



US00D703712S

(12)

United States Design Patent
Andrews et al.

(10)

Patent No.: **US D703,712 S**

(45)

Date of Patent: **** Apr. 29, 2014**

(54) **VENTILATED VACUUM COMMUTATION STRUCTURE**

(71) Applicants: **Robert E. Andrews**, Sheboygan, WI (US); **Jason Hohm**, Sheboygan Falls, WI (US)

(72) Inventors: **Robert E. Andrews**, Sheboygan, WI (US); **Jason Hohm**, Sheboygan Falls, WI (US)

(73) Assignee: **Curt G. Joa, Inc.**, Sheboygan Falls, WI (US)

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

(21) Appl. No.: **29/465,062**

(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, 122; 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

293,353 A

312,257 A

410,123 A

432,742 A

643,821 A

1,393,524 A

1,431,315 A

1,605,842 A

1,686,595 A

1,957,651 A

2,009,857 A

2,054,832 A

1/1873

2/1884

2/1885

8/1889

7/1890

2/1900

10/1921

10/1922

11/1926

10/1928

5/1934

7/1935

9/1936

Murphy

Purvis

Cotton et al.

Stilwell

Stanley

Howlett

Grupe

Le Moine

Jones

Belluche

Joa

Potdevin

Potdevin

2,117,432 A

2,128,746 A

2,131,808 A

2,164,408 A

2,167,179 A

2,171,741 A

2,213,431 A

2,254,290 A

2,254,291 A

2,282,477 A

5/1938

8/1938

10/1938

7/1939

7/1939

9/1939

9/1940

9/1941

9/1941

5/1942

Linscott

Joa

Joa

Joa

Joa

Cohn et al.

Joa

Joa

Joa

Joa

(Continued)

FOREIGN PATENT DOCUMENTS

BE

CA

1007854

1146129

11/1995

5/1983

(Continued)

OTHER PUBLICATIONS

“Reciprocating Mechanisms”, Franklin Jones, vol. 1, date unknown, 2 pages.

Primary Examiner — Patricia Palasik

(74) *Attorney, Agent, or Firm* — Ryan Kromholz & Manion, S.C.

(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;

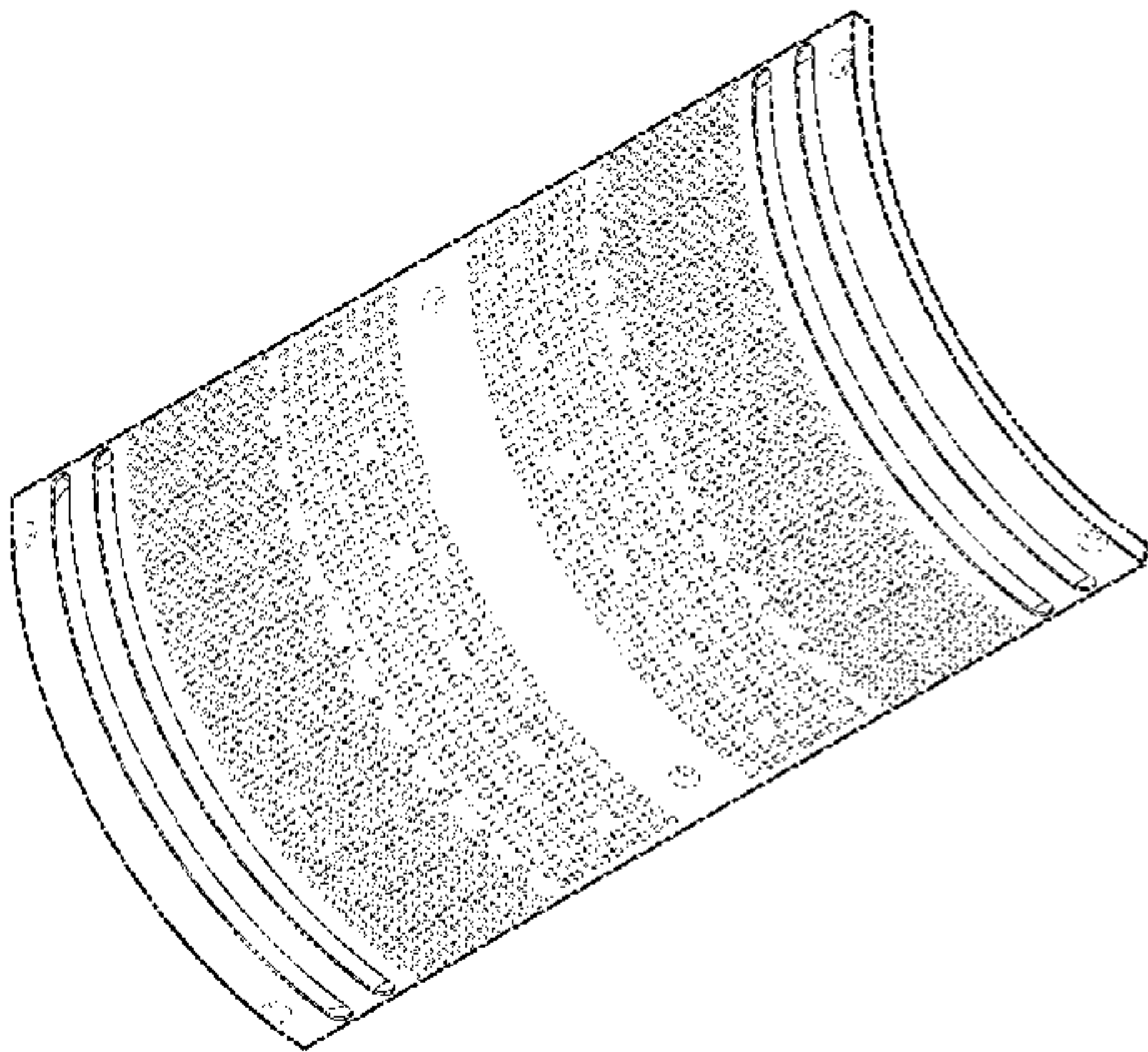
FIG. 2 is a top view of the ventilated vacuum commutation structure;

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

FIG. 4 is a first side view of the ventilated vacuum commutation structure; and,

FIG. 5 is a second side view of the ventilated vacuum commutation structure.

1 Claim, 1 Drawing Sheet



(56)

References Cited

U.S. PATENT DOCUMENTS

2,286,096 A	6/1942	Joa	3,575,170 A	4/1971	Clark
2,296,931 A	9/1942	Joa	3,607,578 A	9/1971	Berg et al.
2,304,571 A	12/1942	Joa	3,635,462 A	1/1972	Joa
2,324,930 A	7/1943	Joa	3,656,741 A	4/1972	Macke et al.
2,345,937 A	4/1944	Joa	3,666,611 A	5/1972	Joa
2,466,240 A	4/1949	Joa	3,673,021 A	6/1972	Joa
2,481,929 A	9/1949	Joa	3,685,818 A	8/1972	Burger et al.
2,510,229 A	6/1950	Joa	3,728,191 A	4/1973	Wierzba et al.
2,540,844 A	2/1951	Strauss	3,745,947 A *	7/1973	Brocklehurst 112/470.05
2,584,002 A	1/1952	Elser et al.	3,751,224 A	8/1973	Wackerle
2,591,359 A	4/1952	Joa	3,758,102 A	9/1973	Munn et al.
2,618,816 A	11/1952	Joa	3,762,542 A	10/1973	Grimes
2,627,859 A	2/1953	Hargrave	3,772,120 A	11/1973	Radzins
2,695,025 A	11/1954	Andrews	3,776,798 A	12/1973	Milano
2,702,406 A	2/1955	Reed	3,796,360 A	3/1974	Alexeff
2,721,554 A	10/1955	Joa	3,811,987 A	5/1974	Wilkinson et al.
2,730,144 A	1/1956	Joa	3,816,210 A	6/1974	Aoko et al.
2,772,611 A	12/1956	Heywood	3,847,710 A	11/1974	Blomqvist et al.
2,780,253 A	2/1957	Joa	3,854,917 A	12/1974	McKinney et al.
2,785,609 A	3/1957	Billeb	3,883,389 A	5/1975	Schott, Jr.
2,788,786 A	4/1957	Dexter	3,888,400 A	6/1975	Wiig
2,811,905 A	11/1957	Kennedy, Jr.	3,901,238 A	8/1975	Geller et al.
2,828,745 A	4/1958	Deutz	3,903,768 A	9/1975	Amberg et al.
2,839,059 A	6/1958	Joa	3,904,147 A	9/1975	Taitel et al.
2,842,169 A	7/1958	Joa	3,918,968 A	11/1975	Coast
2,851,934 A	9/1958	Heywood	3,921,481 A	11/1975	Fleetwood
2,875,724 A	3/1959	Joa	3,941,038 A	3/1976	Bishop
2,890,700 A	6/1959	Lonberg-Holm	3,960,646 A	6/1976	Wiedemann
2,913,862 A	11/1959	Sabee	3,988,194 A	10/1976	Babcock et al.
2,939,461 A	6/1960	Joa	3,991,994 A	11/1976	Farish
2,939,646 A	6/1960	Stone	4,002,005 A	1/1977	Mueller et al.
2,960,143 A	11/1960	Joa	4,003,298 A	1/1977	Schott, Jr.
2,990,081 A	6/1961	De Neui et al.	4,009,626 A	3/1977	Gressman
2,991,739 A	7/1961	Joa	4,009,814 A	3/1977	Singh
3,016,207 A	1/1962	Comstock, III	4,009,815 A	3/1977	Ericson et al.
3,016,582 A	1/1962	Joa	4,053,150 A	10/1977	Lane
3,017,795 A	1/1962	Joa	4,056,919 A	11/1977	Hirsch
3,020,687 A	2/1962	Joa	4,081,301 A	3/1978	Buell
3,021,135 A	2/1962	Joa	4,090,516 A	5/1978	Schaar
3,024,957 A	3/1962	Pinto	4,094,319 A	6/1978	Joa
3,053,427 A	9/1962	Wasserman	4,103,595 A	8/1978	Corse
3,054,516 A	9/1962	Joa	4,106,974 A	8/1978	Hirsch
3,069,982 A	12/1962	Heywood et al.	4,108,584 A	8/1978	Radzins et al.
3,075,684 A	1/1963	Rothmann	4,136,535 A	1/1979	Audas
3,086,253 A	4/1963	Joa	4,141,193 A	2/1979	Joa
3,087,689 A	4/1963	Heim	4,141,509 A	2/1979	Radzins
3,089,494 A	5/1963	Schwartz	4,142,626 A	3/1979	Bradley
3,091,408 A	5/1963	Schoeneman	4,157,934 A	6/1979	Ryan et al.
3,114,994 A	12/1963	Joa	4,165,666 A	8/1979	Johnson et al.
3,122,293 A	2/1964	Joa	4,168,776 A	9/1979	Hoeboer
3,128,206 A	4/1964	Dungler	4,171,239 A	10/1979	Hirsch et al.
3,203,419 A	8/1965	Joa	4,205,679 A	6/1980	Repke et al.
3,230,955 A	1/1966	Joa	4,208,230 A	6/1980	Magarian
3,268,954 A	8/1966	Joa	4,213,356 A	7/1980	Armitage
3,288,037 A	11/1966	Burnett	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.
3,336,847 A	8/1967	Johnson	4,236,955 A	12/1980	Prittie
3,342,184 A	9/1967	Joa	4,275,510 A	6/1981	George
3,356,092 A	12/1967	Joa	4,284,454 A	8/1981	Joa
3,360,103 A	12/1967	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	5,575,187 A	11/1996	Dieterlen
5,000,806 A	3/1991	Merkatoris et al.	5,586,964 A	12/1996	Chase
5,021,111 A	6/1991	Swenson	5,602,747 A	2/1997	Rajala
5,025,910 A	6/1991	Lasure et al.	5,603,794 A	2/1997	Thomas
5,029,505 A	7/1991	Holliday	5,624,420 A	4/1997	Bridges et al.
5,045,039 A	9/1991	Bay	5,624,428 A	4/1997	Sauer
5,045,135 A	9/1991	Meissner et al.	5,628,738 A	5/1997	Suekane
5,062,597 A	11/1991	Martin et al.	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.
			5,645,543 A	7/1997	Nomura et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

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	Andersson
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	Truttmann 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
6,314,333	B1	11/2001	Rajala et al.	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
				7,045,031	B2	5/2006	Popp et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

7,047,852 B2 5/2006 Franklin et al.
 7,048,725 B2 5/2006 Kling et al.
 7,066,586 B2 6/2006 da Silva
 7,069,970 B2 7/2006 Tomsovic et al.
 7,077,393 B2 7/2006 Ishida
 7,130,710 B2 10/2006 Shechtman
 7,137,971 B2 11/2006 Tanzer
 7,172,666 B2 2/2007 Groves et al.
 7,175,584 B2 2/2007 Maxton et al.
 7,195,684 B2 3/2007 Satoh
 7,201,345 B2 4/2007 Werner
 7,214,174 B2 5/2007 Allen et al.
 7,214,287 B2 5/2007 Akihisa
 7,220,335 B2 5/2007 Van Gompel et al.
 7,247,219 B2 7/2007 O'Dowd
 7,252,730 B2 8/2007 Hoffman et al.
 7,264,686 B2 9/2007 Thorson et al.
 7,303,708 B2 12/2007 Andrews et al.
 7,326,311 B2 2/2008 Krueger et al.
 7,332,459 B2 2/2008 Collins et al.
 7,374,627 B2 5/2008 McCabe
 7,380,213 B2 5/2008 Pesin
 7,398,870 B2 7/2008 McCabe
 7,449,084 B2 11/2008 Nakakado
 7,452,436 B2 11/2008 Andrews
 7,533,709 B2 5/2009 Meyer
 7,537,215 B2 5/2009 Beaudoin et al.
 7,587,966 B2 9/2009 Nakakado et al.
 7,618,513 B2 11/2009 Meyer
 7,638,014 B2 12/2009 Coose et al.
 7,640,962 B2 1/2010 Meyer et al.
 7,695,464 B2 4/2010 Fletcher et al.
 7,703,599 B2 4/2010 Meyer
 7,708,849 B2 5/2010 McCabe
 7,770,712 B2 8/2010 McCabe
 7,771,407 B2 8/2010 Umebayashi
 7,780,052 B2 8/2010 McCabe
 7,793,772 B2 9/2010 Schafer
 7,811,403 B2 10/2010 Andrews
 7,861,756 B2 1/2011 Jenquin et al.
 7,871,400 B2 1/2011 Sablone et al.
 7,909,956 B2 3/2011 Coose et al.
 7,922,983 B2 4/2011 Prokash et al.
 7,935,296 B2 5/2011 Koele et al.
 7,975,584 B2 7/2011 McCabe
 7,987,964 B2 8/2011 McCabe
 8,007,484 B2 8/2011 McCabe et al.
 8,007,623 B2 8/2011 Andrews
 8,011,493 B2 9/2011 Giuliani et al.
 8,016,972 B2 9/2011 Andrews et al.
 8,025,652 B2 9/2011 Hornung et al.
 8,062,459 B2 11/2011 Nakakado et al.
 8,100,173 B2 1/2012 Hornung et al.
 8,172,977 B2 5/2012 Andrews et al.
 8,176,573 B2 5/2012 Popp et al.
 8,178,035 B2 5/2012 Edvardsson et al.
 8,182,624 B2 5/2012 Handziak
 8,182,735 B2 5/2012 Edvardsson
 8,182,736 B2 5/2012 Edvardsson
 8,293,056 B2 10/2012 McCabe
 8,381,489 B2 2/2013 Freshwater et al.
 8,398,793 B2 3/2013 Andrews et al.
 8,417,374 B2 4/2013 Meyer et al.
 8,439,814 B2 * 5/2013 Piantoni et al. 493/416
 8,460,495 B2 6/2013 McCabe
 8,512,496 B2 8/2013 Makimura
 2001/0012813 A1 8/2001 Bluemle
 2001/0017181 A1 8/2001 Otruba et al.
 2001/0035332 A1 11/2001 Zeitler
 2001/0042591 A1 11/2001 Milner et al.
 2002/0040630 A1 4/2002 Piazza
 2002/0046802 A1 4/2002 Tachibana et al.
 2002/0059013 A1 5/2002 Rajala et al.
 2002/0096241 A1 7/2002 Instance
 2002/0125105 A1 9/2002 Nakakado

2002/0162776 A1 11/2002 Hergeth
 2003/0000620 A1 1/2003 Herrin et al.
 2003/0015209 A1 1/2003 Gingras et al.
 2003/0051802 A1 3/2003 Hargett et al.
 2003/0052148 A1 3/2003 Rajala et al.
 2003/0066585 A1 4/2003 McCabe
 2003/0083638 A1 5/2003 Molee
 2003/0084984 A1 5/2003 Glaug et al.
 2003/0089447 A1 5/2003 Molee et al.
 2003/0115660 A1 6/2003 Hopkins
 2003/0121244 A1 7/2003 Abba
 2003/0121614 A1 7/2003 Tabor et al.
 2003/0135189 A1 7/2003 Umebayashi
 2003/0150551 A1 8/2003 Baker
 2004/0007328 A1 1/2004 Popp et al.
 2004/0016500 A1 1/2004 Tachibana et al.
 2004/0044325 A1 3/2004 Corneliusson
 2004/0073187 A1 4/2004 Karami
 2004/0084468 A1 * 5/2004 Kelbert et al. 221/1
 2004/0087425 A1 5/2004 Tony et al.
 2004/0098791 A1 5/2004 Faulks
 2004/0112517 A1 6/2004 Groves et al.
 2004/0164482 A1 8/2004 Edinger
 2004/0167493 A1 8/2004 Jarpenberg et al.
 2004/0177737 A1 9/2004 Adami
 2004/0182213 A1 9/2004 Wagner et al.
 2004/0182497 A1 9/2004 Lowrey
 2004/0216830 A1 11/2004 Van Eperen
 2005/0000628 A1 1/2005 Norrby
 2005/0022476 A1 2/2005 Hamer
 2005/0056678 A1 3/2005 Nomura et al.
 2005/0077418 A1 4/2005 Werner
 2005/0196538 A1 9/2005 Sommer et al.
 2005/0230056 A1 10/2005 Meyer et al.
 2005/0230449 A1 10/2005 Meyer et al.
 2005/0233881 A1 10/2005 Meyer
 2005/0234412 A1 10/2005 Andrews et al.
 2005/0257881 A1 11/2005 Coose et al.
 2005/0275148 A1 12/2005 Beaudoin et al.
 2006/0011030 A1 1/2006 Wagner et al.
 2006/0021300 A1 2/2006 Tada et al.
 2006/0137298 A1 6/2006 Oshita et al.
 2006/0201619 A1 9/2006 Andrews
 2006/0224137 A1 10/2006 McCabe et al.
 2006/0265867 A1 11/2006 Schaap
 2006/0266465 A1 * 11/2006 Meyer 156/250
 2007/0074953 A1 4/2007 McCabe
 2007/0131343 A1 6/2007 Nordang
 2007/0131817 A1 6/2007 Fromm
 2008/0041206 A1 2/2008 Mergola et al.
 2008/0210067 A1 9/2008 Schlinz et al.
 2008/0223537 A1 9/2008 Wiedmann
 2008/0281286 A1 11/2008 Petersen
 2008/0287898 A1 11/2008 Guzman
 2009/0020211 A1 1/2009 Andrews et al.
 2009/0126864 A1 5/2009 Tachibana et al.
 2009/0198205 A1 8/2009 Malowaniec et al.
 2009/0212468 A1 8/2009 Edvardsson et al.
 2010/0078119 A1 4/2010 Yamamoto
 2010/0078120 A1 4/2010 Otsubo
 2010/0078127 A1 4/2010 Yamamoto
 2010/0193135 A1 8/2010 Eckstein et al.
 2010/0193138 A1 8/2010 Eckstein
 2010/0193155 A1 8/2010 Nakatani
 2010/0249737 A1 9/2010 Ito et al.
 2011/0106042 A1 5/2011 Sablone et al.
 2012/0079926 A1 4/2012 Long et al.
 2012/0123377 A1 5/2012 Back
 2012/0270715 A1 10/2012 Motegi et al.
 2012/0285306 A1 11/2012 Weibelt
 2012/0310193 A1 12/2012 Ostertag
 2012/0312463 A1 12/2012 Ogasawara et al.
 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

(56)

References Cited

FOREIGN PATENT DOCUMENTS

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	0048011	3/1982
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	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	2891811	4/2007
ES	200601373	7/2009
ES	2311349	9/2009
FR	2177355	11/1973
FR	2255961	7/1975
FR	1132325	10/2006
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	WO2009/06550	3/2009
WO	WO2009/065497	3/2009
WO	WO2010028786	3/2010
WO	WO2011101773	8/2011

* cited by examiner

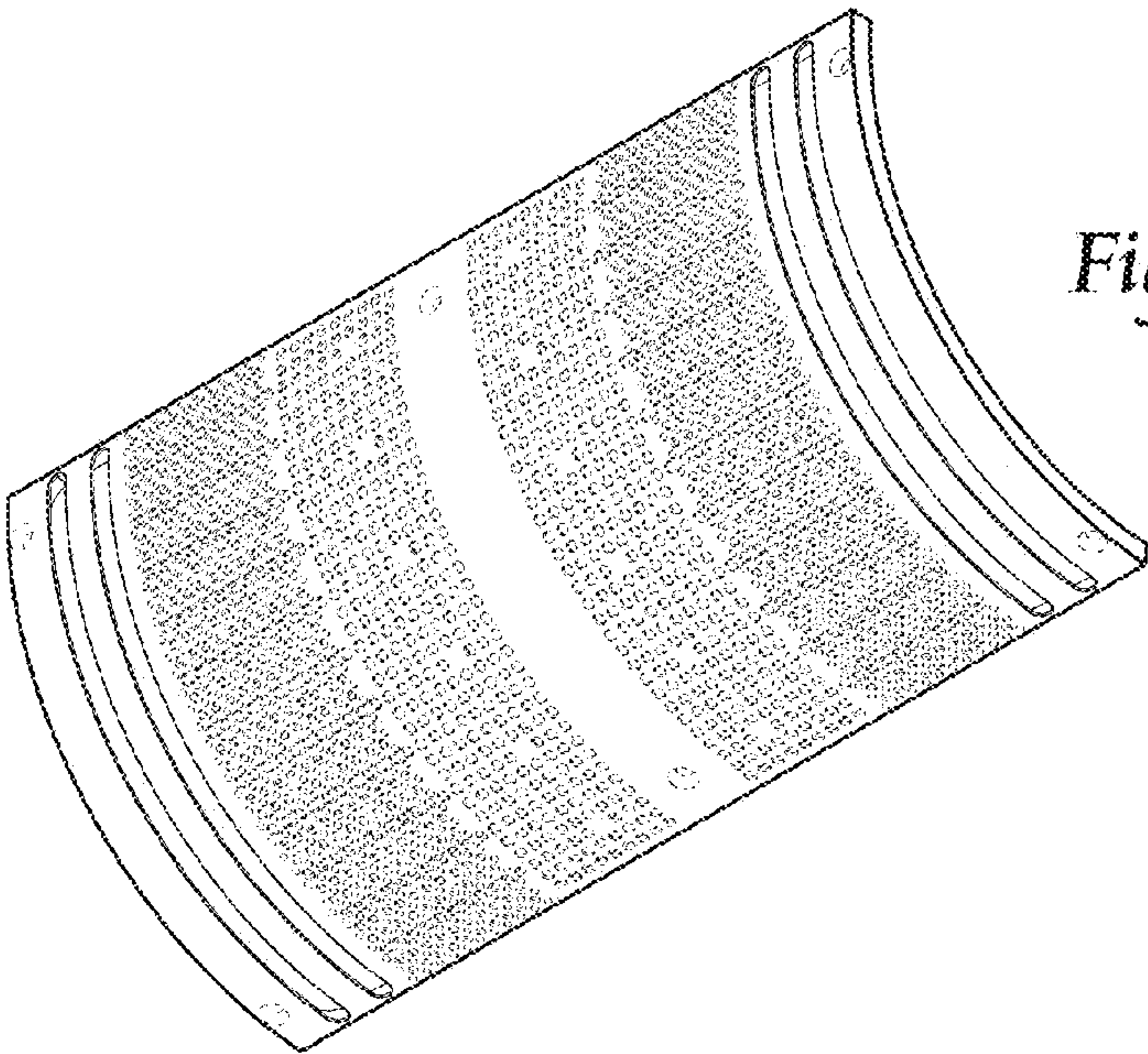


Fig. 1

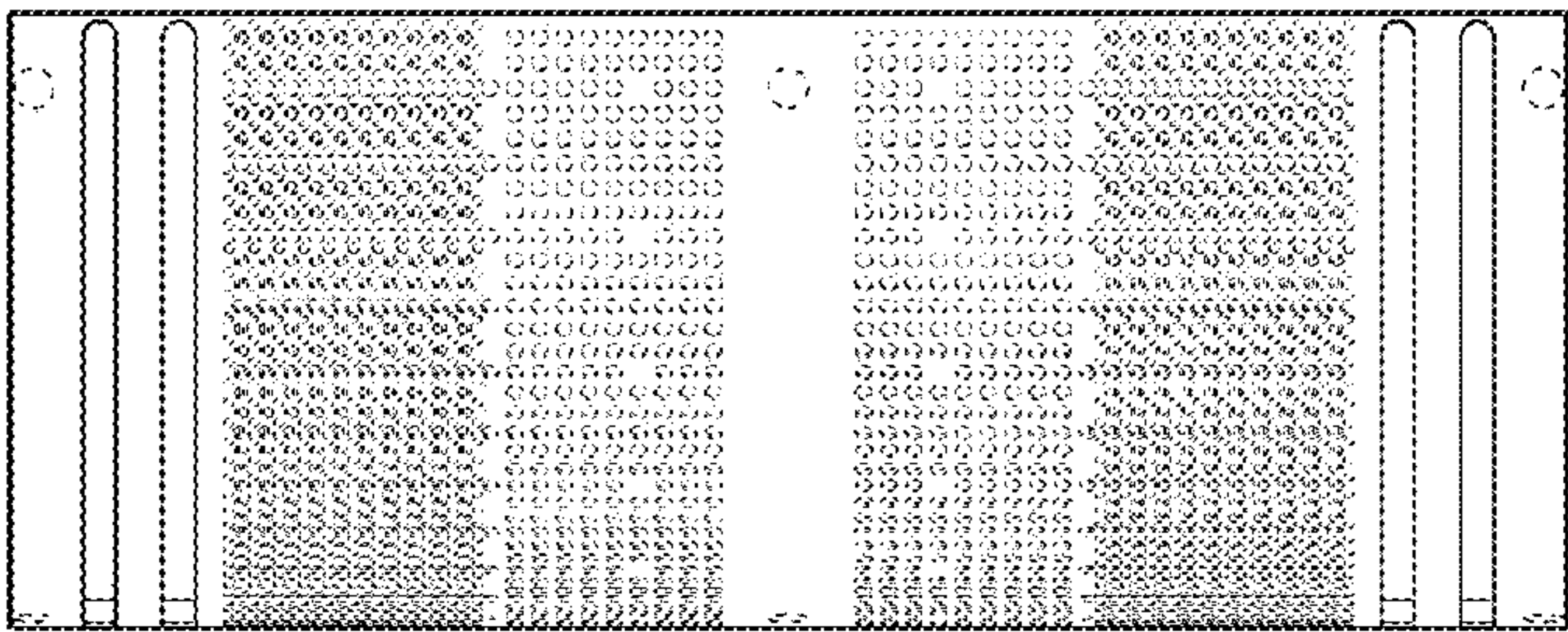


Fig. 2

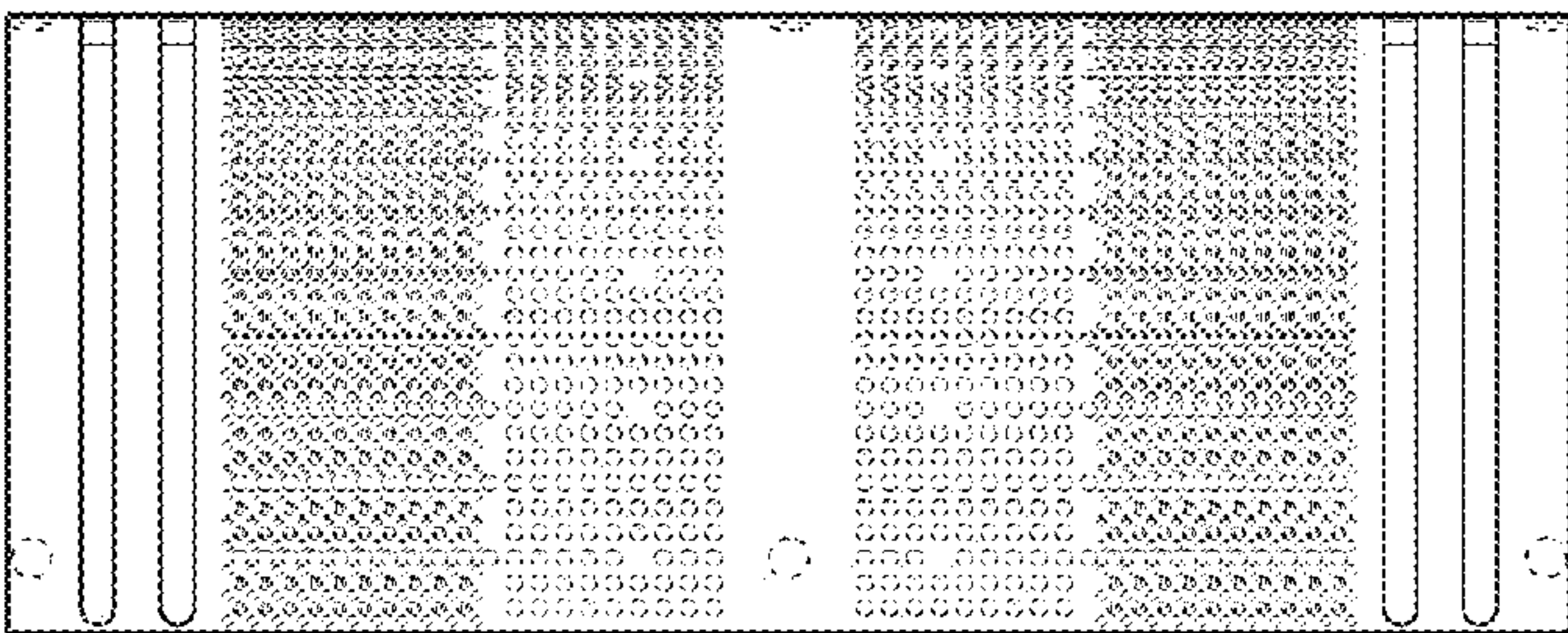


Fig. 3

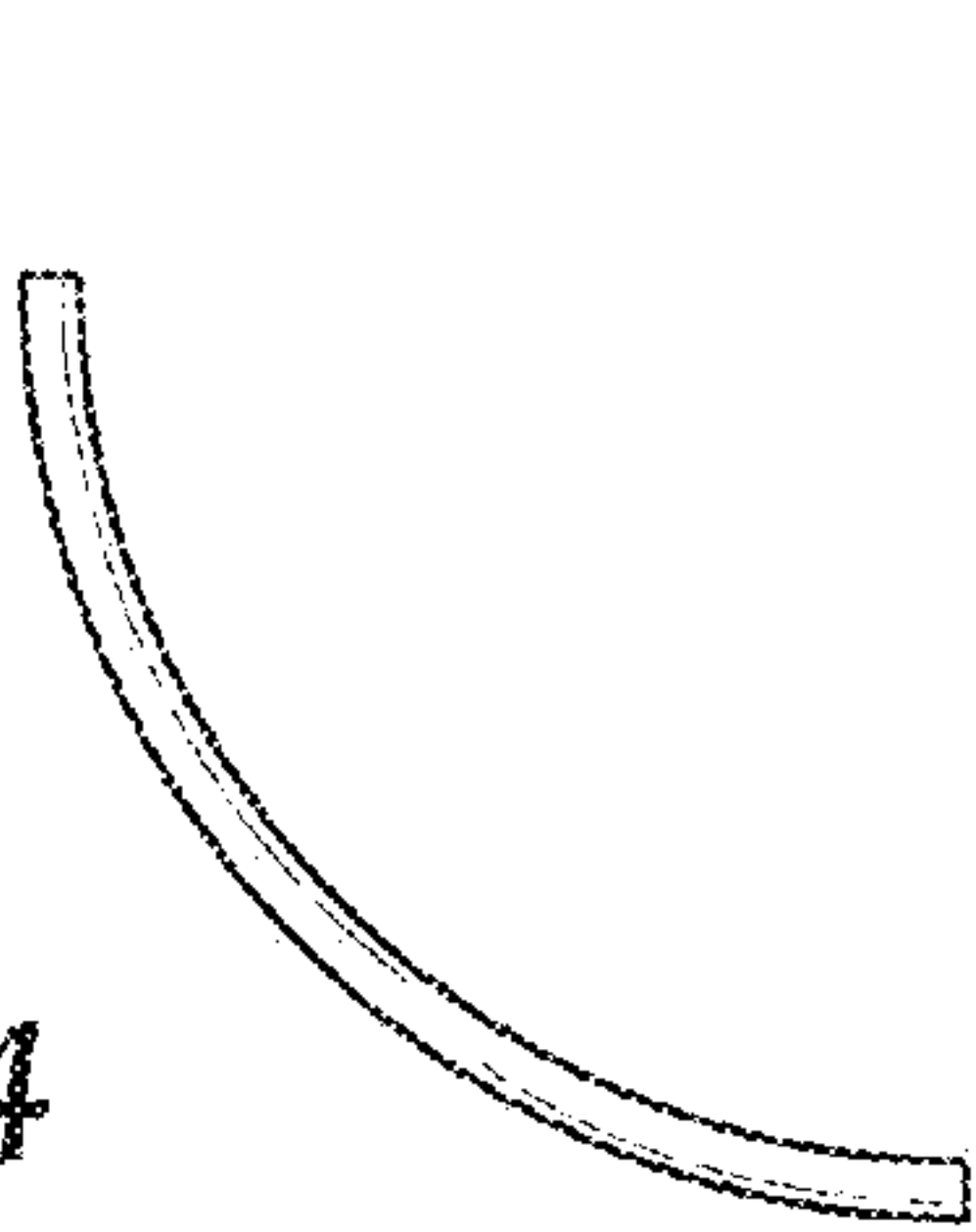


Fig. 4

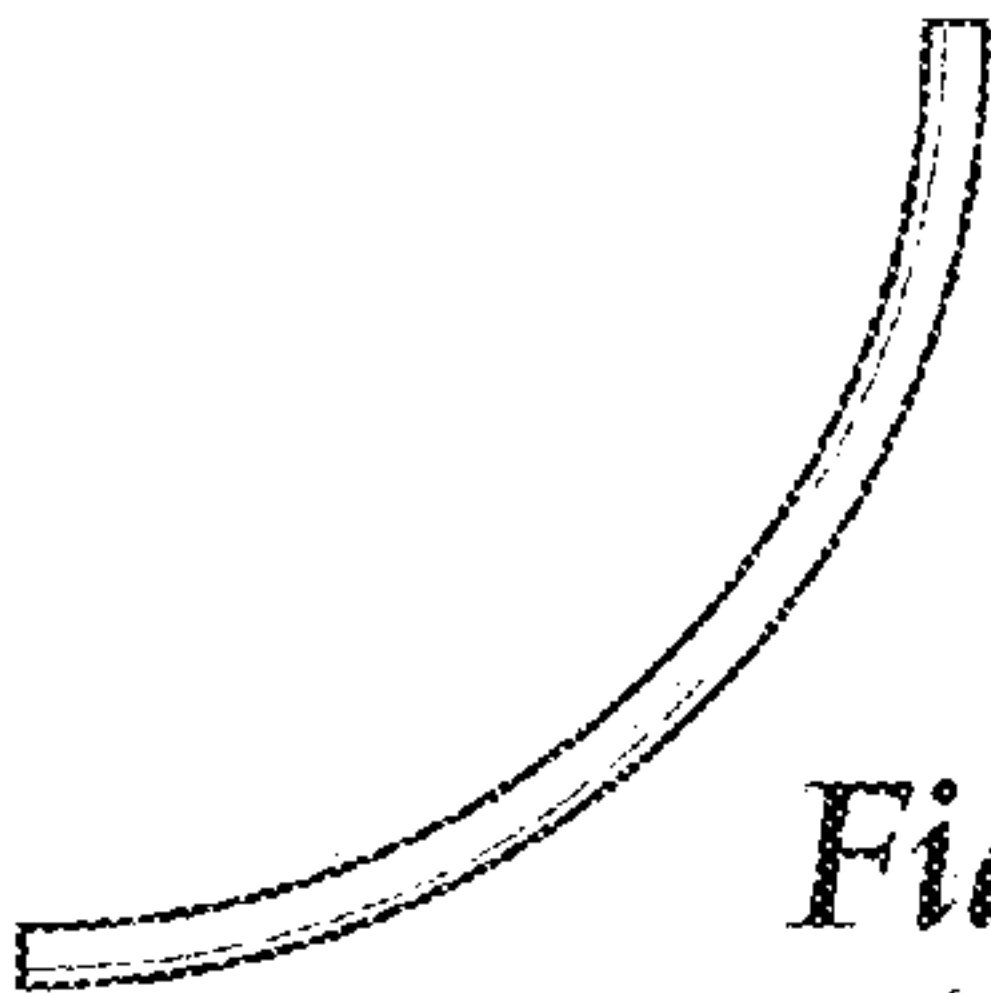


Fig. 5

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : D703,712 S
APPLICATION NO. : 29/465062
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

(56) References Cited Foreign Patent Documents:

delete "DE 0048011 3/1982" and substitute -- EP 0048011 3/1982 --

(56) References Cited Foreign Patent Documents:

delete "ES 2891811 4/2007" and substitute -- FR 2891811 4/2007 --

Signed and Sealed this
Ninth Day of September, 2014



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