



US00D747297S

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

(10) **Patent No.:** **US D747,297 S**
(45) **Date of Patent:** **** Jan. 12, 2016**

- (54) **MULTI-BAND LTE ANTENNA**
- (71) Applicant: **Airgain, Inc.**, Carlsbad, CA (US)
- (72) Inventor: **Ziming He**, Irvine, CA (US)
- (73) Assignee: **Airgain, Inc.**, San Diego, CA (US)
- (**) Term: **14 Years**
- (21) Appl. No.: **29/467,900**
- (22) Filed: **Sep. 24, 2013**
- (51) **LOC (10) Cl.** **14-03**
- (52) **U.S. Cl.**
USPC **D14/230**
- (58) **Field of Classification Search**
USPC D14/230–238, 299, 358;
343/700 R–705, 711–713, 871–908;
455/90.2–90.3; 333/193
CPC H01Q 7/00; H01Q 13/10; H01Q 9/285;
H01Q 19/30; H01Q 19/12; H01Q 1/38;
H04B 1/0475; H04B 1/034; H05K 11/00
See application file for complete search history.

7,477,195	B2	1/2009	Vance	
D592,195	S	5/2009	Wu et al.	
7,538,729	B2 *	5/2009	Lin et al.	343/700 MS
D599,334	S	9/2009	Chiang	
D606,053	S	12/2009	Wu et al.	
D607,442	S	1/2010	Su et al.	
D608,769	S	1/2010	Bufe	
D611,936	S *	3/2010	Kishler	D14/230
D612,368	S	3/2010	Yang et al.	
7,705,783	B2	4/2010	Rao et al.	
D621,819	S	8/2010	Tsai et al.	
7,843,390	B2	11/2010	Liu	
D633,483	S	3/2011	Su et al.	
D635,127	S	3/2011	Tsai et al.	
D635,560	S	4/2011	Tsai et al.	
D635,963	S	4/2011	Podduturi	
D635,964	S	4/2011	Podduturi	

(Continued)

Primary Examiner — John Windmuller

Assistant Examiner — John R Yeh

(74) *Attorney, Agent, or Firm* — Clause Eight IPS; Michael Catania

(57) **CLAIM**

The ornamental design for a multi-band LTE antenna, as shown and described.

DESCRIPTION

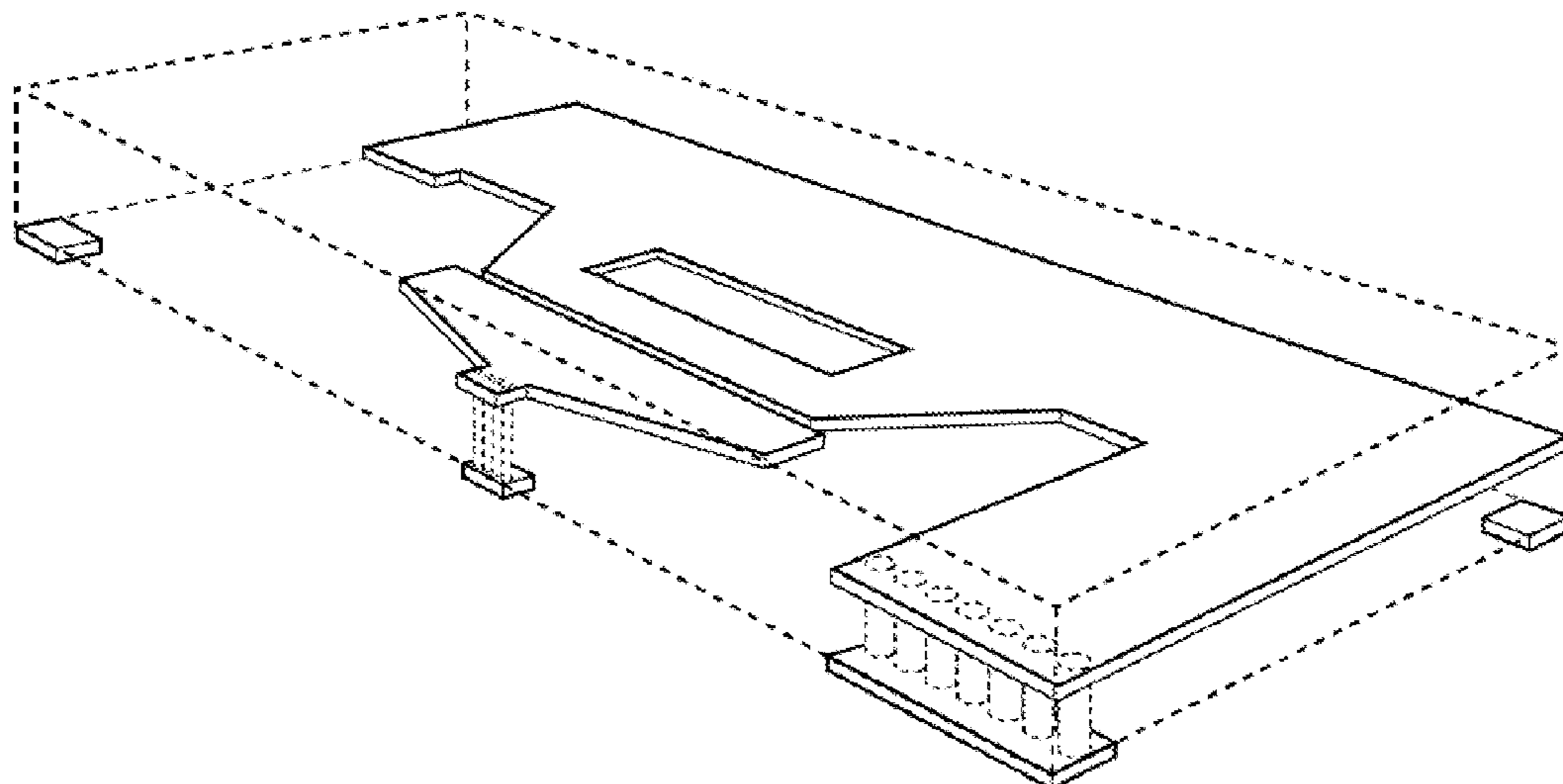
FIG. 1 is a top plan view of an antenna.
 FIG. 2 is a front plan view of the antenna of FIG. 1.
 FIG. 3 is a rear plan view of the antenna of FIG. 1.
 FIG. 4 is a side plan view of the antenna of FIG. 1.
 FIG. 5 is a side plan view of the antenna of FIG. 1
 FIG. 6 is a top perspective view of the antenna of FIG. 1 within a cover in broken lines; and,
 FIG. 7 is a bottom plan view of a cover in broken lines.
 The broken lines are for illustration purposes only and form no part of the claimed invention.

1 Claim, 2 Drawing Sheets

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,847,682	A *	12/1998	Ke	343/752
6,476,769	B1 *	11/2002	Lehtola	343/702
7,042,401	B2 *	5/2006	Park et al.	343/700 MS
7,061,437	B2	6/2006	Lin et al.	
7,123,207	B2 *	10/2006	Yazdandoost et al.	343/795
7,148,849	B2	12/2006	Lin	
7,205,943	B2 *	4/2007	Mei	343/700 MS
D546,821	S	7/2007	Oliver	
D549,696	S	8/2007	Oshima et al.	
7,333,067	B2	2/2008	Hung et al.	
D573,589	S	7/2008	Montgomery et al.	
7,405,704	B1	7/2008	Lin et al.	



(56)

References Cited

U.S. PATENT DOCUMENTS

D635,965 S	4/2011	Mi et al.			
D636,382 S	4/2011	Podduturi			
D649,962 S	12/2011	Tseng et al.			
D651,198 S	12/2011	Mi et al.			
D654,059 S	2/2012	Mi et al.			
D654,060 S	2/2012	Ko et al.			
D654,061 S *	2/2012	Tseng et al.	.....	D14/230	
D654,062 S *	2/2012	Ko et al.	.....	D14/230	
D656,131 S *	3/2012	Suleiman et al.	.....	D14/230	
D658,639 S	5/2012	Huang et al.			
D659,129 S	5/2012	Mi et al.			
D659,685 S	5/2012	Huang et al.			
D659,688 S	5/2012	Huang et al.			
D662,916 S	7/2012	Huang et al.			
D671,097 S	11/2012	Mi et al.			
D676,429 S	2/2013	Gosalia et al.			
D678,255 S	3/2013	Ko et al.			
D684,565 S	6/2013	Wei			
D685,772 S *	7/2013	Zheng et al.	.....	D14/230	
D695,279 S *	12/2013	Yang et al.	.....	D14/230	
D695,280 S *	12/2013	Yang et al.	.....	D14/230	
D698,764 S *	2/2014	Zeng	.....	D14/230	
D706,751 S *	6/2014	Chang et al.	.....	D14/230	
D708,602 S *	7/2014	Gosalia et al.	.....	D14/230	
2002/0003499 A1	1/2002	Kouarn et al.			
2004/0051673 A1 *	3/2004	Moren et al.	.....	343/702	
2004/0222936 A1	11/2004	Hung et al.			
2005/0073462 A1	4/2005	Lin et al.			
2005/0190108 A1	9/2005	Lin et al.			
2006/0208900 A1	9/2006	Tavassoli Hozouri			
2007/0030203 A1	2/2007	Tsai et al.			
2008/0150829 A1	6/2008	Lin et al.			
2009/0002244 A1	1/2009	Woo			
2009/0058739 A1	3/2009	Konishi			
2009/0135072 A1	5/2009	Ke et al.			
2009/0262028 A1	10/2009	Mumbru et al.			
2010/0188297 A1	7/2010	Chen et al.			
2010/0309067 A1	12/2010	Tsou et al.			
2011/0006950 A1	1/2011	Park et al.			
2012/0038514 A1	2/2012	Bang			
2012/0229348 A1	9/2012	Chiang			
2012/0242546 A1	9/2012	Hu et al.			

* cited by examiner

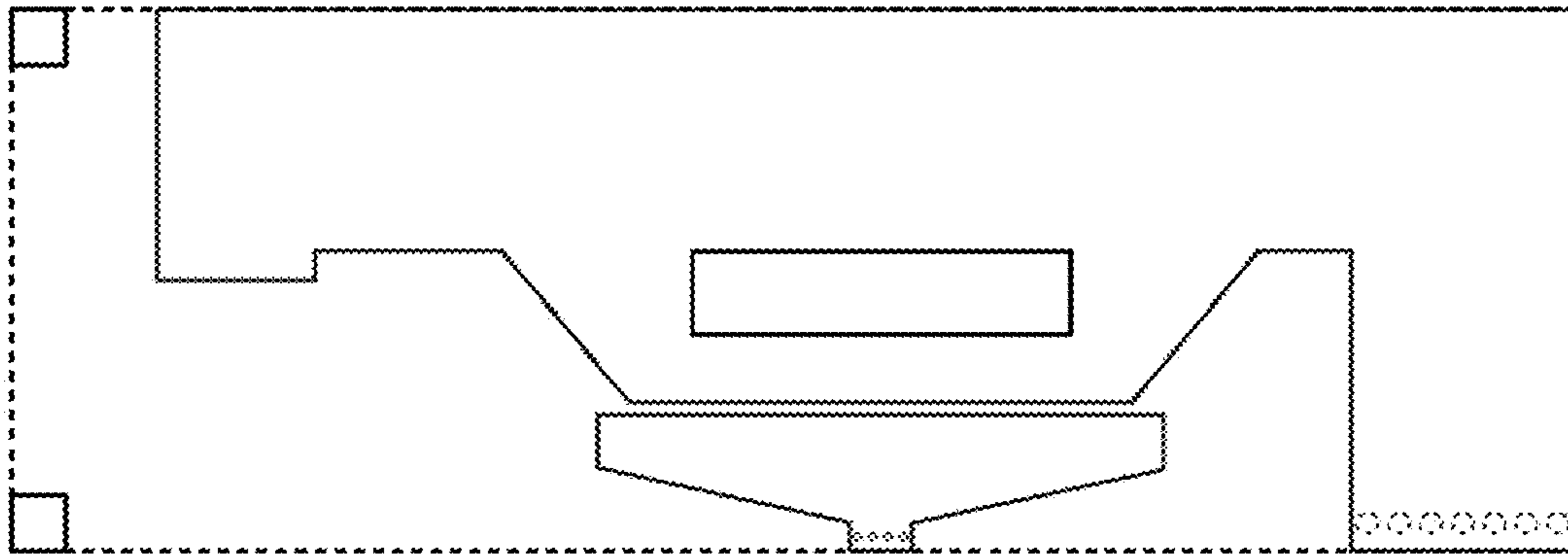


FIG. 1



FIG. 2

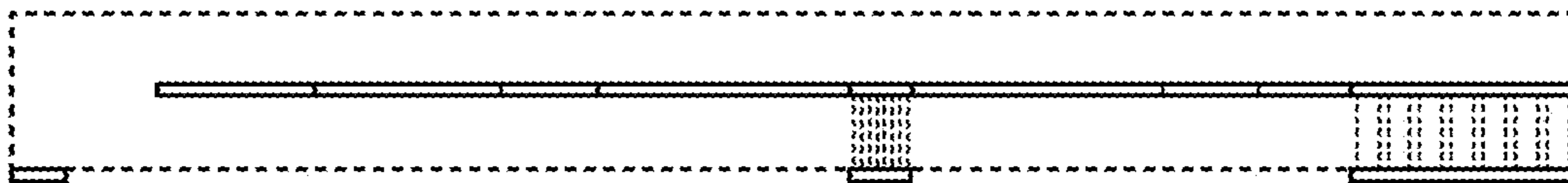


FIG. 3

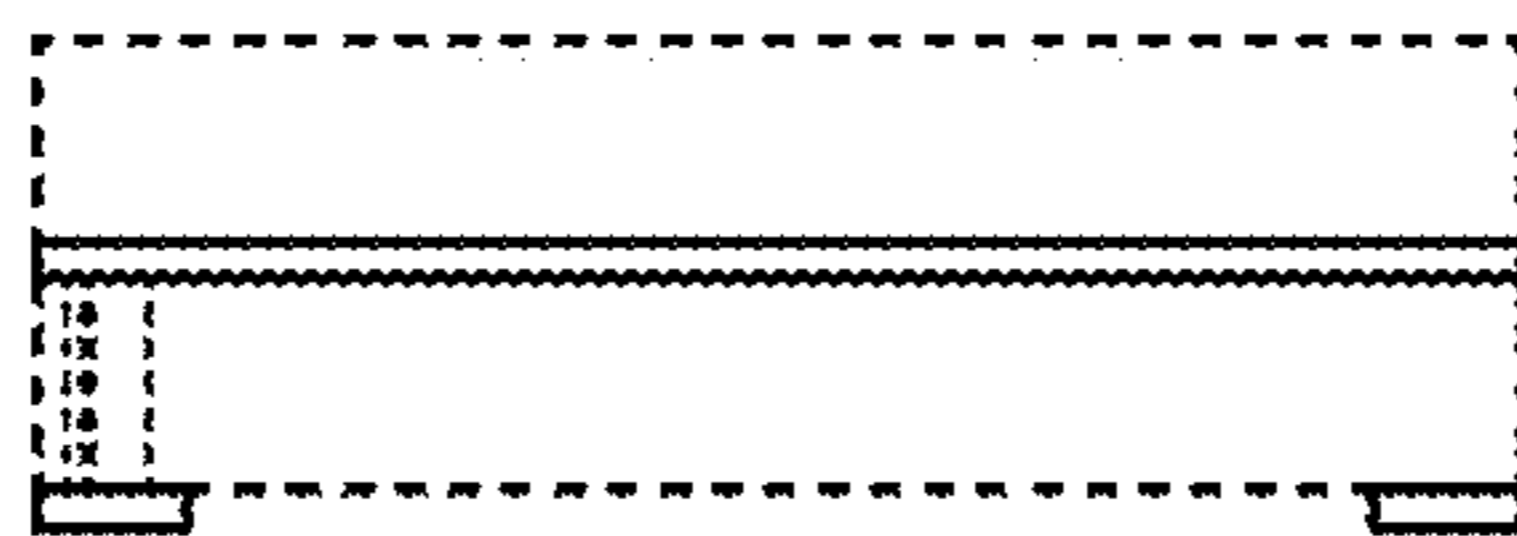


FIG. 4

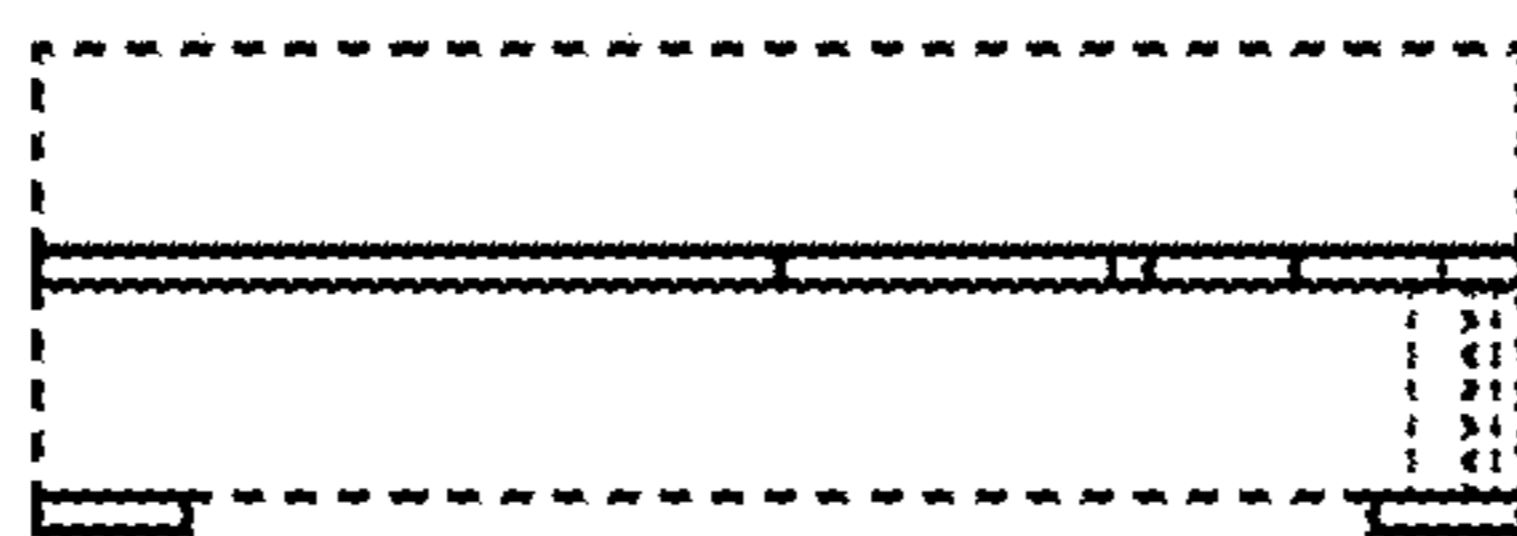


FIG. 5

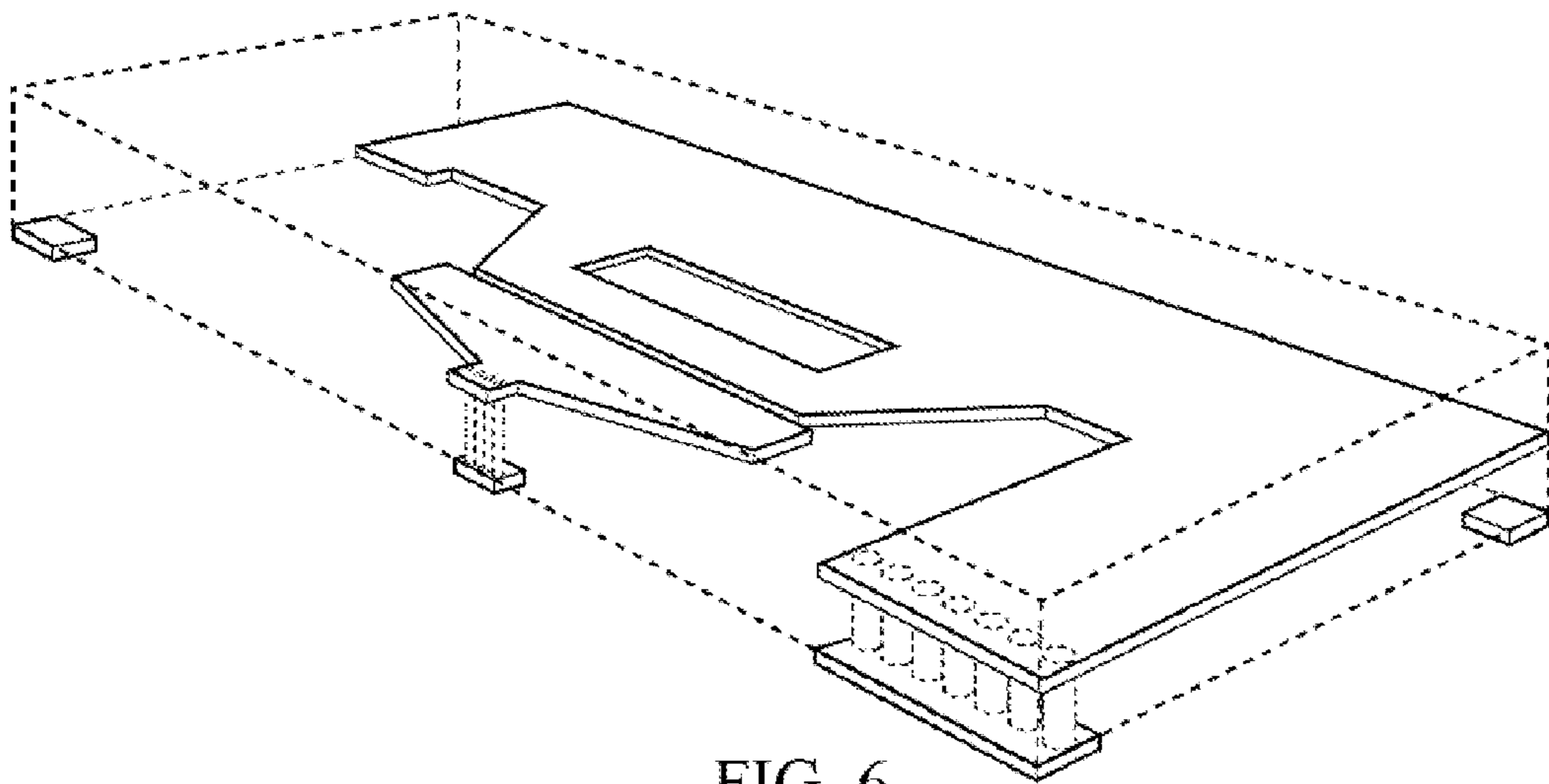


FIG. 6

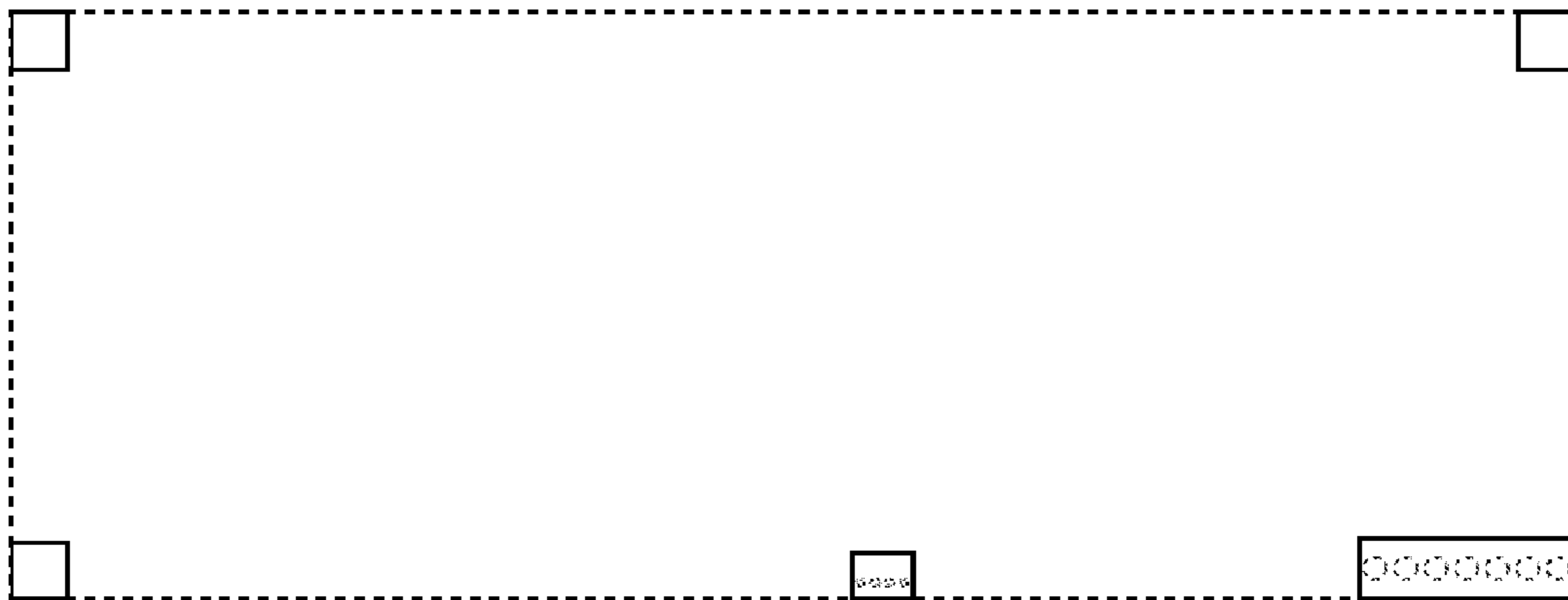


FIG. 7