



US00D631004S

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

(10) **Patent No.:** **US D631,004 S**  
(45) **Date of Patent:** **\*\* Jan. 18, 2011**

(54) **DUAL TROUGH CONCENTRATING SOLAR PHOTOVOLTAIC MODULE**

6,276,359 B1 8/2001 Frazier  
6,399,874 B1 6/2002 Olah

(75) Inventor: **Eric C. Johnson**, Mountain View, CA (US)

(Continued)

FOREIGN PATENT DOCUMENTS

(73) Assignee: **Skyline Solar, Inc.**, Mountain View, CA (US)

DE 20314372 1/2004

(Continued)

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

OTHER PUBLICATIONS

(21) Appl. No.: **29/324,036**

International Search Report dated Apr. 16, 2009 in PCT Application No. PCT/US2008/075250.

(22) Filed: **Sep. 4, 2008**

(Continued)

(51) **LOC (9) Cl.** ..... **13-02**

(52) **U.S. Cl.** ..... **D13/102**

(58) **Field of Classification Search** ..... D13/102,  
D13/101, 184, 199; 52/173.3; 126/424,  
126/573, 580, 600; 136/206, 244–251, 256,  
136/259, 291–292; 359/853, 867

See application file for complete search history.

*Primary Examiner*—Prabhakar Deshmukh

*Assistant Examiner*—Derrick Holland

(74) *Attorney, Agent, or Firm*—Beyer Law Group LLP

(57)

**CLAIM**

We claim the ornamental design for a dual trough concentrating solar photovoltaic module, substantially as shown and described.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,830,375	A	11/1931	Shoop	
3,760,624	A	9/1973	Robinson	
4,243,019	A	1/1981	Severson	
4,316,448	A *	2/1982	Dodge	126/600
4,337,758	A	7/1982	Meinel et al.	
4,571,812	A	2/1986	Gee	
4,583,520	A	4/1986	Dietrich et al.	
4,611,575	A	9/1986	Powell	
D307,260	S *	4/1990	Happy et al.	D13/102
5,038,858	A	8/1991	Jordan et al.	
5,058,565	A	10/1991	Gee et al.	
5,228,924	A *	7/1993	Barker et al.	136/246
5,288,337	A	2/1994	Mitchell	
5,722,145	A	3/1998	Haushalter et al.	
5,771,966	A	6/1998	Jacoby	
5,961,739	A	10/1999	Osborne	
D420,973	S *	2/2000	Kalarney	D13/102
6,020,554	A	2/2000	Kaminar et al.	
D425,013	S *	5/2000	Lai	D13/102
6,260,610	B1	7/2001	Biber et al.	

**DESCRIPTION**

FIG. 1 is a front perspective view of a dual trough concentrating solar photovoltaic module showing my new design;

FIG. 2 is a front elevation view thereof, the rear being a mirror image;

FIG. 3 is another front elevation view thereof, shown in an alternate position;

FIG. 4 is a top plan view thereof;

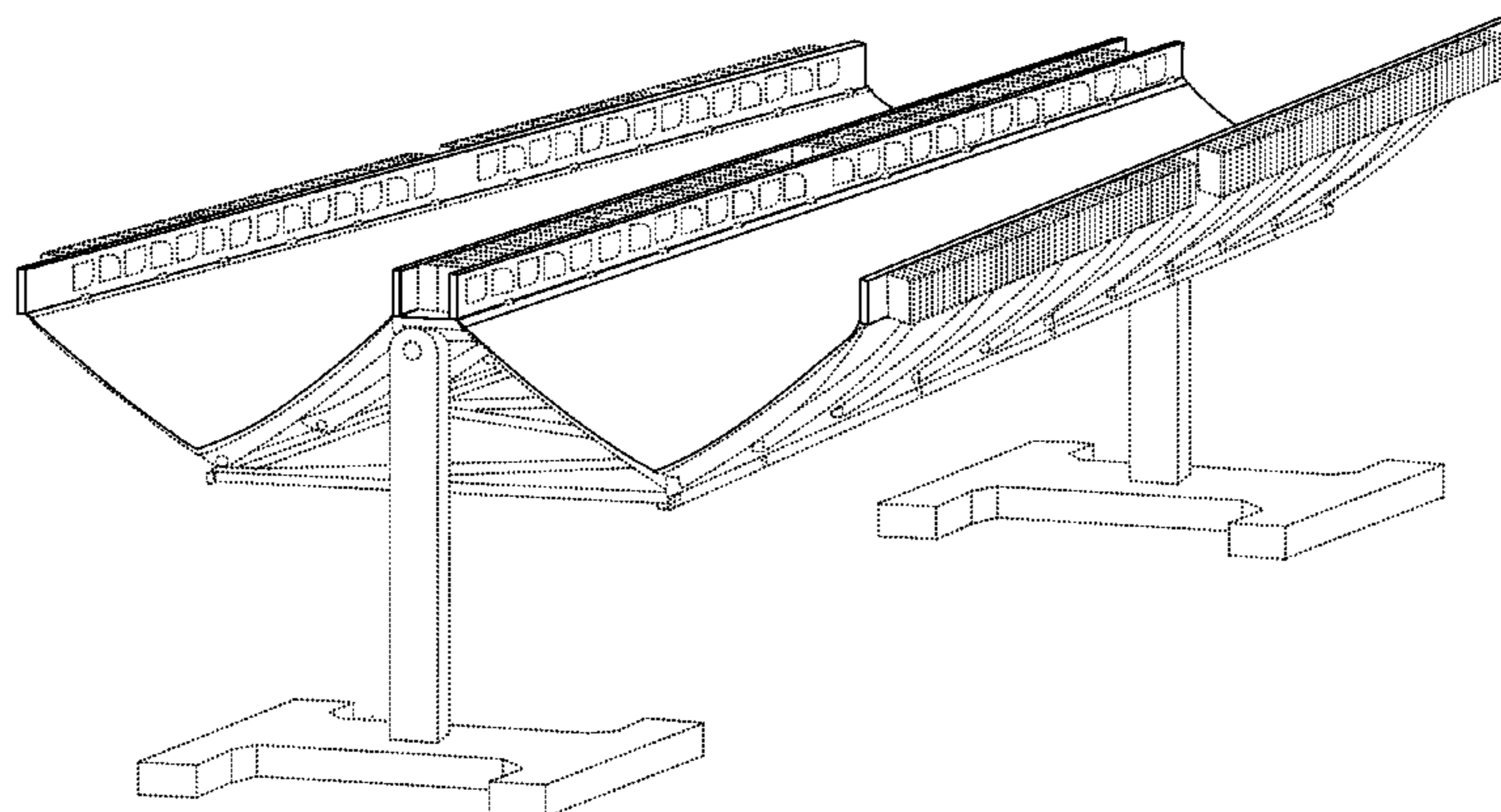
FIG. 5 is a bottom plan view thereof;

FIG. 6 is a right side elevation view thereof; and,

FIG. 7 is a left side elevation view thereof.

The features shown in broken lines in the various Figures are for illustrating environmental structure and form no part of the claimed design.

**1 Claim, 5 Drawing Sheets**



U.S. PATENT DOCUMENTS

6,401,807	B1	6/2002	Wyler et al.	
6,508,301	B2	1/2003	Marsala	
6,615,909	B2	9/2003	Fast	
6,672,018	B2 *	1/2004	Shingleton .....	52/173.3
6,861,293	B2	3/2005	Soule	
6,870,087	B1	3/2005	Gallagher	
D505,113	S *	5/2005	Lam .....	D13/107
6,978,827	B2	12/2005	Armstrong	
6,994,082	B2	2/2006	Hochberg et al.	
7,065,873	B2	6/2006	Kang et al.	
2002/0075579	A1 *	6/2002	Vasylyev et al. ....	359/853
2004/0261786	A1	12/2004	Kirk	
2006/0225730	A1	10/2006	Anderson	
2006/0266407	A1	11/2006	Lichy et al.	
2007/0089777	A1	4/2007	Johnson, Jr. et al.	
2007/0144578	A1	6/2007	Cunningham et al.	
2007/0272295	A1	11/2007	Rubin et al.	
2008/0134497	A1	6/2008	Corrales et al.	
2008/0135085	A1	6/2008	Corrales et al.	
2008/0135086	A1	6/2008	Corrales	
2008/0142319	A1	6/2008	Manter	

FOREIGN PATENT DOCUMENTS

JP	53-131781	11/1978
WO	WO 01/63665	8/2001
WO	03/098705	11/2003
WO	2004/114419	12/2004
WO	2005/006435	1/2005
WO	2006/083742	8/2006
WO	2008/013976	1/2008

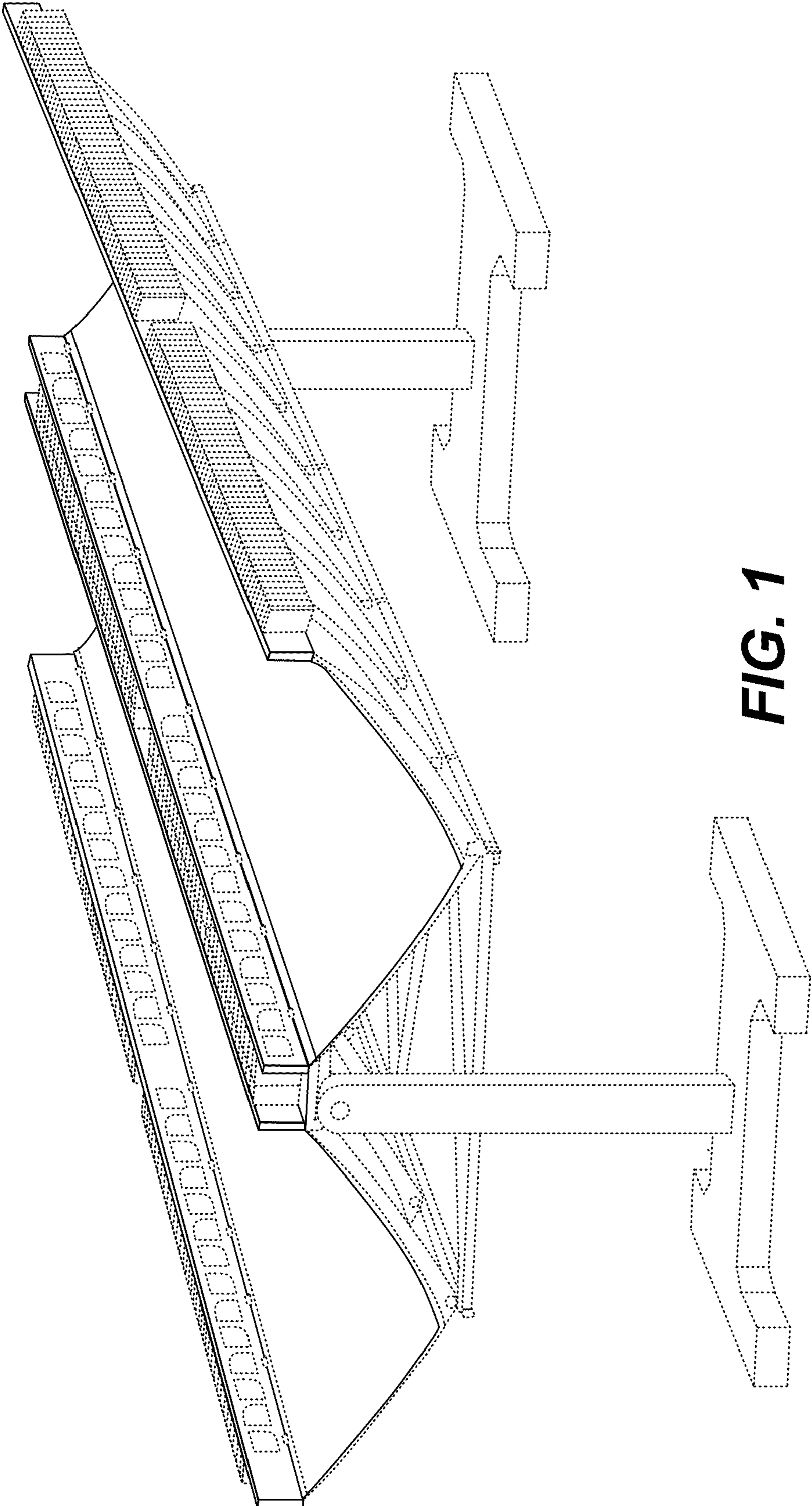
OTHER PUBLICATIONS

Written Opinion dated Apr. 16, 2009 in PCT Application No. PCT/US2008/075250.  
 International Search Report in PCT Application No. PCT/US2008/075247 dated Nov. 30, 2009.  
 Written Opinion in PCT Application No. PCT/US2008/075247 dated Nov. 30, 2009.  
 International Preliminary Report on Patentability in PCT Application No. PCT/US2008/075250 dated Dec. 7, 2009.  
 International Preliminary Report on Patentability in PCT Application No. PCT/US2008/075247 dated Jan. 21, 2010.  
 Invitation to Pay Additional Fees in PCT Application No. PCT/US2008/075250 dated Feb. 10, 2009.  
 Alarte et al. "Design, Construction and Measurement of a Single-Mirror Two-Stage (SMTS) Photovoltaic Concentrator." 2<sup>nd</sup> World

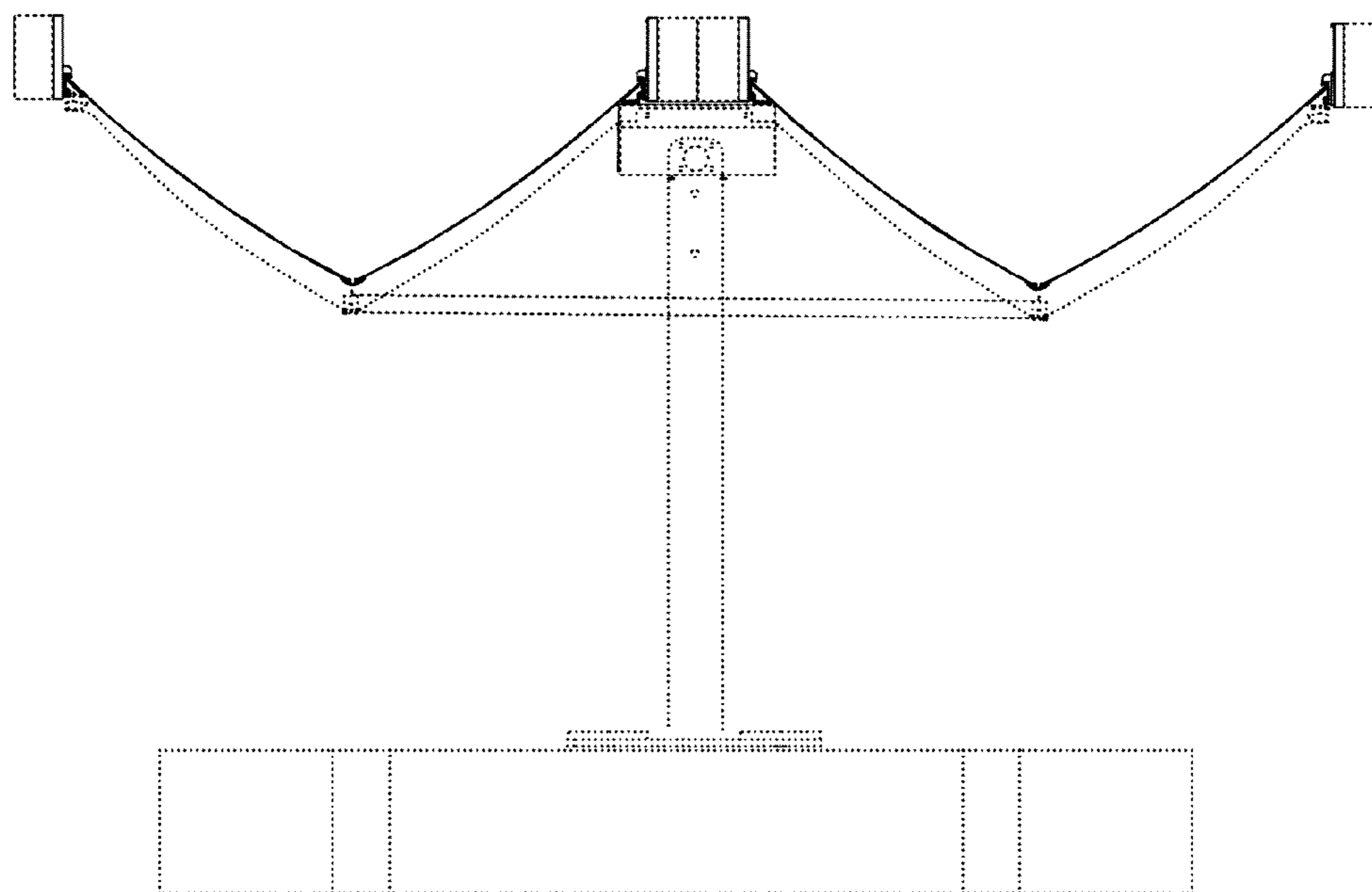
Conference and Exhibition on Photovoltaic Solar Energy Conversion, Vienna, Austria, Jul. 6-10, 1998.  
 Database WPI Week 200735, Thomson Scientific, London, GB; AN 2007-370318, XP002512878 & RU 2300058C2 abstract.  
 Whitefield et al. "The Development and Testing of Small Concentrating PV Systems." Solar Energy, Pergamon Press. Oxford, GB, vol. 67, No. 1-3, pgs. 23-34, Jul. 1, 1999.  
 Partial International Search Report dated Feb. 11, 2009 in PCT Application No. PCT/US2008/075247.  
 Robinson Fin website: [http://www.robfin.com/portals/0/R600006%20ruffled%20Model%20\(1\)](http://www.robfin.com/portals/0/R600006%20ruffled%20Model%20(1)) downloaded on Apr. 17, 2009.  
 Notice of Allowance dated Mar. 26, 2010 from U.S. Appl. No. 12/100,726.  
 Office Action dated Apr. 29, 2010 from U.S. Appl. No. 12/124,124.  
 Mohedano et al., "Design, Construction and Measurement of a Dielectric-Single Mirror Two Stage (DSMTS) Photovoltaic Concentrator," *Proc. Of the Spie*, 4446, 2002, pp. 20-31.  
 Mohedano et al., "Design of a Simple Structure for the D-SMTS Concentrator," 16th European Photovoltaic Solar Energy Conference, Glasgow, UK 2000, pp. 2563-2566.  
 Sala et al., "480 kW peak EUCLIDES™ Concentrator Power Plant Using Parabolic Troughs," Springer Berlin / Heidelberg, ISSN 0342-4111, 2007 (6 pages).  
 Sala et al., "The 480 kWp EUCLIDES™—Thermie Power Plant: Installation, Set-Up and First Results," (6 pages).  
 Smeltink et al., "40kW PV Thermal Roof Mounted Concentrator System," Energy Conversion, Conference Record of the 2006 IEEE 4th World Conference on vol. 1, May 2006 (4 pages).  
 Smeltink et al., "The ANU 20kW PV/Trough Concentration," Conference paper, 1999 (4 pages).  
 Wenham et al., "Applied Photovoltaics" Second Edition, Earthscan, ISBN-10:184407-401-3, 2007 (7 pages).  
 Winston et al., "Nonimaging Optics," Elsevier Academic Press, ISBN-13:978-0-12-759751-5, 2005 (10 pages).  
 "Harmony 11.5 kW Solar Cogeneration," Heliodynamics, Product datasheet (2 pages).  
 "Industrial Solar Engery," Menova Energy Inc., 2006 (5 pages).  
 "Continuing Testing Materials and Concepts," Solar20, [www.solar20.com/SE/EN/1210-EN\\_prototype2.php](http://www.solar20.com/SE/EN/1210-EN_prototype2.php), 2003 (1 page).  
 "Solar Power for a Sustainable World," Abengoa Solar IST, [www.solucar.es/sotes/solar/en/tec\\_ccp.jsp](http://www.solucar.es/sotes/solar/en/tec_ccp.jsp), printed from online Apr. 15, 2008 (4 pages).  
 U.S. Appl. No. 12/100,726, filed Apr. 10, 2008.  
 U.S. Appl. No. 12/124,124, filed May 20, 2008.  
 U.S. Appl. No. 12/124,118, filed May 20, 2008.  
 U.S. Appl. No. 12/124,121, filed May 20, 2008.

\* cited by examiner

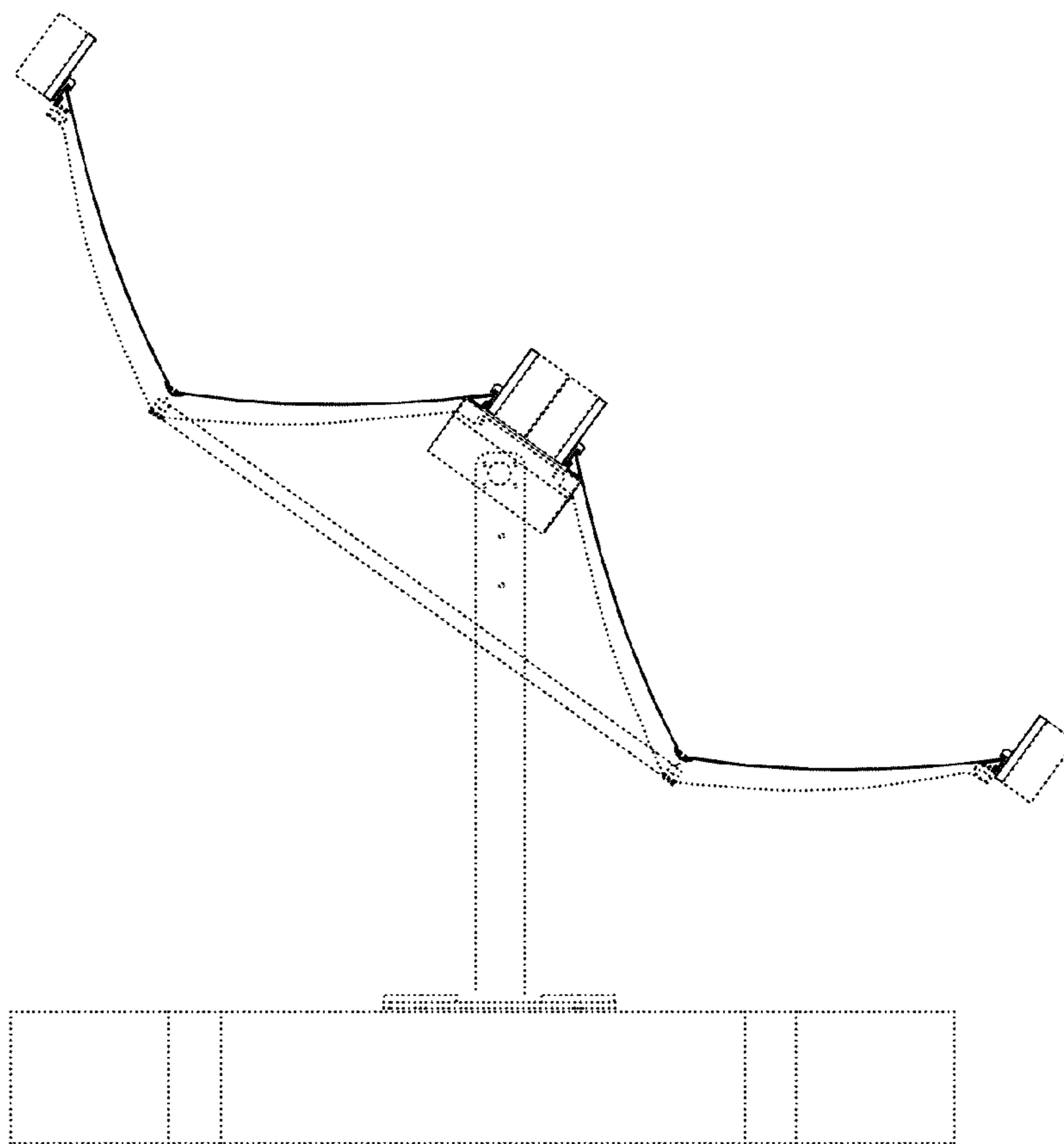




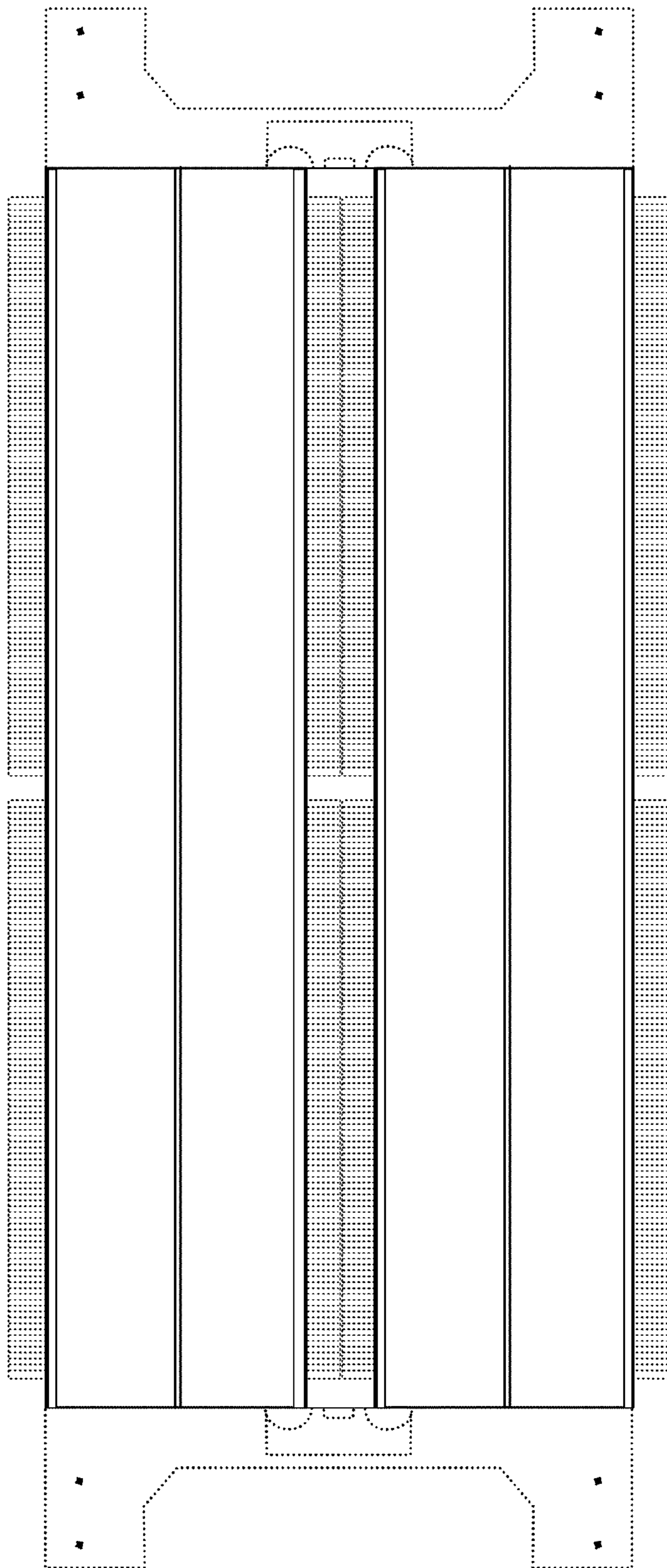
**FIG. 1**



**FIG. 2**



**FIG. 3**



**FIG. 4**



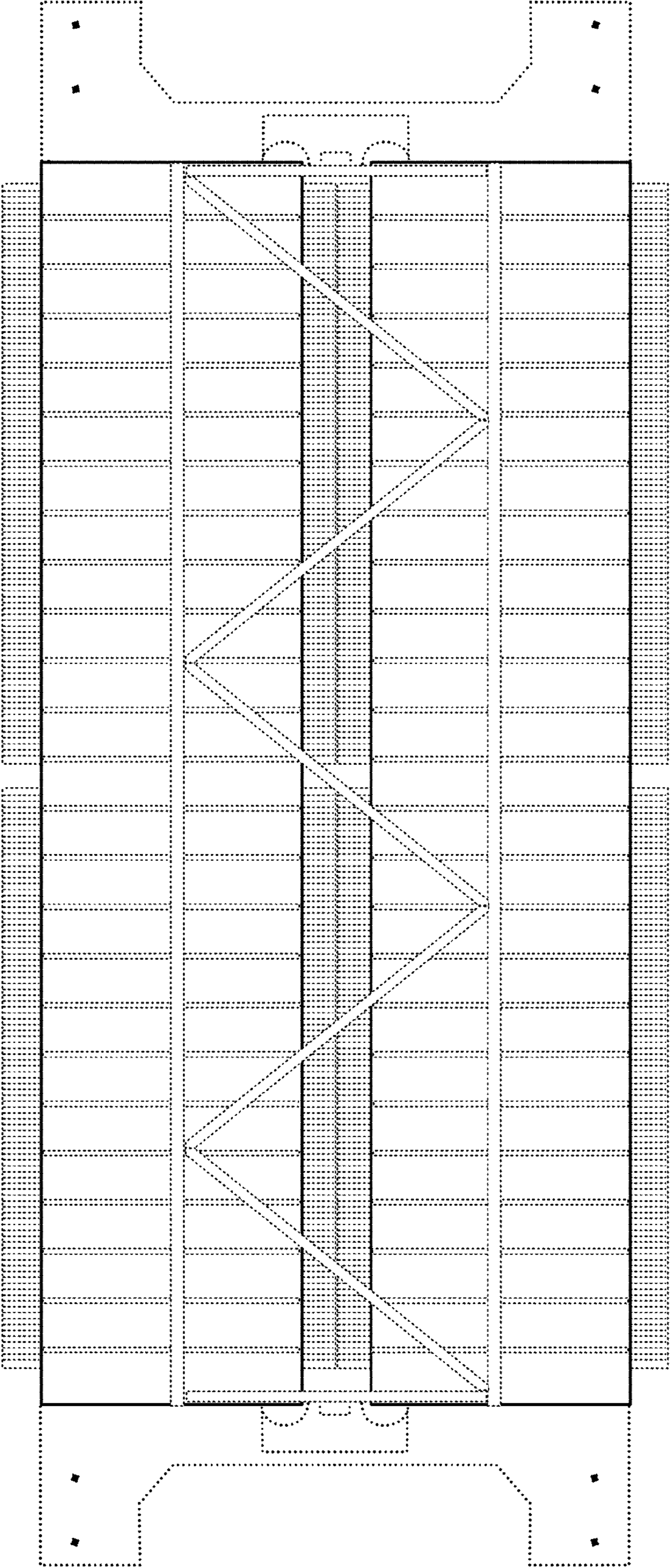
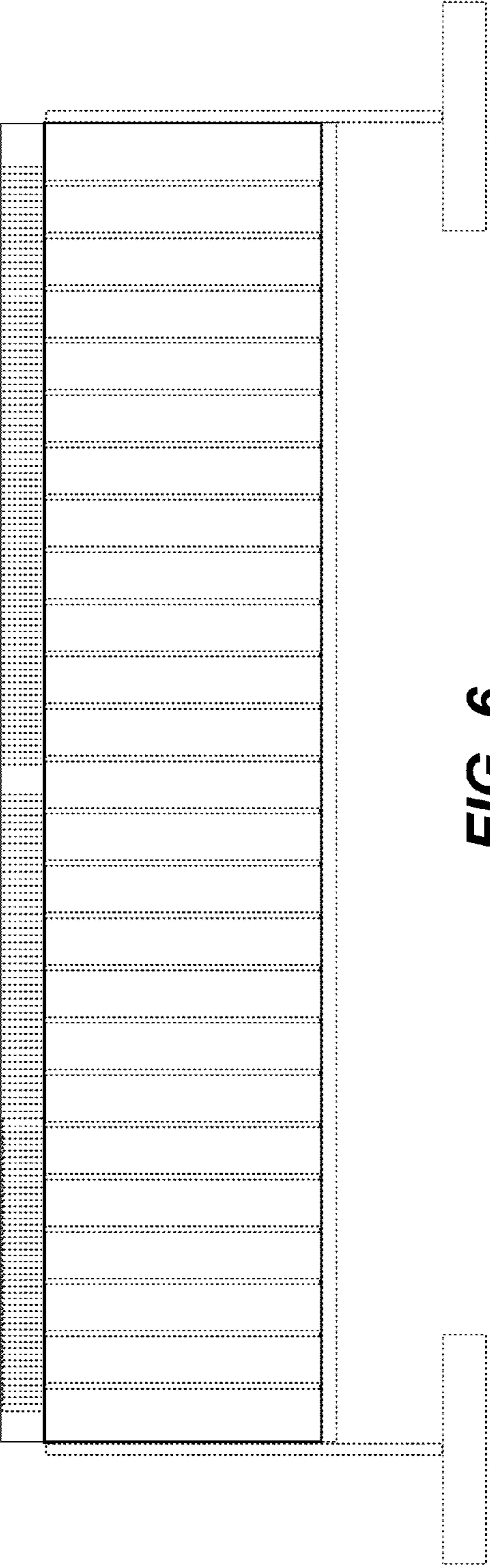
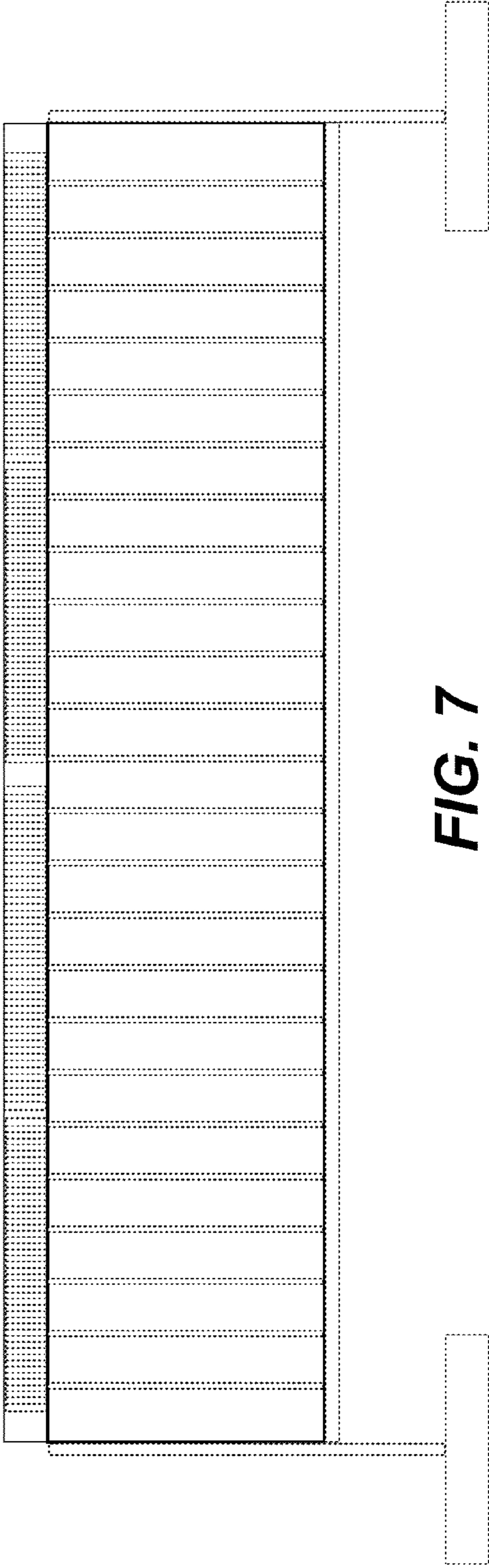


FIG. 5



**FIG. 6**



**FIG. 7**