US00D900330S

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

(10) **Patent No.: US D900,330 S**
(45) **Date of Patent: ** Oct. 27, 2020**

(54) **INSTRUMENT**

(71) Applicant: **GenMark Diagnostics, Inc.**, Carlsbad, CA (US)

(72) Inventors: **Jon Faiz Kayyem**, Boulder, CO (US); **Matthew Sean Thomas**, McKinney, TX (US); **Mathieu Dominic Turpault**, Pennington, NJ (US); **Christopher John Murray**, Philadelphia, PA (US)

(73) Assignee: **GenMark Diagnostics, Inc.**, Carlsbad, CA (US)

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

(21) Appl. No.: **29/675,465**

(22) Filed: **Jan. 2, 2019**

Related U.S. Application Data

(63) Continuation of application No. 15/901,489, filed on Feb. 21, 2018, which is a continuation of application No. 14/062,865, filed on Oct. 24, 2013, now Pat. No. 9,957,553.

(51) **LOC (12) Cl.** **24-01**
(52) **U.S. Cl.**
USPC **D24/216**
(58) **Field of Classification Search**
USPC D10/81; D24/107, 186, 216, 219, 220, D24/221, 223–227, 231, 232
CPC G01N 2035/00306; G01N 2035/00326; G01N 2035/00336; G01N 2030/027; G01N 21/76; G01N 1/28; G01N 33/50; G01N 35/025
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

D60,340	S	2/1922	Grier
D202,013	S	8/1965	Hamilton
3,641,909	A	2/1972	Baker
3,687,051	A	8/1972	Baker et al.
3,776,425	A	12/1973	Baker et al.
3,820,149	A	6/1974	Baker et al.
D234,404	S	2/1975	Merril
4,007,010	A	2/1977	Woodbridge, III
4,065,263	A	12/1977	Woodbridge, III
D253,126	S	10/1979	Baxter
4,182,447	A	1/1980	Kay
D268,130	S	3/1983	Easton

(Continued)

FOREIGN PATENT DOCUMENTS

EP	583833	2/1994
EP	870541	10/1998

(Continued)

OTHER PUBLICATIONS

Sample to Answer Genetic System—Key Tech. Available in 2017.*
U.S. Appl. No. 11/883,896, filed Oct. 2009, Graeme Huntley.
U.S. Appl. No. 11/993,705, filed Aug. 2010, John McDevitt et al.
U.S. Appl. No. 62/396,449, filed Sep. 2016, Nguyen.

(Continued)

Primary Examiner — Anhdao Doan
(74) *Attorney, Agent, or Firm* — Brinks Gilson & Lione

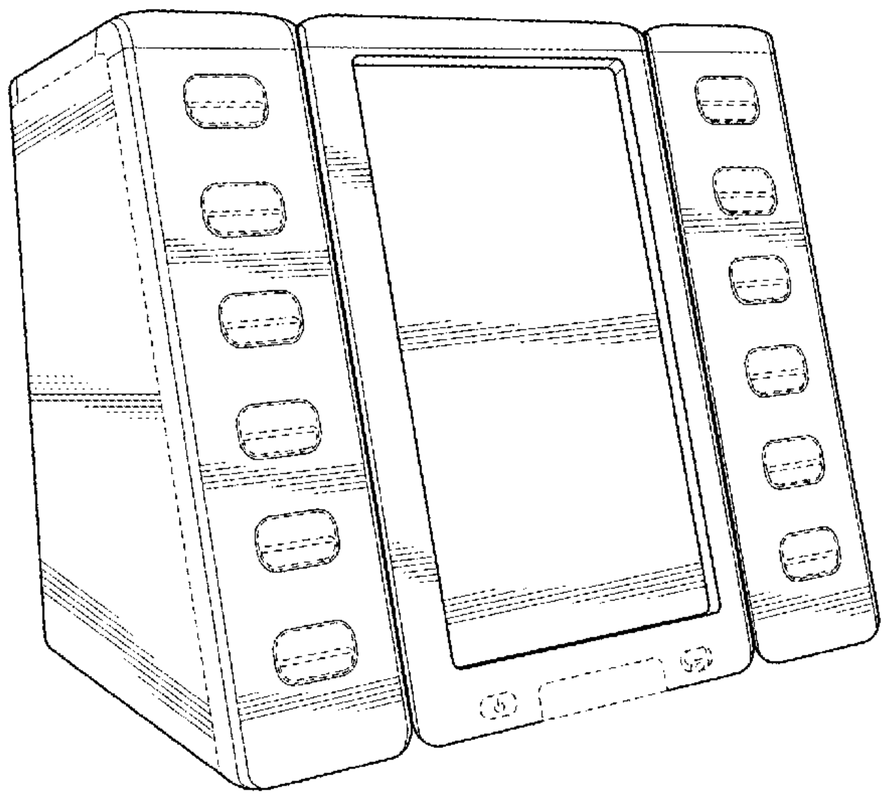
(57) **CLAIM**

The ornamental design for an instrument, as shown and described.

DESCRIPTION

FIG. **1** is a perspective view of an instrument.
FIG. **2** is a front view of the instrument shown in FIG. **1**; and,
FIG. **3** is a right side view of the instrument shown in FIG. **1**.
The bottom, top, and rear views are not shown and form no part of the claimed design.
The broken lines illustrate portions of the instrument that form no part of the claimed design.

1 Claim, 2 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

4,429,792	A	2/1984	Machbitz
4,469,863	A	9/1984	Ts'o et al.
4,526,320	A	7/1985	Von Philipp et al.
D287,760	S	1/1987	Discko, Jr.
4,739,903	A	4/1988	Bedwell et al.
4,769,333	A	9/1988	Dole et al.
4,844,251	A	7/1989	Gueret
4,859,603	A	8/1989	Dole et al.
4,887,455	A	12/1989	Payne et al.
4,978,502	A	12/1990	Dole et al.
5,034,506	A	7/1991	Summerton et al.
5,089,233	A	2/1992	Devaney, Jr. et al.
5,098,660	A	3/1992	Devaney, Jr.
D327,363	S	6/1992	Farb
5,154,888	A	10/1992	Zander et al.
5,216,141	A	6/1993	Benner
5,229,297	A	7/1993	Schnipelsky et al.
5,234,809	A	8/1993	Boom et al.
5,235,033	A	8/1993	Summerton et al.
5,254,479	A	10/1993	Chemelli
5,288,463	A	2/1994	Chemelli
5,290,518	A	3/1994	Johnson
D350,478	S	9/1994	Fuller
D351,996	S	11/1994	Kalvelage
5,374,395	A	12/1994	Robinson et al.
5,386,023	A	1/1995	Sanghvi et al.
5,399,486	A	3/1995	Cathey
5,422,271	A	6/1995	Chen et al.
5,449,096	A	9/1995	Sedlmeier
5,460,780	A	10/1995	Devaney, Jr. et al.
5,468,366	A	11/1995	Wegner et al.
5,512,439	A	4/1996	Hornes et al.
5,529,188	A	6/1996	Coggswell
5,591,578	A	1/1997	Meade et al.
5,593,804	A	1/1997	Chemelli et al.
5,602,240	A	2/1997	De Mesmaeker et al.
5,637,684	A	6/1997	Cook et al.
5,644,048	A	7/1997	Yau
5,652,149	A	7/1997	Mileaf et al.
5,674,653	A	10/1997	Chemelli et al.
5,681,702	A	10/1997	Collins et al.
5,692,644	A	12/1997	Gueret
5,705,348	A	1/1998	Meade et al.
5,705,628	A	1/1998	Hawkins
5,714,380	A	2/1998	Neri et al.
5,716,852	A	2/1998	Yager et al.
5,726,404	A	3/1998	Brody
5,726,751	A	3/1998	Altendorf et al.
5,747,349	A	5/1998	Van Den Engh et al.
5,748,827	A	5/1998	Holl et al.
5,770,365	A	6/1998	Lane et al.
5,807,701	A	9/1998	Payne et al.
5,820,826	A	10/1998	Moorman
5,824,473	A	10/1998	Meade et al.
5,842,787	A	12/1998	Kopf-Sill et al.
5,849,486	A	12/1998	Heller et al.
5,851,536	A	12/1998	Yager et al.
5,873,990	A	2/1999	Wojciechowski et al.
5,876,187	A	3/1999	Afromowitz et al.
5,882,497	A	3/1999	Persaud et al.
5,898,071	A	4/1999	Hawkins
5,932,100	A	8/1999	Yager et al.
5,948,684	A	9/1999	Weigl et al.
5,955,028	A	9/1999	Chow
5,957,579	A	9/1999	Kopf-Sill et al.
5,971,158	A	10/1999	Yager et al.
5,972,710	A	10/1999	Weigl et al.
5,973,138	A	10/1999	Collis
5,974,867	A	11/1999	Forster et al.
6,003,728	A	12/1999	Elliott
6,007,775	A	12/1999	Yager
6,013,170	A	1/2000	Meade
6,013,459	A	1/2000	Meade
6,033,601	A	3/2000	Persaud et al.
6,039,897	A	3/2000	Lochhead et al.
6,063,573	A	5/2000	Kayyem
6,065,641	A	5/2000	Laguna Valderrama
6,067,157	A	5/2000	Altendorf
6,071,478	A	6/2000	Chow
6,090,933	A	7/2000	Kayyem et al.
6,091,502	A	7/2000	Weigl et al.
6,096,273	A	8/2000	Kayyem et al.
6,098,795	A	8/2000	Mollstam et al.
6,110,354	A	8/2000	Saban et al.
6,123,798	A	9/2000	Gandhi et al.
6,134,950	A	10/2000	Forster et al.
6,136,272	A	10/2000	Weigl et al.
6,159,739	A	12/2000	Weigl et al.
6,167,910	B1	1/2001	Chow
6,171,865	B1	1/2001	Weigl et al.
6,180,064	B1	1/2001	Persaud et al.
6,180,114	B1	1/2001	Yager et al.
6,190,858	B1	2/2001	Persaud et al.
6,192,351	B1	2/2001	Persaud
6,221,583	B1	4/2001	Kayyem et al.
6,221,677	B1	4/2001	Wu et al.
6,227,809	B1	5/2001	Forster et al.
6,230,884	B1	5/2001	Coory
6,232,062	B1	5/2001	Kayyem et al.
6,235,501	B1	5/2001	Gautsch et al.
6,236,951	B1	5/2001	Payne et al.
6,248,229	B1	6/2001	Meade
6,255,477	B1	7/2001	Kleiber et al.
6,264,825	B1	7/2001	Blackburn et al.
6,265,155	B1	7/2001	Meade et al.
6,268,136	B1	7/2001	Shuber et al.
6,277,641	B1	8/2001	Yager
6,290,839	B1	9/2001	Kayyem et al.
6,297,061	B1	10/2001	Wu et al.
6,300,138	B1	10/2001	Gleason et al.
6,321,791	B1	11/2001	Chow
6,361,958	B1	3/2002	Shieh et al.
6,366,924	B1	4/2002	Parce
6,376,232	B1	4/2002	Payne et al.
6,387,290	B1	5/2002	Brody et al.
6,391,558	B1	5/2002	Henkens et al.
6,391,622	B1	5/2002	Knapp et al.
6,399,023	B1	6/2002	Chow
6,399,025	B1	6/2002	Chow
6,403,338	B1	6/2002	Knapp et al.
6,404,493	B1	6/2002	Altendorf
6,406,857	B1	6/2002	Shuber et al.
6,408,884	B1	6/2002	Kamholz et al.
6,409,832	B2	6/2002	Weigl et al.
6,415,821	B2	7/2002	Kamholz et al.
6,426,230	B1	7/2002	Feistel
6,431,016	B1	8/2002	Payne
6,431,212	B1	8/2002	Hayenga et al.
6,431,476	B1	8/2002	Taylor et al.
6,432,720	B2	8/2002	Chow
6,432,723	B1	8/2002	Plaxco et al.
6,433,160	B1	8/2002	Collis
6,440,725	B1	8/2002	Pourahmadi et al.
6,443,179	B1	9/2002	Benavides
6,443,307	B1	9/2002	Burridge
6,451,606	B1	9/2002	Konig et al.
6,454,945	B1	9/2002	Weigl et al.
6,479,240	B1	11/2002	Kayyem et al.
6,482,306	B1	11/2002	Yager et al.
6,488,895	B1	12/2002	Kennedy
6,488,896	B2	12/2002	Weigl et al.
6,494,230	B2	12/2002	Chow
6,495,104	B1	12/2002	Unno et al.
6,495,323	B1	12/2002	Kayyem et al.
6,503,757	B1	1/2003	Chow
6,518,024	B2	2/2003	Choong et al.
6,524,456	B1	2/2003	Ramsey et al.
6,537,501	B1	3/2003	Holl et al.
6,541,213	B1	4/2003	Weigl et al.
6,541,617	B1	4/2003	Bamdad et al.
6,557,427	B2	5/2003	Weigl et al.
6,562,568	B1	5/2003	Kleiber et al.
6,565,727	B1	5/2003	Shenderov
6,575,188	B2	6/2003	Parunak

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,576,194 B1 6/2003 Holl et al.
6,581,899 B2 6/2003 Williams
6,582,963 B1 6/2003 Weigl et al.
6,591,852 B1 7/2003 McNeely
6,596,483 B1 7/2003 Choong et al.
6,600,026 B1 7/2003 Yu
6,602,400 B1 8/2003 Choong et al.
6,627,412 B1 9/2003 Manning et al.
6,642,046 B1 11/2003 McGarry et al.
6,645,758 B1 11/2003 Schnipelsky et al.
6,647,397 B2 11/2003 Parce
6,648,015 B1 11/2003 Chow
6,655,010 B1 12/2003 Hatfield et al.
6,656,431 B2 12/2003 Holl et al.
6,660,480 B2 12/2003 Ramsey et al.
6,664,104 B2 12/2003 Pourahmadi et al.
6,674,525 B2 1/2004 Bardell et al.
6,686,150 B1 2/2004 Blackburn et al.
6,695,147 B1 2/2004 Yager et al.
6,706,498 B2 3/2004 Gautsch et al.
6,712,925 B1 3/2004 Holl et al.
6,739,531 B2 5/2004 Taylor
6,740,518 B1 5/2004 Duong et al.
6,742,661 B1 6/2004 Schulte et al.
6,743,399 B1 6/2004 Weigl et al.
6,753,143 B2 6/2004 Tao et al.
6,761,816 B1 7/2004 Blackburn et al.
6,773,566 B2 8/2004 Shenderov
6,783,647 B2 8/2004 Culbertson et al.
6,790,341 B1 9/2004 Saban et al.
6,811,668 B1 11/2004 Berndt et al.
6,824,669 B1 11/2004 Li et al.
6,830,729 B1 12/2004 Holl et al.
6,833,267 B1 12/2004 Kayyem
6,852,284 B1 2/2005 Holl et al.
6,857,449 B1 2/2005 Chow
6,875,619 B2 4/2005 Blackburn
6,878,540 B2 4/2005 Pourahmadi et al.
6,881,312 B2 4/2005 Kopf-Sill et al.
6,881,541 B2 4/2005 Petersen et al.
6,887,693 B2 5/2005 McMillan et al.
6,893,879 B2 5/2005 Petersen et al.
6,914,137 B2 7/2005 Baker
6,919,444 B2 7/2005 Harttig et al.
6,942,771 B1 9/2005 Kayyem
6,951,759 B2 10/2005 Travers et al.
6,960,437 B2 11/2005 Enzelberger et al.
6,960,467 B2 11/2005 Shieh et al.
6,967,489 B2 11/2005 Brooks et al.
6,968,978 B1 11/2005 Matthews
6,977,151 B2 12/2005 Kayyem et al.
6,979,424 B2 12/2005 Northrup et al.
7,010,391 B2 3/2006 Handique et al.
7,011,791 B2 3/2006 Weigl et al.
7,014,992 B1 3/2006 Kayyem et al.
7,018,523 B2 3/2006 Meade
7,030,989 B2 4/2006 Yager et al.
7,045,285 B1 5/2006 Kayyem et al.
7,056,475 B2 6/2006 Lum et al.
7,056,669 B2 6/2006 Kayyem et al.
7,087,148 B1 8/2006 Blackburn et al.
7,090,804 B2 8/2006 Kayyem et al.
7,119,194 B2 10/2006 Uematsu et al.
7,125,668 B2 10/2006 Kayyem et al.
7,141,429 B2 11/2006 Munson et al.
7,155,344 B1 12/2006 Parce et al.
7,160,678 B1 1/2007 Kayyem et al.
7,163,612 B2 1/2007 Sterling et al.
7,169,358 B2 1/2007 Henkens et al.
7,172,897 B2 2/2007 Blackburn et al.
7,192,557 B2 3/2007 Wu et al.
7,201,881 B2 4/2007 Cox et al.
7,208,271 B2 4/2007 Bost et al.
7,223,371 B2 5/2007 Hayenga et al.
7,226,562 B2 6/2007 Holl et al.
7,238,268 B2 7/2007 Ramsey et al.
7,255,780 B2 8/2007 Shenderov
7,258,837 B2 8/2007 Yager et al.
7,267,939 B2 9/2007 Meade
7,270,786 B2 9/2007 Parunak et al.
7,271,007 B2 9/2007 Weigl et al.
7,312,087 B2 12/2007 Duong et al.
7,323,140 B2 1/2008 Handique et al.
7,343,248 B2 3/2008 Parce et al.
7,364,886 B2 4/2008 Hasenbank et al.
7,371,830 B2 5/2008 Kleiber et al.
7,381,525 B1 6/2008 Kayyem et al.
7,381,533 B2 6/2008 Kayyem et al.
7,384,749 B2 6/2008 Kayyem et al.
7,393,645 B2 7/2008 Kayyem et al.
7,405,054 B1 7/2008 Hasenbank et al.
7,416,791 B1 8/2008 Carlson et al.
7,416,892 B2 8/2008 Battrell et al.
7,419,575 B2 9/2008 Culbertson et al.
7,419,638 B2 9/2008 Saltsman et al.
7,439,014 B2 10/2008 Pamula et al.
7,449,096 B2 11/2008 Berndt et al.
7,473,397 B2 1/2009 Griffin et al.
7,491,495 B2 2/2009 Zielenski et al.
7,497,997 B2 3/2009 Glezer et al.
7,514,228 B2 4/2009 Meade
7,534,331 B2 5/2009 Kayyem
7,544,506 B2 6/2009 Breidford et al.
7,550,267 B2 6/2009 Hawkins et al.
7,560,237 B2 7/2009 O'Connor et al.
7,566,534 B2 7/2009 Meade
7,569,346 B2 8/2009 Petersen et al.
7,579,145 B2 8/2009 Meade
D599,832 S 9/2009 Chapin et al.
D600,503 S 9/2009 Ragsdale
7,582,419 B2 9/2009 Meade
7,595,153 B2 9/2009 Meade
7,601,507 B2 10/2009 O'Connor et al.
7,607,460 B2 10/2009 Johns et al.
7,644,898 B2 1/2010 White et al.
7,648,835 B2 1/2010 Breidford et al.
7,655,129 B2 2/2010 Blackburn et al.
7,655,190 B2 2/2010 Satou et al.
7,659,089 B2 2/2010 Hasenbank et al.
7,669,597 B2 3/2010 Sullivan et al.
7,670,559 B2 3/2010 Chien et al.
7,713,711 B2 5/2010 O'Connor et al.
7,727,723 B2 6/2010 Pollack et al.
7,731,906 B2 6/2010 Handique et al.
7,736,891 B2 6/2010 Nelson et al.
7,759,073 B2 7/2010 O'Connor et al.
7,763,453 B2 7/2010 Clemmens et al.
7,763,471 B2 7/2010 Pamula et al.
7,789,270 B2 9/2010 Tanaami et al.
7,794,669 B2 9/2010 Gyonouchi et al.
7,815,871 B2 10/2010 Pamula et al.
7,816,121 B2 10/2010 Pollack et al.
7,820,030 B2 10/2010 Althaus et al.
7,820,391 B2 10/2010 Chunlin
7,822,510 B2 10/2010 Paik et al.
7,833,708 B2 11/2010 Enzelberger et al.
7,851,184 B2 12/2010 Pollack et al.
7,854,897 B2 12/2010 Tanaami et al.
7,858,045 B2 12/2010 Tanaami et al.
7,863,035 B2 1/2011 Clemens et al.
7,867,757 B2 1/2011 Karlsen et al.
7,901,947 B2 3/2011 Pollack et al.
7,910,294 B2 3/2011 Karlsen
7,914,994 B2 3/2011 Petersen et al.
7,919,330 B2 4/2011 De Guzman et al.
7,935,316 B2 5/2011 Gyonouchi et al.
7,935,481 B1 5/2011 Umek et al.
7,935,537 B2 5/2011 Haley
7,939,021 B2 5/2011 Smith et al.
7,943,030 B2 5/2011 Shenderov
7,955,836 B2 6/2011 Clemmens et al.
7,987,022 B2 7/2011 Handique et al.
7,998,436 B2 8/2011 Pollack et al.
7,998,708 B2 8/2011 Handique et al.

(56) **References Cited**

U.S. PATENT DOCUMENTS

8,007,739	B2	8/2011	Pollack et al.	
8,012,743	B2	9/2011	Bamdad et al.	
8,017,340	B2	9/2011	Collier et al.	
8,041,463	B2	10/2011	Pollack et al.	
8,048,628	B2	11/2011	Pollack et al.	
8,053,239	B2	11/2011	Wheeler et al.	
8,088,578	B2	1/2012	Hua et al.	
8,093,062	B2	1/2012	Winger	
8,101,403	B2	1/2012	Yager et al.	
8,101,431	B2	1/2012	McDevitt et al.	
8,105,477	B2	1/2012	Althaus et al.	
8,105,783	B2	1/2012	Handique	
8,105,849	B2	1/2012	McDevitt et al.	
8,110,392	B2	2/2012	Battrell et al.	
8,114,661	B2	2/2012	O'Connor et al.	
8,129,118	B2	3/2012	Weindel et al.	
8,133,671	B2	3/2012	Williams et al.	
8,133,703	B2	3/2012	Ching et al.	
8,137,917	B2	3/2012	Pollack et al.	
8,168,442	B2	5/2012	Petersen et al.	
8,187,864	B2	5/2012	Wheeler et al.	
8,201,765	B2	6/2012	Rajagopal et al.	
8,202,686	B2	6/2012	Pamula et al.	
8,202,736	B2	6/2012	Mousa et al.	
8,208,146	B2	6/2012	Srinivasan et al.	
8,216,529	B2	7/2012	Ade et al.	
8,216,832	B2	7/2012	Battrell et al.	
8,222,023	B2	7/2012	Battrell et al.	
8,247,176	B2	8/2012	Petersen et al.	
8,247,191	B2	8/2012	Ritzen et al.	
8,268,246	B2	9/2012	Srinivasan et al.	
8,273,308	B2	9/2012	Handique et al.	
8,304,253	B2	11/2012	Yi et al.	
8,313,698	B2	11/2012	Pollack et al.	
8,313,895	B2	11/2012	Pollack et al.	
8,317,990	B2	11/2012	Pamula et al.	
8,318,109	B2	11/2012	Saltsman et al.	
8,318,439	B2	11/2012	Battrell et al.	
8,323,900	B2	12/2012	Handique et al.	
8,329,453	B2	12/2012	Battrell et al.	
8,338,166	B2	12/2012	Beer et al.	
8,342,367	B2	1/2013	Tuyls	
8,343,636	B2	1/2013	Jen et al.	
8,349,276	B2	1/2013	Pamula et al.	
8,356,763	B2	1/2013	Rajagopal et al.	
8,364,315	B2	1/2013	Sturmer et al.	
8,367,370	B2	2/2013	Wheeler et al.	
8,372,340	B2	2/2013	Bird et al.	
8,388,909	B2	3/2013	Pollack et al.	
8,389,297	B2	3/2013	Pamula et al.	
8,394,608	B2	3/2013	Ririe et al.	
8,394,641	B2	3/2013	Winger	
8,404,440	B2	3/2013	Solli et al.	
8,426,213	B2	4/2013	Eckhardt et al.	
8,426,214	B2	4/2013	Stayton et al.	
8,431,389	B2	4/2013	Battrell et al.	
8,440,392	B2	5/2013	Pamula et al.	
8,454,905	B2	6/2013	Pope et al.	
8,460,528	B2	6/2013	Pollack et al.	
8,470,606	B2	6/2013	Srinivasan et al.	
8,481,125	B2	7/2013	Yi et al.	
8,492,168	B2	7/2013	Srinivasan et al.	
8,501,921	B2	8/2013	Bamdad et al.	
8,506,908	B2	8/2013	Benn et al.	
8,518,662	B2	8/2013	Ritzen et al.	
8,541,176	B2	9/2013	Pamula et al.	
8,551,424	B2	10/2013	Abraham-Fuchs et al.	
8,557,198	B2	10/2013	Saltsman et al.	
8,562,807	B2	10/2013	Srinivasan et al.	
8,580,209	B2	11/2013	Kurowski et al.	
8,591,830	B2	11/2013	Sudarsan et al.	
8,592,217	B2	11/2013	Eckhardt	
8,613,889	B2	12/2013	Pollack et al.	
8,637,317	B2	1/2014	Pamula et al.	
8,637,324	B2	1/2014	Pollack et al.	
8,658,111	B2	2/2014	Srinivasan et al.	
8,663,974	B2	3/2014	Brown et al.	
D702,364	S	4/2014	Iqbal	
8,685,344	B2	4/2014	Sudarsan et al.	
8,685,754	B2	4/2014	Pollack et al.	
8,701,906	B1	4/2014	Anderson	
8,795,607	B2	8/2014	Kurowski et al.	
8,951,781	B2	2/2015	Reed et al.	
9,040,288	B2	5/2015	Handique et al.	
9,211,538	B2	12/2015	Weber	
9,222,623	B2	12/2015	Wright et al.	
9,260,475	B2	2/2016	Irvine et al.	
9,410,663	B2	8/2016	Wright et al.	
9,453,613	B2	9/2016	Wright et al.	
9,498,778	B2	11/2016	Corey et al.	
9,557,295	B2	1/2017	Kayyem	
9,598,722	B2	3/2017	Wright et al.	
D800,337	S	10/2017	Daines	
D804,808	S	12/2017	Ukrainsky	
D815,752	S	4/2018	Jackson	
D815,754	S	4/2018	Morkos et al.	
D819,225	S *	5/2018	Mead	D24/233
9,957,553	B2	5/2018	Kayyem et al.	
D830,573	S	10/2018	Poirier	
D831,224	S	10/2018	Hsu	
D845,503	S *	4/2019	Jensen	D24/216
10,391,489	B2	8/2019	Wright et al.	
10,495,656	B2	12/2019	Kayyem et al.	
D881,409	S	4/2020	Kayyem et al.	
2002/0006643	A1	1/2002	Kayyem et al.	
2002/0066677	A1	6/2002	Moscovitz	
2002/0068357	A1	6/2002	Mathies et al.	
2003/0025129	A1	2/2003	Hahn et al.	
2003/0034271	A1	2/2003	Burridge	
2003/0038040	A1	2/2003	Bertl et al.	
2003/0048631	A1	3/2003	Ladyjensky	
2003/0197139	A1	10/2003	Williams	
2004/0037739	A1	2/2004	McNeely et al.	
2004/0053290	A1	3/2004	Terbrueggen et al.	
2004/0137607	A1	7/2004	Tanaami et al.	
2004/0185551	A1	9/2004	Niehaus	
2004/0189311	A1	9/2004	Giezer	
2004/0229378	A1	11/2004	Schulte et al.	
2004/0254559	A1	12/2004	Tanaami et al.	
2005/0003399	A1	1/2005	Blackburn et al.	
2005/0064423	A1	3/2005	Higuchi et al.	
2005/0164373	A1	7/2005	Oldham et al.	
2005/0182301	A1	8/2005	Acker et al.	
2005/0201903	A1	9/2005	Weigl et al.	
2005/0205816	A1	9/2005	Hayenga et al.	
2005/0233440	A1	10/2005	Scurati et al.	
2005/0244308	A1	11/2005	Tanaami et al.	
2006/0040379	A1	2/2006	Tanaami et al.	
2006/0057581	A1	3/2006	Karlsen et al.	
2006/0079834	A1	4/2006	Tennican et al.	
2006/0166233	A1	7/2006	Wu et al.	
2006/0183216	A1	8/2006	Handique et al.	
2006/0246575	A1	11/2006	Lancaster et al.	
2006/0257993	A1	11/2006	McDevitt et al.	
2006/0264782	A1	11/2006	Holmes et al.	
2006/0275813	A1	12/2006	Tanaami et al.	
2006/0275852	A1	12/2006	Montagu et al.	
2007/0013733	A1	1/2007	Katsurai et al.	
2007/0017927	A1	1/2007	D'Amore et al.	
2007/0039974	A1	2/2007	Lloyd	
2007/0042427	A1	2/2007	Gerdes et al.	
2007/0098600	A1	5/2007	Kayyem	
2007/0178529	A1	8/2007	Breidford et al.	
2007/0184547	A1	8/2007	Handique et al.	
2007/0219480	A1	9/2007	Kamen et al.	
2007/0241068	A1	10/2007	Pamula et al.	
2007/0242105	A1	10/2007	Srinivasan et al.	
2007/0248958	A1	10/2007	Jovanovich	
2007/0275415	A1	11/2007	Srinivasan et al.	
2007/0292941	A1	12/2007	Handique et al.	
2008/0038810	A1	2/2008	Pollack et al.	
2008/0050287	A1	2/2008	Araragi et al.	
2008/0056948	A1	3/2008	Dale et al.	
2008/0108122	A1	5/2008	Paul	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2008/0182301 A1 7/2008 Handique et al.
2008/0227185 A1 9/2008 Schonfeld et al.
2008/0230386 A1 9/2008 Srinivasan et al.
2008/0248590 A1 10/2008 Gulliksen et al.
2008/0274513 A1 11/2008 Shenderov et al.
2008/0283439 A1 11/2008 Sullivan et al.
2008/0314167 A1 12/2008 Kahl
2009/0022624 A1 1/2009 Saltsman et al.
2009/0061450 A1 3/2009 Hunter
2009/0148847 A1 6/2009 Kokoris et al.
2009/0155902 A1 6/2009 Pollack et al.
2009/0171311 A1 7/2009 Genosar
2009/0180931 A1 7/2009 Silbert et al.
2009/0182575 A1 7/2009 Warner et al.
2009/0197778 A1 8/2009 Lepschi et al.
2009/0221059 A1 9/2009 Williams et al.
2009/0221091 A1 9/2009 Mogi et al.
2009/0223989 A1 9/2009 Gelardi
2009/0263834 A1 10/2009 Sista et al.
2009/0298059 A1 12/2009 Gumbrecht et al.
2009/0304944 A1 12/2009 Sudarsan et al.
2009/0325276 A1 12/2009 Battrell et al.
2010/0021910 A1 1/2010 Cao
2010/0025250 A1 2/2010 Pamula et al.
2010/0032293 A1 2/2010 Pollack et al.
2010/0035349 A1 2/2010 Bau et al.
2010/0048410 A1 2/2010 Shenderov et al.
2010/0068764 A1 3/2010 Sista et al.
2010/0087012 A1 4/2010 Shenderov
2010/0093019 A1 4/2010 Ditcham
2010/0116640 A1 5/2010 Pamula et al.
2010/0120130 A1 5/2010 Srinivasan et al.
2010/0130369 A1 5/2010 Shenderov et al.
2010/0136554 A1 6/2010 Parthasarathy
2010/0150783 A1 6/2010 Araragi et al.
2010/0151475 A1 6/2010 Tanaami et al.
2010/0173394 A1 7/2010 Colston
2010/0178697 A1 7/2010 Doebler et al.
2010/0190263 A1 7/2010 Srinivasan et al.
2010/0194408 A1 8/2010 Sturmer et al.
2010/0206094 A1 8/2010 Shenderov
2010/0224511 A1 9/2010 Boatner
2010/0226199 A1 9/2010 Mogi et al.
2010/0233824 A1 9/2010 Verhoeckx et al.
2010/0236928 A1 9/2010 Srinivasan et al.
2010/0236929 A1 9/2010 Pollack et al.
2010/0270156 A1 10/2010 Srinivasan et al.
2010/0279374 A1 11/2010 Sista et al.
2010/0282608 A1 11/2010 Srinivasan et al.
2010/0282609 A1 11/2010 Pollack et al.
2010/0288789 A1 11/2010 Tanaami et al.
2010/0291578 A1 11/2010 Pollack et al.
2010/0291588 A1 11/2010 McDevitt et al.
2010/0297754 A1 11/2010 Solli et al.
2010/0304986 A1 12/2010 Chen et al.
2010/0307917 A1 12/2010 Srinivasan et al.
2010/0307922 A1 12/2010 Wu
2010/0308051 A1 12/2010 Weber
2010/0311599 A1 12/2010 Wheeler et al.
2010/0317093 A1 12/2010 Turewicz et al.
2010/0323405 A1 12/2010 Pollack et al.
2010/0331522 A1 12/2010 Irvine et al.
2011/0048951 A1 3/2011 Wu
2011/0053289 A1 3/2011 Lowe et al.
2011/0076692 A1 3/2011 Sista et al.
2011/0086377 A1 4/2011 Thwar et al.
2011/0091989 A1 4/2011 Sista et al.
2011/0097763 A1 4/2011 Pollack et al.
2011/0104725 A1 5/2011 Pamula et al.
2011/0104747 A1 5/2011 Pollack et al.
2011/0104816 A1 5/2011 Pollack et al.
2011/0114490 A1 5/2011 Pamula et al.
2011/0129931 A1 6/2011 Reboud
2011/0143339 A1 6/2011 Wisniewski
2011/0159578 A1 6/2011 Godsey et al.
2011/0180571 A1 7/2011 Srinivasan et al.
2011/0186433 A1 8/2011 Pollack et al.
2011/0186466 A1 8/2011 Kurowski et al.
2011/0203930 A1 8/2011 Pamula et al.
2011/0207209 A1 8/2011 Hammons
2011/0207621 A1 8/2011 Montagu et al.
2011/0209998 A1 9/2011 Shenderov
2011/0240471 A1 10/2011 Wheeler et al.
2011/0303542 A1 12/2011 Srinivasan et al.
2011/0311980 A1 12/2011 Pollack et al.
2011/0318824 A1 12/2011 Tanaami et al.
2011/0319279 A1 12/2011 Montagu et al.
2012/0018306 A1 1/2012 Srinivasan et al.
2012/0022695 A1 1/2012 Handique et al.
2012/0044299 A1 2/2012 Winger
2012/0064597 A1 3/2012 Clemmens et al.
2012/0071342 A1 3/2012 Lochhead et al.
2012/0083046 A1 4/2012 Watson et al.
2012/0085645 A1 4/2012 Mousa et al.
2012/0107811 A1 5/2012 Kelso et al.
2012/0122108 A1 5/2012 Handique
2012/0132528 A1 5/2012 Shenderov et al.
2012/0142070 A1 6/2012 Battrell et al.
2012/0156112 A1 6/2012 Sprague et al.
2012/0156750 A1 6/2012 Battrell et al.
2012/0160826 A1 6/2012 Handique
2012/0164627 A1 6/2012 Battrell et al.
2012/0165238 A1 6/2012 Pamula et al.
2012/0171759 A1 7/2012 Williams et al.
2012/0177543 A1 7/2012 Battrell et al.
2012/0187117 A1 7/2012 Weber
2012/0196280 A1 8/2012 Karlsen et al.
2012/0252008 A1 10/2012 Brown et al.
2012/0261264 A1 10/2012 Srinivasan et al.
2012/0270305 A1 10/2012 Reed et al.
2012/0271127 A1 10/2012 Battrell et al.
2012/0329142 A1 12/2012 Battrell et al.
2013/0011912 A1 1/2013 Battrell et al.
2013/0017544 A1 1/2013 Eckhardt et al.
2013/0018611 A1 1/2013 Sturmer
2013/0020202 A1 1/2013 Feiglin
2013/0059366 A1 3/2013 Pollack et al.
2013/0118901 A1 5/2013 Pollack et al.
2013/0130262 A1 5/2013 Battrell et al.
2013/0130936 A1 5/2013 Eckhardt
2013/0142708 A1 6/2013 Battrell et al.
2013/0146461 A1 6/2013 Pamula et al.
2013/0164742 A1 6/2013 Pollack et al.
2013/0178374 A1 7/2013 Eckhardt et al.
2013/0178968 A1 7/2013 Sturmer et al.
2013/0203606 A1 8/2013 Pollack et al.
2013/0217103 A1 8/2013 Bauer
2013/0217113 A1 8/2013 Srinivasan et al.
2013/0225450 A1 8/2013 Pollack et al.
2013/0225452 A1 8/2013 Pollack et al.
2013/0230875 A1 9/2013 Pamula et al.
2013/0233425 A1 9/2013 Srinivasan et al.
2013/0233712 A1 9/2013 Pamula et al.
2013/0252262 A1 9/2013 Srinivasan et al.
2013/0302787 A1 11/2013 Agarwal et al.
2013/0327672 A1 12/2013 Kurowski et al.
2013/0331298 A1 12/2013 Rea
2013/0341231 A1 12/2013 Lange et al.
2014/0000223 A1 1/2014 Osterloh et al.
2014/0000735 A1 1/2014 Weber et al.
2014/0045275 A1 2/2014 Rothacher et al.
2014/0127773 A1 5/2014 Brown et al.
2014/0160877 A1 6/2014 Lange et al.
2014/0170641 A1 6/2014 Macemon
2014/0194305 A1 7/2014 Kayyem et al.
2014/0220702 A1 8/2014 Johnson et al.
2014/0252079 A1 9/2014 Bjerke et al.
2014/0255275 A1 9/2014 Barry et al.
2014/0261708 A1 9/2014 Wright et al.
2014/0263439 A1 9/2014 Wright et al.
2014/0322706 A1 10/2014 Kayyem et al.
2014/0370609 A1 12/2014 Frank et al.
2015/0024436 A1 1/2015 Eberhart et al.
2015/0024480 A1 1/2015 Doebler et al.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2015/0132860	A1	5/2015	Cook et al.
2015/0298118	A1	10/2015	Chard et al.
2015/0323555	A1	11/2015	Kayyem et al.
2015/0346097	A1	12/2015	Battrell et al.
2016/0129437	A1	5/2016	Kayyem et al.
2016/0129445	A1	5/2016	Corey et al.
2016/0130640	A1	5/2016	Wright et al.
2016/0131672	A1	5/2016	Tieman
2016/0146803	A1	5/2016	Allen et al.
2016/0339426	A1	11/2016	Wright et al.
2017/0181314	A1	6/2017	Leigh et al.
2018/0015454	A1	1/2018	Wright
2018/0095100	A1	4/2018	Nguyen
2018/0223345	A1	8/2018	Kayyem et al.

FOREIGN PATENT DOCUMENTS

JP	2009534653	9/2009
JP	2011520449	7/2011
JP	2011252768	12/2011
JP	2012055321	3/2012
WO	WO 2004/034028	4/2004
WO	WO 2007/044917	4/2007
WO	WO 2007/112114	10/2007
WO	WO 2007/120241	10/2007
WO	WO 2010/025302	3/2010
WO	WO 2011/106314	9/2011
WO	WO 2011/127040	10/2011
WO	WO 2012/151192	11/2012
WO	WO 2013/059750	4/2013
WO	WO 2014/049371	4/2014
WO	WO 2014/066704	5/2014
WO	WO 2015/191916	12/2015

OTHER PUBLICATIONS

Beaucage et al., "Tetrahedron Report No. 329: The Functionalization of Oligonucleotides via Phosphoramidite Derivatives," Tetrahedron vol. 49, No. 10, pp. 1925-2963 (1993).

Erickson et al., "Integrated Microfluidic Devices," Elsevier B.V., 16 pages (2003).

Findlay et al., "Automated Closed-Vessel System for in Vitro Diagnostics Based on Polymerase Chain Reaction," Clinical Chemistry, 39:9, pp. 1927-1933, 1993).

Focke et al., "Lab-on-a-Foil: Microfluidics on Thin and Flexible Films," The Royal Society of Chemistry, pp. 1365-1386 (2010).

Letsinger et al., "Hybridization of Alternating Cationic/ Anionic Oligonucleotides to RNA Segments," Nucleosides & Nucleotides vol. 13, No. 6&7, pp. 1597-1605 (1994).

Malic et al., "Current State of Intellectual Property in Microfluidic Nucleic Acid Analysis," McGill University, Bentham Science Publishers, 18 pages (2007).

Mesmaeker et al., "Comparison of Rigid and Flexible Backbones in Antisense Oligonucleotides," Bioorganic & Medicinal Chem. Letters, vol. 4, No. 3, pp. 395-398 (1994).

Vandeventer et al., "Mechanical Disruption of Lysis-Resistant Bacterial Cells by Use of a Miniature, Low-Power, Disposable Device," American Society for Microbiology, Journal of Clinical Microbiology, 49:7, pp. 2533-2539 (Jul. 2011).

Non-final Office Action of U.S. Appl. No. 29/623,931 dated Feb. 21, 2019, 14 pages.

Respiratory Pathogen (RP) Panel. Online, published date unknown. Retrieved on Dec. 23, 2018 from URL: https://www.genmarkdx.com/solutions/panels/eplex-panels/respiratory-pathogen-panel/.

Non-Final Office Action in U.S. Appl. No. 29/623,925, 9 pages, (dated Sep. 6, 2018).

Office Action in U.S. Appl. No. 16/541,893, dated Feb. 28, 2020, 14 pages.

* cited by examiner

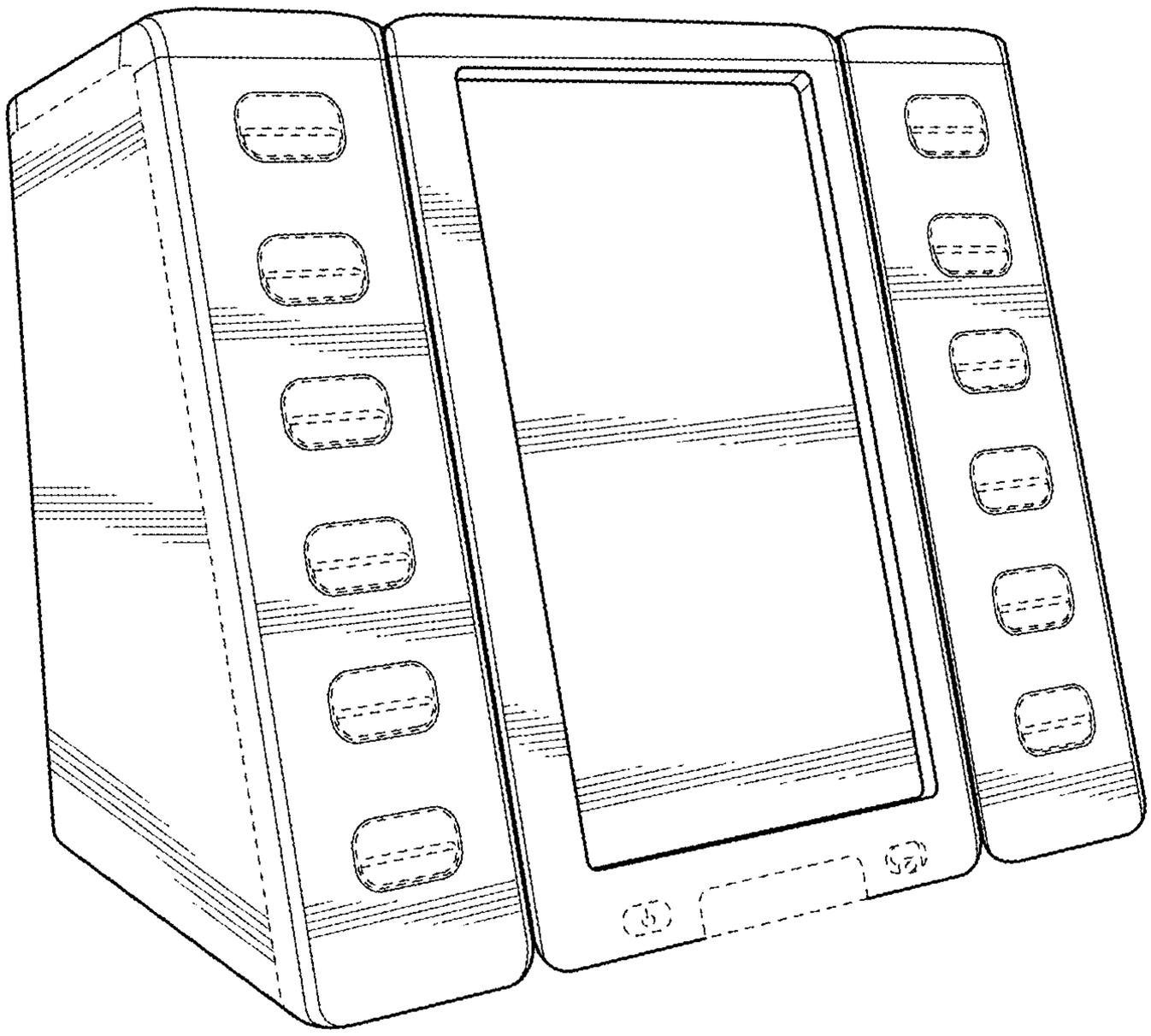


FIG. 1

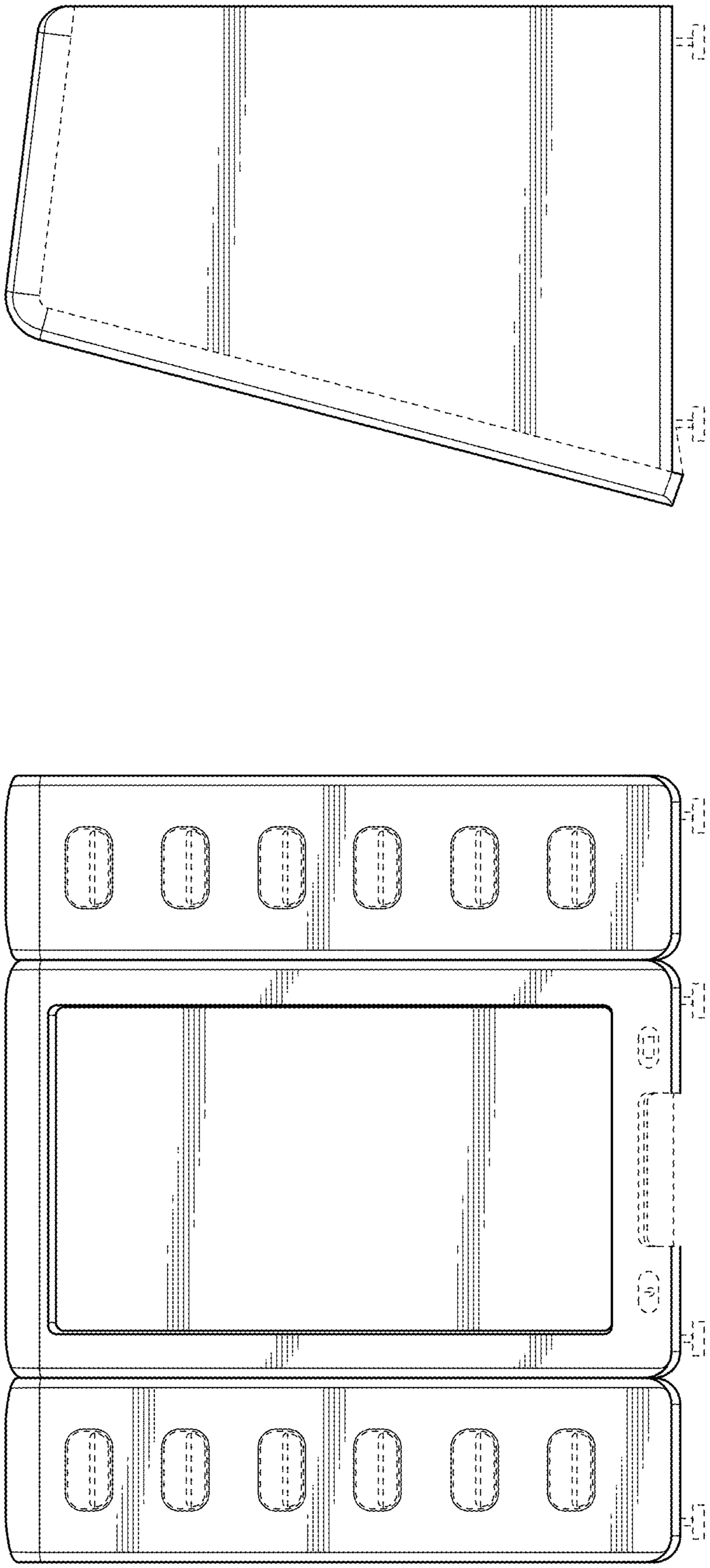


FIG. 2

FIG. 3