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

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(54) **FIXTURE FOR DELIVERING 1752 SOLDER COLUMNS ONTO A SUBSTRATE**

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

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(51) **LOC (12) Cl.** **13-03**

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

USPC **D13/182**; D15/144.1

(58) **Field of Classification Search**

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D15/144.2, 199; 439/66, 71, 620.15,
439/620.2

CPC .. H01R 13/66; H01R 13/665; H01R 13/6658;
H01L 23/32; H01L 23/40; H01L 21/00;
H01L 21/02; H01L 21/02002; B23K 3/06;
B23K 3/0607; B23K 37/04; B23K
37/0408; B23K 37/0426; B23K 37/0435;
B23K 37/0461; B23K 37/0623; B23K
37/06; H05K 3/4015

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,705,205 A * 11/1987 Allen B23K 3/06
228/180.22
4,712,721 A * 12/1987 Noel B23K 3/06
228/180.22
4,842,184 A * 6/1989 Miller, Jr. B23K 3/06
228/180.1
5,029,748 A * 7/1991 Lauterbach B23K 3/087
228/180.1

5,040,717 A * 8/1991 McGaffigan B23K 3/06
228/248.1
5,497,938 A * 3/1996 McMahon B23K 3/0623
228/253
5,626,278 A * 5/1997 Tang B23K 3/0607
228/246
5,695,109 A * 12/1997 Chiang B23K 35/0222
101/127
D421,968 S * 3/2000 Matsumura D13/147
D426,522 S * 6/2000 Matsumura D13/147
D432,504 S * 10/2000 Matsumura D13/182

(Continued)

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(57) **CLAIM**

The ornamental design for a fixture for delivering 1752 solder columns onto a substrate, as shown and described.

DESCRIPTION

FIG. 1 is a top perspective view of a fixture for delivering 1752 solder columns onto a substrate, showing my new design;

FIG. 2 is a bottom perspective view thereof;

FIG. 3 is a top view thereof;

FIG. 4 is a bottom view thereof;

FIG. 5 is a left side view thereof;

FIG. 6 is a right side view thereof;

FIG. 7 is a front side view thereof;

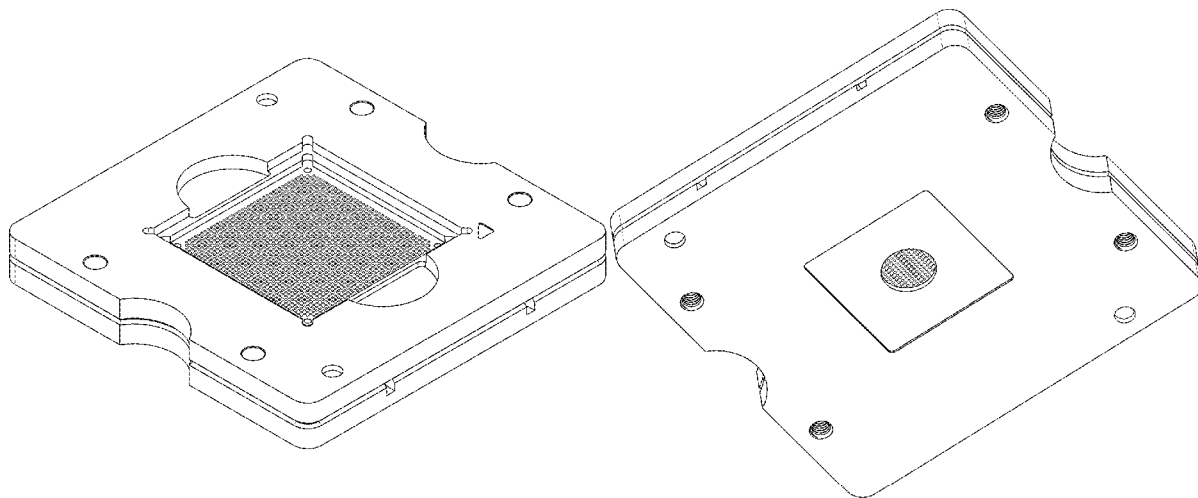
FIG. 8 is a rear side view thereof;

FIG. 9 is a top exploded perspective view thereof;

FIG. 10 is a bottom exploded perspective view thereof; and, FIG. 11 is a bottom view of the top plate of the fixture for delivering 1752 solder columns onto a substrate, shown separately for ease of illustration.

The broken lines shown in the drawings represent portions of the fixture for delivering 1752 solder columns onto a substrate that form no part of the claimed design.

1 Claim, 9 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,276,596	B1 *	8/2001	Gruber	B23K 3/0638 228/225
6,296,173	B2 *	10/2001	Davis	B23K 3/0623 228/180.22
D503,691	S *	4/2005	Standing	H01L 24/63 D13/182
6,955,285	B2 *	10/2005	Nomoto	B23K 3/0607 228/214
8,277,255	B2 *	10/2012	Consoli	H01R 12/7076 439/620.2
9,108,262	B1	8/2015	Hart	
9,629,259	B1	4/2017	Hart	
D808,350	S	1/2018	Hart	

* cited by examiner

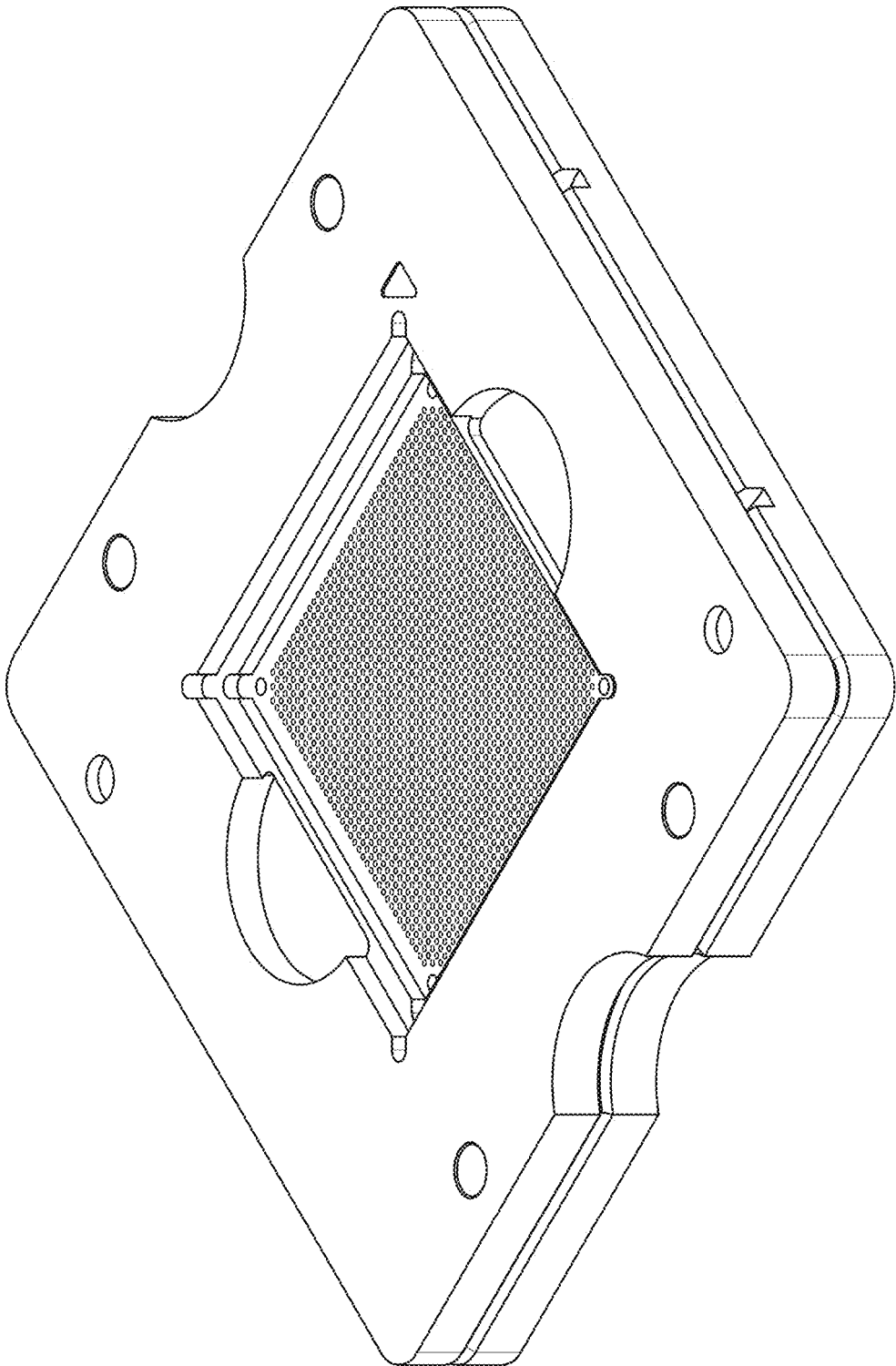


FIG. 1

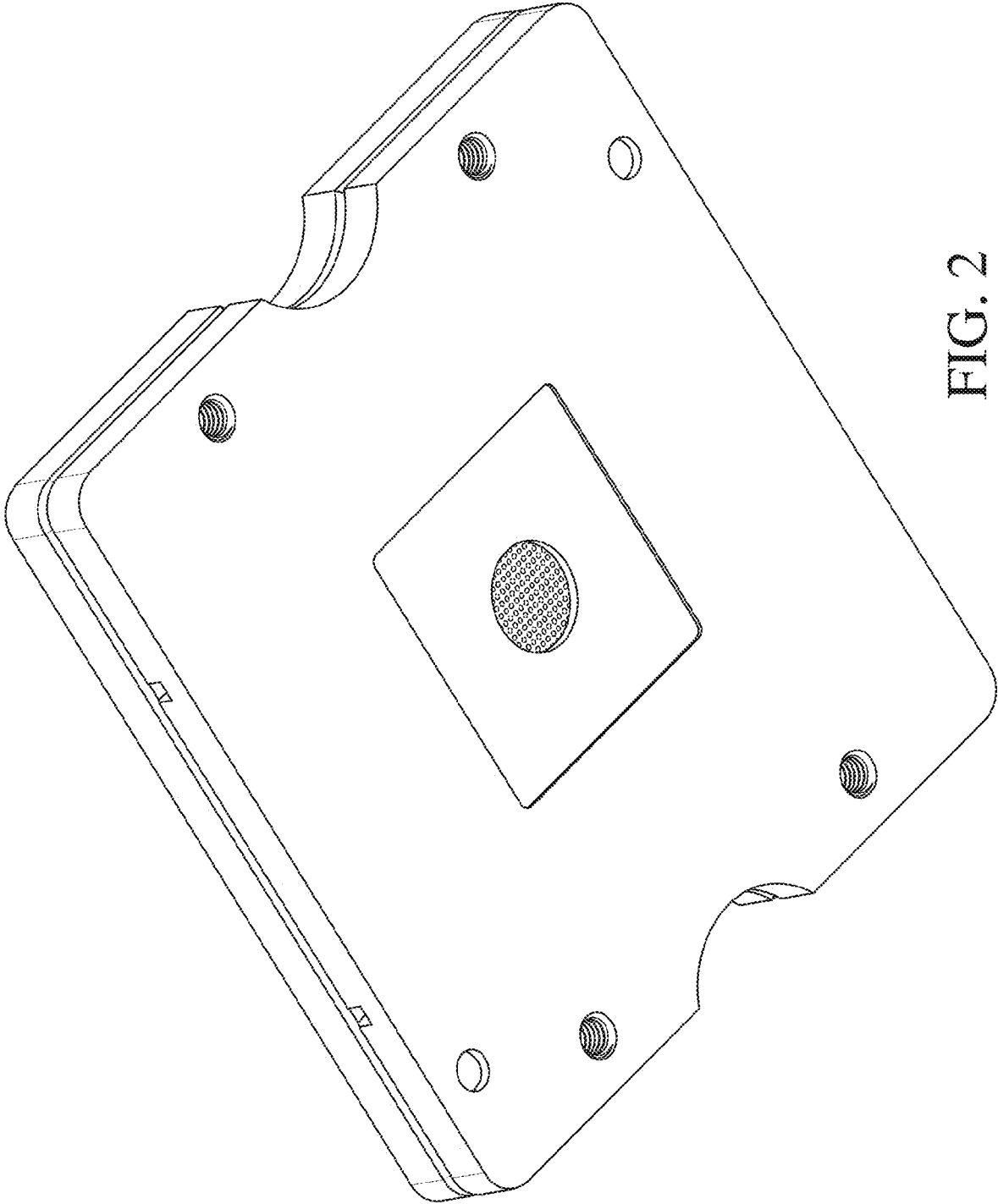


FIG. 2

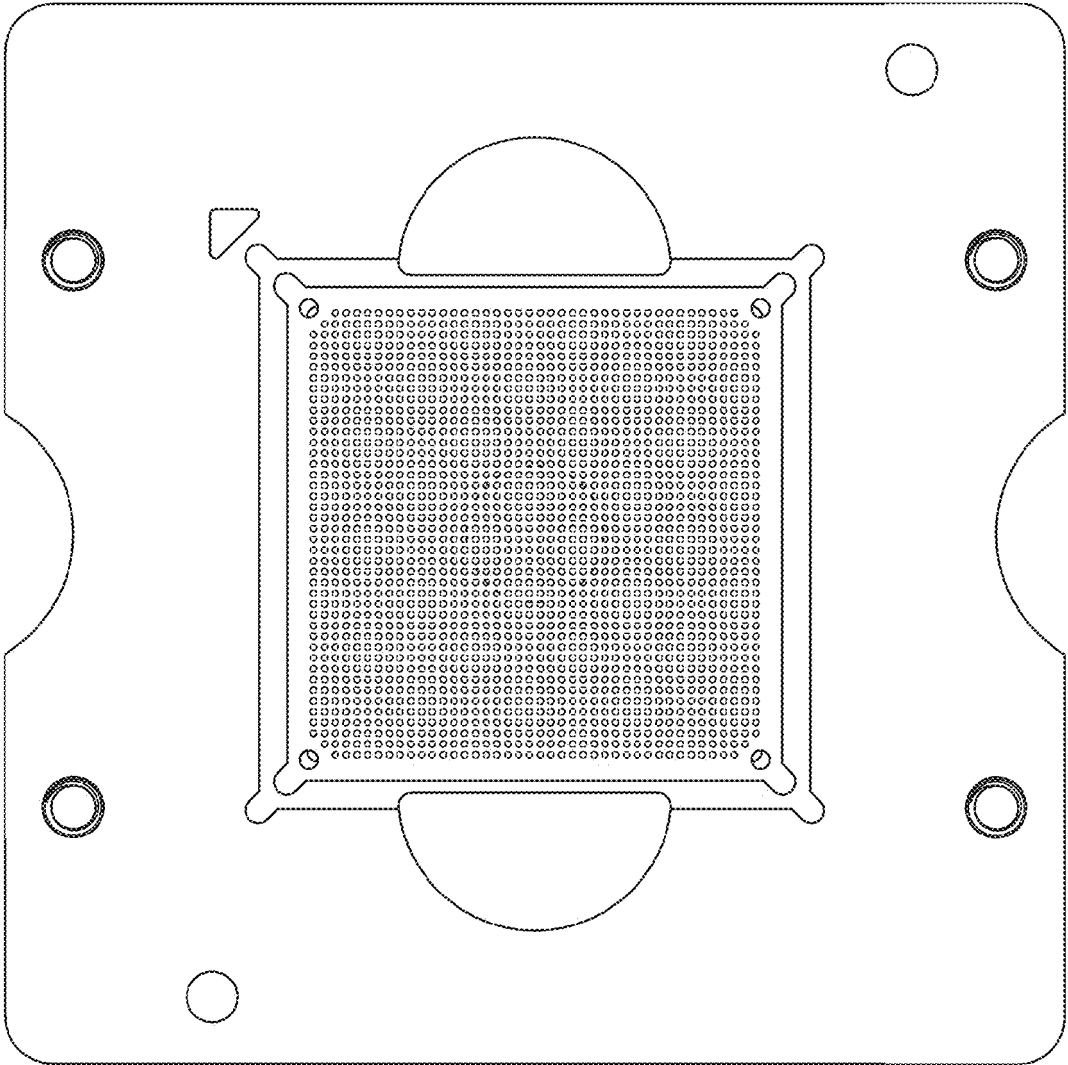


FIG. 3

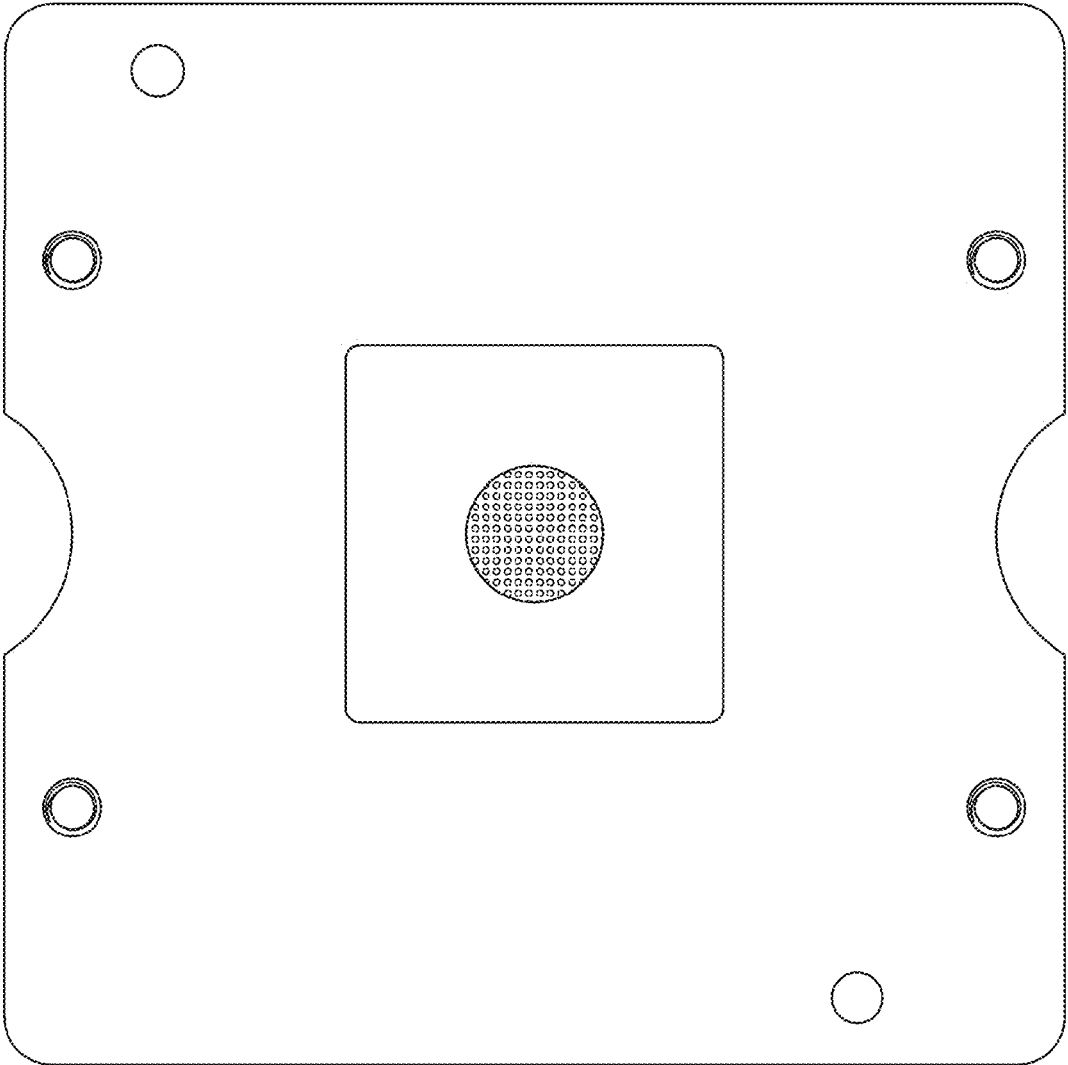


FIG. 4

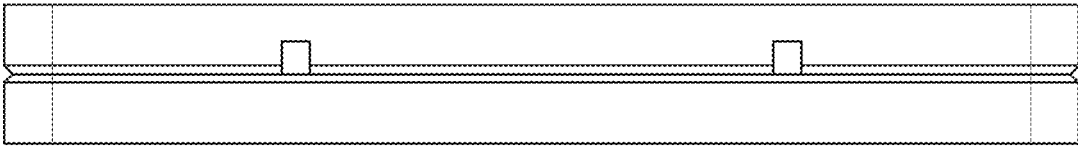


FIG. 6

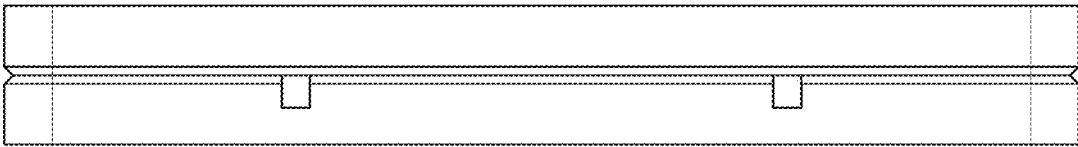


FIG. 5

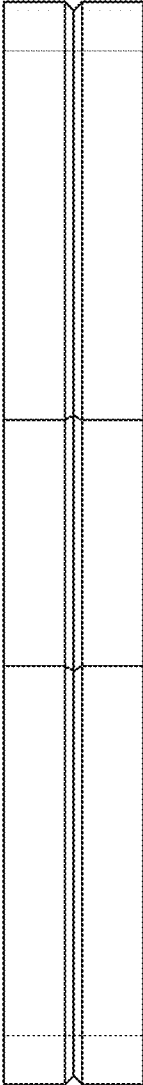


FIG. 7

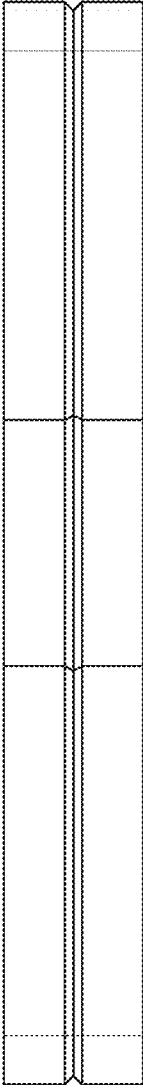


FIG. 8

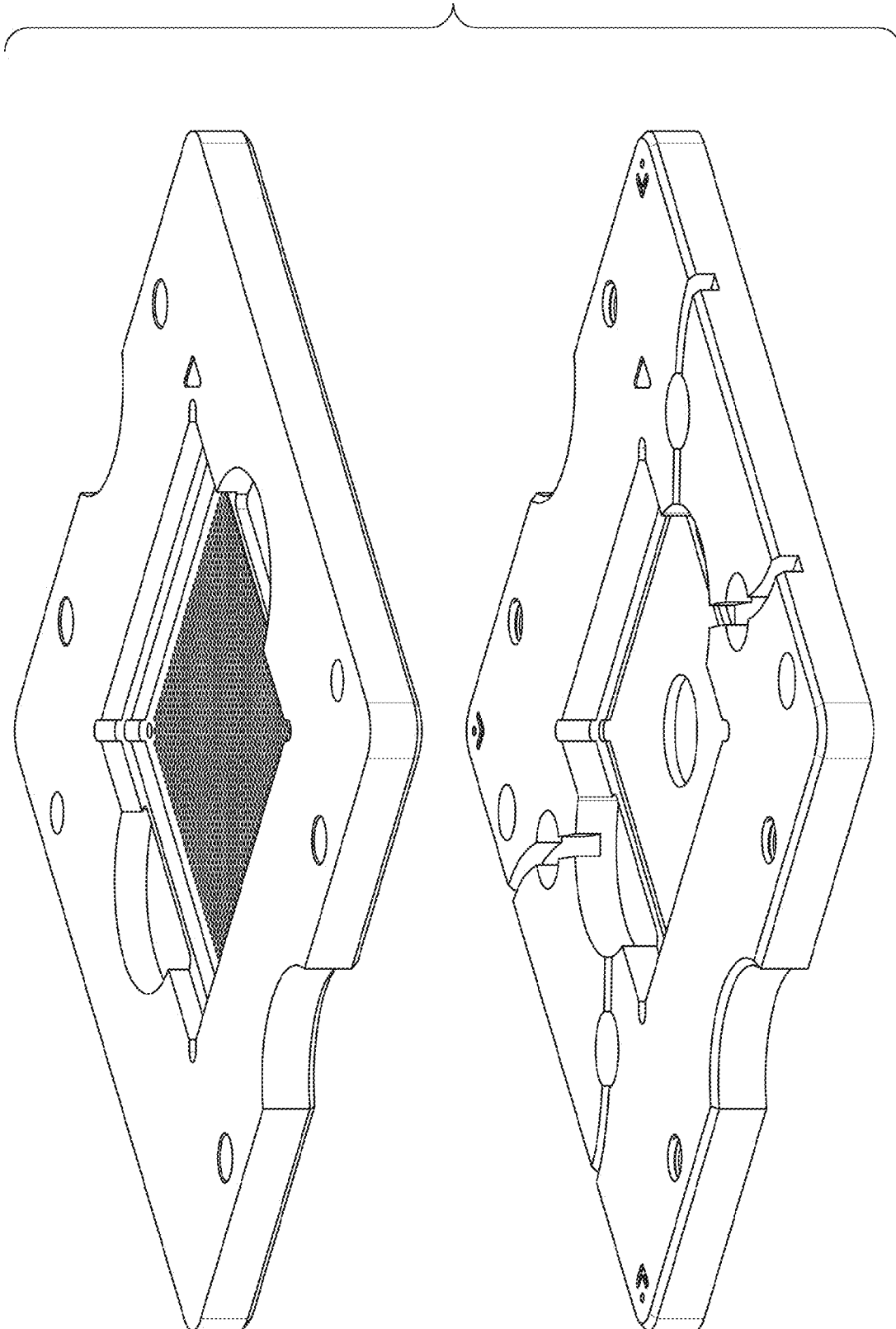


FIG. 9

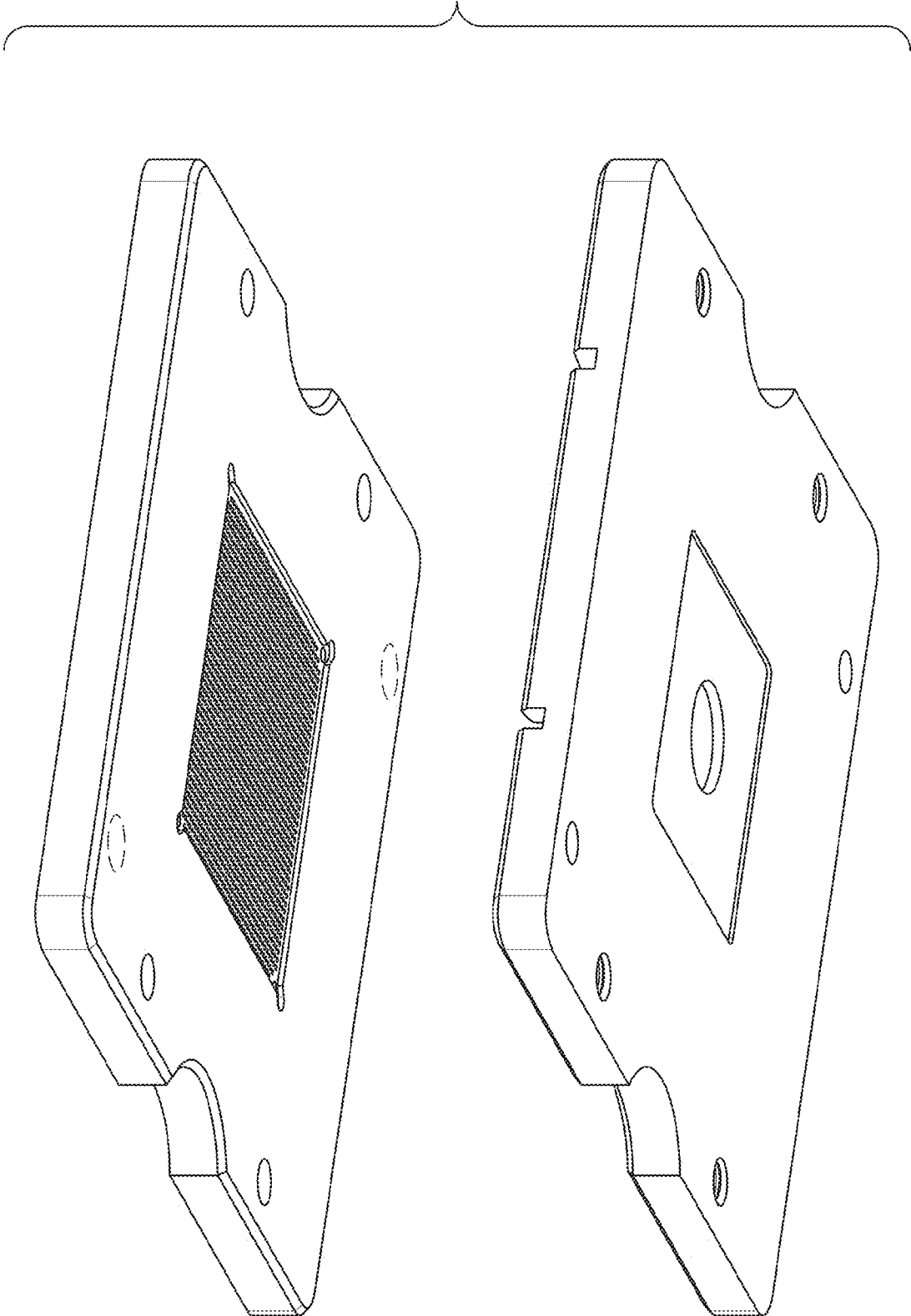


FIG. 10

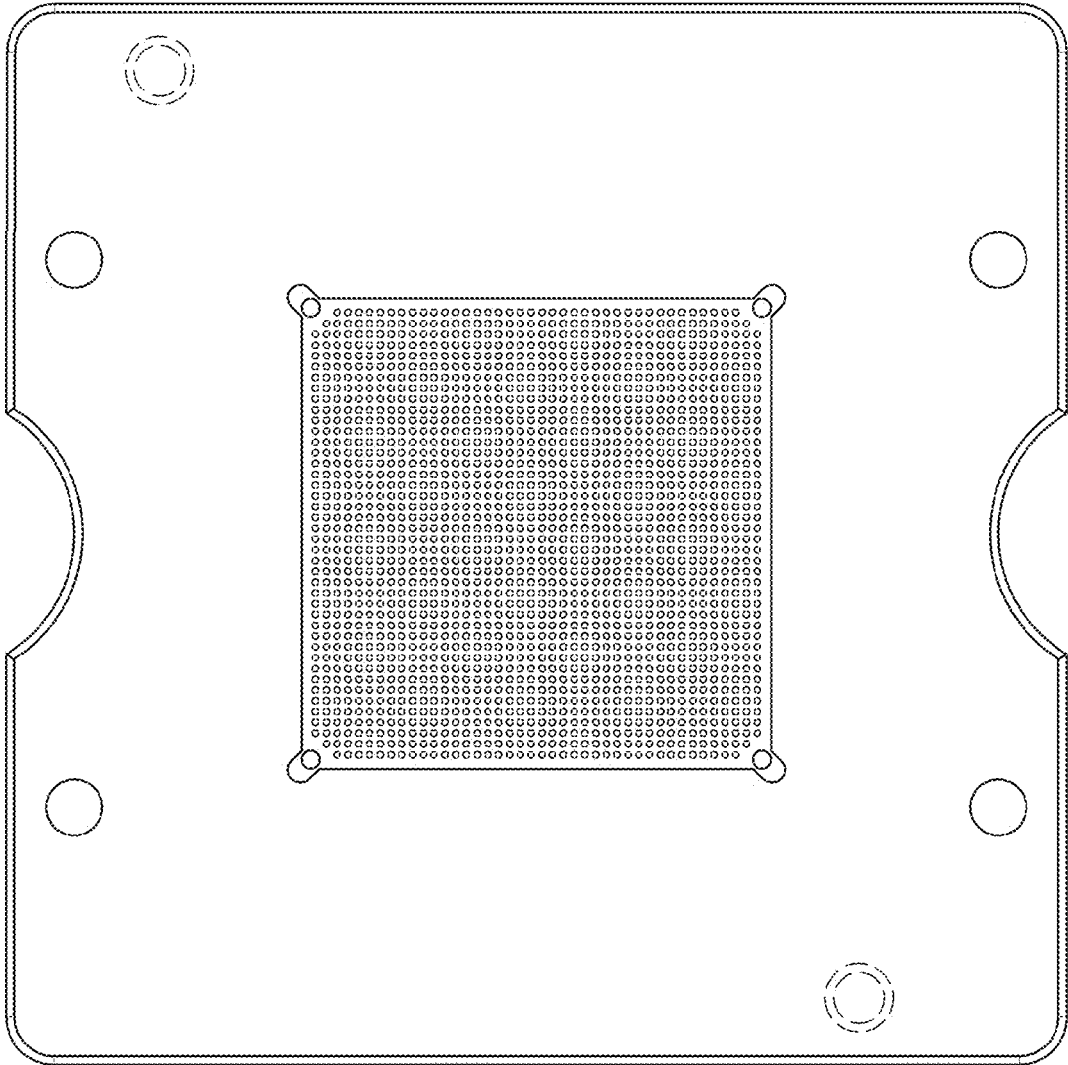


FIG. 11