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Wilcox et al.

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(54) **LIGHT EMITTING DEVICE COMPONENT**

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(52) **U.S. Cl.**
USPC **D13/180**

(58) **Field of Classification Search**

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257/89, 95, 98, 99, 100, E33.058; 313/483,
313/498, 500; 362/555, 800
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H01L 33/20; H01L 33/38; H01L 33/42;
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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,855,194 A 8/1989 Wright
4,946,547 A 8/1990 Palmour
5,200,022 A 4/1993 Kong
5,210,051 A 5/1993 Carter, Jr. et al.

RE34,861 E 2/1995 Davis et al.
5,393,993 A 2/1995 Edmond et al.
5,523,589 A 6/1996 Edmond et al.
6,093,053 A 7/2000 Horioka et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CN ZL 2011-30139847.5 8/2012
CN ZL 2011-30166527.9 8/2012

(Continued)

OTHER PUBLICATIONS

Taiwanese Office Action for Application No. 100141889 dated Aug. 6, 2014.

(Continued)

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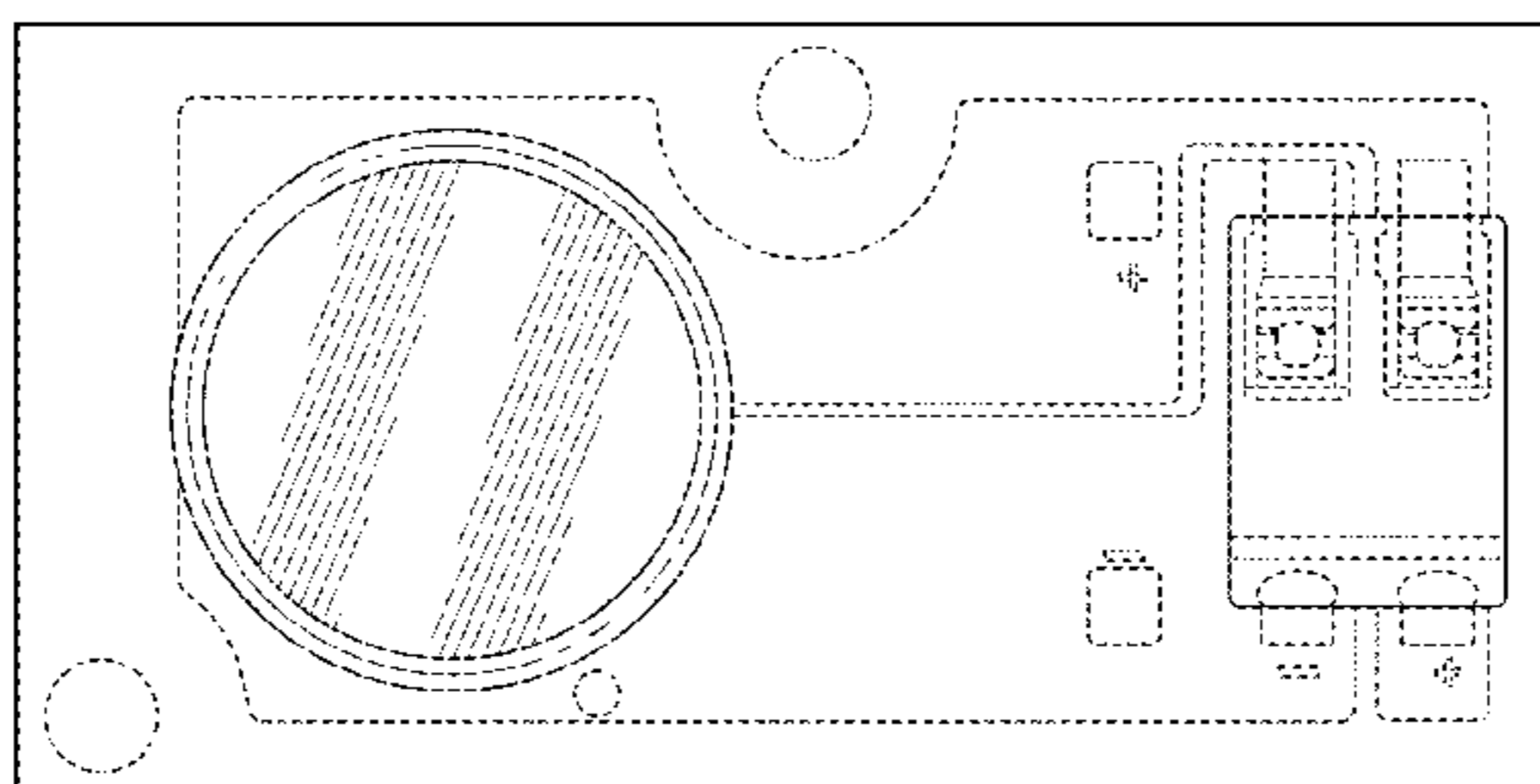
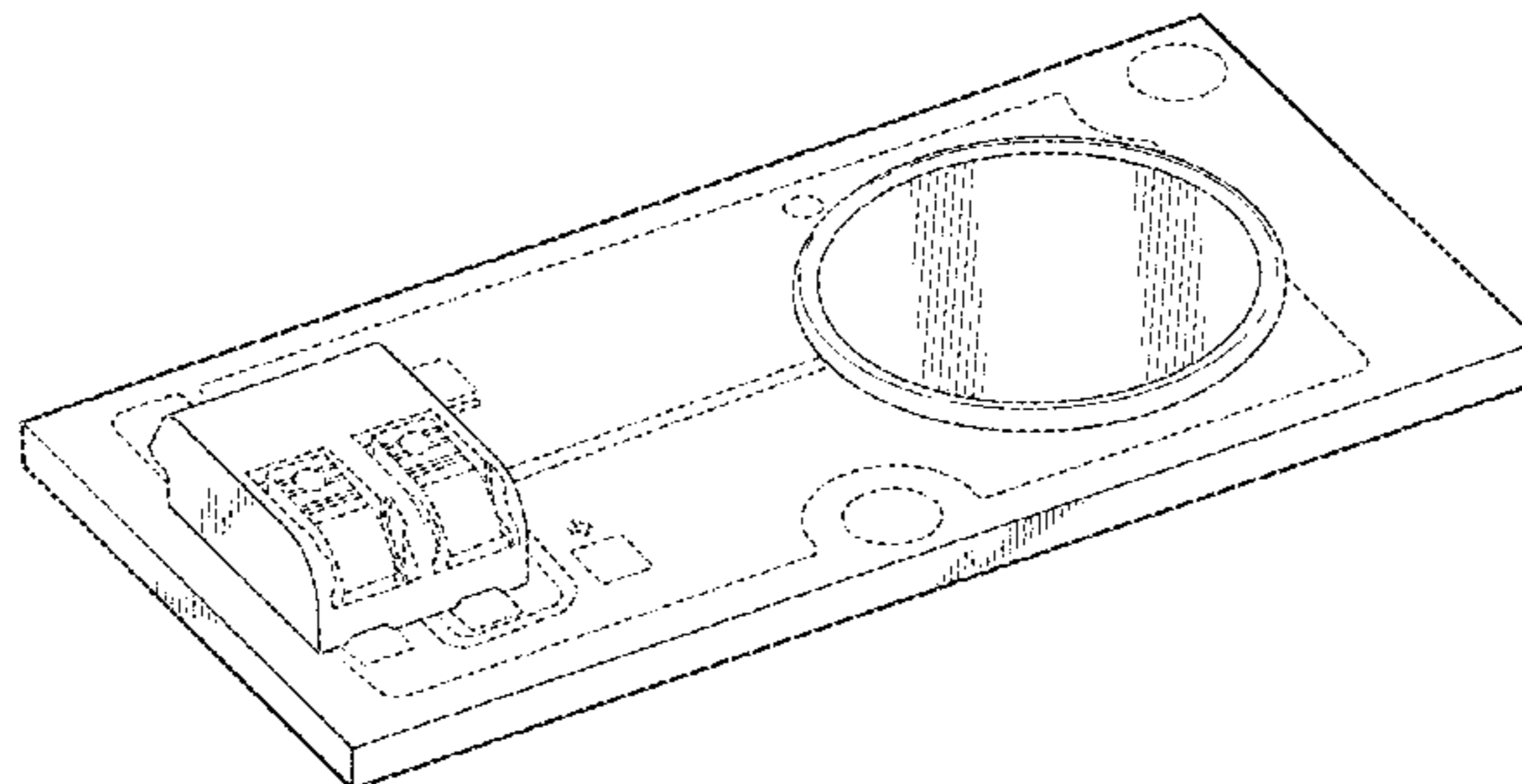
(57) **CLAIM**

The ornamental design for a light emitting device component, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a light emitting device showing the design;
FIG. 2 is a top view thereof;
FIG. 3 is a bottom view thereof;
FIG. 4 is a first side view thereof;
FIG. 5 is a second side view thereof, which is an opposing view of that shown in FIG. 4;
FIG. 6 is a third side view thereof; and,
FIG. 7 is a fourth side view thereof, which is an opposing view of that shown in FIG. 6.
The dashed broken lines are for illustrative purposes only. The broken lines form no part of the claimed design.

1 Claim, 4 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,224,430 B1	5/2001	Kusuda et al.	2004/0196663 A1	10/2004	Ishida et al.
6,548,832 B1	4/2003	Sakamoto et al.	2005/0073244 A1	4/2005	Chou et al.
6,909,051 B2	6/2005	Noble	2005/0152145 A1	7/2005	Currie et al.
7,034,778 B1	4/2006	Hähl	2005/0199899 A1	9/2005	Lin et al.
7,055,987 B2	6/2006	Staufert	2005/0264172 A1	12/2005	Wojnarowski et al.
D528,672 S	9/2006	Nagai	2006/0139595 A1	6/2006	Koenen et al.
D541,761 S	5/2007	Saito et al.	2006/0147746 A1	7/2006	Wakako et al.
7,213,940 B1	5/2007	Van de Ven et al.	2006/0186418 A1	8/2006	Edmond
7,224,000 B2	5/2007	Aanegola et al.	2007/0018295 A1	1/2007	Kim et al.
D570,506 S	6/2008	Uemoto	2007/0029569 A1	2/2007	Andrews
D570,797 S	6/2008	Song	2007/0131954 A1	6/2007	Murayama et al.
D573,553 S	7/2008	Uemoto et al.	2007/0158668 A1	7/2007	Tarsa
D573,731 S	7/2008	Uemoto	2007/0194336 A1	8/2007	Shin et al.
7,393,237 B2	7/2008	Kuo	2007/0241345 A1	10/2007	Huang
D576,576 S	9/2008	Shida et al.	2007/0246730 A1	10/2007	Oishi et al.
7,479,660 B2	1/2009	Kobilke	2008/0019130 A1	1/2008	Wang
7,482,636 B2	1/2009	Murayama et al.	2008/0026498 A1	1/2008	Tarsa et al.
D586,303 S	2/2009	Fuwa et al.	2008/0054279 A1	3/2008	Hussell et al.
D589,470 S	3/2009	Chen	2008/0054284 A1	3/2008	Hussell et al.
D591,248 S	4/2009	Imai et al.	2008/0054286 A1	3/2008	Loh et al.
D592,615 S	5/2009	Imai et al.	2008/0078664 A1	4/2008	Schmidt et al.
D593,043 S	5/2009	Song	2008/0079017 A1	4/2008	Loh et al.
D602,451 S	10/2009	Gielen	2008/0089072 A1	4/2008	Kim et al.
D603,813 S	11/2009	Nishimura et al.	2008/0106723 A1	5/2008	Hoogendam et al.
D607,420 S	1/2010	Imai et al.	2008/0173884 A1	7/2008	Chitnis
D615,051 S	5/2010	Chen et al.	2008/0179611 A1	7/2008	Chitnis
D615,052 S	5/2010	Imai et al.	2008/0191222 A1	8/2008	Lee
D618,635 S	6/2010	Imai et al.	2008/0219003 A1	9/2008	Park
7,780,313 B2	8/2010	Lam et al.	2008/0224166 A1	9/2008	Glovatsky et al.
7,804,147 B2	9/2010	Tarsa et al.	2008/0239318 A1	10/2008	Den Boef et al.
7,812,365 B2	10/2010	Murayama	2008/0258130 A1	10/2008	Bergmann
7,825,578 B2	11/2010	Takashima et al.	2009/0009103 A1	1/2009	McKechnie et al.
D630,171 S	1/2011	Hsieh	2009/0023323 A1	1/2009	Lin et al.
7,872,418 B2	1/2011	Hata et al.	2009/0122514 A1	5/2009	Yoon et al.
D636,899 S	4/2011	Shibahara	2009/0130889 A1	5/2009	Daily et al.
D637,564 S	5/2011	Tseng et al.	2009/0166657 A1	7/2009	Yamada et al.
7,943,952 B2	5/2011	Loh et al.	2009/0239409 A1	9/2009	Bishop
7,955,147 B1	6/2011	Legrady et al.	2009/0261374 A1	10/2009	Hayashi
D640,997 S	7/2011	Imai et al.	2009/0262527 A1	10/2009	Chou
7,994,518 B2	8/2011	Wang et al.	2009/0289169 A1	11/2009	Yang et al.
D645,417 S	9/2011	Imai et al.	2009/0315061 A1	12/2009	Andrews
8,022,626 B2	9/2011	Hamby et al.	2010/0078664 A1	4/2010	Helbing
8,044,418 B2	10/2011	Loh et al.	2010/0096642 A1	4/2010	Chang et al.
8,058,088 B2	11/2011	Cannon et al.	2010/0103660 A1	4/2010	Van de Ven et al.
D650,760 S	12/2011	Hussell et al.	2010/0139836 A1	6/2010	Horikoshi
8,119,534 B2	2/2012	Tanaka et al.	2010/0141182 A1	6/2010	Shi
D658,601 S	5/2012	Egawa et al.	2010/0155763 A1	6/2010	Donofrio
D658,602 S	5/2012	Egawa et al.	2010/0193822 A1	8/2010	Inobe et al.
D658,603 S	5/2012	Egawa et al.	2010/0253248 A1	10/2010	Shi
8,167,674 B2	5/2012	Hussell et al.	2010/0270567 A1	10/2010	Emerson et al.
D667,803 S	9/2012	Hussell et al.	2010/0320483 A1	12/2010	Kadotani et al.
D669,041 S	10/2012	Imai et al.	2011/0013400 A1	1/2011	Kanno et al.
D676,000 S	2/2013	Hussell et al.	2011/0065241 A1	3/2011	Lin et al.
D676,395 S	2/2013	Hussell et al.	2011/0068674 A1	3/2011	Takenaka et al.
8,410,679 B2	4/2013	Ibbetson et al.	2011/0068696 A1	3/2011	Van de Ven et al.
8,425,271 B2	4/2013	Hussell et al.	2011/0068702 A1	3/2011	Van de Ven et al.
D683,708 S	6/2013	Sasano et al.	2011/0116275 A1	5/2011	Sheek
8,455,908 B2	6/2013	Welch et al.	2011/0121323 A1	5/2011	Wu et al.
8,461,613 B2	6/2013	Chou et al.	2011/0127912 A1	6/2011	Lee et al.
8,517,572 B2	8/2013	Ferenc	2011/0128730 A1	6/2011	Chiu
D689,451 S	9/2013	Shimonishi et al.	2011/0136394 A1	6/2011	Mostoller et al.
8,563,339 B2	10/2013	Tarsa	2011/0291151 A1	12/2011	Matsuda et al.
8,564,000 B2	10/2013	Hussell	2012/0126255 A1	5/2012	Hussell et al.
8,575,639 B2	11/2013	Hussell	2012/0126257 A1	5/2012	Reiherzer et al.
8,624,271 B2	1/2014	Reiherzer	2012/0193651 A1	8/2012	Edmond
D702,653 S	4/2014	Wilcox et al.	2012/0205689 A1	8/2012	Welch et al.
D705,181 S	5/2014	Hussell et al.	2012/0241807 A1	9/2012	Hoetzl et al.
8,729,589 B2	5/2014	Hussell et al.	2012/0250310 A1	10/2012	Hussell et al.
D706,231 S	6/2014	Hussell et al.	2012/0299022 A1	11/2012	Hussell
D707,192 S	6/2014	Hussell et al.	2013/0058099 A1	3/2013	Shum et al.
8,809,880 B2	8/2014	Hussell	2013/0207130 A1	8/2013	Reiherzer
D712,850 S	9/2014	Welch et al.	2013/0207142 A1	8/2013	Reiherzer
8,921,869 B2	12/2014	Welch et al.	2013/0256711 A1	10/2013	Joo et al.
D721,339 S *	1/2015	Hussell et al. D13/180	2014/0097453 A1	4/2014	Hussell et al.
2004/0079957 A1	4/2004	Andrews et al.	2014/0097454 A1	4/2014	Hussell

(56)

References Cited

U.S. PATENT DOCUMENTS

2014/0183577 A1 7/2014 Hussell et al.
 2014/0217433 A1 8/2014 Tudorica et al.
 2014/0240974 A1 8/2014 Hussell et al.

FOREIGN PATENT DOCUMENTS

CN ZL201230099913.5 11/2012
 CN ZL201230099954.4 12/2012
 CN ZL201230099981.1 12/2012
 CN ZL 201230472866.4 5/2013
 CN ZL201230130915.6 10/2013
 CN ZL201230652790.3 10/2013
 CN ZL201230652789.0 11/2013
 CN ZL201230652840.8 11/2013
 CN ZL201330361367.2 1/2014
 EP 1640792 3/2006
 EP 2327930 6/2011
 EP 2 643 861 10/2013
 EP 2 643 862 10/2013
 EP 2751471 7/2014
 FR 2 921 537 9/2007
 JP 07-038940 9/1995
 JP 10-311937 11/1998
 JP 2001-294083 10/2001
 JP 2003-303504 10/2003
 JP 2005-183148 7/2005
 JP 2005-266117 9/2005
 JP 2005-276979 10/2005
 JP 2006-294898 10/2006
 JP 2007-227680 9/2007
 JP 2007-266357 10/2007
 JP 2007-323857 12/2007
 JP 2007-335371 12/2007
 JP 2009-503888 1/2009
 JP 2009-044055 2/2009
 JP 2009-289918 12/2009
 JP 2010-009972 1/2010
 JP 2010-147189 7/2010
 JP 2012-503331 2/2012
 JP 2012-079855 4/2012
 JP 1476166 7/2013
 JP 1476175 7/2013
 JP 1493219 2/2014
 KR 10-0793338 1/2008
 KR 10-2008-0033496 4/2008
 KR 10-2008-0092239 10/2008
 KR 10-2009-0011121 2/2009
 KR 10-2011-0004632 1/2011
 KR DES 30-0753131 7/2014
 KR DES 30-0753132 7/2014
 TW 540169 7/2003
 TW 113260 10/2006
 TW 124444 8/2008
 TW D125589 10/2008
 TW 128526 5/2009
 TW 201029146 8/2010
 TW D141645 7/2011
 TW D144159 12/2011
 TW D145644 3/2012
 TW D156539 10/2013
 TW D159326 3/2014
 TW D159849 4/2014
 TW D159850 4/2014
 TW D159851 4/2014
 TW D160508 5/2014
 TW D160509 5/2014
 TW D160580 5/2014
 TW D160850 6/2014
 WO WO 2009/133615 11/2009
 WO WO 2009/141982 11/2009
 WO WO 2012/071136 5/2012
 WO WO 2012/071138 5/2012
 WO WO 2012/071139 5/2012
 WO WO 2013/032737 3/2013

WO WO 2013/070696 5/2013
 WO WO 2013/096431 6/2013
 WO WO 2013/122831 8/2013

OTHER PUBLICATIONS

European Patent Office Communication pursuant to Rule 114(2) EPC for Application No. 20110843026 dated Sep. 24, 2014.
 Taiwanese Office Action for Application No. 100141887 dated Sep. 11, 2014.
 Bridgelux Product Data Sheet—1 page.
 Citizen Co. Product Data Sheet —4 pages. http://ce.citizen.co.jp/lighting_led/en/products/index.html.
 U.S. Appl. No. 29/379,636 for “Light Emitting Device Package” filed Nov. 22, 2010.
 Design U.S. Appl. No. 29/380,387 for “Light Emitting Device Package” filed Dec. 3, 2010.
 U.S. Appl. No. 13/028,972 for “Light Emitting Devices and Methods” filed Feb. 16, 2011.
 U.S. Appl. No. 13/104,558 for “Light Emitting Devices and Methods” filed May 10, 2011.
 Notice of Allowance for U.S. Appl. No. 29/379,636 dated Aug. 4, 2011.
 Design U.S. Appl. No. 29/404,913 for “Light Emitting Device Component” filed Oct. 26, 2011.
 U.S. Appl. No. 13/224,850 for “Light Emitting Device Component” filed Sep. 2, 2011.
 Design U.S. Appl. No. 29/379,636 for “Light Emitting Device Package” filed Nov. 22, 2011.
 Design U.S. Appl. No. 29/408,955 for “Light Emitting Device Package” filed Dec. 19, 2011.
 Patent Application for U.S. Appl. No. 13/336,540 dated Dec. 23, 2011.
 Notification of Granting Patent Right for Design for Application Serial No. CN 2011/30166527.9 dated Apr. 6, 2012.
 Non-Final Office Action for U.S. Appl. No. 29/380,387 dated Apr. 25, 2012.
 Notification of Granting Patent Right for Design for Application Serial No. CN 2011/30139847.5 dated Apr. 26, 2012.
 Notice of Allowance for U.S. Appl. No. 29/408,955 dated May 7, 2012.
 Notice of Allowance for U.S. Appl. No. 29/407,084 dated May 18, 2012.
 International Search Report and Written Opinion for Application Serial No. PCT/US2011/058603 dated May 23, 2012.
 International Search Report and Written Opinion for Application Serial No. PCT/US2011/058601 dated May 24, 2012.
 International Search Report and Written Opinion for Application Serial No. PCT/US2011/058596 dated Jun. 18, 2012.
 Chinese Office Action for Application Serial No. CN 2012/30130915.6 dated Jul. 12, 2012.
 Office Action/Restriction Requirement for U.S. Appl. No. 13/028,972 dated Jul. 25, 2012.
 Notification of Grant for Chinese Patent Application No. 2012/30099913.5 dated Aug. 7, 2012.
 Notification of Grant for Chinese Patent Application No. 2012/30099981.1 dated Aug. 17, 2012.
 Notification of Grant for Chinese Patent Application No. 2012/30099954.4 dated Aug. 17, 2012.
 Notice of Allowance for U.S. Appl. No. 29/407,084 dated Aug. 21, 2012.
 Notice of Allowance for U.S. Appl. No. 29/380,387 dated Sep. 18, 2012.
 Notice of Allowance for U.S. Appl. No. 29/408,955 dated Oct. 4, 2012.
 Non-Final Office Action for U.S. Appl. No. 13/028,972 dated Oct. 10, 2012.
 Chinese Office Action for Application No. CN 2012/30130915.6 dated Oct. 24, 2012.
 Chinese Office Action for Application No. 201230472866.4 dated Nov. 14, 2012.
 Non-Final Office Action for U.S. Appl. No. 13/104,558 dated Jan. 3, 2013.

(56)

References Cited

OTHER PUBLICATIONS

Taiwanese Search Report for Application No. 101302309 dated Jan. 14, 2013.
 Taiwanese Office Action for Application No. 101302309 dated Jan. 23, 2013.
 Chinese Decision to Grant for Application No. 201230472866.4 dated Jan. 24, 2013.
 Notice of Allowance for U.S. Appl. No. 13/336,540 dated Jan. 31, 2013.
 Restriction Requirement for U.S. Appl. No. 13/671,089 dated Feb. 7, 2013.
 Restriction Requirement for U.S. Appl. No. 29/404,913 dated Feb. 15, 2013.
 Japanese Office Action for Application No. 2012-023963 dated Feb. 26, 2013.
 Japanese Office Action for Application No. 2012-026117 dated Feb. 26, 2013.
 Chinese Office Action for Application No. CN 2012/30130915.6 dated Feb. 27, 2013.
 Notice of Allowance for U.S. Appl. No. 13/028,972 dated Feb. 28, 2013.
 International Search Report and Written Opinion for Application No. PCT/US2012/051344 dated Feb. 28, 2013.
 International Search Report and Written Opinion for Application No. PCT/US2012/063861 dated Mar. 18, 2013.
 Non-Final Office Action for U.S. Appl. No. 13/671,089 dated Mar. 29, 2013.
 Taiwanese Search Report for Application No. 102300059 dated Apr. 17, 2013.
 International Search Report and Written Opinion for Application No. PCT/US2012/070589 dated Apr. 22, 2013.
 Taiwanese Search Report for Application No. 102300058 dated Apr. 29, 2013.
 International Search Report and Written Opinion for Application No. PCT/US2013/025307 dated May 15, 2013.
 Notice of Allowance for U.S. Appl. No. 13/028,972 dated May 23, 2013.
 Japanese Office Action for Application No. 2012-031549 dated Jun. 4, 2013.
 Japanese Decision of Registration for Application No. 2012-023963 dated Jun. 4, 2013.
 Japanese Decision of Registration for Application No. 2012-026117 dated Jun. 4, 2013.
 Taiwanese Notice of Allowance for Application No. 101302309 dated Jun. 5, 2013.
 Notice of Allowance for U.S. Appl. No. 13/435,912 dated Jun. 19, 2013.
 Notice of Allowance for U.S. Appl. No. 29/404,913 dated Jun. 25, 2013.
 Chinese Notice of Grant for Application No. 201230652790.3 dated Jun. 26, 2013.
 Notice of Allowance for U.S. Appl. No. 13/104,558 dated Jul. 1, 2013.
 Chinese Notice of Grant for Application No. 201230130915.6 dated Jul. 3, 2013.
 Taiwanese Search Report for Application No. 102301394 dated Jul. 9, 2013.
 Taiwanese Search Report for Application No. 102301395 dated Jul. 9, 2013.
 Taiwanese Office Action for Application No. 102301394 dated Jul. 15, 2013.
 Taiwanese Office Action for Application No. 102301395 dated Jul. 15, 2013.
 Chinese Decision to Grant for Application No. 201230652789 dated Jul. 17, 2013.
 Chinese Notice of Grant for Application No. 201230652840.3 dated Jul. 26, 2013.
 Ex Parte Quayle Action for Application No. 13/671,089 dated Aug. 13, 2013.

Korean Office Action for Application No. 30-2012-0020196 dated Aug. 13, 2013.
 Korean Office Action for Application No. 30-2012-0020197 dated Aug. 13, 2013.
 Korean Office Action for Application No. 30-2012-0020198 dated Aug. 13, 2013.
 Taiwanese Office Action for Application No. 102300058 dated Aug. 27, 2013.
 Notice of Allowance for U.S. Appl. No. 13/104,558 dated Aug. 28, 2013.
 Non-Final Office Action for U.S. Appl. No. 13/224,850 dated Sep. 5, 2013.
 Taiwanese Office Action for Application No. 102301581 dated Sep. 6, 2013.
 Taiwanese Office Action for Application No. 102301582 dated Sep. 6, 2013.
 Taiwanese Office Action for Application No. 102301583 dated Sep. 6, 2013.
 Taiwanese Office Action for Application No. 102301584 dated Sep. 6, 2013.
 Taiwanese Office Action for Application No. 102301585 dated Sep. 6, 2013.
 Restriction Requirement for U.S. Appl. No. 13/793,882 dated Sep. 20, 2013.
 Restriction Requirement for U.S. Appl. No. 29/417,220 dated Sep. 27, 2013.
 Restriction Requirement for U.S. Appl. No. 29/451,177 dated Sep. 27, 2013.
 Restriction Requirement for U.S. Appl. No. 29/425,831 dated Sep. 30, 2013.
 Taiwanese Office Action for Application No. 102300059 dated Oct. 1, 2013.
 Chinese Notice to Grant for Application No. 201330361367.2 dated Oct. 8, 2013.
 Notice of Allowance for U.S. Appl. No. 13/671,089 dated Oct. 22, 2013.
 Restriction Requirement for U.S. Appl. No. 29/412,166 dated Oct. 25, 2013.
 Restriction Requirement for U.S. Appl. No. 29/412,168 dated Oct. 25, 2013.
 Japanese Office Action for Application No. 2012-031548 dated Nov. 5, 2013.
 Japanese Office Action for Application No. 2012-031549 dated Nov. 5, 2013.
 Taiwanese Notice of Allowance for Application No. 102301394 dated Nov. 8, 2013.
 Taiwanese Notice of Allowance for Application No. 102301395 dated Nov. 8, 2013.
 Non-Final Office Action for U.S. Appl. No. 13/793,882 dated Nov. 15, 2013.
 Restriction Requirement for U.S. Appl. No. 13/282,172 dated Nov. 26, 2013.
 Notice of Allowance for U.S. Appl. No. 29/404,913 dated Nov. 27, 2013.
 Taiwanese Notice of Allowance for Application No. 102301583 dated Dec. 17, 2013.
 Taiwanese Notice of Allowance for Application No. 102301581 dated Dec. 17, 2013.
 Taiwanese Notice of Allowance for Application No. 102301585 dated Dec. 17, 2013.
 Notice of Allowance for U.S. Appl. No. 29/412,168 dated Dec. 20, 2013.
 Non-Final Office Action for U.S. Appl. No. 29/425,831 dated Dec. 24, 2013.
 Notice of Allowance for U.S. Appl. No. 29/412,166 dated Dec. 24, 2013.
 Non-Final Office Action for U.S. Appl. No. 29/451,177 dated Dec. 30, 2013.
 Notice of Allowance for U.S. Appl. No. 29/417,220 dated Jan. 10, 2014.
 Taiwanese Notice of Allowance for Application No. 102301582 dated Jan. 13, 2014.

(56)

References Cited

OTHER PUBLICATIONS

Taiwanese Notice of Allowance for Application No. 102301584 dated Jan. 13, 2014.

Japanese Decision of Registration for Application No. 2013-018279 dated Jan. 15, 2014.

Taiwanese Notice of Allowance for Application No. 102300058 dated Jan. 17, 2014.

Taiwanese Notice of Allowance for Application No. 102300059 dated Jan. 17, 2014.

Korean Notice of Rejection for Application No. KR 30-2012-0020198 dated Jan. 14, 2014.

Taiwanese Notice of Allowance for Application No. 101307667 dated Feb. 7, 2014.

Supplemental Notice of Allowance for U.S. Appl. No. 29/404,913 dated Feb. 20, 2014.

Notice of Allowance for U.S. Appl. No. 13/793,882 dated Mar. 12, 2014.

Restriction Requirement for U.S. Appl. No. 14/043,494 dated Mar. 20, 2014.

Restriction Requirement for U.S. Appl. No. 13/908,597 dated Mar. 20, 2014.

Restriction Requirement for U.S. Appl. No. 14/052,201 dated Mar. 20, 2014.

Non-Final Office Action for U.S. Appl. No. 13/282,172 dated Mar. 21, 2014.

Taiwanese Office Action for Application No. 100141888 dated Mar. 11, 2014.

Notice of Allowance for U.S. Appl. No. 29/451,177 dated Apr. 25, 2014.

Restriction Requirement for U.S. Appl. No. 14/148,102 dated Apr. 24, 2014.

Korean Notice of Allowance for Application No. 30-2012-0020196 dated Apr. 21, 2014.

Korean Notice of Allowance for Application No. 30-2012-0020197 dated Apr. 21, 2014.

Final Office Action for U.S. Appl. No. 13/224,850 dated May 30, 2014.

Online definition of the term "non-linear", <http://thefreedictionary.com/nonlinear>, accessed on May 17, 2014.

Final Office Action for U.S. Appl. No. 29/425,831 dated Jun. 10, 2014.

Korean Decision of Rejection for Application No. 10-2013-7015669 dated Nov. 6, 2014.

Non-Final Office Action for U.S. Appl. No. 14/148,102 dated Dec. 5, 2014.

Taiwanese Notice of Allowance for Application No. 100141889 dated Dec. 8, 2014.

Notice of Allowance for U.S. Appl. No. 14/043,494 dated Dec. 10, 2014.

Korean Certificate of Design Patent for Application No. 2012-0020196 dated Jul. 14, 2014.

Korean Certificate of Design Patent for Application No. 2012-0020197 dated Jul. 14, 2014.

Notice of Allowance for U.S. Appl. No. 14/052,201 dated Nov. 28, 2014.

Restriction Requirement for U.S. Appl. No. 29/452,692 dated Dec. 4, 2014.

Non-Final Office Action for U.S. Appl. No. 13/224,850 dated Dec. 18, 2014.

Japanese Office Action for Application No. 2013-540955 dated Jan. 20, 2015.

Notice of Allowance for U.S. Appl. No. 14/189,500 dated Jan. 23, 2015.

Korean Decision to Decline Amendment and Decision of Rejection for Application No. 10-2013-7015669 dated Dec. 26, 2014.

Notice of Allowance for U.S. Appl. No. 14/168,561 dated Nov. 28, 2014.

Korean Office Action for Application No. 10-2013-7015669 dated Jun. 3, 2014.

European Notice of Publication for Application No. 12827778.7 dated Jun. 12, 2014

Restriction Requirement for U.S. Appl. No. 13/836,709 dated Jun. 19, 2014.

Non-Final Office Action for U.S. Appl. No. 14/052,201 dated Jun. 19, 2014.

Non-Final Office Action for U.S. Appl. No. 14/043,494 dated Jun. 20, 2014.

Non-Final Office Action for U.S. Appl. No. 14/148,102 dated Jun. 20, 2014.

Restriction Requirement for U.S. Appl. No. 14/168,561 dated Jul. 1, 2014.

Non-Final Office Action for U.S. Appl. No. 14/189,500 dated Jul. 15, 2014.

Korean Trial Decision for Application No. 30-2012-0020198 dated Jul. 29, 2014.

Notice of Allowance for U.S. Appl. No. 13/908,597 dated Aug. 20, 2014.

European Patent Office Communication pursuant to Rule 114(2) EPC for Application No. 2011-0843773 dated Aug. 20, 2014.

Japanese Office Action for Application No. 2012031548 dated Sep. 1, 2014.

Japanese Office Action for Application No. 2012031549 dated Sep. 1, 2014.

Notice of Allowance for U.S. Appl. No. 29/425,831 dated Sep. 4, 2014.

Final Office Action for U.S. Appl. No. 13/282,172 dated Sep. 17, 2014.

* cited by examiner

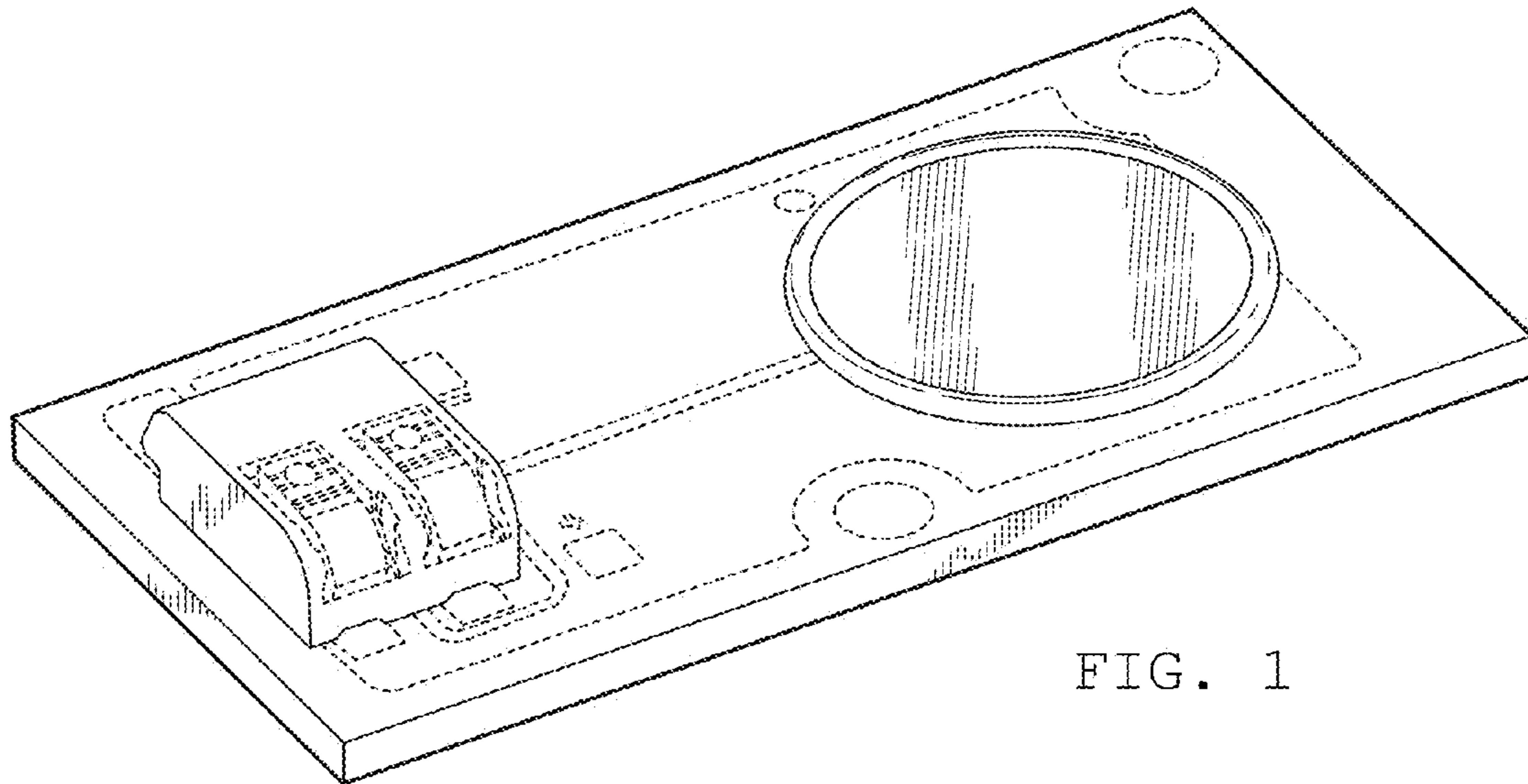


FIG. 1

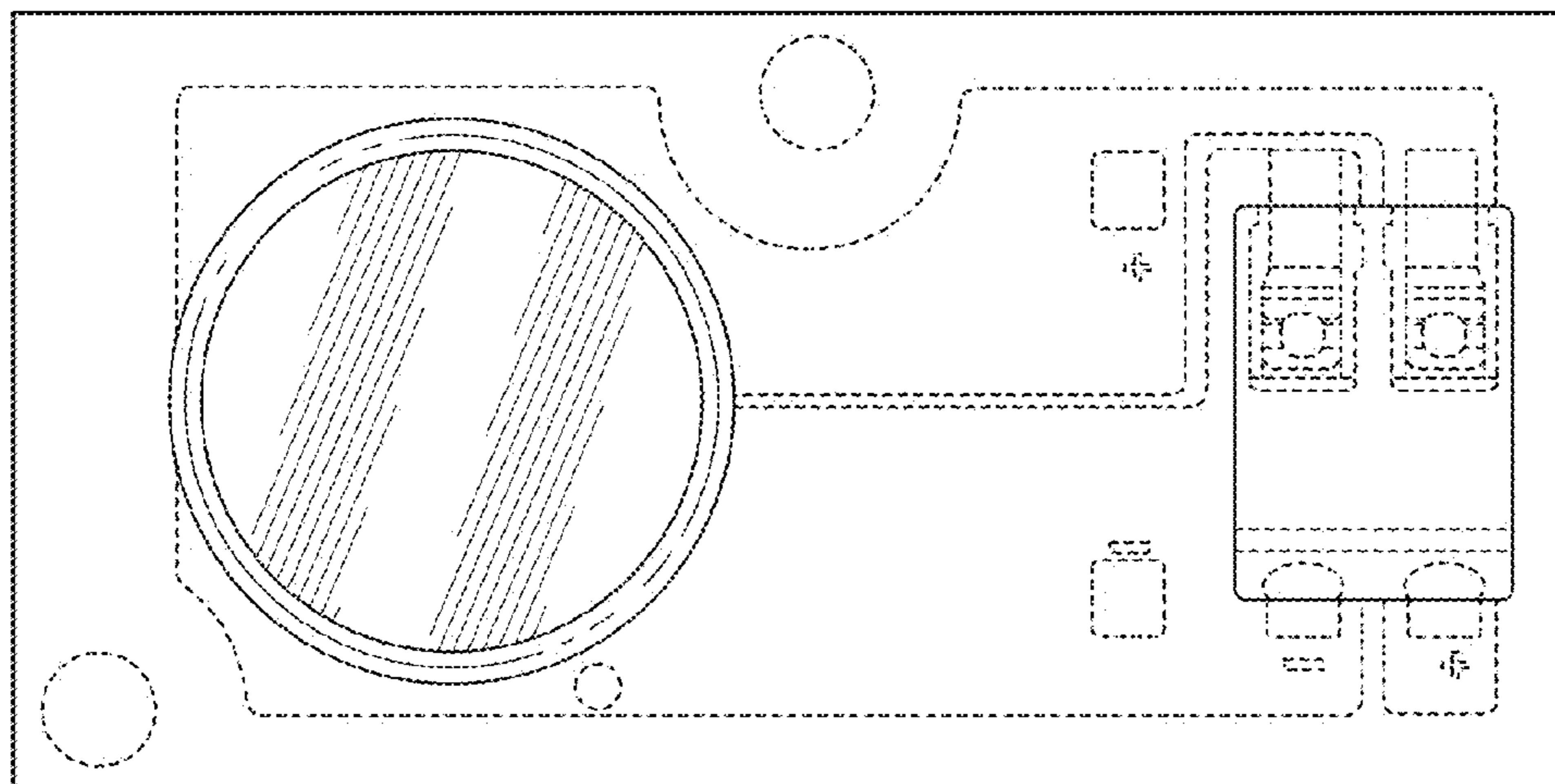


FIG. 2

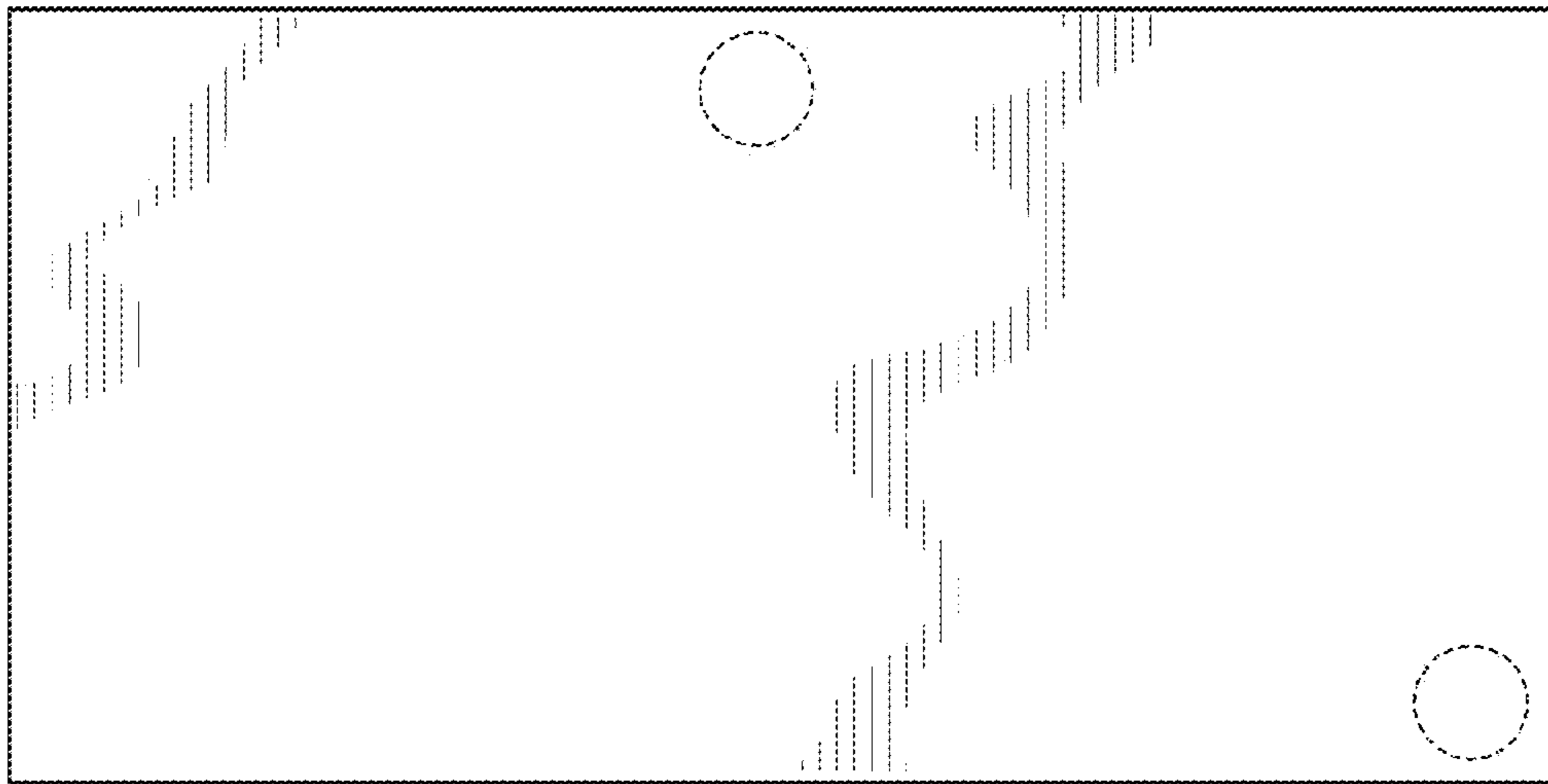


FIG. 3

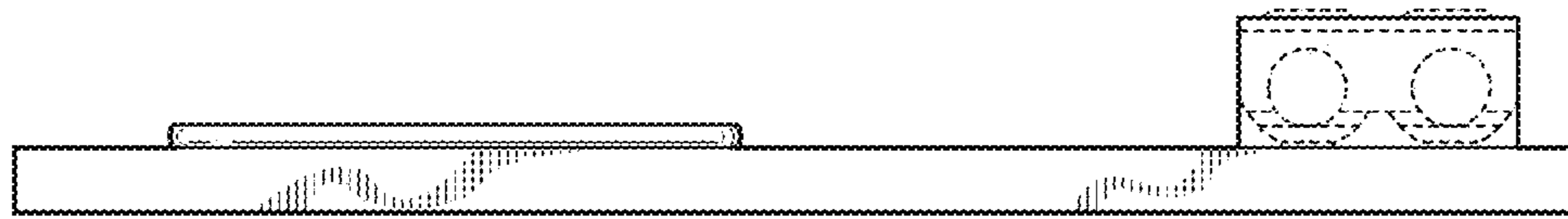


FIG. 4

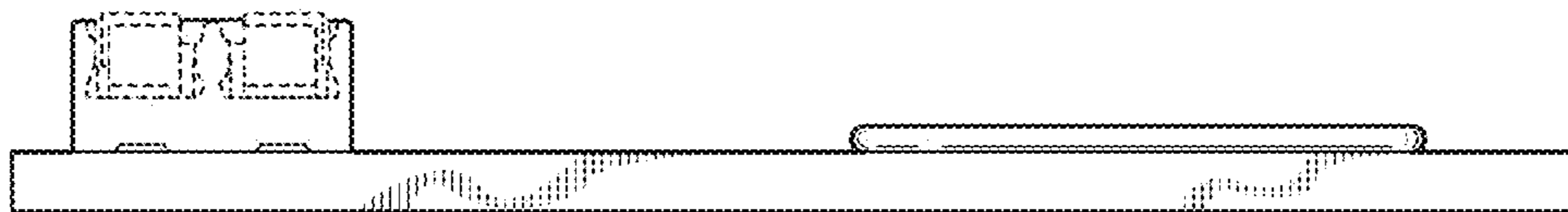


FIG. 5

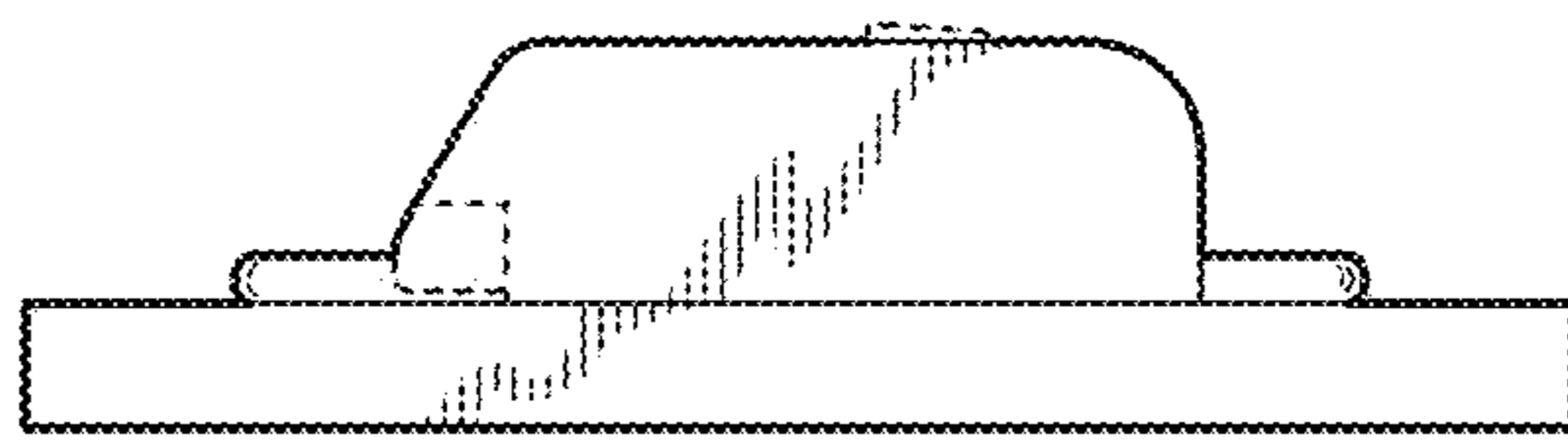


FIG. 6

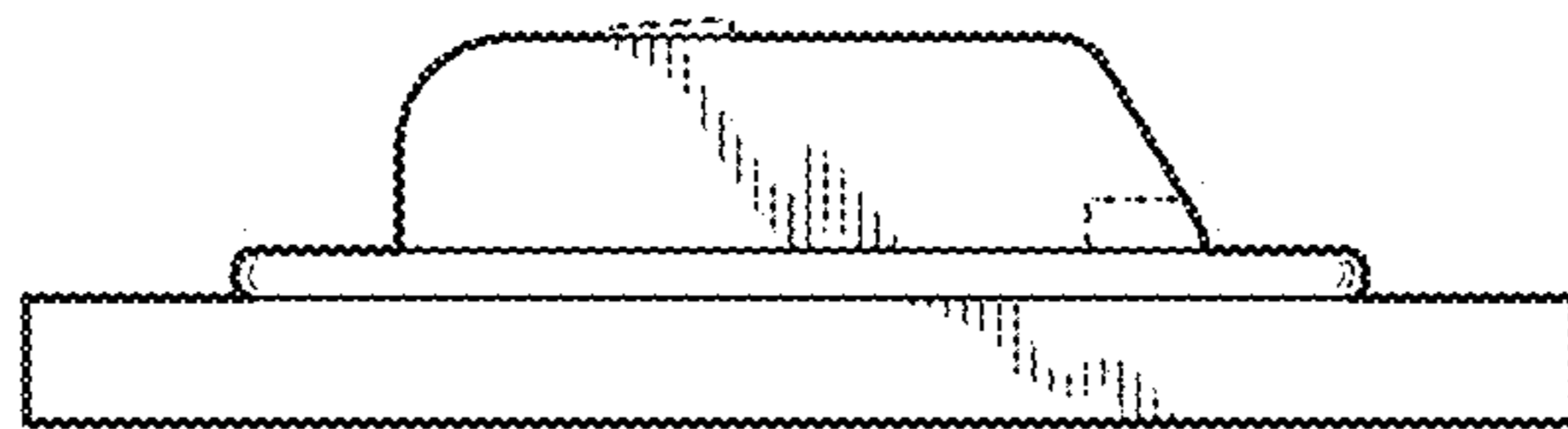


FIG. 7