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

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(54) **SMART CARD INTERFACE**

(71) Applicant: **NagraStar LLC**, Englewood, CO (US)

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

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(51) **LOC (13) Cl.** **14-02**

(52) **U.S. Cl.**
USPC **D14/436**; D14/437

(58) **Field of Classification Search**

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23/13; H01L 23/31; H01L 23/3128; H01L 23/48; H01L 23/49541; H01L 23/498; H01L 23/49811; H01L 23/49816; H01L 23/49833; H01L 23/49838; H01L 23/49844; H01L 23/4985; H01L 23/49855; H01L 23/49888; H01L 23/50; H01L 23/522; H01L 23/528; H01L 23/5283; H01L 23/538; H01L 23/5386; H01L 23/5388; H01L 23/5389; H01L 25/00; H01L 25/0655; H01L 27/0203; H01L 27/0207; H01L 27/12; H01L 27/1218; H01L 27/1222; H01L 27/127; H01L 24/00-17; H01L 24/94-98; H01L 2224/01; H01L 2224/0501; H01L 2224/05013-05017; H01L

(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

D54,610 S * 3/1920 Evans et al. D19/1
3,702,025 A * 11/1972 Archer H01L 27/118
438/6

(Continued)

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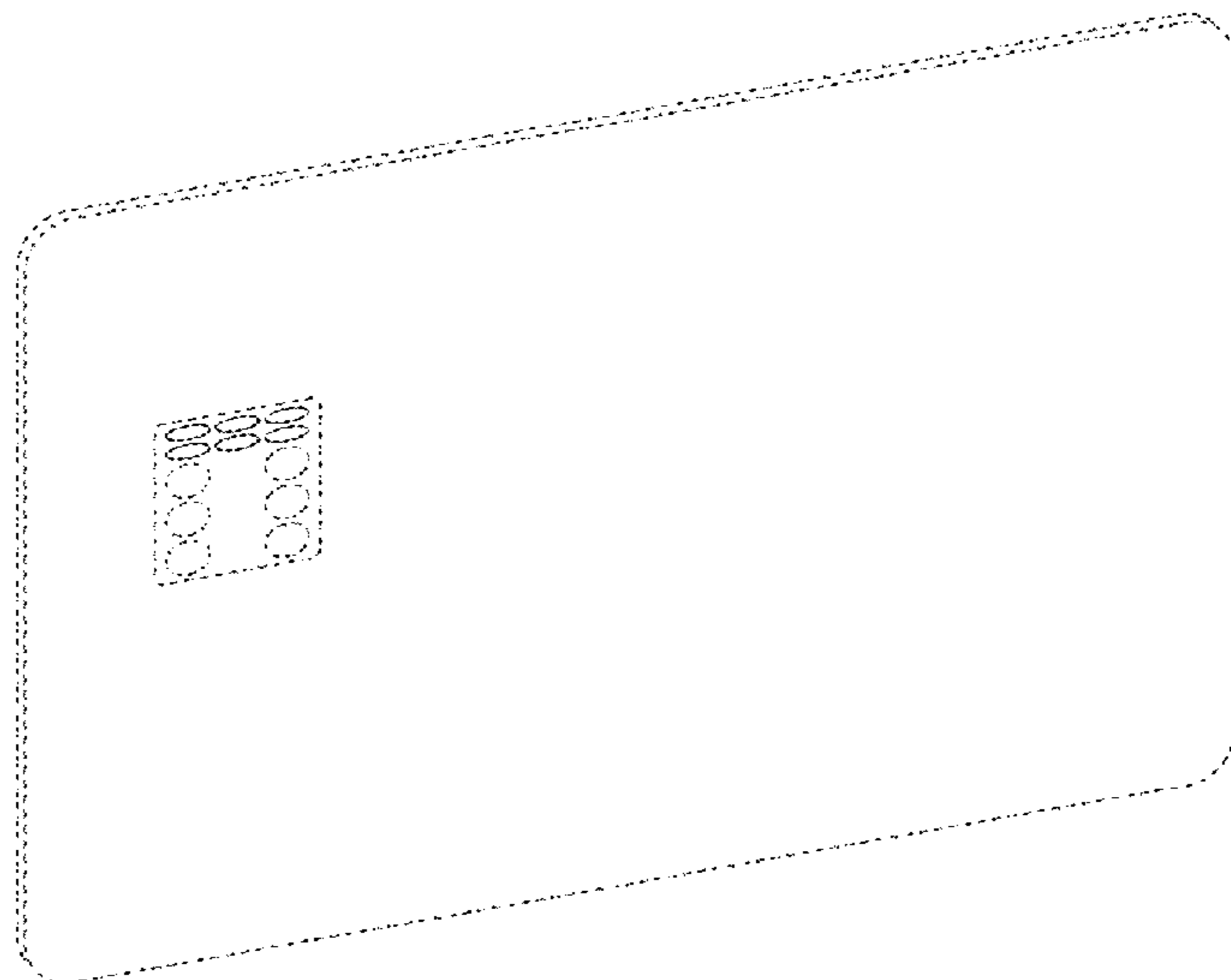
(57) **CLAIM**

The ornamental design for a smart card interface, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a smart card interface; FIG. 2 is a top view thereof; and, FIG. 3 is an enlarged top view thereof. The illustrative broken line showing of a base surface throughout the drawing figures depicts an exemplary component to which the smart card interface might be applied and forms no part of the claimed design.

1 Claim, 2 Drawing Sheets



Related U.S. Application Data

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(58) **Field of Classification Search**

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See application file for complete search history.

(56)

References Cited

U.S. PATENT DOCUMENTS

4,104,785 A * 8/1978 Shiba G01R 31/2644
257/48
4,264,917 A * 4/1981 Ugon G06K 19/07745
174/521
D267,094 S * 11/1982 Doi D14/436
4,380,699 A * 4/1983 Monnier H01L 23/5388
235/492
4,394,654 A * 7/1983 Hofmann-Cerfontaine
G06Q 20/3415
340/5.81
4,417,413 A * 11/1983 Hoppe G06K 19/07745
40/630
4,532,419 A * 7/1985 Takeda G06K 19/07
235/492
4,535,385 A * 8/1985 August H01L 23/36
257/E23.101
4,549,200 A * 10/1985 Ecker H01L 23/4006
174/252
4,549,247 A * 10/1985 Hoppe G06K 19/07743
174/528
4,575,621 A * 3/1986 Dreifus G06Q 20/382
235/380
4,600,257 A * 7/1986 Fushimoto H01R 13/4534
235/492
4,603,249 A * 7/1986 Hoppe G01S 7/529
235/492
4,614,861 A * 9/1986 Pavlov G06Q 20/4014
235/380
4,628,407 A * 12/1986 August H01L 23/36
257/E23.101
4,639,585 A * 1/1987 Haghiri-Tehrani
G06K 19/07728
235/487
4,677,529 A * 6/1987 Watanabe H05K 1/167
338/115
4,689,103 A * 8/1987 Elarde H05K 3/0097
156/242
4,696,034 A * 9/1987 Wiedemer H04N 21/6581
380/230
4,727,246 A * 2/1988 Hara G06K 19/07745
174/544
4,739,448 A * 4/1988 Rowe H01L 23/66
333/238
4,750,089 A * 6/1988 Derryberry H05K 3/3436
361/712
4,754,319 A * 6/1988 Saito B32B 37/185
257/679
4,774,633 A * 9/1988 Dehaine H01L 24/81
361/751
4,792,843 A * 12/1988 Haghiri-Tehrani
G06K 19/07745
257/679
4,794,243 A * 12/1988 Hamada G06K 19/07743
235/492
4,795,895 A * 1/1989 Hara G06K 19/07745
235/488
4,797,542 A * 1/1989 Hara G06K 19/0719
235/380
4,803,542 A * 2/1989 Haghiri-Tehrani
G06K 19/07745
257/679

4,811,082 A * 3/1989 Jacobs H01L 23/538
174/261
4,814,943 A * 3/1989 Okuaki H01L 23/293
361/783
4,822,989 A * 4/1989 Miyamoto G06K 19/07745
235/492
4,825,283 A * 4/1989 Shino G06K 19/07703
174/535
4,835,846 A * 6/1989 Juan G06K 19/07743
29/840
4,849,944 A * 7/1989 Matsushita G11C 5/143
714/718
4,868,376 A * 9/1989 Lessin G06K 19/07703
235/492
D304,826 S * 11/1989 Sutoh D14/436
D305,023 S * 12/1989 Suto D14/436
4,887,234 A * 12/1989 Iijima G06Q 20/341
711/173
4,889,980 A * 12/1989 Hara G06K 19/07745
235/488
4,896,028 A * 1/1990 Kushima G06K 19/07
235/492
4,897,534 A * 1/1990 Haghiri-Tehrani
G06K 19/07718
235/488
4,943,464 A * 7/1990 Gloton H01L 23/49855
428/76
4,980,802 A * 12/1990 Champagne H01L 24/73
361/764
4,985,920 A * 1/1991 Seki G06Q 20/341
235/379
4,990,759 A * 2/1991 Gloton G06K 19/07728
235/487
5,023,751 A * 6/1991 Stampfli H01L 21/4839
361/751
5,027,190 A * 6/1991 Haghiri-Tehrani
G06K 19/07747
257/679
5,031,026 A * 7/1991 Ueda G06K 19/077
257/679
5,049,718 A * 9/1991 Spletter B23K 26/18
219/121.64
5,049,728 A * 9/1991 Rovin G06K 19/077
235/492
5,055,913 A * 10/1991 Haghiri-Tehrani
G06K 19/07745
257/676
5,097,117 A * 3/1992 Champagne G06K 19/07745
235/488
5,122,860 A * 6/1992 Kikuchi G06K 19/07747
257/679
5,126,548 A * 6/1992 Sekiguchi G06K 7/0086
235/492
D327,883 S * 7/1992 Gloton D13/182
D328,599 S * 8/1992 Gloton D13/182
5,134,773 A * 8/1992 LeMaire B29C 45/14467
174/545
5,155,068 A * 10/1992 Tada G06K 19/07745
257/E23.064
5,203,078 A * 4/1993 Nakanishi G06K 19/077
228/5.1
5,208,450 A * 5/1993 Uenishi G06K 19/07728
235/488
5,216,278 A * 6/1993 Lin H01L 23/3121
174/538
5,220,598 A * 6/1993 Bock H04M 1/02
379/110.01
5,250,341 A * 10/1993 Kobayashi G06K 19/07745
257/E29.022
5,255,430 A * 10/1993 Tallaksen G06K 19/07745
174/530
D342,728 S * 12/1993 Gloton D14/437
5,270,964 A * 12/1993 Bechtolsheim G11C 5/00
365/52
5,276,311 A * 1/1994 Hennige G07F 7/1008
235/380

(56)

References Cited

U.S. PATENT DOCUMENTS

- 5,276,317 A * 1/1994 Ozouf A45C 11/18
235/441
- D344,502 S * 2/1994 Gloton D14/437
- 5,285,352 A * 2/1994 Pastore H01L 23/3677
361/707
- 5,304,513 A * 4/1994 Haghiri-Tehrani
G06K 19/07745
156/245
- 5,321,297 A * 6/1994 Enomoto H01L 27/14627
257/432
- 5,361,062 A * 11/1994 Weiss G07C 9/21
340/5.26
- 5,362,955 A * 11/1994 Haghiri-Tehrani B26D 7/01
235/492
- 5,363,279 A * 11/1994 Cha H01L 24/06
361/767
- D353,135 S * 12/1994 Gloton D14/437
- D353,136 S * 12/1994 Gloton D14/437
- 5,375,037 A * 12/1994 Le Roux G07F 7/1008
361/679.31
- 5,386,340 A * 1/1995 Kurz G06K 19/077
206/701
- D357,909 S * 5/1995 Gloton D14/437
- D358,142 S * 5/1995 Gloton D14/437
- 5,438,481 A * 8/1995 Murphy H01L 23/495
257/E23.031
- 5,444,301 A * 8/1995 Song H01L 23/3107
257/737
- 5,448,511 A * 9/1995 Paurus H01L 25/0657
257/686
- 5,457,590 A * 10/1995 Barrett G06F 21/80
235/492
- 5,463,210 A * 10/1995 Imura G06K 7/0021
235/441
- 5,467,251 A * 11/1995 Katchmar H01L 23/3672
174/252
- D365,092 S * 12/1995 Mundigl D14/437
- 5,486,687 A * 1/1996 Le Roux G06Q 20/341
235/382
- 5,502,278 A * 3/1996 Mabboux H01L 23/49838
174/261
- 5,517,752 A * 5/1996 Sakata H01L 24/81
174/260
- 5,526,233 A * 6/1996 Hayakawa G06K 19/077
235/488
- 5,534,720 A * 7/1996 Song H01L 27/1462
257/232
- 5,543,585 A * 8/1996 Booth H01L 21/563
174/260
- 5,544,014 A * 8/1996 Atsumi G06K 19/04
257/679
- 5,552,632 A * 9/1996 Iwasaki G06K 19/07743
257/679
- 5,563,400 A * 10/1996 Le Roux G06K 19/07741
235/486
- 5,569,941 A * 10/1996 Takahashi H01L 29/0834
257/132
- D375,303 S * 11/1996 Gaumet D14/436
- 5,572,779 A * 11/1996 Adelman H01F 41/046
257/E23.061
- 5,579,207 A * 11/1996 Hayden H01L 25/0657
174/261
- 5,581,065 A * 12/1996 Nishikawa G06K 19/072
235/487
- 5,584,043 A * 12/1996 Burkart G06K 7/0013
710/2
- 5,590,596 A * 1/1997 Tani B41F 15/0818
101/115
- 5,594,275 A * 1/1997 Kwon H01L 25/105
257/686
- 5,604,330 A * 2/1997 Hasan H01L 23/49838
174/261
- 5,604,379 A * 2/1997 Mori H01L 23/3157
257/737
- 5,615,085 A * 3/1997 Wakabayashi B41J 29/00
361/679.31
- 5,616,520 A * 4/1997 Nishiuma H01L 23/10
438/125
- 5,623,552 A * 4/1997 Lane G06K 13/073
382/124
- 5,637,858 A * 6/1997 Hoppe G06K 19/07718
235/492
- 5,652,428 A * 7/1997 Nishioka G01Q 10/06
850/4
- 5,655,917 A * 8/1997 Kaneshige H01R 13/635
439/155
- 5,677,524 A * 10/1997 Haghiri-Tehrani
G06K 19/077
235/487
- D387,746 S * 12/1997 Ishihara D14/437
- D387,747 S * 12/1997 Ishihara D14/437
- D388,066 S * 12/1997 Ishihara D14/437
- D389,130 S * 1/1998 Ishihara D14/437
- 5,724,545 A * 3/1998 Skorski G06F 15/0283
705/41
- 5,729,000 A * 3/1998 Sugimoto G06K 7/0021
235/441
- 5,736,969 A * 4/1998 Kuga G11B 20/00007
345/6
- 5,739,515 A * 4/1998 Takemura G06K 7/0021
235/441
- 5,742,680 A * 4/1998 Wilson H04N 7/163
348/E7.061
- 5,745,988 A * 5/1998 Hohmann G06K 19/041
235/488
- 5,752,857 A * 5/1998 Knights G06K 7/0021
439/638
- 5,754,410 A * 5/1998 Bardsley G01R 31/2884
361/777
- 5,764,522 A * 6/1998 Shalev G01G 19/414
700/240
- 5,767,999 A * 6/1998 Kayner G06F 13/409
398/164
- 5,780,836 A * 7/1998 Iguchi G06K 13/08
235/441
- 5,780,837 A * 7/1998 Garcia B42D 25/00
235/487
- 5,786,988 A * 7/1998 Harari G06K 19/07728
235/487
- 5,787,399 A * 7/1998 Lee G11C 7/16
704/270
- 5,789,733 A * 8/1998 Jachimowicz G06K 7/1097
235/380
- 5,807,762 A * 9/1998 Akram H01L 23/5382
257/E23.171
- 5,822,190 A * 10/1998 Iwasaki G06K 19/07743
361/737
- 5,827,084 A * 10/1998 Biernath H05K 3/365
439/262
- 5,834,747 A * 11/1998 Cooper G06K 19/06206
235/449
- 5,837,984 A * 11/1998 Bleier G06K 7/0021
235/441
- 5,852,290 A * 12/1998 Chaney G07F 7/1008
235/492
- 5,856,662 A * 1/1999 Kohama G06K 19/07724
235/492
- 5,866,950 A * 2/1999 Iwasaki H01L 24/81
257/782
- D407,392 S * 3/1999 Kleineidam D14/479
- 5,877,488 A * 3/1999 Klatt G06K 7/0043
235/486
- 5,877,975 A * 3/1999 Jigour G06K 7/0021
365/52
- 5,900,655 A * 5/1999 Shim H01L 31/02162
257/232
- 5,912,502 A * 6/1999 Kano G01R 31/2884
257/620

(56)	References Cited					
	U.S. PATENT DOCUMENTS					
5,932,866	A *	8/1999	Terada	.....	G06K 19/08	6,281,450 B1 * 8/2001 Urasaki
					235/487	174/258
5,933,328	A *	8/1999	Wallace	.....	G06K 7/0021	6,285,559 B1 * 9/2001 Fukiharu
					361/737	.....
5,955,961	A *	9/1999	Wallerstein	.....	G06Q 20/4037	257/E23.114
					340/5.4	6,292,490 B1 * 9/2001 Gratacap
5,991,400	A *	11/1999	Kamperman	.....	H04N 7/1675	.....
					380/239	H04N 21/23424
5,993,261	A *	11/1999	Klatt	.....	G06K 7/0021	370/412
					439/630	6,296,552 B1 * 10/2001 Boutaghou
6,002,605	A *	12/1999	Iwasaki	.....	G07F 7/1008	.....
					365/51	B24B 39/06
6,019,639	A *	2/2000	Brunker	.....	H01R 13/6464	451/290
					439/60	6,297,548 B1 * 10/2001 Moden
6,019,663	A *	2/2000	Angell	.....	B24B 19/16	.....
					451/5	H01L 23/13
6,025,997	A *	2/2000	Huber	.....	G06K 19/07745	257/686
					361/777	6,304,683 B1 * 10/2001 Kiyohara
6,027,028	A *	2/2000	Pieterse	.....	G06K 7/0013	.....
					235/492	H04N 1/0402
6,035,037	A *	3/2000	Chaney	.....	H04N 7/163	358/486
					348/565	6,315,205 B1 * 11/2001 Bates, III
6,035,216	A *	3/2000	Cheng	.....	H04B 1/3816	.....
					235/475	G06K 7/0021
6,036,099	A *	3/2000	Leighton	.....	B32B 37/185	235/441
					156/154	6,326,243 B1 * 12/2001 Suzuya
6,054,774	A *	4/2000	Ohmori	.....	G06K 19/07743	.....
					257/679	H01L 23/49503
D425,519	S *	5/2000	Merlin	.....	D14/436	438/124
6,062,887	A *	5/2000	Schuster	.....	G06K 7/0021	6,328,217 B1 * 12/2001 Everett
					439/218	.....
6,065,681	A *	5/2000	Trueggelmann	.....	G06K 19/07745	235/492
					235/487	6,329,228 B1 * 12/2001 Terashima
6,085,155	A *	7/2000	Hayase	.....	G01C 15/004	.....
					702/40	H01L 21/486
6,089,451	A *	7/2000	Krause	.....	G06K 7/084	257/675
					235/380	6,330,164 B1 * 12/2001 Khandros
6,097,605	A *	8/2000	Klatt	.....	G06F 1/183	.....
					361/737	H01L 24/81
6,102,743	A *	8/2000	Haffenden	.....	G06K 19/07743	361/760
					439/377	D452,864 S * 1/2002 Wallace
6,118,114	A *	9/2000	Fujimoto	.....	H04N 1/00002	.....
					250/208.1	6,344,162 B1 * 2/2002 Miyajima
6,141,210	A *	10/2000	Iwasaki	.....	G06K 7/0021	.....
					361/679.31	B29C 43/18
D434,396	S *	11/2000	Iwasaki	.....	D14/436	264/272.14
D434,418	S *	11/2000	Shinada	.....	D14/436	D456,414 S * 4/2002 Turin
6,149,058	A *	11/2000	Albaret	.....	G06K 7/0013	.....
					235/380	D14/437
6,151,511	A *	11/2000	Cruciani	.....	G06K 7/0021	6,369,795 B1 * 4/2002 Lester
					235/486	.....
6,170,116	B1 *	1/2001	Mizuta	.....	B08B 1/00	345/156
					134/42	6,372,541 B1 * 4/2002 Bouchez
6,188,580	B1 *	2/2001	Huber	.....	G06K 19/07743	.....
					361/737	438/106
6,191,951	B1 *	2/2001	Houdeau	.....	G06K 19/07743	6,378,774 B1 * 4/2002 Emori
					361/737	.....
6,195,183	B1 *	2/2001	Fujimoto	.....	H04N 1/486	235/441
					358/512	6,398,114 B1 * 6/2002 Nishikawa
6,205,028	B1 *	3/2001	Matsumura	.....	H05K 1/0201	.....
					174/252	G06K 19/072
6,209,790	B1 *	4/2001	Houdeau	.....	G06K 19/07743	235/487
					235/491	6,402,301 B1 * 6/2002 Powers
6,213,403	B1 *	4/2001	Bates, III	.....	G06K 19/0718	.....
					235/486	B41J 2/1603
6,232,937	B1 *	5/2001	Jacobsen	.....	G02B 25/002	347/63
					345/100	6,407,933 B1 * 6/2002 Bologna
6,241,557	B1 *	6/2001	Reichardt	.....	G06K 7/0021	.....
					439/637	H05K 7/1491
6,257,486	B1 *	7/2001	Teicher	.....	G06K 7/0021	174/168
					235/380	6,409,089 B1 * 6/2002 Eskicioglu
					
						H04N 21/4367
						235/492
						6,420,887 B1 * 7/2002 Kister
					
						G01R 1/07378
						324/754.11
						6,443,361 B1 * 9/2002 Klatt
					
						G06K 7/0021
						235/384
						6,460,772 B1 * 10/2002 Stahl
					
						G06K 7/0013
						235/482
						6,462,273 B1 * 10/2002 Corisis
					
						G06K 19/077
						174/521
						6,474,776 B1 * 11/2002 Murray
					
						B41J 2/14
						347/12
						6,492,718 B2 * 12/2002 Ohmori
					
						H01L 24/97
						257/685
						6,513,718 B1 * 2/2003 Bouchez
					
						G06K 19/07728
						235/492
						6,548,888 B1 * 4/2003 Fidalgo
					
						G06K 19/07743
						257/679
						6,561,432 B1 * 5/2003 Vedder
					
						G06K 19/077
						235/492
						6,568,600 B1 * 5/2003 Carpier
					
						H05K 3/3436
						235/492
						6,570,768 B2 * 5/2003 Medina
					
						G02B 6/4201
						361/728
						6,581,840 B2 * 6/2003 Takeda
					
						G06K 19/07739
						235/488
						6,592,031 B1 * 7/2003 Klatt
					
						G06F 21/32
						235/382
						6,592,044 B1 * 7/2003 Wong
					
						G06K 19/06196
						235/449
						6,594,361 B1 * 7/2003 Chaney
					
						G06Q 20/40975
						380/221
						6,613,610 B2 * 9/2003 Iwafuchi
					
						H01L 21/2007
						438/128
						6,617,693 B2 * 9/2003 Hikita
					
						H01L 23/49575
						257/777
						6,618,258 B2 * 9/2003 Gohs
					
						G06K 7/0021
						361/728

(56)	References Cited					
	U.S. PATENT DOCUMENTS					
6,641,049	B2 *	11/2003	Luu	.....	G06K 19/0719	7,051,128 B2 * 5/2006 Bando G06F 13/385 710/100
6,646,957	B2 *	11/2003	Martin	.....	H04B 1/385 368/10	7,051,929 B2 * 5/2006 Li G06K 19/07 235/380
6,657,523	B2 *	12/2003	Tarui	.....	H01L 23/66 333/160	7,061,263 B1 * 6/2006 Ong G01R 31/2884 324/750.3
6,693,315	B2 *	2/2004	Kuroda	.....	H01L 29/0649 257/288	7,062,584 B1 * 6/2006 Worrell G06K 7/0013 710/16
D487,747	S *	3/2004	Yu	.....	D14/436	7,063,267 B2 * 6/2006 Tsuchimoto G06K 19/07745 235/492
6,705,520	B1 *	3/2004	Pitroda	.....	G06K 7/0013 235/380	7,064,423 B2 * 6/2006 Okita G06K 19/07728 174/250
6,719,206	B1 *	4/2004	Bashan	.....	G06K 19/07747 235/492	7,064,431 B2 * 6/2006 Singh H05K 1/111 257/734
D491,951	S *	6/2004	Yu	.....	D14/436	7,082,034 B2 * 7/2006 Tiwari H01L 23/3675 165/185
D492,688	S *	7/2004	Wallace	.....	D14/436	7,136,514 B1 * 11/2006 Wong G06K 9/00026 382/124
6,762,537	B1 *	7/2004	Kikushima	.....	H03H 9/0547 310/313 R	7,140,550 B2 * 11/2006 Ramachandran G06K 19/08 235/493
6,764,005	B2 *	7/2004	Cooper	.....	G06K 19/06 235/449	7,184,093 B2 * 2/2007 Manning H04N 5/44 348/445
D493,798	S *	8/2004	Yu	.....	D14/436	D537,824 S * 3/2007 Day D14/436
6,779,115	B1 *	8/2004	Naim	.....	G06F 21/10 380/278	7,207,662 B2 * 4/2007 Shin B41J 2/17563 347/63
6,787,469	B2 *	9/2004	Houston	.....	H01L 21/32139 257/E21.314	7,225,537 B2 * 6/2007 Reed H01L 23/3135 29/841
6,809,932	B2 *	10/2004	Wu	.....	H05K 9/0024 165/185	7,245,891 B2 * 7/2007 Hugunin H04M 19/04 455/148
6,811,082	B2 *	11/2004	Wong	.....	G06K 7/10336 235/451	7,252,242 B2 * 8/2007 Ho G06K 19/0719 235/492
6,826,185	B1 *	11/2004	Montanaro	.....	H04L 12/5601 370/395.1	7,273,234 B1 * 9/2007 Collins B42D 25/00 283/72
6,833,323	B2 *	12/2004	Yui	.....	H01L 21/7684 257/758	7,293,716 B1 * 11/2007 Miks H01L 21/561 235/451
6,836,138	B1 *	12/2004	Park	.....	G01R 1/0483 324/756.05	7,294,918 B2 * 11/2007 Wada G06K 19/077 257/679
6,847,265	B2 *	1/2005	Tanaka	.....	H03B 5/04 331/108 D	7,296,750 B2 * 11/2007 Wood G02B 26/0833 235/462.36
6,848,617	B1 *	2/2005	Fries	.....	G07C 9/37 235/492	7,305,535 B2 * 12/2007 Harari G06K 19/077 711/164
6,870,430	B2 *	3/2005	Nakamura	.....	H03B 5/36 331/108 C	7,317,248 B2 * 1/2008 Poechmueller G11C 5/04 257/713
6,882,537	B2 *	4/2005	Barcley	.....	H05K 1/0206 174/252	7,350,714 B2 * 4/2008 Wallace G06K 19/07743 235/487
6,882,541	B2 *	4/2005	Maruyama	.....	H05K 1/189 361/752	7,352,588 B2 * 4/2008 Nishizawa H01L 23/49833 361/737
6,884,642	B2 *	4/2005	Farnworth	.....	G01R 31/2856 438/14	7,360,688 B1 * 4/2008 Harris G06K 7/0021 235/380
6,896,189	B2 *	5/2005	Guion	.....	G06K 19/07733 235/451	D571,810 S * 6/2008 Ikeda D14/437
6,903,935	B1 *	6/2005	Chen	.....	G06K 19/077 235/492	7,384,294 B2 * 6/2008 Washino G06K 7/0021 439/326
6,913,198	B2 *	7/2005	Ruat	.....	G06K 7/0069 235/451	7,385,169 B2 * 6/2008 Saitou H04N 1/0318 250/208.1
6,922,780	B1 *	7/2005	Siegel	.....	H04N 7/162 348/E7.06	7,416,132 B2 * 8/2008 Takiar G06K 13/0825 235/441
6,937,191	B2 *	8/2005	Puente Baliarda	.....	H01Q 1/246 343/700 MS	7,446,352 B2 * 11/2008 Becker H01L 27/092 257/206
6,937,206	B2 *	8/2005	Puente Baliarda	.....	H01Q 1/246 343/700 MS	7,469,420 B2 * 12/2008 Duffield H04N 7/1675 348/E5.004
6,945,712	B1 *	9/2005	Conn	.....	G02B 6/4246 385/94	7,485,501 B2 * 2/2009 Takiar H01L 21/561 438/127
6,950,128	B1 *	9/2005	Sawada	.....	H04N 1/00241 348/231.3	D588,133 S * 3/2009 Nakamura D14/436
6,974,343	B2 *	12/2005	Zheng	.....	H01R 13/2421 439/326	D588,134 S * 3/2009 Nakamura D14/436
7,001,800	B2 *	2/2006	Cappelletti	.....	H01L 27/0207 257/368	7,508,942 B2 * 3/2009 Candelore H04N 7/1675 380/239
7,005,955	B2 *	2/2006	Schumacher	.....	H01F 17/0033 336/200	7,520,052 B2 * 4/2009 Takahashi H01L 21/561 29/841
7,009,233	B2 *	3/2006	Uchiyama	.....	H01L 21/30625 257/296	7,530,495 B2 * 5/2009 Cooper G06K 19/06 235/380
7,019,981	B2 *	3/2006	Heinemann	.....	G06K 19/07745 361/737	7,552,876 B2 * 6/2009 Nishizawa G06K 19/07732 235/492
						7,554,139 B2 * 6/2009 Inoue H01L 21/02381 257/288
						7,559,469 B2 * 7/2009 Noda G06K 7/0021 235/441

(56)	References Cited					
	U.S. PATENT DOCUMENTS					
7,577,846	B2 *	8/2009	Kudelski	.....	H04N 7/163	8,064,205 B2 * 11/2011 Farhan H01R 27/00
					380/241	361/737
7,605,453	B2 *	10/2009	Stampka	.....	G06K 19/07728	8,079,528 B2 * 12/2011 Song G06K 19/07
					257/678	235/492
7,615,858	B2 *	11/2009	Eun	.....	H01L 23/5387	8,093,502 B2 * 1/2012 Mikado H05K 3/4691
					257/686	174/255
7,616,015	B2 *	11/2009	Lee	.....	G01R 3/00	8,141,780 B2 * 3/2012 Lawson G06K 7/083
					324/756.03	235/454
7,618,849	B2 *	11/2009	Khan	.....	H01L 21/56	8,181,879 B2 * 5/2012 Landau B65D 81/05
					257/675	235/487
7,630,203	B1 *	12/2009	Chen	.....	G06K 19/077	8,226,013 B2 * 7/2012 Phillips G06Q 20/3672
					235/492	235/486
7,647,641	B2 *	1/2010	Dubroecq	.....	H04N 21/63345	D667,442 S * 9/2012 Phelan D14/492
					726/27	D667,495 S * 9/2012 Bender D19/10
7,659,606	B2 *	2/2010	Klatt	.....	H05K 5/0269	8,256,667 B2 * 9/2012 Poznansky G06K 19/12
					257/679	235/380
7,673,805	B2 *	3/2010	Onishi	.....	G06K 19/07	D669,478 S * 10/2012 Lepp D14/436
					235/486	D669,479 S * 10/2012 Lepp D14/436
D615,506	S *	5/2010	Eide	.....	D13/182	8,317,103 B1 * 11/2012 Foo G06K 19/06187
7,728,422	B2 *	6/2010	Kim	.....	H01L 23/49855	235/449
					257/698	8,349,709 B2 * 1/2013 Inoue G06F 30/398
7,745,943	B2 *	6/2010	Haba	.....	H01L 23/3128	438/460
					257/786	8,350,158 B2 * 1/2013 Chung H05K 1/0216
7,750,464	B2 *	7/2010	Yoshikawa	.....	H01L 23/5386	174/254
					257/723	8,353,728 B2 * 1/2013 Wang H01R 12/721
7,772,686	B2 *	8/2010	Ye	.....	G11C 29/48	439/637
					257/686	8,384,211 B2 * 2/2013 Soeno H01L 23/473
7,784,693	B2 *	8/2010	Liao	.....	G06K 19/077	257/707
					235/451	D681,640 S * 5/2013 Aoki D14/436
7,793,848	B2 *	9/2010	Abe	.....	H01L 27/10	8,448,102 B2 * 5/2013 Kornachuk G06F 30/39
					235/492	716/55
7,808,788	B2 *	10/2010	Gertiser	.....	H05K 1/0206	8,449,783 B2 * 5/2013 Watanabe B41J 2/1631
					361/709	216/27
7,810,718	B2 *	10/2010	Bonneau, Jr.	.....	G06K 19/044	8,451,122 B2 * 5/2013 Narendra H04B 1/3816
					235/380	340/572.1
7,828,207	B2 *	11/2010	Cooper	.....	G06K 19/06	8,453,094 B2 * 5/2013 Kornachuk H01L 23/498
					235/380	716/126
7,864,540	B2 *	1/2011	Takiar	.....	H01L 24/97	8,456,850 B2 * 6/2013 Kang G06K 19/07743
					361/737	361/737
7,871,007	B2 *	1/2011	Amiot	.....	G06K 19/07745	8,456,852 B2 * 6/2013 Xiao H05K 5/0282
					235/486	361/752
7,871,011	B2 *	1/2011	Reignoux	.....	G06K 19/077	8,469,271 B2 * 6/2013 DePaula G06K 19/07732
					235/492	235/435
7,872,979	B1 *	1/2011	Liu	.....	H04L 12/40006	D685,375 S * 7/2013 Steinberger D14/436
					370/246	D686,214 S * 7/2013 Maus D14/436
7,880,286	B2 *	2/2011	Lee	.....	H01L 23/3677	8,480,002 B2 * 7/2013 Poidomani G06K 19/07722
					257/691	235/492
7,903,422	B2 *	3/2011	Watanabe	.....	H05K 1/0207	8,490,127 B2 * 7/2013 Vantalou H04N 21/6125
					361/719	725/31
7,913,916	B2 *	3/2011	Musial	.....	G06K 19/07309	8,500,019 B2 * 8/2013 Poidomani G06K 19/077
					235/492	235/449
7,922,097	B2 *	4/2011	Yoshikawa	.....	H01Q 1/243	8,505,064 B2 * 8/2013 Hildebrand H04N 21/64322
					235/492	725/152
7,925,016	B2 *	4/2011	Candelore	.....	H04N 7/167	8,523,071 B2 * 9/2013 DePaula G06K 19/041
					380/200	235/435
D638,810	S *	5/2011	Morikawa	.....	D13/180	D691,101 S * 10/2013 Ishizawa D13/182
7,944,058	B2 *	5/2011	Ishihara	.....	H01L 25/0652	8,550,362 B2 * 10/2013 Cowcher G06F 9/4406
					257/780	235/492
7,954,705	B2 *	6/2011	Mullen	.....	G06Q 20/3674	8,582,308 B2 * 11/2013 Sugimoto H05K 3/284
					235/380	361/737
7,967,214	B2 *	6/2011	Landau	.....	G06K 19/077	8,588,561 B2 * 11/2013 Zbinden H05K 7/20418
					235/492	385/14
D643,040	S *	8/2011	Sedio	.....	D14/436	D695,636 S * 12/2013 Mullen D10/10
8,009,432	B2 *	8/2011	Su	.....	H05K 3/00	8,608,082 B2 * 12/2013 Le Garrec G06K 19/07756
					361/752	235/492
8,022,526	B2 *	9/2011	Chall	.....	G06F 1/3203	8,618,669 B2 * 12/2013 Furuta H01L 23/5389
					257/686	257/777
8,030,746	B2 *	10/2011	Tan	.....	G06K 19/07769	D699,201 S * 2/2014 Petsch D13/182
					257/686	8,647,110 B2 * 2/2014 Choi H01L 21/02
8,061,625	B2 *	11/2011	Yu	.....	G06K 19/077	425/577
					235/492	8,649,820 B2 * 2/2014 Schwandt G06K 19/07732
						455/557
						8,654,535 B2 * 2/2014 Lin G06K 19/07741
						361/737
						8,658,542 B2 * 2/2014 Smayling H01L 21/027
						438/725

(56)

References Cited

U.S. PATENT DOCUMENTS

8,679,729	B2 *	3/2014	Lee	.....	G03F 1/38	430/319	2001/0043075	A1 *	11/2001	Suzuki	.....	G01R 1/07371	324/762.05
D701,864	S *	4/2014	Lepp	.....	D14/436		2001/0050846	A1 *	12/2001	Cho	.....	H05K 3/0052	361/784
D702,240	S *	4/2014	Lepp	.....	D14/436		2002/0003168	A1 *	1/2002	Takabayashi	.....	G06K 19/0723	235/492
D702,241	S *	4/2014	Lepp	.....	D14/436		2002/0045106	A1 *	4/2002	Baselmans	.....	G03F 1/36	430/5
D703,208	S *	4/2014	Lepp	.....	D14/436		2002/0137502	A1 *	9/2002	Cronin	.....	H04L 67/34	455/419
8,684,267	B2 *	4/2014	Foo	.....	G06K 19/07722	235/449	2002/0145049	A1 *	10/2002	Lasch	.....	B42D 25/369	235/488
8,690,283	B2 *	4/2014	Pomerantz	.....	B41J 3/407	347/14	2002/0186542	A1 *	12/2002	Choi	.....	H01L 23/3677	361/719
8,700,833	B2 *	4/2014	Cedar	.....	G06F 13/385	710/104	2003/0002577	A1 *	1/2003	Pinder	.....	H04N 21/4622	375/240.01
8,707,237	B2 *	4/2014	Chen	.....	G06F 30/398	716/123	2003/0057537	A1 *	3/2003	Iwasaki	.....	H01L 24/81	257/684
8,730,009	B2 *	5/2014	Barry	.....	G06F 21/34	340/5.84	2003/0058311	A1 *	3/2003	Chen	.....	H05K 1/0266	347/86
D707,682	S *	6/2014	Florek	.....	D14/436		2003/0059047	A1 *	3/2003	Iwamura	.....	H04N 21/440281	380/201
8,746,579	B1 *	6/2014	Cloutier	.....	G06K 19/06206	235/492	2003/0085287	A1 *	5/2003	Gray	.....	G06K 19/072	235/492
8,794,520	B2 *	8/2014	Wang	.....	G06K 7/10752	235/454	2003/0091160	A1 *	5/2003	Enbom	.....	H04L 65/604	379/67.1
8,814,053	B2 *	8/2014	Narendra	.....	G06Q 20/204	235/492	2003/0099118	A1 *	5/2003	Saitoh	.....	G02B 6/0016	362/561
8,826,086	B2 *	9/2014	Hook	.....	G11C 29/56016	714/718	2003/0132284	A1 *	7/2003	Reynolds	.....	G06Q 20/341	235/380
8,936,199	B2 *	1/2015	Lepp	.....	G06K 19/0772	235/492	2003/0153356	A1 *	8/2003	Liu	.....	G06K 7/10237	455/558
8,947,883	B2 *	2/2015	Upadhyayula	...	G06K 19/07735	361/737	2003/0163508	A1 *	8/2003	Goodman	.....	G06F 8/656	718/100
D727,861	S *	4/2015	Tang	.....	D13/182		2003/0169575	A1 *	9/2003	Ikuta	.....	H01L 23/5389	361/761
9,009,633	B2 *	4/2015	Wu	.....	G06F 30/398	716/53	2003/0179910	A1 *	9/2003	Wong	.....	G07C 9/257	382/115
D729,808	S *	5/2015	Beals	.....	D14/436		2003/0194091	A1 *	10/2003	Wajs	.....	H04L 9/0833	380/278
D730,304	S *	5/2015	Matsumoto	.....	D13/182		2003/0213849	A1 *	11/2003	Luu	.....	G06K 19/07739	235/492
9,047,547	B2 *	6/2015	Okada	.....	G06K 19/07743		2003/0224553	A1 *	12/2003	Manansala	.....	H01L 23/4985	438/106
9,049,811	B2 *	6/2015	Subat	.....	H05K 7/20445		2004/0001591	A1 *	1/2004	Mani	.....	H04N 21/4147	380/210
9,054,094	B2 *	6/2015	Anthony	.....	H01L 23/49827		2004/0009409	A1 *	1/2004	Hwang	.....	G03F 1/36	430/5
9,064,195	B2 *	6/2015	Hartwick	.....	B32B 27/06		2004/0016804	A1 *	1/2004	Namaky	.....	G07C 5/0816	235/435
9,101,048	B2 *	8/2015	Nakanishi	.....	H05K 1/0201		2004/0066693	A1 *	4/2004	Osako	.....	H05K 3/284	365/222
9,136,212	B2 *	9/2015	Kato	.....	H01L 23/49822		2004/0096911	A1 *	5/2004	Siniaguine	.....	G01N 21/21	435/7.1
9,170,482	B2 *	10/2015	Landis	.....	G03F 1/36		2004/0111693	A1 *	6/2004	Lin	.....	G06F 30/398	716/52
9,197,218	B2 *	11/2015	Kondo	.....	H03L 1/04		2004/0124246	A1 *	7/2004	Allen	.....	G07F 7/1008	235/492
9,258,897	B2 *	2/2016	Ishihara	.....	H05K 1/183		2004/0129785	A1 *	7/2004	Luu	.....	G06K 7/0034	235/486
9,265,148	B2 *	2/2016	Lassmann	.....	H05K 1/115		2004/0133787	A1 *	7/2004	Doughty	.....	G06Q 20/4014	713/186
9,291,889	B2 *	3/2016	Yoshioka	.....	G03F 1/38		2004/0135645	A1 *	7/2004	Koyama	.....	H03H 9/1014	331/158
D754,083	S *	4/2016	Vinciarelli	.....	D13/182		2004/0139412	A1 *	7/2004	Ito	.....	G06F 30/39	716/55
9,330,992	B2 *	5/2016	Nakagawa	.....	H01L 23/49838		2004/0143716	A1 *	7/2004	Hong	.....	G06F 13/385	711/170
D758,372	S *	6/2016	Beals	.....	D14/436		2004/0152392	A1 *	8/2004	Nakamura	.....	H01L 51/5246	445/25
D759,022	S *	6/2016	Beals	.....	D14/436		2004/0155715	A1 *	8/2004	Nakamura	.....	H03B 5/04	331/158
9,455,517	B2 *	9/2016	Babu	.....	H01R 24/64		2004/0171192	A1 *	9/2004	Morimura	.....	G06K 19/077	438/113
D780,184	S *	2/2017	Beals	.....	D14/436		2004/0181800	A1 *	9/2004	Rakib	.....	H04L 9/0894	725/25
D792,411	S *	7/2017	Beals	.....	D14/436								
9,769,521	B2 *	9/2017	Beals	.....	H04N 21/44004								
9,774,908	B2 *	9/2017	Beals	.....	H04N 21/44004								
D810,195	S *	2/2018	Yoo	.....	D19/9								
9,888,283	B2 *	2/2018	Beals	.....	H04N 21/4367								
10,070,176	B2 *	9/2018	Beals	.....	H04N 21/4367								
D840,404	S *	2/2019	Beals	.....	D14/436								
10,382,816	B2 *	8/2019	Beals	.....	H04N 21/4181								
D864,968	S *	10/2019	Beals	.....	D14/436								
10,670,176	B2 *	6/2020	Byrne	.....	F04B 11/0008								
D930,000	S *	9/2021	Yang	.....	D14/436								
D930,001	S *	9/2021	Yang	.....	D14/437								
2001/0011944	A1 *	8/2001	Garrido-Gadea	....	G06Q 20/341	340/5.86	2001/0043075	A1 *	11/2001	Suzuki	.....	G01R 1/07371	324/762.05
2001/0011962	A1 *	8/2001	Fletout	.....	G06K 19/07745	343/767	2001/0050846	A1 *	12/2001	Cho	.....	H05K 3/0052	361/784
2001/0012366	A1 *	8/2001	Van Rijnsoever	.....	H04N 21/4623	380/241	2002/0003168	A1 *	1/2002	Takabayashi	.....	G06K 19/0723	235/492
2001/0018984	A1 *	9/2001	Takeda	.....	G06K 19/07739	174/256	2002/0045106	A1 *	4/2002	Baselmans	.....	G03F 1/36	430/5

(56)

References Cited

U.S. PATENT DOCUMENTS

2004/0185763	A1 *	9/2004	Ishizaki	B24D 18/00 451/541	2006/0286847	A1 *	12/2006	Zuo	H04B 1/3816 439/331
2004/0229135	A1 *	11/2004	Wang	G03F 7/70466 430/5	2007/0018313	A1 *	1/2007	Gomyo	H01L 21/568 257/723
2004/0238210	A1 *	12/2004	Droz	G06K 19/07749 174/258	2007/0028260	A1 *	2/2007	Williams	H04N 21/4433 725/31
2004/0245891	A1 *	12/2004	Kawachi	H03H 9/02921 310/313 R	2007/0033606	A1 *	2/2007	Yamada	G11B 23/0316 720/725
2004/0256150	A1 *	12/2004	Barchmann	H05K 3/0097 174/266	2007/0035002	A1 *	2/2007	Moto	H01L 24/743 257/686
2004/0260823	A1 *	12/2004	Tiwari	H04L 29/06027 709/230	2007/0035031	A1 *	2/2007	Jessen	G03F 1/36 257/774
2005/0005287	A1 *	1/2005	Claussen	H04N 7/1675 725/31	2007/0042613	A1 *	2/2007	Yoda	B41J 2/161 439/34
2005/0011671	A1 *	1/2005	Takiar	G06K 19/077 174/256	2007/0060198	A1 *	3/2007	Kuo	H04M 1/0202 455/558
2005/0017336	A1 *	1/2005	Kung	H01L 25/0652 257/685	2007/0067820	A1 *	3/2007	Cha	H04N 21/4424 725/151
2005/0023361	A1 *	2/2005	Ikefuji	G07F 7/1008 235/492	2007/0085187	A1 *	4/2007	Sun	H01L 23/5389 257/686
2005/0033688	A1 *	2/2005	Peart	G06Q 20/20 705/39	2007/0090534	A1 *	4/2007	Iwasaki	H05K 1/181 257/777
2005/0048695	A1 *	3/2005	Chia	H01L 25/0655 438/106	2007/0117550	A1 *	5/2007	Boris	H04M 15/30 455/414.1
2005/0061884	A1 *	3/2005	Stewart	G06K 13/08 235/441	2007/0121008	A1 *	5/2007	Kanoh	H04N 21/4305 348/537
2005/0076321	A1 *	4/2005	Smith	G03F 1/36 716/53	2007/0125855	A1 *	6/2007	Jiang	H01R 13/2442 235/441
2005/0111280	A1 *	5/2005	Takiar	G06K 19/07732 365/222	2007/0127185	A1 *	6/2007	Watanabe	G06K 19/0701 361/143
2005/0148121	A1 *	7/2005	Yamazaki	G06K 19/07745 438/149	2007/0138301	A1 *	6/2007	Cinkler	G06K 19/07743 235/492
2005/0191787	A1 *	9/2005	Bolken	H01L 24/97 438/106	2007/0145133	A1 *	6/2007	Jolivet	G06K 19/07733 235/441
2005/0197169	A1 *	9/2005	Son	H04B 1/3816 455/572	2007/0146542	A1 *	6/2007	Strasser	H04N 21/4181 348/462
2005/0212657	A1 *	9/2005	Simon	G06F 21/32 340/5.74	2007/0153487	A1 *	7/2007	Frallicciardi	G06K 19/07743 361/737
2005/0212690	A1 *	9/2005	Nishikawa	G06K 19/07732 340/932.2	2007/0176622	A1 *	8/2007	Yamazaki	H01L 27/1266 257/679
2005/0230853	A1 *	10/2005	Yoshikawa	H01L 24/83 257/81	2007/0228536	A1 *	10/2007	Aoki	H01L 23/49855 257/678
2005/0231921	A1 *	10/2005	Noda	G06K 7/0021 361/737	2007/0235545	A1 *	10/2007	Martinez	G06K 19/07739 235/486
2005/0247784	A1 *	11/2005	Klatt	G06K 19/07741 235/441	2007/0237243	A1 *	10/2007	Fagan	H04L 25/4904 375/257
2005/0252978	A1 *	11/2005	Nishizawa	G06K 19/077 235/492	2007/0241201	A1 *	10/2007	Brown	G07F 7/1016 235/493
2006/0026295	A1 *	2/2006	Iwamura	H04L 47/10 709/233	2007/0243661	A1 *	10/2007	Jackson	H01L 23/5389 438/106
2006/0040189	A1 *	2/2006	Yang	G03F 1/36 430/5	2007/0246536	A1 *	10/2007	Tuin	G06K 7/0021 235/441
2006/0043202	A1 *	3/2006	Kim	G06K 19/07733 235/492	2007/0250872	A1 *	10/2007	Dua	H04N 21/43635 725/81
2006/0058065	A1 *	3/2006	Shen	H04M 1/275 455/558	2007/0262156	A1 *	11/2007	Chen	H04W 88/02 235/492
2006/0059391	A1 *	3/2006	Park	H04N 21/418 714/48	2007/0266182	A1 *	11/2007	Lanning	H04L 12/40032 710/1
2006/0072293	A1 *	4/2006	Peele	H01R 24/58 361/733	2008/0012860	A1 *	1/2008	Klefenz	G06K 9/0061 345/441
2006/0112197	A1 *	5/2006	Yao	G06F 13/409 710/15	2008/0020800	A1 *	1/2008	Xu	G06K 7/0021 455/558
2006/0131396	A1 *	6/2006	Blossom	G06Q 20/3572 235/380	2008/0041952	A1 *	2/2008	Kang	G06K 19/07743 235/441
2006/0133051	A1 *	6/2006	Calvas	G06K 7/0021 361/752	2008/0062066	A1 *	3/2008	Arai	H01Q 21/29 343/867
2006/0155913	A1 *	7/2006	Nishikawa	G06K 19/07741 711/100	2008/0079565	A1 *	4/2008	Koyama	H01L 23/60 340/539.12
2006/0208077	A1 *	9/2006	Hirata	G06K 7/0021 235/441	2008/0083831	A1 *	4/2008	Perez Lafuente	G06K 19/07739 235/492
2006/0283946	A1 *	12/2006	Riester	G06K 13/08 235/441	2008/0094788	A1 *	4/2008	Choe	G06K 19/07 361/679.02
					2008/0096317	A1 *	4/2008	Middlekauff	H05K 1/0268 438/110

(56)

References Cited

U.S. PATENT DOCUMENTS

2012/0007096	A1*	1/2012	Yamazaki	.....	G06K 19/0728	257/72
2012/0018522	A1*	1/2012	Le Garrec	.....	G06K 19/07749	235/492
2012/0048948	A1*	3/2012	Bertin	.....	G06K 19/07743	235/492
2012/0079692	A1*	4/2012	Sinha	.....	H03H 9/205	29/25.35
2012/0138690	A1*	6/2012	Bosquet	.....	G06K 19/07745	235/492
2012/0140420	A1*	6/2012	Soyano	.....	H01L 23/3736	361/715
2012/0168517	A1*	7/2012	Lee	.....	H01Q 1/243	235/492
2012/0193435	A1*	8/2012	Hanaoka	.....	H01Q 9/0407	235/492
2012/0200366	A1*	8/2012	Nishiyama	.....	H03H 9/13	331/158
2012/0231650	A1*	9/2012	Tian	.....	G06K 7/0021	439/374
2012/0248201	A1*	10/2012	Sutera	.....	G06K 19/07728	235/492
2012/0267438	A1*	10/2012	Kato	.....	G06K 19/07756	235/492
2012/0289196	A1*	11/2012	Tan	.....	G06K 19/07739	455/411
2012/0292395	A1*	11/2012	Huang	.....	G07F 7/1008	235/492
2012/0299444	A1*	11/2012	Yokoyama	.....	H03H 9/13	310/326
2013/0008968	A1*	1/2013	Launay	.....	G06K 19/073	235/492
2013/0015441	A1*	1/2013	Takayama	.....	G06K 19/077	257/49
2013/0099118	A1*	4/2013	Tomioaka	.....	G01J 3/42	250/332
2013/0112757	A1*	5/2013	Lee	.....	G06K 19/07707	235/492
2013/0126622	A1*	5/2013	Finn	.....	G06K 19/07794	235/492
2013/0134227	A1*	5/2013	De Maquille	....	G06K 19/07784	235/492
2013/0161390	A1*	6/2013	Rodriquez	.....	G06K 19/07743	235/441
2013/0168454	A1*	7/2013	Oh	.....	B42D 15/022	235/492
2013/0175346	A1*	7/2013	Jenni	.....	G06K 19/077	235/492
2013/0185566	A1*	7/2013	Pang	.....	H04W 12/106	713/180
2013/0193534	A1*	8/2013	Nakatani	.....	G01L 1/148	257/417
2013/0207781	A1*	8/2013	Pagani	.....	G06K 19/025	340/10.1
2013/0219097	A1*	8/2013	Wang	.....	G06F 1/185	710/301
2013/0222484	A1*	8/2013	Yokoyama	.....	B41J 2/1628	347/70
2013/0254445	A1*	9/2013	Burns	.....	H05K 5/0265	710/301
2013/0277434	A1*	10/2013	Lin	.....	G06F 21/77	235/492
2013/0286603	A1*	10/2013	Okada	.....	G11C 5/02	361/746
2013/0287267	A1*	10/2013	Varone	.....	G06K 19/145	382/115
2013/0320088	A1*	12/2013	Lin	.....	G06K 7/10336	235/441
2013/0334320	A1*	12/2013	Thill	.....	G06K 19/073	235/492
2014/0021264	A1*	1/2014	Pueschner	.....	H01L 23/49811	235/492
2014/0042230	A1*	2/2014	Pueschner	.....	H01Q 23/00	235/492
2014/0061316	A1*	3/2014	Narayanaswami	.....	G06K 19/06075	235/492
2014/0158340	A1*	6/2014	Dixler	.....	F28D 20/02	165/287
2014/0166759	A1*	6/2014	Liu	.....	G06K 7/1098	235/462.21
2014/0193988	A1*	7/2014	Ma	.....	H05K 7/00	439/83
2014/0253767	A1*	9/2014	Kato	.....	H01L 27/14621	348/280
2014/0256069	A1*	9/2014	Kishimoto	.....	B41J 2/1628	438/21
2014/0264029	A1*	9/2014	Tomioaka	.....	G01J 3/42	250/338.3
2014/0282685	A1*	9/2014	Beals	.....	H04N 21/835	725/31
2014/0292941	A1*	10/2014	Kobayashi	.....	B41J 2/1634	347/68
2014/0299667	A1*	10/2014	Baek	.....	G06K 19/07771	235/492
2014/0304445	A1*	10/2014	Gervasi	.....	G06F 13/4068	710/301
2014/0313261	A1*	10/2014	Nagai	.....	B41J 2/1404	347/40
2014/0328023	A1*	11/2014	Choi	.....	H01L 23/552	361/715
2015/0016607	A1*	1/2015	Beals	.....	H04N 21/4367	380/211
2015/0049142	A1*	2/2015	Hager	.....	B41J 2/1404	347/60
2015/0092357	A1*	4/2015	Yoshikawa	.....	H05K 3/4007	361/746
2015/0113585	A1*	4/2015	Beals	.....	H04N 21/4367	725/119
2015/0143105	A1*	5/2015	Perrine	.....	H04N 21/64715	713/153
2015/0147914	A1*	5/2015	Gao	.....	H01R 12/716	439/638
2015/0178584	A1*	6/2015	Aller	.....	G06K 9/62	382/165
2015/0320506	A1*	11/2015	Sayles	.....	A61B 90/98	235/385
2015/0366061	A1*	12/2015	Noda	.....	H05K 3/4697	361/803
2016/0132761	A1*	5/2016	Hanmer	.....	G06K 19/0716	235/492
2016/0140433	A1*	5/2016	Padilla Alcaide	....	H01L 23/544	235/492
2016/0157346	A1*	6/2016	Wu	.....	H05K 1/112	174/251
2016/0165731	A1*	6/2016	Hurwitz	.....	H05K 1/09	361/761
2016/0241287	A1*	8/2016	Stein	.....	H04B 1/3818	
2018/0204105	A1*	7/2018	Herslow	.....	G06K 19/07722	

* cited by examiner

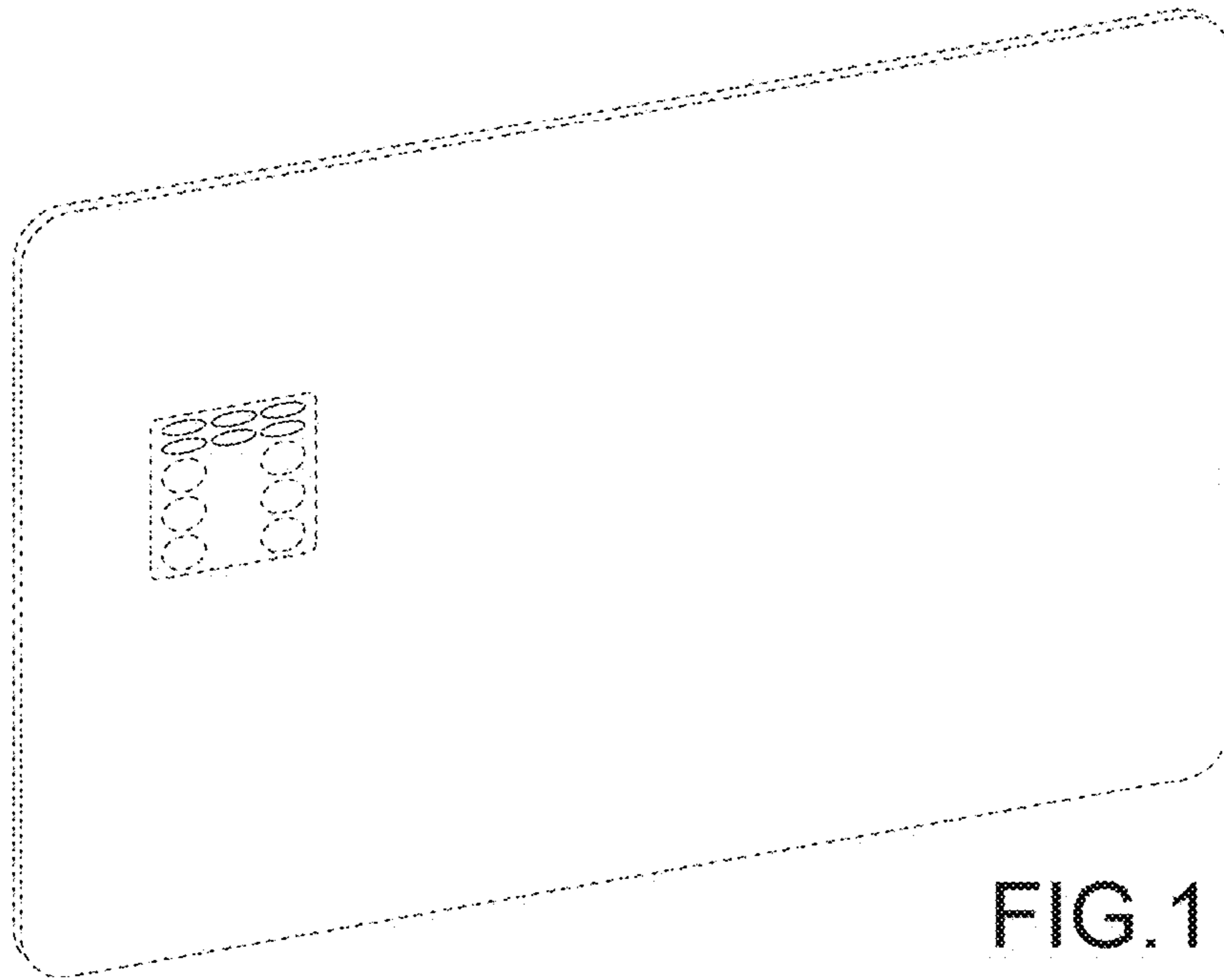


FIG.1

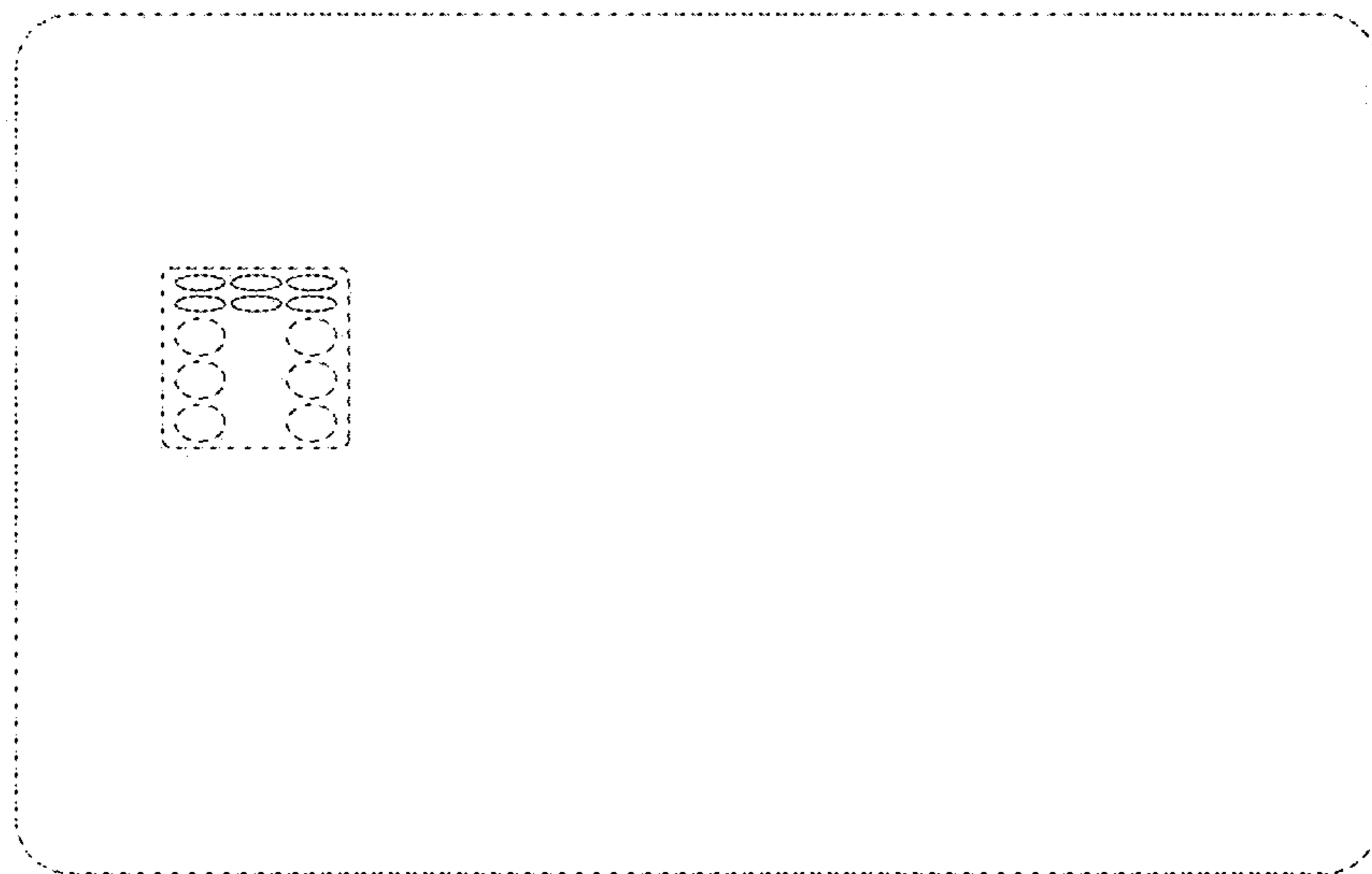


FIG.2

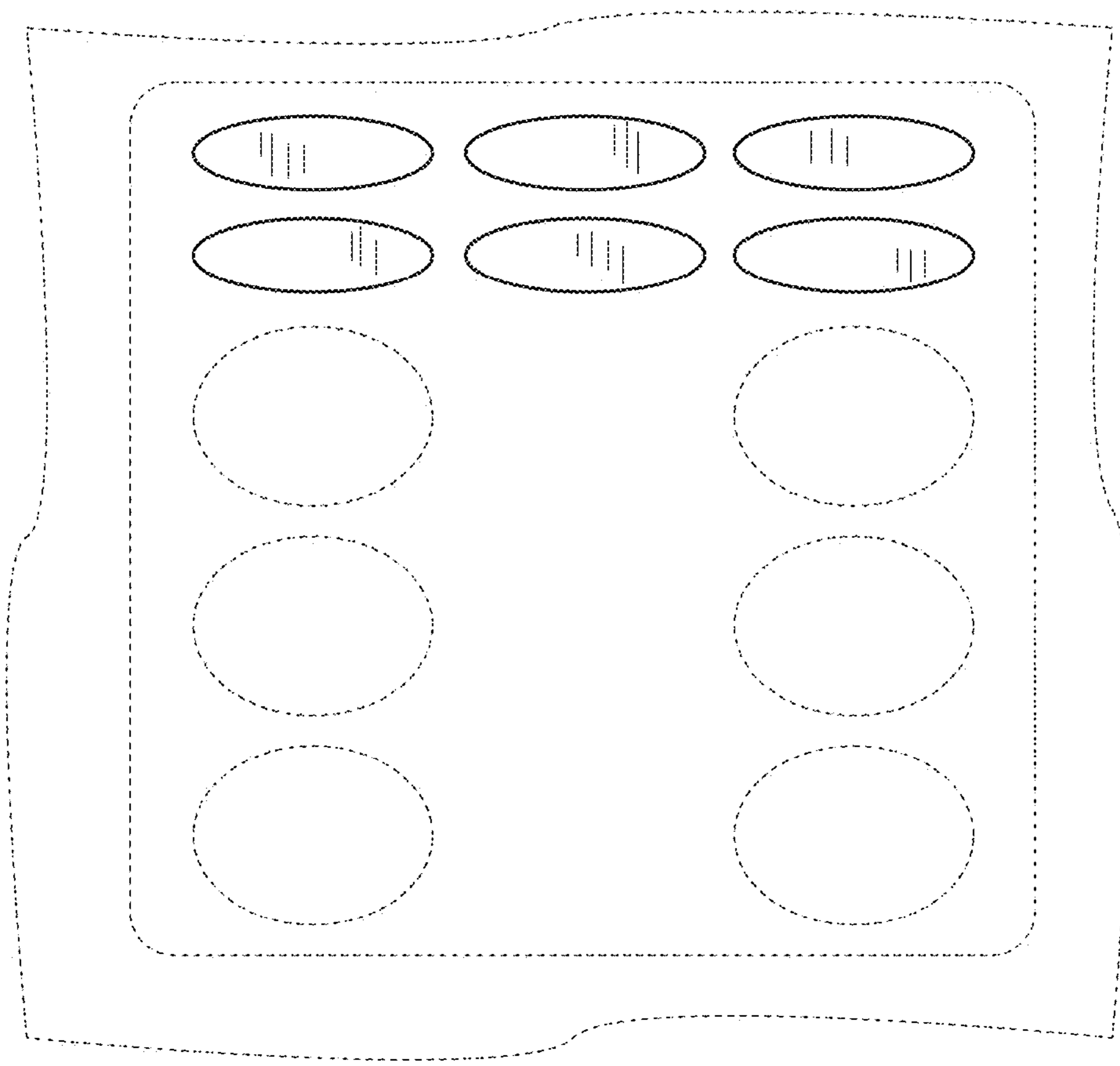


FIG. 3