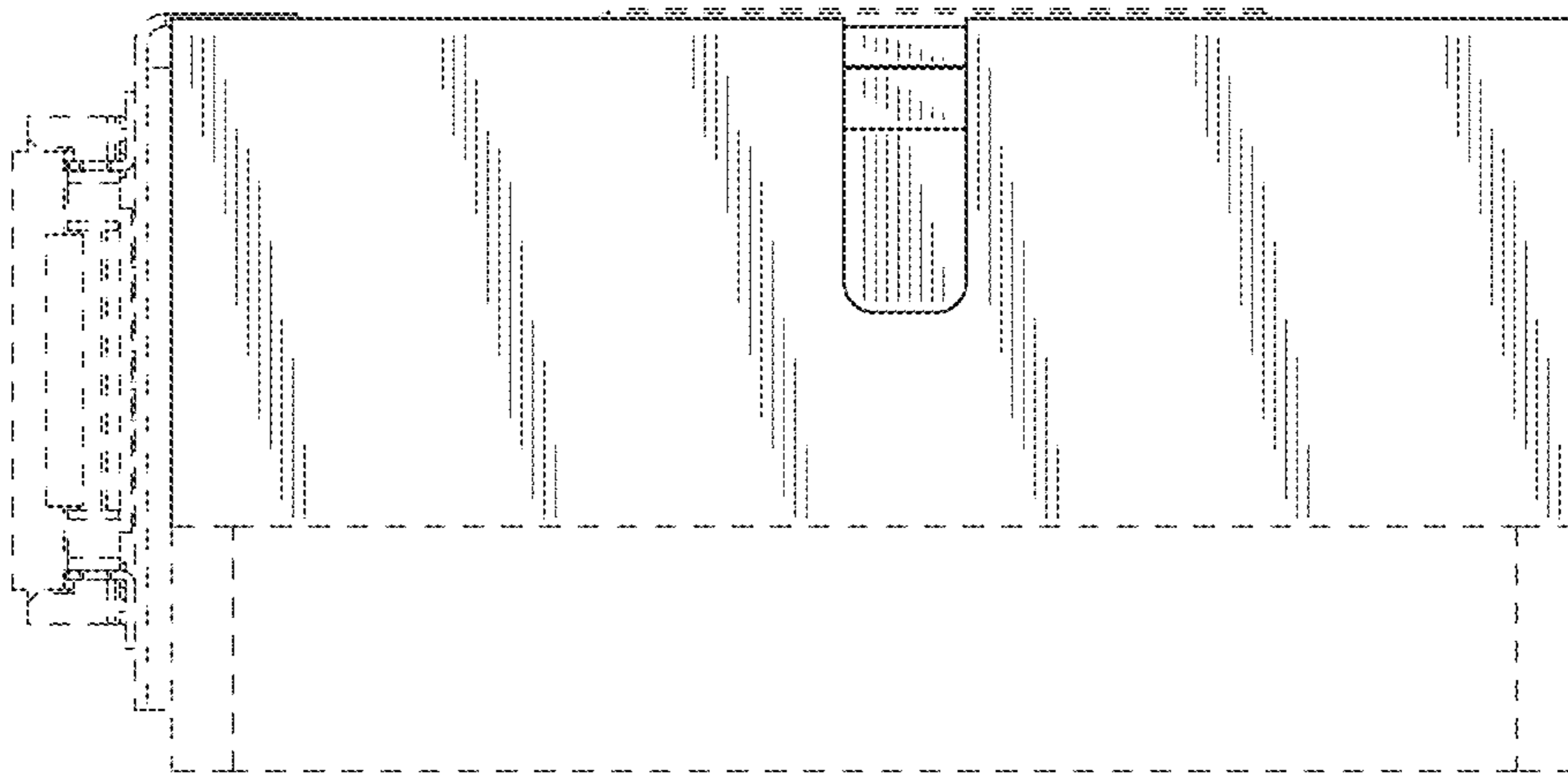


FIG. 5

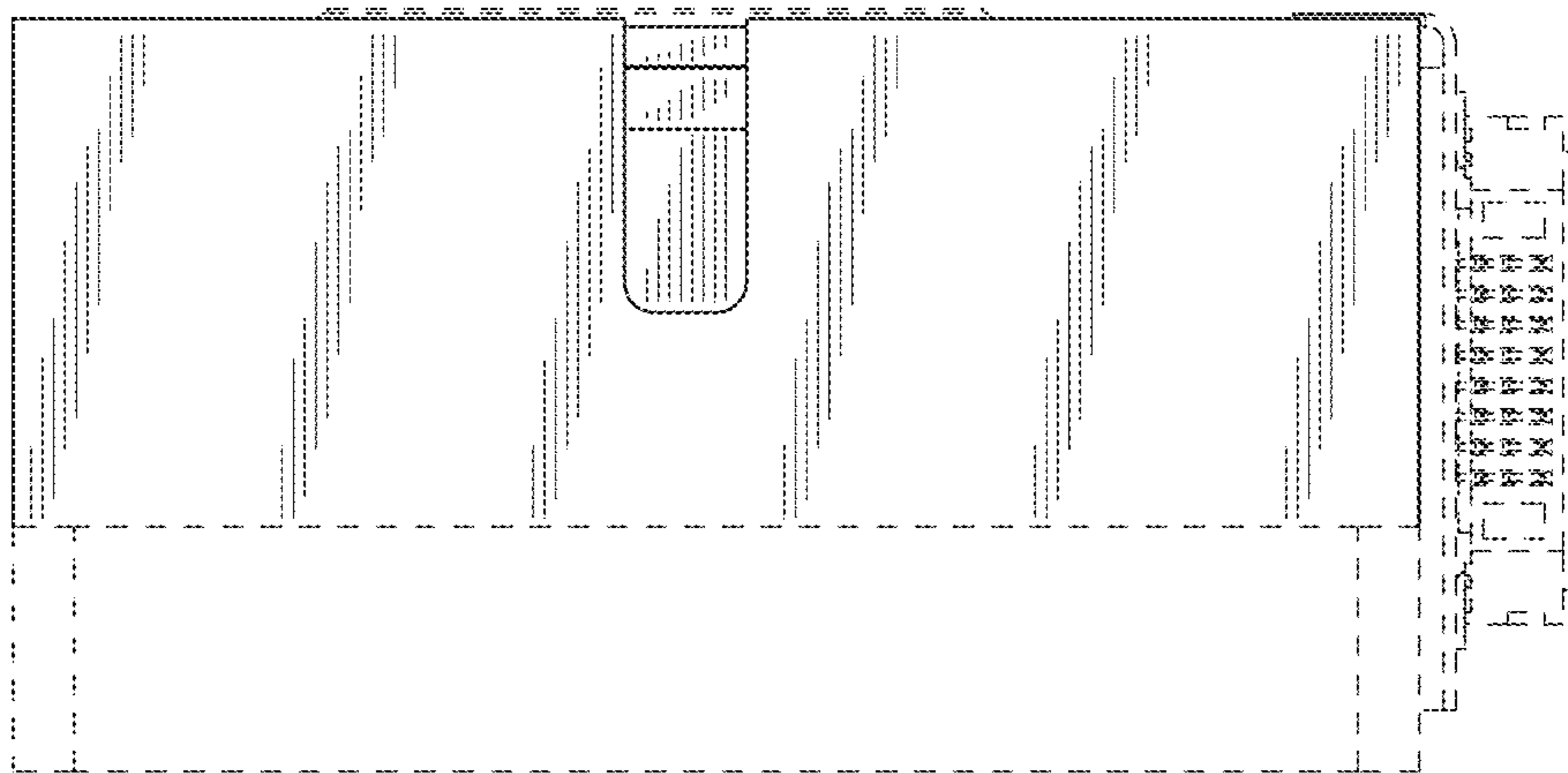


FIG. 6

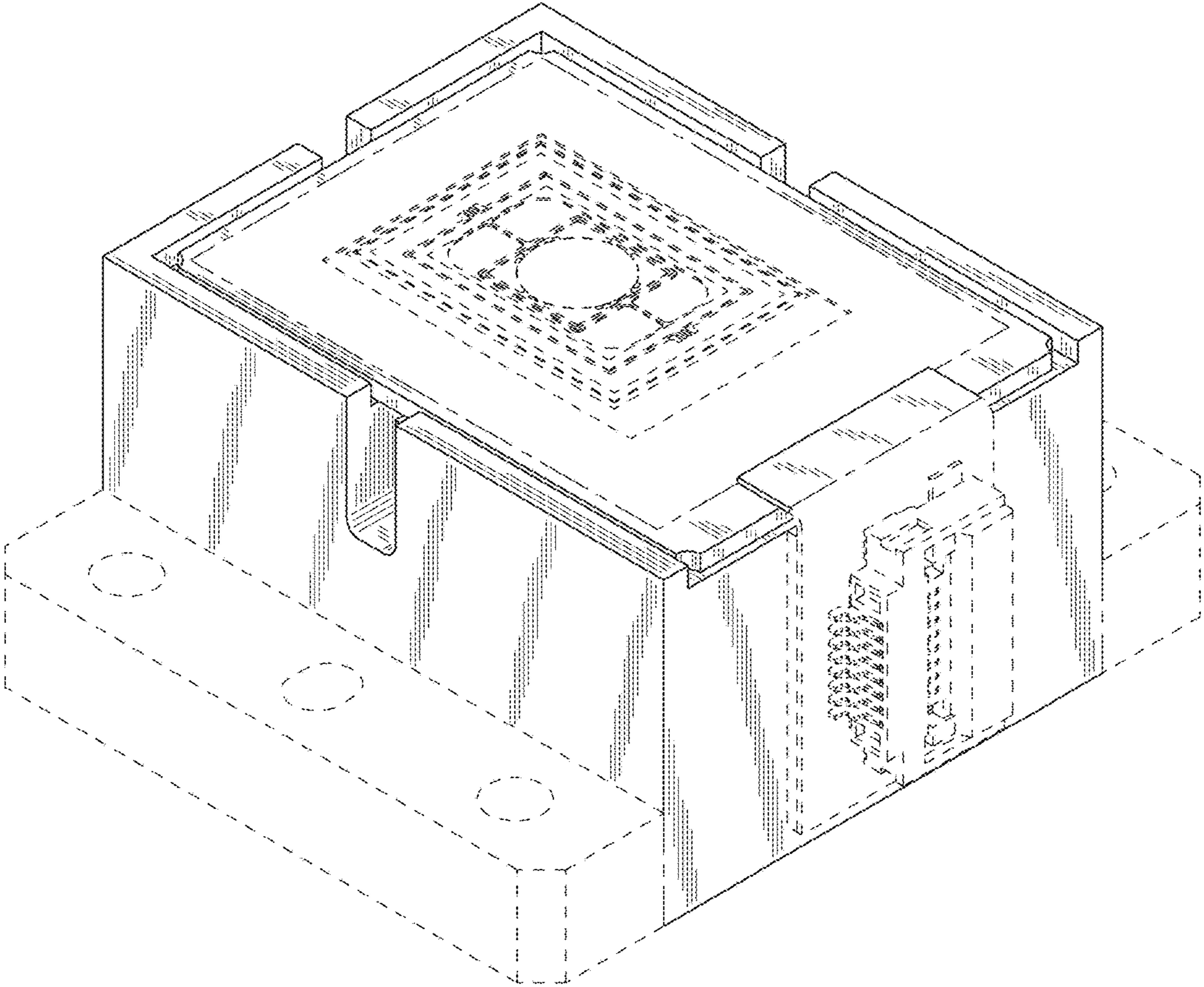


FIG. 7

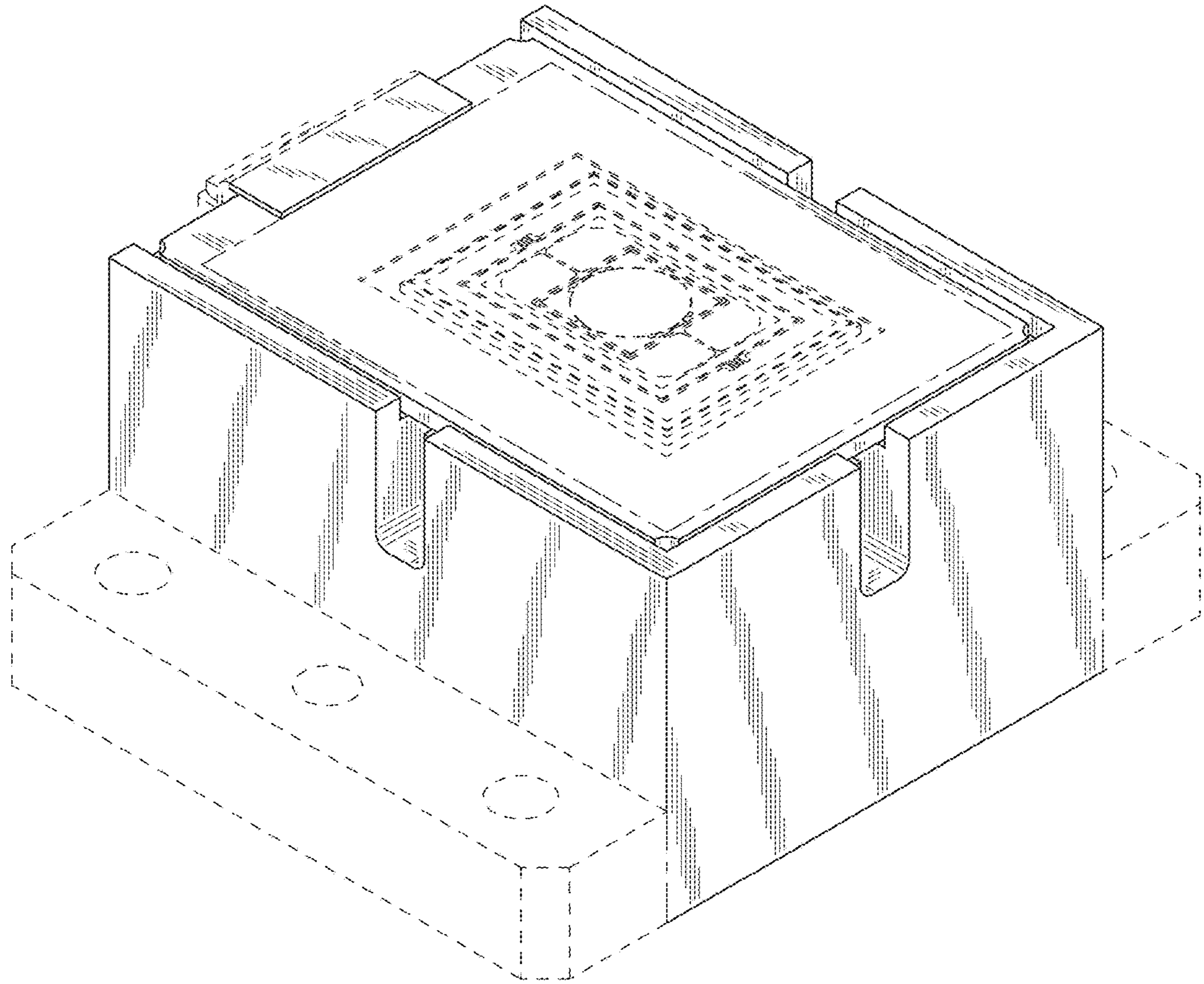


FIG. 8

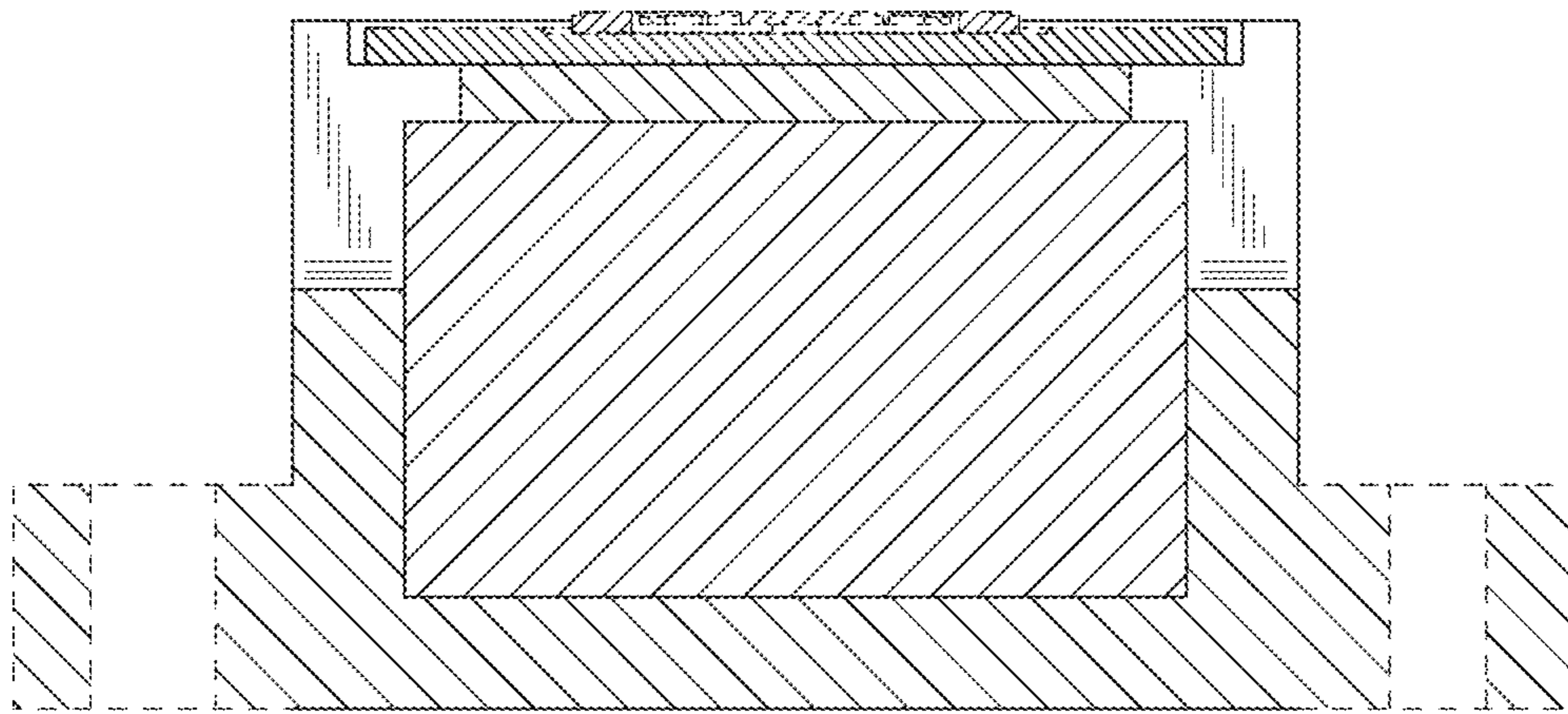


FIG. 9

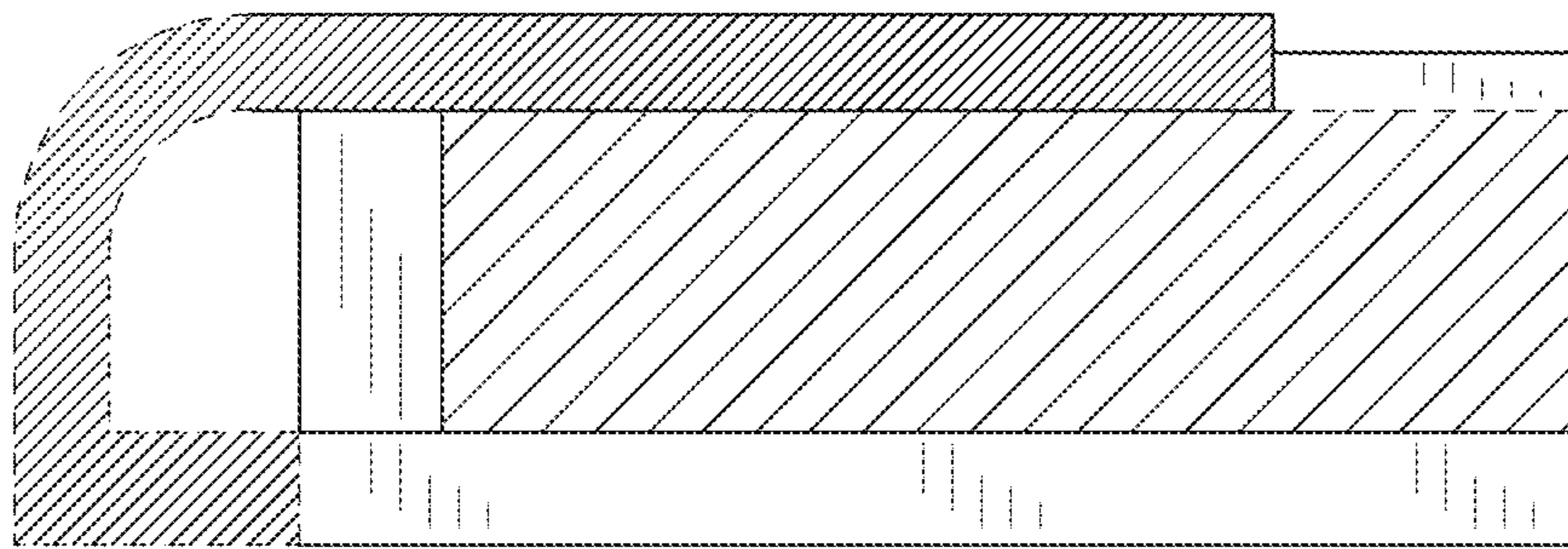


FIG. 10

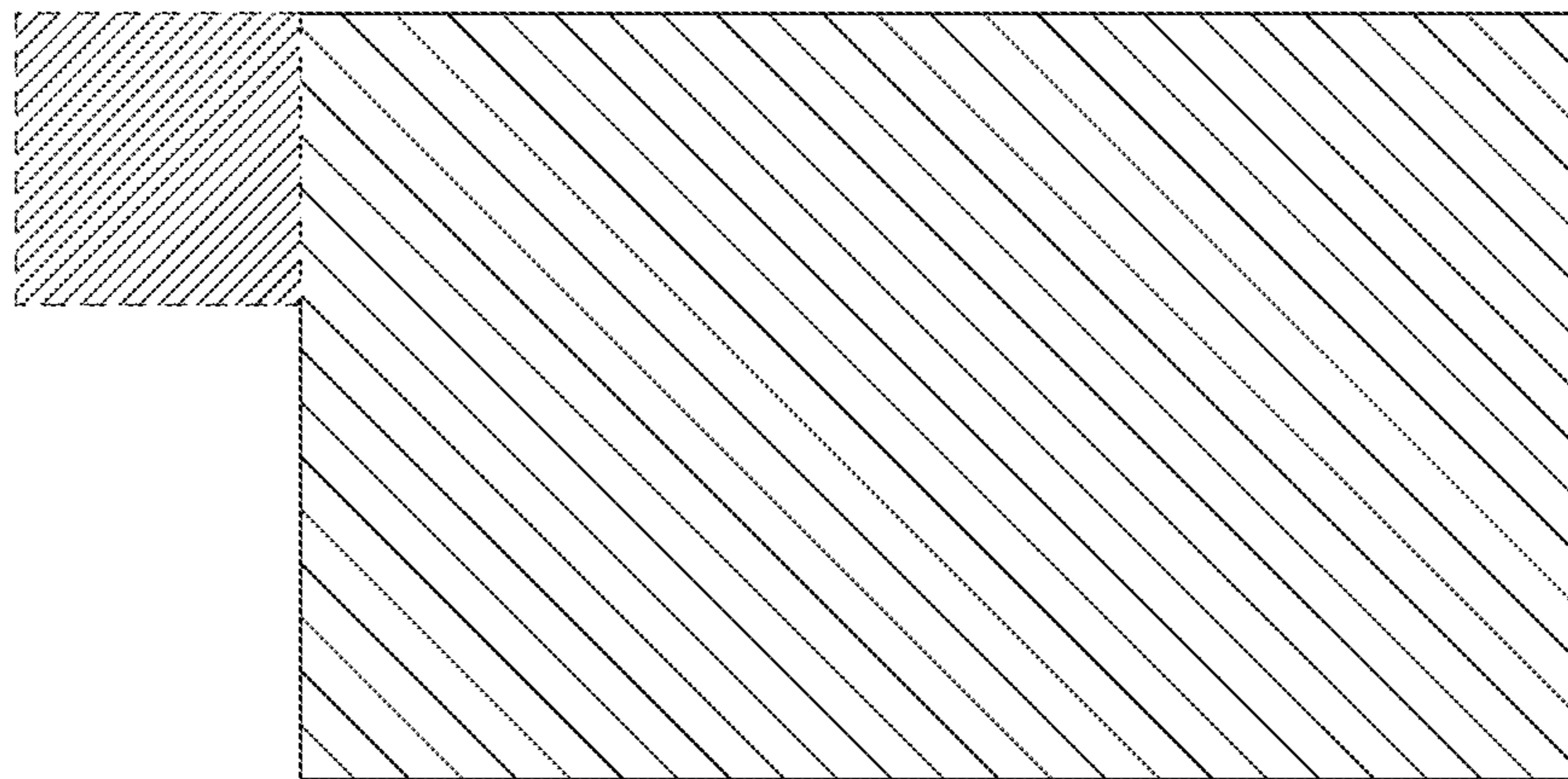


FIG. 11

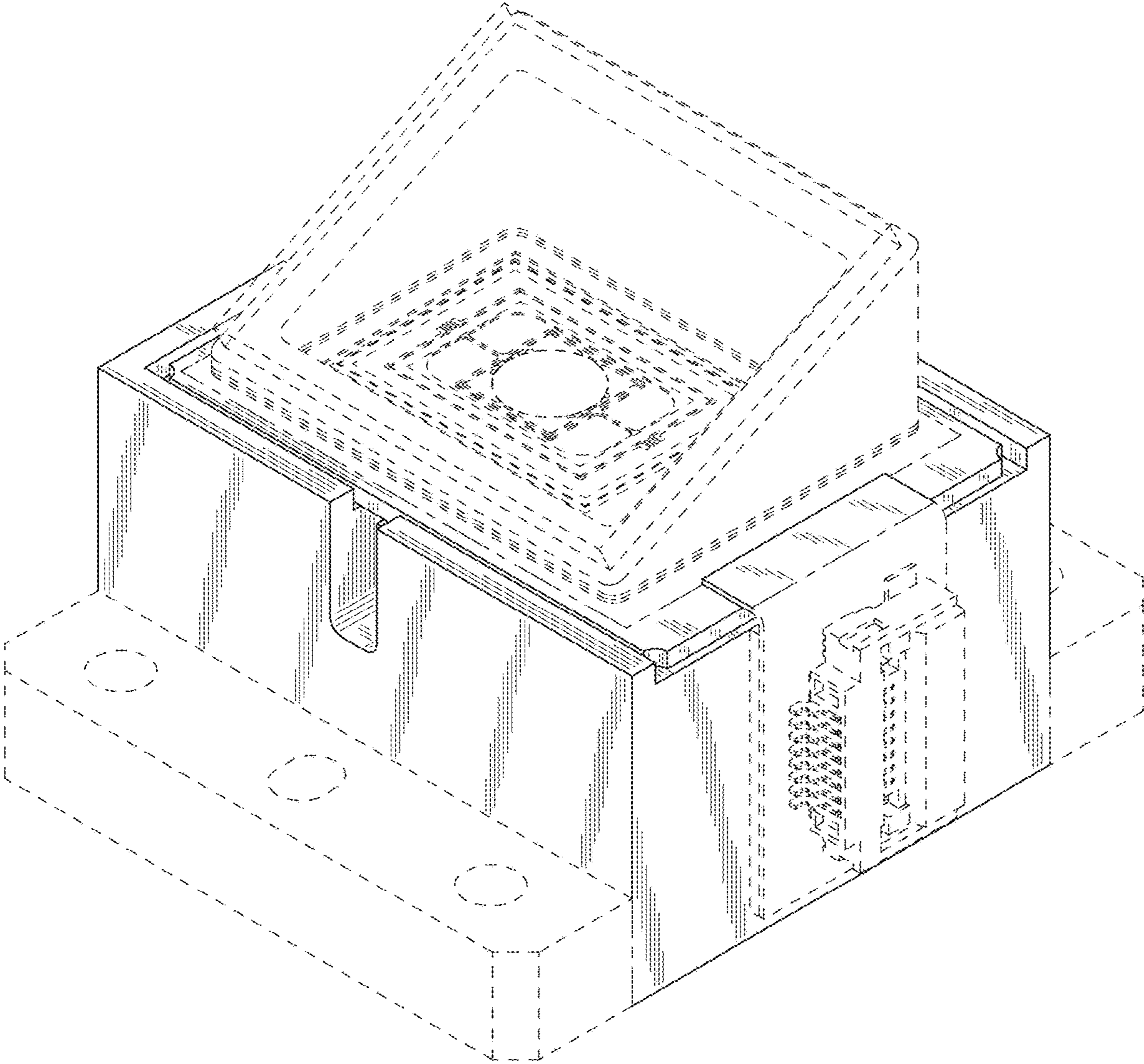


FIG. 12