



US00D665095S

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

(10) **Patent No.:** **US D665,095 S**
(45) **Date of Patent:** **** Aug. 7, 2012**

(54) **REAGENT HOLDER**

(75) Inventors: **Kerry Wilson**, Elkhart, IN (US); **Kalyan Handique**, Ypsilanti, MI (US); **Jeff Williams**, Chelsea, MI (US); **Sundaresh N. Brahmasandra**, Ann Arbor, MI (US)

(73) Assignee: **HandyLab, Inc.**, Franklin Lakes, NJ (US)

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

(21) Appl. No.: **29/389,681**

(22) Filed: **Apr. 14, 2011**

Related U.S. Application Data

(60) Continuation of application No. 29/363,666, filed on Jun. 11, 2010, now Pat. No. Des. 637,737, which is a division of application No. 29/321,200, filed on Jul. 11, 2008, now Pat. No. Des. 618,820.

(51) **LOC (9) Cl.** **24-02**

(52) **U.S. Cl.** **D24/227**

(58) **Field of Classification Search** D24/216, D24/224, 227-232; 422/63-64, 99-104, 422/266, 297, 300; 211/74, 71.01, 85.13; 217/58; D3/294, 295; 206/443, 563

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,434,314	A	10/1922	Raich
1,616,419	A	2/1927	Wilson
1,733,401	A	8/1930	Lovekin
3,528,449	A	9/1970	Witte et al.
3,985,649	A	10/1976	Eddelman
4,018,089	A	4/1977	Dzula et al.
4,018,652	A	4/1977	Lanham et al.
4,038,192	A	7/1977	Serur
4,055,395	A	10/1977	Honkawa et al.
D249,706	S	9/1978	Adamski
4,139,005	A	2/1979	Dickey
D252,157	S	6/1979	Kronish et al.

D252,341	S	7/1979	Thomas
D254,687	S	4/1980	Fadler et al.
4,212,744	A	7/1980	Oota
D261,033	S	9/1981	Armbruster

(Continued)

FOREIGN PATENT DOCUMENTS

CA 2294819 1/1999

(Continued)

OTHER PUBLICATIONS

Bollet, C. et al., "A simple method for the isolation of chromosomal DNA from Gram positive or acid-fast bacteria", *Nucleic Acids Research*, vol. 19, No. 8 (1991), p. 1955.

(Continued)

Primary Examiner — T. Chase Nelson

Assistant Examiner — Mark Cavanna

(74) *Attorney, Agent, or Firm* — Knobbe Martens Olson & Bear, LLP

(57) **CLAIM**

The ornamental design for a reagent holder, substantially as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a reagent holder showing our new design;

FIG. 2 is a first side plan view thereof;

FIG. 3 is a second side plan view thereof with the second side plan view being a mirror image of the first side plan view shown in FIG. 2;

FIG. 4 is a first end view thereof;

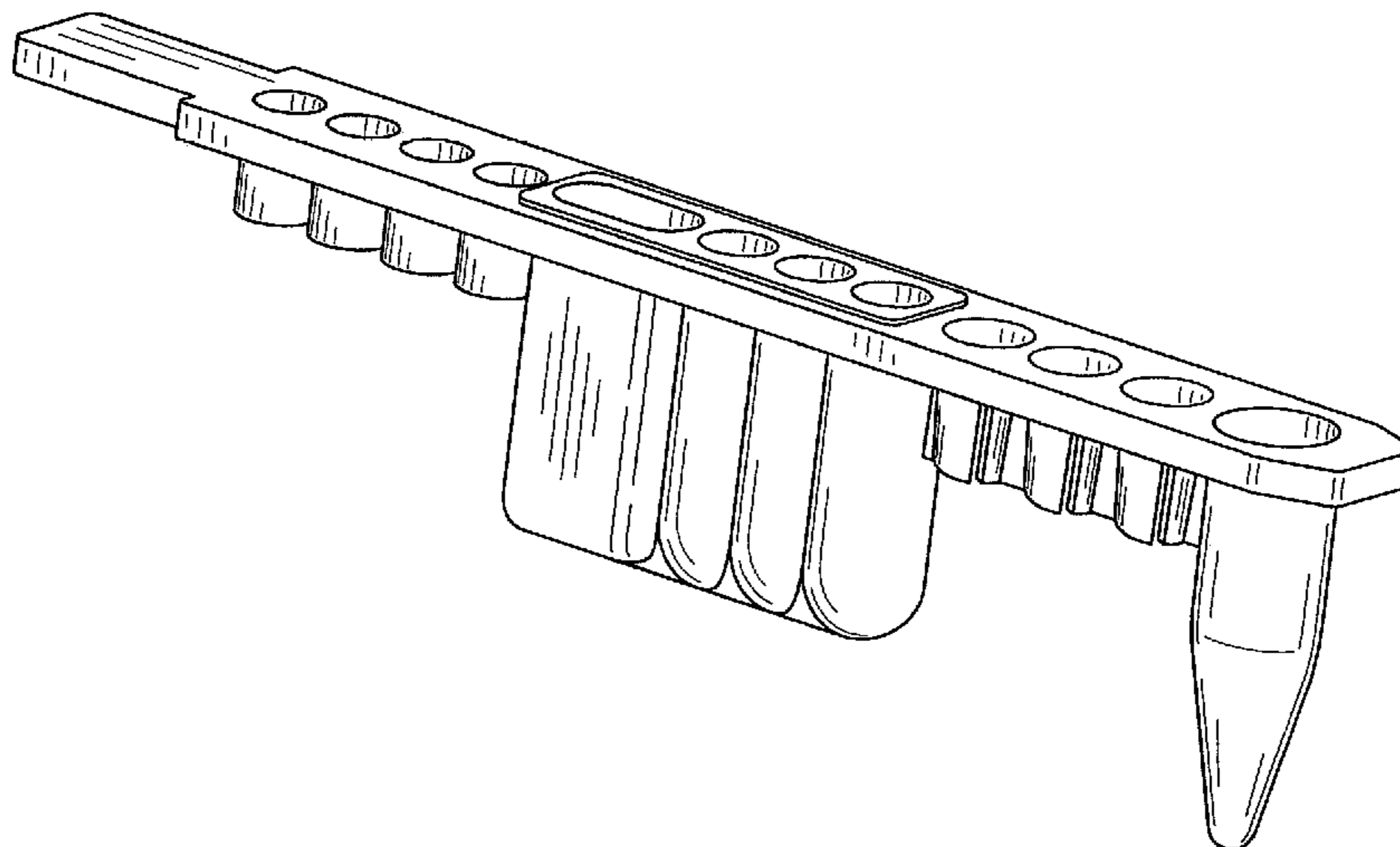
FIG. 5 is a second end view thereof;

FIG. 6 is a top plan thereof; and,

FIG. 7 is a bottom plan view thereof.

The broken lines where present in FIGS. 1 through 7 are for illustrative purposes only and identify portions of the reagent holder that form no part of the claimed design.

1 Claim, 3 Drawing Sheets



US D665,095 S

Page 2

U.S. PATENT DOCUMENTS							
D261,173	S	10/1981	Armbruster	5,389,339	A	2/1995	Petschek et al.
4,301,412	A	11/1981	Hill et al.	5,397,709	A	3/1995	Berndt
4,439,526	A	3/1984	Columbus	5,401,465	A	3/1995	Smethers et al.
4,457,329	A	7/1984	Werley et al.	5,411,708	A	5/1995	Moscetta et al.
4,466,740	A	8/1984	Kano et al.	5,414,245	A	5/1995	Hackleman
4,504,582	A	3/1985	Swann	5,416,000	A	5/1995	Allen et al.
4,522,786	A	6/1985	Ebersole	5,422,271	A	6/1995	Chen et al.
D279,817	S	7/1985	Chen et al.	5,422,284	A	6/1995	Lau
4,599,315	A	7/1986	Terasaki et al.	5,427,946	A	6/1995	Kricka et al.
4,612,873	A	9/1986	Eberle	5,474,796	A	12/1995	Brennan
4,612,959	A	9/1986	Costello	D366,116	S	1/1996	Biskupski
D288,478	S	2/1987	Carlson et al.	5,486,335	A	1/1996	Wilding et al.
4,654,127	A	3/1987	Baker et al.	5,494,639	A	2/1996	Grzegorzewski
4,673,657	A	6/1987	Christian	5,498,392	A	3/1996	Wilding et al.
4,683,195	A	7/1987	Mullis et al.	5,503,803	A	4/1996	Brown
4,683,202	A	7/1987	Mullis	5,516,410	A	5/1996	Schneider et al.
D292,735	S	11/1987	Lovborg	5,519,635	A	5/1996	Miyake et al.
4,720,374	A	1/1988	Ramachandran	5,529,677	A	6/1996	Schneider et al.
4,798,693	A	1/1989	Mase et al.	5,559,432	A	9/1996	Logue
4,800,022	A	1/1989	Leonard	5,565,171	A	10/1996	Dovich et al.
4,841,786	A	6/1989	Schulz	5,569,364	A	10/1996	Hooper et al.
D302,294	S	7/1989	Hillman	5,578,818	A	11/1996	Kain et al.
4,895,650	A	1/1990	Wang	5,579,928	A	12/1996	Anukwuem
4,919,829	A	4/1990	Gates et al.	5,580,523	A	12/1996	Bard
4,921,809	A	5/1990	Schiff et al.	5,582,884	A	12/1996	Ball et al.
4,935,342	A	6/1990	Seligson et al.	5,585,069	A	12/1996	Zanzucchi et al.
4,946,562	A	8/1990	Guruswamy	5,585,089	A	12/1996	Queen et al.
4,949,742	A	8/1990	Rando et al.	5,585,242	A	12/1996	Bouma et al.
D310,413	S	9/1990	Bigler et al.	5,587,128	A	12/1996	Wilding et al.
4,963,498	A	10/1990	Hillman	5,589,136	A	12/1996	Northrup et al.
4,967,950	A	11/1990	Legg et al.	5,593,838	A	1/1997	Zanzucchi et al.
4,978,502	A	12/1990	Dole et al.	5,595,708	A	1/1997	Berndt
4,978,622	A	12/1990	Mishell et al.	5,599,432	A	2/1997	Manz et al.
4,989,626	A	2/1991	Takagi et al.	5,599,503	A	2/1997	Manz et al.
5,001,417	A	3/1991	Pumphrey et al.	5,599,667	A	2/1997	Arnold, Jr. et al.
5,004,583	A	4/1991	Guruswamy et al.	5,601,727	A	2/1997	Bormann et al.
5,048,554	A	9/1991	Kremer	5,603,351	A	2/1997	Cherukuri et al.
5,053,199	A	10/1991	Keiser et al.	5,605,662	A	2/1997	Heller et al.
5,060,823	A	10/1991	Perlman	D378,782	S	4/1997	LaBarbera et al.
5,061,336	A	10/1991	Soane	5,628,890	A	5/1997	Carter et al.
5,064,618	A	11/1991	Baker et al.	5,630,920	A	5/1997	Friese et al.
5,071,531	A	12/1991	Soane	5,631,337	A	5/1997	Sassi et al.
5,091,328	A	2/1992	Miller	5,632,876	A	5/1997	Zanzucchi et al.
D324,426	S	3/1992	Fan et al.	5,632,957	A	5/1997	Heller et al.
5,096,669	A	3/1992	Lauks et al.	5,635,358	A	6/1997	Wilding et al.
5,126,002	A	6/1992	Iwata et al.	5,637,469	A	6/1997	Wilding et al.
5,126,022	A	6/1992	Soane et al.	5,639,423	A	6/1997	Northrup et al.
D328,135	S	7/1992	Fan et al.	5,643,738	A	7/1997	Zanzucchi et al.
D328,794	S	8/1992	Frenkel et al.	5,646,039	A	7/1997	Northrup et al.
5,135,627	A	8/1992	Soane	5,647,994	A	7/1997	Tuunanen et al.
5,135,872	A	8/1992	Pouletty et al.	5,651,839	A	7/1997	Rauf
5,147,606	A	9/1992	Charlton et al.	5,652,149	A	7/1997	Mileaf et al.
5,169,512	A	12/1992	Wiedenmann et al.	D382,346	S	8/1997	Buhler et al.
D333,522	S	2/1993	Gianino	D382,647	S	8/1997	Staples et al.
5,186,339	A	2/1993	Heissler	5,667,976	A	9/1997	Van Ness et al.
5,192,507	A	3/1993	Taylor et al.	5,671,303	A	9/1997	Shieh et al.
5,208,163	A	5/1993	Charlton et al.	5,674,394	A	10/1997	Whitmore
5,223,226	A	6/1993	Wittmer et al.	5,674,742	A	10/1997	Northrup et al.
D338,275	S	8/1993	Fischer et al.	5,681,484	A	10/1997	Zanzucchi et al.
5,250,263	A	10/1993	Manz	5,681,529	A	10/1997	Taguchi et al.
5,252,743	A	10/1993	Barrett et al.	5,683,657	A	11/1997	Mian
5,256,376	A	10/1993	Callan et al.	5,699,157	A	12/1997	Parce
5,275,787	A	1/1994	Yuguchi et al.	5,700,637	A	12/1997	Southern
5,282,950	A	2/1994	Dietze et al.	5,705,813	A	1/1998	Apffel et al.
5,296,375	A	3/1994	Kricka et al.	5,726,026	A	3/1998	Wilding et al.
5,304,477	A	4/1994	Nagoh et al.	5,726,404	A	3/1998	Brody
5,304,487	A	4/1994	Wilding et al.	5,726,944	A	3/1998	Taft et al.
D347,478	S	5/1994	Pinkney	5,731,212	A	3/1998	Gavin et al.
5,311,896	A	5/1994	Kaartinen et al.	5,744,366	A	4/1998	Kricka et al.
5,311,996	A	5/1994	Duffy et al.	5,747,666	A	5/1998	Willis
5,316,727	A	5/1994	Suzuki et al.	5,750,015	A	5/1998	Soane et al.
5,327,038	A	7/1994	Culp	5,755,942	A	5/1998	Zanzucchi et al.
5,339,486	A	8/1994	Persic, Jr.	5,763,262	A	6/1998	Wong et al.
D351,475	S	10/1994	Gerber	5,770,029	A	6/1998	Nelson et al.
D351,913	S	10/1994	Hieb et al.	5,770,388	A	6/1998	Vorpahl
5,364,591	A	11/1994	Green et al.	5,772,966	A	6/1998	Maracas et al.
5,372,946	A	12/1994	Cusak et al.	5,779,868	A	7/1998	Parce et al.
5,374,395	A	12/1994	Robinson	5,787,032	A	7/1998	Heller et al.
				5,788,814	A	8/1998	Sun et al.

US D665,095 S

Page 3

5,800,690 A	9/1998	Chow et al.	6,010,627 A	1/2000	Hood, III
5,804,436 A	9/1998	Okun et al.	6,012,902 A	1/2000	Parce
D399,959 S	10/1998	Prokop et al.	D420,747 S	2/2000	Dumitrescu et al.
5,827,481 A	10/1998	Bente et al.	D421,130 S	2/2000	Cohen et al.
5,842,106 A	11/1998	Thaler et al.	6,024,920 A	2/2000	Cunanan
5,842,787 A	12/1998	Kopf-Sill et al.	D421,653 S	3/2000	Purcell
5,846,396 A	12/1998	Zanzucchi et al.	6,033,546 A	3/2000	Ramsey
5,849,208 A	12/1998	Hayes et al.	6,043,080 A	3/2000	Lipshutz et al.
5,849,486 A	12/1998	Heller et al.	6,046,056 A	4/2000	Parce et al.
5,849,489 A	12/1998	Heller	6,048,734 A	4/2000	Burns et al.
5,849,598 A	12/1998	Wilson et al.	6,054,034 A	4/2000	Soane et al.
5,852,495 A	12/1998	Parce	6,054,277 A	4/2000	Furcht et al.
5,856,174 A	1/1999	Lipshutz et al.	6,056,860 A	5/2000	Amigo et al.
5,858,187 A	1/1999	Ramsey et al.	6,057,149 A	5/2000	Burns et al.
5,858,188 A	1/1999	Soane et al.	6,062,261 A	5/2000	Jacobson et al.
5,863,502 A	1/1999	Southgate et al.	6,063,341 A	5/2000	Fassbind et al.
5,863,708 A	1/1999	Zanzucchi et al.	6,063,589 A	5/2000	Kellogg et al.
5,863,801 A	1/1999	Southgate et al.	6,071,478 A	6/2000	Chow
5,866,345 A	2/1999	Wilding et al.	6,074,725 A	6/2000	Kennedy
5,869,004 A	2/1999	Parce et al.	6,074,827 A	6/2000	Nelson et al.
5,872,010 A	2/1999	Karger et al.	D428,497 S	7/2000	Lapeus et al.
5,872,623 A	2/1999	Stabile et al.	6,086,740 A	7/2000	Kennedy
5,874,046 A	2/1999	Megerle	6,096,509 A	8/2000	Okun et al.
5,876,675 A	3/1999	Kennedy	6,100,541 A	8/2000	Nagle et al.
5,880,071 A	3/1999	Parce et al.	6,102,897 A	8/2000	Lang
5,882,465 A	3/1999	McReynolds	6,103,537 A	8/2000	Ullman et al.
5,883,211 A	3/1999	Sassi et al.	6,106,685 A	8/2000	McBride et al.
5,885,432 A	3/1999	Hooper et al.	6,110,343 A	8/2000	Ramsey et al.
5,885,470 A	3/1999	Parce et al.	6,123,205 A	9/2000	Dumitrescu et al.
5,895,762 A	4/1999	Greenfield et al.	6,123,798 A	9/2000	Gandhi et al.
5,900,130 A	5/1999	Benvegnu et al.	6,130,098 A	10/2000	Handique et al.
5,912,124 A	6/1999	Kumar	6,132,580 A	10/2000	Mathies et al.
5,912,134 A	6/1999	Shartle	6,132,684 A	10/2000	Marino
5,916,522 A	6/1999	Boyd et al.	6,133,436 A	10/2000	Koster et al.
5,916,776 A	6/1999	Kumar	D433,759 S	11/2000	Mathis et al.
5,919,646 A	7/1999	Okun et al.	6,143,250 A	11/2000	Tajima
5,919,711 A	7/1999	Boyd et al.	6,149,787 A	11/2000	Chow et al.
5,922,591 A	7/1999	Anderson et al.	6,156,199 A	12/2000	Zuk, Jr.
5,927,547 A	7/1999	Papen et al.	6,158,269 A	12/2000	Dorenkott et al.
5,928,880 A	7/1999	Wilding et al.	6,167,910 B1	1/2001	Chow
5,929,208 A	7/1999	Heller et al.	6,168,948 B1	1/2001	Anderson et al.
D413,391 S	8/1999	Lapeus et al.	6,171,850 B1	1/2001	Nagle et al.
5,932,799 A	8/1999	Moles	6,174,675 B1	1/2001	Chow et al.
5,935,401 A	8/1999	Amigo	D438,311 S	2/2001	Yamanishi et al.
5,939,291 A	8/1999	Loewy et al.	6,190,619 B1	2/2001	Kilcoin et al.
5,942,443 A	8/1999	Parce et al.	D438,632 S	3/2001	Miller
D413,677 S	9/1999	Dumitrescu et al.	D438,633 S	3/2001	Miller
5,948,227 A	9/1999	Dubrow	6,197,595 B1	3/2001	Anderson et al.
5,955,028 A	9/1999	Chow	6,211,989 B1	4/2001	Wulf et al.
5,955,029 A	9/1999	Wilding et al.	6,213,151 B1	4/2001	Jacobson et al.
5,957,579 A	9/1999	Kopf-Sill et al.	6,221,600 B1	4/2001	MacLeod et al.
5,958,203 A	9/1999	Parce et al.	6,228,635 B1	5/2001	Armstrong et al.
5,958,694 A	9/1999	Nikiforov	6,235,175 B1	5/2001	Dubrow et al.
5,959,221 A	9/1999	Boyd et al.	6,235,313 B1	5/2001	Mathiowitz et al.
5,959,291 A	9/1999	Jensen	6,235,471 B1	5/2001	Knapp et al.
5,964,995 A	10/1999	Nikiforov et al.	6,236,581 B1	5/2001	Lines et al.
5,964,997 A	10/1999	McBride	6,251,343 B1	6/2001	Dubrow et al.
5,965,001 A	10/1999	Chow et al.	6,254,826 B1	7/2001	Acosta et al.
5,965,410 A	10/1999	Chow et al.	6,259,635 B1	7/2001	Torelli et al.
5,965,886 A	10/1999	Sauer et al.	6,261,431 B1	7/2001	Mathies et al.
5,972,187 A	10/1999	Parce et al.	6,267,858 B1	7/2001	Parce et al.
5,973,138 A	10/1999	Collis	D446,306 S	8/2001	Ochi et al.
D417,009 S	11/1999	Boyd	6,271,021 B1	8/2001	Burns et al.
5,976,336 A	11/1999	Dubrow et al.	6,274,089 B1	8/2001	Chow et al.
5,980,704 A	11/1999	Cherukuri et al.	6,280,967 B1	8/2001	Ransom et al.
5,980,719 A	11/1999	Cherukuri et al.	6,281,008 B1	8/2001	Komai et al.
5,981,735 A	11/1999	Thatcher et al.	6,284,113 B1	9/2001	Bjornson et al.
5,989,402 A	11/1999	Chow et al.	6,287,254 B1	9/2001	Dodds
5,992,820 A	11/1999	Fare et al.	6,287,774 B1	9/2001	Kikiforov
5,993,611 A	11/1999	Moroney, III et al.	6,291,248 B1	9/2001	Haj-Ahmad
5,993,750 A	11/1999	Ghosh et al.	6,294,063 B1	9/2001	Becker et al.
5,997,708 A	12/1999	Craig	6,302,134 B1	10/2001	Kellogg et al.
6,001,229 A	12/1999	Ramsey	6,302,304 B1	10/2001	Spencer
6,001,231 A	12/1999	Kopf-Sill	6,303,343 B1	10/2001	Kopf-sill
6,001,307 A	12/1999	Naka et al.	6,306,273 B1	10/2001	Wainright et al.
6,004,515 A	12/1999	Parce et al.	6,306,590 B1	10/2001	Mehta et al.
6,007,690 A	12/1999	Nelson et al.	6,319,469 B1	11/2001	Mian et al.
6,010,607 A	1/2000	Ramsey	6,322,683 B1	11/2001	Wolk et al.
6,010,608 A	1/2000	Ramsey	6,326,083 B1	12/2001	Yang et al.

US D665,095 S

Page 4

6,326,211 B1	12/2001	Anderson et al.	6,613,211 B1	9/2003	Mccormick et al.
6,337,435 B1	1/2002	Chu et al.	6,613,512 B1	9/2003	Kopf-sill et al.
6,353,475 B1	3/2002	Jensen et al.	6,613,580 B1	9/2003	Chow et al.
6,358,387 B1	3/2002	Kopf-sill et al.	6,613,581 B1	9/2003	Wada et al.
6,366,924 B1	4/2002	Parce	6,614,030 B2	9/2003	Maher et al.
6,368,871 B1	4/2002	Christel et al.	6,620,625 B2	9/2003	Wolk et al.
6,370,206 B1	4/2002	Schenk	6,623,860 B2	9/2003	Hu et al.
6,375,185 B1	4/2002	Lin	6,627,406 B1	9/2003	Singh et al.
6,375,901 B1	4/2002	Robotti et al.	D480,814 S	10/2003	Lafferty et al.
6,379,884 B2	4/2002	Wada et al.	6,632,655 B1	10/2003	Mehta et al.
6,379,929 B1	4/2002	Burns et al.	D482,796 S	11/2003	Oyama et al.
6,379,974 B1	4/2002	Parce et al.	6,649,358 B1	11/2003	Parce et al.
6,391,541 B1	5/2002	Petersen et al.	6,664,104 B2	12/2003	Pourahmadi et al.
6,391,623 B1	5/2002	Besemer et al.	6,669,831 B2	12/2003	Chow et al.
6,395,161 B1	5/2002	Schneider et al.	6,670,153 B2	12/2003	Stern
6,398,956 B1	6/2002	Coville et al.	D484,989 S	1/2004	Gebrian
6,399,025 B1	6/2002	Chow	6,681,616 B2	1/2004	Spaid et al.
6,399,389 B1	6/2002	Parce et al.	6,681,788 B2	1/2004	Parce et al.
6,399,952 B1	6/2002	Maher et al.	6,685,813 B2	2/2004	Williams et al.
6,403,338 B1	6/2002	Knapp et al.	6,692,700 B2	2/2004	Handique
6,408,878 B2	6/2002	Unger et al.	6,695,009 B2	2/2004	Chien et al.
6,413,401 B1	7/2002	Chow et al.	6,706,519 B1	3/2004	Kellogg et al.
6,416,642 B1	7/2002	Alajoki et al.	6,720,148 B1	4/2004	Nikiforov
6,420,143 B1	7/2002	Kopf-sill	6,730,206 B2	5/2004	Ricco et al.
6,425,972 B1	7/2002	Mc Reynolds	6,733,645 B1	5/2004	Chow
D461,906 S	8/2002	Pham	6,734,401 B2	5/2004	Bedingham et al.
6,428,987 B2	8/2002	Franzen	D491,272 S	6/2004	Alden et al.
6,430,512 B1	8/2002	Gallagher	D491,273 S	6/2004	Biegler et al.
6,432,366 B2	8/2002	Ruediger et al.	D491,276 S	6/2004	Langille
6,440,725 B1	8/2002	Pourahmadi et al.	6,750,661 B2	6/2004	Brooks et al.
D463,031 S	9/2002	Slomski et al.	6,752,966 B1	6/2004	Chazan
6,444,461 B1	9/2002	Knapp et al.	6,756,019 B1	6/2004	Dubrow et al.
6,447,661 B1	9/2002	Chow et al.	6,766,817 B2	7/2004	da Silva
6,447,727 B1	9/2002	Parce et al.	6,773,567 B1	8/2004	Wolk
6,448,064 B1	9/2002	Vo-Dinh et al.	6,777,184 B2	8/2004	Nikiforov et al.
6,453,928 B1	9/2002	Kaplan et al.	6,783,962 B1	8/2004	Olander et al.
6,465,257 B1	10/2002	Parce et al.	D495,805 S	9/2004	Lea et al.
6,468,761 B2	10/2002	Yang et al.	6,787,015 B2	9/2004	Lackritz et al.
6,472,141 B2	10/2002	Nikiforov	6,787,016 B2	9/2004	Tan et al.
6,475,364 B1	11/2002	Dubrow et al.	6,790,328 B2	9/2004	Jacobson et al.
D467,348 S	12/2002	McMichael et al.	6,790,330 B2	9/2004	Gascoyne et al.
D467,349 S	12/2002	Niedbala et al.	6,811,668 B1	11/2004	Berndt et al.
6,488,897 B2	12/2002	Dubrow et al.	6,818,113 B2	11/2004	Williams et al.
6,495,104 B1	12/2002	Unno et al.	6,819,027 B2	11/2004	Saraf
6,498,497 B1	12/2002	Chow et al.	6,824,663 B1	11/2004	Boone
6,500,323 B1	12/2002	Chow et al.	D499,813 S	12/2004	Wu
6,500,390 B1	12/2002	Boulton et al.	D500,142 S	12/2004	Crisanti et al.
D468,437 S	1/2003	McMenamy et al.	6,827,831 B1	12/2004	Chow et al.
6,506,609 B1	1/2003	Wada et al.	6,827,906 B1	12/2004	Bjornson et al.
6,509,193 B1	1/2003	Tajima	6,838,156 B1	1/2005	Neyer et al.
6,511,853 B1	1/2003	Kopf-sill et al.	6,838,680 B2	1/2005	Maher et al.
D470,595 S	2/2003	Crisanti et al.	6,852,287 B2	2/2005	Ganesan
6,515,753 B2	2/2003	Maher	6,858,185 B1	2/2005	Kopf-sill et al.
6,517,783 B2	2/2003	Horner et al.	6,859,698 B2	2/2005	Schmeisser
6,520,197 B2	2/2003	Deshmukh et al.	6,861,035 B2	3/2005	Pham et al.
6,521,188 B1	2/2003	Webster	6,878,540 B2	4/2005	Pourahmadi et al.
6,524,456 B1	2/2003	Ramsey et al.	6,878,755 B2	4/2005	Singh et al.
6,524,790 B1	2/2003	Kopf-sill et al.	6,884,628 B2	4/2005	Hubbell et al.
D472,324 S	3/2003	Rumore et al.	6,887,693 B2	5/2005	McMillan et al.
6,534,295 B2	3/2003	Tai et al.	6,893,879 B2	5/2005	Petersen et al.
6,537,771 B1	3/2003	Farinas et al.	6,900,889 B2	5/2005	Bjornson et al.
6,540,896 B1	4/2003	Manz et al.	6,905,583 B2	6/2005	Wainright et al.
6,544,734 B1	4/2003	Briscoe et al.	6,905,612 B2	6/2005	Dorian et al.
6,547,942 B1	4/2003	Parce et al.	6,906,797 B1	6/2005	Kao et al.
6,555,389 B1	4/2003	Ullman et al.	6,908,594 B1	6/2005	Schaevitz et al.
6,556,923 B2	4/2003	Gallagher et al.	6,911,183 B1	6/2005	Handique et al.
D474,279 S	5/2003	Mayer et al.	6,914,137 B2	7/2005	Baker
D474,280 S	5/2003	Niedbala et al.	6,915,679 B2	7/2005	Chien et al.
6,558,916 B2	5/2003	Veerapandian et al.	6,918,404 B2	7/2005	da Silva
6,558,945 B1	5/2003	Kao	D508,999 S	8/2005	Fanning et al.
6,569,607 B2	5/2003	Mc Reynolds	6,939,451 B2	9/2005	Zhao et al.
6,572,830 B1	6/2003	Burdon et al.	6,942,771 B1	9/2005	Kayyem
6,575,188 B2	6/2003	Parunak	6,958,392 B2	10/2005	Fomovskaia et al.
6,576,459 B2	6/2003	Miles et al.	D512,155 S	11/2005	Matsumoto
6,579,453 B1	6/2003	Bächler et al.	6,964,747 B2	11/2005	Banerjee et al.
6,589,729 B2	7/2003	Chan et al.	6,977,163 B1	12/2005	Mehta
6,592,821 B1	7/2003	Wada et al.	6,984,516 B2	1/2006	Briscoe et al.
6,597,450 B1	7/2003	Andrews et al.	D515,707 S	2/2006	Shinohara et al.
6,602,474 B1	8/2003	Tajima	D516,221 S	2/2006	Wohlstadter et al.

US D665,095 S

7,001,853 B1	2/2006	Brown et al.	7,744,817 B2	6/2010	Bui
7,004,184 B2	2/2006	Handique et al.	7,867,776 B2	1/2011	Kennedy et al.
D517,554 S	3/2006	Yanagisawa et al.	D632,799 S *	2/2011	Canner et al. D24/216
7,010,391 B2	3/2006	Handique et al.	7,892,819 B2	2/2011	Wilding et al.
7,023,007 B2	4/2006	Gallagher	2001/0023848 A1	9/2001	Gjerde et al.
7,024,281 B1	4/2006	Unno	2001/0038450 A1	11/2001	McCaffrey et al.
7,036,667 B2	5/2006	Greenstein et al.	2001/0046702 A1	11/2001	Schembri
7,037,416 B2	5/2006	Parce et al.	2001/0055765 A1	12/2001	O'Keefe et al.
7,038,472 B1	5/2006	Chien	2002/0001848 A1	1/2002	Bedingham et al.
7,039,527 B2	5/2006	Tripathi et al.	2002/0009015 A1	1/2002	Laugharn, Jr. et al.
7,040,144 B2	5/2006	Spaid et al.	2002/0015667 A1	2/2002	Chow
D523,153 S	6/2006	Akashi et al.	2002/0021983 A1	2/2002	Comte et al.
7,055,695 B2	6/2006	Greenstein et al.	2002/0037499 A1	3/2002	Quake et al.
7,060,171 B1	6/2006	Nikiforov et al.	2002/0039783 A1	4/2002	McMillan et al.
7,066,586 B2	6/2006	da Silva	2002/0053399 A1	5/2002	Soane et al.
7,069,952 B1	7/2006	McCreynolds et al.	2002/0054835 A1	5/2002	Robotti et al.
7,099,778 B2	8/2006	Chien	2002/0055167 A1	5/2002	Pourahmadi et al.
D528,215 S	9/2006	Malmsater	2002/0060156 A1	5/2002	Mathies et al.
7,101,467 B2	9/2006	Spaid	2002/0068357 A1	6/2002	Mathies et al.
7,105,304 B1	9/2006	Nikiforov et al.	2002/0141903 A1	10/2002	Parunak et al.
D531,321 S	10/2006	Godfrey et al.	2002/0142471 A1	10/2002	Handique et al.
7,118,910 B2	10/2006	Unger et al.	2002/0143297 A1	10/2002	Francavilla et al.
7,138,032 B2	11/2006	Gandhi et al.	2002/0143437 A1	10/2002	Handique et al.
D534,280 S	12/2006	Gomm et al.	2002/0169518 A1	11/2002	Luoma et al.
7,148,043 B2	12/2006	Kordunsky et al.	2002/0187557 A1	12/2002	Hobbs et al.
7,150,814 B1	12/2006	Parce et al.	2003/0019522 A1	1/2003	Parunak
7,150,999 B1	12/2006	Shuck	2003/0049833 A1	3/2003	Chen et al.
D535,403 S	1/2007	Isozaki et al.	2003/0070677 A1	4/2003	Handique et al.
7,160,423 B2	1/2007	Chien et al.	2003/0073106 A1	4/2003	Johansen et al.
7,161,356 B1	1/2007	Chien	2003/0083686 A1	5/2003	Freeman et al.
7,169,277 B2	1/2007	Ausserer et al.	2003/0087300 A1	5/2003	Knapp et al.
7,169,618 B2	1/2007	Skould	2003/0127327 A1	7/2003	Kurnik
D537,951 S	3/2007	Okamoto et al.	2003/0136679 A1	7/2003	Bohn et al.
D538,436 S	3/2007	Patadia et al.	2003/0186295 A1	10/2003	Colin et al.
7,192,557 B2	3/2007	Wu et al.	2003/0199081 A1	10/2003	Wilding et al.
7,195,986 B1	3/2007	Bousse et al.	2003/0211517 A1	11/2003	Carulli et al.
7,208,125 B1	4/2007	Dong	2004/0014238 A1	1/2004	Krug et al.
7,235,406 B1	6/2007	Woudenberg et al.	2004/0029258 A1	2/2004	Heaney et al.
7,247,274 B1	7/2007	Chow	2004/0053290 A1	3/2004	Terbrueggen et al.
D548,841 S	8/2007	Brownell et al.	2004/0063217 A1	4/2004	Webster et al.
D549,827 S	8/2007	Maeno et al.	2004/0072278 A1	4/2004	Chou et al.
7,252,928 B1	8/2007	Hafeman et al.	2004/0072375 A1	4/2004	Gjerde et al.
7,270,786 B2	9/2007	Parunak et al.	2004/0141887 A1	7/2004	Mainquist et al.
D554,069 S	10/2007	Bolotin et al.	2004/0151629 A1	8/2004	Pease et al.
D554,070 S	10/2007	Bolotin et al.	2004/0157220 A1	8/2004	Kurnool et al.
7,276,330 B2	10/2007	Chow et al.	2004/0161788 A1	8/2004	Chen et al.
D556,914 S	12/2007	Okamoto et al.	2004/0189311 A1	9/2004	Glezer et al.
7,303,727 B1	12/2007	Dubrow et al.	2004/0209331 A1	10/2004	Ririe
D559,995 S	1/2008	Handique et al.	2004/0209354 A1	10/2004	Mathies et al.
7,323,140 B2	1/2008	Handique et al.	2004/0219070 A1	11/2004	Handique
7,332,130 B2	2/2008	Handique	2004/0240097 A1	12/2004	Evans
7,338,760 B2	3/2008	Gong	2005/0009174 A1	1/2005	Nikiforov et al.
D566,291 S	4/2008	Parunak et al.	2005/0048540 A1	3/2005	Inami et al.
7,351,377 B2	4/2008	Chazan et al.	2005/0084424 A1	4/2005	Ganesan et al.
D569,526 S	5/2008	Duffy et al.	2005/0106066 A1	5/2005	Saltsman et al.
7,374,949 B2	5/2008	Kuriger	2005/0121324 A1	6/2005	Park et al.
7,390,460 B2	6/2008	Osawa et al.	2005/0133370 A1	6/2005	Park et al.
7,419,784 B2	9/2008	Dubrow et al.	2005/0135655 A1	6/2005	Kopf-sill et al.
7,422,669 B2	9/2008	Jacobson et al.	2005/0152808 A1	7/2005	Ganesan
7,440,684 B2	10/2008	Spaid et al.	2005/0170362 A1	8/2005	Wada et al.
7,476,313 B2	1/2009	Siddiqi	2005/0202470 A1	9/2005	Sundberg et al.
7,494,577 B2	2/2009	Williams et al.	2005/0202504 A1	9/2005	Anderson et al.
7,494,770 B2	2/2009	Wilding et al.	2005/0208676 A1	9/2005	Kahatt
7,514,046 B2	4/2009	Kechagia et al.	2005/0220675 A1	10/2005	Reed et al.
7,518,726 B2	4/2009	Rulison et al.	2005/0227269 A1	10/2005	Lloyd et al.
7,521,186 B2	4/2009	Burd Mehta	2005/0233370 A1	10/2005	Ammann et al.
7,527,769 B2	5/2009	Bunch et al.	2005/0238545 A1	10/2005	Parce et al.
7,553,671 B2	6/2009	Sinclair et al.	2005/0272079 A1	12/2005	Burns et al.
D596,312 S	7/2009	Giraud et al.	2006/0041058 A1	2/2006	Yin et al.
D598,566 S *	8/2009	Allaer D24/230	2006/0057039 A1	3/2006	Morse et al.
7,595,197 B2	9/2009	Brasseur	2006/0057629 A1	3/2006	Kim
7,604,938 B2	10/2009	Takahashi et al.	2006/0062696 A1	3/2006	Chow et al.
7,635,588 B2	12/2009	King et al.	2006/0094108 A1	5/2006	Yoder et al.
7,645,581 B2	1/2010	Knapp et al.	2006/0113190 A1	6/2006	Kurnik
7,670,559 B2	3/2010	Chien et al.	2006/0133965 A1	6/2006	Tajima et al.
7,704,735 B2	4/2010	Facer et al.	2006/0134790 A1	6/2006	Tanaka et al.
7,723,123 B1	5/2010	Murphy et al.	2006/0148063 A1	7/2006	Fauzzi et al.
7,727,371 B2	6/2010	Kennedy et al.	2006/0165558 A1	7/2006	Witty et al.
7,727,477 B2	6/2010	Boronkay et al.	2006/0165559 A1	7/2006	Greenstein et al.

2006/0166233	A1	7/2006	Wu et al.	WO	WO 01/041931	6/2001
2006/0177376	A1	8/2006	Tomalia et al.	WO	WO 01/054813	8/2001
2006/0183216	A1	8/2006	Handique	WO	WO 01/89681	11/2001
2006/0207944	A1	9/2006	Siddiqi	WO	WO 02/078845	10/2002
2006/0246493	A1	11/2006	Jensen et al.	WO	WO 03/012325	2/2003
2006/0246533	A1	11/2006	Fathollahi et al.	WO	WO 03/012406	2/2003
2007/0004028	A1	1/2007	Lair et al.	WO	WO 03/055605	7/2003
2007/0009386	A1	1/2007	Padmanabhan et al.	WO	WO 2004/007081	1/2004
2007/0020699	A1	1/2007	Carpenter et al.	WO	WO 2004/074848	9/2004
2007/0026421	A1	2/2007	Sundberg et al.	WO	WO 2005/011867	2/2005
2007/0042441	A1	2/2007	Masters et al.	WO	WO 2005/108620	11/2005
2007/0092901	A1	4/2007	Ligler et al.	WO	WO 2006/079082	7/2006
2007/0098600	A1	5/2007	Kayyem et al.	WO	WO 2008/060604	5/2008
2007/0099200	A1	5/2007	Chow et al.	WO	WO 2009/012185	1/2009
2007/0104617	A1	5/2007	Coulling et al.			
2007/0154895	A1	7/2007	Spaid et al.			
2007/0177147	A1	8/2007	Parce			
2007/0178607	A1	8/2007	Prober et al.			
2007/0184463	A1	8/2007	Molho et al.			
2007/0184547	A1	8/2007	Handique et al.			
2007/0196238	A1	8/2007	Kennedy et al.			
2007/0199821	A1	8/2007	Chow			
2007/0215554	A1	9/2007	Kreuwel et al.			
2007/0218459	A1	9/2007	Miller et al.			
2007/0231213	A1	10/2007	Prabhu et al.			
2007/0261479	A1	11/2007	Spaid et al.			
2007/0269861	A1	11/2007	Williams et al.			
2007/0292941	A1	12/2007	Handique et al.			
2008/0000774	A1	1/2008	Park et al.			
2008/0050804	A1	2/2008	Handique et al.			
2008/0056948	A1	3/2008	Dale et al.			
2008/0075634	A1	3/2008	Herchenbach et al.			
2008/0090244	A1	4/2008	Knapp et al.			
2008/0095673	A1	4/2008	Xu			
2008/0118987	A1	5/2008	Eastwood et al.			
2008/0124723	A1	5/2008	Dale et al.			
2008/0149840	A1	6/2008	Handique et al.			
2008/0160601	A1	7/2008	Handique			
2008/0182301	A1	7/2008	Handique et al.			
2008/0192254	A1	8/2008	Kim et al.			
2008/0247914	A1	10/2008	Edens et al.			
2008/0262213	A1	10/2008	Wu et al.			
2009/0047713	A1	2/2009	Handique			
2009/0129978	A1	5/2009	Wilson et al.			
2009/0130719	A1	5/2009	Handique			
2009/0130745	A1	5/2009	Williams et al.			
2009/0131650	A1	5/2009	Brahmasandra et al.			
2009/0134069	A1	5/2009	Handique			
2009/0136385	A1	5/2009	Handique et al.			
2009/0136386	A1	5/2009	Duffy et al.			
2009/0155123	A1	6/2009	Williams et al.			
2009/0221059	A1	9/2009	Williams et al.			
2009/0223925	A1	9/2009	Morse et al.			

OTHER PUBLICATIONS

Brahmassandra, et al., On-Chip DNA Detection in Microfabricated Separation Systems, Part of the SPIE Conference on Microfluidic Devices and Systems, 1998, Santa Clara, California, vol. 3515, pp. 242-251.

Breadmore, M.C. et al., "Microchip-Based Purification of DNA from Biological Samples", *Anal. Chem.*, vol. 75 (2003), pp. 1880-1886.

Brody, et al., Diffusion-Based Extraction in a Microfabricated Device, *Sensors and Actuators Elsevier*, 1997, vol. A58, No. 1, pp. 13-18.

Burns et al., "An Integrated Nanoliter DNA Analysis Device", *Science* 282:484-487 (1998).

Carlen et al., "Paraffin Actuated Surface Micromachined Valve," in *IEEE MEMS 2000 Conference*, p. 381-385, Miyazaki, Japan, Jan. 2000.

Chung, Y. et al., "Microfluidic chip for high efficiency DNA extraction", *Miniaturisation for Chemistry, Biology & Bioengineering*, vol. 4, No. 2 (Apr. 2004), pp. 141-147.

Handique K., et al., On-Chip Thermopneumatic Pressure for Discrete Drop Pumping, *Analytical Chemistry*, American Chemical Society, Apr. 15, 2001, vol. 73, No. 8, 1831-1838.

Handique, K. et al, "Microfluidic flow control using selective hydrophobic patterning", *SPIE*, vol. 3224, pp. 185-194 (1997).

Handique, K. et al., "Nanoliter-volume discrete drop injection and pumping in microfabricated chemical analysis systems", *Solid-State Sensor and Actuator Workshop (Hilton Head, South Carolina, Jun. 8-11, 1998)* pp. 346-349.

Handique, K. et al., "Mathematical Modeling of Drop Mixing in a Slit-Type Microchannel", *J. Micromech. Microeng.*, 11:548-554 (2001).

Handique, K. et al., "Nanoliter Liquid Metering in Microchannels Using Hydrophobic Patterns", *Anal. Chem.*, 72:4100-4109 (2000).

He, et al., Microfabricated Filters for Microfluidic Analytical Systems, *Analytical Chemistry*, American Chemical Society, 1999, vol. 71, No. 7, pp. 1464-1468.

Ibrahim, et al., Real-Time Microchip PCR for Detecting Single-Base Differences in Viral and Human DNA, *Analytical Chemistry*, American Chemical Society, 1998, vol. 70, No. 9, pp. 2013-2017.

Khandurina, et al., Microfabricated Porous Membrane Structure for Sample Concentration and Electrophoretic Analysis, *Analytical Chemistry* American Chemical Society, 1999, vol. 71, No. 9, pp. 1815-1819.

Kopp, et al., Chemical Amplification: Continuous-Flow PCR on a Chip, *www.sciencemag.org*, 1998, vol. 280, pp. 1046-1048.

Kutter, et al., Solid Phase Extraction on Microfluidic Devices, *J. Microcolumn Separations*, John Wiley & Sons, Inc., 2000, vol. 12, No. 2, pp. 93-97.

Lagally, et al., Single-Molecule DNA Amplification and Analysis in an Integrated Microfluidic Device, *Analytical Chemistry*, American Chemical Society, 2001, vol. 73, No. 3 pp. 565-570.

Livache, T. et al., "Polypyrrole DNA chip on a Silicon Device: Example of Hepatitis C Virus Genotyping", *Analytical Biochemistry*, vol. 255 (1998), pp. 188-194.

Northrup, et al., A Miniature Analytical Instrument for Nucleic Acids Based on Micromachined Silicon Reaction Chambers, *Analytical Chemistry*, American Chemical Society, 1998, vol. 70, No. 5, pp. 918-922.

FOREIGN PATENT DOCUMENTS

DE	19929734	12/1999
EP	0766256	4/1997
FR	2672301	8/1992
FR	2795426	12/2000
JP	58212921 A	12/1983
JP	H07-290706	11/1995
JP	2001-515216	9/2001
JP	A-2001-527220	12/2001
JP	A-2003-500674	1/2003
JP	2005-514718	5/2005
JP	A-2005-204661	8/2005
WO	WO 88/06633	9/1988
WO	WO 92/05443	4/1992
WO	WO 98/00231	1/1998
WO	WO 98/22625	5/1998
WO	WO 98/53311	11/1998
WO	WO 99/01688	1/1999
WO	WO 99/09042	2/1999
WO	WO 99/12016	3/1999
WO	WO 99/33559	7/1999
WO	WO 01/05510	1/2001
WO	WO 01/014931	3/2001
WO	WO 01/27614	4/2001
WO	WO 01/28684	4/2001

Oleschuk, et al., Trapping of Bead-Based Reagents within Microfluidic Systems; On-Chip Solid-Phase Extraction and Electrochromatography, *Analytical Chemistry*, American Chemical Society, 2000, vol. 72, No. 3, pp. 585-590.

Orchid BioSciences, Inc., www.orchid.com, Jul. 6, 2001.

Roche, et al. "Ectodermal commitment of insulin-producing cells derived from mouse embryonic stem cells" *Faseb J* (2005) 19: 1341-1343.

Ross, et al., Analysis of DNA Fragments from Conventional and Microfabricated PCR Devices Using Delayed Extraction MALDI-TOF Mass Spectrometry, *Analytical Chemistry*, American Chemical Society, 1998, vol. 70, No. 10, pp. 2067-2073.

Shoffner, M. A. et al., Chip PCR.I. Surface Passivation of Microfabricated Silicon-Glass Chips for PCR, *Nucleic Acids Research*, Oxford University Press, 1996, vol. 24, No. 2, 375-379.

Smith, K. et al., "Comparison of Commercial DNA Extraction Kits for Extraction of Bacterial Genomic DNA from Whole-Blood Samples", *Journal of Clinical Microbiology*, vol. 41, No. 6 (Jun. 2003), pp. 2440-2443.

Waters, et al., Microchip Device for Cell Lysis, Multiplex PCR Amplification, and Electrophoretic Sizing, *Analytical Chemistry*, American Chemical Society, 1998, vol. 70, No. 1, pp. 158-162.

Weigl, et al., Microfluidic Diffusion-Based Separation and Detection, www.sciencemag.org, 1999, vol. 283, pp. 346-347.

Yoza, Brandon et al., DNA extraction using bacterial magnetic particles modified with hyperbranched polyamidoamine dendrimer, Mar. 20, 2003, vol. 101, No. 3, 219-228.

Yoza, et al., "Fully Automated DNA Extraction fro Blood Using Magnetic Particles Modified with a Hyperbranched Polyamidomine Dendrimer", *Journal of Bioscience and Bioengineering*, 95(1):21-26, 2003.

Broyles, et al., "Sample Filtration, Concentration, and Separation Integrated on Microfluidic Devices" *Analytical Chemistry* (American Chemical Society), vol. 75 No. 11: pp. 2761-2767.

* cited by examiner

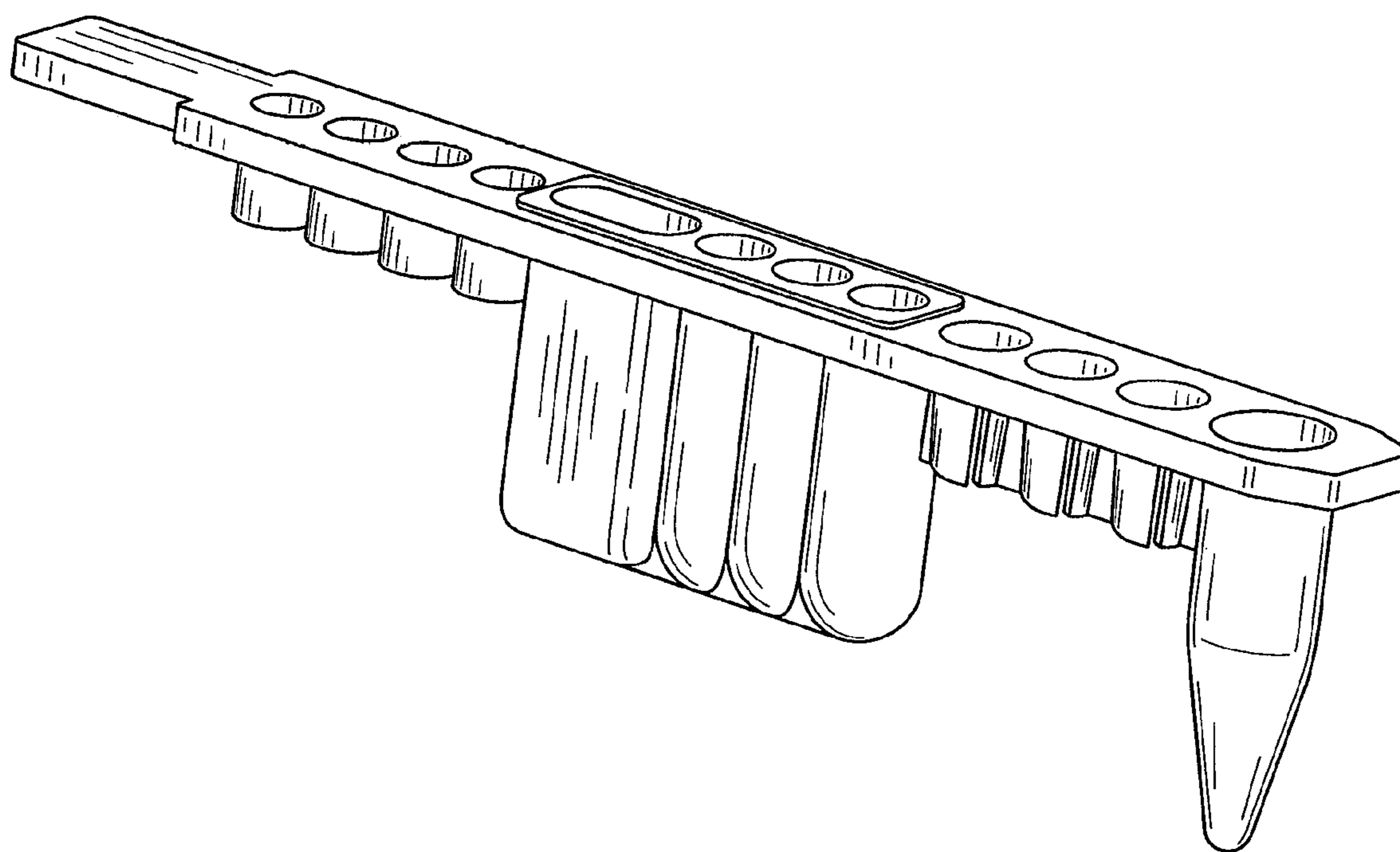


FIG. 1

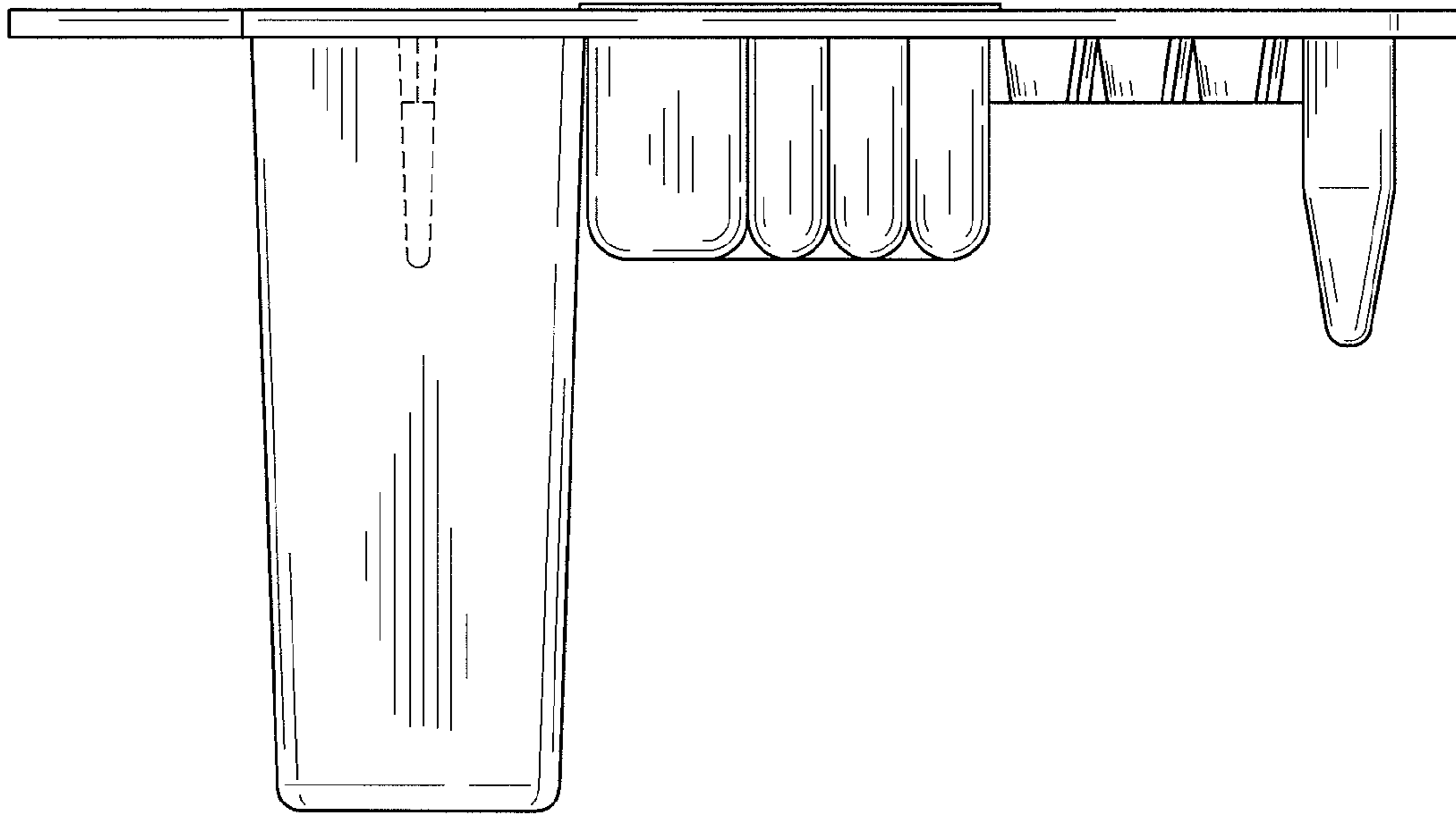


FIG. 2

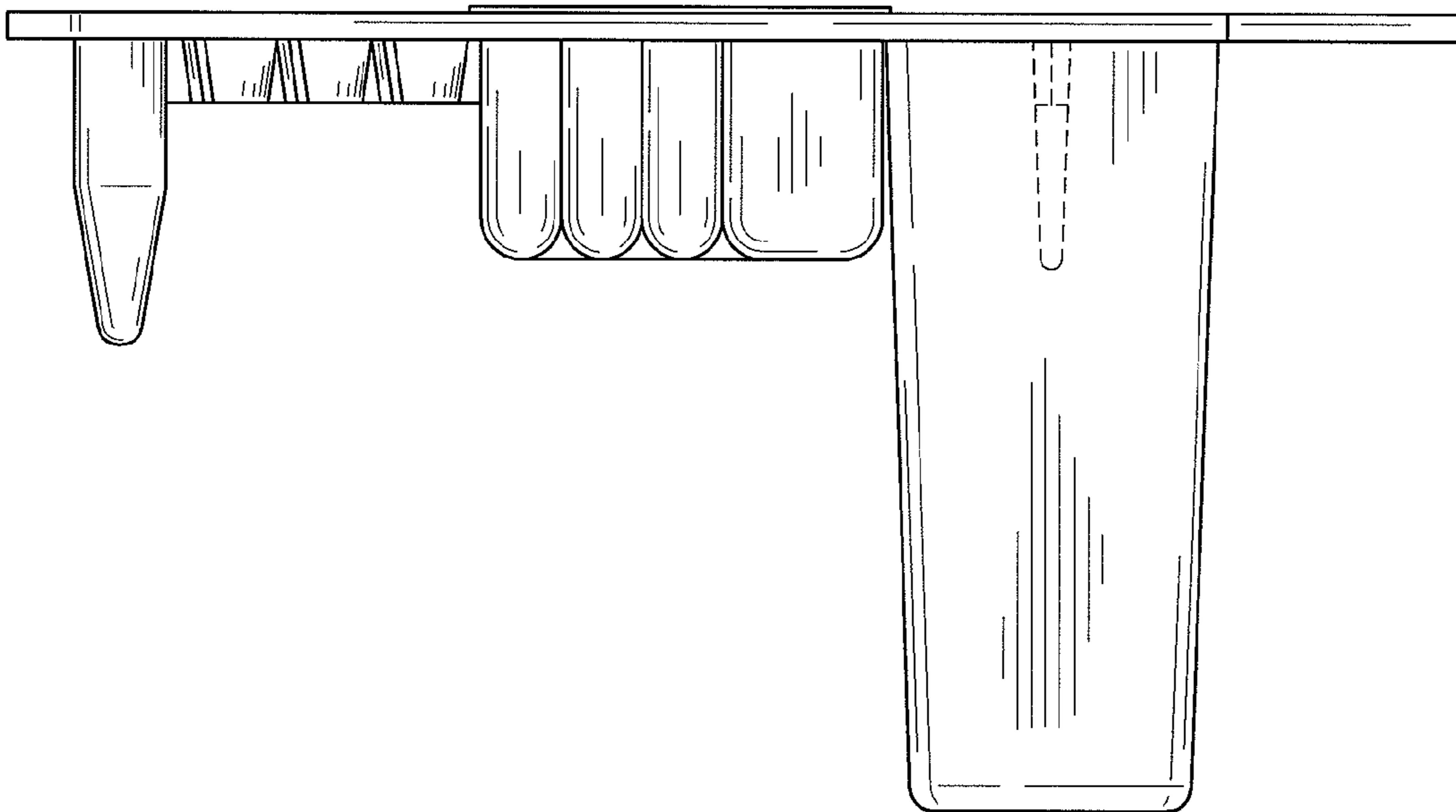


FIG. 3

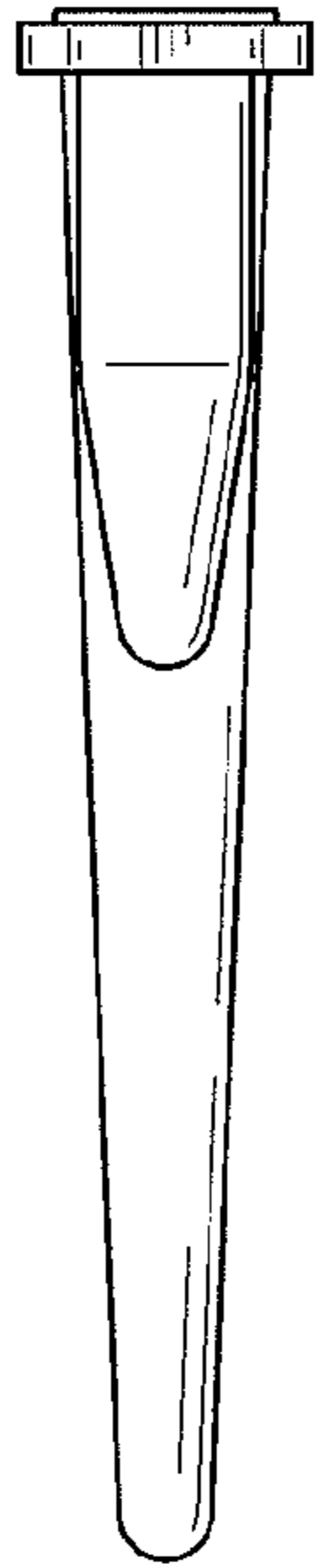


FIG. 4

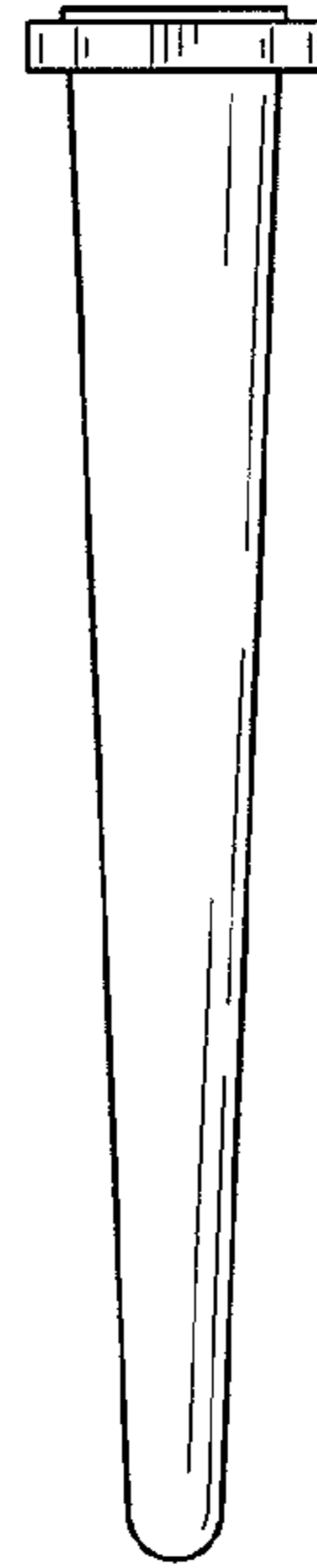


FIG. 5

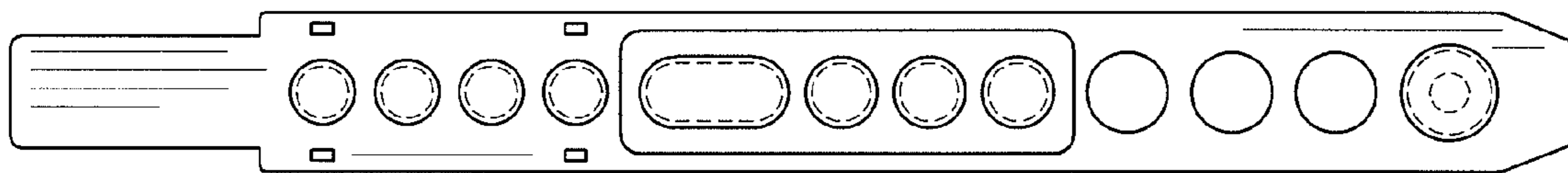


FIG. 6

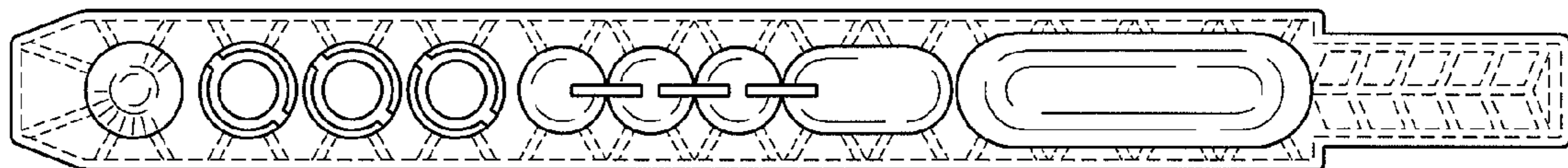


FIG. 7