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(54) **INSULIN DELIVERY CONTROLLER**

(71) Applicant: **Bigfoot Biomedical, Inc.**, Milpitas, CA (US)

(72) Inventors: **Sabine Kabel-Eckes**, Milpitas, CA (US); **Charles R. Lewis, Jr.**, Milpitas, CA (US); **Shannon Sieber**, Milpitas, CA (US); **Jeff Boissier**, Milpitas, CA (US); **Bryan Mazlish**, Milpitas, CA (US); **George Crothall**, Oceanside, CA (US)

(73) Assignee: **Bigfoot Biomedical, Inc.**, Milpitas, CA (US)

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USPC **D24/111**

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CPC A61M 5/142; A61M 2005/14208; A61M 5/14212; A61M 5/14228; A61M 5/14232; A61M 5/145; A61M 5/1456; A61M 5/14566; A61M 5/1458; A61M 5/1452; A61M 2205/505; A61M 5/14244; A61M 5/1723; A61M 2205/52; G06F 19/3468
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,605,765	A	8/1952	Kollsman
3,886,938	A	6/1975	Szabo et al.
4,077,405	A	3/1978	Haerten et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CA	2543545 A1	5/2005
DE	19627619	1/1998

(Continued)

OTHER PUBLICATIONS

Xilas Temp Touch, "The latest in high-tech and convenient devices," DOCNews, vol. 2, No. 7, Jul. 1, 2005, http://docnews.diabetesjournals.ordlcgi/contenl/foll/2/7i 13, 3 pages.

(Continued)

Primary Examiner — Eric L Goodman
Assistant Examiner — Lilyana Bekic
(74) *Attorney, Agent, or Firm* — TraskBritt

(57) **CLAIM**

The ornamental design for an insulin delivery controller, substantially as shown and described.

DESCRIPTION

FIG. **1** is a top perspective view of an insulin delivery controller.

FIG. **2** is a left side view of the insulin delivery controller of FIG. **1**.

FIG. **3** is a right side view of the insulin delivery controller of FIG. **1**.

FIG. **4** is a top view of the insulin delivery controller of FIG. **1**.

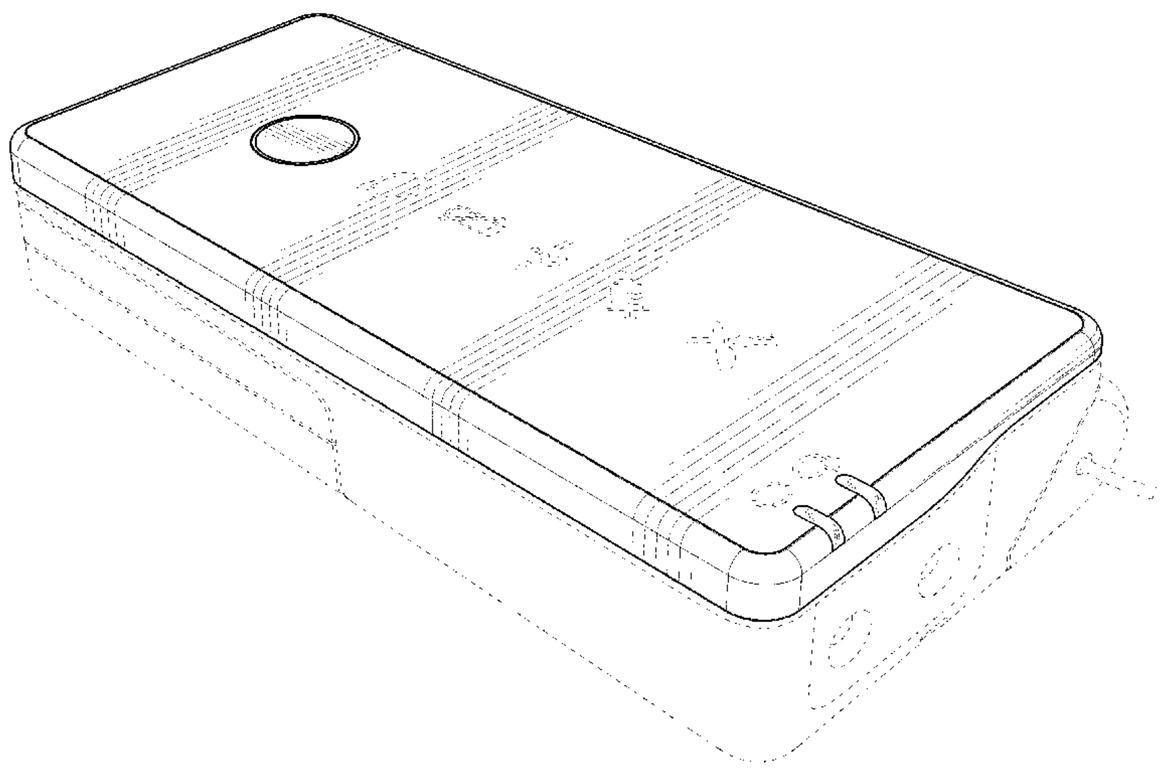
FIG. **5** is a bottom view of the insulin delivery controller of FIG. **1**.

FIG. **6** is a front view of the insulin delivery controller of FIG. **1**; and,

FIG. **7** is a rear view of the insulin delivery controller of FIG. **1**.

The broken lines in the drawings depict portions of the insulin delivery controller that form no part of the claimed design.

1 Claim, 5 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

4,231,368	A	11/1980	Becker
4,265,241	A	5/1981	Portner et al.
4,300,554	A	11/1981	Hessberg et al.
4,313,439	A	2/1982	Babb et al.
4,398,908	A	8/1983	Siposs
4,435,173	A	3/1984	Siposs et al.
4,443,218	A	4/1984	Decant et al.
4,493,704	A	1/1985	Beard et al.
4,529,401	A	7/1985	Leslie et al.
4,681,569	A	7/1987	Coble et al.
4,749,109	A	6/1988	Kamen
4,838,857	A	6/1989	Strowe et al.
4,850,817	A	7/1989	Nason et al.
5,045,064	A	9/1991	Idriss
5,088,981	A	2/1992	Howson et al.
5,088,990	A	2/1992	Hivale et al.
D325,781	S	4/1992	Moller-Jensen
5,190,522	A	3/1993	Wojcicki et al.
5,225,763	A	7/1993	Krohn et al.
5,250,027	A	10/1993	Lewis et al.
5,261,882	A	11/1993	Sealfon
5,314,412	A	5/1994	Rex
5,335,994	A	8/1994	Weynant Nee Girones
5,338,157	A	8/1994	Blomquist
5,342,180	A	8/1994	Daoud
D351,469	S	10/1994	Okamoto
5,389,078	A	2/1995	Zalesky et al.
5,395,340	A	3/1995	Lee
5,411,487	A	5/1995	Castagna
5,545,143	A	8/1996	Fischell et al.
5,551,850	A	9/1996	Williamson et al.
5,554,123	A	9/1996	Herskowitz
5,569,186	A	10/1996	Lord et al.
5,626,566	A	5/1997	Petersen et al.
5,637,095	A	6/1997	Nason et al.
5,640,954	A	6/1997	Pfeiffer et al.
5,665,065	A	9/1997	Colman et al.
5,678,571	A	10/1997	Brown
5,718,562	A	2/1998	Lawless et al.
D393,264	S	4/1998	Leung
5,741,216	A	4/1998	Hemmingsen et al.
5,766,155	A	6/1998	Hyman et al.
5,772,635	A	6/1998	Dastur et al.
5,816,306	A	10/1998	Giacomel
5,852,803	A	12/1998	Ashby et al.
5,858,001	A	1/1999	Tsals et al.
5,918,603	A	7/1999	Brown
5,919,167	A	7/1999	Mulhauser et al.
5,925,018	A	7/1999	Ungerstedt
5,928,201	A	7/1999	Poulsen et al.
5,947,934	A	9/1999	Hansen et al.
5,951,530	A	9/1999	Steengaard et al.
5,957,889	A	9/1999	Poulsen et al.
5,984,894	A	11/1999	Poulsen et al.
5,984,897	A	11/1999	Petersen et al.
5,997,475	A	12/1999	Bortz
6,003,736	A	12/1999	Ljunggren
6,010,485	A	1/2000	Buch-Rasmussen et al.
6,032,119	A	2/2000	Brown et al.
6,033,377	A	3/2000	Rasmussen et al.
6,045,537	A	4/2000	Klitmose
D424,036	S	5/2000	Arora et al.
6,056,728	A	5/2000	Von Schuckmann
6,074,372	A	6/2000	Hansen
6,110,149	A	8/2000	Klitgaard et al.
6,156,014	A	12/2000	Petersen et al.
6,171,276	B1	1/2001	Lippe et al.
6,231,540	B1	5/2001	Smedegaard
6,248,067	B1	6/2001	Causey et al.
6,248,090	B1	6/2001	Jensen et al.
6,248,093	B1	6/2001	Moberg
6,277,098	B1	8/2001	Klitmose et al.
6,302,855	B1	10/2001	Lav et al.
6,302,869	B1	10/2001	Klitgaard
6,354,996	B1	3/2002	Drinan et al.
6,368,314	B1	4/2002	Kipfer et al.
6,375,638	B2	4/2002	Mason et al.
6,379,339	B1	4/2002	Klitgaard et al.
6,381,496	B1	4/2002	Meadows et al.
6,404,098	B1	6/2002	Kayama et al.
D460,053	S	7/2002	Choi
6,427,088	B1	7/2002	Bowman et al.
D461,241	S	8/2002	Moberg et al.
D461,891	S	8/2002	Moberg
6,436,072	B1	8/2002	Kullas et al.
6,461,331	B1	10/2002	Van Antwerp
6,474,219	B2	11/2002	Klitmose et al.
6,485,461	B1	11/2002	Mason et al.
6,508,788	B2	1/2003	Preuthun
6,524,280	B2	2/2003	Hansen et al.
6,533,183	B2	3/2003	Aasmul et al.
6,537,251	B2	3/2003	Klitmose
6,540,672	B1	4/2003	Simonsen et al.
6,544,229	B1	4/2003	Danby et al.
6,547,764	B2	4/2003	Larsen et al.
6,551,276	B1	4/2003	Mann et al.
6,554,798	B1	4/2003	Mann et al.
6,554,800	B1	4/2003	Nezhadian et al.
6,558,320	B1	5/2003	Causey et al.
6,558,351	B1	5/2003	Steil et al.
6,562,001	B2	5/2003	Lebel et al.
6,562,011	B1	5/2003	Buch-Rasmussen et al.
6,564,105	B2	5/2003	Starkweather et al.
6,569,126	B1	5/2003	Poulsen et al.
6,571,128	B2	5/2003	Lebel et al.
6,577,899	B2	6/2003	Lebel et al.
6,582,404	B1	6/2003	Klitgaard et al.
6,585,644	B2	7/2003	Lebel et al.
6,585,699	B2	7/2003	Ljunggreen et al.
6,589,229	B1	7/2003	Connelly et al.
6,605,067	B1	8/2003	Larsen
6,613,019	B2	9/2003	Munk
6,641,533	B2	11/2003	Causey et al.
6,648,821	B2	11/2003	Lebel et al.
6,650,951	B1	11/2003	Jones et al.
6,656,158	B2	12/2003	Mahoney et al.
6,656,159	B2	12/2003	Flaherty
6,659,948	B2	12/2003	Lebel et al.
6,659,978	B1	12/2003	Kasuga et al.
6,659,980	B2	12/2003	Moberg et al.
6,663,602	B2	12/2003	Moeller
6,668,196	B1	12/2003	Villegas et al.
6,669,669	B2	12/2003	Flaherty et al.
6,687,546	B2	2/2004	Lebel et al.
6,690,192	B1	2/2004	Wing
6,691,043	B2	2/2004	Ribeiro, Jr.
6,692,457	B2	2/2004	Flaherty
6,692,472	B2	2/2004	Hansen et al.
6,694,191	B2	2/2004	Starkweather et al.
6,699,218	B2	3/2004	Flaherty et al.
6,702,779	B2	3/2004	Connelly et al.
6,715,516	B2	4/2004	Ohms et al.
6,716,198	B2	4/2004	Larsen
6,723,072	B2	4/2004	Flaherty et al.
6,733,446	B2	5/2004	Lebel et al.
6,736,796	B2	5/2004	Shekalim
6,740,059	B2	5/2004	Flaherty
6,740,072	B2	5/2004	Starkweather et al.
6,740,075	B2	5/2004	Lebel et al.
6,744,350	B2	6/2004	Blomquist
6,749,587	B2	6/2004	Flaherty
6,752,787	B1	6/2004	Causey et al.
6,758,810	B2	7/2004	Lebel et al.
6,768,425	B2	7/2004	Flaherty et al.
6,780,156	B2	8/2004	Haueter et al.
6,786,246	B2	9/2004	Ohms et al.
6,786,890	B2	9/2004	Preuthun et al.
6,796,970	B1	9/2004	Klitmose et al.
6,799,149	B2	9/2004	Hartlaub
6,809,653	B1	10/2004	Mann et al.
6,810,290	B2	10/2004	Lebel et al.
6,811,533	B2	11/2004	Lebel et al.
6,811,534	B2	11/2004	Bowman et al.
6,813,519	B2	11/2004	Lebel et al.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,827,702 B2 12/2004 Lebel et al.
6,830,558 B2 12/2004 Flaherty et al.
6,852,104 B2 2/2005 Blomquist
6,854,620 B2 2/2005 Ramey
6,854,653 B2 2/2005 Eilersen
6,855,129 B2 2/2005 Jensen et al.
6,872,200 B2 3/2005 Mann et al.
6,873,268 B2 3/2005 Lebel et al.
6,878,132 B2 4/2005 Kipfer
6,893,415 B2 5/2005 Madsen et al.
6,899,695 B2 5/2005 Herrera
6,899,699 B2 5/2005 Enggaard
6,922,590 B1 7/2005 Whitehurst
6,936,006 B2 8/2005 Sabra
6,936,029 B2 8/2005 Mann et al.
6,945,961 B2 9/2005 Miller et al.
6,948,918 B2 9/2005 Hansen
6,950,708 B2 9/2005 Bowman et al.
6,956,572 B2 10/2005 Zaleski
6,960,192 B1 11/2005 Flaherty et al.
6,979,326 B2 12/2005 Mann et al.
6,997,911 B2 2/2006 Klitmose
6,997,920 B2 2/2006 Mann et al.
7,005,078 B2 2/2006 Van et al.
7,008,399 B2 3/2006 Larsen et al.
7,014,625 B2 3/2006 Bengtsson
7,018,360 B2 3/2006 Flaherty et al.
7,025,743 B2 4/2006 Mann et al.
7,029,455 B2 4/2006 Flaherty
7,054,836 B2 5/2006 Christensen et al.
7,096,431 B2 8/2006 Tambata et al.
7,104,972 B2 9/2006 Moller et al.
7,109,878 B2 9/2006 Mann et al.
7,128,727 B2 10/2006 Flaherty et al.
7,133,329 B2 11/2006 Skyggebjerg et al.
7,232,423 B2 6/2007 Mernoee Morten
D545,837 S 7/2007 Haldimann et al.
7,241,265 B2 7/2007 Cummings et al.
D550,227 S 9/2007 Sato et al.
D554,140 S 10/2007 Armendariz
7,291,107 B2 11/2007 Hellwig et al.
7,343,197 B2 3/2008 Shusterman
7,454,359 B2 11/2008 Rosenfeld et al.
D592,223 S 5/2009 Neuhaus
7,534,226 B2 5/2009 Mernoe et al.
7,553,281 B2 6/2009 Hellwig et al.
7,570,980 B2 8/2009 Ginsberg
D600,341 S 9/2009 Loerwald
D603,421 S 11/2009 Ebeling et al.
D607,099 S 12/2009 Loerwald
7,647,237 B2 1/2010 Malave et al.
D614,587 S 4/2010 Yodfat et al.
7,695,434 B2 4/2010 Malecha
7,708,717 B2 5/2010 Estes et al.
7,717,903 B2 5/2010 Estes et al.
7,751,907 B2 7/2010 Blomquist
D623,753 S 9/2010 Saffer et al.
7,789,859 B2 9/2010 Estes et al.
7,828,528 B2 11/2010 Estes et al.
7,837,647 B2 11/2010 Estes et al.
7,850,641 B2 12/2010 Lebel et al.
7,871,376 B2 1/2011 Brown
D632,699 S 2/2011 Judy et al.
7,878,975 B2 2/2011 Liljeryd et al.
7,887,512 B2 2/2011 Estes et al.
7,931,613 B2 4/2011 Haueter et al.
7,938,797 B2 5/2011 Estes
D640,269 S 6/2011 Chen
7,956,845 B2 6/2011 Lee
D642,191 S 7/2011 Barnett et al.
8,012,119 B2 9/2011 Estes et al.
D652,426 S 1/2012 Anzures
8,132,101 B2 3/2012 Buck et al.
D656,950 S 4/2012 Shallcross et al.
8,156,070 B2 4/2012 Buck et al.
D660,315 S 5/2012 Anzures
D661,701 S 6/2012 Brown et al.
8,202,249 B2 6/2012 Iio et al.
8,217,946 B2 7/2012 Halpern et al.
8,219,222 B2 7/2012 Blomquist
8,221,345 B2 7/2012 Blomquist
8,231,562 B2 7/2012 Buck et al.
D665,409 S 8/2012 Gupta et al.
8,237,715 B2 8/2012 Buck et al.
8,250,483 B2 8/2012 Blomquist
8,257,652 B2 9/2012 Drucker et al.
8,257,653 B2 9/2012 Drucker et al.
8,262,616 B2 9/2012 Grant et al.
8,273,296 B2 9/2012 Drucker et al.
D669,165 S 10/2012 Estes et al.
D669,166 S 10/2012 Estes et al.
D669,167 S 10/2012 Estes et al.
8,279,226 B2 10/2012 Krieftewirth
8,310,415 B2 11/2012 McLaughlin et al.
8,337,469 B2 12/2012 Eberhart et al.
8,357,091 B2 1/2013 Say et al.
8,365,065 B2 1/2013 Gejdos et al.
8,372,005 B2 2/2013 Say et al.
D682,289 S 5/2013 DiJulio et al.
D682,304 S 5/2013 Mierau et al.
D682,305 S 5/2013 Mierau et al.
8,439,834 B2 5/2013 Schmelzeisen-Redeker et al.
D683,738 S 6/2013 Wujcik et al.
D687,541 S 8/2013 Estes et al.
8,514,086 B2 8/2013 Harper et al.
D689,087 S 9/2013 Fymat
D689,523 S 9/2013 Galbraith et al.
D689,874 S 9/2013 Brinda et al.
8,529,838 B2 9/2013 Drucker et al.
8,529,839 B2 9/2013 Drucker et al.
8,529,841 B2 9/2013 Drucker et al.
D691,258 S 10/2013 Estes et al.
D691,259 S 10/2013 Estes et al.
D693,114 S 11/2013 Lemanski, Sr.
8,579,815 B2 11/2013 Galley et al.
8,601,005 B2 12/2013 Bousamra et al.
8,615,366 B2 12/2013 Galley et al.
D697,204 S 1/2014 Maier et al.
8,622,906 B2 1/2014 Say et al.
D699,741 S 2/2014 Wantland et al.
8,657,779 B2 2/2014 Blomquist
D701,879 S 4/2014 Foit et al.
D702,258 S 4/2014 Wantland et al.
8,719,945 B2 5/2014 Birtwhistle et al.
8,756,074 B2 6/2014 Brzustowicz
8,761,940 B2 6/2014 Long et al.
D709,080 S 7/2014 Kim
D709,183 S 7/2014 Kemlein
8,774,887 B2 7/2014 Say et al.
8,816,862 B2 8/2014 Harper et al.
8,839,106 B2 9/2014 Lee et al.
D714,816 S 10/2014 Varon
D715,835 S 10/2014 Montgomery et al.
D717,822 S 11/2014 Brotman et al.
D717,830 S 11/2014 Brinda et al.
D718,438 S 11/2014 Davis et al.
8,895,315 B2 11/2014 Batman et al.
D719,186 S 12/2014 Kim
8,961,465 B2 2/2015 Blomquist
D724,616 S 3/2015 Jou
D727,336 S 4/2015 Allison et al.
9,008,803 B2 4/2015 Blomquist
9,022,996 B2 5/2015 Eberhart et al.
9,033,877 B2 5/2015 Werner et al.
9,041,730 B2 5/2015 Johnson et al.
D730,929 S 6/2015 Yu et al.
D733,175 S 6/2015 Bae
D733,179 S 6/2015 Kwon
9,050,409 B2 6/2015 Haueter et al.
9,072,477 B2 7/2015 Say et al.
9,076,107 B2 7/2015 Cameron et al.
D736,792 S 8/2015 Brinda et al.
D737,278 S 8/2015 Shin et al.
D738,907 S 9/2015 Cabrera-Cordon et al.

(56) **References Cited**

U.S. PATENT DOCUMENTS

D738,913	S	9/2015	Cabrera-Cordon et al.	
D738,914	S	9/2015	Torres et al.	
9,134,823	B2	9/2015	Grant et al.	
9,136,939	B2	9/2015	Galley et al.	
D741,891	S	10/2015	Gardner et al.	
9,159,148	B2	10/2015	Boyer et al.	
D743,435	S	11/2015	Herold et al.	
9,186,113	B2	11/2015	Harper et al.	
D744,505	S	12/2015	Wilberding et al.	
D745,050	S	12/2015	Kwon	
9,198,623	B2	12/2015	Fern et al.	
D751,585	S	3/2016	Kaufthal et al.	
D751,586	S	3/2016	Kaufthal et al.	
D752,736	S	3/2016	Chandrasenan et al.	
D753,177	S	4/2016	Mierau et al.	
D753,685	S	4/2016	Zimmerman et al.	
D754,713	S	4/2016	Zhang et al.	
D754,714	S	4/2016	Zhang et al.	
D755,830	S	5/2016	Chaudhri et al.	
D757,026	S	5/2016	Lim et al.	
D757,047	S	5/2016	Cornwell et al.	
D758,433	S	6/2016	Lee et al.	
D760,752	S	7/2016	Anzures et al.	
D762,234	S	7/2016	Li et al.	
D762,675	S	8/2016	Lim et al.	
D763,860	S	8/2016	Sunshine et al.	
D765,092	S	8/2016	Chaudhri et al.	
D765,710	S	9/2016	Anzures et al.	
D766,257	S	9/2016	Zhang et al.	
D766,424	S	9/2016	Anderson et al.	
D768,144	S	10/2016	Kim et al.	
D768,687	S	10/2016	Bae et al.	
D769,314	S	10/2016	Piroddi et al.	
D769,322	S	10/2016	Rajeswaran et al.	
D772,924	S	11/2016	Begin et al.	
D776,137	S	1/2017	Chaudhri et al.	
D776,253	S	1/2017	Li	
D777,906	S	1/2017	Anderson et al.	
D781,305	S	3/2017	Lau	
D781,908	S	3/2017	Bhandari et al.	
D784,372	S	4/2017	Kovchiy	
D786,266	S	5/2017	Van et al.	
D786,270	S	5/2017	Barry et al.	
D788,138	S	5/2017	Lee et al.	
D788,140	S	5/2017	Hemsley et al.	
D788,145	S	5/2017	Sullivan et al.	
D789,419	S	6/2017	Chaudhri et al.	
D790,583	S	6/2017	Kay et al.	
D791,806	S	7/2017	Brewington et al.	
9,707,336	B2	7/2017	Dang et al.	
D794,649	S	8/2017	Niijima et al.	
D795,284	S	8/2017	Miller et al.	
D797,771	S	9/2017	Caporal et al.	
D797,772	S	9/2017	Mizono et al.	
D798,318	S	9/2017	Ferguson et al.	
D800,757	S	10/2017	Mullen et al.	
D801,519	S	10/2017	Sabin et al.	
D802,607	S	11/2017	Apodaca et al.	
D804,505	S	12/2017	Hoffman et al.	
D806,748	S	1/2018	Van et al.	
D806,749	S	1/2018	Van et al.	
D806,750	S	1/2018	Van et al.	
D808,417	S	1/2018	Mander et al.	
D809,134	S	1/2018	Crothall	
9,878,097	B2 *	1/2018	Estes	A61M 5/1723
D810,095	S	2/2018	Vali et al.	
D816,093	S	4/2018	Mazur et al.	
9,931,454	B2	4/2018	Lo et al.	
D816,708	S	5/2018	Riedel et al.	
D816,709	S	5/2018	Riedel et al.	
D819,065	S	5/2018	Xie et al.	
D819,067	S	5/2018	Behzadi et al.	
D820,304	S	6/2018	Coffman et al.	
D828,375	S	9/2018	Mok et al.	
D828,377	S	9/2018	Dhide	
D830,385	S	10/2018	Lepine et al.	
2001/0041869	A1	11/2001	Causey et al.	
2001/0056262	A1	12/2001	Cabiri et al.	
2002/0004651	A1	1/2002	Ljunggreen et al.	
2002/0007154	A1	1/2002	Hansen et al.	
2002/0040208	A1	4/2002	Flaherty et al.	
2002/0091358	A1	7/2002	Klitmose	
2002/0126036	A1	9/2002	Flaherty et al.	
2002/0177810	A1	11/2002	Reilly et al.	
2003/0055380	A1	3/2003	Flaherty	
2003/0065308	A1	4/2003	Lebel et al.	
2003/0088238	A1	5/2003	Poulsen et al.	
2003/0167035	A1	9/2003	Flaherty et al.	
2003/0198558	A1	10/2003	Nason et al.	
2003/0199825	A1	10/2003	Flaherty	
2003/0216683	A1	11/2003	Shekalim	
2004/0010207	A1	1/2004	Flaherty et al.	
2004/0019325	A1	1/2004	Shekalim	
2004/0064088	A1	4/2004	Gorman et al.	
2004/0064096	A1	4/2004	Flaherty et al.	
2004/0078028	A1	4/2004	Flaherty et al.	
2004/0087894	A1	5/2004	Flaherty	
2004/0092865	A1	5/2004	Flaherty et al.	
2004/0092878	A1	5/2004	Flaherty	
2004/0093331	A1	5/2004	Garner et al.	
2004/0116866	A1	6/2004	Gorman et al.	
2004/0127844	A1	7/2004	Flaherty	
2004/0153032	A1	8/2004	Garribotto et al.	
2004/0153257	A1	8/2004	Munk	
2004/0171983	A1	9/2004	Sparks et al.	
2004/0176727	A1	9/2004	Shekalim	
2004/0204673	A1	10/2004	Flaherty	
2004/0220551	A1	11/2004	Flaherty et al.	
2004/0235446	A1	11/2004	Flaherty et al.	
2004/0260233	A1	12/2004	Garibotto et al.	
2005/0021005	A1	1/2005	Flaherty et al.	
2005/0022274	A1	1/2005	Campbell et al.	
2005/0065760	A1	3/2005	Murtfeldt et al.	
2005/0090808	A1	4/2005	Malave et al.	
2005/0090851	A1	4/2005	Devlin	
2005/0095063	A1	5/2005	Fathallah et al.	
2005/0160858	A1	7/2005	Mernoe	
2005/0171512	A1	8/2005	Flaherty	
2005/0182366	A1	8/2005	Vogt et al.	
2005/0192494	A1	9/2005	Ginsberg	
2005/0192561	A1	9/2005	Mernoe	
2005/0203461	A1	9/2005	Flaherty et al.	
2005/0215982	A1	9/2005	Malave et al.	
2005/0222645	A1	10/2005	Malave et al.	
2005/0234404	A1	10/2005	Vilks et al.	
2005/0238507	A1	10/2005	Diianni et al.	
2005/0245878	A1	11/2005	Mernoe et al.	
2005/0251097	A1	11/2005	Mernoe	
2005/0267402	A1	12/2005	Stewart et al.	
2005/0273059	A1	12/2005	Mernoe et al.	
2006/0041229	A1	2/2006	Garibotto et al.	
2006/0069382	A1	3/2006	Pedersen	
2006/0074381	A1	4/2006	Malave et al.	
2006/0095014	A1	5/2006	Ethelfeld	
2006/0135913	A1	6/2006	Ethelfeld	
2006/0142698	A1	6/2006	Ethelfeld	
2006/0151545	A1	7/2006	Imhof et al.	
2006/0178633	A1	8/2006	Garibotto et al.	
2006/0184119	A1	8/2006	Remde et al.	
2006/0200073	A1	9/2006	Radmer et al.	
2006/0206054	A1	9/2006	Shekalim	
2006/0247581	A1	11/2006	Pedersen et al.	
2007/0073228	A1	3/2007	Mernoe et al.	
2007/0073235	A1	3/2007	Estes et al.	
2007/0073236	A1	3/2007	Mernoe et al.	
2007/0088271	A1	4/2007	Richards	
2007/0106218	A1	5/2007	Yodfat et al.	
2007/0124002	A1	5/2007	Estes et al.	
2007/0156092	A1	7/2007	Estes et al.	
2007/0167905	A1	7/2007	Estes et al.	
2007/0167912	A1	7/2007	Causey et al.	
2007/0179444	A1	8/2007	Causey et al.	
2007/0239116	A1	10/2007	Follman et al.	
2008/0051716	A1	2/2008	Stutz	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2008/0097381	A1	4/2008	Moberg et al.	
2008/0119705	A1	5/2008	Patel et al.	
2008/0208627	A1	8/2008	Skyggebjerg	
2008/0287755	A1	11/2008	Sass et al.	
2008/0294094	A1	11/2008	Mhatre et al.	
2008/0294108	A1	11/2008	Briones et al.	
2008/0294109	A1	11/2008	Estes et al.	
2008/0294142	A1	11/2008	Patel et al.	
2008/0319383	A1	12/2008	Byland et al.	
2009/0067989	A1	3/2009	Estes et al.	
2009/0069745	A1	3/2009	Estes et al.	
2009/0069746	A1	3/2009	Miller et al.	
2009/0069749	A1	3/2009	Miller et al.	
2009/0069784	A1	3/2009	Estes et al.	
2009/0069785	A1	3/2009	Miller et al.	
2009/0069787	A1	3/2009	Estes et al.	
2009/0099523	A1*	4/2009	Grant	A61M 5/14244 604/151
2009/0156990	A1	6/2009	Wenger et al.	
2009/0292247	A1	11/2009	Basso et al.	
2010/0048358	A1	2/2010	Tchao et al.	
2010/0280329	A1	11/2010	Pedersen et al.	
2010/0305965	A1	12/2010	Benjamin et al.	
2011/0009846	A1*	1/2011	Istoc	A61M 5/142 604/500
2011/0040247	A1	2/2011	Mandro et al.	
2011/0160555	A1	6/2011	Reifman et al.	
2012/0022496	A1*	1/2012	Causey	A61M 5/14244 604/500
2012/0053560	A1	3/2012	Kawamura	
2012/0215201	A1	8/2012	Brauker et al.	
2012/0238999	A1	9/2012	Estes et al.	
2012/0330270	A1*	12/2012	Colton	A61M 5/1456 604/500
2013/0172710	A1	7/2013	Mears et al.	
2013/0324941	A1	12/2013	Mann et al.	
2013/0331659	A1	12/2013	Koski et al.	
2013/0338453	A1	12/2013	Duke et al.	
2014/0025400	A1	1/2014	Galley et al.	
2014/0039383	A1	2/2014	Dobbles et al.	
2014/0058749	A1	2/2014	Galley et al.	
2014/0068487	A1	3/2014	Steiger et al.	
2014/0073892	A1	3/2014	Randloev et al.	
2014/0317546	A1	10/2014	Jacobson et al.	
2014/0344280	A1	11/2014	Wei et al.	
2014/0358082	A1	12/2014	Ohzawa	
2015/0025498	A1	1/2015	Estes	
2015/0073337	A1	3/2015	Saint et al.	
2015/0080842	A1*	3/2015	Mathys	A61M 5/1452 604/500
2015/0112264	A1	4/2015	Kamen et al.	
2015/0141912	A1	5/2015	Estes	
2015/0173674	A1	6/2015	Hayes et al.	
2015/0277722	A1	10/2015	Masterson et al.	
2016/0000998	A1	1/2016	Estes	
2016/0038675	A1	2/2016	Estes et al.	
2016/0058939	A1	3/2016	Brewer et al.	
2016/0072841	A1	3/2016	Caporal et al.	
2016/0089491	A1	3/2016	Smith	
2016/0235913	A1	8/2016	Smith et al.	
2016/0250422	A1	9/2016	Koch et al.	
2016/0361494	A1	12/2016	Rg et al.	
2017/0003848	A1	1/2017	Wakayanagi et al.	
2017/0049957	A1	2/2017	Michaud	
2017/0100538	A1*	4/2017	Mhatre	A61M 5/1413
2017/0189614	A1*	7/2017	Mazlish	A61M 5/1407
2017/0199985	A1*	7/2017	Mazlish	A61M 5/1723
2017/0203030	A1*	7/2017	Brewer	A61M 5/14244
2017/0203036	A1*	7/2017	Mazlish	A61M 5/16854
2017/0203037	A1*	7/2017	Desborough	G16H 20/17
2017/0203038	A1*	7/2017	Desborough	G16H 20/17
2017/0203039	A1*	7/2017	Desborough	G16H 20/17
2017/0224910	A1*	8/2017	Yodfat	A61M 5/1413
2017/0232195	A1*	8/2017	Desborough	G16H 20/17 604/504
2017/0242975	A1	8/2017	Kahlbaugh	
2017/0316592	A1	11/2017	Kamath et al.	
2017/0332952	A1*	11/2017	Desborough	G06F 19/00
2018/0001006	A1*	1/2018	Schade	G06F 19/00
2018/0133397	A1*	5/2018	Estes	A61M 5/1723
2018/0150614	A1	5/2018	Sokolovskyy et al.	
2018/0161499	A1	6/2018	Al-Ali et al.	
2018/0200435	A1*	7/2018	Mazlish	G16H 40/60
2018/0200436	A1*	7/2018	Mazlish	A61M 5/1723
2018/0200437	A1*	7/2018	Mazlish	A61M 5/1723
2018/0200438	A1*	7/2018	Mazlish	A61M 5/1723
2018/0200439	A1*	7/2018	Mazlish	A61M 5/1723
2018/0200441	A1*	7/2018	Desborough	A61M 5/1723
2018/0207380	A1	7/2018	Lantz et al.	

FOREIGN PATENT DOCUMENTS

DE	10236669	A1	2/2004
EM	0006276170001		1/2007
EM	0006276170002		1/2007
EM	0006276170003		1/2007
EM	0007326490001		6/2007
EM	0007326490002		6/2007
EM	0031267050001		7/2016
EM	0031267050002		7/2016
EM	0031267050003		7/2016
EM	0031267050004		7/2016
EP	0062974	A1	10/1982
EP	0275213	A2	7/1988
EP	0496141	A1	7/1992
EP	0612004	A1	8/1994
EP	0721358	A1	7/1996
EP	1045146	A2	10/2000
EP	1136698	A1	9/2001
EP	1177802	A1	2/2002
EP	1495775	A1	1/2005
EP	1527792	A1	5/2005
EP	1754498	A1	2/2007
EP	1818664	A1	8/2007
FR	2585252	A1	1/1987
GB	0747701		4/1956
GB	2218831	A	11/1989
WO	90/15928	A1	12/1990
WO	92/18175	A1	10/1992
WO	97/21457	A1	6/1997
WO	98/04301	A1	2/1998
WO	98/11927	A1	3/1998
WO	98/57683	A1	12/1998
WO	99/21596	A1	5/1999
WO	99/39118	A1	8/1999
WO	99/48546	A1	9/1999
WO	01/72360	A1	10/2001
WO	01/91822	A1	12/2001
WO	01/91833	A1	12/2001
WO	02/40083	A2	5/2002
WO	02/57627	A1	7/2002
WO	02/68015	A2	9/2002
WO	02/84336	A2	10/2002
WO	2002/100469	A2	12/2002
WO	03/26726	A1	4/2003
WO	20031103763	A1	12/2003
WO	20041056412	A2	7/2004
WO	20041110526	A1	12/2004
WO	20051002652	A2	1/2005
WO	20051039673	A2	5/2005
WO	20051072794	A2	8/2005
WO	20051072795	A2	8/2005
WO	20061067217	A2	6/2006
WO	20061097453	A1	9/2006
WO	20061105792	A1	10/2006
WO	20061105793	A1	10/2006
WO	20061105794	A1	10/2006

(56) **References Cited**

FOREIGN PATENT DOCUMENTS

WO	20071141786	A1	12/2007
WO	2011/163450	A1	12/2011

OTHER PUBLICATIONS

Written Opinion of the International Searching Authority for PCT Application No. PCT/US2017/053814, dated Jan. 4, 2018, 8 pages.
Written Opinion of the International Searching Authority for PCT Application No. PCT/US2017/053811, dated Dec. 26, 2017, 6 pages.
The Medtronic Diabetes Connection, 2006, 6 pages.
t:slimx2 Insulin Pump User Guide, Tandem Diabetes Care, Jul. 22, 2016.
Sara Krugman, Bionic Pancreas User Interface (3/4): Interface Details, Tidepool.org, Jul. 20, 2015.
Samuel Vozeh and Jean-Louis Steimer, Feedback Control Methods for Drug Dosage Optimisation, Concepts, Classification and Clinical Application, Clinical Pharmacokinetics, 10(6), pp. 457-476, Nov.-Dec. 1985.
Patent Abstracts of Japan, vol. 1999, No. 04, and JP 11 010036, Apr. 30, 1999 and Jan. 19, 1999, Toray Ind. Inc.
OmniPod Quick Start Guide, 2007, 2 pages.
OmniPod Insulin Management System-Investor Relations—Press Release, Feb. 1, 2005, http://investors.insulet.com/phoenix.zhtml?c=209336&p=irol-newsArticle&ID=988708&highlight= 1 page.
Michele Schiavon, Chiara Dalla Man, Yogish C. Kudva, Ananda Basu, and Claudio Cobelli, Quantitative Estimation of Insulin Sensitivity in Type 1 Diabetic Subjects Wearing a Sensor-Augmented Insulin Pump, Diabetes Care, vol. 37, pp. 1216-1223, May 2014.
Medtronic News Release, "Medtronic Receives FDA Approval for World's First Insulin Pump with Real-time Continuous Glucose Monitoring," Apr. 13, 2006, 3 pages.
JDRF, Statistics: JDRF and Diabetes, http://jdrf.org/about-jdrf/fact-sheets/jdrf-anddiabetes- statistics/, 2014.
International Search Report for PCT Application No. PCT/US2017/53811, dated Dec. 26, 2017, 4 pages.
International Search Report for PCT Application No. PCT/US2017/053814, dated Jan. 4, 2018, 4 pages.
Hurley, Dan. Artificial Pancreas Makers Race to Market. Discover. Date published: Apr. 12, 2016. <http://discovermagazine.com/2016/may/13-priming-the-pump>.
Guy A. Dumont, Feedback Control for Clinicians, Springer Science+Media, Apr. 12, 2013, New York.
Fischer et al., In Vivo Comparison of Different Algorithms for the Artificial Beta-Cell, Artificial Organs, 9(2), International Society for Artificial Organs, May 1985, New York.
E. Salzsieder, G. Albrecht, E. Jutzi, and U. Fischer, Estimation of Individually Adapted Control Parameters for an Artificial Beta Cell, Biomedica Biochimica Acta. 43(5) pp. 585-596, May 1984.
Debiotech News Release, "Debiotech reveals its new miniaturized Disposable Insulin Nanopump™ for Diabetes therapy," available at http://www.debiotech.com/news/nw 159.html Apr. 24, 2006, 3 pages.
David A. Copp, Ravi Gondhalekar, and Joao P. Hespanha, Simultaneous Model Predictive Control and Moving Horizon Estimation for Blood Glucose Regulation in Type 1 Diabetes, Optimal Control Applications and Methods, Wiley InterScience, DOI: 10.1002/oca, pp. 1-15, Oct. 2016.
Dassau and Associates, 12-Week 24/7 Ambulatory Artificial Pancreas With Weekly Adaptation of Insulin Delivery Settings: Effect on Hemoglobin A1C and Hypoglycemia, Diabetes Care, Oct. 13, 2017.
Collins and Lee, "Microfluidic flow transducer based on the measurement of electrical admittance," Lab Chip, 2004,4:7-10.
Centers for Disease Control and Prevention, Number (in Millions) of Adults with Diabetes by Diabetes Medication Status, United States, 1997-2011, http://www.cdc.gov/diabetes/statistics/meduse/fig1.htm, 2013.
Bigfoot Biomedical Reveals its Automated Insulin Delivery System. diaTribe. Date published: Jan. 25, 2016 <https://diatribe.org/bigfoot-biomedical-reveals-its-automated-insulin-delivery-system>.
Bhalla, Raveesh, Understanding Material Design Part II, Sep. 28, 2014, Medium.com [online], [site visited Apr. 11, 2018], Available from Internet: https://medium.eom/@raveeshbhalla/understanding-material-design-cf2d60a16de3 (Year: 2014).
Accu-Chek Spirit, "Pump Therapy Made for You," Roche, 2006, 6 pages.
"Omnipod Horizon: Automated Glucose Control" Jun. 2017, 2 pages.
Delaney, Chelsey, "4 apps for tracking your fertility" Jun. 6, 2016, Bedsider, site visited Oct. 19, 2018: https://www.bedsider.org/features/647-4-apps-for-tracking-your-fertility.
"Clean Toggle Button Navigation Menu PSD" Jan. 24, 2014, WeLoveSoLo, site visited Oct. 19, 2018: https://www.welovesolo.com/clean-toggle-button-navigation-menu-psd/.

* cited by examiner

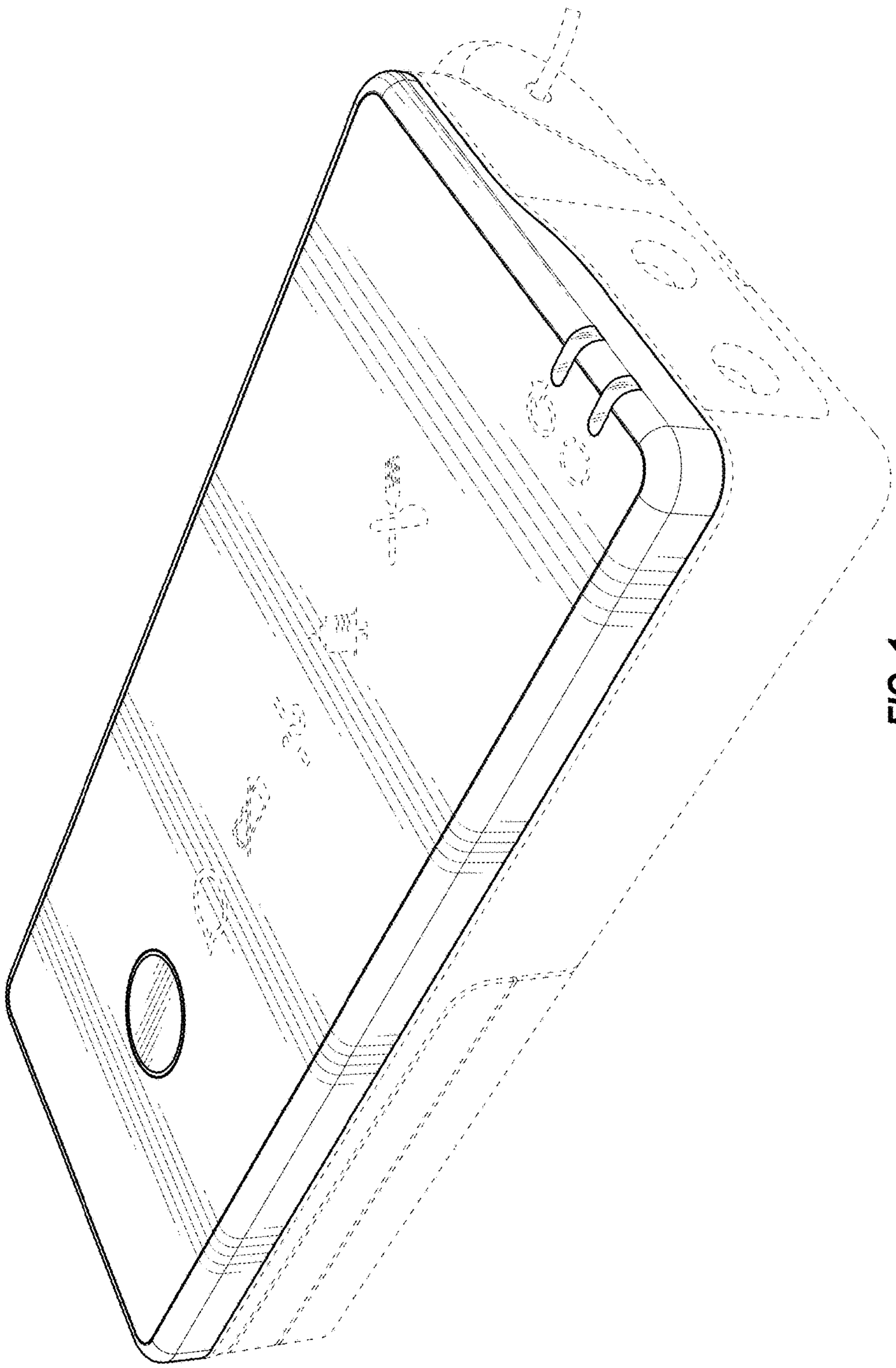


FIG. 1

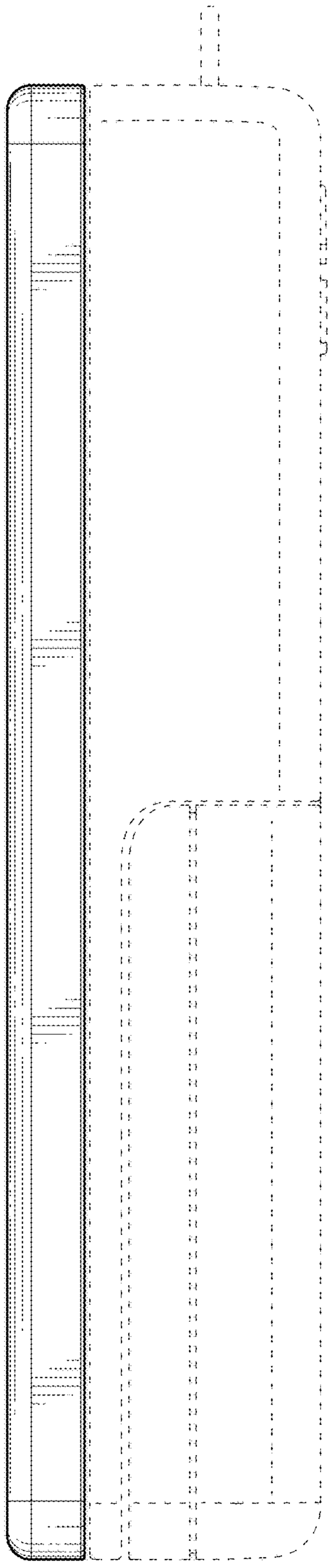


FIG. 2

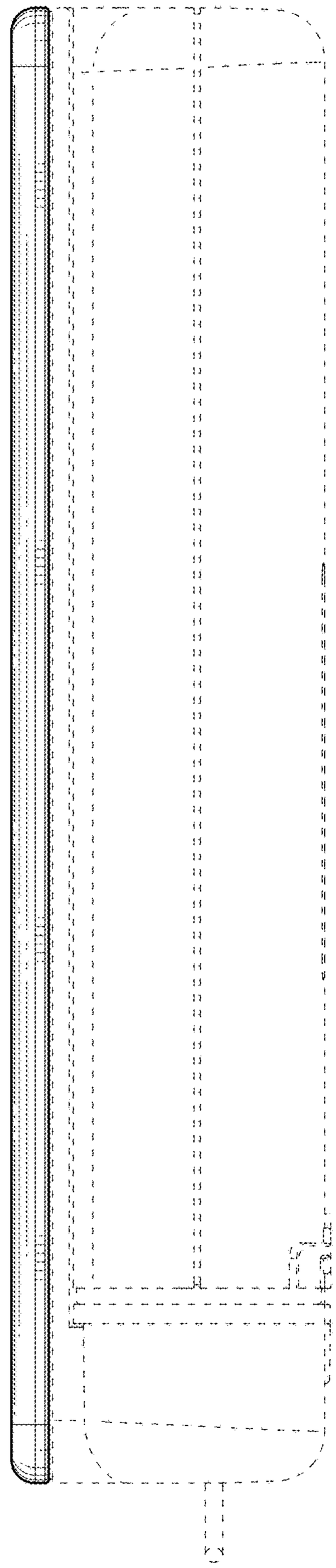


FIG. 3

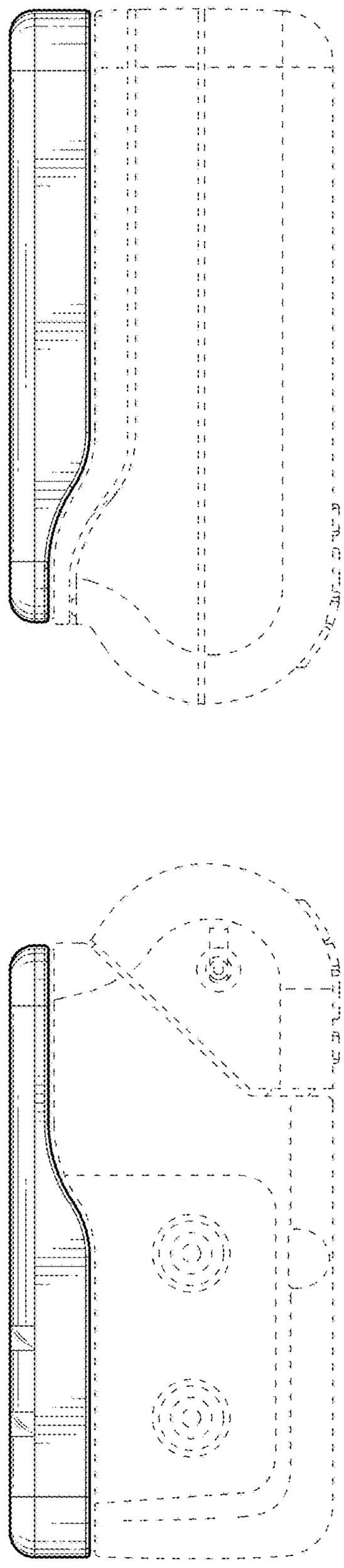


FIG. 5

FIG. 4

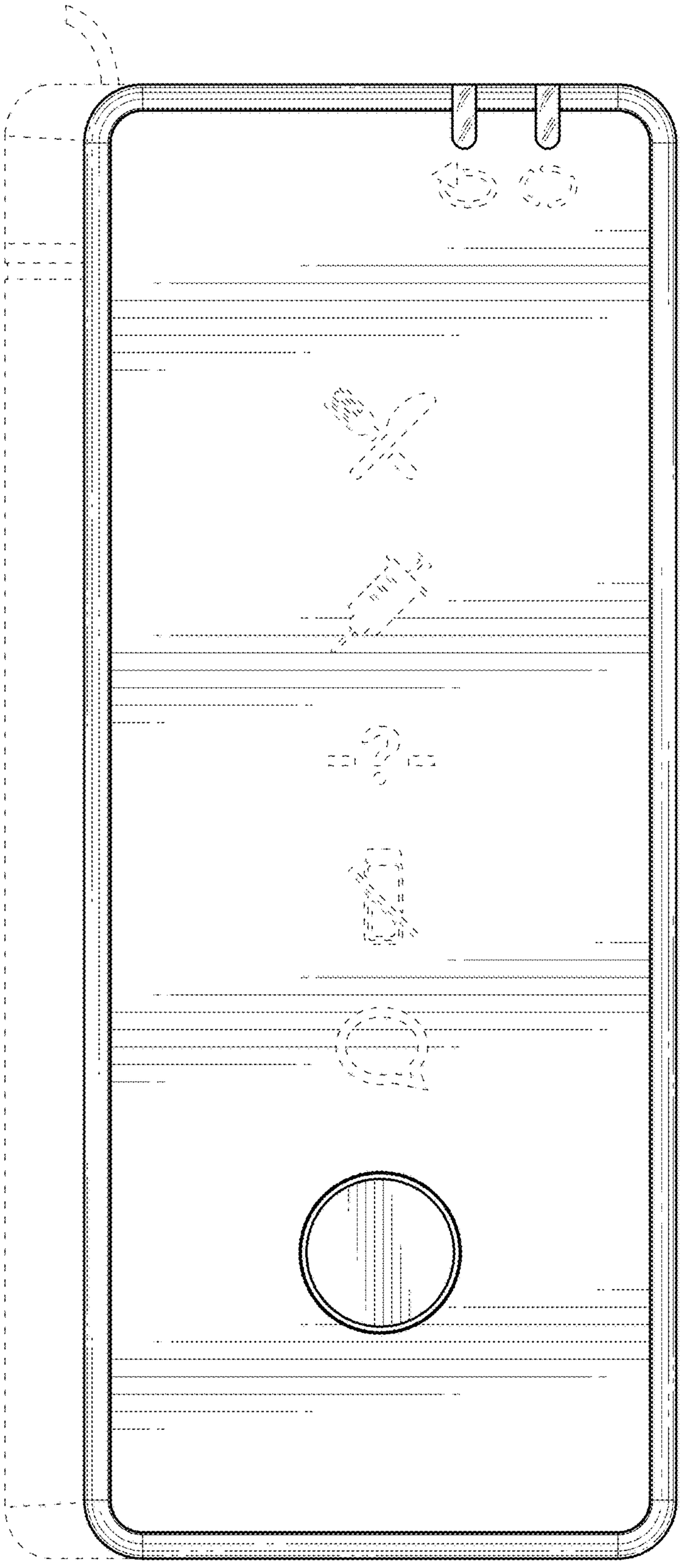


FIG. 6

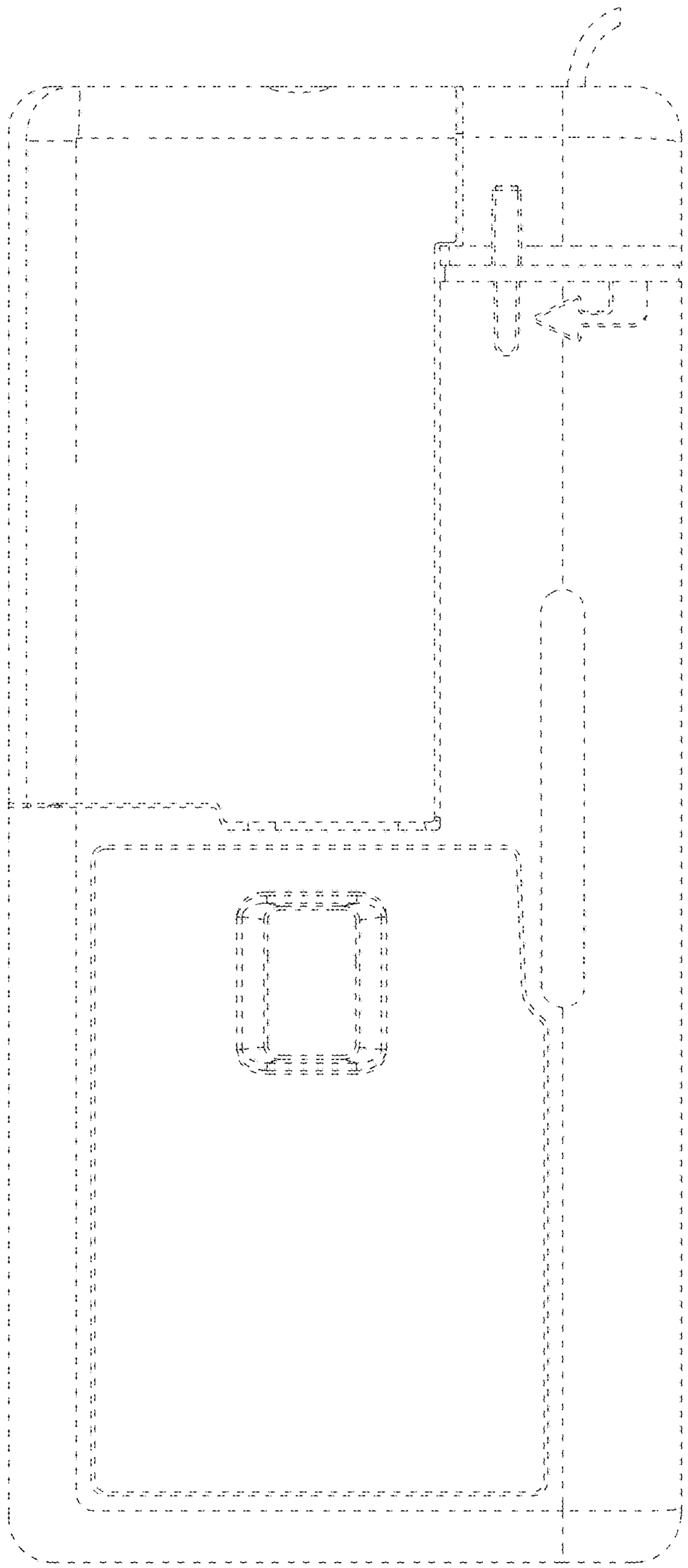


FIG. 7