



US00D748850S

(12) **United States Design Patent**
Johnson et al.

(10) **Patent No.:** **US D748,850 S**
(45) **Date of Patent:** **** Feb. 2, 2016**

(54) **AIR-COOLED OPTICAL REFLECTOR**

(71) Applicant: **SURNA INC.**, Boulder, CO (US)

(72) Inventors: **Jordan Johnson**, Longmont, CO (US);
Stephen Keen, Erie, CO (US); **Thomas Bollich**, Boulder, CO (US); **Chris Pearson**, Boulder, CO (US); **Todd Whitaker**, Boulder, CO (US)

(73) Assignee: **Surna Inc.**, Boulder, CO (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/506,653**

(22) Filed: **Oct. 17, 2014**

(51) **LOC (10) Cl.** **26-99**

(52) **U.S. Cl.**
USPC **D26/118**

(58) **Field of Classification Search**
USPC D10/18, 21, 24, 25, 27, 28, 46, 93, 104,
D10/106, 113, 116.1, 121; D26/118, 120,
D26/124, 138
CPC A63H 30/04; G05G 2009/04748;
H04B 1/1027; F21S 8/04; F21S 2/005;
F21S 2/00; B29D 21/04; F21V 15/015;
F21V 27/00; F21V 21/14; F21V 21/005;
F21Y 2103/00

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 2,740,883 A * 4/1956 Kruger F21S 4/003
362/219
- 2,741,694 A * 4/1956 Wiig F21V 3/02
362/332
- 3,193,001 A 7/1965 Meckler
- 3,272,978 A * 9/1966 Jackson F21S 8/06
174/535
- 3,560,729 A * 2/1971 Liberman F21V 33/0088
362/241
- 4,078,169 A 3/1978 Armstrong
- 4,175,360 A * 11/1979 Mulvey E04B 9/0428
362/148

- 4,460,942 A 7/1984 Pizzuti et al.
- 4,531,180 A * 7/1985 Hernandez F21V 11/00
362/297
- 5,025,356 A 6/1991 Gawad
- 5,195,822 A * 3/1993 Takahashi G02F 1/133605
349/62
- D366,226 S 1/1996 Foutes
- D377,234 S * 1/1997 Roberts D26/138

(Continued)

FOREIGN PATENT DOCUMENTS

WO WO2008/036930 3/2008

OTHER PUBLICATIONS

Surna Reflector, image post date 2015, site visited Sep. 20, 2015, (online), <<http://surna.com/images-surna-reflector/>>.*

(Continued)

Primary Examiner — Kevin Rudzinski

Assistant Examiner — Sean D Lough

(74) *Attorney, Agent, or Firm* — Lathrop & Gage LLP

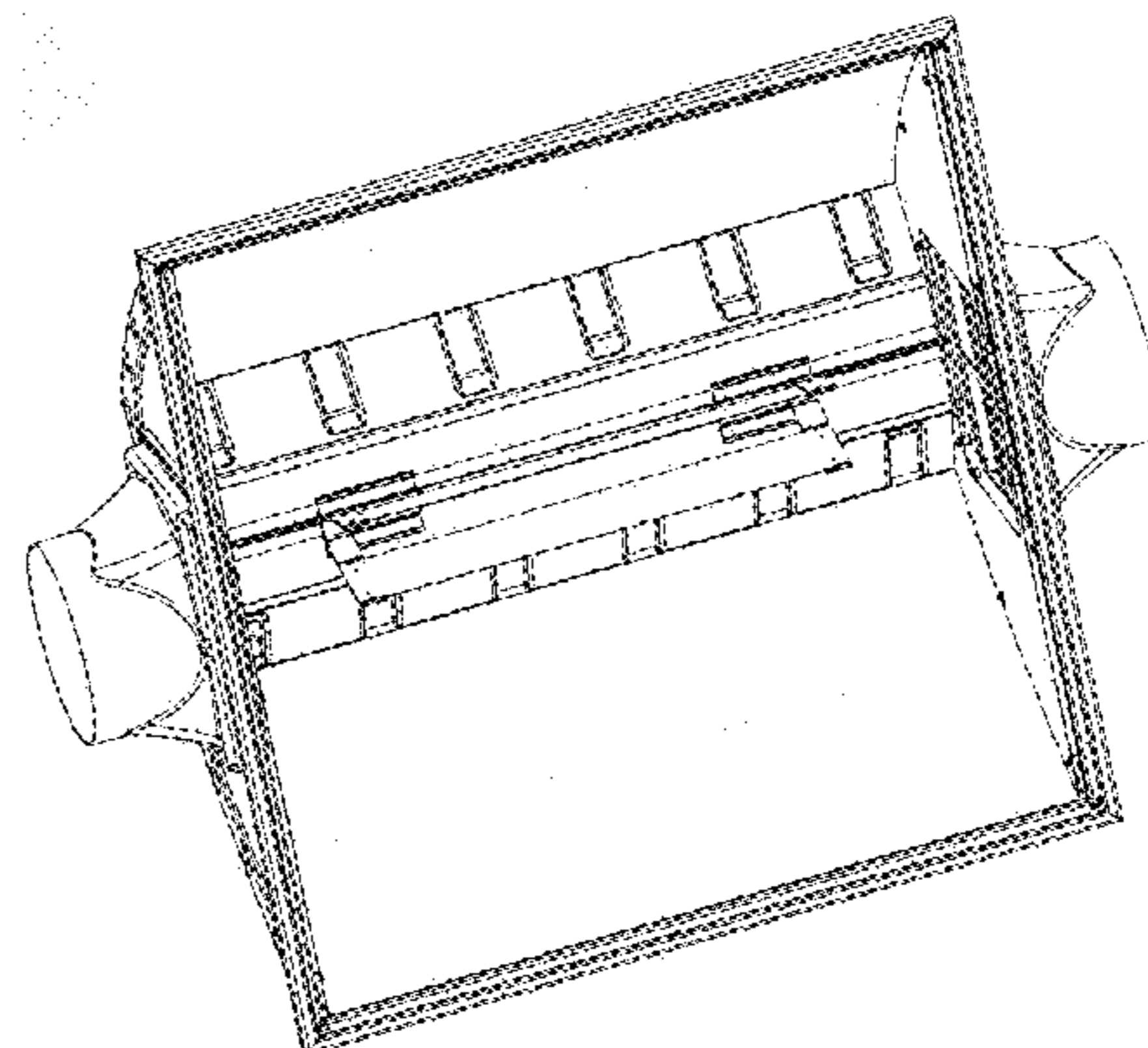
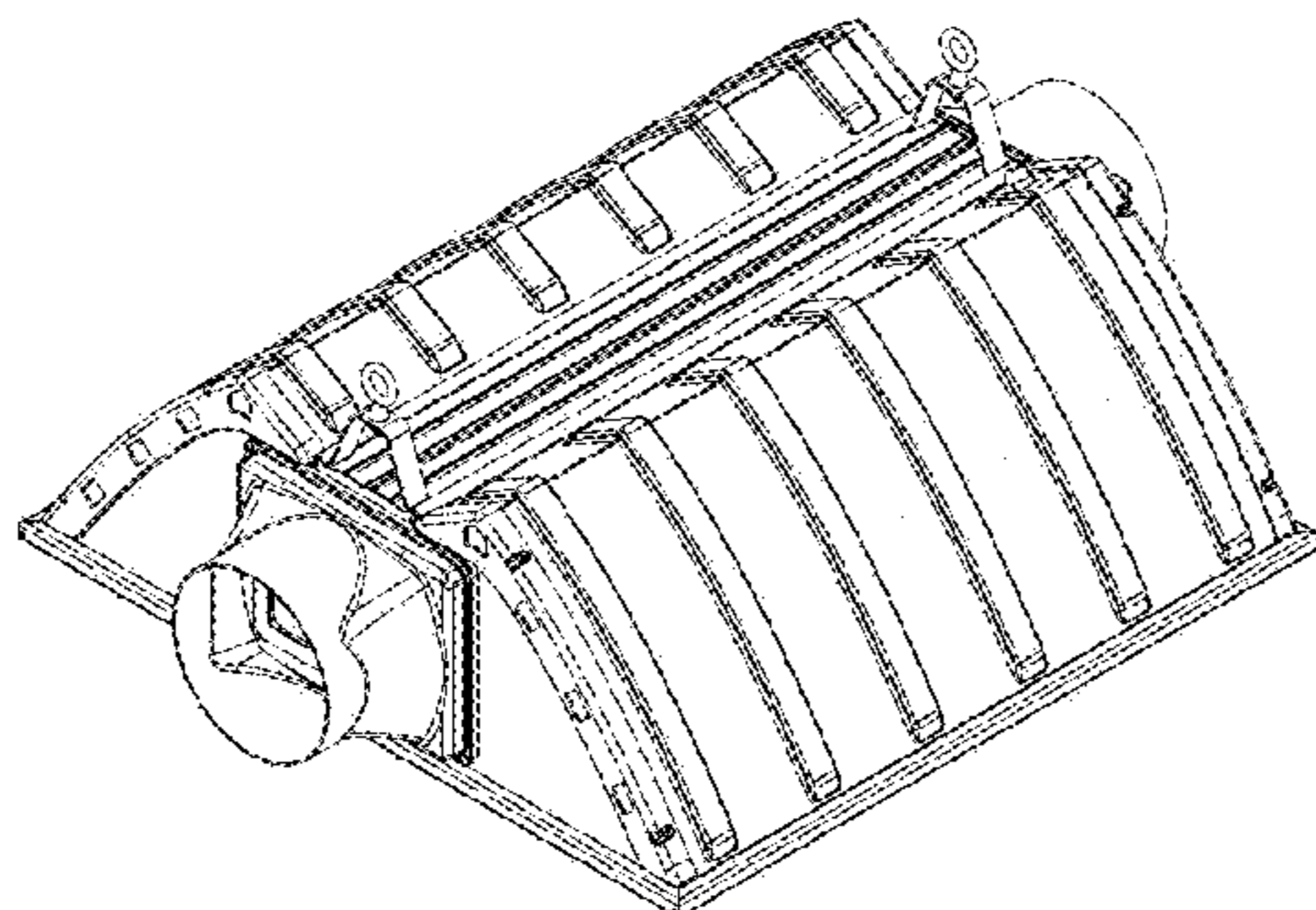
(57) **CLAIM**

The ornamental design for an air-cooled optical reflector, as shown and described.

DESCRIPTION

FIG. 1 is a top, front and left perspective view of an air-cooled optical reflector showing our new design;
 FIG. 2 is a right view thereof;
 FIG. 3 is a left view thereof;
 FIG. 4 is a front, view thereof, the rear view being identical thereto;
 FIG. 5 is a top view thereof;
 FIG. 6 is a bottom view thereof;
 FIG. 7 is a bottom perspective view thereof, wherein the inward-facing top and rear surfaces are mirror images of each other, and the inward-facing left and right surfaces are mirror images of each other; and,
 FIG. 8 is a sectional view of the liquid-cooled optical reflector viewed from the left end.

1 Claim, 7 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

D397,822 S * 9/1998 Miranda D26/144
 D403,801 S * 1/1999 Summers D26/138
 D420,565 S * 2/2000 Griffiths D8/354
 D438,480 S * 3/2001 Arumugasaamy D10/111
 D439,539 S * 3/2001 Arumugasaamy D10/111
 D439,857 S * 4/2001 Arumugasaamy D10/111
 6,247,830 B1 6/2001 Winnett et al.
 D447,272 S * 8/2001 Smith D26/118
 6,299,327 B1 * 10/2001 Camarota F21S 4/003
 362/147
 D456,938 S * 5/2002 Wardenburg D26/118
 D459,831 S * 7/2002 Dolan D26/118
 6,527,422 B1 * 3/2003 Hutchison F21S 48/328
 362/290
 6,595,662 B2 7/2003 Wardenburg
 6,758,580 B1 * 7/2004 Verfuether F21S 8/06
 362/221
 D516,930 S * 3/2006 Dicke D10/114.1
 7,011,424 B1 * 3/2006 Poulson F21S 13/00
 362/161
 D523,985 S * 6/2006 Waycaster D26/76
 7,156,539 B2 * 1/2007 Cronk F21V 7/0016
 362/278
 7,203,416 B2 * 4/2007 Craw F24H 3/0411
 392/350
 D543,652 S * 5/2007 Hargreaves D26/118
 D543,653 S * 5/2007 Hargreaves D26/76
 D544,129 S * 6/2007 Hargreaves D26/75
 D544,131 S * 6/2007 Blackman D26/85
 D544,139 S * 6/2007 Hargreaves D26/118
 D544,153 S * 6/2007 Obenshain D30/125
 D544,980 S * 6/2007 Hargreaves D26/75
 D544,981 S * 6/2007 Hargreaves D26/76
 D544,982 S * 6/2007 Hargreaves D26/76
 D544,983 S * 6/2007 Hargreaves D26/76
 D544,984 S * 6/2007 Hargreaves D26/76
 D544,985 S * 6/2007 Hargreaves D26/76
 D544,987 S * 6/2007 Hargreaves D26/88
 D545,484 S * 6/2007 Hargreaves D26/118
 7,245,081 B2 7/2007 Ashida et al.
 7,425,793 B2 9/2008 Haga et al.
 D581,508 S * 11/2008 Miyake D23/371
 D596,778 S * 7/2009 Yamazato D26/76
 7,712,929 B2 * 5/2010 Schaefer F21V 7/005
 362/297
 7,722,208 B1 * 5/2010 Dupre F21V 7/00
 362/147
 7,722,228 B2 5/2010 Broer
 D617,935 S * 6/2010 Miletich D26/76
 D634,060 S * 3/2011 Wardenburg D26/118
 D634,468 S * 3/2011 Hargreaves D26/118
 D637,162 S * 5/2011 Bridgman D13/152
 D637,341 S * 5/2011 Wardenburg D26/118
 D640,819 S * 6/2011 Pan D26/74
 7,954,982 B2 6/2011 Keen
 7,959,331 B2 * 6/2011 Ho
 7,972,044 B2 7/2011 Burkhauser
 7,982,376 B2 7/2011 Keen et al.
 D645,007 S * 9/2011 Alexander D13/134
 8,038,318 B2 * 10/2011 Plunk F21S 8/02
 362/217.11

D649,519 S * 11/2011 Pineda D13/149
 D650,935 S * 12/2011 Beghelli D26/118
 D655,403 S * 3/2012 Zakula D23/388
 D664,699 S * 7/2012 Nakahira D26/74
 8,319,199 B2 11/2012 Garcia
 8,322,011 B2 * 12/2012 Hargreaves A01G 7/045
 29/428
 8,348,481 B2 * 1/2013 Chang F21S 8/04
 362/147
 D676,188 S * 2/2013 Villegas 26/118
 8,449,216 B2 * 5/2013 Vrondran E02D 29/1463
 404/25
 8,505,224 B2 * 8/2013 Huang H02S 30/10
 126/704
 D691,318 S * 10/2013 Wilcox D26/85
 D695,469 S * 12/2013 Dougherty D30/152
 D698,975 S * 2/2014 Blessitt D26/74
 D698,986 S * 2/2014 Reynolds D26/118
 D698,987 S * 2/2014 Stanley D26/118
 D699,386 S * 2/2014 Park D26/118
 D701,341 S * 3/2014 Mayfield, III D26/74
 8,668,362 B2 3/2014 Nelson et al.
 D701,988 S * 4/2014 Clements D26/74
 D702,827 S * 4/2014 Mase D23/370
 D705,974 S * 5/2014 Blessitt D26/74
 8,714,787 B2 * 5/2014 McGehee F21S 8/026
 362/147
 D707,873 S * 6/2014 Boyer D26/74
 D721,844 S * 1/2015 Lay D26/71
 9,010,970 B2 * 4/2015 Guercio F21V 29/004
 362/373
 9,016,907 B2 * 4/2015 Stanley A01G 7/045
 362/373
 D728,848 S * 5/2015 Reyes D26/118
 D731,701 S * 6/2015 Hargreaves D26/118
 D732,233 S * 6/2015 Reynolds D26/118
 D732,234 S * 6/2015 Rashidi Doust D26/118
 9,052,083 B2 * 6/2015 Stein B60Q 1/2611
 D735,391 S * 7/2015 Blessitt D26/74
 9,091,423 B2 * 7/2015 Shen F21S 8/086
 D737,134 S * 8/2015 Thompson D8/396
 9,110,209 B2 * 8/2015 Blessitt G02B 6/0055
 9,121,580 B1 * 9/2015 Bryant F21V 19/00
 2001/0004320 A1 6/2001 Wood
 2001/0023173 A1 * 9/2001 Schiedegger F24F 7/02
 454/367
 2002/0141195 A1 * 10/2002 Peter A01G 7/045
 362/362
 2003/0031011 A1 * 2/2003 Miller E04B 9/32
 362/150
 2008/0074880 A1 3/2008 Keen et al.
 2012/0092859 A1 * 4/2012 Gregoris F21V 7/0033
 362/217.06
 2013/0083539 A1 * 4/2013 Dimitriadis F21V 7/00
 362/297

OTHER PUBLICATIONS

Dimlux Expert Series 315 Watt Full Spectrum flyer, 2 pages, Jul. 2014.
 Dimlux Expert Series 1000 Watt DE EL UHF flyer, 2 pages, Jul. 2014.
 Epapillon 1000W flyer, 1 page, accessed Sep. 10, 2014.

* cited by examiner

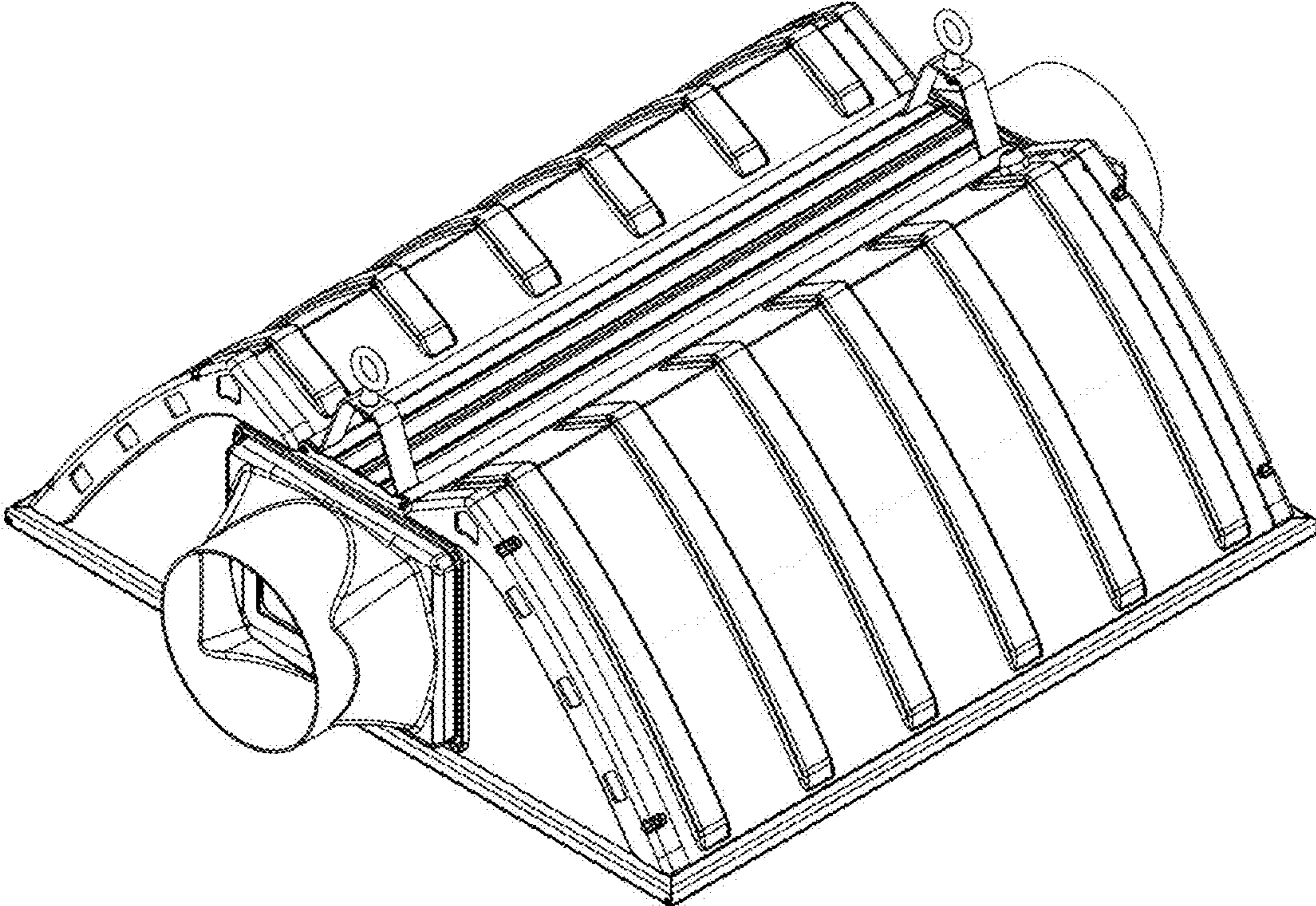


FIG. 1

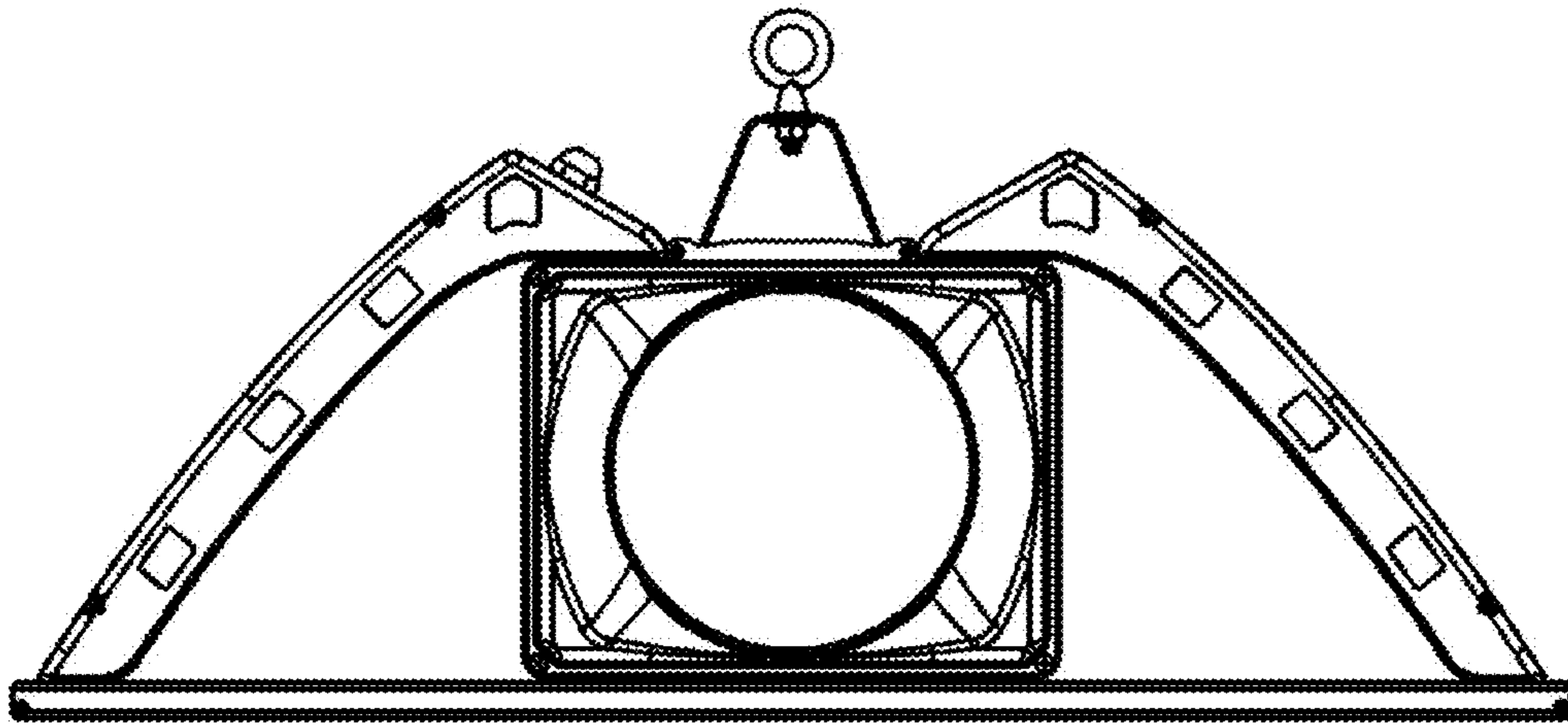


FIG. 2

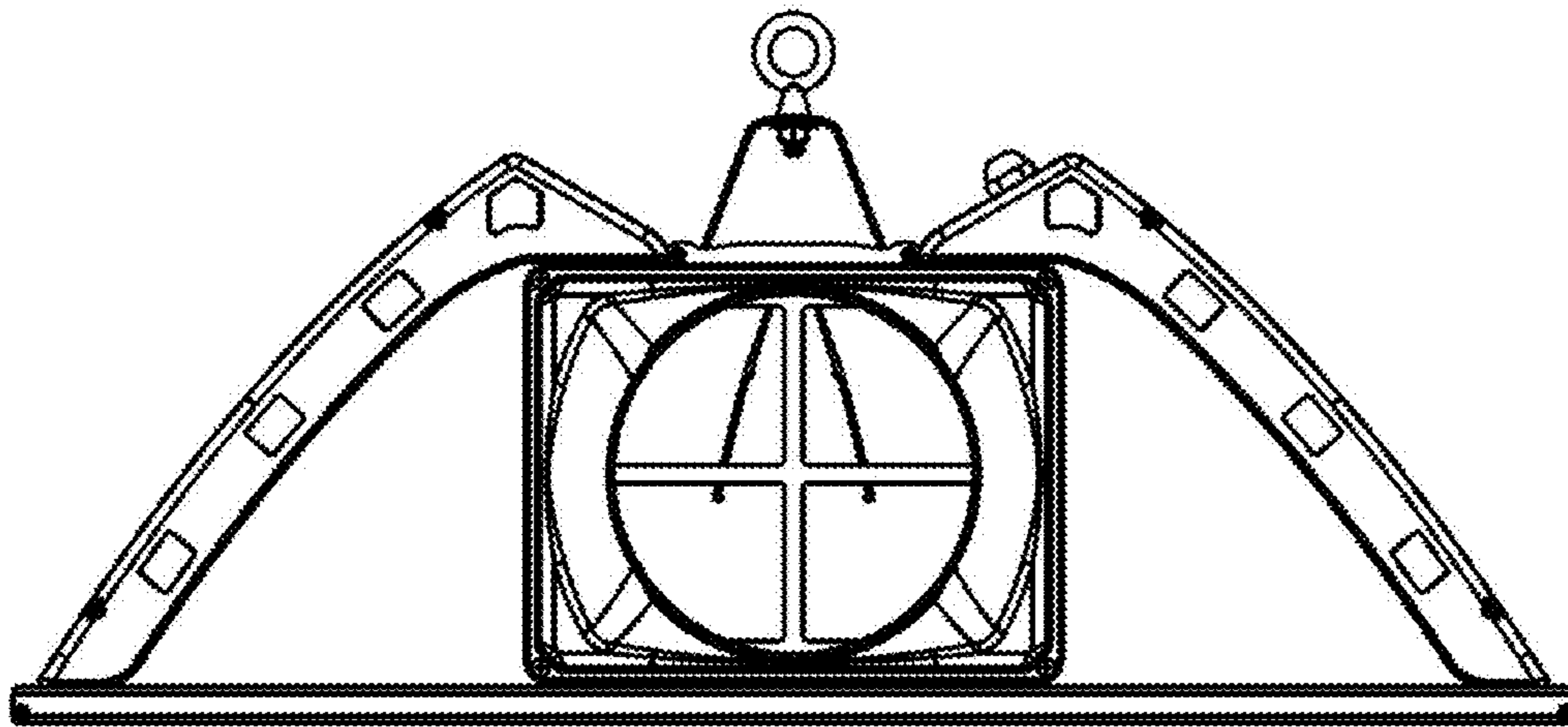


FIG. 3

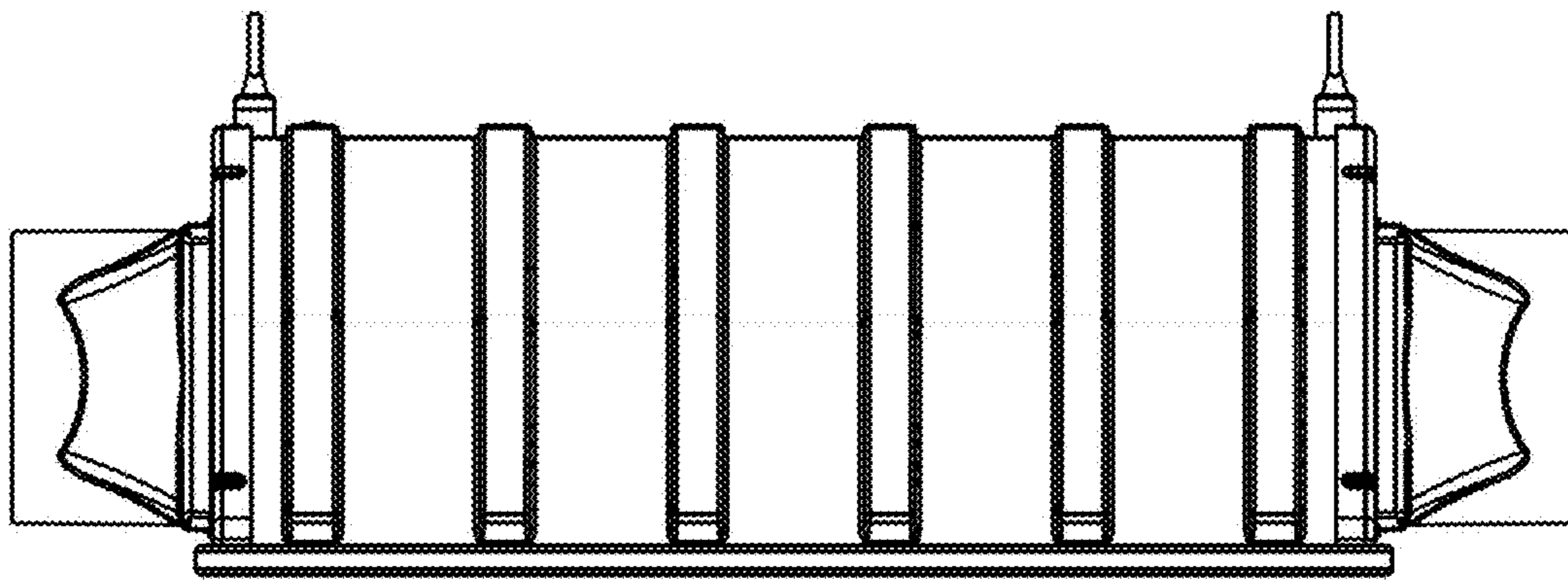


FIG. 4

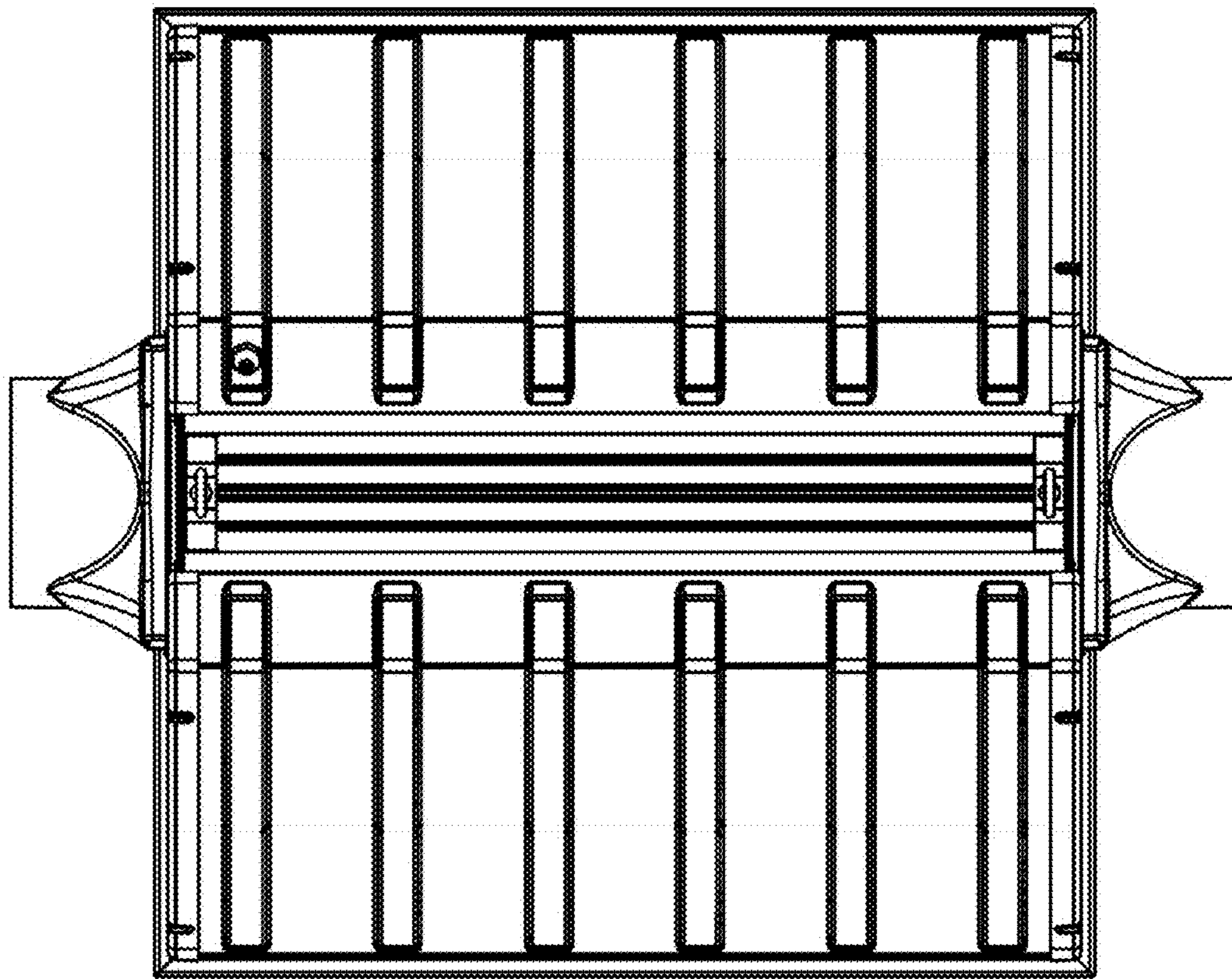


FIG. 5

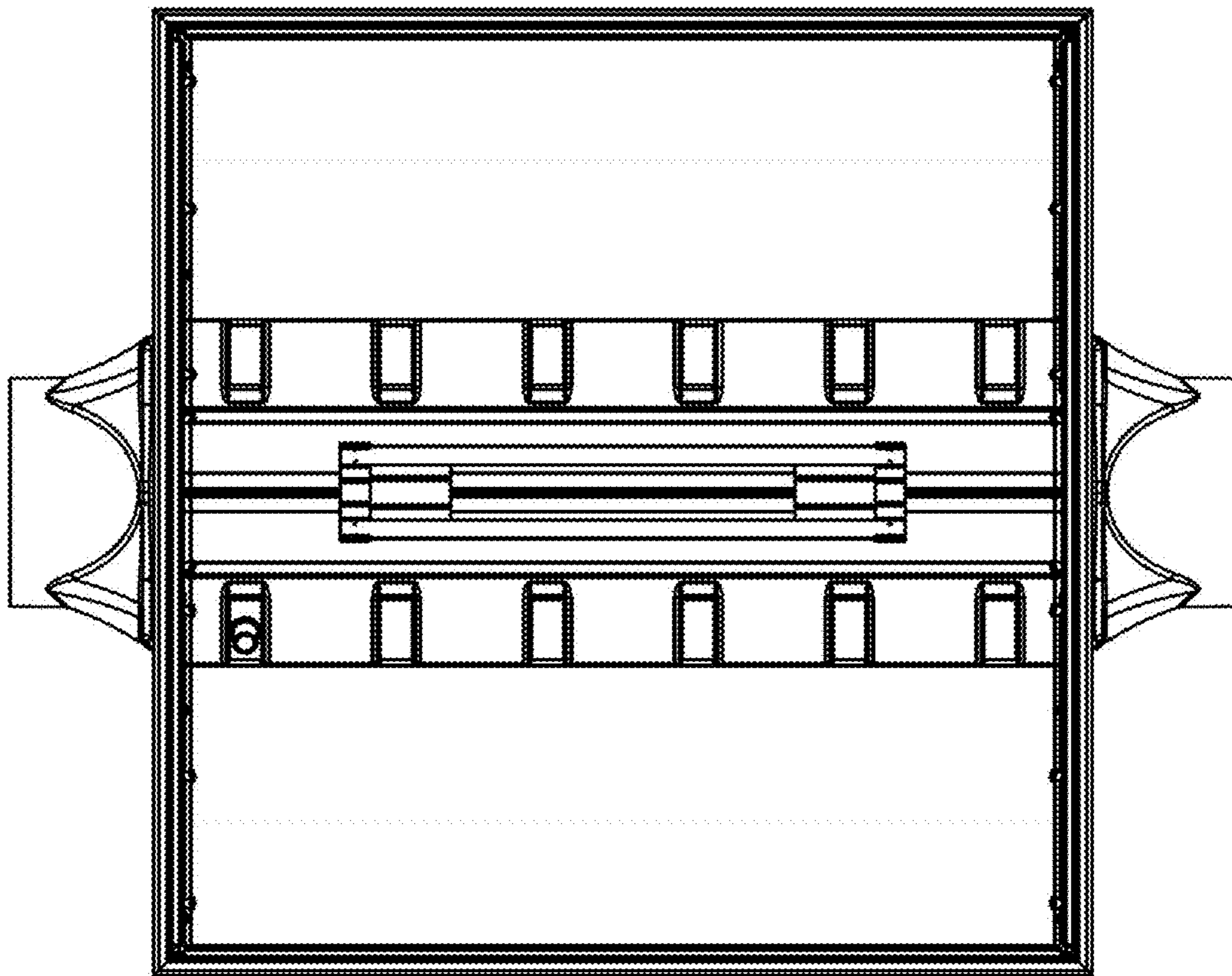


FIG. 6

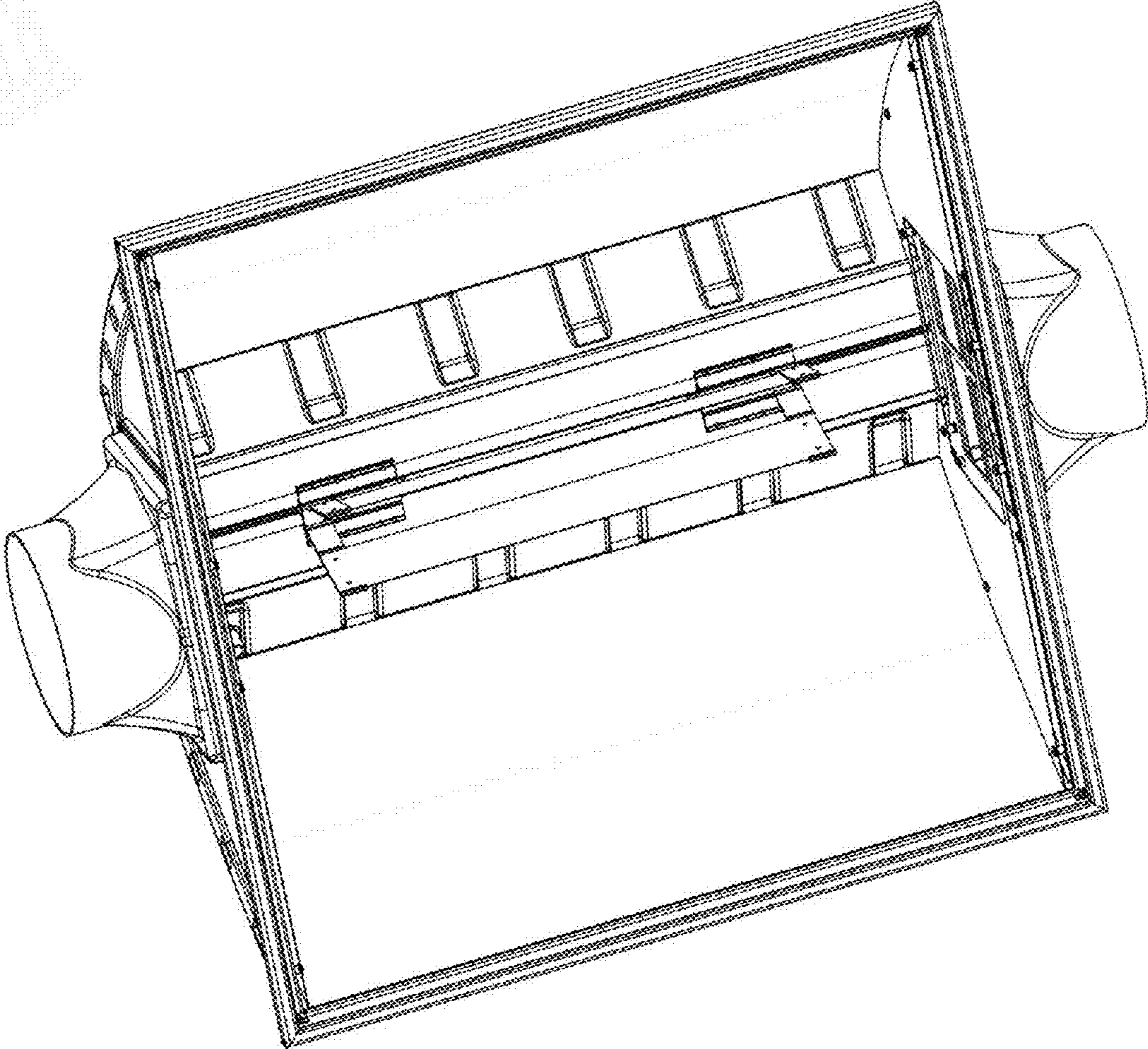


FIG. 7

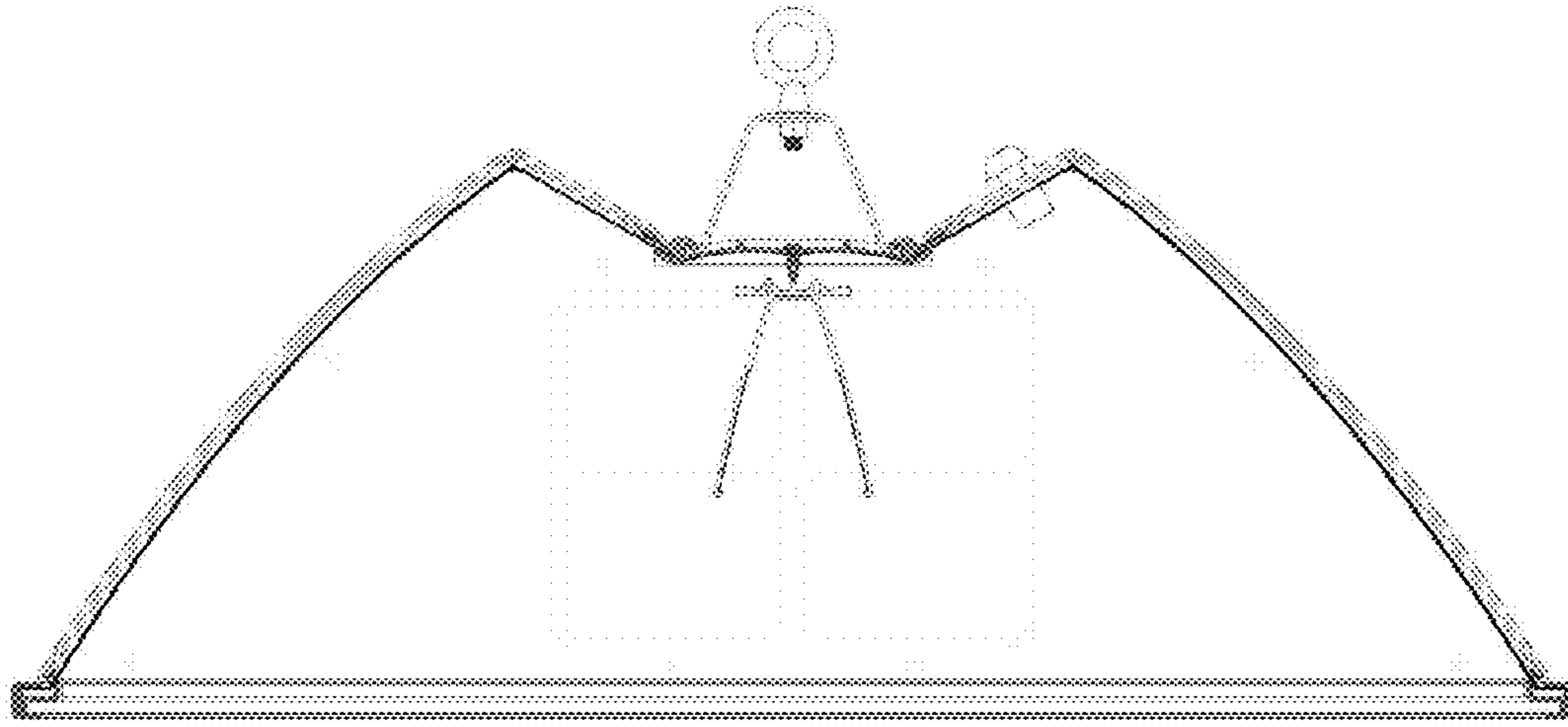


FIG. 8