



US00D703711S

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

(10) **Patent No.:** **US D703,711 S**
(45) **Date of Patent:** **** Apr. 29, 2014**

(54) **VENTILATED VACUUM COMMUNICATION STRUCTURE**

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(**) Term: **14 Years**

(21) Appl. No.: **29/465,046**

(22) Filed: **Aug. 23, 2013**

(51) **LOC (10) Cl.** **15-09**

(52) **U.S. Cl.**
USPC **D15/138**

(58) **Field of Classification Search**
USPC D15/199, 138; 83/100; 156/73.1, 250, 156/256, 265; 198/374, 417, 803.13; 221/1; 226/43, 118; 242/58.3

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

135,145 A	1/1873	Murphy
293,353 A	2/1884	Purvis
312,257 A	2/1885	Cotton et al.
410,123 A	8/1889	Stilwell
432,742 A	7/1890	Stanley
643,821 A	2/1900	Howlett
1,393,524 A	10/1921	Grupe
1,431,315 A	10/1922	Le Moine
1,605,842 A	11/1926	Jones
1,686,595 A	10/1928	Belluche
1,957,651 A	5/1934	Joa
2,009,857 A	7/1935	Potdevin
2,054,832 A	9/1936	Potdevin

2,117,432 A	5/1938	Linscott
2,128,746 A	8/1938	Joa
2,131,808 A	10/1938	Joa
2,164,408 A	7/1939	Joa
2,167,179 A	7/1939	Joa
2,171,741 A	9/1939	Cohn et al.
2,213,431 A	9/1940	Joa
2,254,290 A	9/1941	Joa
2,254,291 A	9/1941	Joa

(Continued)

FOREIGN PATENT DOCUMENTS

BE	1007854	11/1995
CA	1146129	5/1983

(Continued)

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(57) **CLAIM**

We claim the ornamental design for a ventilated vacuum commutation structure, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a ventilated vacuum commutation structure;

FIG. 2 is a first side view of the ventilated vacuum commutation structure;

FIG. 3 is a second side view of the ventilated vacuum commutation structure;

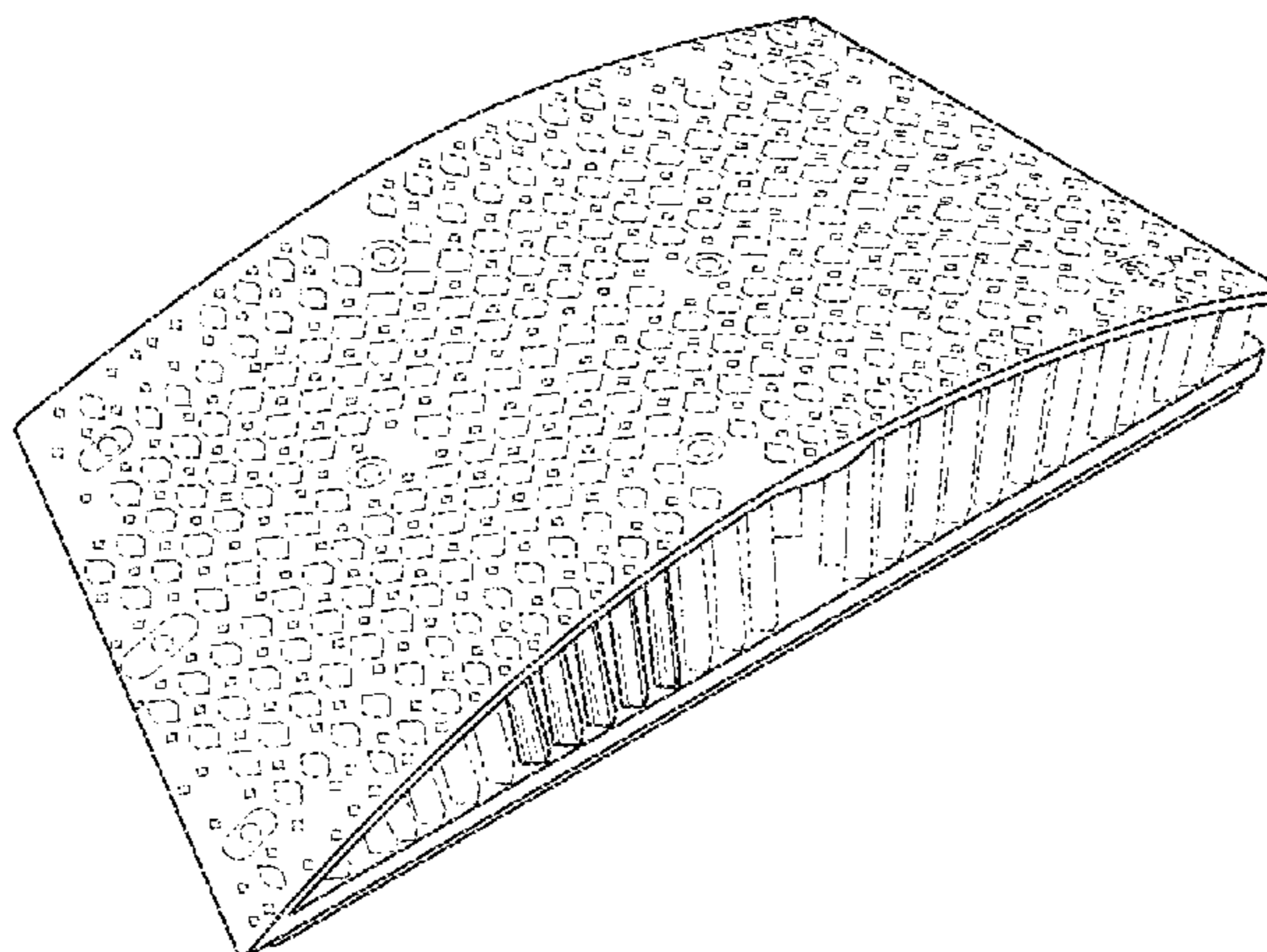
FIG. 4 is a top view of the ventilated vacuum commutation structure;

FIG. 5 is a bottom view of the ventilated vacuum commutation structure;

FIG. 6 is a front view of the ventilated vacuum commutation structure; and,

FIG. 7 is a rear view of the ventilated vacuum commutation structure.

1 Claim, 2 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

2,282,477 A	5/1942	Joa	3,575,170 A	4/1971	Clark
2,286,096 A	6/1942	Joa	3,607,578 A	9/1971	Berg et al.
2,296,931 A	9/1942	Joa	3,635,462 A	1/1972	Joa
2,304,571 A	12/1942	Joa	3,656,741 A	4/1972	Macke et al.
2,324,930 A	7/1943	Joa	3,666,611 A	5/1972	Joa
2,345,937 A	4/1944	Joa	3,673,021 A	6/1972	Joa
2,466,240 A	4/1949	Joa	3,685,818 A	8/1972	Burger et al.
2,481,929 A	9/1949	Joa	3,728,191 A	4/1973	Wierzba et al.
2,510,229 A	6/1950	Joa	3,745,947 A *	7/1973	Brocklehurst 112/470.05
2,540,844 A	2/1951	Strauss	3,751,224 A	8/1973	Wackerle
2,584,002 A	1/1952	Elser et al.	3,758,102 A	9/1973	Munn et al.
2,591,359 A	4/1952	Joa	3,762,542 A	10/1973	Grimes
2,618,816 A	11/1952	Joa	3,772,120 A	11/1973	Radzins
2,627,859 A	2/1953	Hargrave	3,776,798 A	12/1973	Milano
2,695,025 A	11/1954	Andrews	3,796,360 A	3/1974	Alexeff
2,702,406 A	2/1955	Reed	3,811,987 A	5/1974	Wilkinson et al.
2,721,554 A	10/1955	Joa	3,816,210 A	6/1974	Aoko et al.
2,730,144 A	1/1956	Joa	3,847,710 A	11/1974	Blomqvist et al.
2,772,611 A	12/1956	Heywood	3,854,917 A	12/1974	McKinney et al.
2,780,253 A	2/1957	Joa	3,883,389 A	5/1975	Schott, Jr.
2,785,609 A	3/1957	Billeb	3,888,400 A	6/1975	Wiig
2,788,786 A	4/1957	Dexter	3,901,238 A	8/1975	Gellert et al.
2,811,905 A	11/1957	Kennedy, Jr.	3,903,768 A	9/1975	Amberg et al.
2,828,745 A	4/1958	Deutz	3,904,147 A	9/1975	Taitel et al.
2,839,059 A	6/1958	Joa	3,918,698 A	11/1975	Coast
2,842,169 A	7/1958	Joa	3,921,481 A	11/1975	Fleetwood
2,851,934 A	9/1958	Heywood	3,941,038 A	3/1976	Bishop
2,875,724 A	3/1959	Joa	3,960,646 A	6/1976	Wiedemann
2,890,700 A	6/1959	Lonberg-Holm	3,988,194 A	10/1976	Babcock et al.
2,913,862 A	11/1959	Sabee	3,991,994 A	11/1976	Farish
2,939,461 A	6/1960	Joa	4,002,005 A	1/1977	Mueller et al.
2,939,646 A	6/1960	Stone	4,003,298 A	1/1977	Schott, Jr.
2,960,143 A	11/1960	Joa	4,009,626 A	3/1977	Gressman
2,990,081 A	6/1961	De Neui et al.	4,009,814 A	3/1977	Singh
2,991,739 A	7/1961	Joa	4,009,815 A	3/1977	Ericson et al.
3,016,207 A	1/1962	Comstock, III	4,053,150 A	10/1977	Lane
3,016,582 A	1/1962	Joa	4,056,919 A	11/1977	Hirsch
3,017,795 A	1/1962	Joa	4,081,301 A	3/1978	Buell
3,020,687 A	2/1962	Joa	4,090,516 A	5/1978	Schaar
3,021,135 A	2/1962	Joa	4,094,319 A	6/1978	Joa
3,024,957 A	3/1962	Pinto	4,103,595 A	8/1978	Corse
3,053,427 A	9/1962	Wasserman	4,106,974 A	8/1978	Hirsch
3,054,516 A	9/1962	Joa	4,108,584 A	8/1978	Radzins et al.
3,069,982 A	12/1962	Heywood et al.	4,136,535 A	1/1979	Audas
3,075,684 A	1/1963	Rothmann	4,141,193 A	2/1979	Joa
3,086,253 A	4/1963	Joa	4,141,509 A	2/1979	Radzins
3,087,689 A	4/1963	Heim	4,142,626 A	3/1979	Bradley
3,089,494 A	5/1963	Schwartz	4,157,934 A	6/1979	Ryan et al.
3,091,408 A	5/1963	Schoeneman	4,165,666 A	8/1979	Johnson et al.
3,114,994 A	12/1963	Joa	4,168,776 A	9/1979	Hoeboer
3,122,293 A	2/1964	Joa	4,171,239 A	10/1979	Hirsch et al.
3,128,206 A	4/1964	Dungler	4,205,679 A	6/1980	Repke et al.
3,203,419 A	8/1965	Joa	4,208,230 A	6/1980	Magarian
3,230,955 A	1/1966	Joa	4,213,356 A	7/1980	Armitage
3,268,954 A	8/1966	Joa	4,215,827 A	8/1980	Roberts et al.
3,289,254 A	12/1966	Joa	4,220,237 A	9/1980	Mohn
3,291,131 A	12/1966	Joa	4,222,533 A	9/1980	Pongracz
3,301,114 A	1/1967	Joa	4,223,822 A	9/1980	Clitheroe
3,318,608 A	5/1967	Smrekar	4,231,129 A	11/1980	Winch
3,322,589 A	5/1967	Joa	4,234,157 A	11/1980	Hodgeman et al.
3,342,184 A	9/1967	Joa	4,236,955 A	12/1980	Prittie
3,356,092 A	12/1967	Joa	4,275,510 A	6/1981	George
3,360,103 A	12/1967	Joa	4,284,454 A	8/1981	Joa
3,363,847 A	1/1968	Joa	4,297,157 A *	10/1981	Van Vliet 156/164
3,391,777 A	7/1968	Joa	4,307,800 A	12/1981	Joa
3,454,442 A	7/1969	Heller, Jr.	4,316,756 A	2/1982	Wilson
3,463,413 A	8/1969	Smith	4,325,519 A	4/1982	McLean
3,470,848 A	10/1969	Dreher	4,342,206 A	8/1982	Rommel
3,484,275 A	12/1969	Lewicki, Jr.	4,349,140 A	9/1982	Passafiume
3,502,322 A	3/1970	Cran	4,364,787 A	12/1982	Radzins
3,521,639 A	7/1970	Joa	4,374,576 A	2/1983	Ryan
3,526,563 A	9/1970	Schott, Jr.	4,379,008 A	4/1983	Gross et al.
3,527,123 A	9/1970	Dovey	4,394,898 A	7/1983	Campbell
3,538,551 A	11/1970	Joa	4,411,721 A	10/1983	Wishart
3,540,641 A	11/1970	Besnyo	4,426,897 A	1/1984	Littleton
			4,452,597 A	6/1984	Achelpohl
			4,479,836 A	10/1984	Dickover et al.
			4,492,608 A	1/1985	Hirsch et al.
			4,501,098 A	2/1985	Gregory

(56)

References Cited

U.S. PATENT DOCUMENTS

4,508,528 A	4/1985	Hirsch et al.	5,064,179 A	11/1991	Martin
4,522,853 A	6/1985	Szonn et al.	5,064,492 A	11/1991	Friesch
4,543,152 A	9/1985	Nozaka	5,080,741 A	1/1992	Nomura et al.
4,551,191 A	11/1985	Kock et al.	5,094,658 A	3/1992	Smithe et al.
4,578,133 A	3/1986	Oshefsky et al.	5,096,532 A	3/1992	Neuwirth et al.
4,586,199 A	5/1986	Birring	5,108,017 A	4/1992	Adamski, Jr. et al.
4,589,945 A	5/1986	Polit	5,109,767 A	5/1992	Nyfeler et al.
4,603,800 A	8/1986	Focke et al.	5,110,403 A	5/1992	Ehlert
4,606,964 A	8/1986	Wideman	5,127,981 A	7/1992	Straub et al.
4,608,115 A	8/1986	Schroth et al.	5,131,525 A	7/1992	Musschoot
4,610,681 A	9/1986	Strohbeen et al.	5,131,901 A	7/1992	Moll
4,610,682 A	9/1986	Kopp	5,133,511 A	7/1992	Mack
4,614,076 A	9/1986	Rathemacher	5,147,487 A	9/1992	Nomura et al.
4,619,357 A	10/1986	Radzins et al.	5,163,594 A	11/1992	Meyer
4,625,612 A	12/1986	Oliver	5,171,239 A	12/1992	Igaue et al.
4,634,482 A	1/1987	Lammers	5,176,244 A	1/1993	Radzins et al.
4,641,381 A	2/1987	Heran et al.	5,183,252 A	2/1993	Wolber et al.
4,642,150 A	2/1987	Stemmler	5,188,627 A	2/1993	Igaue et al.
4,642,839 A	2/1987	Urban	5,190,234 A	3/1993	Ezekiel
4,650,173 A *	3/1987	Johnson et al. 270/45	5,195,684 A	3/1993	Radzins
4,650,530 A	3/1987	Mahoney et al.	5,203,043 A	4/1993	Riedel
4,663,220 A	5/1987	Wisneski et al.	5,213,645 A	5/1993	Nomura et al.
4,672,705 A	6/1987	Bors et al.	5,222,422 A	6/1993	Benner, Jr. et al.
4,675,016 A	6/1987	Meuli et al.	5,223,069 A	6/1993	Tokuno et al.
4,675,062 A	6/1987	Instance	5,226,992 A	7/1993	Morman
4,675,068 A	6/1987	Lundmark	5,246,433 A	9/1993	Hasse et al.
4,686,136 A	8/1987	Homonoff et al.	5,252,228 A	10/1993	Stokes
4,693,056 A	9/1987	Raszewski	5,267,933 A	12/1993	Precoma
4,701,239 A	10/1987	Craig	5,273,228 A	12/1993	Yoshida
4,720,415 A	1/1988	Vander Wielen et al.	5,275,076 A	1/1994	Greenwalt
4,723,698 A	2/1988	Schoonderbeek	5,275,676 A	1/1994	Rooyakkers et al.
4,726,874 A	2/1988	Van Vliet	5,308,345 A	5/1994	Herrin
4,726,876 A	2/1988	Tomsovic, Jr.	5,328,438 A	7/1994	Crowley
4,743,241 A	5/1988	Igaue et al.	5,334,446 A	8/1994	Quantrille et al.
4,751,997 A	6/1988	Hirsch	5,340,424 A	8/1994	Matsushita
4,753,429 A	6/1988	Irvine et al.	5,353,909 A	10/1994	Mukai
4,756,141 A	7/1988	Hirsch et al.	5,368,893 A	11/1994	Sommer et al.
4,764,325 A	8/1988	Angstadt	5,389,173 A	2/1995	Merkatoris et al.
4,765,780 A	8/1988	Angstadt	5,393,360 A	2/1995	Bridges et al.
4,776,920 A	10/1988	Ryan	5,407,507 A	4/1995	Ball
4,777,513 A	10/1988	Nelson	5,407,513 A	4/1995	Hayden et al.
4,782,647 A	11/1988	Williams et al.	5,410,857 A	5/1995	Utlely
4,785,986 A	11/1988	Daane et al.	5,415,649 A	5/1995	Watanabe et al.
4,795,451 A	1/1989	Buckley	5,417,132 A	5/1995	Cox et al.
4,795,510 A	1/1989	Wittrock et al.	5,421,924 A	6/1995	Ziegelhoffer et al.
4,798,353 A	1/1989	Peugh	5,424,025 A	6/1995	Hanschen et al.
4,801,345 A	1/1989	Dussaud et al.	5,429,576 A	7/1995	Doderer-Winkler
4,802,570 A	2/1989	Hirsch et al.	5,435,802 A	7/1995	Kober
4,826,499 A	5/1989	Ahr	5,435,971 A	7/1995	Dyckman
4,840,609 A	6/1989	Jones et al.	5,449,353 A	9/1995	Watanabe et al.
4,845,964 A	7/1989	Bors et al.	5,464,401 A	11/1995	Hasse et al.
4,864,802 A	9/1989	D'Angelo	5,486,253 A	1/1996	Otruba
4,880,102 A	11/1989	Indrebo	5,494,622 A	2/1996	Heath et al.
4,888,231 A	12/1989	Angstadt	5,500,075 A	3/1996	Herrmann
4,892,536 A	1/1990	Des Marais et al.	5,516,392 A	5/1996	Bridges et al.
4,904,440 A	2/1990	Angstadt	5,518,566 A	5/1996	Bridges et al.
4,908,175 A	3/1990	Angstadt	5,525,175 A	6/1996	Blenke et al.
4,909,019 A	3/1990	Delacretaz et al.	5,531,850 A	7/1996	Herrmann
4,915,767 A	4/1990	Rajala et al.	5,540,647 A	7/1996	Weiermann et al.
4,917,746 A	4/1990	Kons	5,540,796 A	7/1996	Fries
4,925,520 A	5/1990	Beaudoin et al.	5,545,275 A	8/1996	Herrin et al.
4,927,322 A	5/1990	Schweizer et al.	5,545,285 A	8/1996	Johnson
4,927,486 A	5/1990	Fattal et al.	5,552,013 A	9/1996	Ehlert et al.
4,927,582 A	5/1990	Bryson	5,555,786 A	9/1996	Fuller
4,937,887 A	7/1990	Schreiner	5,556,360 A	9/1996	Kober et al.
4,963,072 A	10/1990	Miley et al.	5,556,504 A	9/1996	Rajala et al.
4,987,940 A	1/1991	Straub et al.	5,560,793 A	10/1996	Ruscher et al.
4,994,010 A	2/1991	Doderer-Winkler	3,288,037 A	11/1996	Burnett
5,000,806 A	3/1991	Merkatoris et al.	5,575,187 A	11/1996	Dieterlen
5,021,111 A	6/1991	Swenson	5,586,964 A	12/1996	Chase
5,025,910 A	6/1991	Lasure et al.	5,602,747 A	2/1997	Rajala
5,029,505 A	7/1991	Holiday	5,603,794 A	2/1997	Thomas
5,045,039 A	9/1991	Bay	5,624,420 A	4/1997	Bridges et al.
5,045,135 A	9/1991	Meissner et al.	5,624,428 A	4/1997	Sauer
5,062,597 A	11/1991	Martin et al.	5,628,738 A	5/1997	Suekane
			5,634,917 A	6/1997	Fujioka et al.
			5,636,500 A	6/1997	Gould
			5,643,165 A	7/1997	Klekamp
			5,643,396 A	7/1997	Rajala et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

5,645,543	A	7/1997	Nomura et al.	6,314,333	B1	11/2001	Rajala et al.
5,659,229	A	8/1997	Rajala	6,315,022	B1	11/2001	Herrin et al.
5,660,657	A	8/1997	Rajala et al.	6,319,347	B1	11/2001	Rajala
5,660,665	A	8/1997	Jalonen	6,336,921	B1	1/2002	Kato et al.
5,683,376	A	11/1997	Kato et al.	6,336,922	B1	1/2002	VanGompel et al.
5,683,531	A	11/1997	Roessler et al.	6,336,923	B1	1/2002	Fujioka et al.
5,685,873	A	11/1997	Bruemmer	6,358,350	B1	3/2002	Glaug et al.
RE35,687	E	12/1997	Igaue et al.	6,369,291	B1	4/2002	Uchimoto et al.
5,693,165	A	12/1997	Schmitz	6,375,769	B1	4/2002	Quereshi et al.
5,699,653	A	12/1997	Hartman et al.	6,391,013	B1	5/2002	Suzuki et al.
5,705,013	A	1/1998	Nease	6,416,697	B1	7/2002	Venturino et al.
5,707,470	A	1/1998	Rajala et al.	6,425,430	B1*	7/2002	Ward et al. 156/440
5,711,832	A	1/1998	Glaug et al.	6,431,038	B2	8/2002	Couturier
5,725,518	A	3/1998	Coates	6,440,246	B1	8/2002	Vogt et al.
5,725,714	A	3/1998	Fujioka	6,443,389	B1	9/2002	Palone
5,743,994	A	4/1998	Roessler et al.	6,446,795	B1	9/2002	Allen et al.
5,745,922	A	5/1998	Rajala et al.	6,473,669	B2	10/2002	Rajala et al.
5,746,869	A	5/1998	Hayden et al.	6,475,325	B1	11/2002	Parrish et al.
5,749,989	A	5/1998	Linman et al.	6,478,786	B1	11/2002	Glaug et al.
5,759,340	A	6/1998	Boothe et al.	6,482,278	B1	11/2002	McCabe et al.
5,766,389	A	6/1998	Brandon et al.	6,494,244	B2	12/2002	Parrish et al.
5,766,411	A	6/1998	Wilson	6,514,233	B1	2/2003	Glaug
5,779,689	A	7/1998	Pfeifer et al.	6,521,320	B2	2/2003	McCabe et al.
5,788,797	A	8/1998	Herrin et al.	6,523,595	B1	2/2003	Milner et al.
5,817,199	A	10/1998	Brennecke et al.	6,524,423	B1	2/2003	Hilt et al.
5,827,259	A	10/1998	Laux et al.	6,533,879	B2	3/2003	Quereshi et al.
5,829,164	A	11/1998	Kotitschke	6,540,857	B1	4/2003	Coenen et al.
5,836,931	A	11/1998	Toyoda et al.	6,547,909	B1	4/2003	Butterworth
5,858,012	A	1/1999	Yamaki et al.	6,550,517	B1	4/2003	Hilt et al.
5,865,393	A	2/1999	Kreft et al.	6,551,228	B1	4/2003	Richards
5,868,727	A	2/1999	Barr et al.	6,551,430	B1	4/2003	Glaug et al.
5,876,027	A	3/1999	Fukui et al.	6,554,815	B1	4/2003	Umebayashi
5,876,792	A	3/1999	Caldwell	6,569,275	B1	5/2003	Popp et al.
5,879,500	A	3/1999	Herrin et al.	6,572,520	B2	6/2003	Blumle
5,902,431	A	5/1999	Wilkinson et al.	6,581,517	B1	6/2003	Becker et al.
5,904,675	A	5/1999	Laux et al.	6,585,841	B1	7/2003	Popp et al.
5,932,039	A	8/1999	Popp et al.	6,589,149	B1	7/2003	VanEperen et al.
5,935,367	A	8/1999	Hollenbeck	6,596,107	B2	7/2003	Stopher
5,938,193	A	8/1999	Bluemle et al.	6,596,108	B2	7/2003	McCabe
5,938,652	A	8/1999	Sauer	6,605,172	B1	8/2003	Anderson et al.
5,964,390	A	10/1999	Borresen et al.	6,605,173	B2	8/2003	Glaug et al.
5,964,970	A	10/1999	Woolwine et al.	6,620,276	B1	9/2003	Kuntze et al.
5,971,134	A	10/1999	Trefz et al.	6,634,269	B2	10/2003	Eckstein et al.
5,983,764	A	11/1999	Hillebrand	6,637,583	B1	10/2003	Anderson
6,009,781	A	1/2000	McNeil	6,648,122	B1	11/2003	Hirsch et al.
6,022,443	A	2/2000	Rajala et al.	6,649,010	B2	11/2003	Parrish et al.
6,036,805	A	3/2000	McNichols	6,656,309	B1	12/2003	Parker et al.
6,043,836	A	3/2000	Kerr et al.	6,659,150	B1	12/2003	Perkins et al.
6,050,517	A	4/2000	Dobrescu et al.	6,659,991	B2	12/2003	Suckane
6,074,110	A	6/2000	Verlinden et al.	6,675,552	B2	1/2004	Kunz et al.
6,076,442	A	6/2000	Arterburn et al.	6,682,626	B2	1/2004	Mlinar et al.
6,080,909	A	6/2000	Osterdahl et al.	6,684,925	B2	2/2004	Nagate et al.
6,098,249	A	8/2000	Toney et al.	6,722,494	B2	4/2004	Nakakado
6,123,792	A	9/2000	Samida et al.	6,730,189	B1	5/2004	Franzmann
6,142,048	A	11/2000	Bradatsch et al.	6,743,324	B2	6/2004	Hargett et al.
6,171,432	B1	1/2001	Brisebois	6,750,466	B2	6/2004	Song
6,183,576	B1	2/2001	Couillard et al.	6,758,109	B2	7/2004	Nakakado
6,193,054	B1	2/2001	Henson et al.	6,766,817	B2	7/2004	da Silva
6,193,702	B1	2/2001	Spencer	6,779,426	B1	8/2004	Holliday
6,195,850	B1	3/2001	Melbye	6,808,582	B2	10/2004	Popp et al.
6,210,386	B1	4/2001	Inoue	D497,991	S	11/2004	Otsubo et al.
6,212,859	B1	4/2001	Bielik, Jr. et al.	6,811,019	B2	11/2004	Christian et al.
6,214,147	B1	4/2001	Mortellite et al.	6,811,642	B2	11/2004	Ochi
6,250,048	B1	6/2001	Linkiewicz	6,814,217	B2	11/2004	Blumenthal et al.
6,264,639	B1	7/2001	Sauer	6,820,671	B2	11/2004	Calvert
6,264,784	B1	7/2001	Menard et al.	6,823,981	B2*	11/2004	Ogle et al. 198/417
6,276,421	B1	8/2001	Valenti et al.	6,837,840	B2	1/2005	Yonekawa et al.
6,276,587	B1	8/2001	Borresen	6,840,616	B2	1/2005	Summers
6,280,373	B1	8/2001	Lanvin	6,852,186	B1	2/2005	Matsuda et al.
6,284,081	B1	9/2001	Vogt et al.	6,869,494	B2	3/2005	Roessler et al.
6,287,409	B1	9/2001	Stephany	6,875,202	B2	4/2005	Kumasaka et al.
6,305,260	B1	10/2001	Truttman et al.	6,884,310	B2	4/2005	Roessler et al.
6,306,122	B1	10/2001	Narawa et al.	6,893,528	B2	5/2005	Middelstadt et al.
6,309,336	B1	10/2001	Muessig et al.	6,913,718	B2	7/2005	Ducker
6,312,420	B1	11/2001	Sasaki et al.	6,918,404	B2	7/2005	Dias da Silva
				6,976,521	B2	12/2005	Mlinar
				6,978,486	B2	12/2005	Zhou et al.
				7,017,321	B2	3/2006	Salvoni
				7,017,820	B1	3/2006	Brunner

(56)

References Cited

U.S. PATENT DOCUMENTS

7,045,031 B2	5/2006	Popp et al.	2002/0059013 A1	5/2002	Rajala et al.
7,047,852 B2	5/2006	Franklin et al.	2002/0096241 A1	7/2002	Instance
7,048,725 B2	5/2006	Kling et al.	2002/0125105 A1	9/2002	Nakakado
7,066,586 B2	6/2006	da Silva	2002/0162776 A1	11/2002	Hergeth
7,069,970 B2	7/2006	Tomsovic et al.	2003/0000620 A1	1/2003	Herrin et al.
7,077,393 B2	7/2006	Ishida	2003/0015209 A1	1/2003	Gingras et al.
7,130,710 B2	10/2006	Shechtman	2003/0051802 A1	3/2003	Hargett et al.
7,137,971 B2	11/2006	Tanzer	2003/0052148 A1	3/2003	Rajala et al.
7,172,666 B2	2/2007	Groves et al.	2003/0066585 A1	4/2003	McCabe
7,175,584 B2	2/2007	Maxton et al.	2003/0083638 A1	5/2003	Molee
7,195,684 B2	3/2007	Satoh	2003/0084984 A1	5/2003	Glaug et al.
7,201,345 B2	4/2007	Werner	2003/0089447 A1	5/2003	Molee et al.
7,214,174 B2	5/2007	Allen et al.	2003/0115660 A1	6/2003	Hopkins
7,214,287 B2	5/2007	Shiomi	2003/0121244 A1	7/2003	Abba
7,220,335 B2	5/2007	Van Gompel et al.	2003/0121614 A1	7/2003	Tabor et al.
7,247,219 B2	7/2007	O'Dowd	2003/0135189 A1	7/2003	Umebayashi
7,252,730 B2	8/2007	Hoffman et al.	2003/0150551 A1	8/2003	Baker
7,264,686 B2	9/2007	Thorson et al.	2004/0007328 A1	1/2004	Popp et al.
7,303,708 B2	12/2007	Andrews et al.	2004/0016500 A1	1/2004	Tachibana et al.
7,326,311 B2	2/2008	Krueger et al.	2004/0044325 A1	3/2004	Corneliusson
7,332,459 B2	2/2008	Collins et al.	2004/0073187 A1	4/2004	Karami
7,374,627 B2	5/2008	McCabe	2004/0084468 A1*	5/2004	Kelbert et al. 221/1
7,380,213 B2	5/2008	Pesin	2004/0087425 A1	5/2004	Ng et al.
7,398,870 B2	7/2008	McCabe	2004/0098791 A1	5/2004	Faulks
7,449,084 B2	11/2008	Nakakado	2004/0112517 A1	6/2004	Groves et al.
7,452,436 B2	11/2008	Andrews	2004/0164482 A1	8/2004	Edinger
7,533,709 B2	5/2009	Meyer	2004/0167493 A1	8/2004	Jarpenberg et al.
7,537,215 B2	5/2009	Beaudoin et al.	2004/0177737 A1	9/2004	Adami
7,587,966 B2	9/2009	Nakakado et al.	2004/0182213 A1	9/2004	Wagner et al.
7,618,513 B2	11/2009	Meyer	2004/0182497 A1	9/2004	Lowrey
7,638,014 B2	12/2009	Coose et al.	2004/0216830 A1	11/2004	Van Eperen
7,640,962 B2	1/2010	Meyer et al.	2005/0000628 A1	1/2005	Norrby
7,695,464 B2	4/2010	Fletcher et al.	2005/0022476 A1	2/2005	Hamer
7,703,599 B2	4/2010	Meyer	2005/0056678 A1	3/2005	Nomura et al.
7,708,849 B2	5/2010	McCabe	2005/0077418 A1	4/2005	Werner et al.
7,770,712 B2	8/2010	McCabe	2005/0196538 A1	9/2005	Sommer et al.
7,771,407 B2	8/2010	Umebayashi	2005/0230056 A1	10/2005	Meyer et al.
7,780,052 B2	8/2010	McCabe	2005/0230449 A1	10/2005	Meyer et al.
7,793,772 B2	9/2010	Schafer	2005/0233881 A1	10/2005	Meyer
7,811,403 B2	10/2010	Andrews	2005/0234412 A1	10/2005	Andrews et al.
7,861,756 B2	1/2011	Jenquin et al.	2005/0257881 A1	11/2005	Coose et al.
7,871,400 B2	1/2011	Sablone et al.	2005/0275148 A1	12/2005	Beaudoin et al.
7,909,956 B2	3/2011	Coose et al.	2006/0011030 A1	1/2006	Wagner et al.
7,922,983 B2	4/2011	Prokash et al.	2006/0021300 A1	2/2006	Tada et al.
7,935,296 B2	5/2011	Koele et al.	2006/0137298 A1	6/2006	Oshita et al.
7,975,584 B2	7/2011	McCabe	2006/0201619 A1	9/2006	Andrews
7,987,964 B2	8/2011	McCabe	2006/0224137 A1	10/2006	McCabe et al.
8,007,484 B2	8/2011	McCabe et al.	2006/0265867 A1	11/2006	Schaap
8,007,623 B2	8/2011	Andrews	2006/0266465 A1*	11/2006	Meyer 156/250
8,011,493 B2	9/2011	Giuliani et al.	2007/0074953 A1	4/2007	McCabe
8,016,972 B2	9/2011	Andrews et al.	2007/0131343 A1	6/2007	Nordang
8,025,652 B2	9/2011	Hornung et al.	2007/0131817 A1	6/2007	Fromm
8,062,459 B2	11/2011	Nakakado et al.	2008/0041206 A1	2/2008	Mergola et al.
8,100,173 B2	1/2012	Hornung et al.	2008/0210067 A1	9/2008	Schlinz et al.
8,172,977 B2	5/2012	Andrews et al.	2008/0223537 A1	9/2008	Wiedmann
8,176,573 B2	5/2012	Popp et al.	2008/0281286 A1	11/2008	Peterson
8,178,035 B2	5/2012	Edvardsson et al.	2008/0287898 A1	11/2008	Guzman
8,182,624 B2	5/2012	Handziak	2009/0020211 A1	1/2009	Andrews et al.
8,182,735 B2	5/2012	Edvardsson	2009/0126864 A1	5/2009	Tachibana et al.
8,182,736 B2	5/2012	Edvardsson	2009/0198205 A1	8/2009	Malowaniec et al.
8,293,056 B2	10/2012	McCabe	2009/0212468 A1	8/2009	Edvardsson et al.
8,381,489 B2	2/2013	Freshwater et al.	2010/0078119 A1	4/2010	Yamamoto
8,398,793 B2	3/2013	Andrews et al.	2010/0078120 A1	4/2010	Otsubo
8,417,374 B2	4/2013	Meyer et al.	2010/0078127 A1	4/2010	Yamamoto
8,439,814 B2*	5/2013	Piantoni et al. 493/416	2010/0193135 A1	8/2010	Eckstein et al.
8,460,495 B2	6/2013	McCabe	2010/0193138 A1	8/2010	Eckstein
8,512,496 B2	8/2013	Makimura	2010/0193155 A1	8/2010	Nakatani
2001/0012813 A1	8/2001	Bluemle	2010/0249737 A1	9/2010	Ito et al.
2001/0017181 A1	8/2001	Otruba et al.	2011/0106042 A1	5/2011	Sablone et al.
2001/0035332 A1	11/2001	Zeitler	2012/0079926 A1	4/2012	Long et al.
2001/0042591 A1	11/2001	Milner et al.	2012/0123377 A1	5/2012	Back
2002/0040630 A1	4/2002	Piazza	2012/0270715 A1	10/2012	Motegi et al.
2002/0046802 A1	4/2002	Tachibana et al.	2012/0285306 A1	11/2012	Weibelt
			2012/0310193 A1	12/2012	Ostertag
			2012/0312463 A1	12/2012	Ogasawara et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2013/0066613 A1* 3/2013 Russell 703/7
 2013/0239765 A1* 9/2013 McCabe et al. 83/100

FOREIGN PATENT DOCUMENTS

CA 1153345 9/1983
 CA 1190078 7/1985
 CA 1210744 9/1986
 CA 1212132 9/1986
 CA 1236056 5/1988
 CA 1249102 1/1989
 CA 1292201 11/1991
 CA 1307244 9/1992
 CA 1308015 9/1992
 CA 1310342 11/1992
 CA 2023816 3/1994
 CA 2330679 9/1999
 CA 2404154 10/2001
 CA 2541194 10/2006
 CA 2559517 4/2007
 CA 2337700 8/2008
 CA 2407867 6/2010
 CA 2699136 10/2010
 CA 142627 6/2013
 CA 2600432 7/2013
 CN 202105105 1/2012
 DE 60123502 10/2006
 DE 60216550 12/2006
 DE 102005035544 2/2007
 DE 102005048868 4/2007
 DE 102006047280 4/2007
 DE 102007063209 6/2009
 EP 0044206 1/1982
 EP 0048011 3/1982
 EP 0089106 9/1983
 EP 0099732 2/1984
 EP 0206208 12/1986
 EP 0304140 2/1989
 EP 0411287 2/1991
 EP 0439897 8/1991
 EP 0455231 A1 11/1991
 EP 510251 10/1992
 EP 0589859 3/1994
 EP 0676352 4/1995
 EP 0652175 A1 5/1995
 EP 0811473 12/1997
 EP 0901780 3/1999
 EP 0990588 4/2000
 EP 1132325 A2 9/2001
 EP 1035818 4/2002
 EP 1199057 4/2002
 EP 1366734 12/2003
 EP 1393701 3/2004
 EP 1415628 5/2004
 EP 1433731 6/2004
 EP 1571249 9/2005
 EP 1619008 1/2006
 EP 1707168 A2 10/2006
 EP 1726414 11/2006
 EP 1302424 12/2006
 EP 1801045 6/2007
 EP 1941853 7/2008
 EP 1961403 8/2008
 EP 1994919 11/2008
 EP 2180864 11/2008
 EP 2211812 11/2008
 EP 2103427 9/2009
 EP 2233116 9/2010

EP 2238955 10/2010
 EP 1175880 5/2012
 EP 1868821 1/2013
 EP 2036522 3/2013
 EP 1272347 4/2013
 EP 2032338 8/2013
 ES 509706 11/1982
 ES 520559 12/1983
 ES 296211 12/1987
 ES 200601373 7/2009
 ES 2311349 9/2009
 FR 2177355 11/1973
 FR 2255961 7/1975
 FR 1132325 10/2006
 FR 2891811 4/2007
 GB 191101501 A 0/1912
 GB 439897 12/1935
 GB 856389 12/1960
 GB 941073 11/1963
 GB 1096373 12/1967
 GB 1126539 9/1968
 GB 1346329 2/1974
 GB 1412812 11/1975
 GB 1467470 3/1977
 GB 2045298 10/1980
 GB 2115775 9/1983
 GB 2288316 10/1995
 IT 1374910 5/2010
 IT 1374911 5/2010
 JP 428364 1/1992
 JP 542180 2/1993
 JP 576566 3/1993
 JP 626160 2/1994
 JP 626161 2/1994
 JP 6197925 A 7/1994
 JP 9299398 11/1997
 JP 10035621 2/1998
 JP 10-277091 A 10/1998
 JP 2008-161300 7/2008
 SE 0602047 5/2007
 SE 0601003-7 6/2007
 SE 0601145-6 10/2009
 WO WO2008155618 12/1988
 WO WO93/15248 8/1993
 WO WO9403301 2/1994
 WO WO97/23398 7/1997
 WO WO9732552 9/1997
 WO WO9747265 12/1997
 WO WO9747810 12/1997
 WO WO9821134 5/1998
 WO WO98/55298 12/1998
 WO WO9907319 2/1999
 WO WO9913813 A1 3/1999
 WO WO9932385 7/1999
 WO WO9965437 12/1999
 WO WO0143682 6/2001
 WO WO0172237 A2 10/2001
 WO WO03/031177 4/2003
 WO WO2004007329 1/2004
 WO WO2005075163 8/2005
 WO WO2006038946 4/2006
 WO WO2007029115 3/2007
 WO WO2007039800 4/2007
 WO WO2007126347 11/2007
 WO WO2008001209 1/2008
 WO WO2008/015594 2/2008
 WO WO2008037281 4/2008
 WO WO2008/123348 10/2008
 WO WO2010028786 3/2010
 WO WO2011101773 8/2011

* cited by examiner

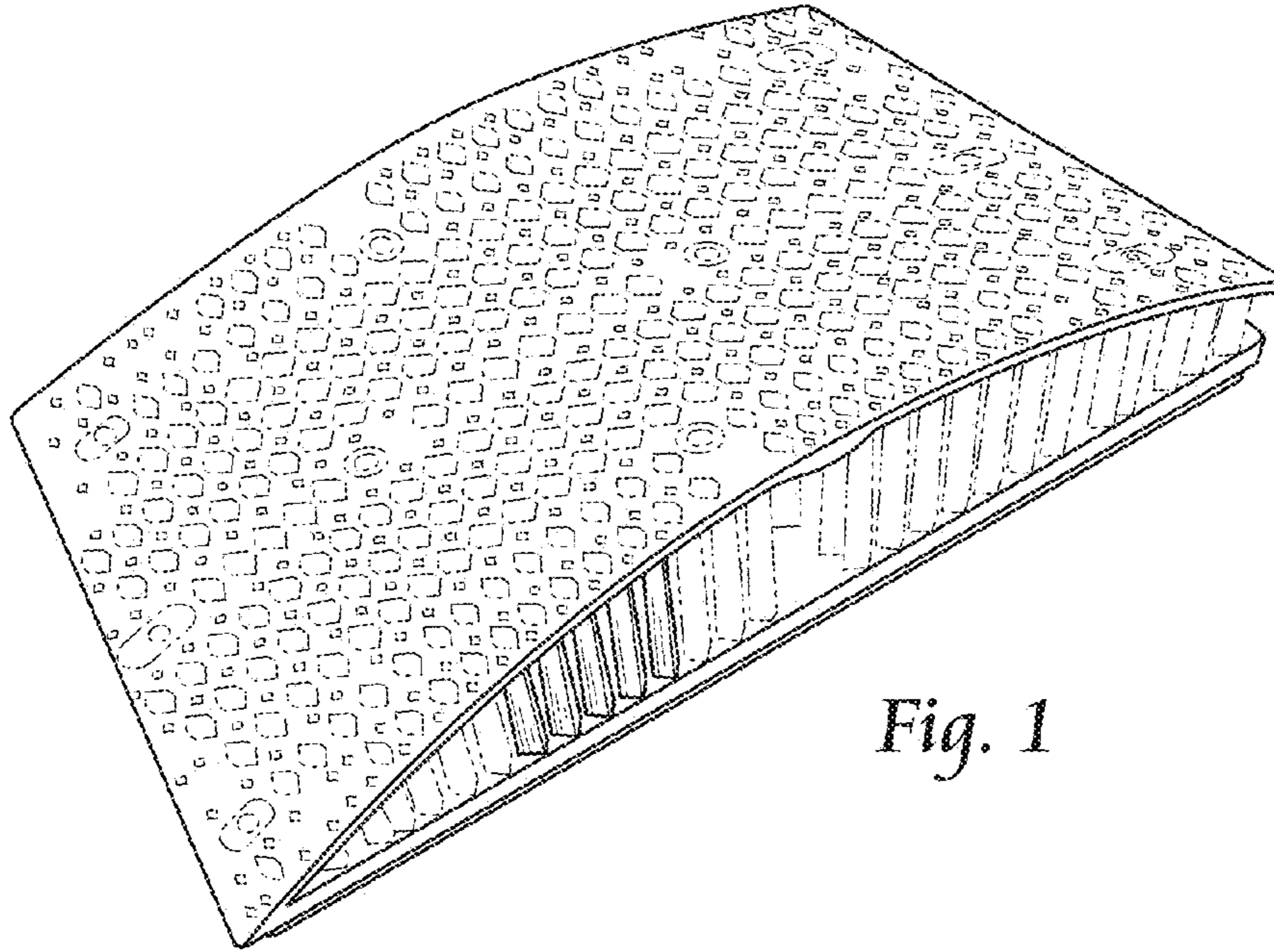


Fig. 1

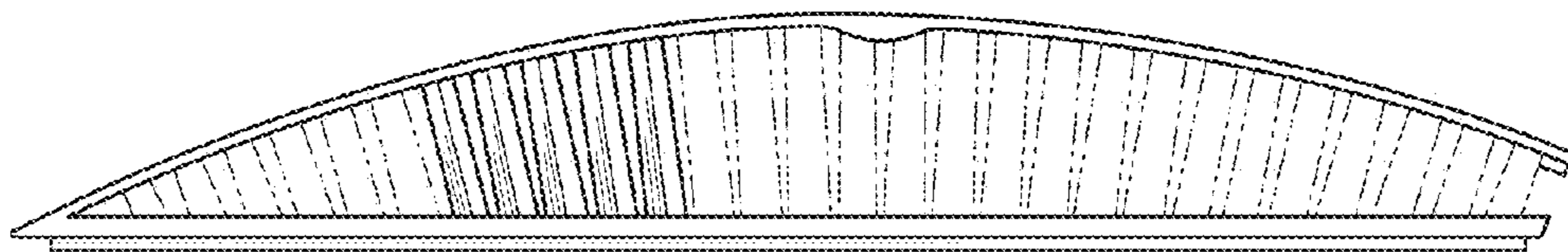


Fig. 2

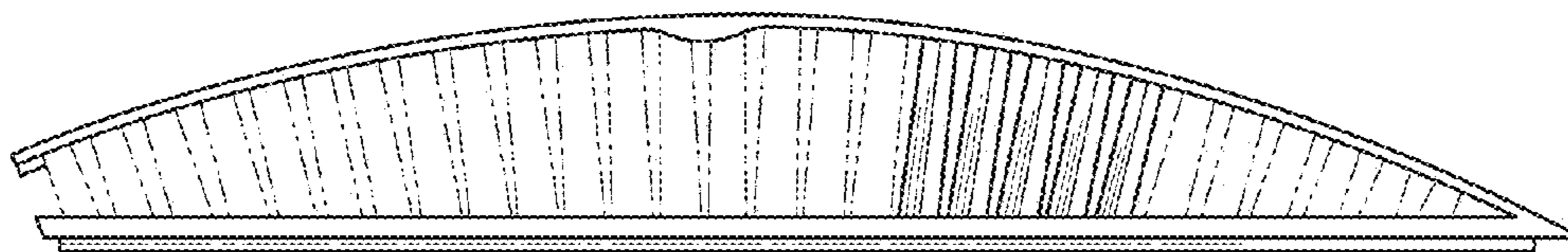


Fig. 3

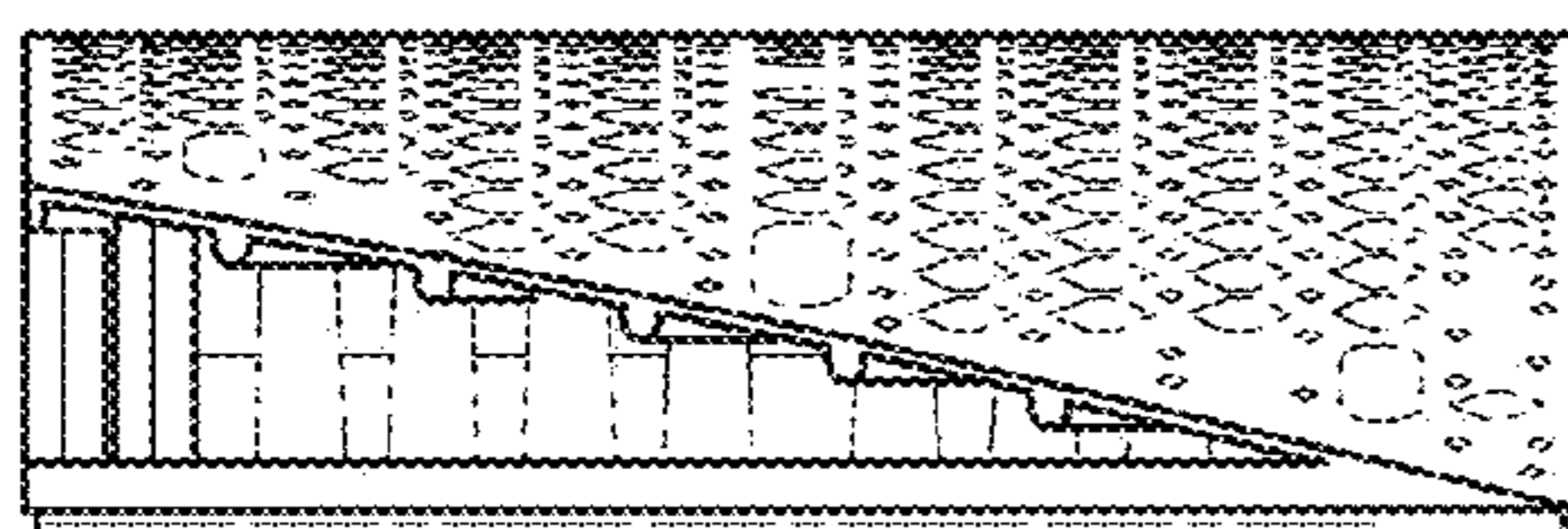
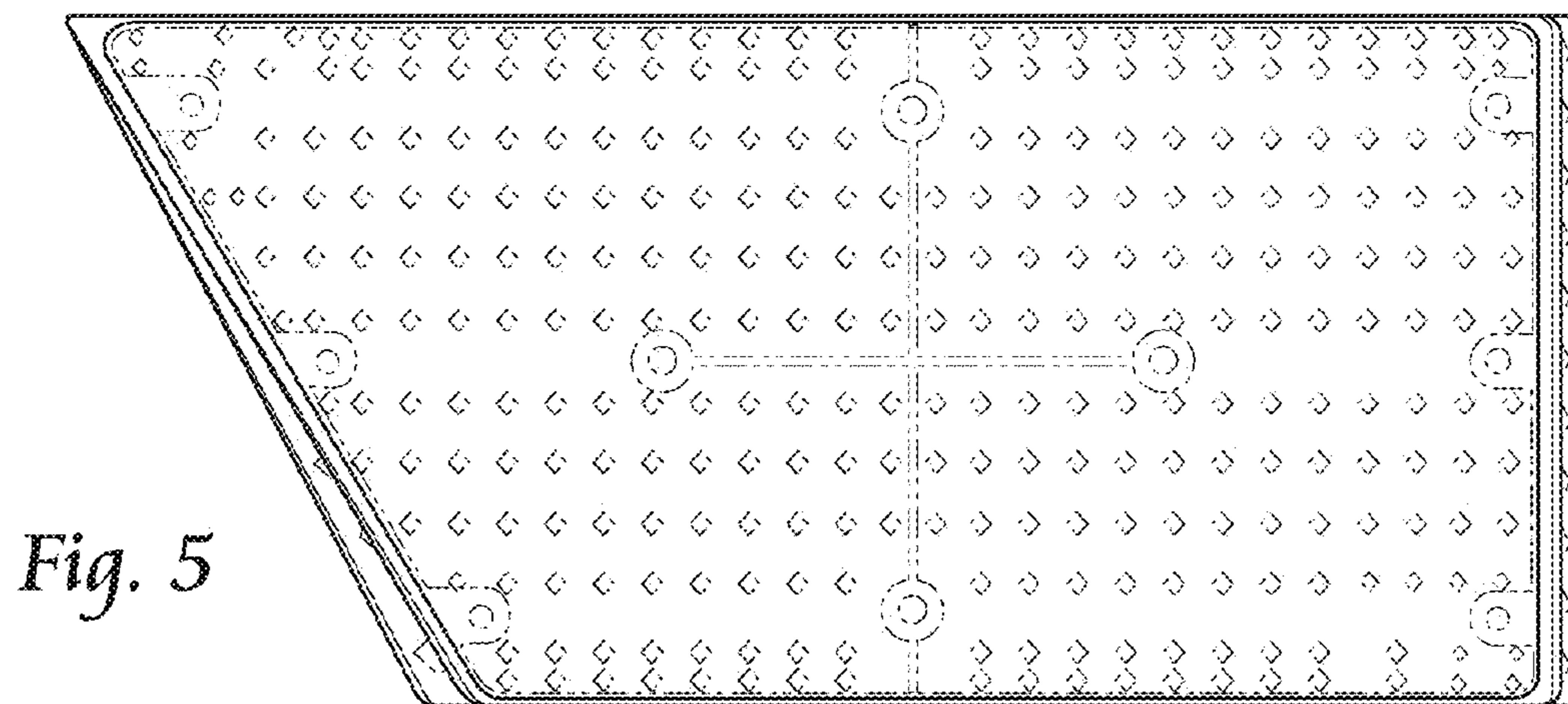
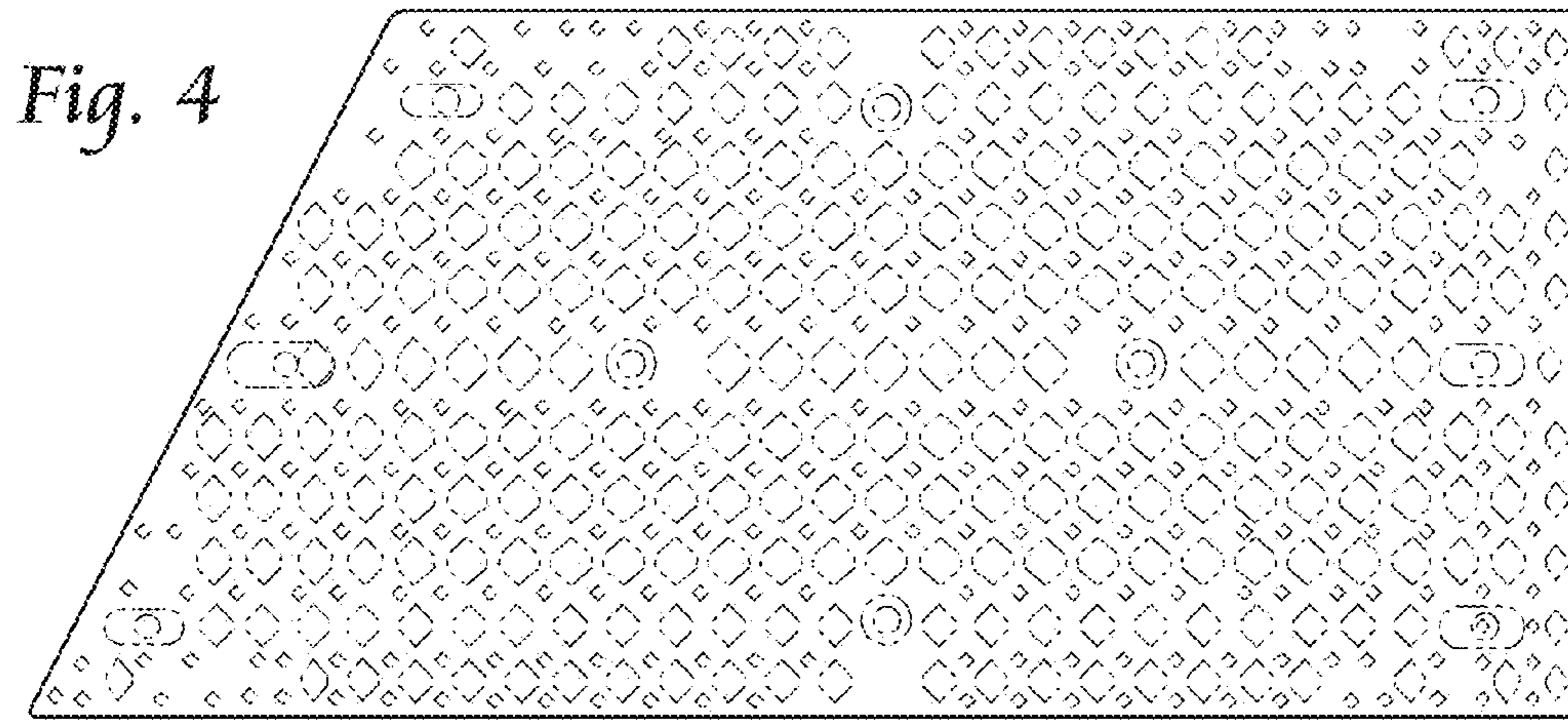
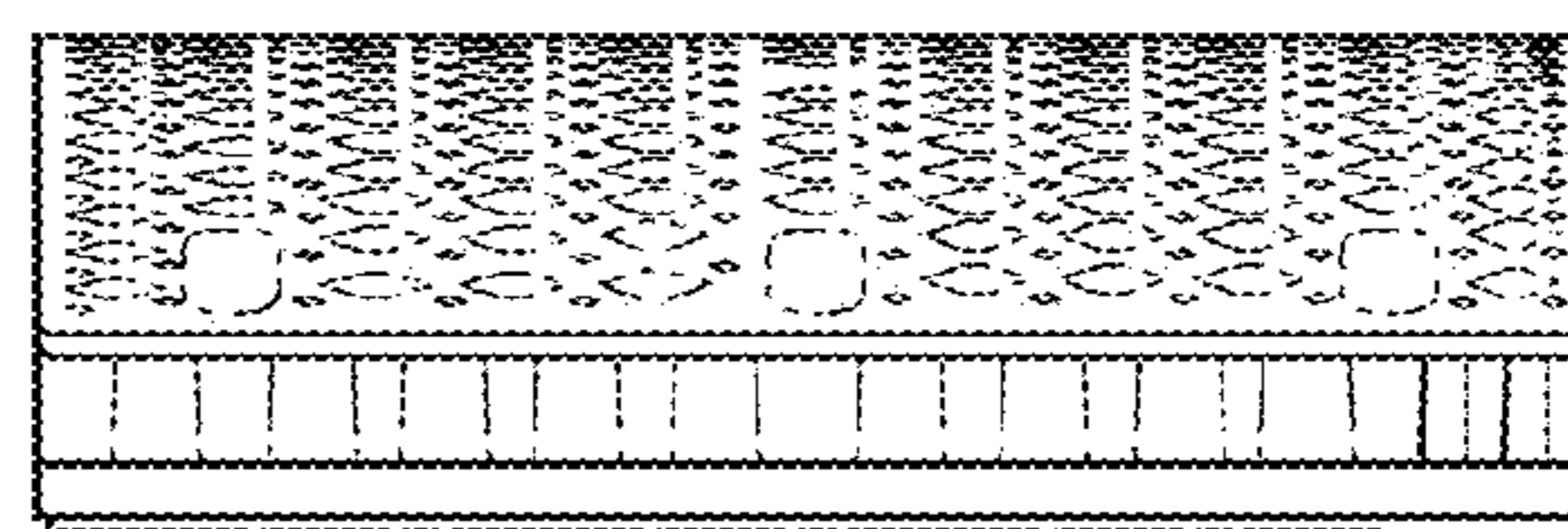


Fig. 6

Fig. 7



UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : D703,711 S
APPLICATION NO. : 29/465046
DATED : April 29, 2014
INVENTOR(S) : Andrews et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the title page, item (56) Other Publications insert -- "Reciprocating Mechanisms", Franklin Jones,
Vol. 1, date unknown, 2 pages --

Signed and Sealed this
Thirtieth Day of September, 2014



Michelle K. Lee
Deputy Director of the United States Patent and Trademark Office