



US00D912715S

(12) **United States Design Patent**
Suzuki

(10) **Patent No.:** **US D912,715 S**

(45) **Date of Patent:** **** Mar. 9, 2021**

(54) **LASER BEAM REFLECTOR**

(71) Applicant: **HAMAMATSU PHOTONICS K.K.**,
Hamamatsu (JP)

(72) Inventor: **Daiki Suzuki**, Hamamatsu (JP)

(73) Assignee: **HAMAMATSU PHOTONICS K.K.**,
Hamamatsu (JP)

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

(21) Appl. No.: **29/668,503**

(22) Filed: **Oct. 31, 2018**

(30) **Foreign Application Priority Data**

May 1, 2018 (JP) 2018-009716

(51) **LOC (13) Cl.** **16-99**

(52) **U.S. Cl.**
USPC **D16/130; D13/184**

(58) **Field of Classification Search**
USPC D16/130, 131, 136, 221, 223, 225, 232,
D16/235, 248, 250; D10/57, 72, 74, 76,
D10/78, 80, 100, 102, 103, 124, 125;
D24/133, 137, 138, 127, 113; D13/180,
D13/134, 184
CPC . F16B 2/06; F16B 2/10; F01D 21/003; G02B
26/08

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

D175,401 S	8/1955	Gottschalk et al.
D271,208 S	11/1983	Daggett et al.
D276,240 S	11/1984	Bonnefoy
4,859,029 A	8/1989	Durell
D304,952 S	12/1989	Fukuda et al.
5,132,509 A	7/1992	Hayakawa
5,629,790 A	5/1997	Neukermans et al.
6,002,507 A	12/1999	Floyd et al.

6,122,089 A 9/2000 Minamoto et al.
6,128,122 A 10/2000 Drake et al.
6,154,522 A 11/2000 Cumings

(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 — Keli L Hill

Assistant Examiner — Harold E Blackwell, II

(74) *Attorney, Agent, or Firm* — Faegre Drinker Biddle & Reath LLP

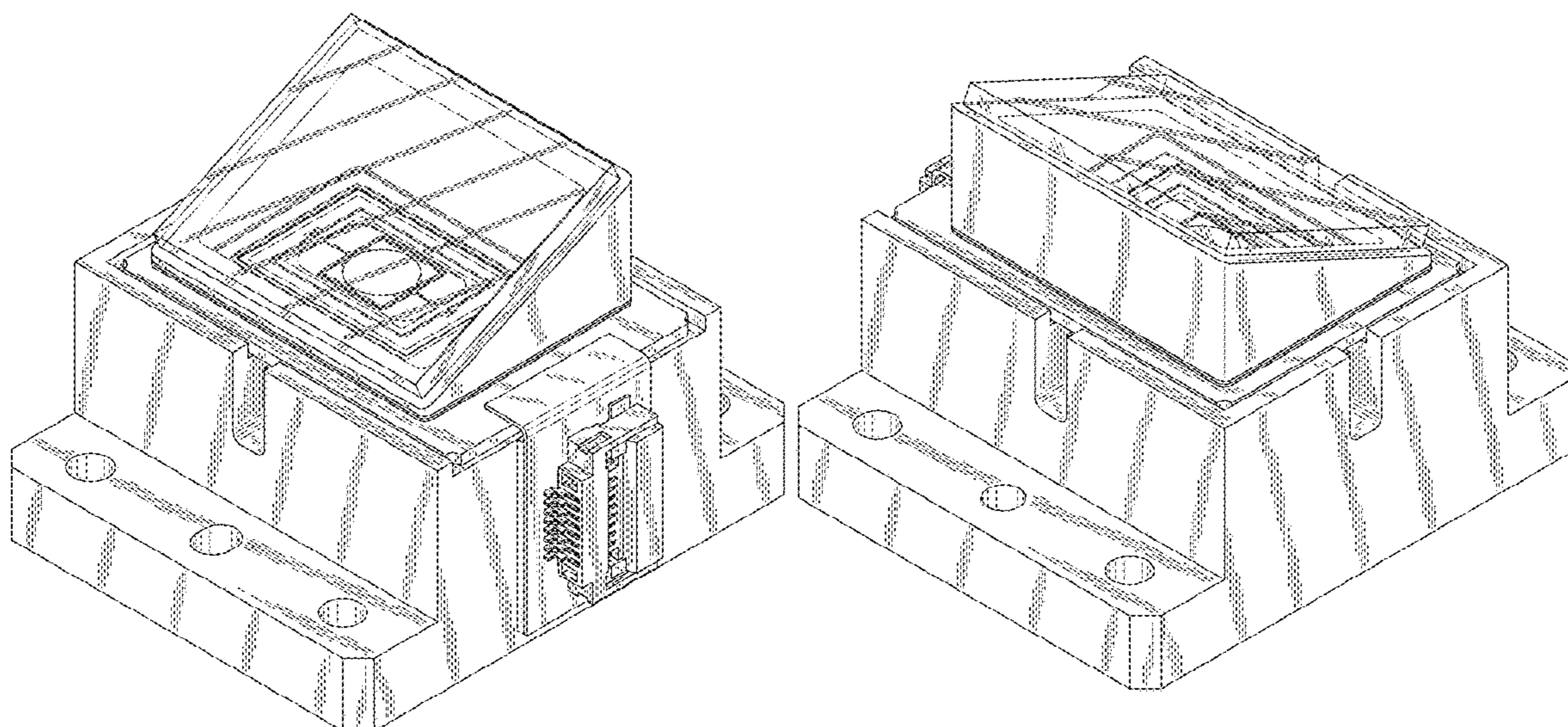
(57) **CLAIM**

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; and,
FIG. 10 is a cross-sectional view along the line 10-10 in FIG. 1.

1 Claim, 10 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,232,861 B1 5/2001 Asada
 6,426,013 B1 7/2002 Neukermans et al.
 D464,628 S * 10/2002 Saito D13/162
 6,528,887 B2 3/2003 Daneman et al.
 RE38,437 E 2/2004 Floyd et al.
 6,781,732 B2 8/2004 Cho et al.
 6,791,731 B2 9/2004 Ryu et al.
 6,803,938 B2 10/2004 Turner
 D502,953 S 3/2005 Kerrod et al.
 6,897,990 B2 5/2005 Yagi et al.
 6,900,925 B2 5/2005 Kato et al.
 6,903,818 B2 6/2005 Cerni et al.
 6,924,915 B2 8/2005 Hirose et al.
 6,949,996 B2 9/2005 Matsumoto et al.
 7,012,737 B2 3/2006 Iwasaki et al.
 D528,997 S 9/2006 Jung et al.
 7,224,507 B2 5/2007 Kamiya et al.
 7,230,743 B2 6/2007 Matsuo et al.
 7,256,926 B2 8/2007 Kamiya et al.
 7,391,222 B2 6/2008 Nishio
 7,408,690 B2 8/2008 Mizoguchi
 7,605,965 B2 10/2009 Tani et al.
 D689,209 S 9/2013 Donofrio et al.
 D725,051 S 3/2015 Kao et al.
 D740,240 S 10/2015 Chen et al.
 9,258,486 B2 2/2016 Hu et al.
 9,322,654 B2 4/2016 Bockem
 D762,183 S 7/2016 Kim et al.
 9,453,721 B2 9/2016 Akita et al.
 9,477,078 B2 10/2016 Murata et al.
 9,482,864 B2 11/2016 Shimizu
 D777,121 S 1/2017 Panaccione et al.
 9,547,170 B2 1/2017 Hino et al.
 D778,849 S 2/2017 Maruyama
 D782,425 S 3/2017 Ko et al.
 9,632,309 B2 4/2017 Yasuda
 9,681,015 B2 6/2017 Mizoguchi
 D791,963 S 7/2017 Orcutt
 9,729,038 B2 8/2017 Takimoto et al.
 9,798,135 B2 10/2017 Erlich et al.
 9,846,076 B2 12/2017 Shibayama et al.
 D807,945 S 1/2018 Otsuka
 D813,692 S 3/2018 Dugarry
 9,952,158 B2 4/2018 Ito et al.
 9,953,729 B2 4/2018 Watari et al.
 10,054,439 B2 8/2018 Jensen et al.

D829,580 S 10/2018 Hirose et al.
 D841,590 S 2/2019 Otsuka et al.
 D846,512 S 4/2019 Nishio et al.
 10,295,852 B2 5/2019 Wada et al.
 10,330,923 B2 6/2019 Hino et al.
 D871,412 S 12/2019 Aprile et al.
 D876,525 S 2/2020 Sun et al.
 10,549,981 B2 2/2020 Takimoto et al.
 10,589,985 B2 3/2020 Takimoto et al.
 10,591,719 B2 3/2020 Byeman et al.
 D892,189 S * 8/2020 Suzuki D16/130
 D892,190 S * 8/2020 Suzuki D16/130
 D892,890 S * 8/2020 Suzuki D16/130
 D892,891 S * 8/2020 Suzuki D16/130
 D892,892 S * 8/2020 Suzuki D16/130
 D892,893 S * 8/2020 Suzuki D16/130
 D892,894 S * 8/2020 Suzuki D16/130
 D893,574 S * 8/2020 Suzuki D16/130
 2020/0174247 A1 * 6/2020 Suzuki B81B 3/00

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 513124-02H (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.
 Notice of Allowance dated Apr. 3, 2020 in U.S. Appl. No. 29/668,500.

* cited by examiner

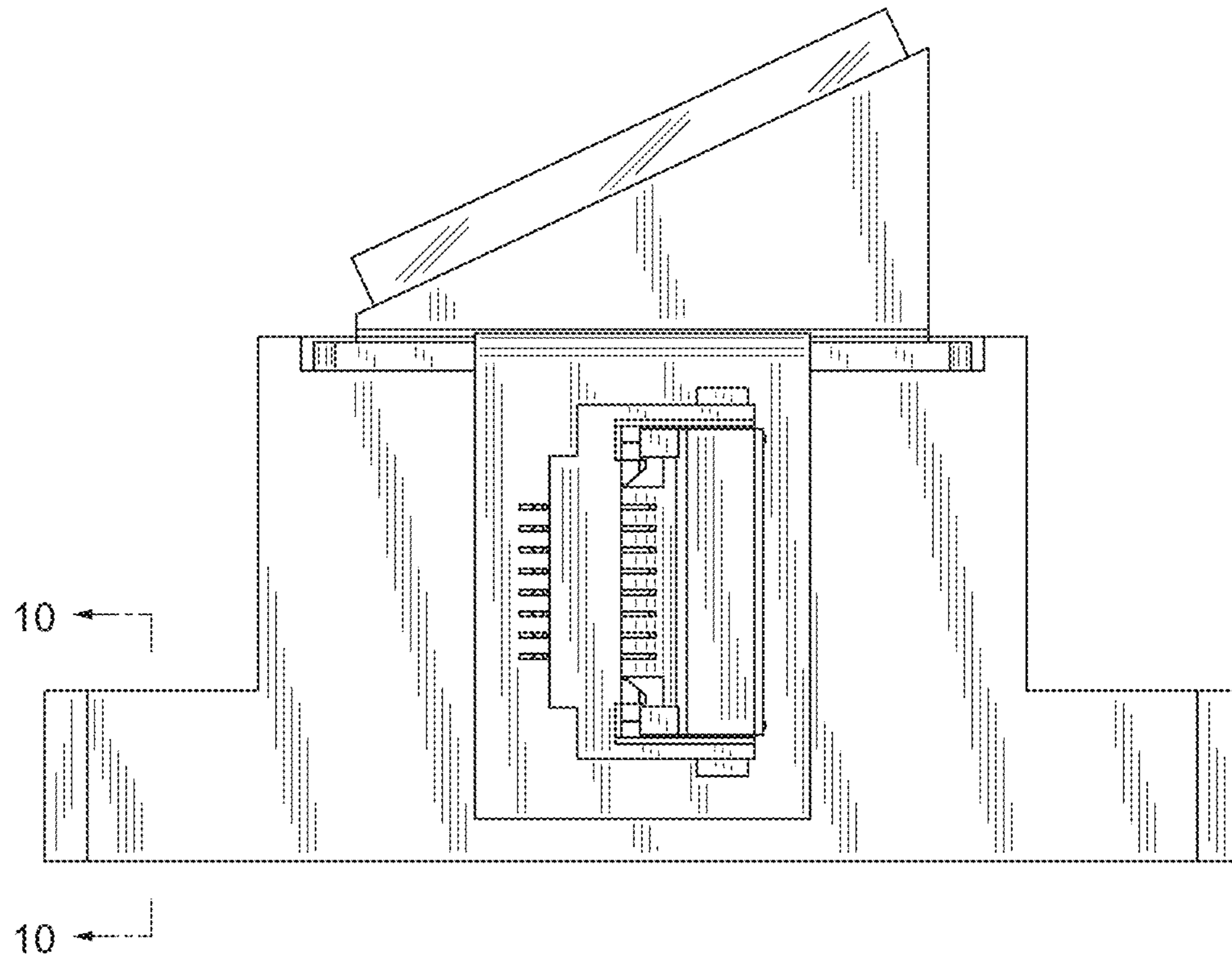


FIG. 1

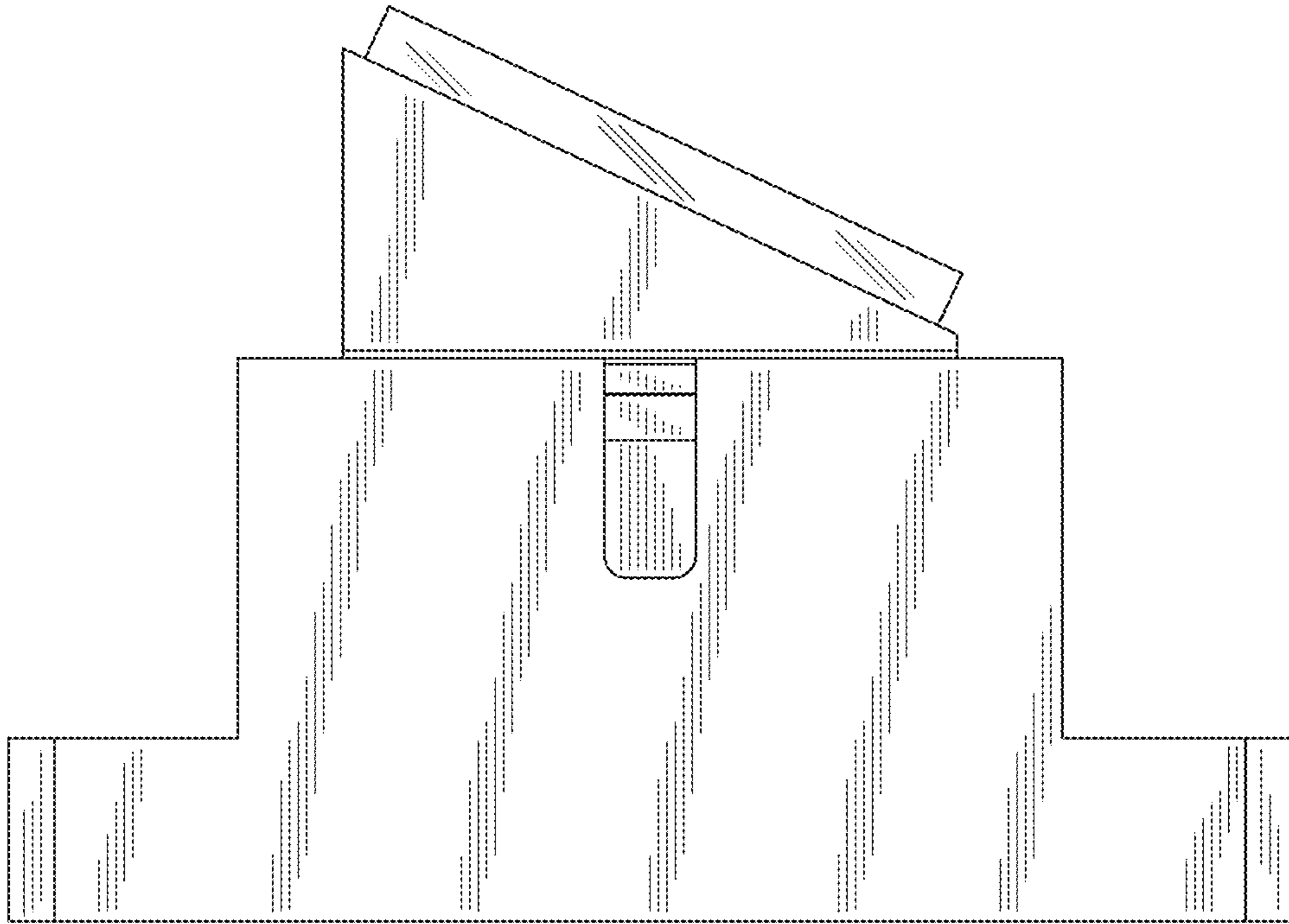


FIG. 2

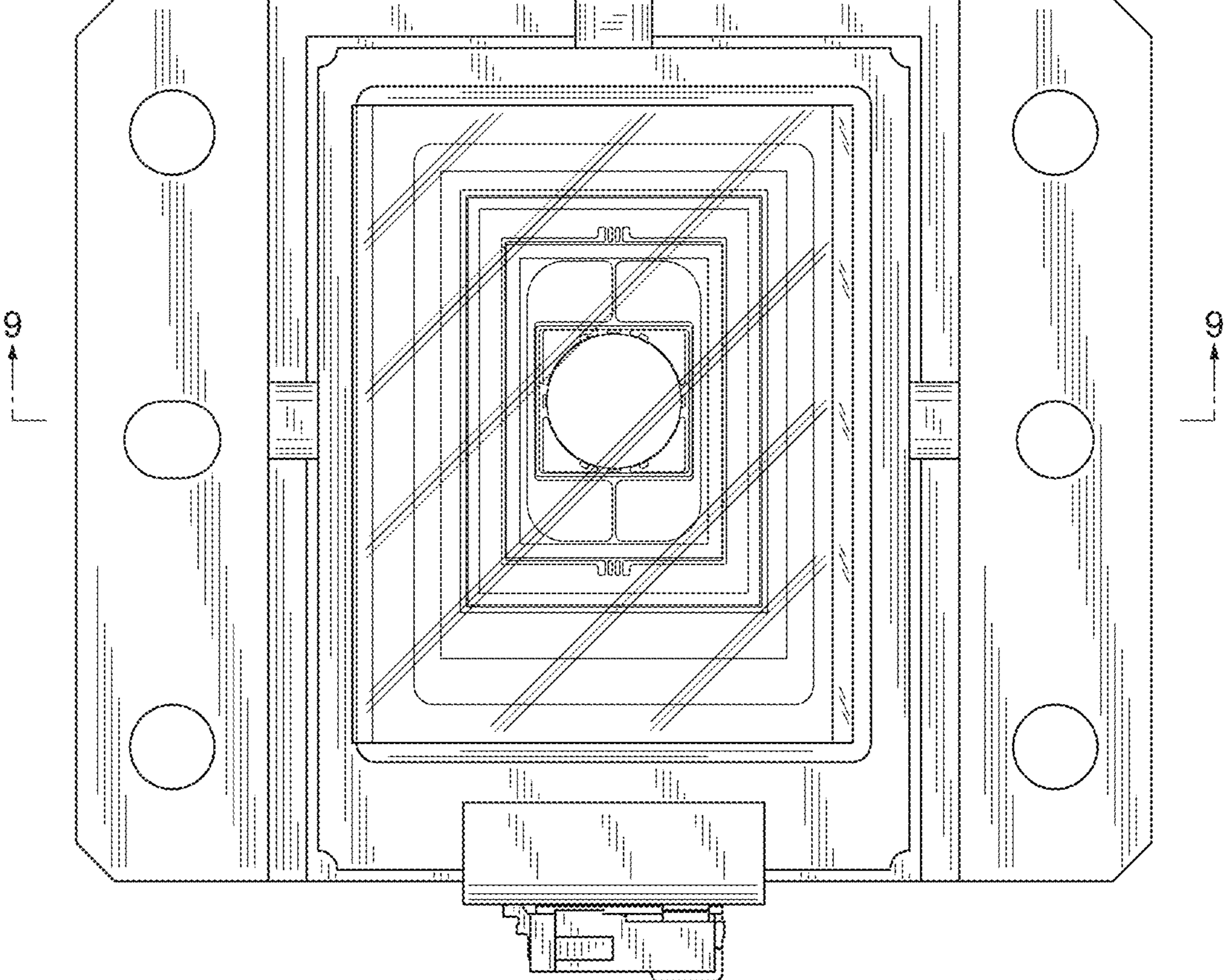


FIG. 3

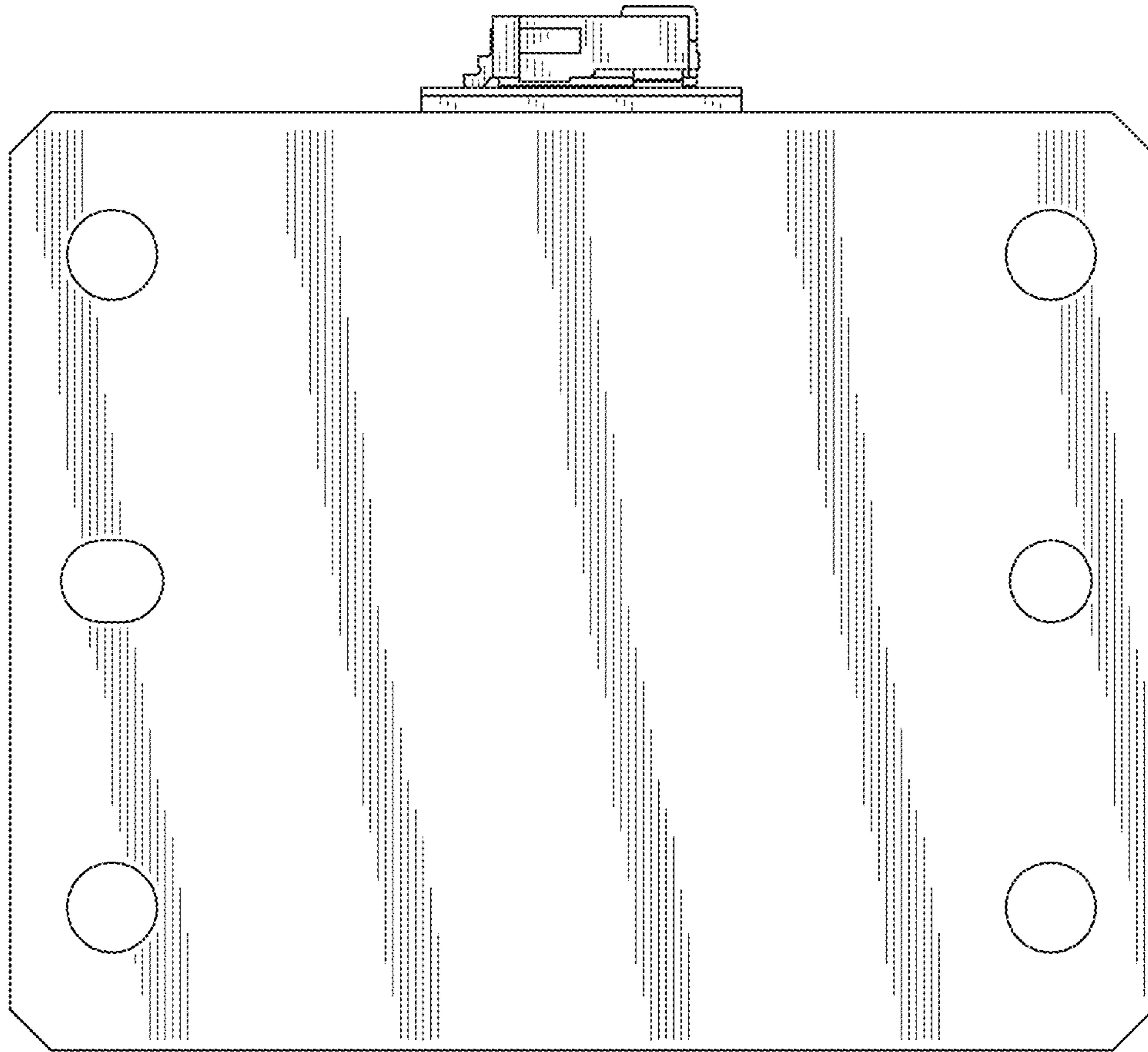


FIG. 4

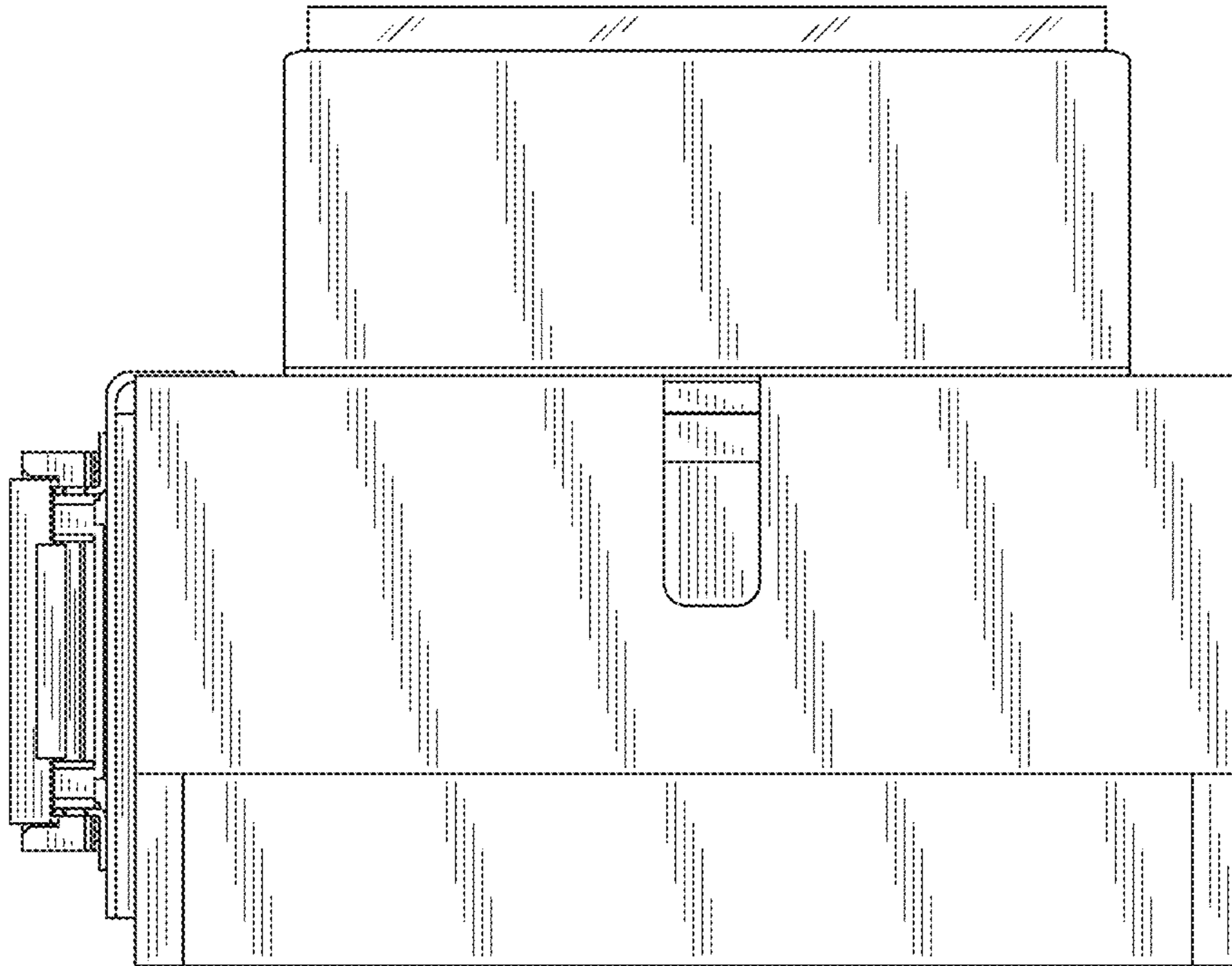


FIG. 5

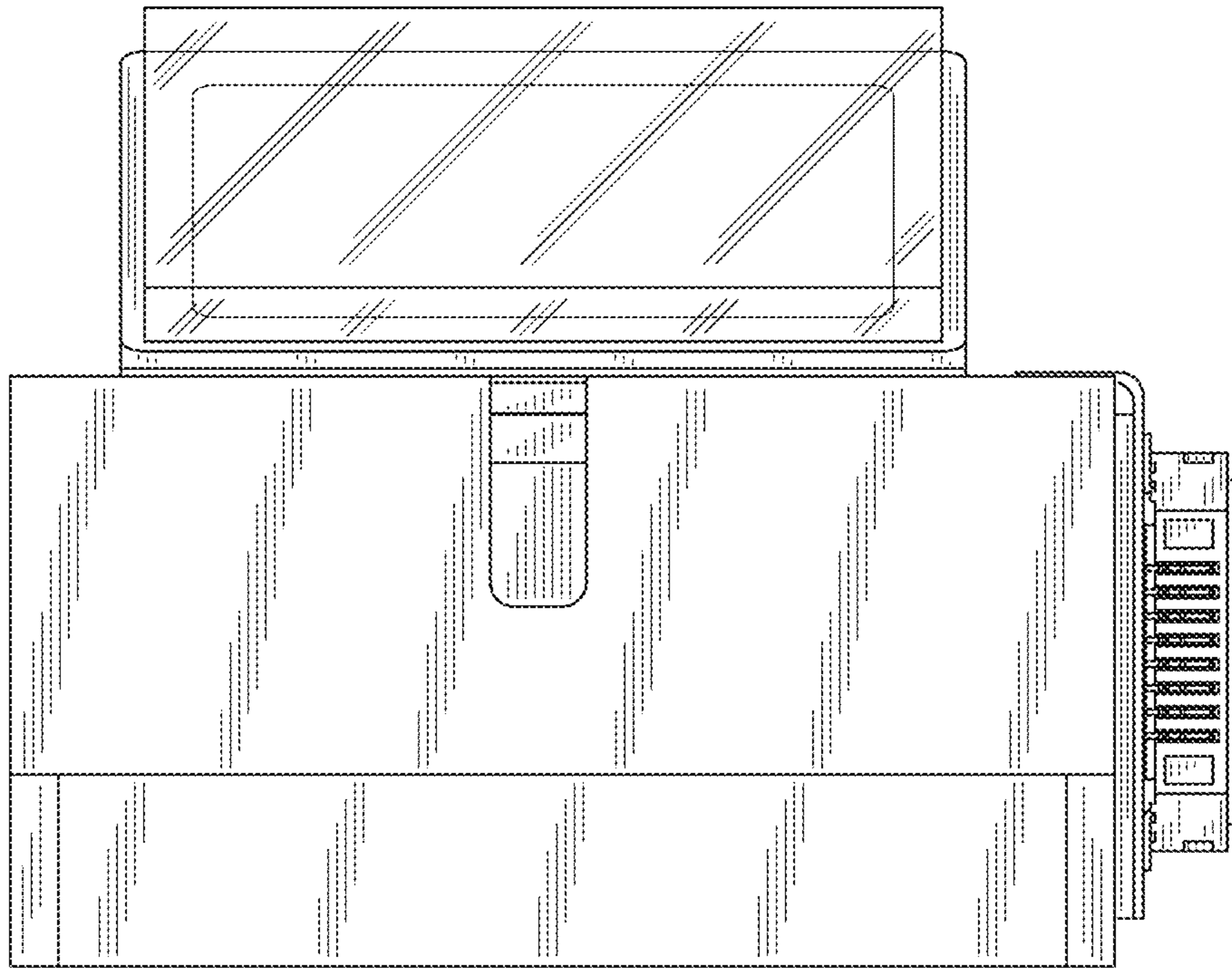


FIG. 6

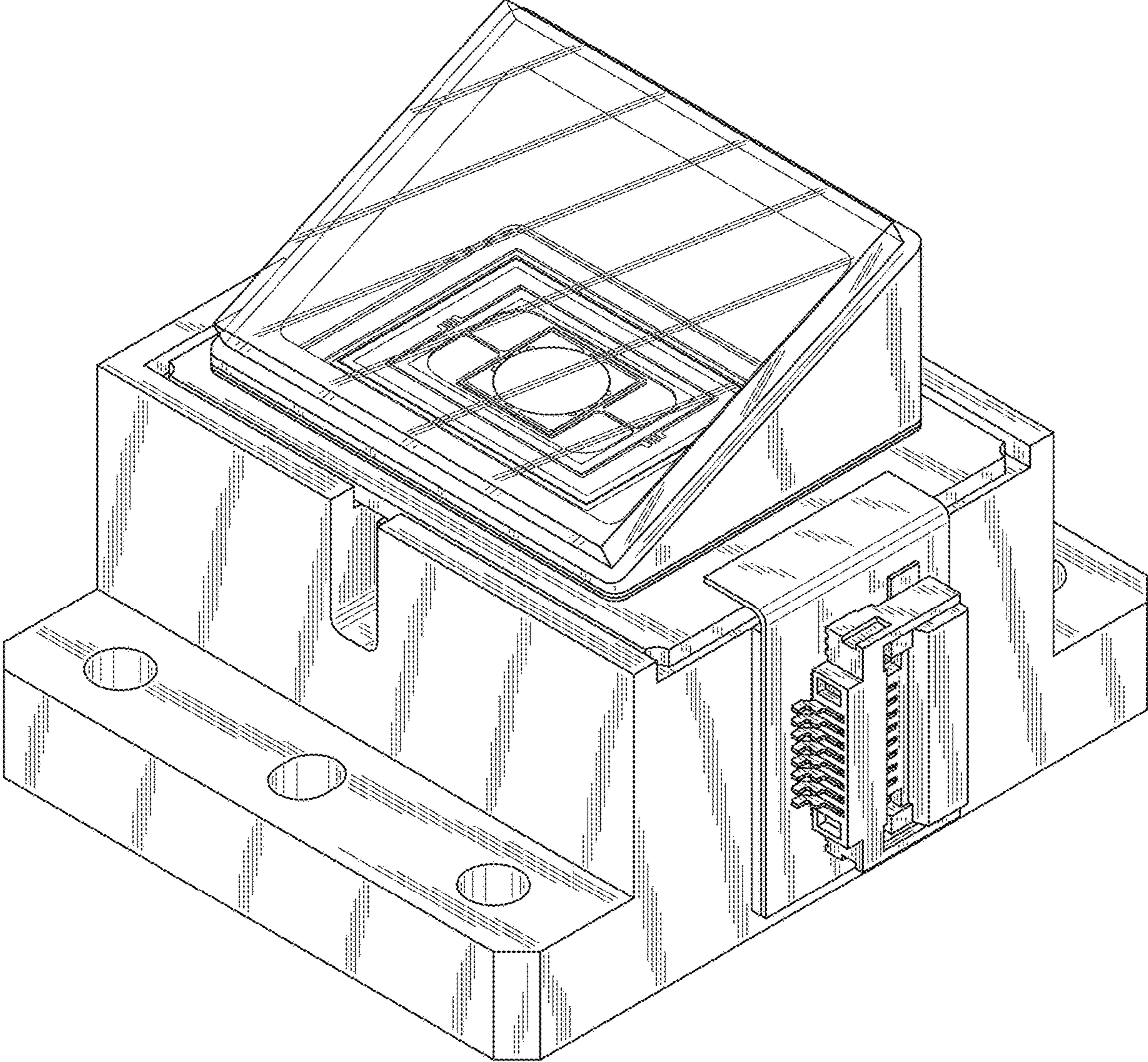


FIG. 7

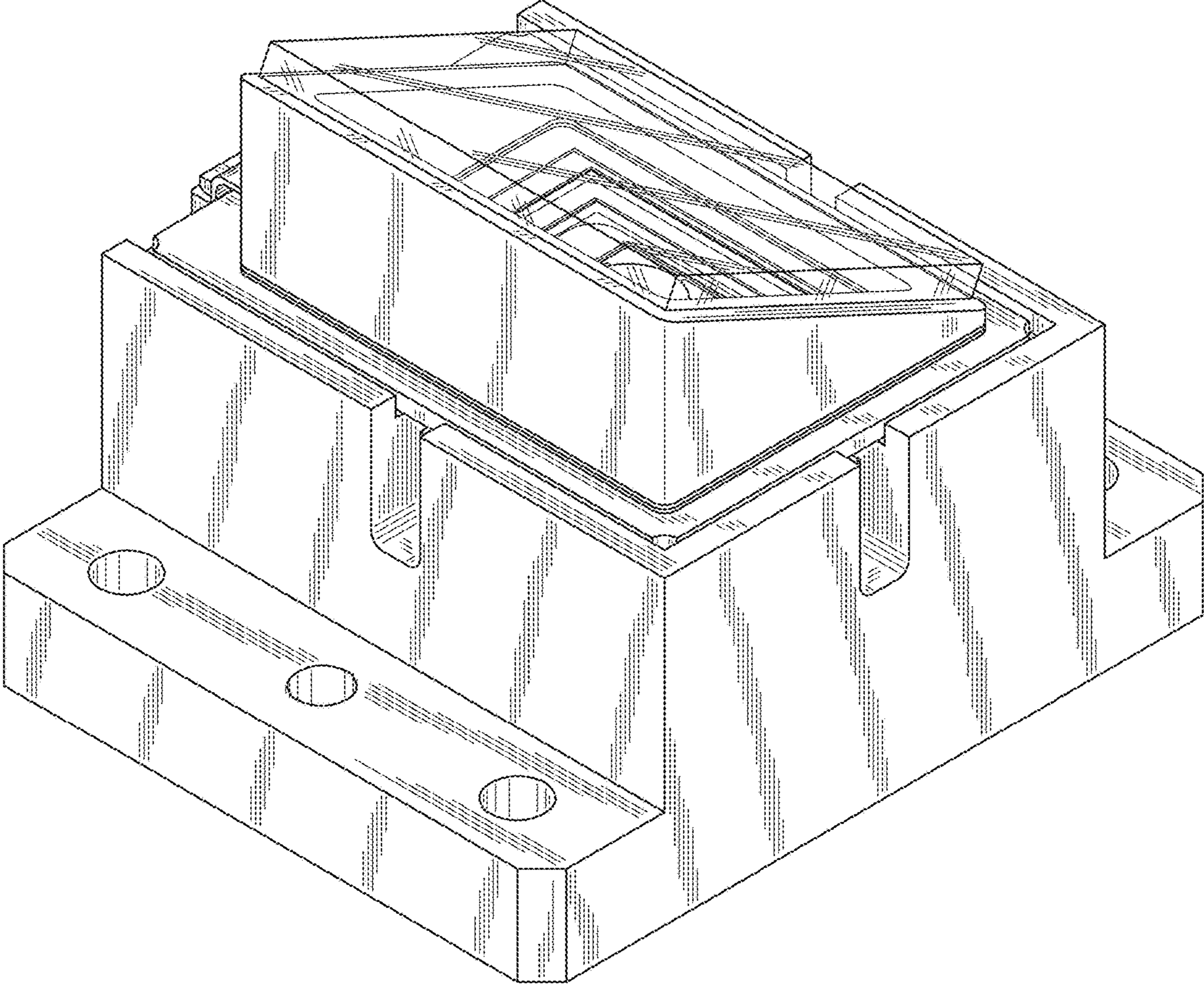


FIG. 8

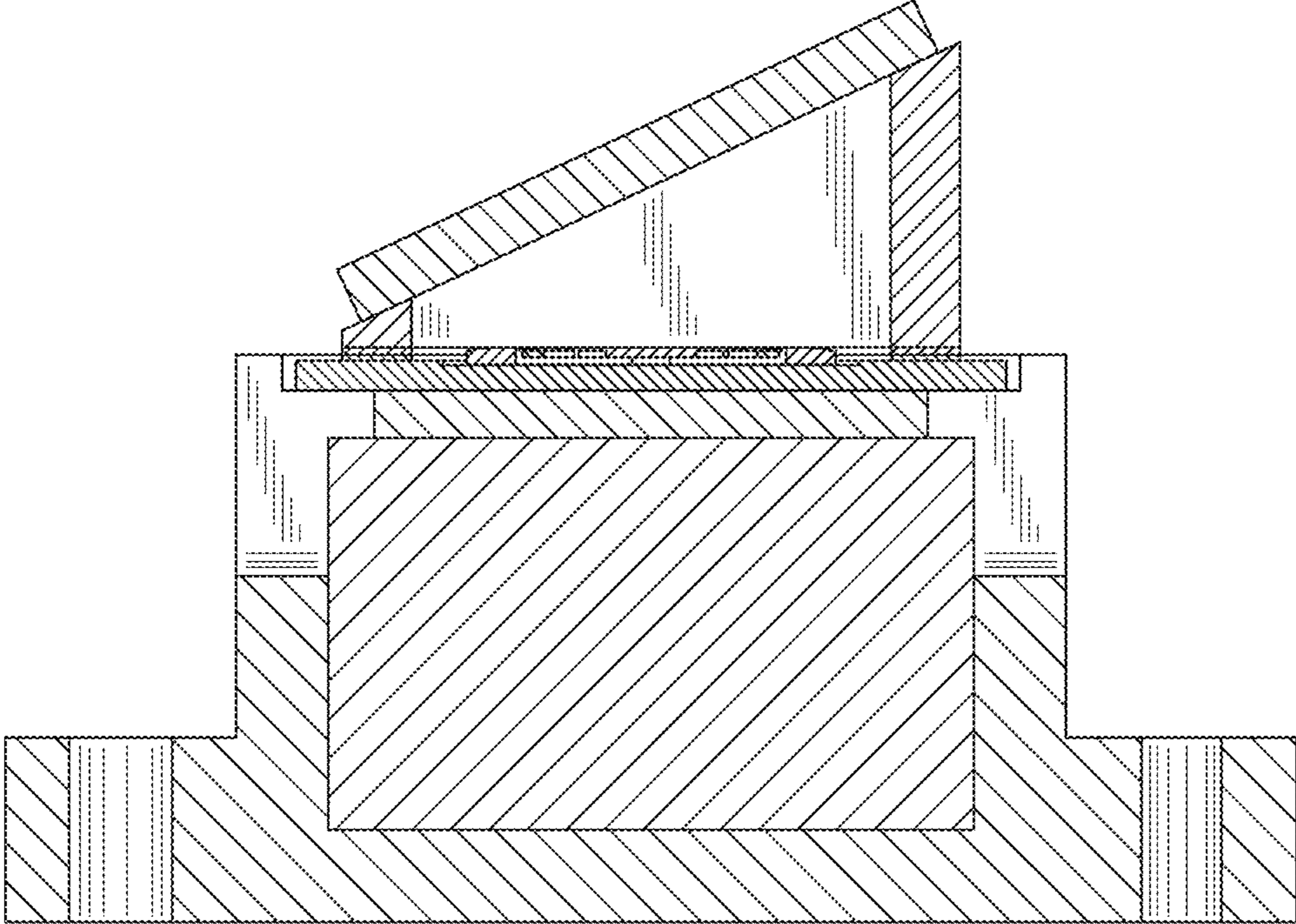


FIG. 9

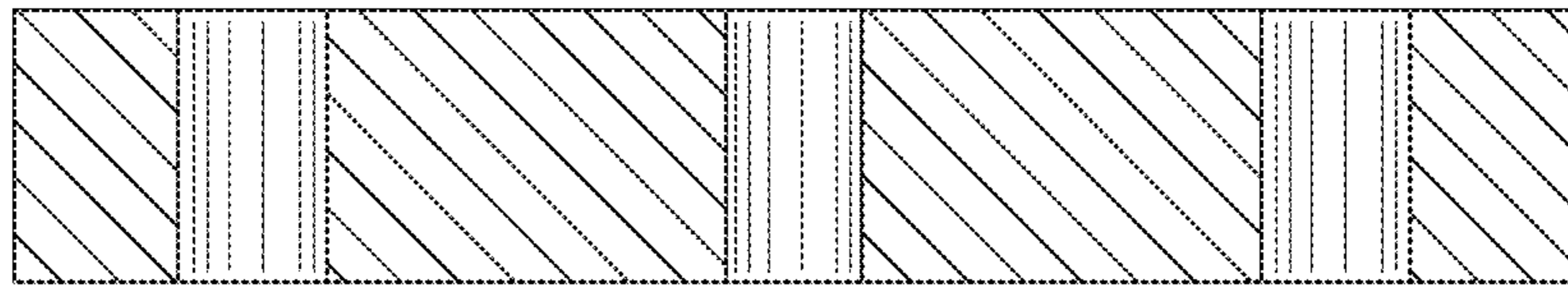


FIG. 10