



US00D927575S

(12) **United States Design Patent** (10) **Patent No.:** **US D927,575 S**
Nagano (45) **Date of Patent:** **** Aug. 10, 2021**

(54) **HEATER BLOCK FOR BONDING APPARATUS**
(71) Applicant: **SHINKAWA LTD.**, Tokyo (JP)

(72) Inventor: **Kazuaki Nagano**, Musashimurayama (JP)

(73) Assignee: **SHINKAWA LTD.**, Tokyo (JP)

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

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(30) **Foreign Application Priority Data**

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Jan. 18, 2019 (JP) 2019-000876

(51) **LOC (13) Cl.** **15-09**

(52) **U.S. Cl.**

USPC **D15/144**; D15/199

CPC **B23K 20/005** (2013.01)

(58) **Field of Classification Search**

USPC D15/144, 199; D23/209, 210, 233,
D23/259-269

CPC B23K 20/005; H01L 24/85; H01L 24/78

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,306,664 A * 4/1994 Sakura H01L 24/11
228/180.22

5,531,835 A * 7/1996 Fodor H01L 21/6831
118/728

5,653,375 A * 8/1997 Nam B23K 20/004
228/4.5

(Continued)

Primary Examiner — Richard E Chilcot

(74) Attorney, Agent, or Firm — JCIPRNET

(57) **CLAIM**

The ornamental design for a heater block for bonding apparatus, as shown and described.

DESCRIPTION

FIG. 1.1 is a front view of a heater block for bonding apparatus showing my new design;

FIG. 1.2 is a back view thereof;

FIG. 1.3 is a top view thereof;

FIG. 1.4 is a bottom view thereof;

FIG. 1.5 is a right view thereof;

FIG. 1.6 is a left view thereof;

FIG. 1.7 is a front perspective view thereof;

FIG. 1.8 is a back perspective view thereof;

FIG. 1.9 is a transverse sectional view taken along the line 1.9-1.9 in FIG. 1.1;

FIG. 1.10 is a transverse sectional view taken along the line 1.10-1.10 in FIG. 1.1;

FIG. 1.11 is a transverse sectional view taken along the line 1.11-1.11 in FIG. 1.1;

FIG. 1.12 is a transverse sectional view taken along the line 1.12-1.12 in FIG. 1.1;

FIG. 1.13 is a transverse sectional view taken along the line 1.13-1.13 in FIG. 1.1;

FIG. 1.14 is a longitudinal sectional view taken along the line 1.14-1.4 in FIG. 1.1;

FIG. 1.15 is a longitudinal sectional view taken along the line 1.15-1.15 in FIG. 1.1;

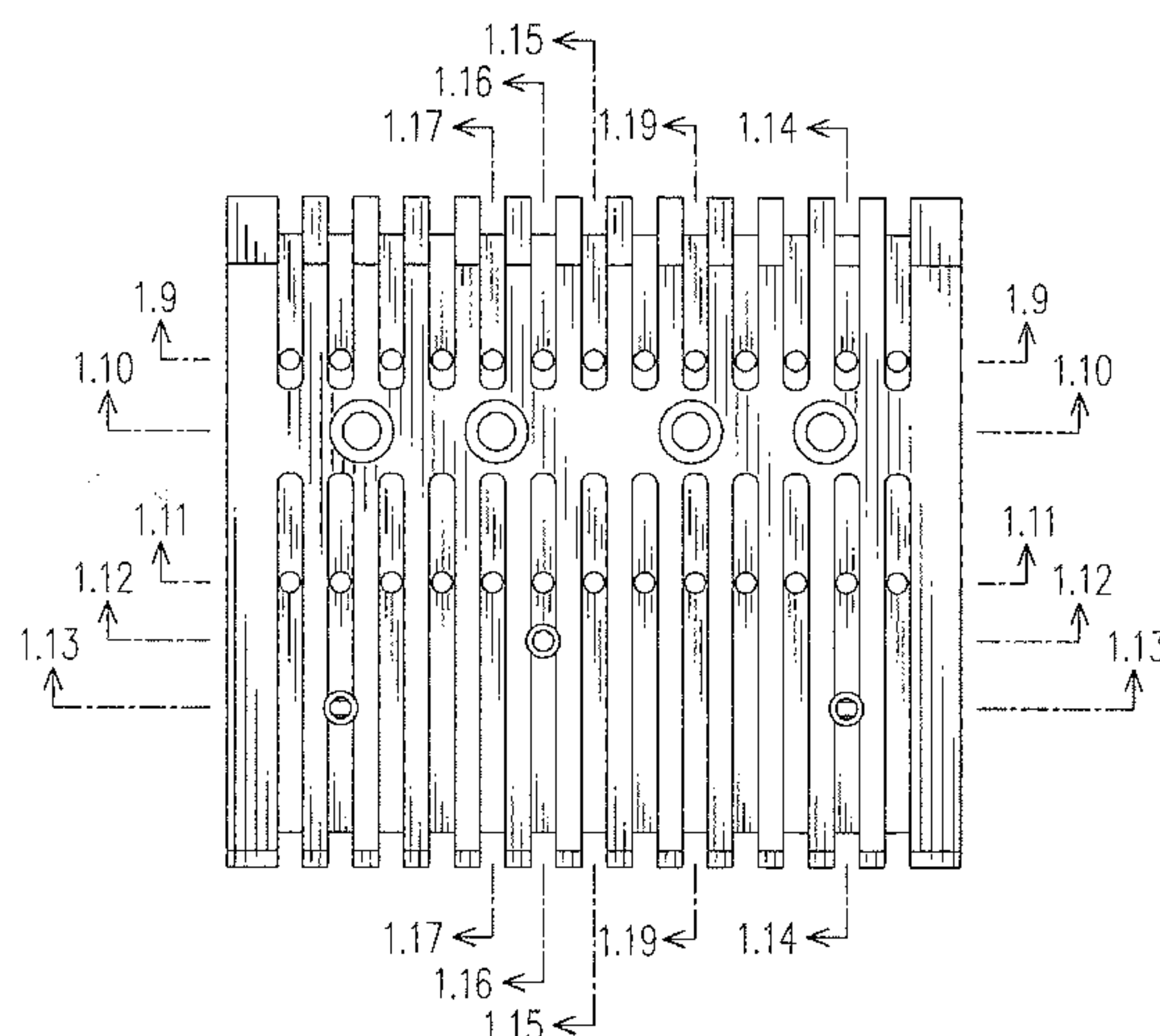
FIG. 1.16 is a longitudinal sectional view taken along the line 1.16-1.16 in FIG. 1.1;

FIG. 1.17 is a longitudinal sectional view taken along the line 1.17-1.17 in FIG. 1.1;

FIG. 1.18 is a transverse sectional view taken along the line 1.18-1.18 in FIG. 1.3; and,

FIG. 1.19 is a cross-sectional perspective view taken along the line 1.19-1.19 in FIG. 1.1.

1 Claim, 19 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

5,810,933 A * 9/1998 Mountsier H01L 21/67109
118/724
6,394,797 B1 * 5/2002 Sugaya H01L 21/67248
432/253
6,634,882 B2 * 10/2003 Goodman C23C 16/4581
211/41.18
6,709,267 B1 * 3/2004 Hawkins C23C 16/4585
118/500
D529,057 S * 9/2006 Willson D15/144
D643,055 S * 8/2011 Takahashi D15/199
7,993,462 B2 * 8/2011 Takahashi C23C 16/52
118/728
D724,196 S * 3/2015 Turner D23/415
D725,168 S * 3/2015 Yamagishi D15/199
D726,884 S * 4/2015 Yamagishi D23/259
9,607,822 B2 * 3/2017 Buckalew H01L 21/76873
D799,646 S * 10/2017 Aida D23/259
D807,921 S * 1/2018 Grzesiak D15/5
D830,981 S * 10/2018 Jeong D13/182
10,087,525 B2 * 10/2018 Schmotzer C23C 16/4588
D859,484 S * 9/2019 Kondo D15/199
D873,782 S * 1/2020 Garcia D13/182
2002/0162630 A1 * 11/2002 Satoh H01L 21/68735
156/345.51
2005/0274708 A1 * 12/2005 Chan H01L 21/67103
219/392
2006/0011298 A1 * 1/2006 Lim C23C 16/45574
156/345.34
2012/0318853 A1 * 12/2012 Wong B23K 20/005
228/180.22

* cited by examiner

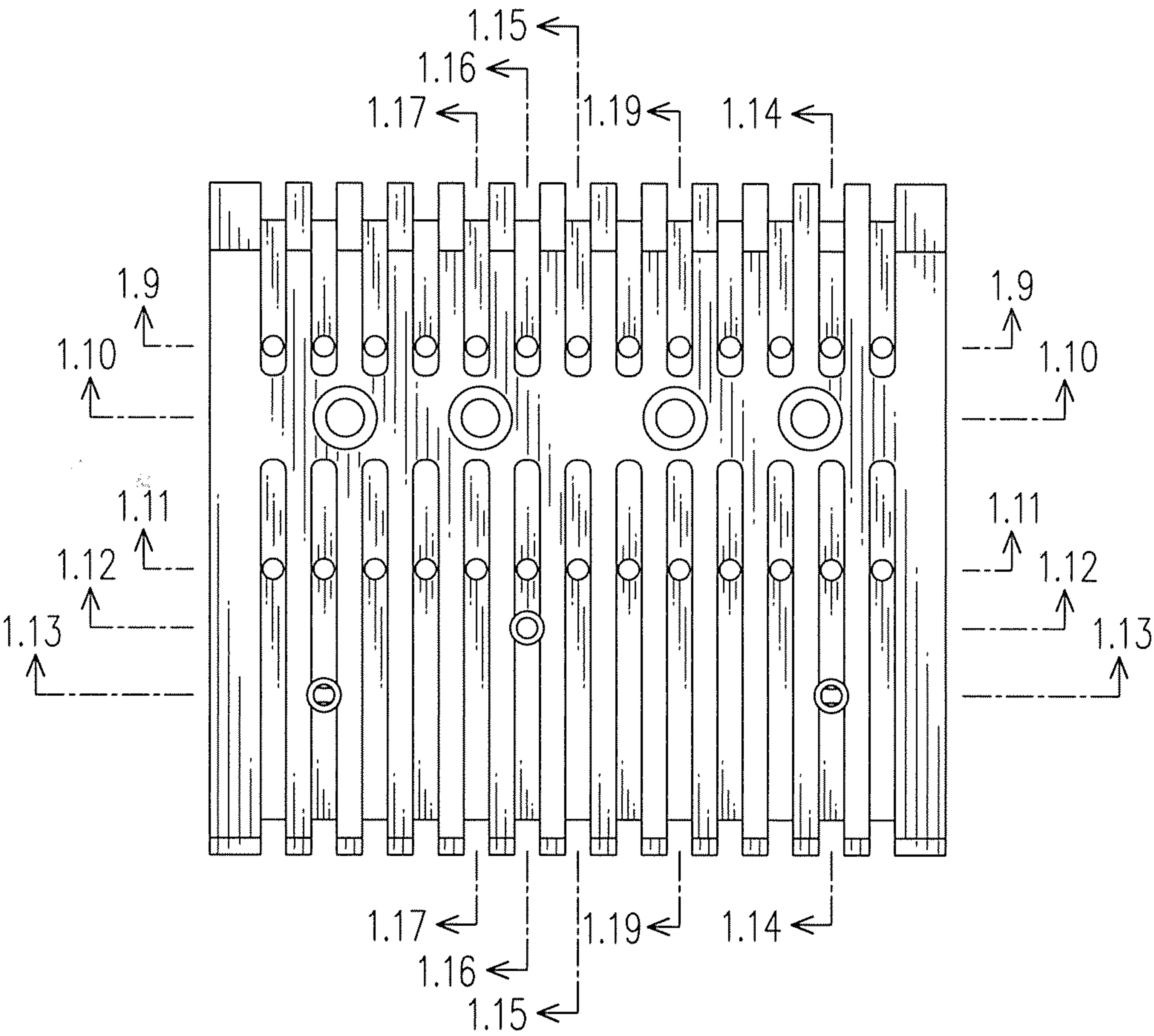


FIG. 1.1

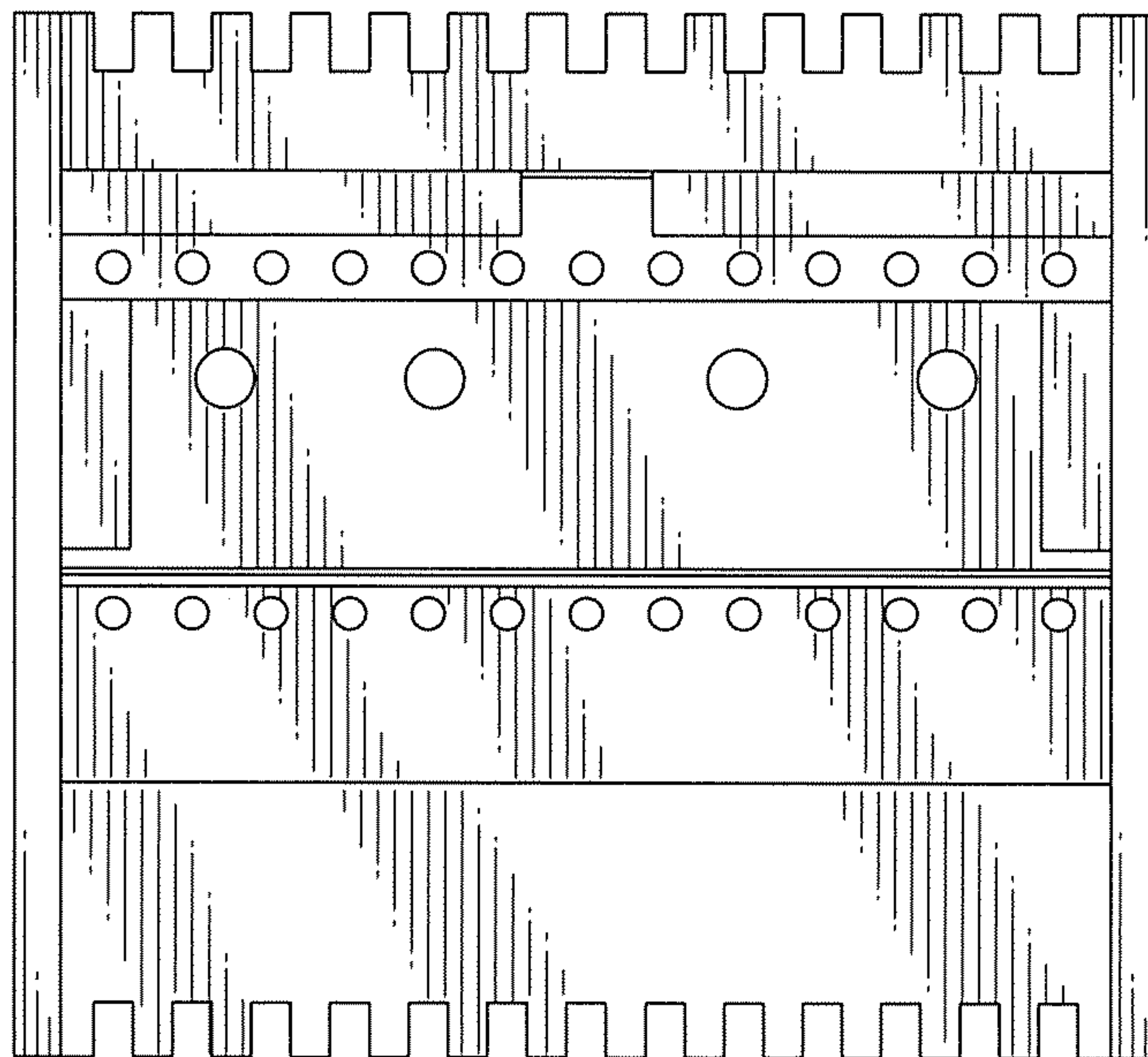


FIG. 1.2

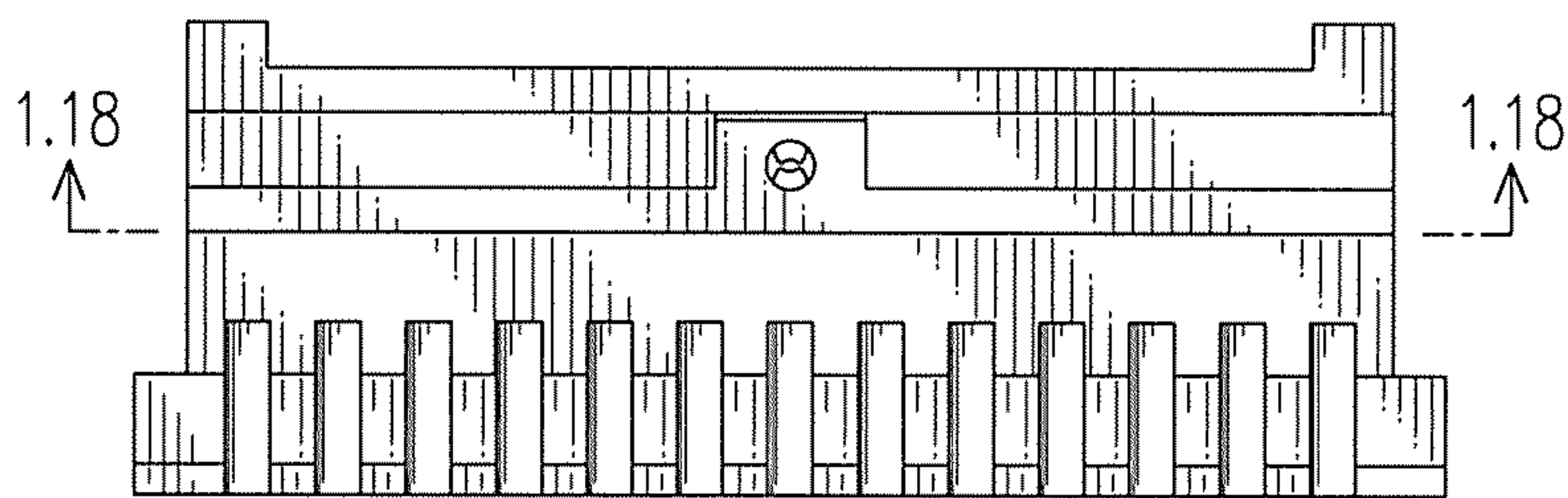


FIG. 1.3

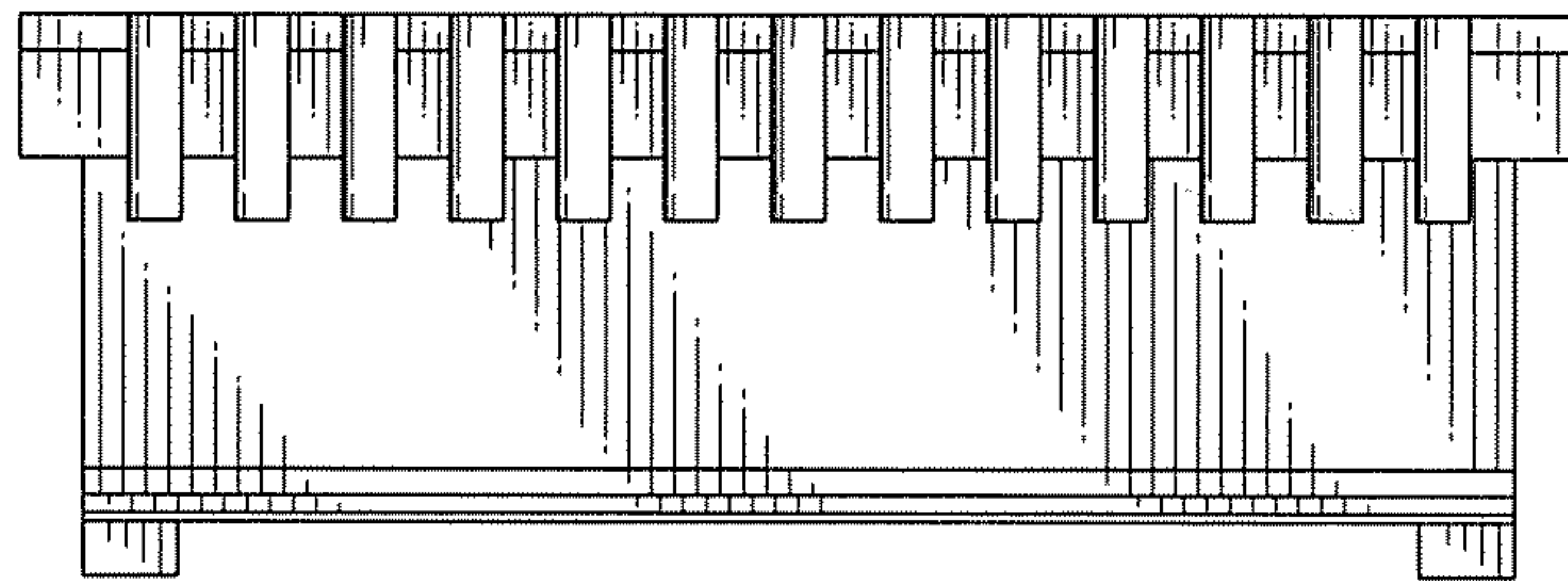


FIG. 1.4

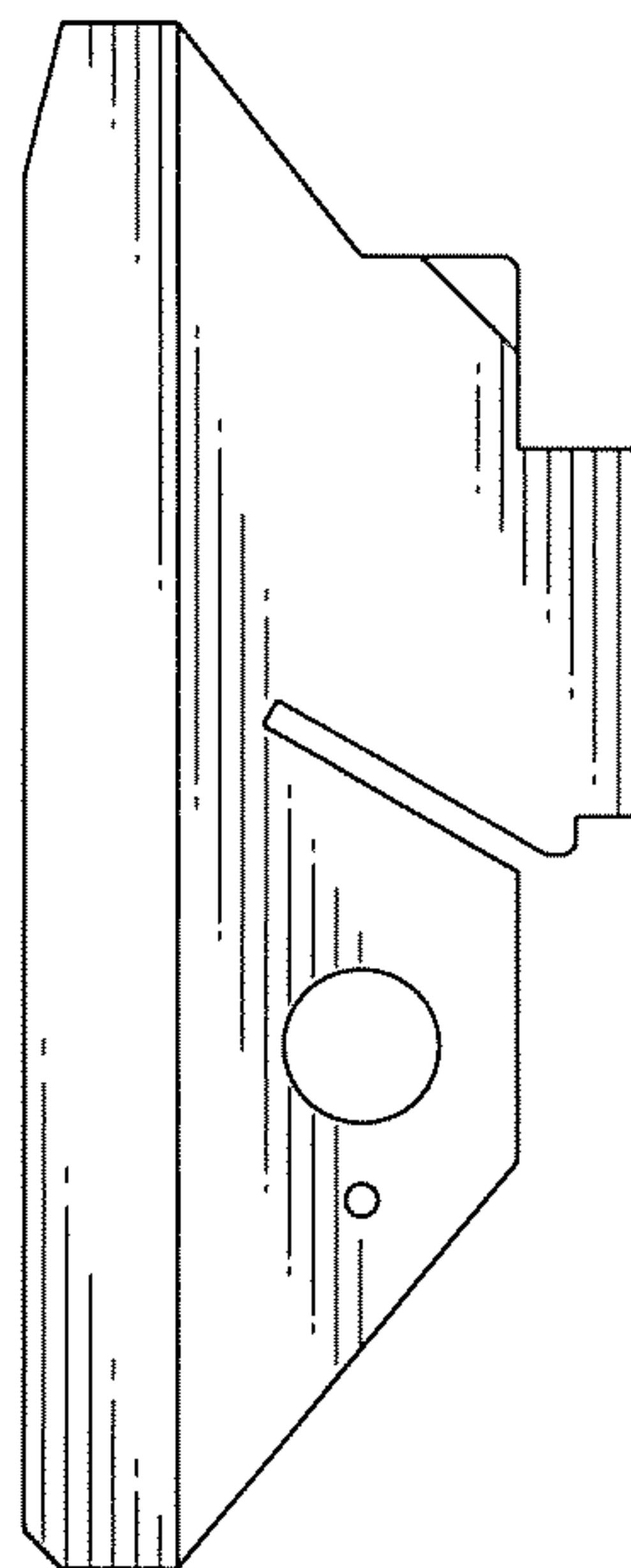


FIG. 1.5

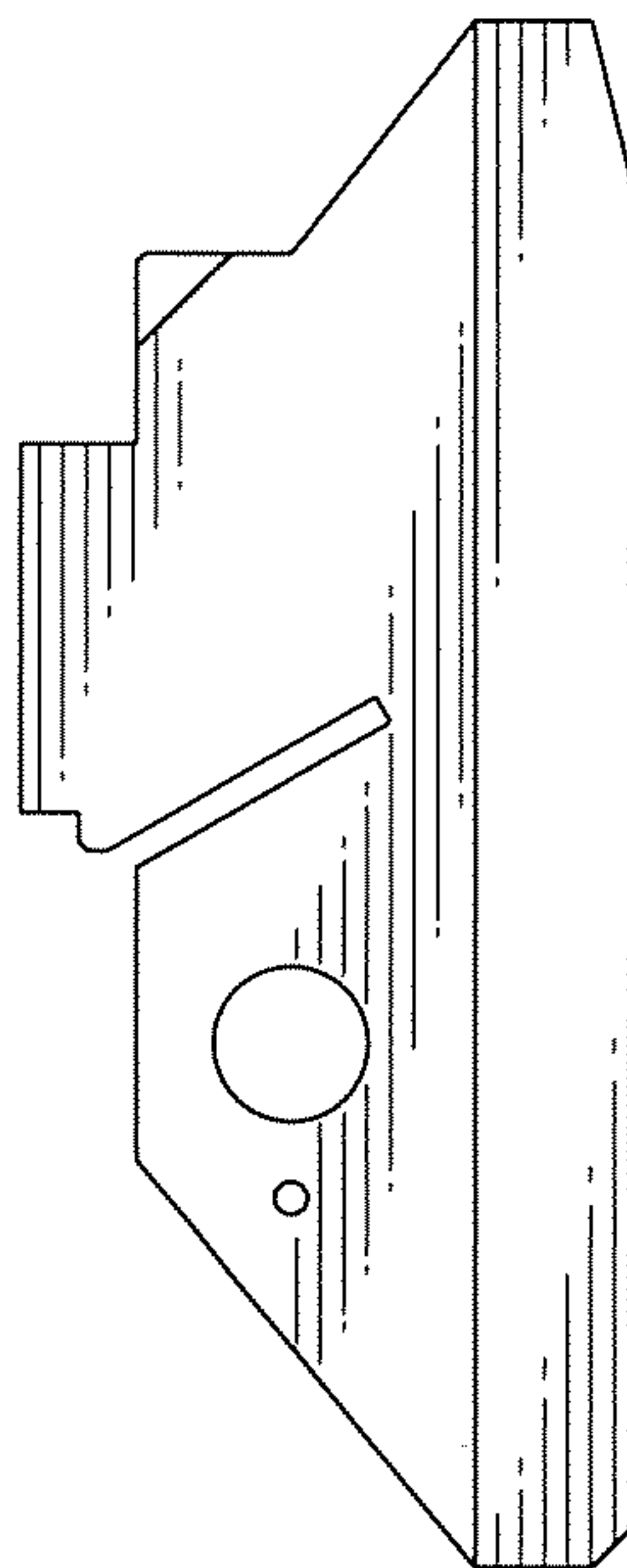


FIG. 1.6

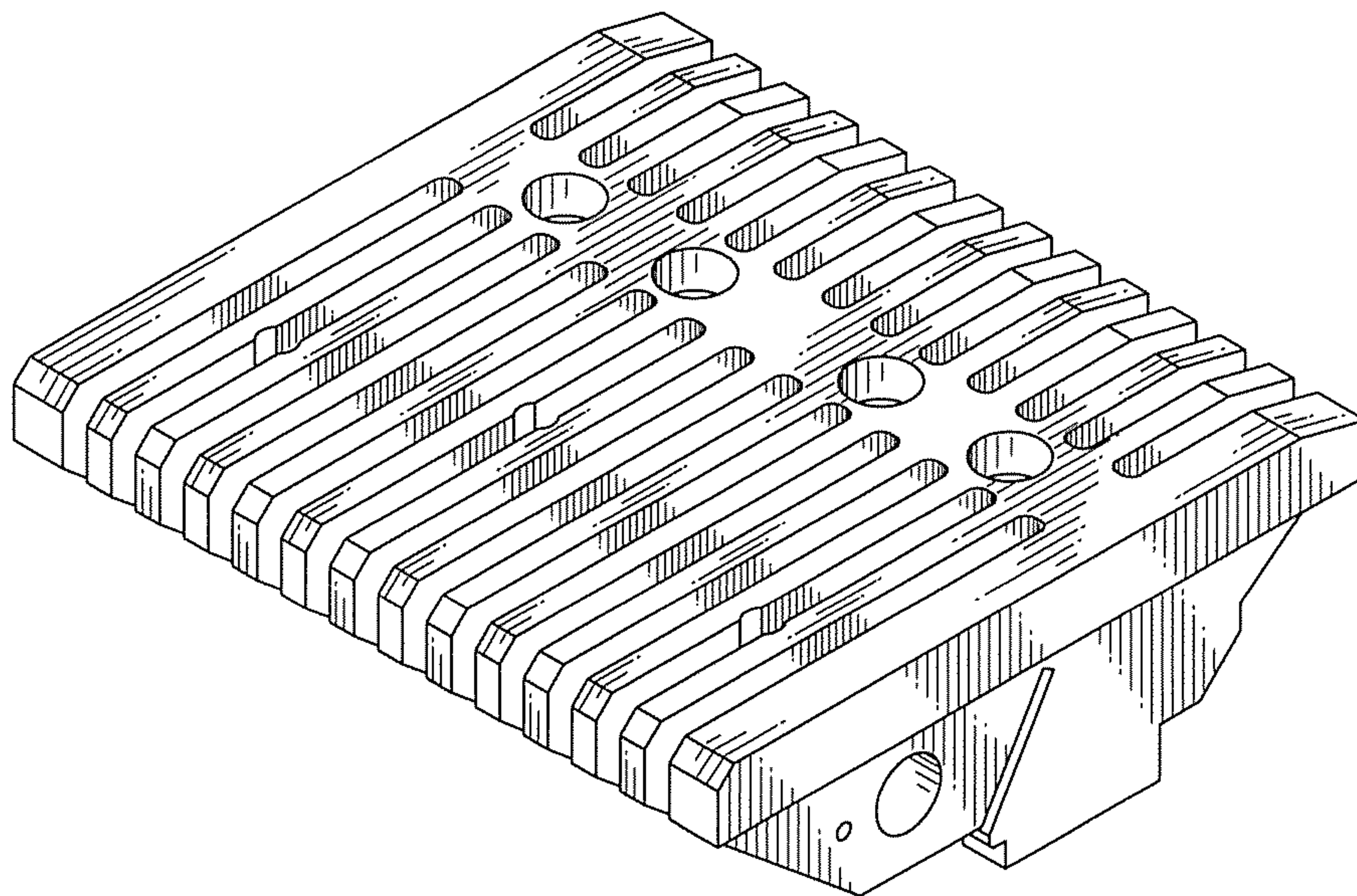


FIG. 1.7

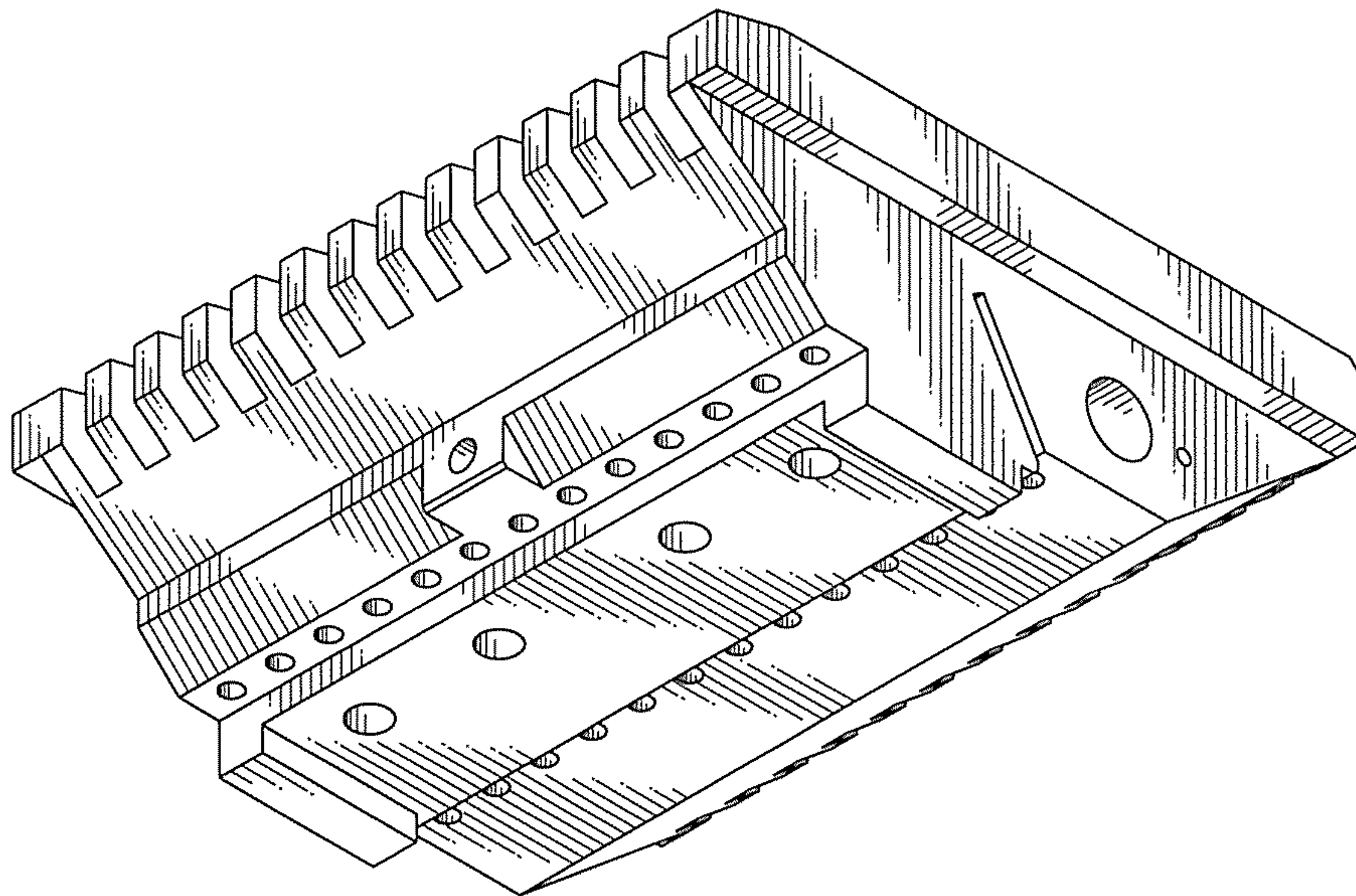


FIG. 1.8

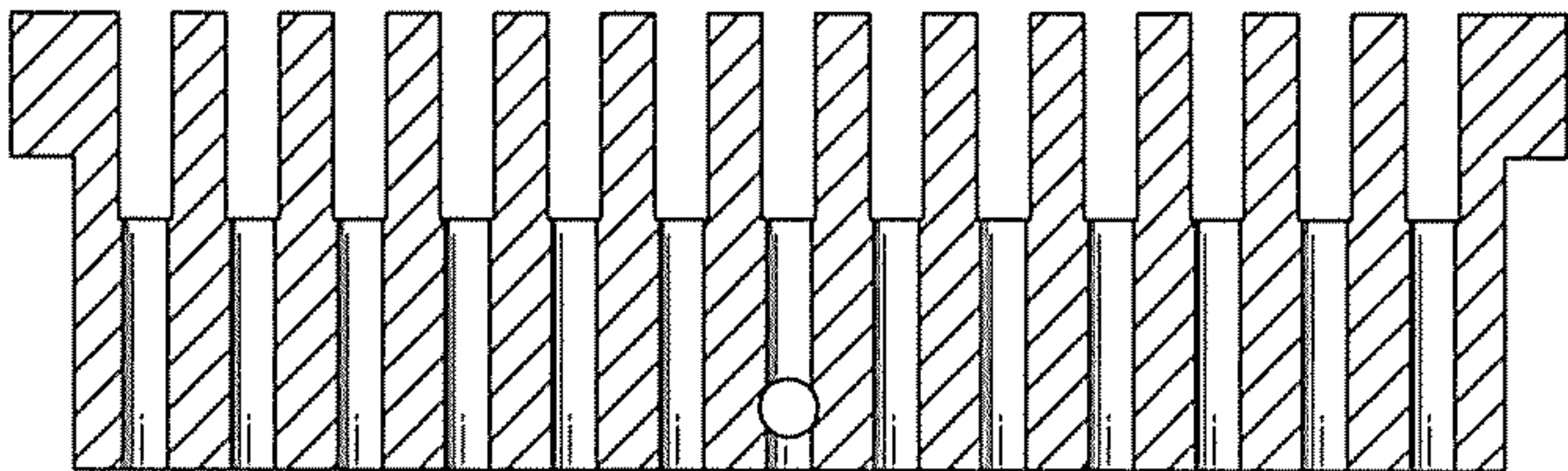


FIG. 1.9

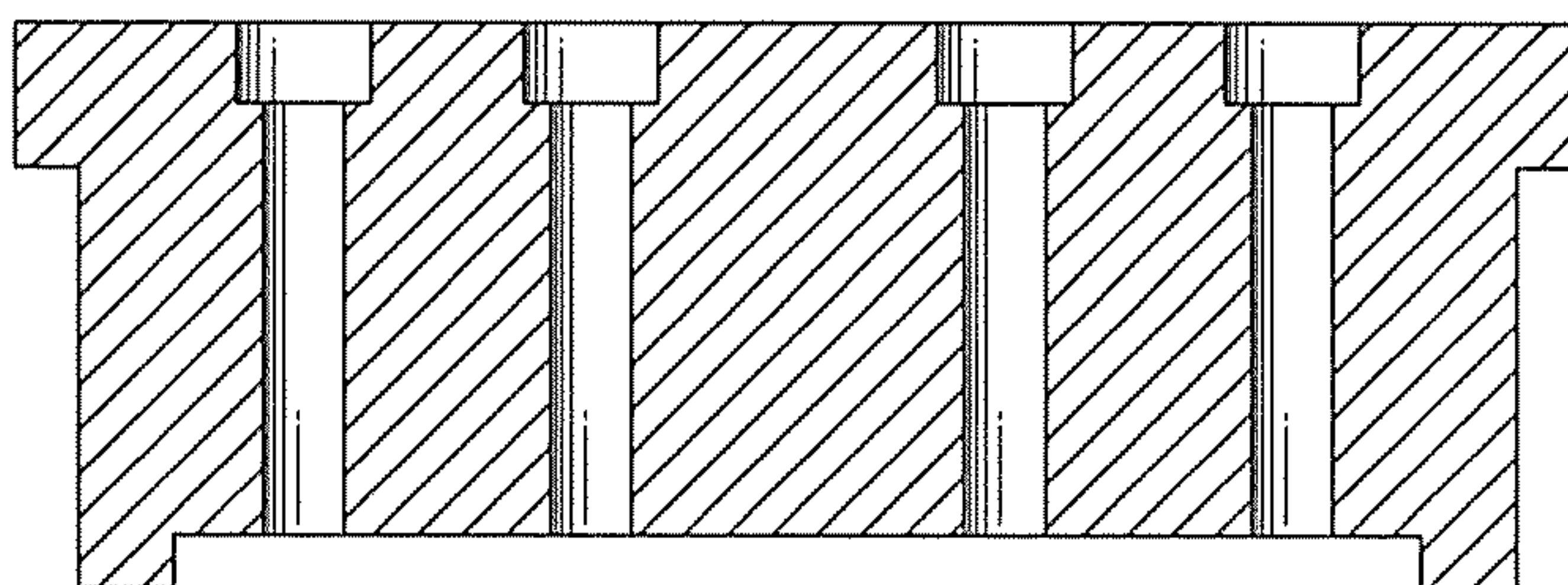


FIG. 1.10

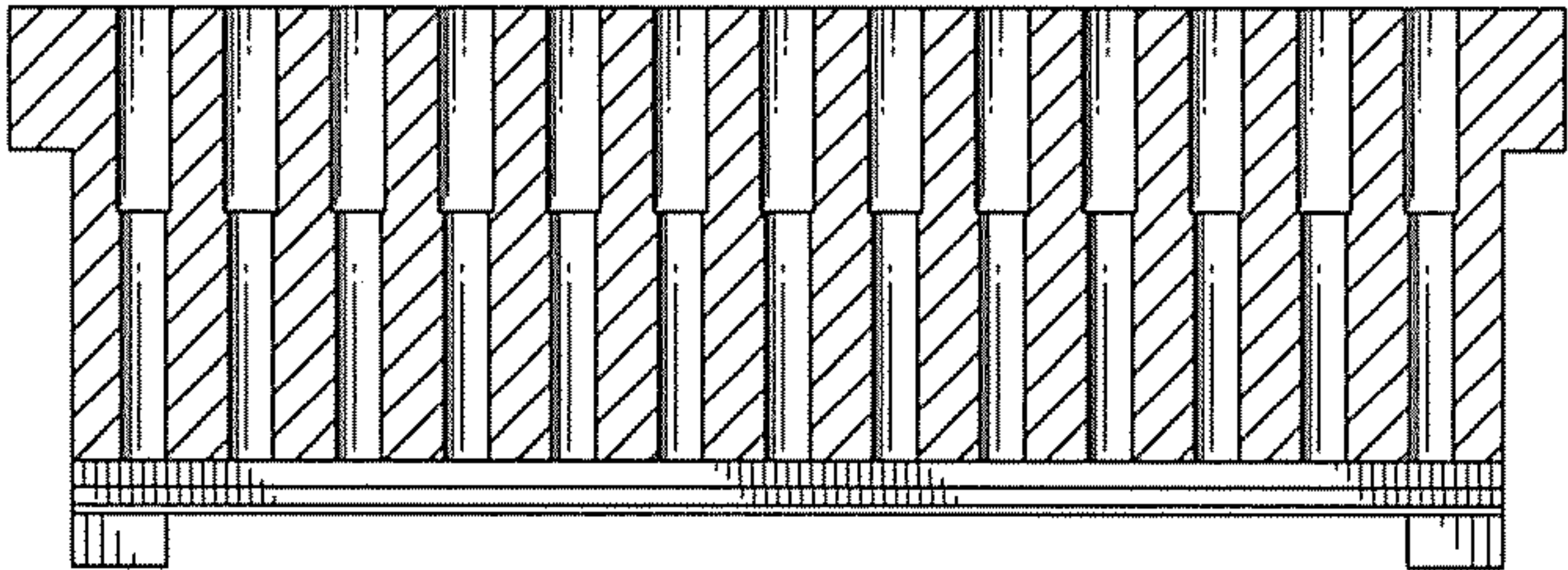


FIG. 1.11

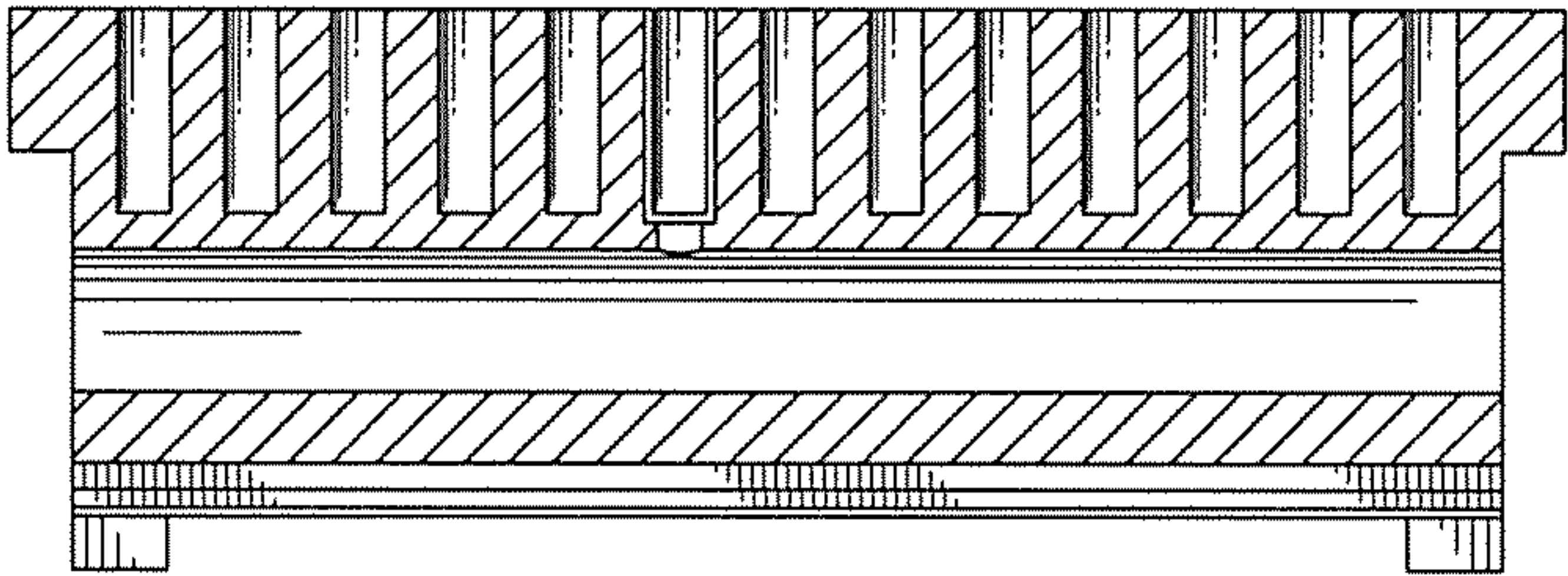


FIG. 1.12

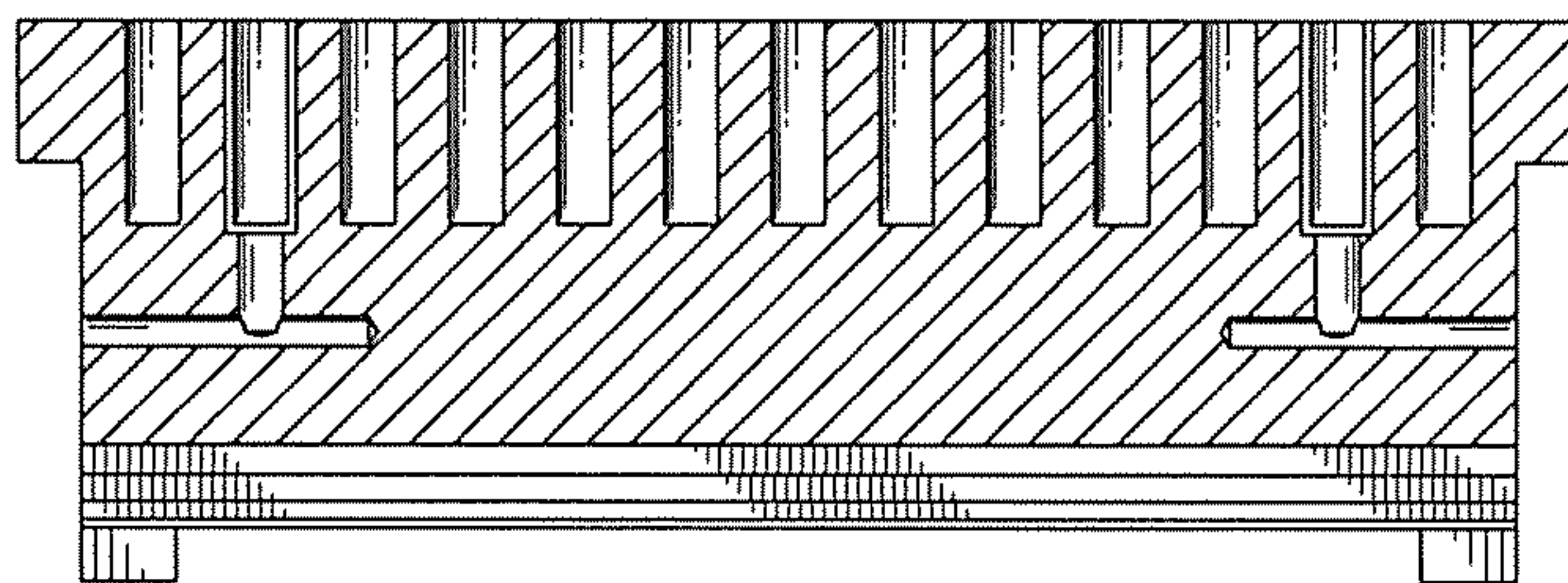


FIG. 1.13

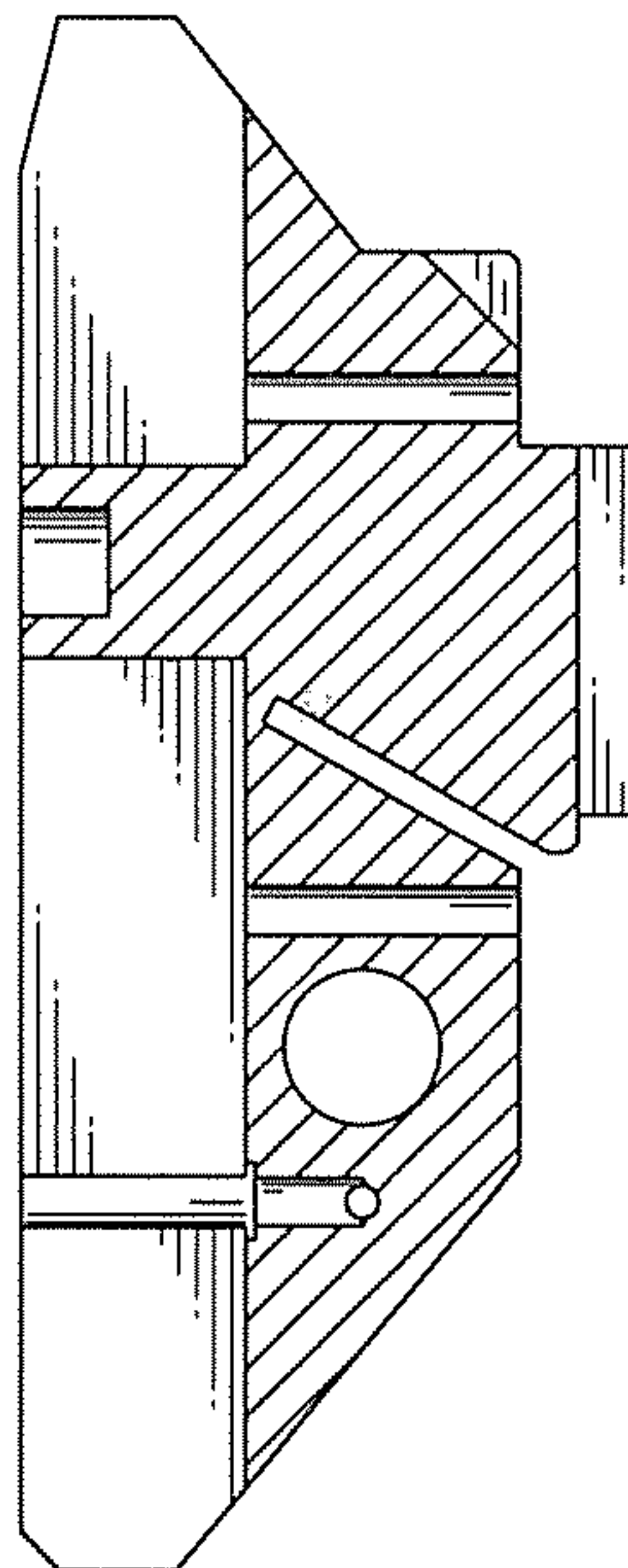


FIG. 1.14

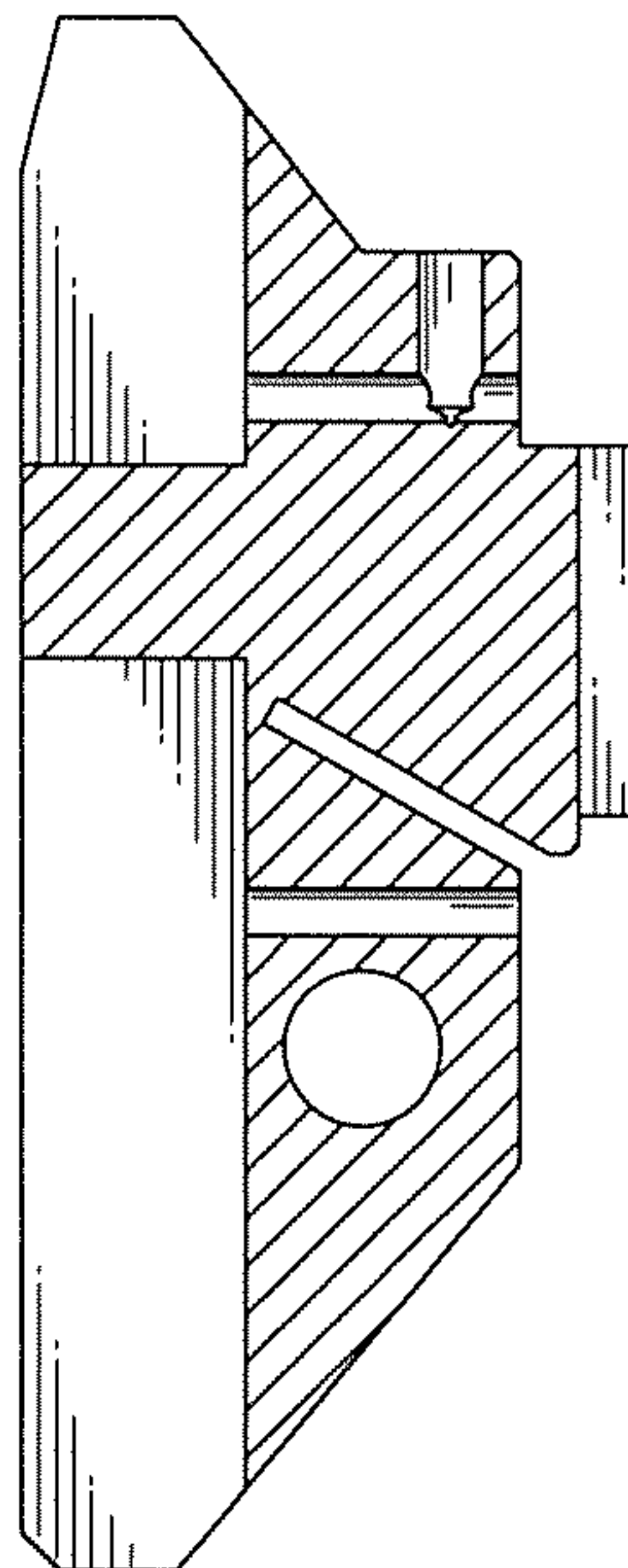


FIG. 1.15

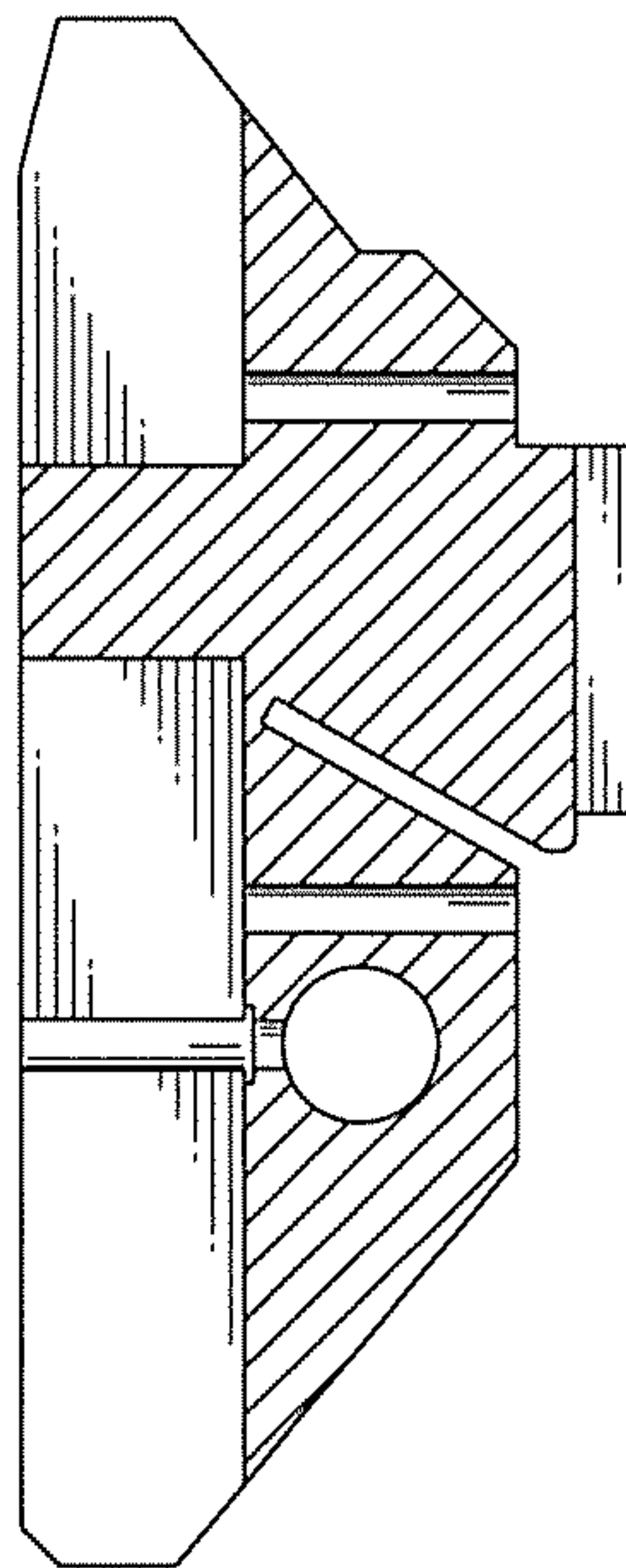


FIG. 1.16

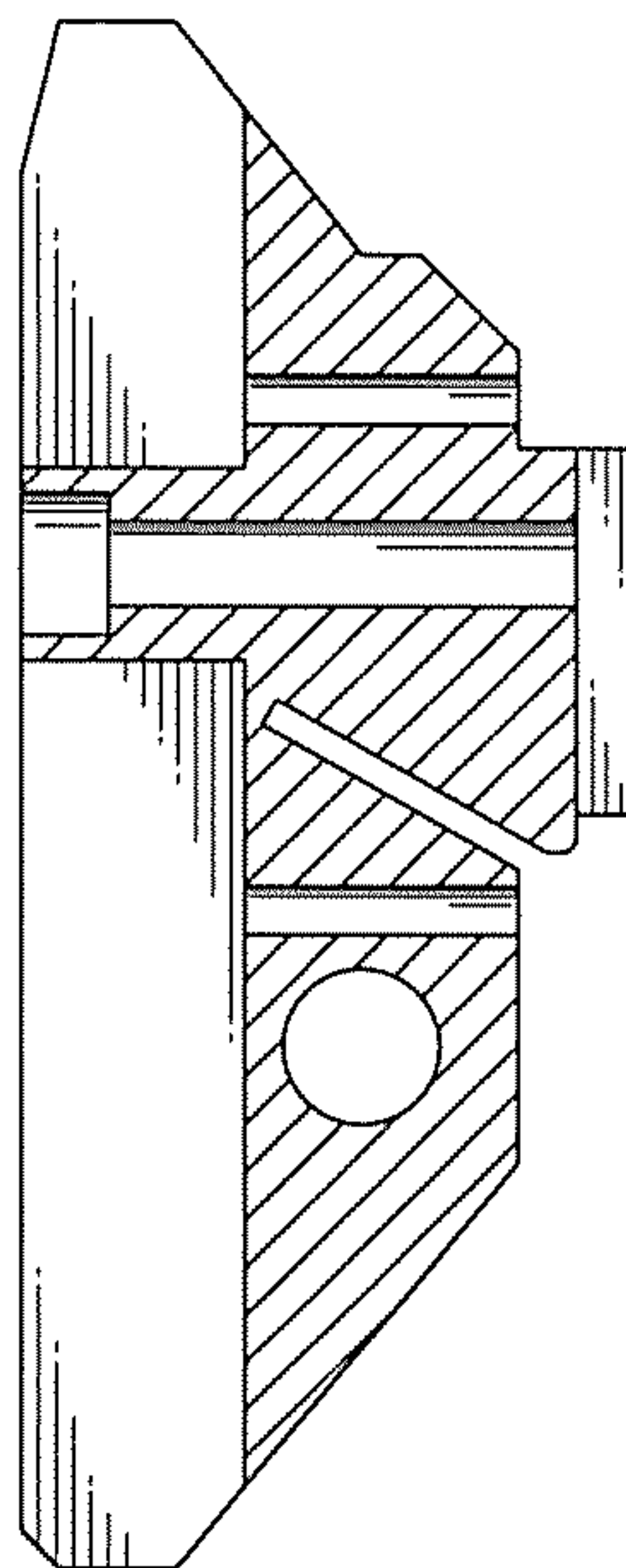


FIG. 1.17

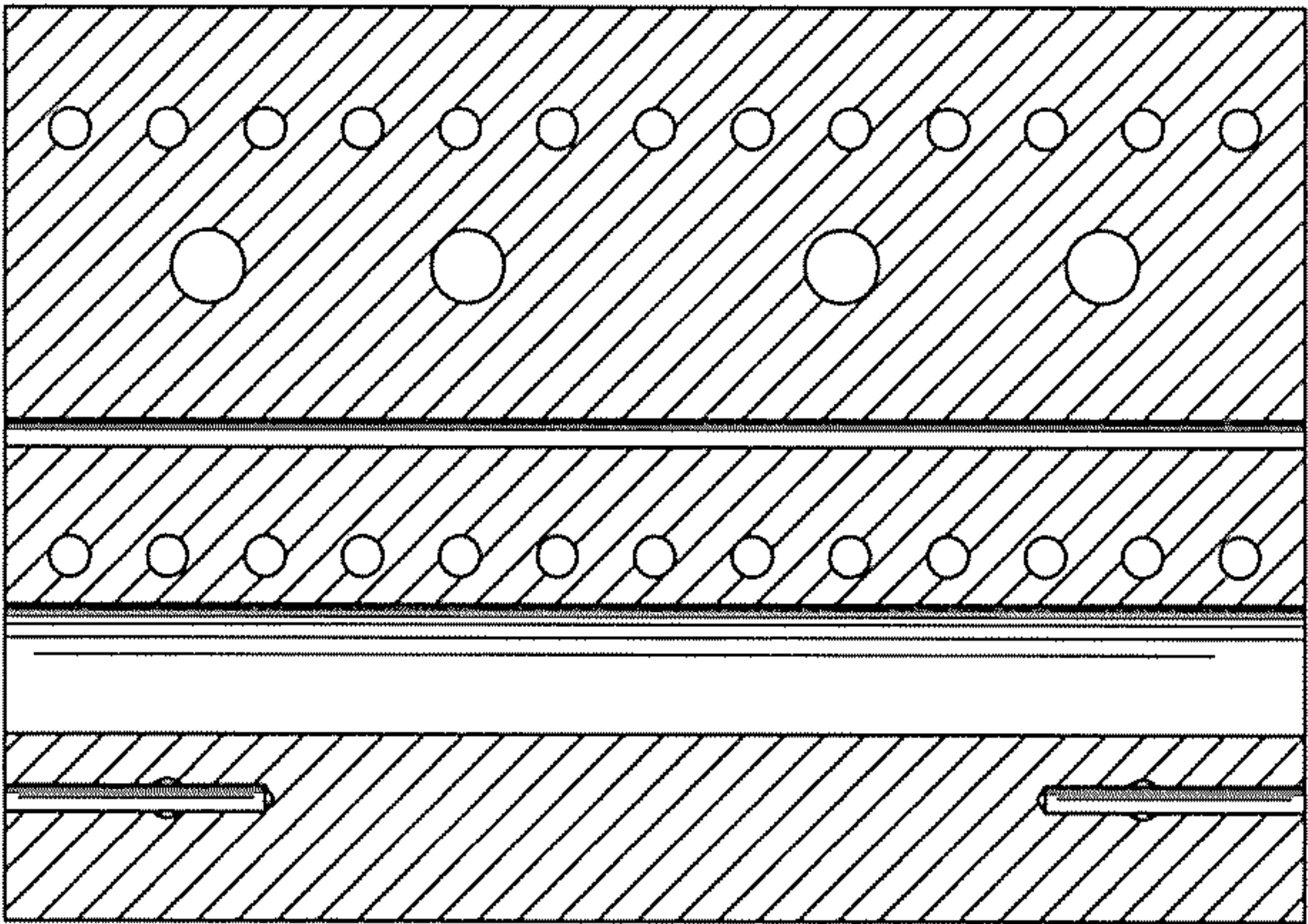


FIG. 1.18

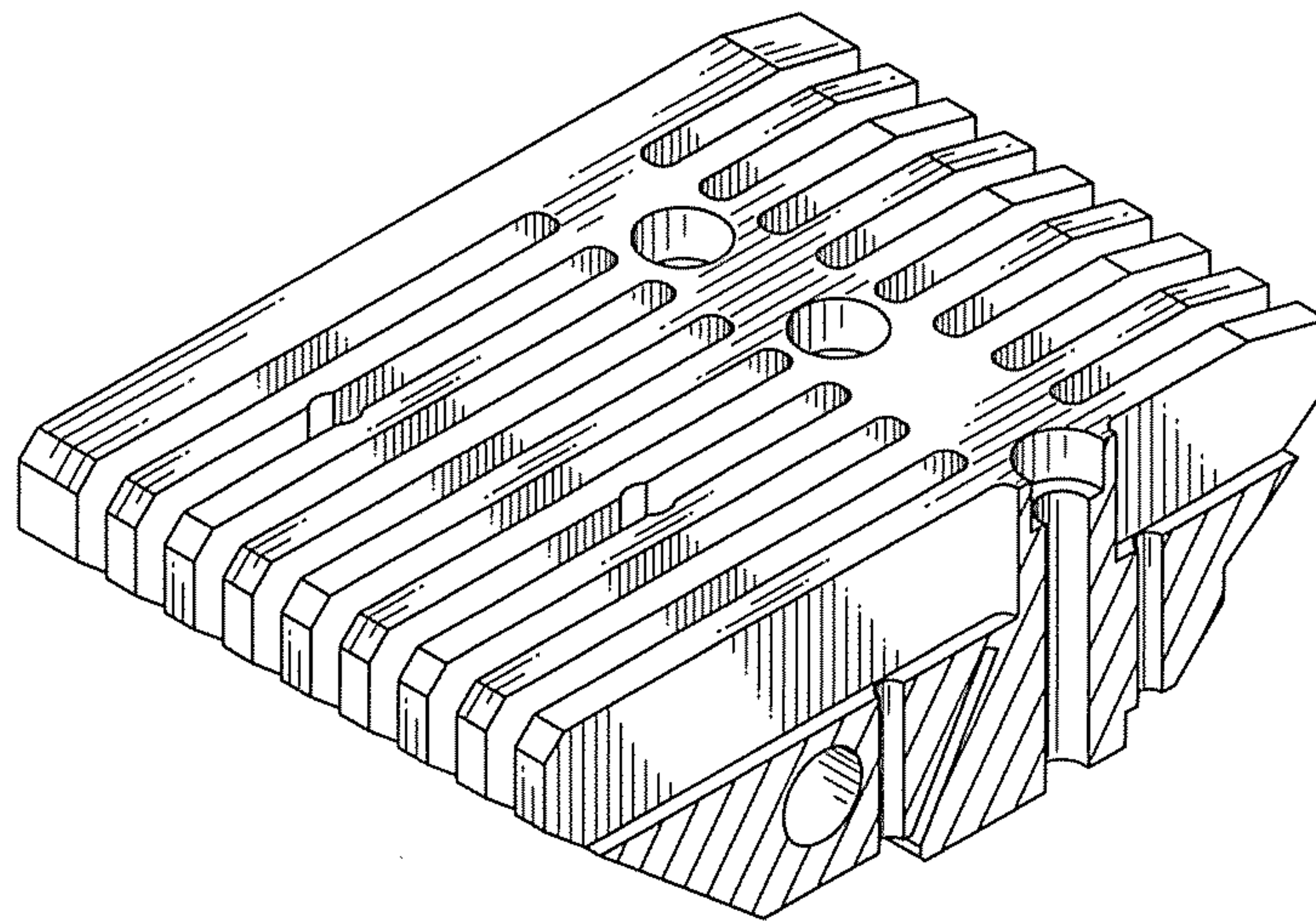


FIG. 1.19