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

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(54) **PACKAGED SEMICONDUCTOR MODULE**

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

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(30) **Foreign Application Priority Data**

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(52) **U.S. Cl.**
USPC **D13/182**

(58) **Field of Classification Search**
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CPC H01L 21/00; H01L 21/02; H01L 21/4814; H01L 21/4846; H01L 21/4871; H01L 21/67144; H01L 2224/42; H01L 2224/43; H01L 2224/01; H01L 2224/08055; H01L 2224/08054; H01L 23/12; H01L 23/13; H01L 23/14; H01L 23/147; H01L 23/00; H01L 23/48; H01L 23/4926; H01L 23/495; H01L 23/49517; H01L 23/498; H01L 23/49805; H01L 23/49811; H01L 23/49861; H01L 23/49866; H01L 23/49872; H01L 23/49575; H01L 23/49579; H01L 2924/171; H01L 2924/1711; H01L 2924/1715; H01L 2924/181; H01L 2924/1811; H01L
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,249,827 A * 5/1966 Schneider H01L 25/074
257/658
4,032,706 A * 6/1977 Paletto H01L 23/49568
174/530

(Continued)

FOREIGN PATENT DOCUMENTS

JP 2017-5165 A 1/2017

OTHER PUBLICATIONS

5pcs IRF1405 IRF 1405 Power MOSFET Transistor TO-220AB "IR" N Channel 55V 169A ,https://www.ebay.com/itm/5pcs-IRF1405-MOSFET-Transistor-IRF-1405-Power-TO-220AB-IR-N-Channel-55V-169A-/202904191139, Copyright © 1995-2021 eBay Inc. All Rights Reserved, May 9, 2020 (Year: 2020).*

(Continued)

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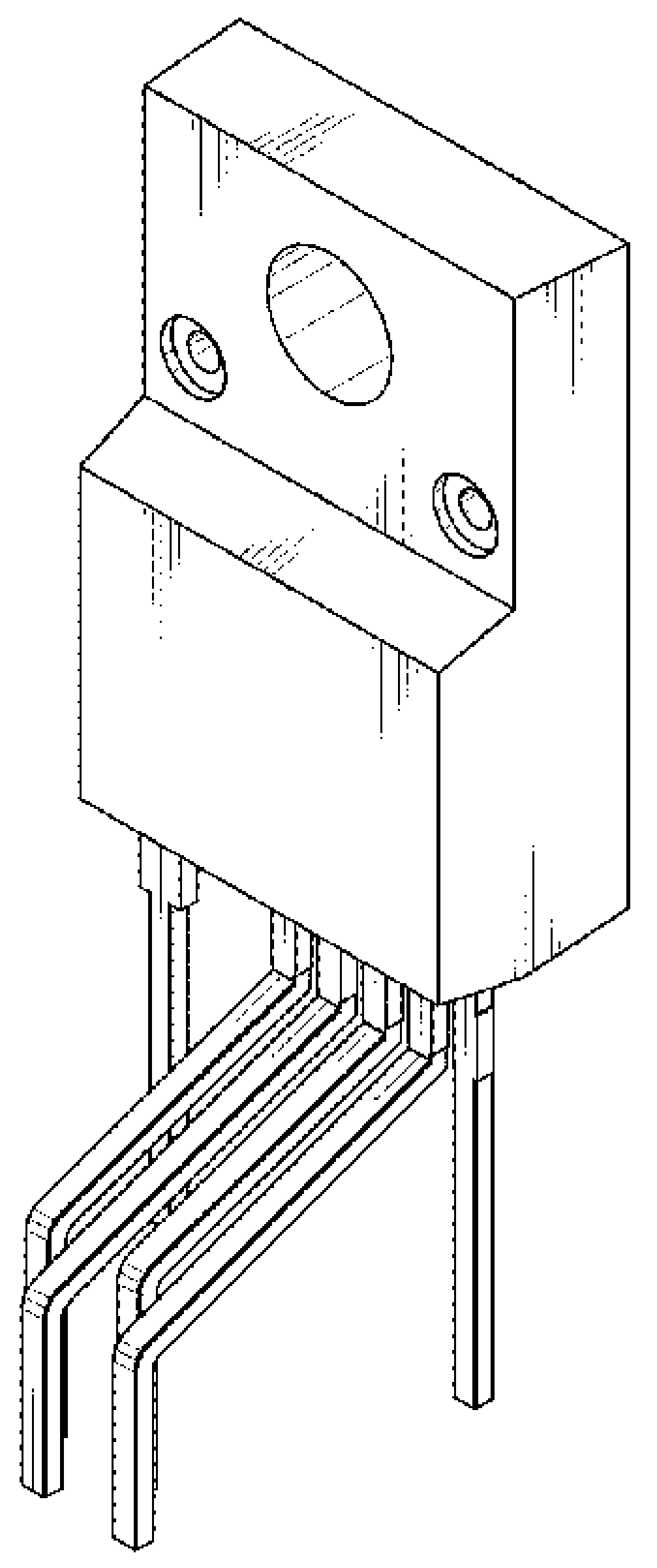
(57) **CLAIM**

The ornamental design for a packaged semiconductor module, as shown and described.

DESCRIPTION

FIG. **1** is a perspective view of a packaged semiconductor module showing our new design;
FIG. **2** is a front view thereof;
FIG. **3** is a rear view thereof;
FIG. **4** is a top plan view thereof;
FIG. **5** is a bottom plan view thereof;
FIG. **6** is a right side view thereof;
FIG. **7** is a left side view thereof;
FIG. **8** is a cross sectional view taken along lines **8-8** in FIG. **2**; and,
FIG. **9** is a cross sectional view taken along lines **9-9** in FIG. **2**.

1 Claim, 7 Drawing Sheets



(58) **Field of Classification Search**
CPC 2924/1815; H01L 2924/19042; H01L 2924/1905
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,346,396	A	*	8/1982	Carroll, II	H01L 21/50 257/674
4,503,452	A	*	3/1985	Yokozawa	H01L 21/565 257/670
4,546,374	A	*	10/1985	Olsen	H01L 23/045 257/772
4,807,087	A	*	2/1989	Sawaya	H05K 3/308 361/773
4,827,329	A	*	5/1989	Schach	H01L 23/36 257/717
4,916,519	A	*	4/1990	Ward	H01L 23/495 257/666
4,951,124	A	*	8/1990	Sawaya	H05K 3/308 257/692
D316,251	S	*	4/1991	Armstrong	D13/182
D317,592	S	*	6/1991	Yoshizawa	D13/182
D345,731	S	*	4/1994	Owens	D13/182
5,563,441	A	*	10/1996	Kato	H01L 23/49548 257/666
D394,244	S	*	5/1998	Majumdar	D13/182
D395,423	S	*	6/1998	Koyama	D13/182
D395,638	S	*	6/1998	Koyama	D13/182
D396,696	S	*	8/1998	Takagi	D13/182
D396,846	S	*	8/1998	Nakayama	D13/182
D396,847	S	*	8/1998	Nakayama	D13/182
D418,485	S	*	1/2000	Kawafuji	D13/182
D420,983	S	*	2/2000	Choi	D13/182
D421,969	S	*	3/2000	Kawafuji	D13/182
D428,859	S	*	8/2000	Kawafuji	D13/182
6,100,580	A	*	8/2000	Murakami	H01L 25/105 257/666
D432,097	S	*	10/2000	Song	D13/182
6,255,722	B1	*	7/2001	Ewer	H01L 23/4093 257/675
D448,739	S	*	10/2001	Iwasaki	D13/182
D448,740	S	*	10/2001	Iwasaki	D13/182
6,335,548	B1	*	1/2002	Roberts	H01L 23/49562 257/98
6,476,481	B2	*	11/2002	Woodworth	H01L 23/49562 174/536
D466,485	S	*	12/2002	Maehara	D13/182
D470,463	S	*	2/2003	Iwasaki	D13/182
D470,824	S	*	2/2003	Iwasaki	D13/182
D472,530	S	*	4/2003	Iwasaki	D13/182
D489,338	S	*	5/2004	Seddon	D13/182
D489,695	S	*	5/2004	Komoto	D13/182
D505,399	S	*	5/2005	Yoshida	D13/182
D505,400	S	*	5/2005	Kawafuji	D13/182
D515,520	S	*	2/2006	Komoto	D13/182
D539,761	S	*	4/2007	Takahashi	D13/182
D548,202	S	*	8/2007	Takahashi	D13/182
D548,203	S	*	8/2007	Takahashi	D13/182
D573,116	S	*	7/2008	Chou	D13/182
D616,387	S	*	5/2010	Chou	D13/182
D654,881	S	*	2/2012	Chou	D13/182
D717,253	S	*	11/2014	Jo	D13/182
D717,254	S	*	11/2014	Jo	D13/182
D717,255	S	*	11/2014	Lim	D13/182
D717,256	S	*	11/2014	Sohn	D13/182
D719,113	S	*	12/2014	Sohn	D13/182
D719,926	S	*	12/2014	Sohn	D13/182
D770,994	S	*	11/2016	Hasegawa	D13/182
D783,550	S	*	4/2017	Hasegawa	D13/182
D824,866	S	*	8/2018	Matsubara	D13/182
D874,411	S	*	2/2020	Kanda	D13/182
D902,877	S	*	11/2020	Hirata	D13/182
2003/0042584	A1	*	3/2003	Yamaguchi	H01L 23/49503 257/666
2006/0001133	A1	*	1/2006	McGarvey	H01L 31/02325 257/666
2006/0033122	A1	*	2/2006	Pavier	H01L 24/37 257/177
2006/0255362	A1	*	11/2006	Otremba	H01L 24/06 257/177
2008/0164590	A1	*	7/2008	Xiaochun	H01L 23/49562 257/675
2009/0001535	A1		1/2009	Heng et al.	
2018/0160569	A1		6/2018	Yoshihara	

OTHER PUBLICATIONS

U.S. Appl. No. 16/588,463, filed Sep. 30, 2019.

Office Action issued in related U.S. Appl. No. 16/588,463, dated Sep. 30, 2019 (14 pages).

* cited by examiner

Fig. 1

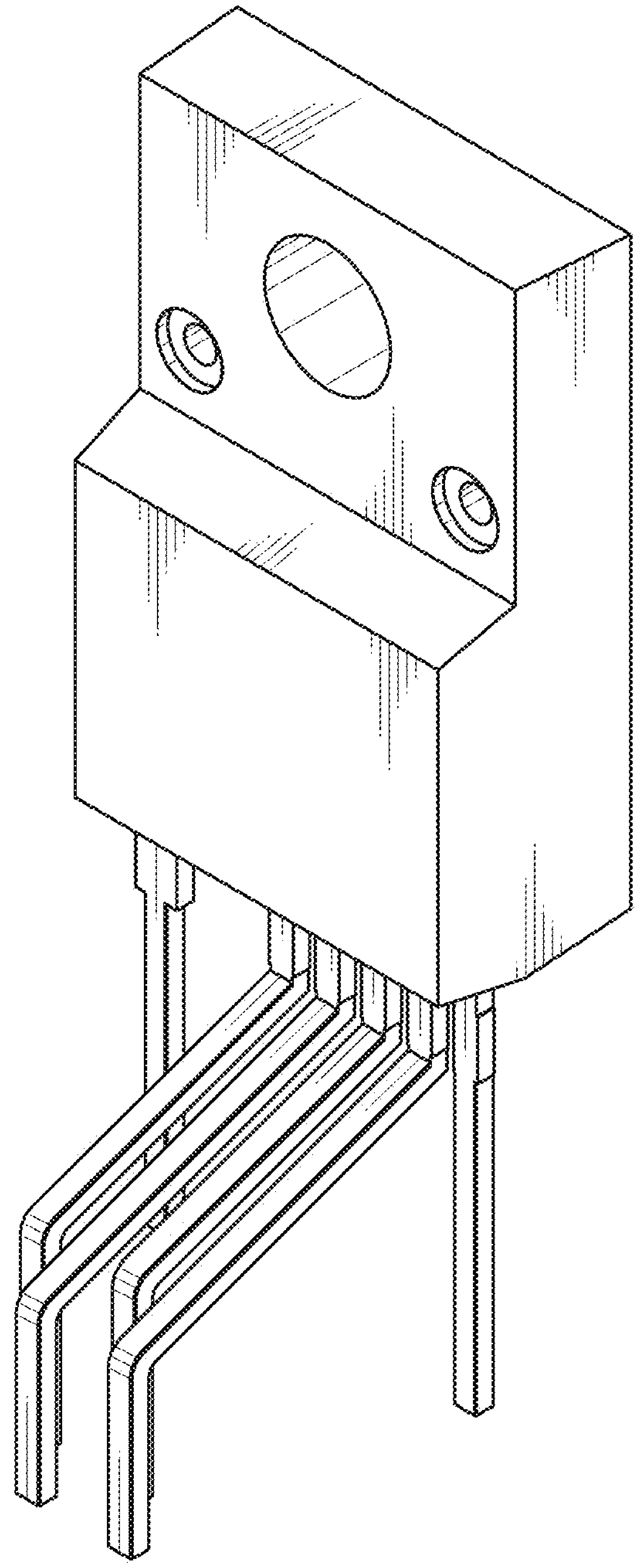
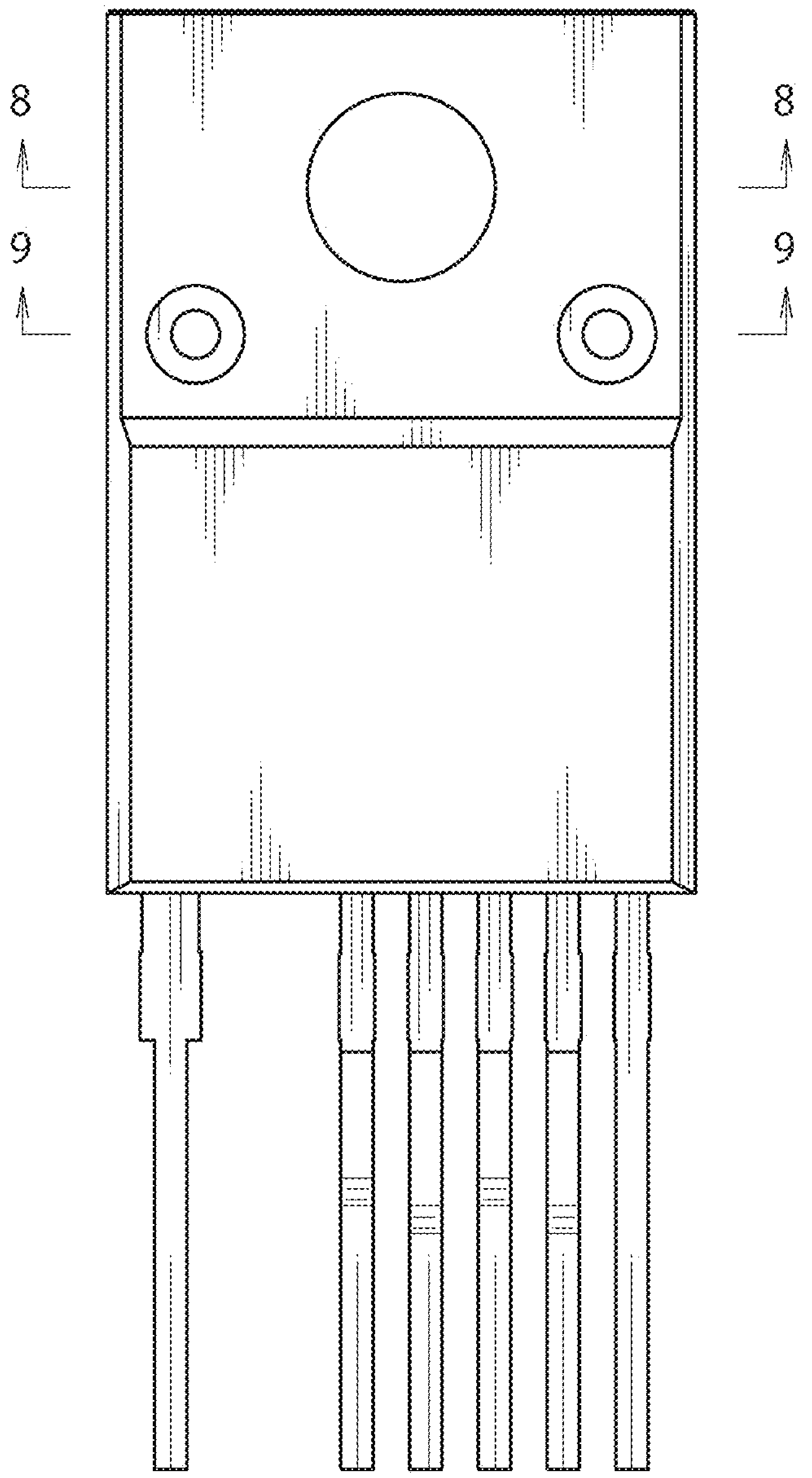


Fig. 2



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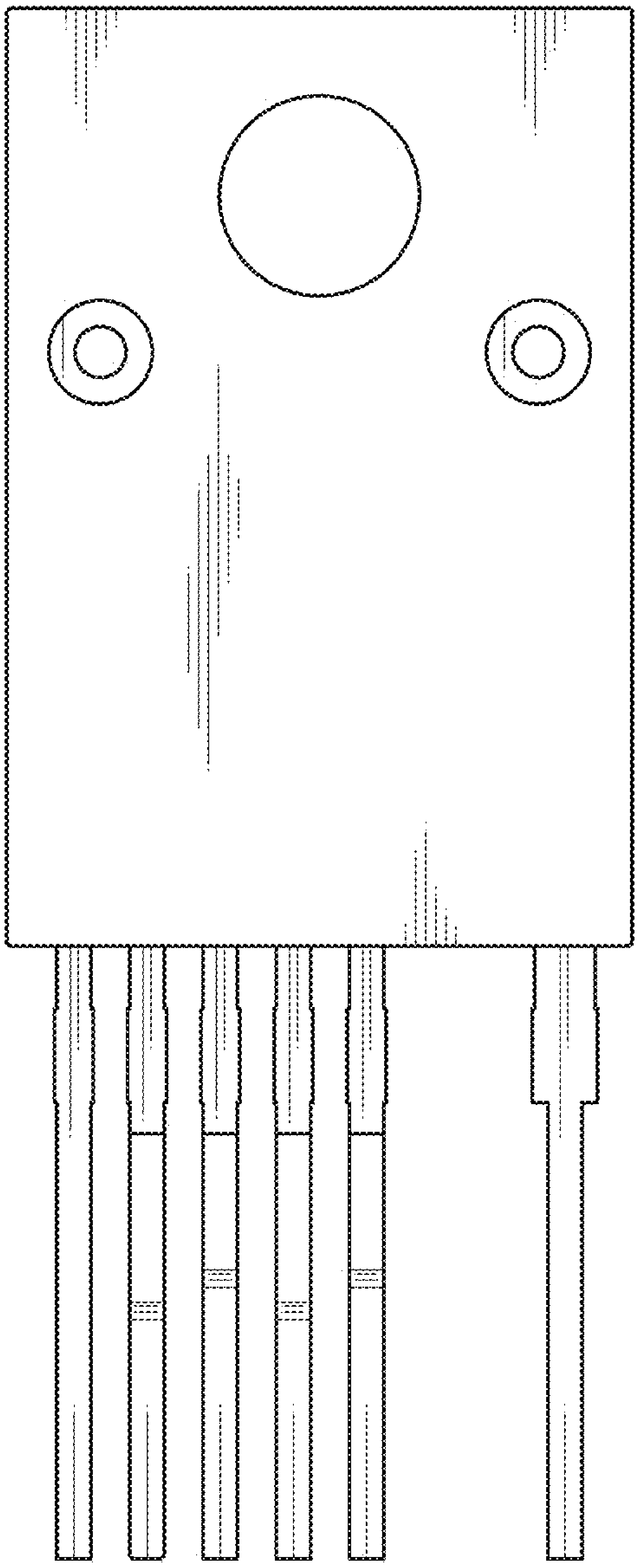

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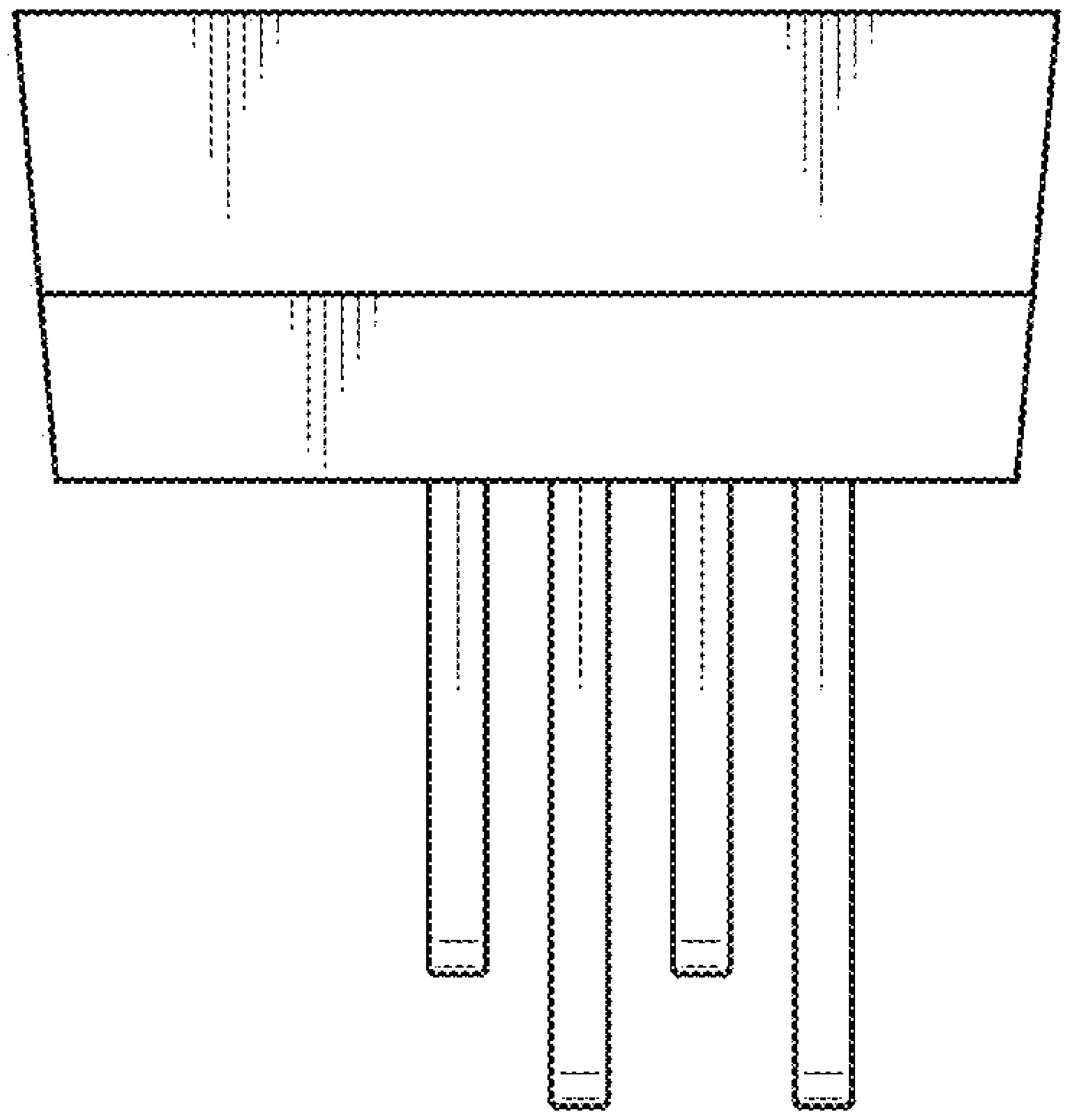

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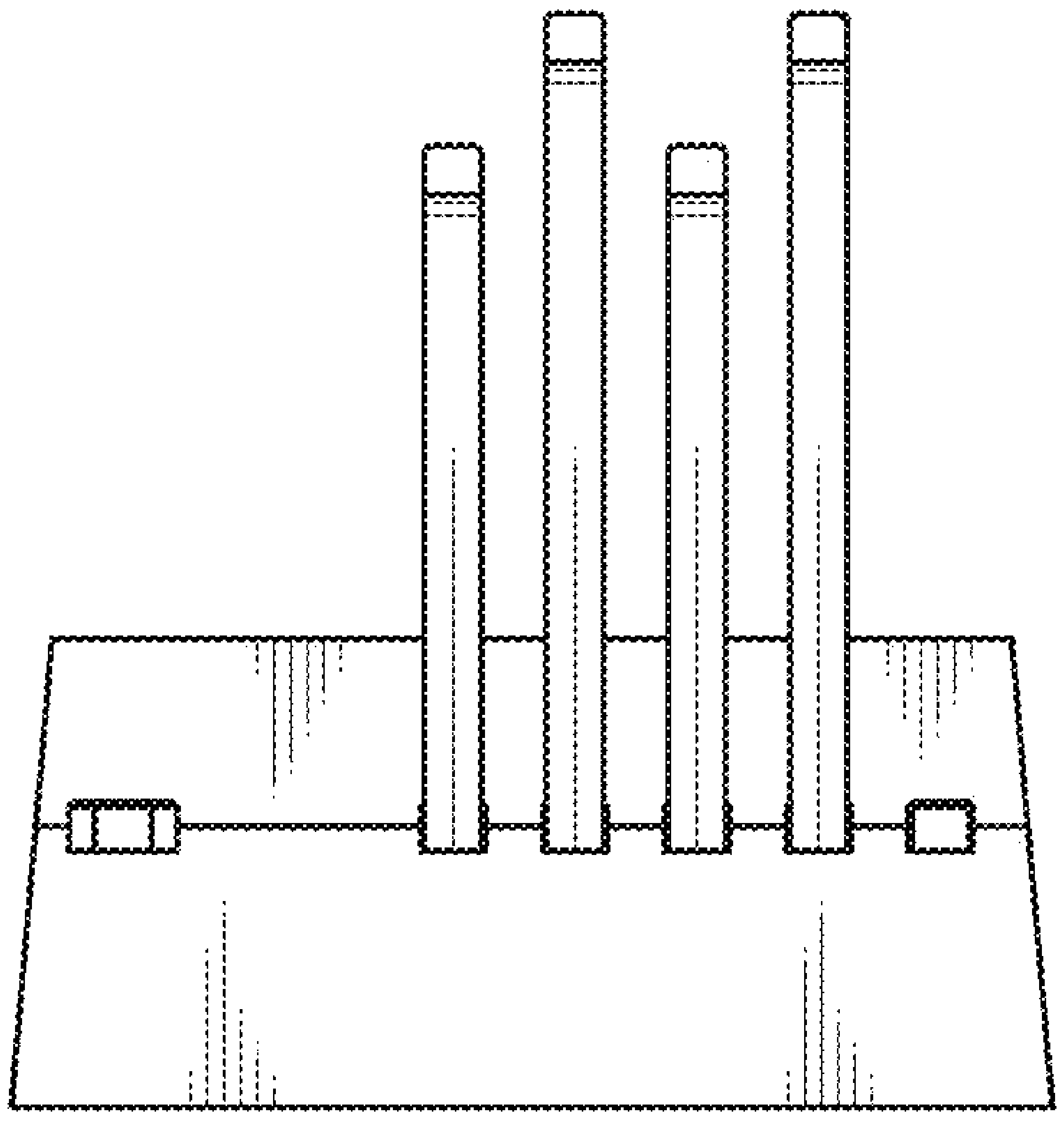

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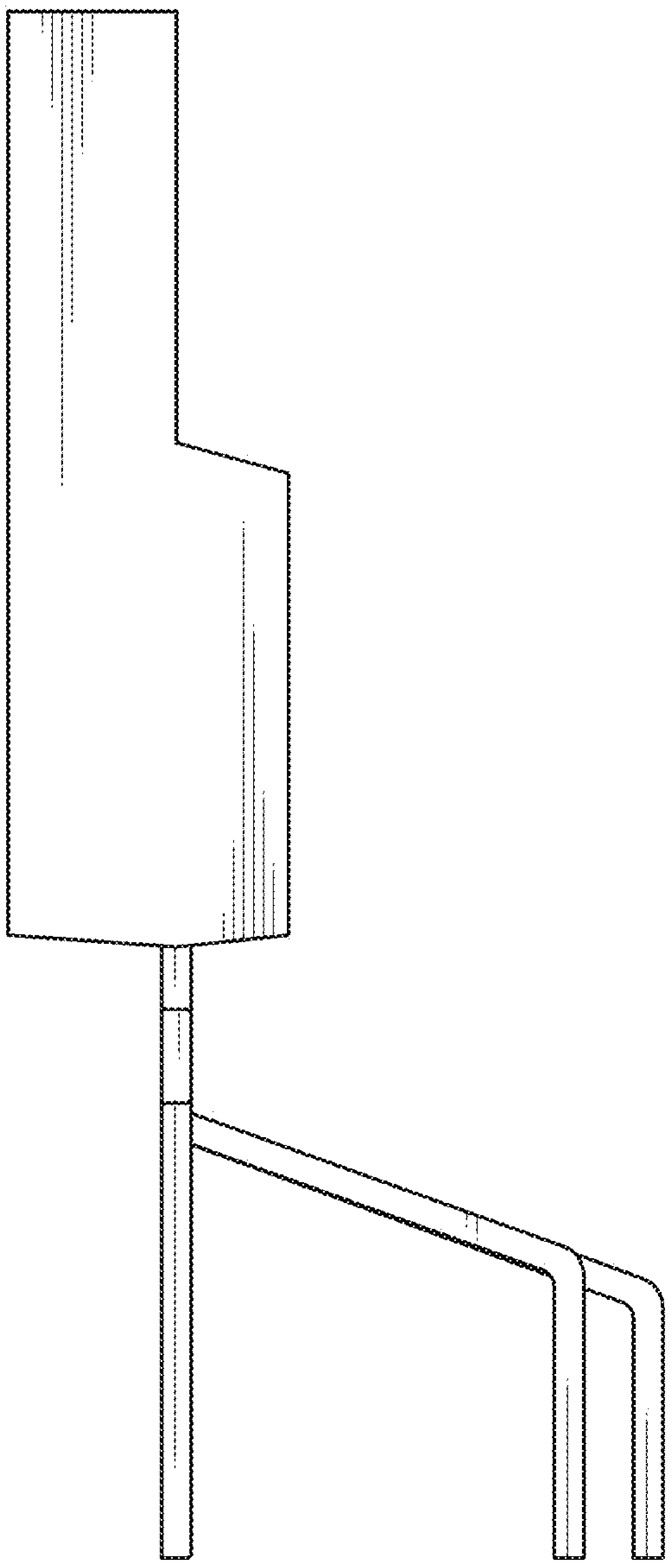

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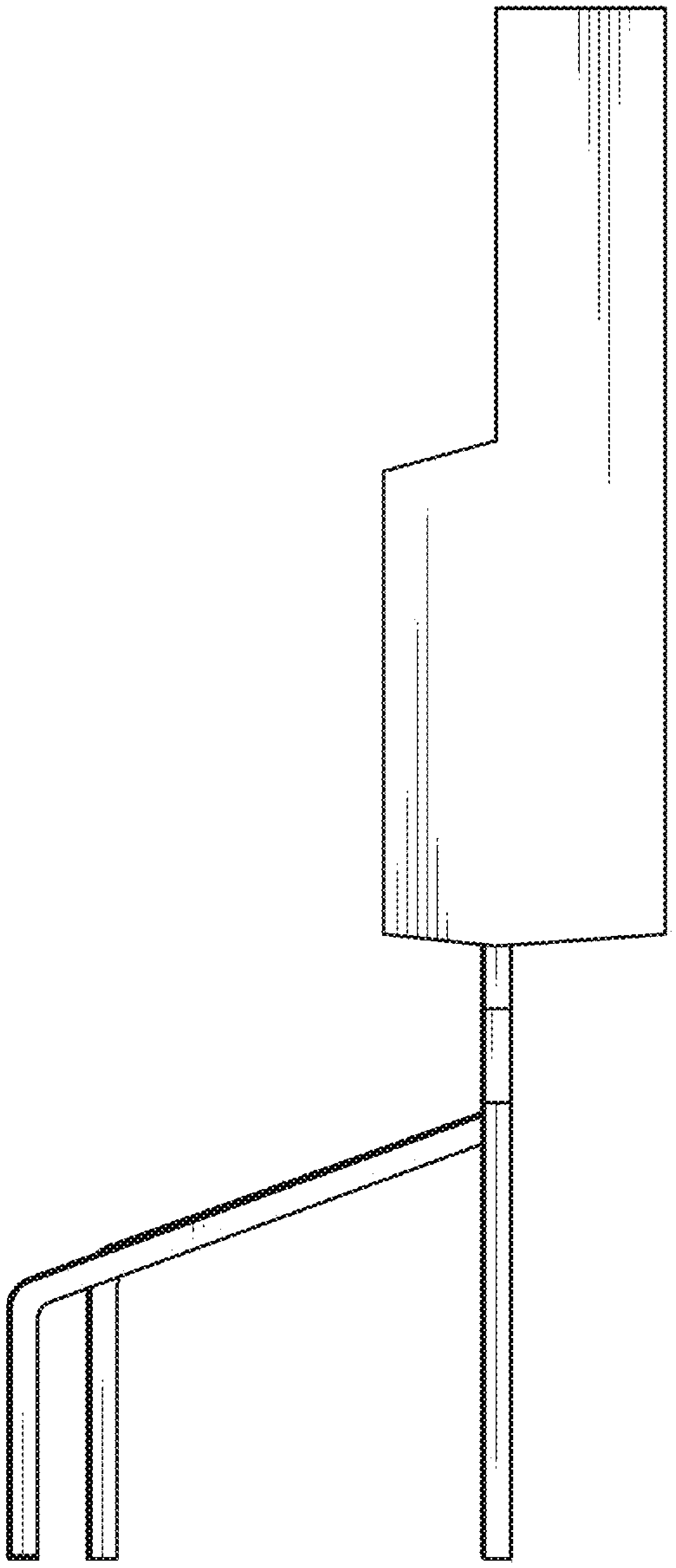

Fig. 8

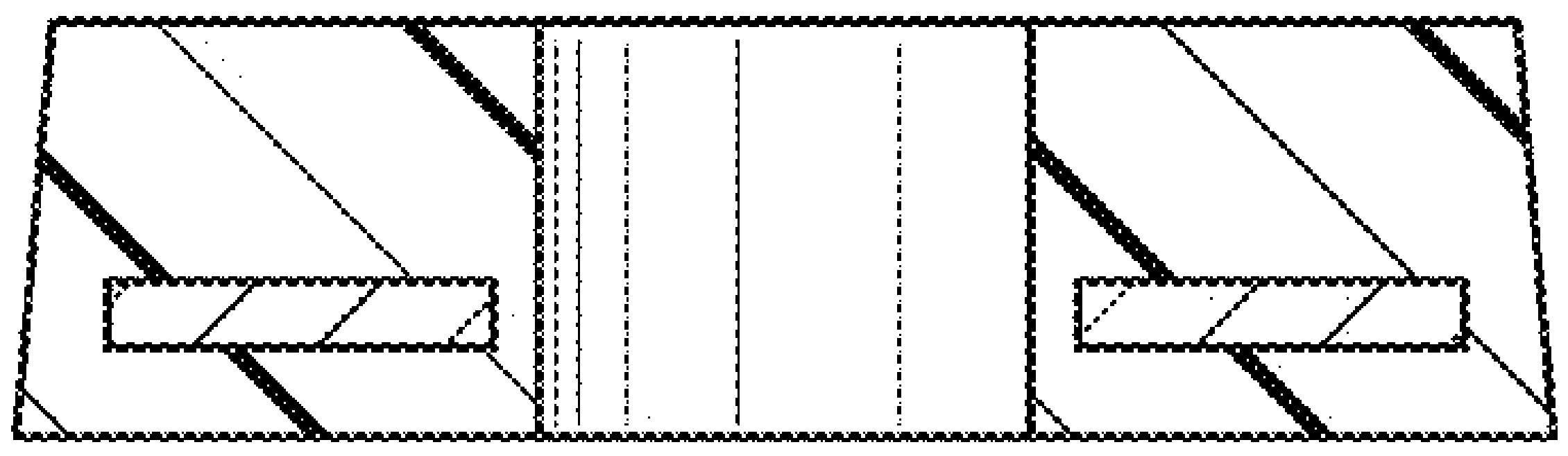

Fig. 9