US00D822625S

(12) United States Design Patent

Tamura et al.

(10) Patent No.: US D822,625 S
(45) Date of Patent: ** Jul. 10, 2018

(54) **FIN FOR HEAT EXCHANGER**

(71) Applicant: **SHOWA DENKO K.K.**, Tokyo (JP)

(72) Inventors: **Shinobu Tamura**, Tokyo (JP); **Takayuki Matsuzawa**, Tokyo (JP)

(73) Assignee: **SHOWA DENKO K.K.**, Tokyo (JP)

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

(21) Appl. No.: **29/582,196**

(22) Filed: **Oct. 26, 2016**

(30) **Foreign Application Priority Data**

Apr. 26, 2016 (JP) D2016-009149
Apr. 26, 2016 (JP) D2016-009150

(51) **LOC (11) Cl.** **13-03**

(52) **U.S. Cl.**
USPC **D13/179**

(58) **Field of Classification Search**
USPC D13/179, 145, 184
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

D268,666 S * 4/1983 Moore D13/179
5,253,702 A * 10/1993 Davidson F28D 15/0233 165/104.14

(Continued)

OTHER PUBLICATIONS

The American Society of Mechanical Engineers, "Effect of Tube Location Change on Heat Transfer Characteristics of Plain Plate Fin-and-Tube Heat Exchangers " by Jixiang Yin, Zeming He, Fuqiang Chen and Jianzong Ma. Published Nov. 15, 2013. (http://thermalscienceapplication.asmedigitalcollection.asme.org/article.aspx?articleid=1727069).*

(Continued)

Primary Examiner — Jennifer Rivard
Assistant Examiner — April Rivas
(74) *Attorney, Agent, or Firm* — Mori & Ward, LLP

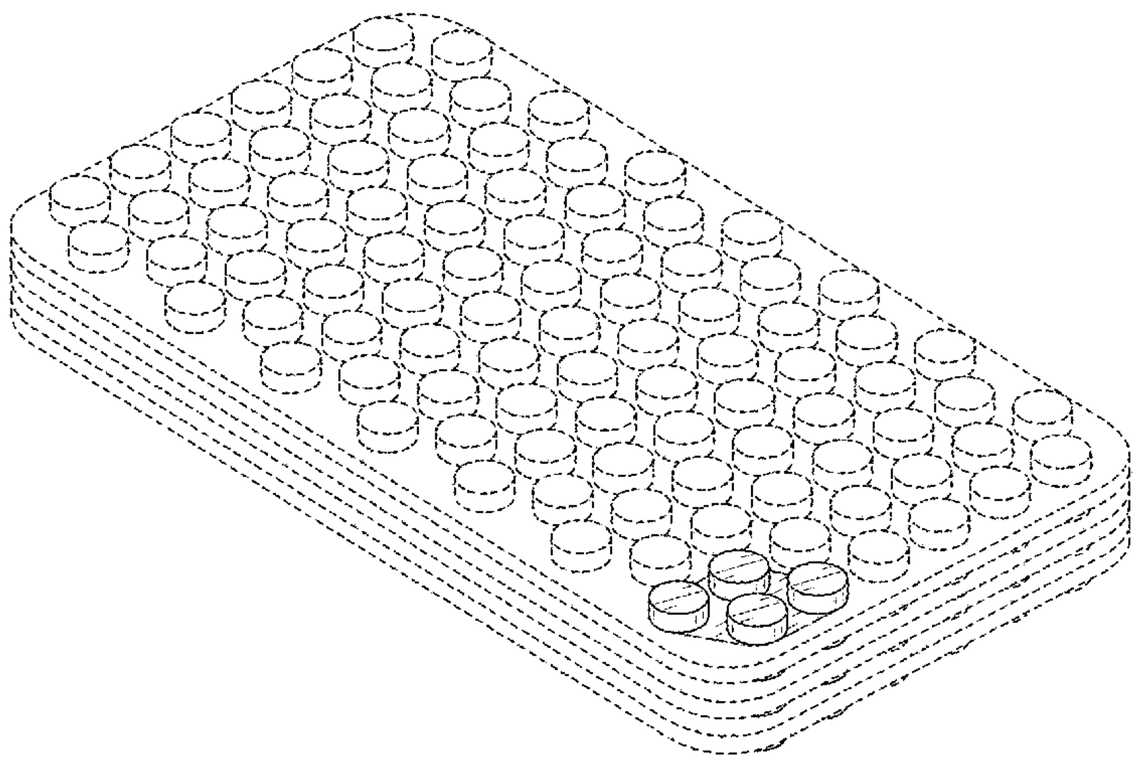
(57) **CLAIM**

The ornamental design for a fin for heat exchanger, as shown and described.

DESCRIPTION

FIG. **1** is a top and right front perspective view of a first embodiment of fin for heat exchanger, showing our design;
FIG. **2** is a front elevational view of the first embodiment;
FIG. **3** is a rear elevational view of the first embodiment;
FIG. **4** is a top plan view of the first embodiment;
FIG. **5** is a bottom elevational view of the first embodiment;
FIG. **6** is a right side elevational view of the first embodiment;
FIG. **7** is a left side elevational view of the first embodiment;
FIG. **8** is an enlarged cross-sectional view of the first embodiment taken along line **8-8** in FIG. **4**;
FIG. **9** is a top and right front perspective view of a second embodiment of fin for heat exchanger, showing our design;
FIG. **10** is a front elevational view of the second embodiment;
FIG. **11** is a rear elevational view of the second embodiment;
FIG. **12** is a top plan view of the second embodiment;
FIG. **13** is a bottom elevational view of the second embodiment;
FIG. **14** is a right side elevational view of the second embodiment;
FIG. **15** is a left side elevational view of the second embodiment; and,
FIG. **16** is an enlarged cross-sectional view of the second embodiment taken along line **16-16** in FIG. **12**.
Portions of the disclosure shown in broken lines form no part of the claimed design.

1 Claim, 12 Drawing Sheets



(58) **Field of Classification Search**
CPC . F28D 15/0275; F28D 21/0003; F02M 26/32; F28F 1/025; F28F 3/022; F28F 21/00
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

D356,067	S *	3/1995	Itoh	D13/179
5,655,600	A *	8/1997	Dewar	F28D 9/0062 165/166
5,832,992	A *	11/1998	Van Andel	B23P 15/26 165/164
5,941,302	A *	8/1999	Hattori	C04B 35/584 165/151
D478,055	S *	8/2003	Jing	D13/179
6,622,786	B1 *	9/2003	Calmidi	F28F 3/022 165/122
D490,382	S *	5/2004	Dugas	D13/179
7,443,676	B1 *	10/2008	Li	H01L 23/427 165/104.33
D597,497	S *	8/2009	Chen	D13/179
D605,141	S *	12/2009	Jones	D13/179
D662,897	S *	7/2012	Desalis	D13/179
8,579,017	B2 *	11/2013	Chen	H01L 23/427 165/80.3
D699,690	S *	2/2014	Hsu	D13/179
8,881,797	B2 *	11/2014	Melo	F28D 9/0062 165/166
D722,574	S *	2/2015	Mira	D13/179
9,064,852	B1 *	6/2015	Hardesty	H01L 21/4871
9,383,145	B2 *	7/2016	Weber	F28D 15/0266
9,655,287	B1 *	5/2017	Babcock	H05K 7/20809
2002/0029871	A1 *	3/2002	Kern	F28D 1/0478 165/151
2006/0196052	A1 *	9/2006	Lesage	B21D 53/085 29/890.043
2009/0151900	A1 *	6/2009	Huang	H01L 23/3672 165/80.3
2010/0258287	A1 *	10/2010	Chen	H01L 21/4882 165/185
2014/0293541	A1 *	10/2014	Opila	F28D 15/02 361/697
2015/0027669	A1 *	1/2015	Kokas	F28D 15/04 165/104.26
2016/0091260	A1 *	3/2016	Schultz	F28F 3/022 165/185
2016/0102920	A1 *	4/2016	Zaghlol	F28D 15/02 165/104.21
2016/0313067	A1 *	10/2016	Shieh	F28D 15/0275

OTHER PUBLICATIONS

Thermopedia, "Extended Surface Heat Transfer" by Ramesh Shah, Article added Feb. 2, 2011. (http://www.thermopedia.com/content/750/).*

Science Direct, "Thermal and hydraulic performance of finned-tube heat exchangers under different flow ranges: A review on modeling and experiment" by Arafat A. Bhuiyan, A.K.M. Sadrul Islam, Published originally Oct. 2016. (http://www.sciencedirect.com/science/article/pii/S001793101630134X).*

Reserch Gate, "Three-Dimensional Numerical Investigations on Flow and Heat Transfer for Flow Past a Channel " by Pratish P Patil and Shaligram Tiwari, Published May 2010. (https://www.researchgate.net/figure/236009504_fig1_Figure-1-Schematic-of-a-fin-tube-heat-exchanger).*

* cited by examiner

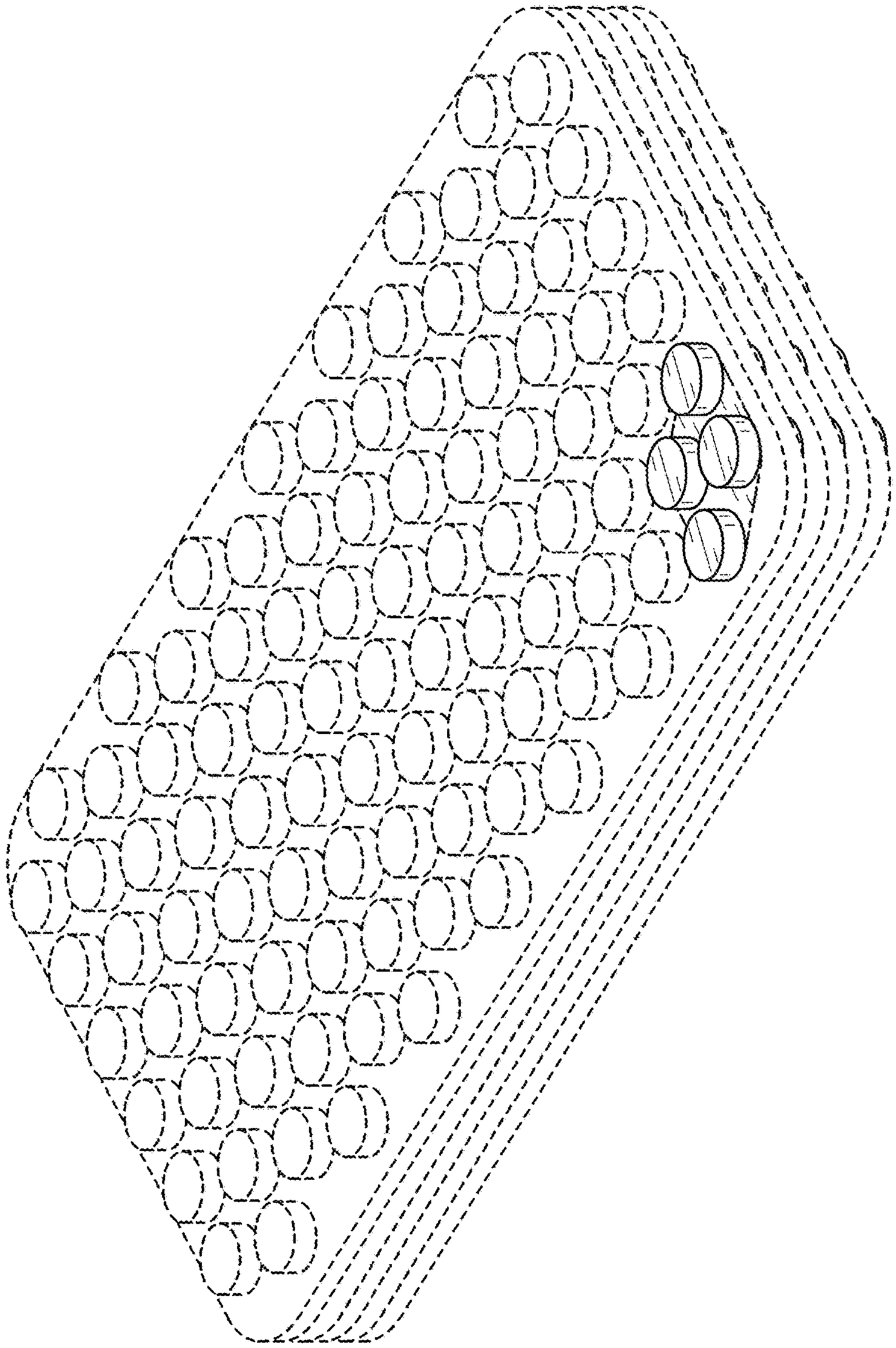


FIG. 1

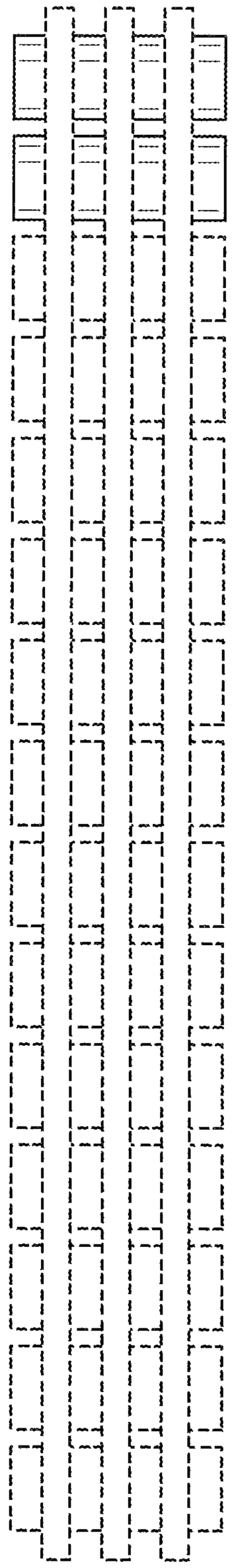


FIG. 2

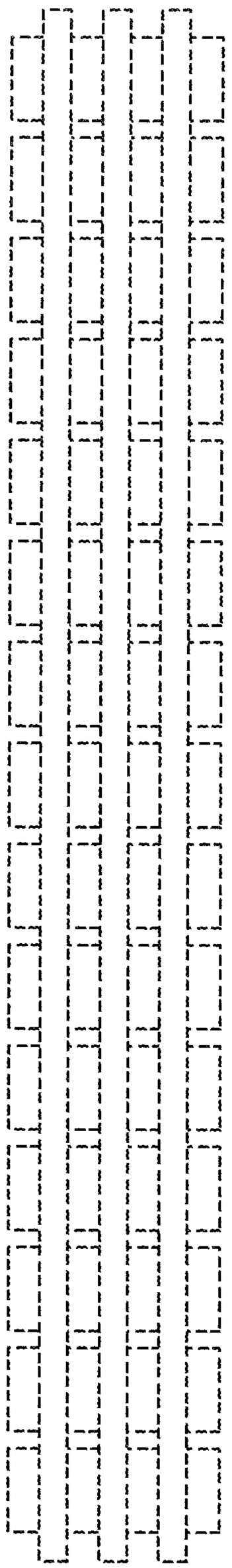


FIG. 3

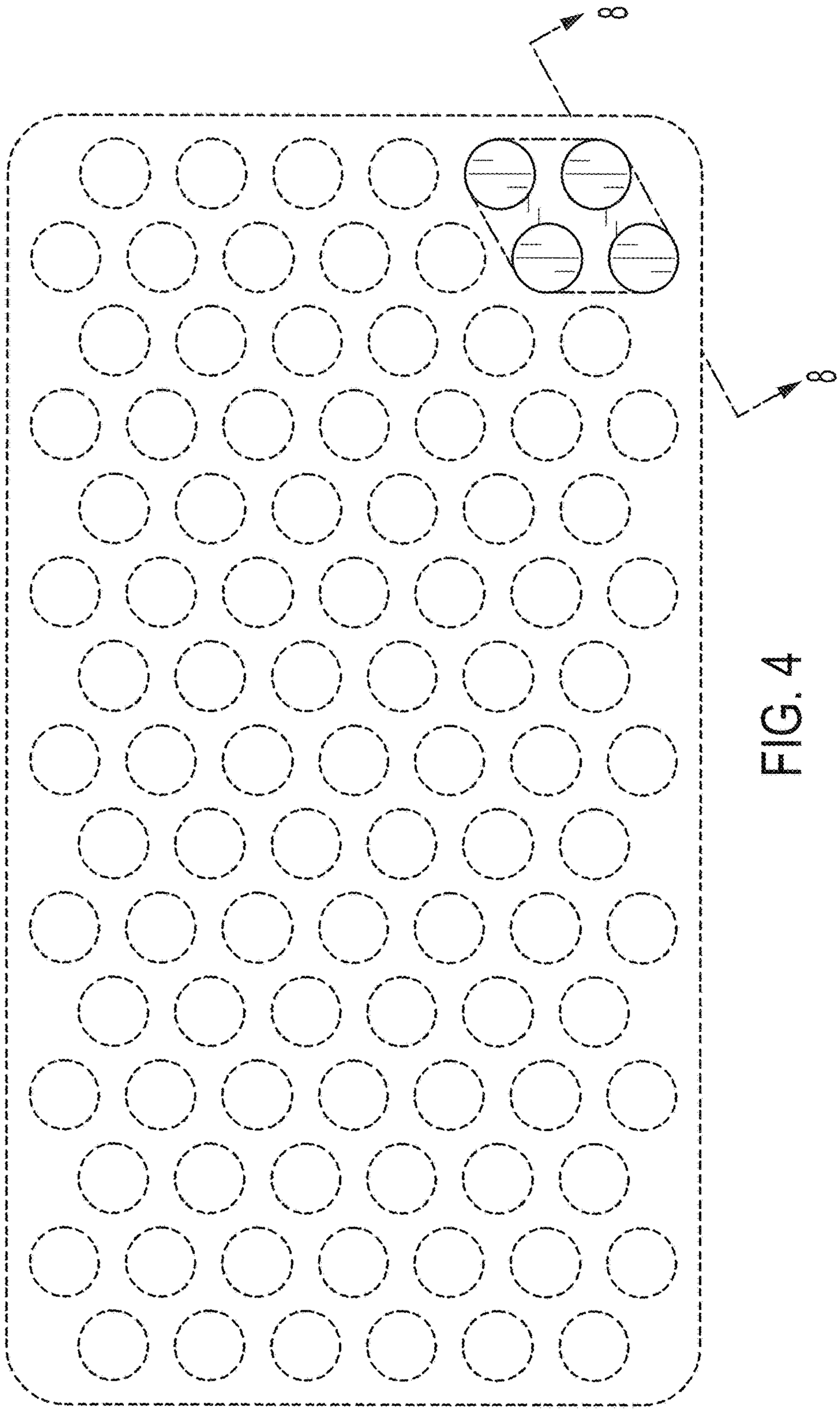


FIG. 4

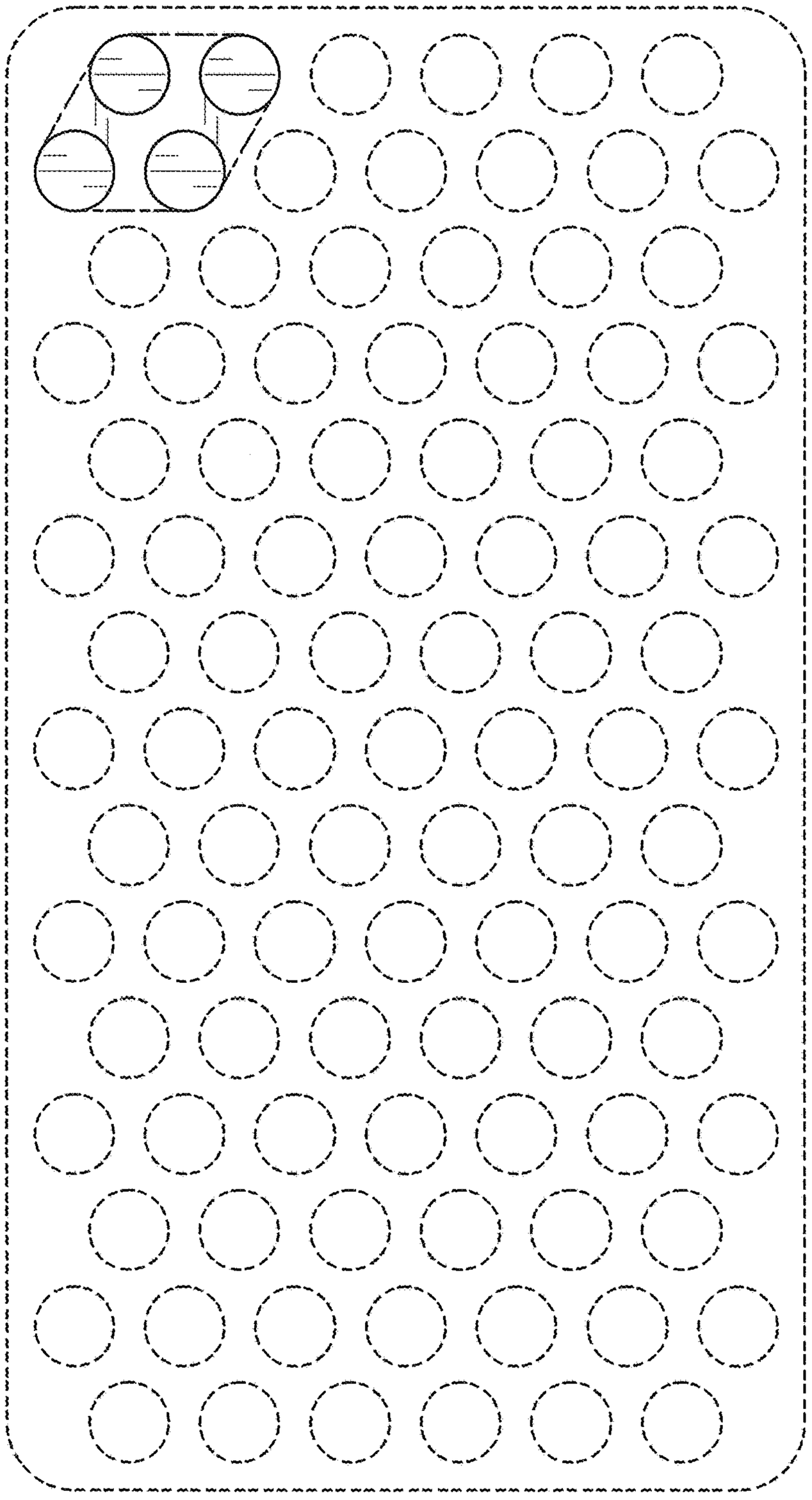


FIG. 5

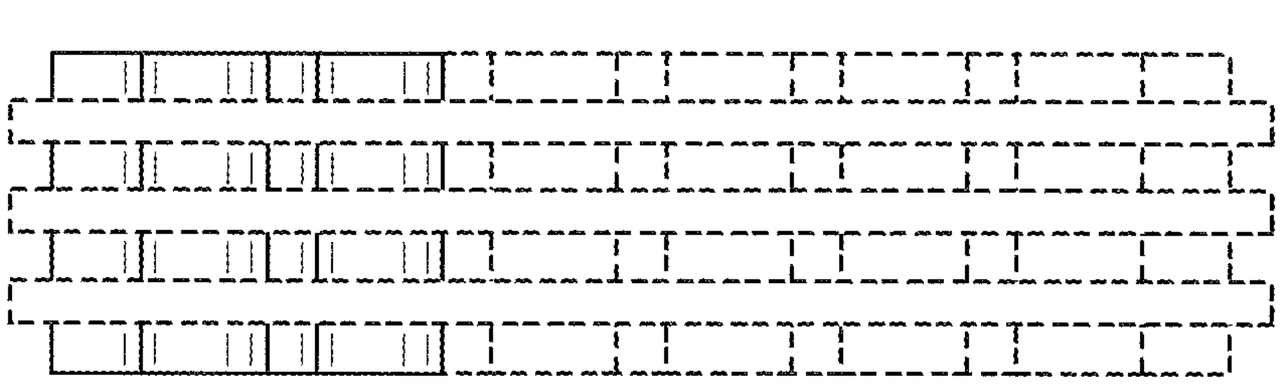


FIG. 6

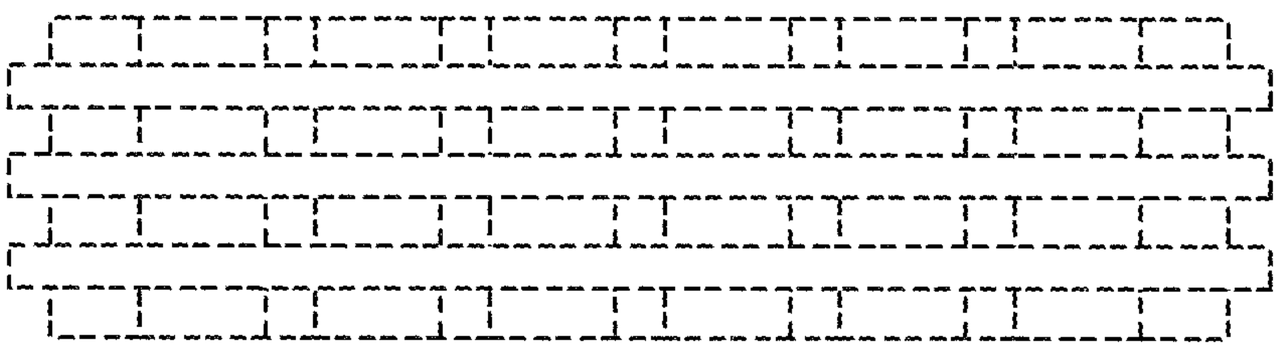


FIG. 7

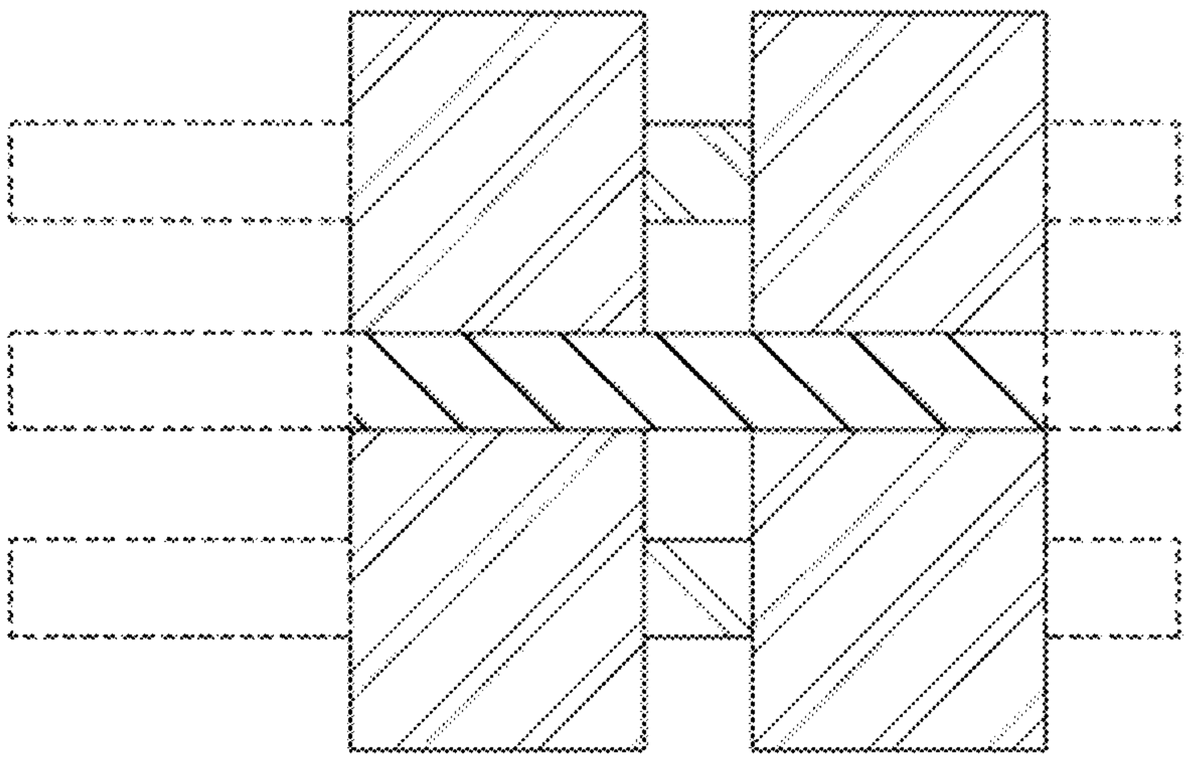


FIG. 8

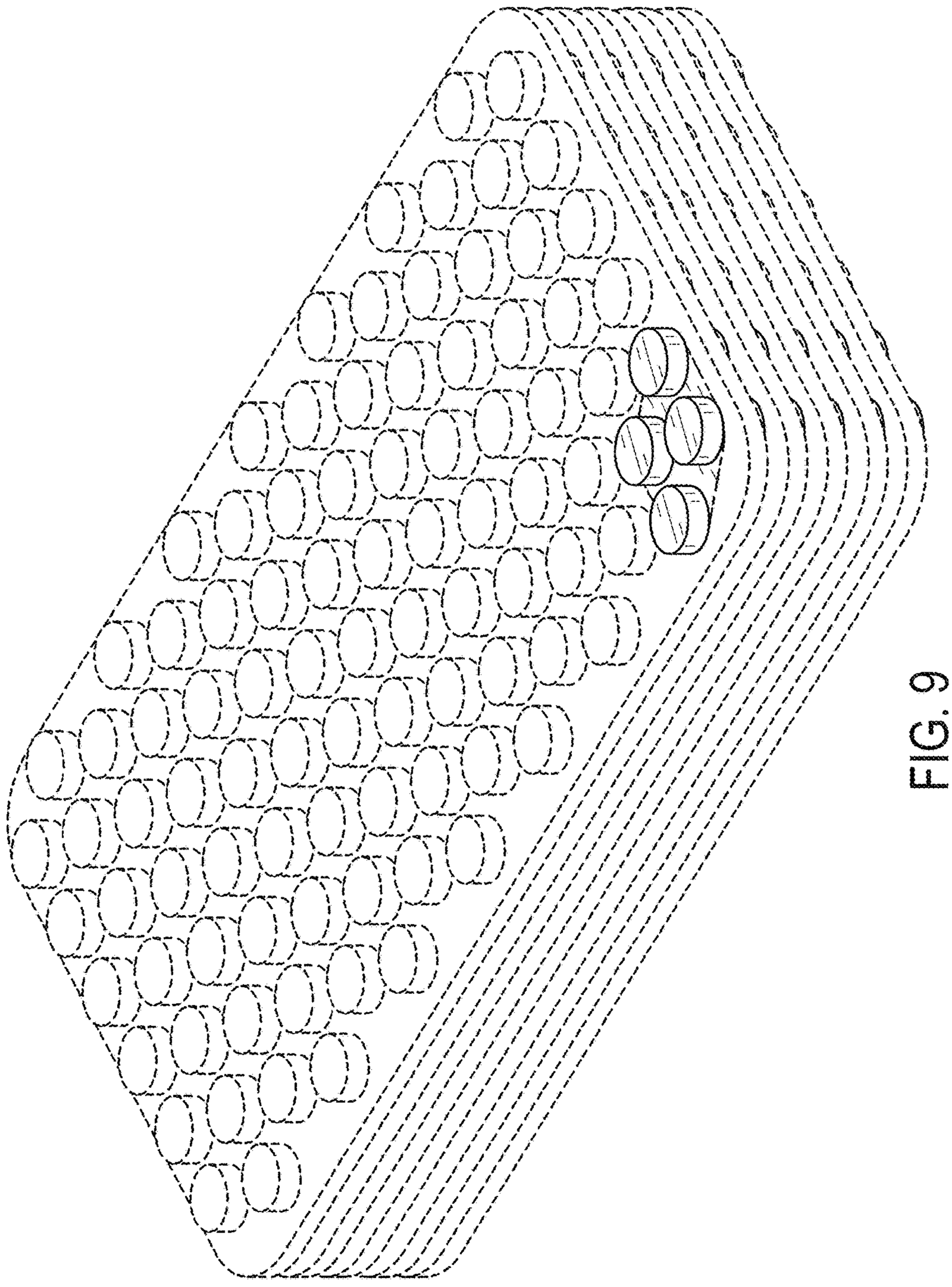


FIG. 9

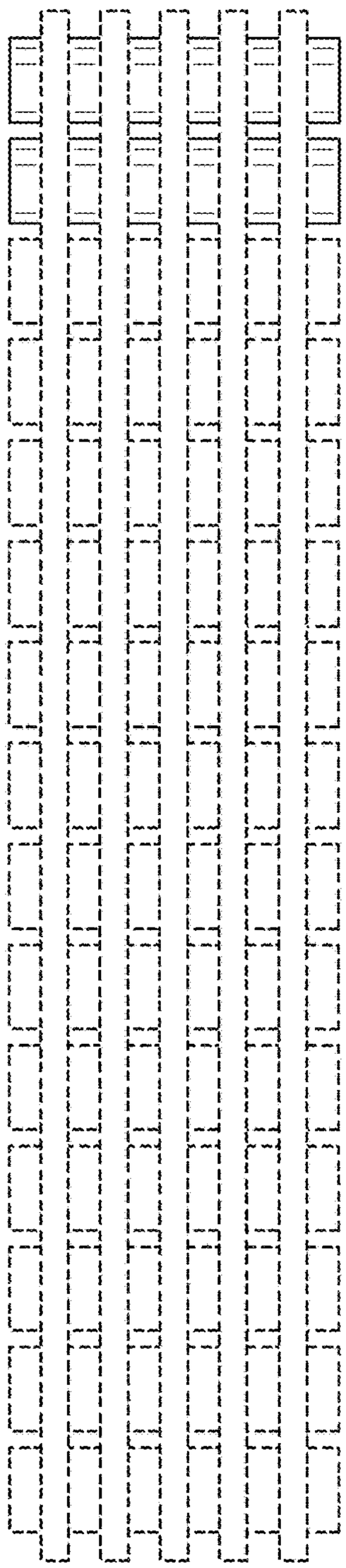


FIG. 10

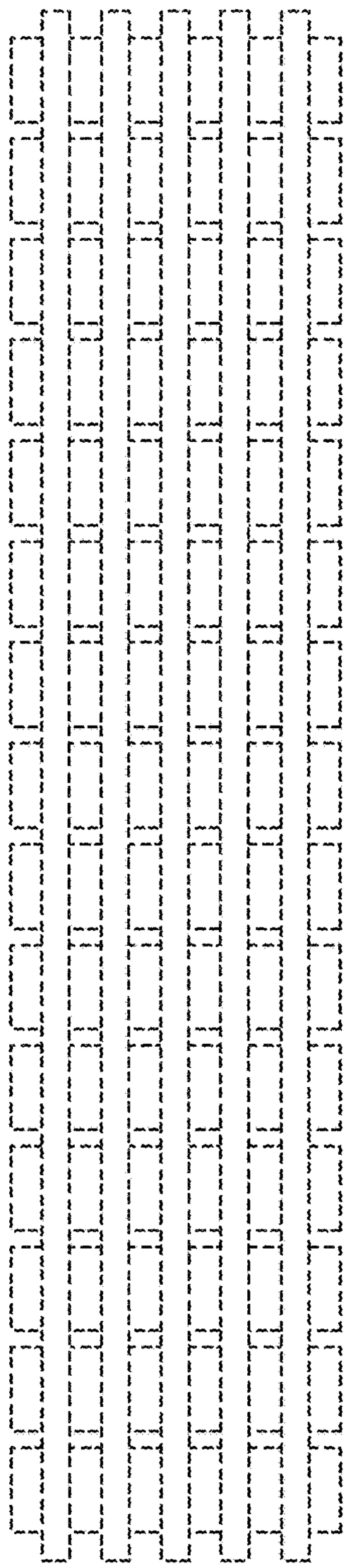


FIG. 11

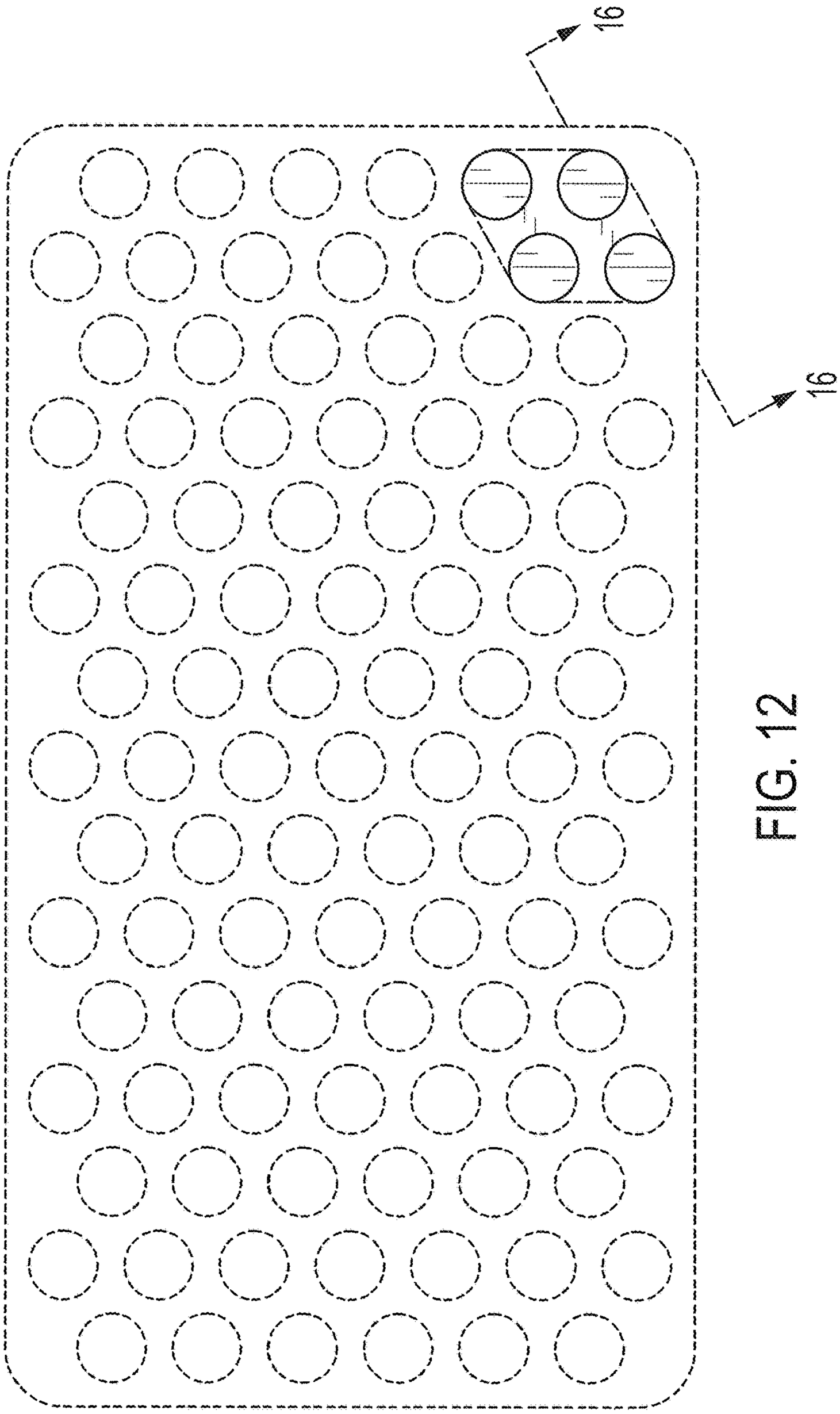


FIG. 12

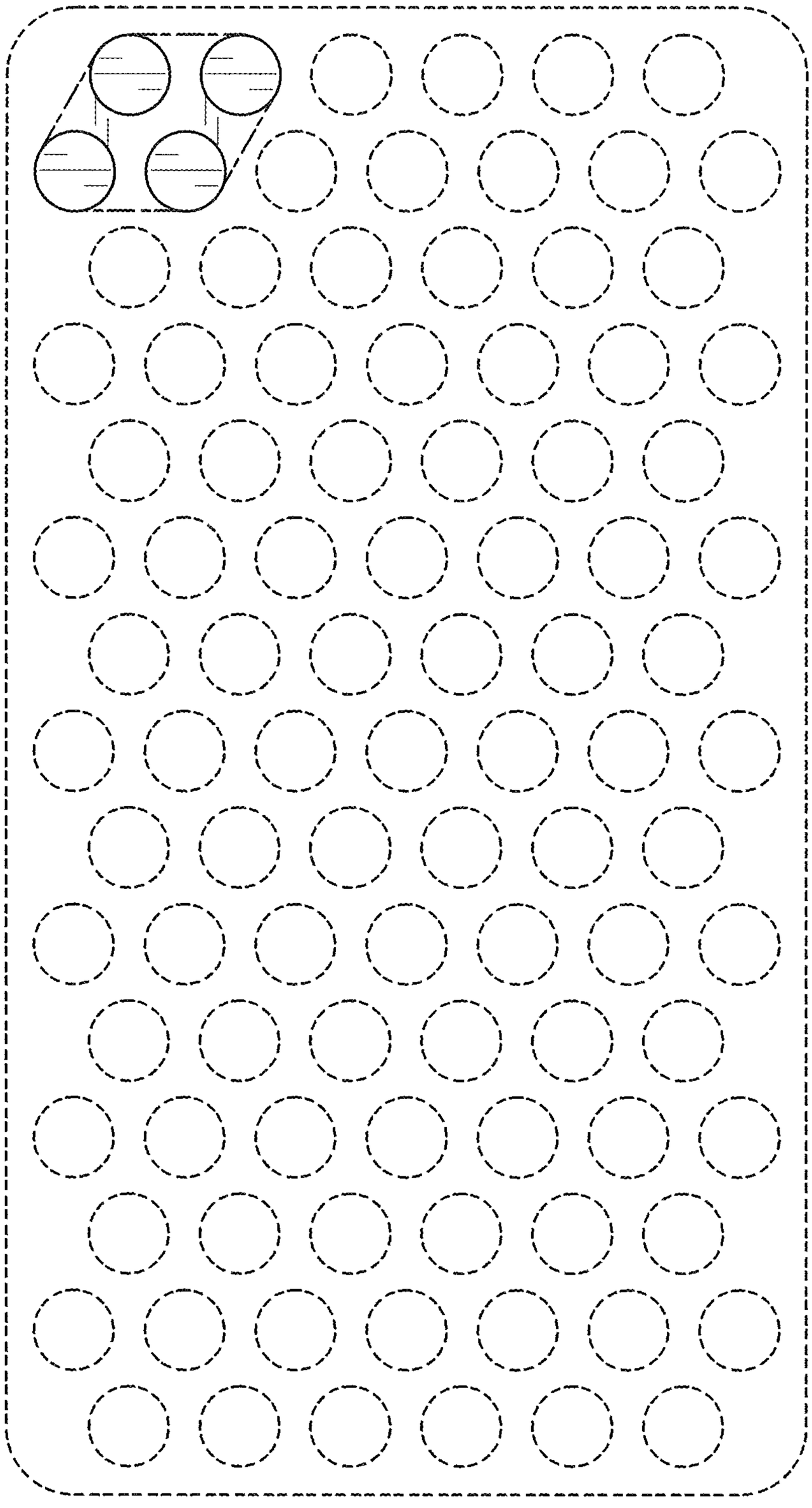


FIG. 13

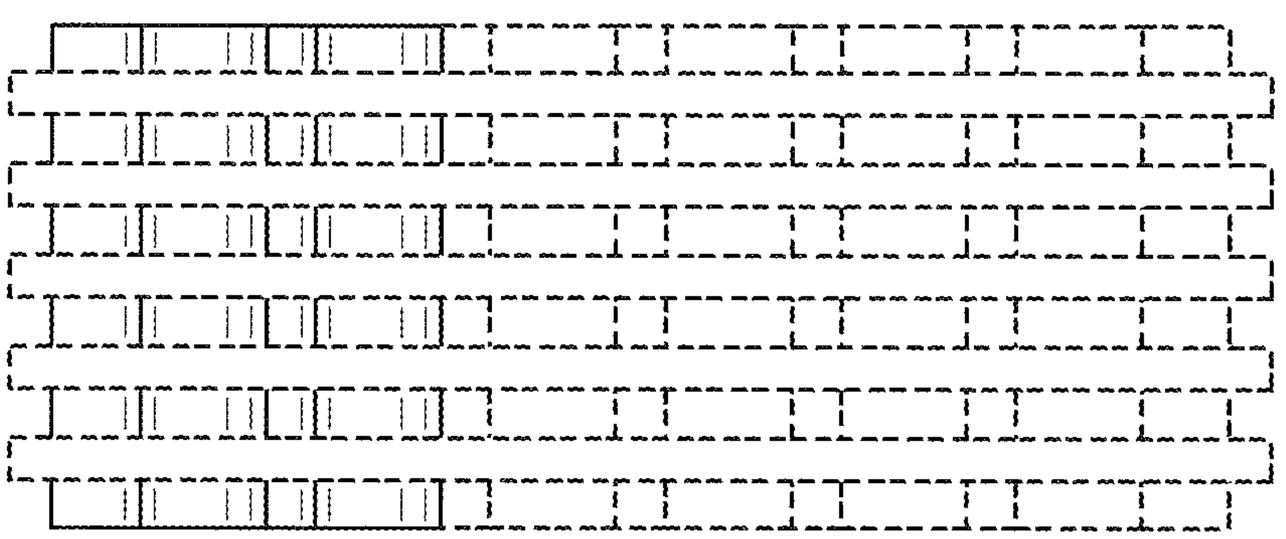


FIG. 14

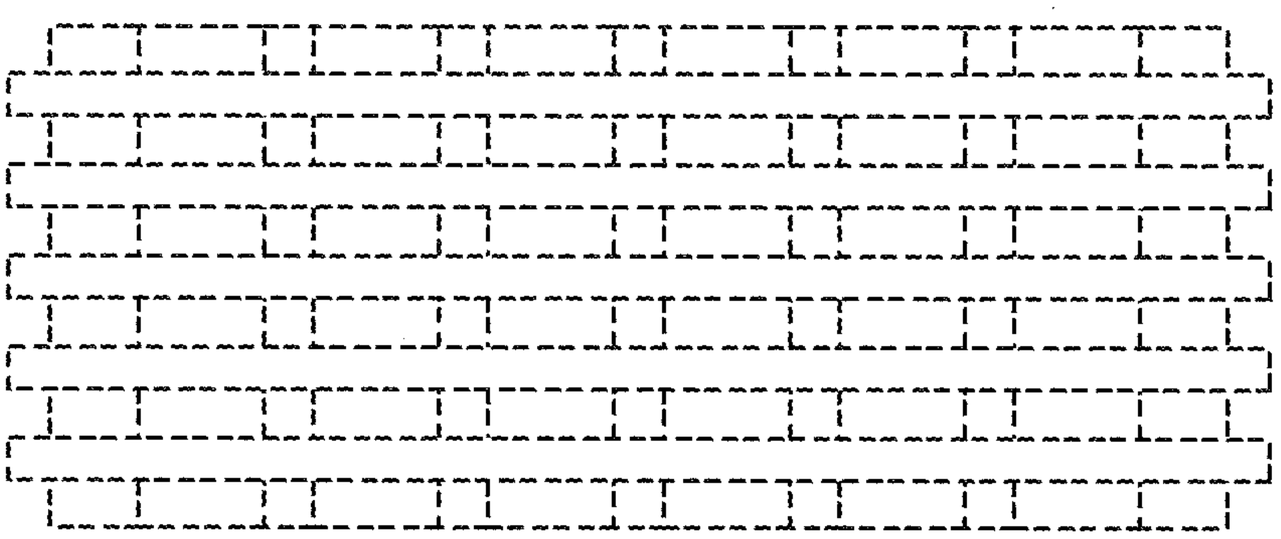


FIG. 15

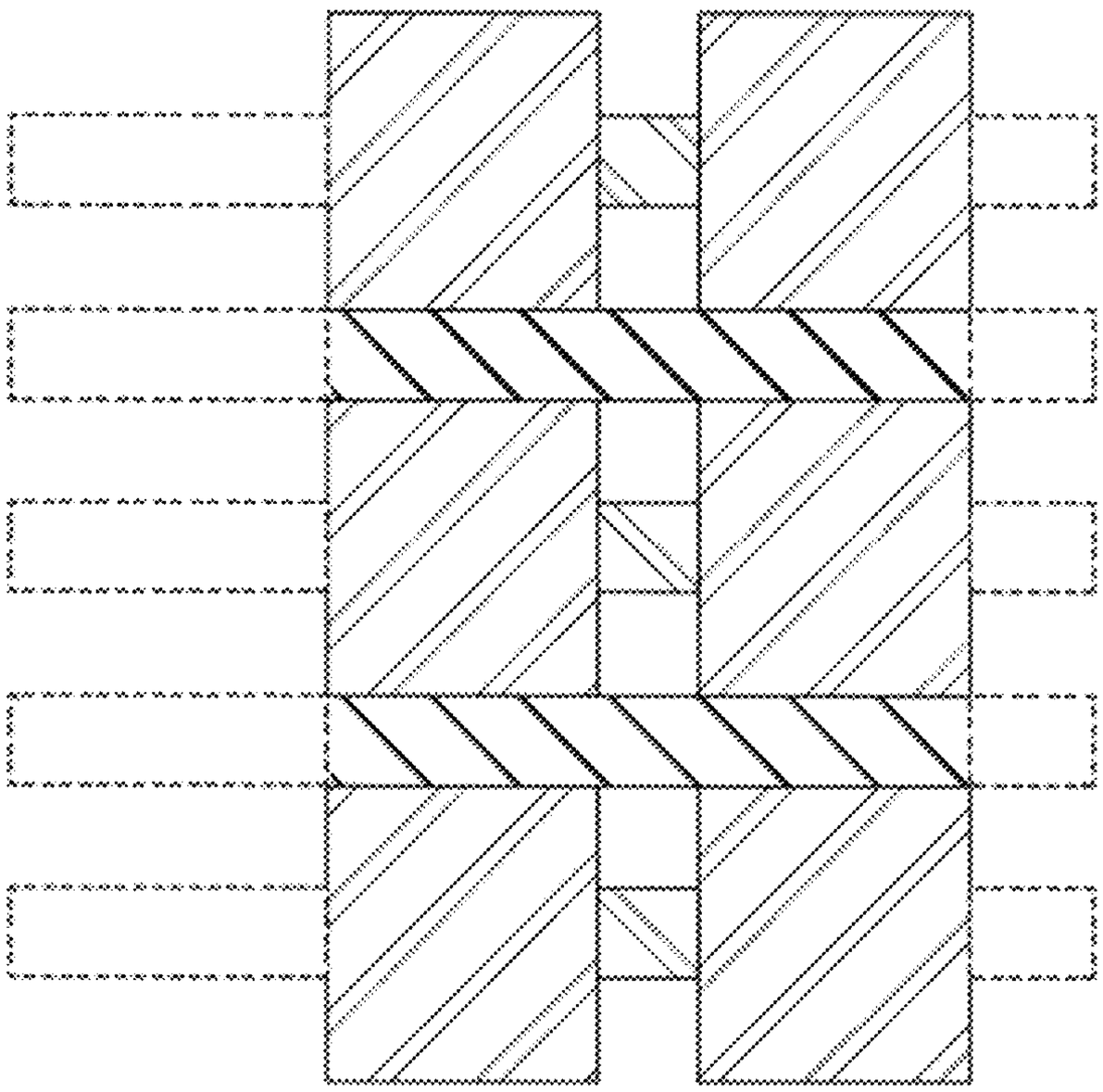


FIG. 16