



US00D792400S

(12) **United States Design Patent**
Osterhout

(10) **Patent No.:** **US D792,400 S**
(45) **Date of Patent:** **** Jul. 18, 2017**

- (54) **COMPUTER GLASSES**
- (71) Applicant: **Osterhout Group, Inc.**, San Francisco, CA (US)
- (72) Inventor: **Ralph F. Osterhout**, San Francisco, CA (US)
- (73) Assignee: **Osterhout Group, Inc.**, San Francisco, CA (US)

- 4,145,125 A 3/1979 Chika
- 4,668,155 A 5/1987 Kaufmann et al.
- 4,788,535 A 11/1988 Chikara et al.
- 4,811,739 A 3/1989 Silver et al.
- 4,852,988 A 8/1989 Velez et al.
- 4,928,301 A 5/1990 Smoot
- D327,674 S 7/1992 Kuo
- 5,151,722 A 9/1992 Massof et al.

(Continued)

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

(21) Appl. No.: **29/553,028**

(22) Filed: **Jan. 28, 2016**

Related U.S. Application Data

(63) Continuation of application No. 29/513,496, filed on Dec. 31, 2014, now Pat. No. Des. 751,552.

(51) **LOC (10) Cl.** **14-02**

(52) **U.S. Cl.**
USPC **D14/372**

(58) **Field of Classification Search**

USPC D14/372, 496, 432, 371, 125, 126, 129, D14/299; D16/300-342; 351/158, 153, 351/144; 345/7-9, 905; 455/344; 348/115, 53, 121, 739

CPC G02B 27/017; G02B 27/0158; G02B 27/0161; G02B 27/0181; G02B 27/0185; G02B 27/0189

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 1,897,833 A 2/1933 Benway
- 2,064,604 A 12/1936 Paul
- 3,305,294 A 2/1967 Alvarez
- 3,531,190 A 9/1970 Leblanc
- 3,671,111 A 6/1972 Okner
- 4,034,401 A 7/1977 Mann

FOREIGN PATENT DOCUMENTS

- EP 368898 A1 5/1990
- EP 777867 A1 6/1997

(Continued)

OTHER PUBLICATIONS

US 8,743,465, 06/2014, Totani et al. (withdrawn)

(Continued)

Primary Examiner — Austin Murphy

(74) *Attorney, Agent, or Firm* — GTC Law Group PC & Affiliates

(57) **CLAIM**

The ornamental design for computer glasses, as shown and described.

DESCRIPTION

FIG. 1 is a front top perspective view of an embodiment of the new design;

FIG. 2 is a front view thereof;

FIG. 3 is a rear view thereof;

FIG. 4 is a side view thereof;

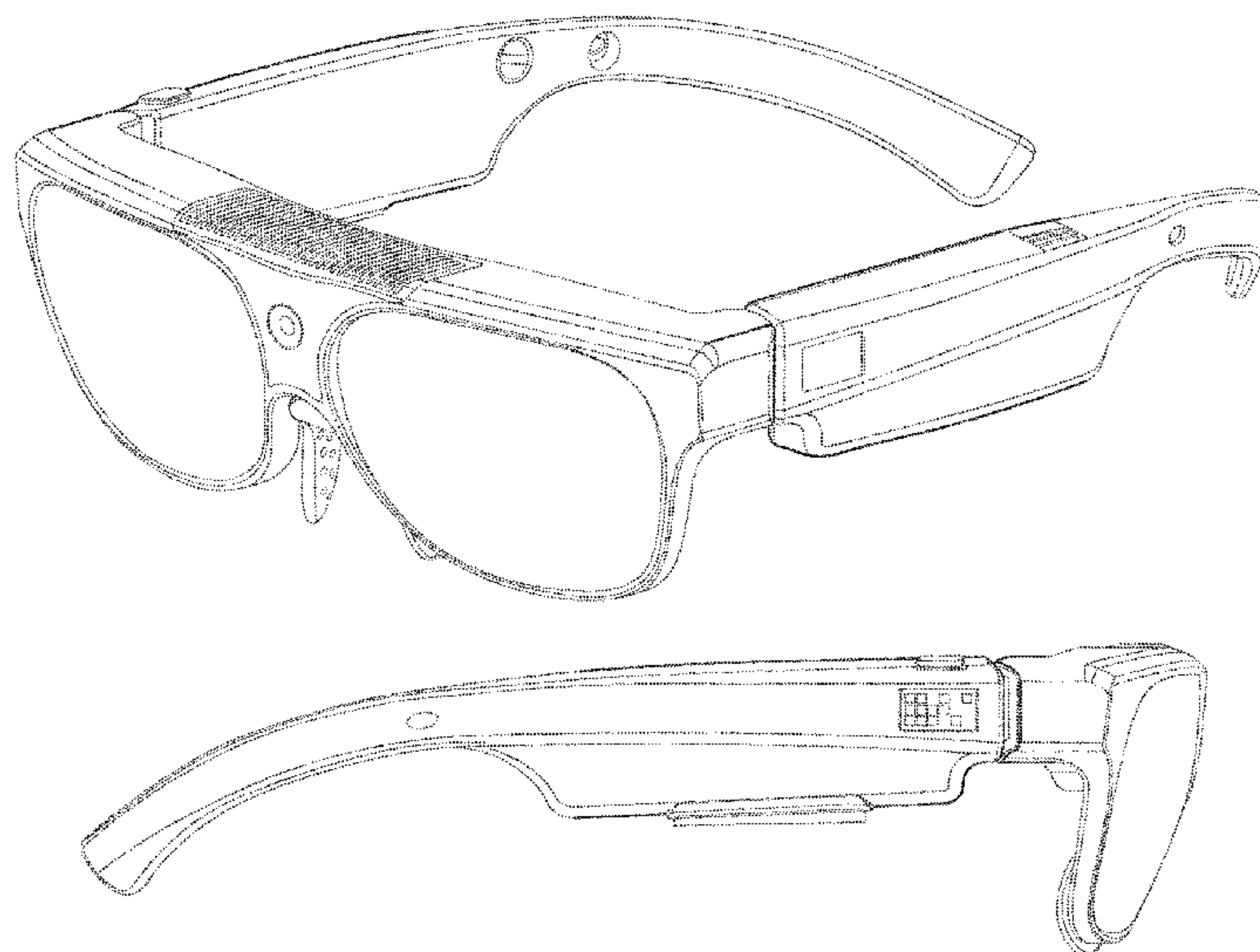
FIG. 5 is a side view thereof;

FIG. 6 is a top view thereof; and,

FIG. 7 is a bottom view thereof.

The broken lines in FIGS. 1-7 are for environmental purposes only and form no part of the claimed design.

1 Claim, 5 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

| | | | | | | |
|--------------|---------|-------------------|--------------|---------|----------------------|--|
| 5,257,094 A | 10/1993 | LaRussa et al. | 7,457,040 B2 | 11/2008 | Amitai | |
| D352,930 S | 11/1994 | Tsuji | 7,481,531 B2 | 1/2009 | Howell et al. | |
| 5,483,307 A | 1/1996 | Anderson | 7,500,747 B2 | 3/2009 | Howell et al. | |
| D375,748 S | 11/1996 | Hartman | 7,522,344 B1 | 4/2009 | Curatu et al. | |
| D376,790 S | 12/1996 | Goulet et al. | 7,542,210 B2 | 6/2009 | Chirieleison et al. | |
| 5,596,451 A | 1/1997 | Handschy et al. | 7,543,943 B1 | 6/2009 | Hubby et al. | |
| 5,621,424 A | 4/1997 | Shimada et al. | 7,646,540 B2 | 1/2010 | Dolgoff et al. | |
| 5,699,057 A | 12/1997 | Ikeda et al. | 7,677,723 B2 | 3/2010 | Howell et al. | |
| 5,699,194 A | 12/1997 | Takahashi | 7,690,799 B2 | 4/2010 | Nestorovic et al. | |
| 5,717,422 A | 2/1998 | Ferguson et al. | 7,728,799 B2 | 6/2010 | Kerr et al. | |
| D392,959 S | 3/1998 | Edwards | 7,733,571 B1 | 6/2010 | Li | |
| 5,729,242 A | 3/1998 | Margerum et al. | 7,771,046 B2 | 8/2010 | Howell et al. | |
| 5,767,841 A | 6/1998 | Hartman | 7,777,690 B2 | 8/2010 | Winsor et al. | |
| 5,788,195 A | 8/1998 | Rice | 7,777,723 B2 | 8/2010 | Namiki et al. | |
| 5,808,589 A | 9/1998 | Ferguson | 7,777,960 B2 | 8/2010 | Freeman | |
| 5,808,800 A | 9/1998 | Handschy et al. | 7,792,552 B2 | 9/2010 | Thomas et al. | |
| 5,808,802 A | 9/1998 | Hur | 7,806,525 B2 | 10/2010 | Howell et al. | |
| D410,638 S | 6/1999 | Sheehan et al. | 7,812,842 B2 | 10/2010 | Gordon et al. | |
| 5,914,818 A | 6/1999 | Tejada et al. | 7,813,743 B1 | 10/2010 | Loeb et al. | |
| 5,949,583 A | 9/1999 | Rallison et al. | 7,830,370 B2 | 11/2010 | Yamazaki et al. | |
| 5,991,084 A | 11/1999 | Hildebrand et al. | 7,850,301 B2 | 12/2010 | DiChiara et al. | |
| 6,028,608 A | 2/2000 | Jenkins | 7,855,743 B2 | 12/2010 | Sako et al. | |
| 6,034,653 A | 3/2000 | Robertson et al. | D631,881 S | 2/2011 | Quinn et al. | |
| 6,046,712 A | 4/2000 | Beller et al. | D631,882 S | 2/2011 | Odgers | |
| 6,147,805 A | 11/2000 | Ferguson | 7,928,926 B2 | 4/2011 | Yamamoto et al. | |
| 6,160,552 A | 12/2000 | Wilsher et al. | 8,004,765 B2 | 8/2011 | Amitai | |
| 6,160,666 A | 12/2000 | Rallison et al. | 8,018,579 B1 | 9/2011 | Krah et al. | |
| 6,195,136 B1 | 2/2001 | Handschy et al. | 8,079,713 B2 | 12/2011 | Ashkenazi et al. | |
| 6,204,974 B1 | 3/2001 | Spitzer | 8,092,007 B2 | 1/2012 | DiChiara et al. | |
| 6,222,677 B1 | 4/2001 | Budd | 8,166,421 B2 | 4/2012 | Magal et al. | |
| 6,297,749 B1 | 10/2001 | Smith et al. | 8,187,481 B1 | 5/2012 | Hobbs et al. | |
| D451,892 S | 12/2001 | Carrere | 8,212,859 B2 | 7/2012 | Tang et al. | |
| 6,347,764 B1 | 2/2002 | Brandon et al. | 8,228,315 B1 | 7/2012 | Starner et al. | |
| 6,359,723 B1 | 3/2002 | Handschy et al. | 8,235,529 B1 | 8/2012 | Raffle et al. | |
| 6,369,952 B1 | 4/2002 | Rallison et al. | 8,246,170 B2 | 8/2012 | Yamamoto et al. | |
| 6,379,009 B1 | 4/2002 | Ferguson | D669,066 S * | 10/2012 | Olsson D14/309 | |
| 6,384,982 B1 | 5/2002 | Spitzer | 8,337,013 B2 | 12/2012 | Howell et al. | |
| 6,392,656 B1 | 5/2002 | Someya et al. | 8,376,548 B2 | 2/2013 | Schultz | |
| D460,071 S | 7/2002 | Sheehan et al. | 8,378,924 B2 | 2/2013 | Jacobsen et al. | |
| 6,433,760 B1 | 8/2002 | Vaissie et al. | 8,384,999 B1 | 2/2013 | Crosby et al. | |
| 6,456,438 B1 | 9/2002 | Lee et al. | D680,112 S | 4/2013 | Monahan | |
| 6,461,000 B1 | 10/2002 | Magarill | D680,152 S * | 4/2013 | Olsson D16/309 | |
| 6,478,429 B1 | 11/2002 | Aritake et al. | 8,427,396 B1 | 4/2013 | Kim | |
| 6,480,174 B1 | 11/2002 | Kaufmann et al. | 8,430,507 B2 | 4/2013 | Howell et al. | |
| 6,491,389 B2 | 12/2002 | Yaguchi et al. | 8,434,863 B2 | 5/2013 | Howell et al. | |
| D470,144 S | 2/2003 | Li | D685,019 S * | 6/2013 | Li D16/309 | |
| 6,535,182 B2 | 3/2003 | Stanton | 8,467,133 B2 | 6/2013 | Miller et al. | |
| D473,871 S | 4/2003 | Santos | 8,472,120 B2 | 6/2013 | Border et al. | |
| 6,563,626 B1 | 5/2003 | Iwasaki et al. | 8,473,241 B2 | 6/2013 | Foxlin | |
| D478,052 S | 8/2003 | Thomas | 8,477,425 B2 | 7/2013 | Border et al. | |
| 6,642,945 B1 | 11/2003 | Sharpe et al. | 8,482,859 B2 | 7/2013 | Border et al. | |
| 6,747,611 B1 | 6/2004 | Budd et al. | 8,487,838 B2 | 7/2013 | Kipman et al. | |
| 6,771,294 B1 | 8/2004 | Pulli et al. | 8,488,246 B2 | 7/2013 | Border et al. | |
| 6,795,041 B2 | 9/2004 | Ogawa et al. | 8,489,326 B1 | 7/2013 | Na et al. | |
| 6,847,336 B1 | 1/2005 | Lemelson et al. | 8,494,215 B2 | 7/2013 | Kimchi et al. | |
| 6,906,836 B2 | 6/2005 | Parker et al. | 8,505,430 B2 | 8/2013 | Andryukov et al. | |
| D512,027 S | 11/2005 | Sarasjoki et al. | D689,862 S | 9/2013 | Liu | |
| D513,233 S | 12/2005 | Stauffer | 8,531,394 B2 | 9/2013 | Maltz et al. | |
| 6,987,787 B1 | 1/2006 | Mick | D690,684 S | 10/2013 | Lee et al. | |
| D514,525 S | 2/2006 | Stauffer | 8,553,910 B1 | 10/2013 | Dong et al. | |
| 7,003,308 B1 | 2/2006 | Fuoss et al. | 8,564,883 B2 | 10/2013 | Totani et al. | |
| 7,016,116 B2 | 3/2006 | Dolgoff et al. | 8,570,273 B1 | 10/2013 | Smith | |
| 7,030,925 B1 | 4/2006 | Tsunekawa et al. | 8,570,656 B1 | 10/2013 | Weissman et al. | |
| D521,493 S | 5/2006 | Wai | 8,576,276 B2 | 11/2013 | Bar-Zeev et al. | |
| 7,088,234 B2 | 8/2006 | Naito et al. | 8,576,491 B2 | 11/2013 | Takagi et al. | |
| D529,467 S | 10/2006 | Rose | 8,587,869 B2 | 11/2013 | Totani et al. | |
| D541,226 S | 4/2007 | Wakisaka et al. | 8,593,795 B1 | 11/2013 | Chi et al. | |
| 7,199,934 B2 | 4/2007 | Yamasaki | 8,594,467 B2 | 11/2013 | Lu et al. | |
| 7,206,134 B2 | 4/2007 | Weissman et al. | D696,668 S | 12/2013 | Chen et al. | |
| D559,793 S | 1/2008 | Fan | 8,611,015 B2 | 12/2013 | Wheeler et al. | |
| D571,816 S | 6/2008 | Corcoran et al. | 8,662,686 B2 | 3/2014 | Takagi et al. | |
| 7,380,936 B2 | 6/2008 | Howell et al. | 8,670,183 B2 | 3/2014 | Clavin et al. | |
| 7,401,918 B2 | 7/2008 | Howell et al. | 8,678,581 B2 | 3/2014 | Blum et al. | |
| 7,414,791 B2 | 8/2008 | Urakawa et al. | 8,698,157 B2 | 4/2014 | Hanamura | |
| 7,417,617 B2 | 8/2008 | Eichenlaub | 8,711,487 B2 | 4/2014 | Takeda et al. | |
| | | | 8,730,129 B2 | 5/2014 | Solomon et al. | |
| | | | 8,743,052 B1 | 6/2014 | Keller et al. | |
| | | | 8,745,058 B1 | 6/2014 | Garcia-Barrio | |
| | | | 8,750,541 B1 | 6/2014 | Dong et al. | |

(56)

References Cited

U.S. PATENT DOCUMENTS

| | | | | | |
|--------------|---------|-------------------------|-----------------|---------|--------------------------|
| 8,752,963 B2 | 6/2014 | McCulloch et al. | 9,299,194 B2 | 3/2016 | Border et al. |
| 8,760,765 B2 | 6/2014 | Gupta et al. | D753,114 S | 4/2016 | Osterhout |
| 8,767,306 B1 | 7/2014 | Miao et al. | 9,310,610 B2 | 4/2016 | Border |
| 8,770,742 B2 | 7/2014 | Howell et al. | 9,316,833 B2 | 4/2016 | Border et al. |
| 8,786,675 B2 | 7/2014 | Deering et al. | D756,363 S | 5/2016 | Mathis |
| 8,786,686 B1 | 7/2014 | Amirparviz | D757,006 S * | 5/2016 | Cazalet D14/372 |
| 8,787,006 B2 | 7/2014 | Golko et al. | D757,007 S * | 5/2016 | Cazalet D14/372 |
| 8,803,867 B2 | 8/2014 | Oikawa | 9,329,387 B2 | 5/2016 | Border et al. |
| 8,814,691 B2 | 8/2014 | Osterhout et al. | 9,354,445 B1 | 5/2016 | Weaver et al. |
| 8,823,071 B2 | 9/2014 | Oyamada | 9,366,867 B2 | 6/2016 | Border et al. |
| 8,824,779 B1 | 9/2014 | Smyth | 9,366,868 B2 | 6/2016 | Border et al. |
| 8,832,557 B2 | 9/2014 | Tang et al. | 9,377,625 B2 | 6/2016 | Border et al. |
| 8,836,768 B1 | 9/2014 | Zuccarino et al. | 9,400,233 B2 | 7/2016 | Lin et al. |
| 8,837,880 B2 | 9/2014 | Takeda et al. | 9,400,390 B2 | 7/2016 | Osterhout et al. |
| 8,854,433 B1 | 10/2014 | Rafii | 9,401,540 B2 | 7/2016 | Osterhout et al. |
| 8,854,735 B2 | 10/2014 | Totani et al. | 9,423,612 B2 | 8/2016 | Border et al. |
| 8,866,702 B1 | 10/2014 | Mirov et al. | 9,423,842 B2 | 8/2016 | Osterhout et al. |
| 8,866,849 B1 | 10/2014 | Chun et al. | 9,436,006 B2 | 9/2016 | Border |
| 8,867,139 B2 | 10/2014 | Gupta | 9,448,409 B2 | 9/2016 | Border et al. |
| D716,808 S * | 11/2014 | Yeom D14/372 | 9,494,800 B2 | 11/2016 | Border et al. |
| D716,813 S | 11/2014 | Deng | 9,523,856 B2 | 12/2016 | Osterhout et al. |
| 8,878,749 B1 | 11/2014 | Wu et al. | 9,529,192 B2 | 12/2016 | Border |
| 8,893,164 B1 | 11/2014 | Teller | 9,532,714 B2 | 1/2017 | Border et al. |
| D719,568 S * | 12/2014 | Heinrich D14/372 | 9,532,715 B2 | 1/2017 | Border et al. |
| D719,569 S | 12/2014 | Heinrich et al. | 2001/0019240 A1 | 9/2001 | Takahashi et al. |
| D719,570 S | 12/2014 | Heinrich et al. | 2001/0050817 A1 | 12/2001 | Travers et al. |
| 8,922,530 B2 | 12/2014 | Pance | 2002/0005108 A1 | 1/2002 | Ludwig et al. |
| 8,947,323 B1 | 2/2015 | Geiss et al. | 2002/0021498 A1 | 2/2002 | Ohtaka et al. |
| 8,948,935 B1 | 2/2015 | Peeters et al. | 2002/0085843 A1 | 7/2002 | Mann |
| 8,955,973 B2 | 2/2015 | Raffle et al. | 2002/0109903 A1 | 8/2002 | Kaeriyama et al. |
| 8,963,068 B2 | 2/2015 | Hagopian et al. | 2002/0148655 A1 | 10/2002 | Cho et al. |
| 8,964,298 B2 | 2/2015 | Haddick et al. | 2002/0149545 A1 | 10/2002 | Hanayama et al. |
| D724,083 S | 3/2015 | Olsson et al. | 2002/0181115 A1 | 12/2002 | Massof et al. |
| 8,970,495 B1 | 3/2015 | Weaver et al. | 2002/0183101 A1 | 12/2002 | Oh et al. |
| 8,971,023 B2 | 3/2015 | Olsson et al. | 2002/0191297 A1 | 12/2002 | Gleckman et al. |
| 8,982,014 B2 | 3/2015 | Evans et al. | 2003/0030597 A1 | 2/2003 | Geist |
| 8,982,471 B1 | 3/2015 | Starner et al. | 2003/0030912 A1 | 2/2003 | Gleckman et al. |
| D727,317 S * | 4/2015 | Olsson D14/372 | 2003/0151834 A1 | 8/2003 | Penn et al. |
| 9,020,832 B2 | 4/2015 | Fisher et al. | 2003/0209953 A1 | 11/2003 | Park et al. |
| D728,573 S | 5/2015 | Deng | 2003/0234823 A1 | 12/2003 | Sato et al. |
| 9,024,842 B1 | 5/2015 | Wheeler et al. | 2004/0008158 A1 | 1/2004 | Chi et al. |
| 9,031,273 B2 | 5/2015 | Dong et al. | 2004/0024287 A1 | 2/2004 | Patton et al. |
| 9,033,502 B2 | 5/2015 | Schmidt et al. | 2004/0027312 A1 | 2/2004 | Owada et al. |
| D732,025 S | 6/2015 | Heinrich et al. | 2004/0030448 A1 | 2/2004 | Solomon |
| 9,046,686 B2 | 6/2015 | Saito | 2004/0032392 A1 | 2/2004 | Chi et al. |
| 9,046,999 B1 | 6/2015 | King et al. | 2004/0066363 A1 | 4/2004 | Yamano et al. |
| 9,063,563 B1 | 6/2015 | Gray et al. | 2004/0066547 A1 | 4/2004 | Parker et al. |
| D733,709 S | 7/2015 | Kawai | 2004/0080541 A1 | 4/2004 | Saiga et al. |
| 9,076,368 B2 | 7/2015 | Evans et al. | 2004/0130522 A1 | 7/2004 | Lin et al. |
| 9,096,920 B1 | 8/2015 | Gomez | 2004/0132509 A1 | 7/2004 | Glezerman |
| 9,107,622 B2 | 8/2015 | Nistico et al. | 2004/0150631 A1 | 8/2004 | Fleck et al. |
| 9,116,337 B1 | 8/2015 | Miao | 2004/0194880 A1 | 10/2004 | Jiang et al. |
| D738,373 S * | 9/2015 | Davies D14/372 | 2004/0227994 A1 | 11/2004 | Ma et al. |
| 9,122,054 B2 | 9/2015 | Osterhout et al. | 2005/0010091 A1 | 1/2005 | Woods et al. |
| 9,128,281 B2 | 9/2015 | Osterhout et al. | 2005/0010563 A1 | 1/2005 | Gross et al. |
| 9,129,157 B2 | 9/2015 | Chao et al. | 2005/0041289 A1 | 2/2005 | Berman et al. |
| 9,129,295 B2 | 9/2015 | Border et al. | 2005/0122319 A1 | 6/2005 | Sakurai et al. |
| 9,143,693 B1 | 9/2015 | Zhou et al. | 2005/0129286 A1 | 6/2005 | Hekimian et al. |
| 9,158,115 B1 | 10/2015 | Worley et al. | 2005/0154505 A1 | 7/2005 | Nakamura et al. |
| 9,158,116 B1 | 10/2015 | Osterhout et al. | 2005/0156915 A1 | 7/2005 | Fisher et al. |
| D743,963 S | 11/2015 | Osterhout | 2005/0157949 A1 | 7/2005 | Aiso et al. |
| 9,176,582 B1 | 11/2015 | Johnson et al. | 2005/0212980 A1 | 9/2005 | Miyazaki et al. |
| D745,007 S * | 12/2015 | Cazalet D14/372 | 2005/0264752 A1 | 12/2005 | Howell et al. |
| 9,202,233 B1 | 12/2015 | Siegel et al. | 2006/0047386 A1 | 3/2006 | Kanevsky et al. |
| 9,225,934 B2 | 12/2015 | Cho | 2006/0050146 A1 | 3/2006 | Richardson et al. |
| 9,229,233 B2 | 1/2016 | Osterhout et al. | 2006/0061542 A1 | 3/2006 | Stokic et al. |
| 9,229,234 B2 | 1/2016 | Osterhout | 2006/0092131 A1 | 5/2006 | Kuroki et al. |
| 9,235,051 B2 | 1/2016 | Salter et al. | 2006/0098293 A1 | 5/2006 | Garoutte et al. |
| 9,269,193 B2 | 2/2016 | Saito | 2006/0119794 A1 | 6/2006 | Hillis et al. |
| D751,551 S * | 3/2016 | Ho D14/372 | 2006/0132457 A1 | 6/2006 | Rimas-Ribikauskas et al. |
| D751,552 S * | 3/2016 | Osterhout D14/372 | 2006/0132924 A1 | 6/2006 | Mimran et al. |
| 9,286,728 B2 | 3/2016 | Osterhout et al. | 2006/0152686 A1 | 7/2006 | Yeralan et al. |
| 9,298,001 B2 | 3/2016 | Border et al. | 2006/0170652 A1 | 8/2006 | Bannai et al. |
| 9,298,002 B2 | 3/2016 | Border et al. | 2006/0173351 A1 | 8/2006 | Marcotte et al. |
| 9,298,007 B2 | 3/2016 | Border | 2006/0178827 A1 | 8/2006 | Aoyama et al. |
| | | | 2006/0215111 A1 | 9/2006 | Mihashi et al. |
| | | | 2006/0224238 A1 | 10/2006 | Azar et al. |
| | | | 2006/0238550 A1 | 10/2006 | Page et al. |
| | | | 2006/0239629 A1 | 10/2006 | Qi et al. |

(56)

References Cited

U.S. PATENT DOCUMENTS

| | | | | | |
|-----------------|---------|----------------------|-----------------|---------|--------------------|
| 2006/0250322 A1 | 11/2006 | Hall et al. | 2010/0253594 A1 | 10/2010 | Szczerba et al. |
| 2006/0250696 A1 | 11/2006 | McGuire | 2010/0254017 A1 | 10/2010 | Martins et al. |
| 2006/0285315 A1 | 12/2006 | Tufenkjian et al. | 2010/0280904 A1 | 11/2010 | Ahuja |
| 2006/0288233 A1 | 12/2006 | Kozlay et al. | 2010/0283774 A1 | 11/2010 | Bovet et al. |
| 2007/0003168 A1 | 1/2007 | Oliver et al. | 2010/0290127 A1 | 11/2010 | Kessler et al. |
| 2007/0004451 A1 | 1/2007 | Anderson et al. | 2010/0309426 A1 | 12/2010 | Howell et al. |
| 2007/0024750 A1 | 2/2007 | Wing Chung et al. | 2010/0329301 A1 | 12/2010 | Pang et al. |
| 2007/0024763 A1 | 2/2007 | Chung et al. | 2011/0006982 A1 | 1/2011 | Rhee et al. |
| 2007/0024764 A1 | 2/2007 | Chung et al. | 2011/0007081 A1 | 1/2011 | Gordon |
| 2007/0024820 A1 | 2/2007 | Chung et al. | 2011/0012874 A1 | 1/2011 | Kurozuka et al. |
| 2007/0024823 A1 | 2/2007 | Chung et al. | 2011/0089325 A1 | 4/2011 | Ottney |
| 2007/0025273 A1 | 2/2007 | Chung et al. | 2011/0096100 A1 | 4/2011 | Sprague et al. |
| 2007/0030243 A1 | 2/2007 | Ishii et al. | 2011/0102234 A1 | 5/2011 | Adams et al. |
| 2007/0030456 A1 | 2/2007 | Duncan et al. | 2011/0130958 A1 | 6/2011 | Stahl et al. |
| 2007/0035563 A1 | 2/2007 | Biocca et al. | 2011/0131495 A1 | 6/2011 | Bull et al. |
| 2007/0038960 A1 | 2/2007 | Rekimoto et al. | 2011/0157236 A1 | 6/2011 | Inoue et al. |
| 2007/0058868 A1 | 3/2007 | Seino et al. | 2011/0159931 A1 | 6/2011 | Boss et al. |
| 2007/0069976 A1 | 3/2007 | Willins et al. | 2011/0164047 A1 | 7/2011 | Pance et al. |
| 2007/0070859 A1 | 3/2007 | Hirayama | 2011/0164163 A1 | 7/2011 | Bilbrey et al. |
| 2007/0091431 A1 | 4/2007 | Mezouari et al. | 2011/0164221 A1 | 7/2011 | Tilleman et al. |
| 2007/0100637 A1 | 5/2007 | McCune et al. | 2011/0176106 A1 | 7/2011 | Lewkowski et al. |
| 2007/0109284 A1 | 5/2007 | Yamazaki et al. | 2011/0196610 A1 | 8/2011 | Waldman et al. |
| 2007/0120806 A1 | 5/2007 | Schmidt et al. | 2011/0199171 A1 | 8/2011 | Prest et al. |
| 2007/0120836 A1 | 5/2007 | Yamaguchi et al. | 2011/0201213 A1 | 8/2011 | Dabov et al. |
| 2007/0132662 A1 | 6/2007 | Morita et al. | 2011/0202823 A1 | 8/2011 | Berger et al. |
| 2007/0178950 A1 | 8/2007 | Lewis et al. | 2011/0205209 A1 | 8/2011 | Kurokawa et al. |
| 2007/0233376 A1 | 10/2007 | Gershony et al. | 2011/0213664 A1 | 9/2011 | Osterhout et al. |
| 2007/0263174 A1 | 11/2007 | Shyu et al. | 2011/0221672 A1 | 9/2011 | Osterhout et al. |
| 2007/0273611 A1 | 11/2007 | Torch | 2011/0221896 A1 | 9/2011 | Haddick et al. |
| 2007/0282682 A1 | 12/2007 | Dietz et al. | 2011/0227820 A1 | 9/2011 | Haddick et al. |
| 2007/0296684 A1 | 12/2007 | Thomas et al. | 2011/0234631 A1 | 9/2011 | Kim et al. |
| 2008/0005702 A1 | 1/2008 | Skourup et al. | 2011/0248963 A1 | 10/2011 | Lawrence et al. |
| 2008/0066973 A1 | 3/2008 | Furuki et al. | 2011/0285638 A1 | 11/2011 | Harris et al. |
| 2008/0121441 A1 | 5/2008 | Sheets et al. | 2011/0285764 A1 | 11/2011 | Kimura et al. |
| 2008/0122736 A1 | 5/2008 | Ronzani et al. | 2012/0026088 A1 | 2/2012 | Goran et al. |
| 2008/0143954 A1 | 6/2008 | Abreu et al. | 2012/0032874 A1 | 2/2012 | Mukawa |
| 2008/0169998 A1 | 7/2008 | Jacobsen et al. | 2012/0035934 A1 | 2/2012 | Cunningham et al. |
| 2008/0186255 A1 | 8/2008 | Cohen et al. | 2012/0050140 A1 | 3/2012 | Border et al. |
| 2008/0191965 A1 | 8/2008 | Pandozy et al. | 2012/0050493 A1 | 3/2012 | Ernst et al. |
| 2008/0219025 A1 | 9/2008 | Spitzer et al. | 2012/0056093 A1 | 3/2012 | Poteet et al. |
| 2008/0266645 A1 | 10/2008 | Dharmatilleke et al. | 2012/0062444 A1 | 3/2012 | Cok et al. |
| 2008/0291277 A1 | 11/2008 | Jacobsen et al. | 2012/0062594 A1 | 3/2012 | Campbell et al. |
| 2008/0298639 A1 | 12/2008 | Tsunekawa et al. | 2012/0062850 A1 | 3/2012 | Travis |
| 2009/0013204 A1 | 1/2009 | Kobayashi et al. | 2012/0062998 A1 | 3/2012 | Schultz et al. |
| 2009/0015735 A1 | 1/2009 | Simmonds et al. | 2012/0068913 A1 | 3/2012 | Bar-Zeev et al. |
| 2009/0040296 A1 | 2/2009 | Moscato et al. | 2012/0069413 A1 | 3/2012 | Schultz et al. |
| 2009/0093702 A1 | 4/2009 | Vollmer et al. | 2012/0075168 A1 | 3/2012 | Osterhout et al. |
| 2009/0108837 A1 | 4/2009 | Johansson et al. | 2012/0078628 A1 | 3/2012 | Ghulman et al. |
| 2009/0110241 A1 | 4/2009 | Takemoto et al. | 2012/0081800 A1 | 4/2012 | Cheng et al. |
| 2009/0147331 A1 | 6/2009 | Ashkenazi et al. | 2012/0092328 A1 | 4/2012 | Flaks et al. |
| 2009/0183929 A1 | 7/2009 | Zhang et al. | 2012/0092329 A1 | 4/2012 | Koo et al. |
| 2009/0209884 A1 | 8/2009 | Van Vorhis et al. | 2012/0096095 A1 | 4/2012 | Bhargava et al. |
| 2009/0251441 A1 | 10/2009 | Edgecomb et al. | 2012/0113514 A1 | 5/2012 | Rodman |
| 2009/0279180 A1 | 11/2009 | Amitai et al. | 2012/0119978 A1 | 5/2012 | Bietry et al. |
| 2010/0001572 A1 | 1/2010 | Masunaga et al. | 2012/0120103 A1 | 5/2012 | Border et al. |
| 2010/0007852 A1 | 1/2010 | Bietry et al. | 2012/0120498 A1 | 5/2012 | Harrison et al. |
| 2010/0046075 A1 | 2/2010 | Powell et al. | 2012/0127062 A1 | 5/2012 | Bar-Zeev et al. |
| 2010/0056274 A1 | 3/2010 | Uusitalo et al. | 2012/0127284 A1 | 5/2012 | Bar-Zeev et al. |
| 2010/0060713 A1 | 3/2010 | Snyder et al. | 2012/0133885 A1 | 5/2012 | Howell et al. |
| 2010/0073376 A1 | 3/2010 | Schmale | 2012/0154920 A1 | 6/2012 | Harrison et al. |
| 2010/0079508 A1 | 4/2010 | Hodge et al. | 2012/0162270 A1 | 6/2012 | Fleck et al. |
| 2010/0079733 A1 | 4/2010 | Lu et al. | 2012/0163013 A1 | 6/2012 | Buelow, II et al. |
| 2010/0082368 A1 | 4/2010 | Gecelter et al. | 2012/0169608 A1 | 7/2012 | Forutanpour et al. |
| 2010/0085325 A1 | 4/2010 | King-Smith et al. | 2012/0176682 A1 | 7/2012 | DeJong et al. |
| 2010/0094161 A1 | 4/2010 | Kiderman et al. | 2012/0188245 A1 | 7/2012 | Hyatt et al. |
| 2010/0097580 A1 | 4/2010 | Yamamoto et al. | 2012/0194550 A1 | 8/2012 | Osterhout et al. |
| 2010/0103075 A1 | 4/2010 | Kalaboukis et al. | 2012/0194553 A1 | 8/2012 | Osterhout et al. |
| 2010/0113062 A1 | 5/2010 | Lee et al. | 2012/0194784 A1 | 8/2012 | Shih et al. |
| 2010/0130140 A1 | 5/2010 | Waku et al. | 2012/0200935 A1 | 8/2012 | Miyao et al. |
| 2010/0149073 A1 | 6/2010 | Chaum et al. | 2012/0206817 A1 | 8/2012 | Totani et al. |
| 2010/0178101 A1 | 7/2010 | Day et al. | 2012/0212398 A1 | 8/2012 | Border et al. |
| 2010/0182561 A1 | 7/2010 | Ikeda | 2012/0212484 A1 | 8/2012 | Haddick et al. |
| 2010/0194682 A1 | 8/2010 | Orr et al. | 2012/0212499 A1 | 8/2012 | Haddick et al. |
| 2010/0240988 A1 | 9/2010 | Varga et al. | 2012/0212593 A1 | 8/2012 | Na'aman et al. |
| 2010/0241450 A1 | 9/2010 | Gierhart et al. | 2012/0218301 A1 | 8/2012 | Miller |
| | | | 2012/0223885 A1 | 9/2012 | Perez |
| | | | 2012/0224060 A1 | 9/2012 | Gurevich et al. |
| | | | 2012/0229367 A1 | 9/2012 | Magyari et al. |
| | | | 2012/0229909 A1 | 9/2012 | Clavin et al. |

(56)

References Cited

U.S. PATENT DOCUMENTS

| | | | | | | | |
|--------------|-----|---------|--------------------------------------|--------------|----|---------|---------------------|
| 2012/0233000 | A1 | 9/2012 | Fisher et al. | 2013/0293580 | A1 | 11/2013 | Spivack et al. |
| 2012/0235885 | A1 | 9/2012 | Miller et al. | 2013/0300637 | A1 | 11/2013 | Smits et al. |
| 2012/0237085 | A1 | 9/2012 | Meier et al. | 2013/0300652 | A1 | 11/2013 | Raffle et al. |
| 2012/0242251 | A1 | 9/2012 | Kwisthout et al. | 2013/0321265 | A1 | 12/2013 | Bychkov et al. |
| 2012/0242697 | A1 | 9/2012 | Border et al. | 2013/0321271 | A1 | 12/2013 | Bychkov et al. |
| 2012/0242698 | A1 | 9/2012 | Haddick et al. | 2013/0321932 | A1 | 12/2013 | Hsu et al. |
| 2012/0249741 | A1 | 10/2012 | Maciocci et al. | 2013/0335301 | A1 | 12/2013 | Wong et al. |
| 2012/0249797 | A1 | 10/2012 | Haddick et al. | 2013/0335435 | A1 | 12/2013 | Ambrus et al. |
| 2012/0250152 | A1 | 10/2012 | Larson et al. | 2013/0335461 | A1 | 12/2013 | Rekimoto et al. |
| 2012/0264510 | A1 | 10/2012 | Wigdor et al. | 2013/0336528 | A1 | 12/2013 | Itani et al. |
| 2012/0287398 | A1 | 11/2012 | Baker et al. | 2013/0336629 | A1 | 12/2013 | Mulholland et al. |
| 2012/0293548 | A1 | 11/2012 | Perez et al. | 2013/0342564 | A1 | 12/2013 | Kinnebrew et al. |
| 2012/0294478 | A1 | 11/2012 | Publicover et al. | 2013/0342571 | A1 | 12/2013 | Kinnebrew et al. |
| 2012/0306850 | A1 | 12/2012 | Balan et al. | 2013/0342981 | A1 | 12/2013 | Cox et al. |
| 2012/0307198 | A1 | 12/2012 | Ifergan | 2013/0346245 | A1 | 12/2013 | Desore et al. |
| 2012/0326948 | A1 | 12/2012 | Crocco et al. | 2014/0028704 | A1 | 1/2014 | Wu et al. |
| 2012/0327040 | A1 | 12/2012 | Simon et al. | 2014/0043682 | A1 | 2/2014 | Hussey et al. |
| 2012/0327116 | A1 | 12/2012 | Liu et al. | 2014/0062854 | A1 | 3/2014 | Cho |
| 2013/0009366 | A1 | 1/2013 | Hannegan et al. | 2014/0063054 | A1 | 3/2014 | Osterhout et al. |
| 2013/0009907 | A1 | 1/2013 | Rosenberg et al. | 2014/0063055 | A1 | 3/2014 | Osterhout et al. |
| 2013/0044042 | A1 | 2/2013 | Olsson et al. | 2014/0063473 | A1 | 3/2014 | Pasolini |
| 2013/0063695 | A1 | 3/2013 | Hsieh | 2014/0078043 | A1 | 3/2014 | Kim et al. |
| 2013/0069924 | A1 | 3/2013 | Robinson et al. | 2014/0078282 | A1 | 3/2014 | Aoki et al. |
| 2013/0069985 | A1 | 3/2013 | Wong et al. | 2014/0091984 | A1 | 4/2014 | Ashbrook et al. |
| 2013/0070344 | A1 | 3/2013 | Takeda et al. | 2014/0101608 | A1 | 4/2014 | Ryskamp et al. |
| 2013/0077049 | A1 | 3/2013 | Bohn et al. | 2014/0104142 | A1 | 4/2014 | Bickerstaff et al. |
| 2013/0083003 | A1 | 4/2013 | Perez et al. | 2014/0104692 | A1 | 4/2014 | Bickerstaff et al. |
| 2013/0083009 | A1 | 4/2013 | Geisner et al. | 2014/0111838 | A1 | 4/2014 | Han et al. |
| 2013/0083055 | A1 | 4/2013 | Piemonte et al. | 2014/0125668 | A1 | 5/2014 | Steed et al. |
| 2013/0088413 | A1 | 4/2013 | Raffle et al. | 2014/0125785 | A1 | 5/2014 | Na et al. |
| 2013/0100259 | A1 | 4/2013 | Ramaswamy | 2014/0129328 | A1 | 5/2014 | Mathew |
| 2013/0106674 | A1 | 5/2013 | Wheeler et al. | 2014/0139655 | A1 | 5/2014 | Mimar |
| 2013/0120224 | A1 | 5/2013 | Cajigas et al. | 2014/0146394 | A1 | 5/2014 | Tout et al. |
| 2013/0120841 | A1 | 5/2013 | Shpunt et al. | 2014/0147829 | A1 | 5/2014 | Jerauld |
| 2013/0127906 | A1 | 5/2013 | Sugita et al. | 2014/0152530 | A1 | 6/2014 | Venkatesha et al. |
| 2013/0127980 | A1 | 5/2013 | Haddick et al. | 2014/0152558 | A1 | 6/2014 | Salter et al. |
| 2013/0135198 | A1 | 5/2013 | Hodge et al. | 2014/0152676 | A1 | 6/2014 | Rohn et al. |
| 2013/0141434 | A1 | 6/2013 | Sugden et al. | 2014/0153173 | A1 | 6/2014 | Pombo et al. |
| 2013/0154913 | A1 | 6/2013 | Genc et al. | 2014/0159995 | A1 | 6/2014 | Adams et al. |
| 2013/0162632 | A1 | 6/2013 | Varga et al. | 2014/0160055 | A1 | 6/2014 | Margolis et al. |
| 2013/0169530 | A1 | 7/2013 | Bhaskar et al. | 2014/0160137 | A1 | 6/2014 | Martin et al. |
| 2013/0176533 | A1 | 7/2013 | Raffle et al. | 2014/0160157 | A1 | 6/2014 | Poulos et al. |
| 2013/0185052 | A1 | 7/2013 | Boyd et al. | 2014/0160170 | A1 | 6/2014 | Lyons |
| 2013/0194389 | A1 | 8/2013 | Vaught et al. | 2014/0168056 | A1 | 6/2014 | Swaminathan et al. |
| 2013/0196757 | A1 | 8/2013 | Latta et al. | 2014/0168266 | A1 | 6/2014 | Kimura et al. |
| 2013/0201080 | A1 | 8/2013 | Evans et al. | 2014/0168716 | A1 | 6/2014 | King et al. |
| 2013/0201081 | A1 | 8/2013 | Evans et al. | 2014/0168735 | A1 | 6/2014 | Yuan et al. |
| 2013/0207887 | A1 | 8/2013 | Raffle et al. | 2014/0176591 | A1 | 6/2014 | Klein et al. |
| 2013/0207970 | A1 | 8/2013 | Shpunt et al. | 2014/0176603 | A1 | 6/2014 | Kumar et al. |
| 2013/0208508 | A1 | 8/2013 | Nichol et al. | 2014/0177023 | A1 | 6/2014 | Gao et al. |
| 2013/0214909 | A1 | 8/2013 | Meijers et al. | 2014/0183269 | A1 | 7/2014 | Glaser et al. |
| 2013/0215149 | A1 | 8/2013 | Hayashi et al. | 2014/0204759 | A1 | 7/2014 | Guo et al. |
| 2013/0222270 | A1 | 8/2013 | Winkler et al. | 2014/0213280 | A1 | 7/2014 | Sandel et al. |
| 2013/0222919 | A1 | 8/2013 | Komatsu et al. | 2014/0222929 | A1 | 8/2014 | Grossman et al. |
| 2013/0230215 | A1 | 9/2013 | Gurman et al. | 2014/0225814 | A1 | 8/2014 | English et al. |
| 2013/0234914 | A1 | 9/2013 | Fujimaki et al. | 2014/0232651 | A1 | 8/2014 | Kress et al. |
| 2013/0235331 | A1* | 9/2013 | Heinrich G02C 11/10 351/158 | 2014/0240103 | A1 | 8/2014 | Lake et al. |
| 2013/0241805 | A1 | 9/2013 | Gomez et al. | 2014/0240313 | A1 | 8/2014 | Varga |
| 2013/0241948 | A1 | 9/2013 | Kimura | 2014/0247286 | A1 | 9/2014 | Chi et al. |
| 2013/0242405 | A1 | 9/2013 | Gupta et al. | 2014/0253588 | A1 | 9/2014 | Mandala et al. |
| 2013/0248691 | A1 | 9/2013 | Mirov et al. | 2014/0253605 | A1 | 9/2014 | Border et al. |
| 2013/0249778 | A1 | 9/2013 | Morimoto et al. | 2014/0267010 | A1 | 9/2014 | Pasquero et al. |
| 2013/0249787 | A1 | 9/2013 | Morimoto | 2014/0275760 | A1 | 9/2014 | Lee et al. |
| 2013/0250207 | A1 | 9/2013 | Bohn et al. | 2014/0285631 | A1 | 9/2014 | Janky et al. |
| 2013/0250430 | A1 | 9/2013 | Robbins et al. | 2014/0306866 | A1 | 10/2014 | Miller et al. |
| 2013/0250503 | A1 | 9/2013 | Olsson et al. | 2014/0310075 | A1 | 10/2014 | Ricci et al. |
| 2013/0257622 | A1 | 10/2013 | Davalos et al. | 2014/0320389 | A1 | 10/2014 | Scavezze et al. |
| 2013/0257709 | A1 | 10/2013 | Raffle et al. | 2014/0320971 | A1 | 10/2014 | Gupta et al. |
| 2013/0258111 | A1 | 10/2013 | Frank et al. | 2014/0341441 | A1 | 11/2014 | Slaby et al. |
| 2013/0265212 | A1 | 10/2013 | Kato et al. | 2014/0361957 | A1 | 12/2014 | Hua et al. |
| 2013/0265227 | A1 | 10/2013 | Julian et al. | 2014/0361976 | A1 | 12/2014 | Osman et al. |
| 2013/0278631 | A1 | 10/2013 | Border et al. | 2014/0362195 | A1 | 12/2014 | Ng-Thow-Hing et al. |
| 2013/0280682 | A1 | 10/2013 | Levine et al. | 2014/0363797 | A1 | 12/2014 | Hu et al. |
| 2013/0293530 | A1 | 11/2013 | Perez et al. | 2014/0372957 | A1 | 12/2014 | Kipman et al. |
| | | | | 2014/0375542 | A1 | 12/2014 | Bohn et al. |
| | | | | 2014/0375545 | A1 | 12/2014 | Finocchio et al. |
| | | | | 2014/0375680 | A1 | 12/2014 | Ackerman et al. |
| | | | | 2014/0375683 | A1 | 12/2014 | Massey et al. |
| | | | | 2015/0002371 | A1 | 1/2015 | Herrod et al. |

(56)

References Cited

U.S. PATENT DOCUMENTS

| | | | | | | | |
|--------------|----|--------|--------------------------|--------------|----|---------|------------------|
| 2015/0022542 | A1 | 1/2015 | Baba | 2015/0213584 | A1 | 7/2015 | Ishikawa et al. |
| 2015/0029088 | A1 | 1/2015 | Kim et al. | 2015/0213650 | A1 | 7/2015 | Barzuza et al. |
| 2015/0035744 | A1 | 2/2015 | Robbins et al. | 2015/0213754 | A1 | 7/2015 | Amjad |
| 2015/0042544 | A1 | 2/2015 | Tatusuta et al. | 2015/0226966 | A1 | 8/2015 | Osterhout |
| 2015/0085333 | A1 | 3/2015 | Theytaz | 2015/0226967 | A1 | 8/2015 | Osterhout et al. |
| 2015/0097719 | A1 | 4/2015 | Balachandreswaran et al. | 2015/0228099 | A1 | 8/2015 | Osterhout |
| 2015/0106623 | A1 | 4/2015 | Holman et al. | 2015/0228119 | A1 | 8/2015 | Osterhout et al. |
| 2015/0134143 | A1 | 5/2015 | Willenborg | 2015/0228120 | A1 | 8/2015 | Osterhout et al. |
| 2015/0143297 | A1 | 5/2015 | Wheeler et al. | 2015/0229019 | A1 | 8/2015 | Osterhout |
| 2015/0145839 | A1 | 5/2015 | Hack et al. | 2015/0234508 | A1 | 8/2015 | Cho et al. |
| 2015/0146004 | A1 | 5/2015 | Rakshit et al. | 2015/0235422 | A1 | 8/2015 | Lohse et al. |
| 2015/0147000 | A1 | 5/2015 | Salvador et al. | 2015/0235429 | A1 | 8/2015 | Miller et al. |
| 2015/0153572 | A1 | 6/2015 | Miao et al. | 2015/0235622 | A1 | 8/2015 | Border et al. |
| 2015/0161913 | A1 | 6/2015 | Dominguez et al. | 2015/0241963 | A1 | 8/2015 | Nortrup et al. |
| 2015/0169953 | A1 | 6/2015 | Border et al. | 2015/0241964 | A1 | 8/2015 | Nortrup et al. |
| 2015/0175068 | A1 | 6/2015 | Szostak et al. | 2015/0241965 | A1 | 8/2015 | Nortrup et al. |
| 2015/0178932 | A1 | 6/2015 | Wyatt et al. | 2015/0241966 | A1 | 8/2015 | Nortrup et al. |
| 2015/0181383 | A1 | 6/2015 | Schulz et al. | 2015/0243039 | A1 | 8/2015 | Holz |
| 2015/0186636 | A1 | 7/2015 | Tharappel et al. | 2015/0245131 | A1 | 8/2015 | Facteau et al. |
| 2015/0198807 | A1 | 7/2015 | Hirai | 2015/0253573 | A1 | 9/2015 | Sako et al. |
| 2015/0201834 | A1 | 7/2015 | Border et al. | 2015/0260887 | A1 | 9/2015 | Salisbury et al. |
| 2015/0201835 | A1 | 7/2015 | Border et al. | 2015/0260986 | A1 | 9/2015 | Nortrup |
| 2015/0201836 | A1 | 7/2015 | Border et al. | 2015/0261015 | A1 | 9/2015 | Ha et al. |
| 2015/0202962 | A1 | 7/2015 | Habashima et al. | 2015/0277113 | A1 | 10/2015 | Border et al. |
| 2015/0205035 | A1 | 7/2015 | Border et al. | 2015/0277116 | A1 | 10/2015 | Richards et al. |
| 2015/0205100 | A1 | 7/2015 | Border | 2015/0277118 | A1 | 10/2015 | Border |
| 2015/0205101 | A1 | 7/2015 | Border | 2015/0277120 | A1 | 10/2015 | Border et al. |
| 2015/0205102 | A1 | 7/2015 | Border | 2015/0277122 | A1 | 10/2015 | Border |
| 2015/0205103 | A1 | 7/2015 | Border | 2015/0277549 | A1 | 10/2015 | Border |
| 2015/0205104 | A1 | 7/2015 | Border | 2015/0277559 | A1 | 10/2015 | Vescovi |
| 2015/0205105 | A1 | 7/2015 | Border | 2015/0279010 | A1 | 10/2015 | Cianfrone et al. |
| 2015/0205107 | A1 | 7/2015 | Border | 2015/0279104 | A1 | 10/2015 | Border et al. |
| 2015/0205108 | A1 | 7/2015 | Border et al. | 2015/0279107 | A1 | 10/2015 | Border et al. |
| 2015/0205111 | A1 | 7/2015 | Border et al. | 2015/0279108 | A1 | 10/2015 | Border |
| 2015/0205112 | A1 | 7/2015 | Border | 2015/0287048 | A1 | 10/2015 | Nortrup et al. |
| 2015/0205113 | A1 | 7/2015 | Border et al. | 2015/0293587 | A1 | 10/2015 | Wilairat et al. |
| 2015/0205114 | A1 | 7/2015 | Border et al. | 2015/0294156 | A1 | 10/2015 | Border et al. |
| 2015/0205115 | A1 | 7/2015 | Border et al. | 2015/0294627 | A1 | 10/2015 | Yoo et al. |
| 2015/0205116 | A1 | 7/2015 | Border et al. | 2015/0301593 | A1 | 10/2015 | Border et al. |
| 2015/0205117 | A1 | 7/2015 | Border et al. | 2015/0302646 | A1 | 10/2015 | Osterhout et al. |
| 2015/0205118 | A1 | 7/2015 | Border et al. | 2015/0302647 | A1 | 10/2015 | Osterhout et al. |
| 2015/0205119 | A1 | 7/2015 | Osterhout et al. | 2015/0304368 | A1 | 10/2015 | Vaccari et al. |
| 2015/0205120 | A1 | 7/2015 | Border et al. | 2015/0309313 | A1 | 10/2015 | Border et al. |
| 2015/0205121 | A1 | 7/2015 | Border et al. | 2015/0309314 | A1 | 10/2015 | Border et al. |
| 2015/0205122 | A1 | 7/2015 | Border et al. | 2015/0309317 | A1 | 10/2015 | Osterhout et al. |
| 2015/0205123 | A1 | 7/2015 | Border | 2015/0309534 | A1 | 10/2015 | Osterhout |
| 2015/0205124 | A1 | 7/2015 | Border | 2015/0309562 | A1 | 10/2015 | Shams et al. |
| 2015/0205125 | A1 | 7/2015 | Border et al. | 2015/0309995 | A1 | 10/2015 | Osterhout |
| 2015/0205126 | A1 | 7/2015 | Schowengerdt | 2015/0316766 | A1 | 11/2015 | Weaver et al. |
| 2015/0205127 | A1 | 7/2015 | Border et al. | 2015/0316769 | A1 | 11/2015 | Border et al. |
| 2015/0205128 | A1 | 7/2015 | Border | 2015/0316770 | A1 | 11/2015 | Border et al. |
| 2015/0205129 | A1 | 7/2015 | Border et al. | 2015/0316771 | A1 | 11/2015 | Border et al. |
| 2015/0205130 | A1 | 7/2015 | Border | 2015/0316772 | A1 | 11/2015 | Border et al. |
| 2015/0205131 | A1 | 7/2015 | Border et al. | 2015/0331241 | A1 | 11/2015 | Haddick et al. |
| 2015/0205132 | A1 | 7/2015 | Osterhout et al. | 2015/0332032 | A1 | 11/2015 | Alameh et al. |
| 2015/0205135 | A1 | 7/2015 | Border et al. | 2015/0338661 | A1 | 11/2015 | Osterhout et al. |
| 2015/0205346 | A1 | 7/2015 | Border | 2015/0346496 | A1 | 12/2015 | Haddick et al. |
| 2015/0205347 | A1 | 7/2015 | Border | 2015/0346511 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205348 | A1 | 7/2015 | Nortrup et al. | 2015/0347823 | A1 | 12/2015 | Monnerat et al. |
| 2015/0205349 | A1 | 7/2015 | Nortrup et al. | 2015/0355466 | A1 | 12/2015 | Border |
| 2015/0205351 | A1 | 7/2015 | Osterhout et al. | 2015/0355468 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205373 | A1 | 7/2015 | Osterhout et al. | 2015/0356772 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205378 | A1 | 7/2015 | Osterhout | 2015/0356775 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205384 | A1 | 7/2015 | Osterhout et al. | 2015/0356776 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205385 | A1 | 7/2015 | Osterhout et al. | 2015/0356777 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205387 | A1 | 7/2015 | Osterhout et al. | 2015/0356778 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205388 | A1 | 7/2015 | Osterhout | 2015/0356779 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205401 | A1 | 7/2015 | Osterhout | 2015/0363975 | A1 | 12/2015 | Osterhout et al. |
| 2015/0205402 | A1 | 7/2015 | Osterhout | 2015/0382305 | A1 | 12/2015 | Drincic |
| 2015/0205494 | A1 | 7/2015 | Scott et al. | 2016/0005003 | A1 | 1/2016 | Norris et al. |
| 2015/0205566 | A1 | 7/2015 | Osterhout | 2016/0007849 | A1 | 1/2016 | Krueger et al. |
| 2015/0206008 | A1 | 7/2015 | Border et al. | 2016/0011417 | A1 | 1/2016 | Border et al. |
| 2015/0206173 | A1 | 7/2015 | Nortrup et al. | 2016/0015470 | A1 | 1/2016 | Border |
| 2015/0212324 | A1 | 7/2015 | Osterhout | 2016/0018640 | A1 | 1/2016 | Haddick et al. |
| 2015/0212327 | A1 | 7/2015 | Osterhout et al. | 2016/0018641 | A1 | 1/2016 | Haddick et al. |
| | | | | 2016/0018642 | A1 | 1/2016 | Haddick et al. |
| | | | | 2016/0018644 | A1 | 1/2016 | Border et al. |
| | | | | 2016/0018645 | A1 | 1/2016 | Haddick et al. |
| | | | | 2016/0018646 | A1 | 1/2016 | Osterhout et al. |

(56)

References Cited

U.S. PATENT DOCUMENTS

2016/0018647 A1 1/2016 Osterhout et al.
 2016/0018648 A1 1/2016 Osterhout et al.
 2016/0018649 A1 1/2016 Osterhout et al.
 2016/0018650 A1 1/2016 Haddick et al.
 2016/0018651 A1 1/2016 Haddick et al.
 2016/0018652 A1 1/2016 Haddick et al.
 2016/0018653 A1 1/2016 Haddick et al.
 2016/0018654 A1 1/2016 Haddick et al.
 2016/0019715 A1 1/2016 Haddick et al.
 2016/0019719 A1 1/2016 Osterhout et al.
 2016/0021304 A1 1/2016 Osterhout
 2016/0025974 A1 1/2016 Osterhout et al.
 2016/0025977 A1 1/2016 Osterhout
 2016/0025979 A1 1/2016 Border et al.
 2016/0025980 A1 1/2016 Osterhout et al.
 2016/0026239 A1 1/2016 Border et al.
 2016/0027211 A1 1/2016 Osterhout et al.
 2016/0027414 A1 1/2016 Osterhout et al.
 2016/0035139 A1 2/2016 Fuchs et al.
 2016/0045810 A1 2/2016 Minkovitch
 2016/0048018 A1 2/2016 De Matos
 2016/0048019 A1 2/2016 Haddick et al.
 2016/0048021 A1 2/2016 Border
 2016/0048023 A1 2/2016 Haddick et al.
 2016/0048160 A1 2/2016 Haddick et al.
 2016/0049008 A1 2/2016 Haddick et al.
 2016/0054566 A1 2/2016 Osterhout et al.
 2016/0055675 A1 2/2016 Kasahara et al.
 2016/0062118 A1 3/2016 Osterhout
 2016/0062121 A1 3/2016 Border et al.
 2016/0062122 A1 3/2016 Border
 2016/0077342 A1 3/2016 Osterhout et al.
 2016/0085071 A1 3/2016 Border
 2016/0085072 A1 3/2016 Haddick et al.
 2016/0085278 A1 3/2016 Osterhout et al.
 2016/0091718 A1 3/2016 Border et al.
 2016/0091719 A1 3/2016 Border
 2016/0109709 A1 4/2016 Osterhout
 2016/0109711 A1 4/2016 Border
 2016/0109713 A1 4/2016 Osterhout
 2016/0116738 A1 4/2016 Osterhout et al.
 2016/0116745 A1* 4/2016 Osterhout G02B 27/0176
 359/614
 2016/0116979 A1 4/2016 Border
 2016/0131904 A1 5/2016 Border et al.
 2016/0131911 A1 5/2016 Border et al.
 2016/0131912 A1 5/2016 Border et al.
 2016/0132082 A1 5/2016 Border et al.
 2016/0133201 A1 5/2016 Border et al.
 2016/0137312 A1 5/2016 Osterhout
 2016/0147063 A1 5/2016 Border et al.
 2016/0147064 A1 5/2016 Border et al.
 2016/0147065 A1 5/2016 Border et al.
 2016/0147070 A1 5/2016 Border et al.
 2016/0154242 A1 6/2016 Border
 2016/0154244 A1 6/2016 Border et al.
 2016/0161743 A1 6/2016 Osterhout et al.
 2016/0161747 A1 6/2016 Osterhout
 2016/0170207 A1 6/2016 Haddick et al.
 2016/0170208 A1 6/2016 Border et al.
 2016/0170209 A1 6/2016 Border et al.
 2016/0170699 A1 6/2016 Border et al.
 2016/0171769 A1 6/2016 Haddick et al.
 2016/0187651 A1 6/2016 Border et al.
 2016/0187658 A1 6/2016 Osterhout et al.
 2016/0202946 A1 7/2016 Osterhout et al.
 2016/0207457 A1 7/2016 Border et al.
 2016/0216516 A1 7/2016 Border
 2016/0216517 A1 7/2016 Border
 2016/0231571 A1 8/2016 Border et al.
 2016/0239985 A1 8/2016 Haddick et al.
 2016/0240008 A1 8/2016 Haddick et al.
 2016/0246055 A1 8/2016 Border et al.
 2016/0252731 A1 9/2016 Border et al.
 2016/0259166 A1 9/2016 Border et al.

2016/0274361 A1 9/2016 Border et al.
 2016/0274365 A1 9/2016 Bailey et al.
 2016/0282626 A1 9/2016 Border et al.
 2016/0286177 A1 9/2016 Border et al.
 2016/0286203 A1 9/2016 Border et al.
 2016/0286210 A1 9/2016 Border et al.
 2016/0306173 A1 10/2016 Tsukahara et al.
 2016/0329634 A1 11/2016 Osterhout et al.
 2016/0357019 A1 12/2016 Border et al.
 2016/0370606 A1 12/2016 Huynh

FOREIGN PATENT DOCUMENTS

EP 1326121 A2 7/2003
 EP 2207164 A2 7/2010
 EP 2486450 A1 8/2012
 EP 2490130 A1 8/2012
 EP 2502410 A1 9/2012
 EP 2674834 A2 12/2013
 GB 2491984 A 12/2012
 JP 07110735 A 4/1995
 JP 2000102036 A 4/2000
 JP 2005138755 A 6/2005
 JP 2009171505 A 7/2009
 JP 5017989 B2 9/2012
 JP 2012212990 A 11/2012
 KR 1020110101944 A 9/2011
 WO 2011143655 A1 11/2011
 WO 2012040030 A2 3/2012
 WO 2012058175 A1 5/2012
 WO 2012064546 A1 5/2012
 WO 2012082807 A2 6/2012
 WO 2012118573 A1 9/2012
 WO 2012118575 A2 9/2012
 WO 2013043288 A2 3/2013
 WO 2013049248 A2 4/2013
 WO 2013050650 A1 4/2013
 WO 2013103825 A1 7/2013
 WO 2013110846 A1 8/2013
 WO 2013170073 A1 11/2013
 WO 2013176079 A1 11/2013
 WO 2015/109145 A1 7/2015
 WO 2015109145 A9 7/2015
 WO 2015164276 A1 10/2015
 WO 2015179877 A2 11/2015
 WO 2015179877 A3 11/2015
 WO 2015195444 A1 12/2015
 WO PCT/US2016/018040 2/2016
 WO 2016/044035 3/2016
 WO 2016073734 A1 5/2016
 WO PCT/US2016/038008 6/2016
 WO PCT/US2016/042440 7/2016
 WO 2016133886 A1 8/2016
 WO PCT/US2016/057021 10/2016
 WO PCT/US2016/058203 10/2016
 WO PCT/US2016/063946 11/2016
 WO 2016205601 A1 12/2016
 WO PCT/US2016/064441 12/2016

OTHER PUBLICATIONS

US 8,792,178, 07/2014, Totani et al. (withdrawn)
 US 9,195,056, 11/2015, Border et al. (withdrawn)
 Fathi, et al, "Social interactions: A first-person perspective.", Computer Vision and Pattern Recognition (CVPR), 2012, 8 Pages.
 U.S. Appl. No. 14/623,932, filed Feb. 17, 2015, Pending.
 U.S. Appl. No. 14/659,781, filed Mar. 17, 2015, Pending.
 U.S. Appl. No. 14/670,677, filed Mar. 27, 2015, Pending.
 U.S. Appl. No. 14/670,885, filed Mar. 27, 2015, Pending.
 U.S. Appl. No. 14/671,899, filed Mar. 27, 2015, Pending.
 U.S. Appl. No. 14/671,906, filed Mar. 27, 2015, Pending.
 U.S. Appl. No. 14/743,047, filed Jun. 18, 2015, Pending.
 U.S. Appl. No. 14/802,878, filed Jul. 17, 2015, Pending.
 U.S. Appl. No. 14/806,385, filed Jul. 22, 2015, Pending.
 U.S. Appl. No. 14/806,410, filed Jul. 22, 2015, Pending.
 U.S. Appl. No. 14/880,809, filed Oct. 12, 2015, Pending.
 U.S. Appl. No. 14/919,981, filed Oct. 22, 2015, Pending.

(56)

References Cited

OTHER PUBLICATIONS

- U.S. Appl. No. 14/966,586, filed Dec. 11, 2015, Pending.
 U.S. Appl. No. 14/970,647, filed Dec. 16, 2015, Pending.
 U.S. Appl. No. 14/970,653, filed Dec. 16, 2015, Pending.
 U.S. Appl. No. 29/553,028, filed Jan. 28, 2016, Allowed.
 U.S. Appl. No. 29/555,129, filed Feb. 18, 2016, Allowed.
 U.S. Appl. No. 15/051,365, filed Feb. 23, 2016, Pending.
 U.S. Appl. No. 15/053,054, filed Feb. 25, 2016, Pending.
 U.S. Appl. No. 15/053,110, filed Feb. 25, 2016, Pending.
 U.S. Appl. No. 15/056,573, filed Feb. 29, 2016, Pending.
 U.S. Appl. No. 15/058,383, filed Mar 2, 2016, Pending.
 U.S. Appl. No. 15/058,835, filed Mar. 2, 2016, Pending.
 U.S. Appl. No. 15/063,667, filed Mar. 8, 2016, Pending.
 U.S. Appl. No. 15/063,682, filed Mar. 8, 2016, Pending.
 U.S. Appl. No. 15/063,691, filed Mar 8, 2016, Pending.
 U.S. Appl. No. 15/063,702, filed Mar 8, 2016, Pending.
 U.S. Appl. No. 15/063,714, filed Mar. 8, 2016, Pending.
 U.S. Appl. No. 15/094,039, filed Apr. 8, 2016, Pending.
 U.S. Appl. No. 15/149,456, filed May 9, 2016, Pending.
 U.S. Appl. No. 15/155,139, filed May 16, 2016, Pending.
 U.S. Appl. No. 15/155,476, filed May 16, 2016, Pending.
 U.S. Appl. No. 15/157,573, filed May 18, 2016, Pending.
 U.S. Appl. No. 15/162,737, filed May 24, 2016, Pending.
 U.S. Appl. No. 15/167,621, filed May 27, 2016, Pending.
 U.S. Appl. No. 15/167,648, filed May 27, 2016, Pending.
 U.S. Appl. No. 15/167,665, filed May 27, 2016, Pending.
 U.S. Appl. No. 15/167,679, filed May 27, 2016, Pending.
 U.S. Appl. No. 15/167,695, filed May 27, 2016, Pending.
 U.S. Appl. No. 15/167,708, filed May 27, 2016, Pending.
 U.S. Appl. No. 15/167,720, filed May 27, 2016, Pending.
 U.S. Appl. No. 15/170,256, filed Jun. 1, 2016, Pending.
 U.S. Appl. No. 15/210,957, filed Jul. 15, 2016, Pending.
 U.S. Appl. No. 15/214,591, filed Jul. 20, 2016, Pending.
 U.S. Appl. No. 15/223,423, filed Jul. 29, 2016, Pending.
 U.S. Appl. No. 15/242,893, filed Aug. 22, 2016, Pending.
 U.S. Appl. No. 15/242,757, filed Aug. 22, 2016, Pending.
 U.S. Appl. No. 14/181,459, filed Feb. 14, 2014, Pending.
 U.S. Appl. No. 15/241,314, filed Aug. 19, 2016, Pending.
 U.S. Appl. No. 29/575,093, filed Aug. 22, 2016, Pending.
 U.S. Appl. No. 15/249,637, filed Aug. 29, 2016, Pending.
 "Audio Spotlight", by Holosonics, <http://www.holosonics.com>, accessed Jul. 3, 2014, 3 pages.
 "Genius Ring Mice", <http://www.geniusnet.com/Genius/wSite/productCompare/compare.jsp>, Dec. 23, 2014, 1 page.
 "Help Requested! Comments and input needed for new coaxial UAS—DIY Drones", <http://diydrone.com/profiles/blogs/help-requested-comments-and-input-needed-for-new-coaxial-uas>, Mar. 5, 2015, pp. 1-3.
 "How Ascent AeroSystems is looking to add to your outdoor adventure", <http://droneblog.com/2015/03/23/how-ascent-aerosystems-is-looking-to-add-to-your-outdoor-adventure/#!prettyPhoto>, Mar. 23, 2015, pp. 1-10.
 "Lightberry", <https://web.archive.org/web/20131201194408/http://lightberry.eu/>, Dec. 1, 2013, 11 Pages.
 "Meet Nod, the Bluetooth Ring That Wants to Replace Your Mouse", <http://www.pcmag.com/article2/0,2817,2457238,00.asp>, Apr. 29, 2014, 6 pages.
 "Sound from Ultrasound", Wikipedia entry, http://en.m.wikipedia.org/wiki/Sound_from_ultrasound, accessed Jul. 3, 2014, 13 pages.
 Allison, Robert S. et al., "Tolerance of Temporal Delay in Virtual Environments", VR '01 Proceedings of the Virtual Reality 2001 Conference (VR'01), Centre for Vision Research and Departments of Computer Science and Psychology, Mar. 2001, 2-8.
 Bezryadin, Sergey et al., "Brightness Calculation in Digital Image Processing", Technologies for Digital Fulfillment 2007, Las Vegas, NV, 2007, pp. 1-6.
 Huang, Jin-Bin, "Image Completion Using Planar Structure Guidelines", ACM Transactions on Graphics, vol. 33, No. 4, Article 129, Jul. 2014, pp. 1-10.
 Janin, Adam L. et al., "Calibration of Head-Mounted Displays for Augmented Reality Applications", Research and Technology Boeing Computer Services MS 7L-48 P.O. Box 24346 Seattle, WA 98124-0346 Virtual Reality Annual International Symposium, 1993., 1993 IEEE 1993, 10 Pages.
 Lang, Manuel et al., "Nonlinear Disparity Mapping for Stereoscopic 3D", Jul. 2010, pp. 1-10.
 Logbar Inc., "Ring: Shortcut Everything", <https://www.kickstarter.com/projects/1761670738/ring-shortcut-everything>, Jun. 2012, 1 page.
 Mastandrea, Nick, "Mycestro, The Next Generation 3D Mouse", <https://www.kickstarter.com/projects/mycestro/mycestrotm-the-next-generation-3d-mouse>, Dec. 2014, 22 pages.
 Pamplona, Vitor R. et al., "Photorealistic Models for Pupil Light Reflex and Iridal Pattern Deformation", ACM Transactions on Graphics, vol. 28, No. 4, Article 106, Publication date: Aug. 2009, pp. 1-12.
 PCT/US2015/011697, "International Application Serial No. PCT/US2015/011697, International Search Report and Written Opinion mailed Apr. 13, 2015", Osterhout Group, Inc., 14 pages.
 PCT/US2015/011697, "International Application Serial No. PCT/US2015/011697, International Preliminary Report on Patentability and Written Opinion mailed Jul. 28, 2016", Osterhout Group, Inc., 10 pages.
 PCT/US2015/026704, Osterhout Group, Inc., "International Search Report and Written Opinion", 15 pages.
 PCT/US2015/035192 "International Application Serial No. PCT/US2015/035192, International Search Report and Written Opinion mailed Sep. 3, 2015", Osterhout Group, Inc., 11 pages.
 PCT/US2015/059264 "International Application Serial No. PCT/US2015/059264, International Search Report and Written Opinion mailed Feb. 19, 2016", Osterhout Group, Inc., 11 Pages.
 PCT/US2016/018040, "International Application Serial No. PCT/US2016/018040, International Search Report and Written Opinion mailed Jul. 6, 2016", Osterhout Group, Inc., 10 pages.
 PCT/US2015033379, "International Application Serial No. PCT/US2015/033379, International Search Report and Written Opinion mailed Nov. 30, 2015", Osterhout Group, Inc., 12 Pages.
 Plainis, Sotiris et al., "The Physiologic Mechanism of Accommodation", Cataract & Refractive Surgery Today Europe, Apr. 2014, pp. 23-29.
 Schedwill, "Bidirectional OLED Microdisplay", Fraunhofer Research Institution for Organics, Materials and Electronic Device Comedd, Apr. 11, 2014, 2 pages.
 Vogel, et al., "Data glasses controlled by eye movements", Information and communication, Fraunhofer-Gesellschaft, Sep. 22, 2013, 2 pages.
 Walton, Zach, "Wear This Smartphone Controller on Your Finger", <http://www.webpronews.com/wear-this-smartphone-controller-on-your-finger-2012-06>, 5 pages.
 Ye, Hui et al., "High Quality Voice Morphing", Cambridge University Engineering Department Trumpington Street, Cambridge, England, CB2 1PZ, 2004, pp. I-9-I-11.
 U.S. Appl. No. 15/259,473, filed Sep. 8, 2016, Pending.
 U.S. Appl. No. 15/259,465, filed Sep. 8, 2016, Pending.
 U.S. Appl. No. 15/281,504, filed Sep. 30, 2016, Pending.
 U.S. Appl. No. 29/581,145, filed Oct. 17, 2016, Pending.
 U.S. Appl. No. 15/334,412, filed Oct. 26, 2016, Pending.
 U.S. Appl. No. 15/347,958, filed Nov. 10, 2016, Pending.
 U.S. Appl. No. 15/352,745, filed Nov. 16, 2016, Pending.
 U.S. Appl. No. 15/400,982, filed Jan. 7, 2017, Pending.
 U.S. Appl. No. 15/395,690, filed Dec. 30, 2016, Pending.
 U.S. Appl. No. 15/397,920, filed Jan. 4, 2017, Pending.
 U.S. Appl. No. 15/389,387, filed Jan. 4, 2017, Pending.
 U.S. Appl. No. 29/589,483, filed Dec. 31, 2016, Pending.
 U.S. Appl. No. 29/589,676, filed Jan. 4, 2017, Pending.
 Losev, et al., "Light-emitting diode", Nov. 2016, pp. 1-25.
 PCT/US2015/026704, "International Application Serial No. PCT/US2015/026704, International Preliminary Report on Patentability and Written Opinion mailed Nov. 3, 2016", Osterhout Group, Inc., 10 Pages.

(56)

References Cited

OTHER PUBLICATIONS

PCT/US2015/033379, "International Application Serial No. PCT/US2015/033379, International Preliminary Report on Patentability and Written Opinion mailed Dec. 1, 2016", Osterhout Group, Inc., 8 Pages.

PCT/US2015/035192, "International Preliminary Report on Patentability and Written Opinion mailed Dec. 29, 2016", Osterhout Group, Inc., 8 Pages.

PCT/US2016/038008, "Application Serial No. PCT/US2016/038008, International Search Report and Written Opinion mailed Oct. 27, 2016", Osterhout Group, Inc., 8 pages.

PCT/US2016/042440, "Application Serial No. PCT/US2016/042440, the International Search Report and Written opinion mailed Oct. 13, 2016", Osterhout Group, Inc., 7 pages.

PCT/US2016/058023, "Application Serial No. PCT/US2016/058023, International Search Report and Written Opinion mailed Dec. 30, 2016", Osterhout Group, Inc., 13 pages.

* cited by examiner

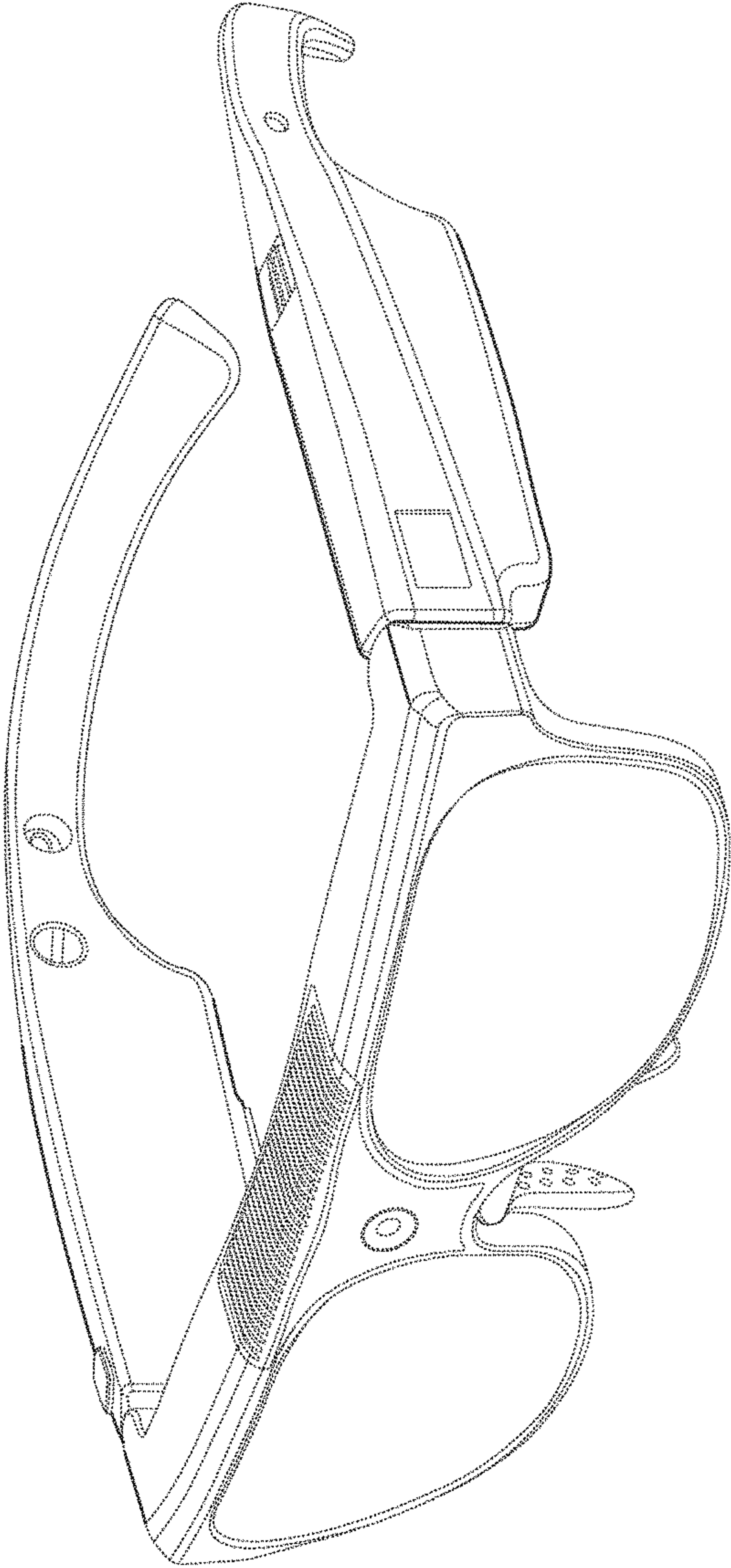


FIG. 1

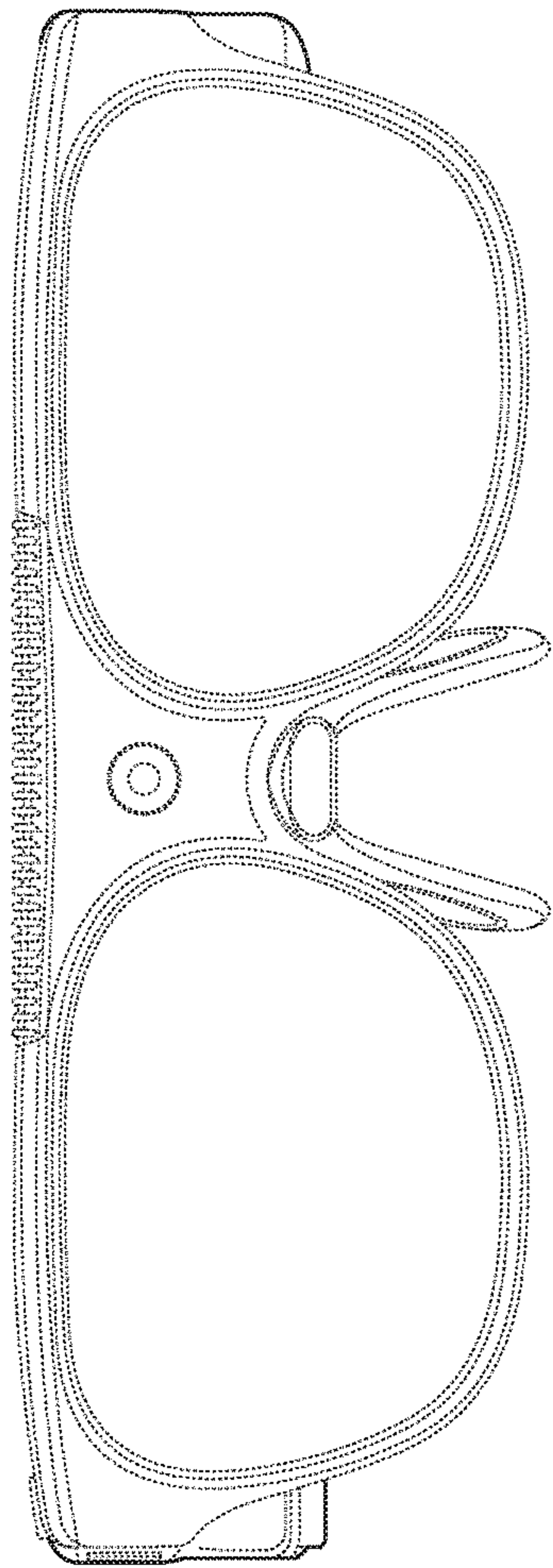


FIG. 2

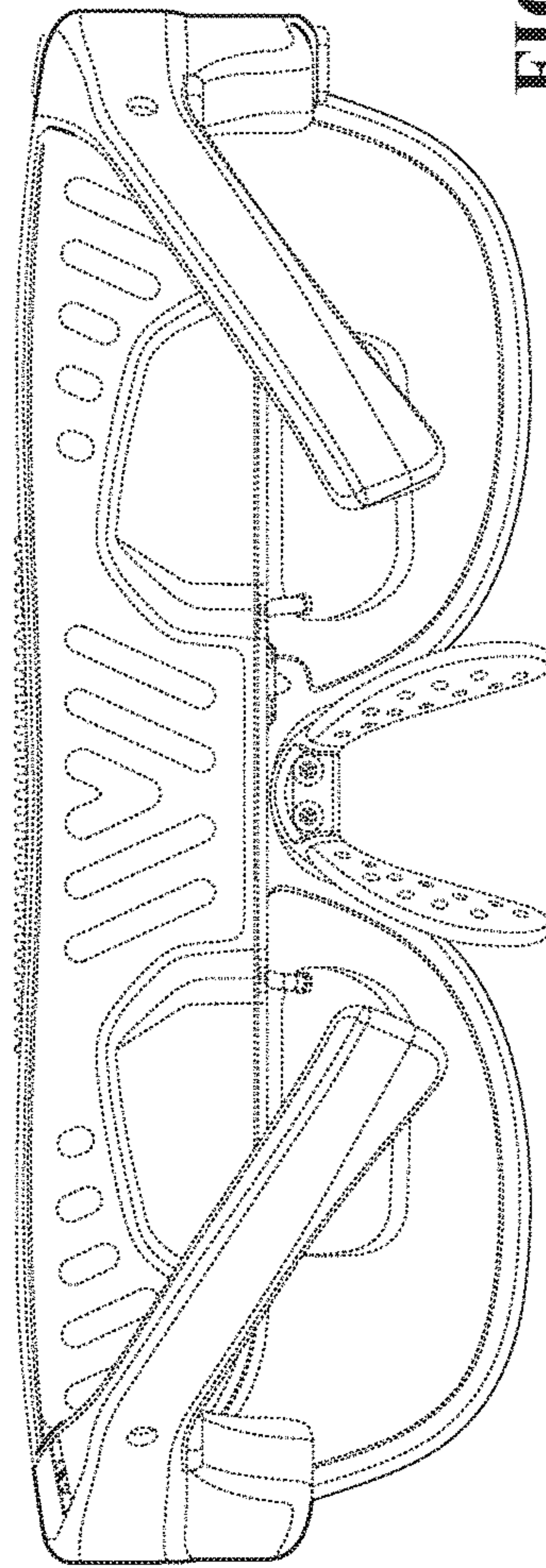
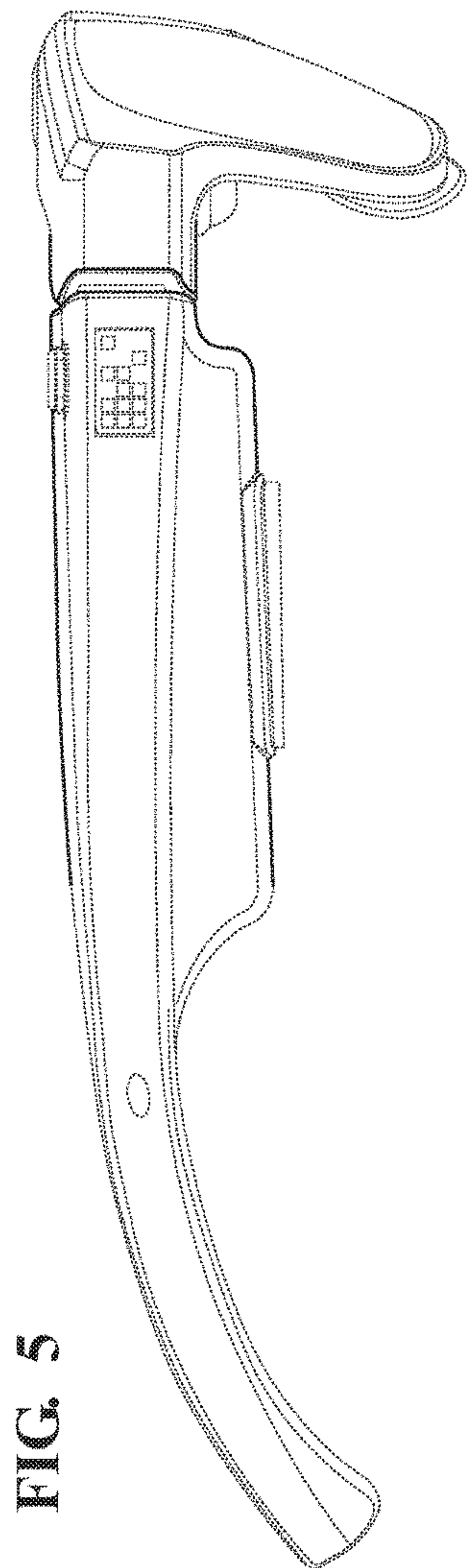
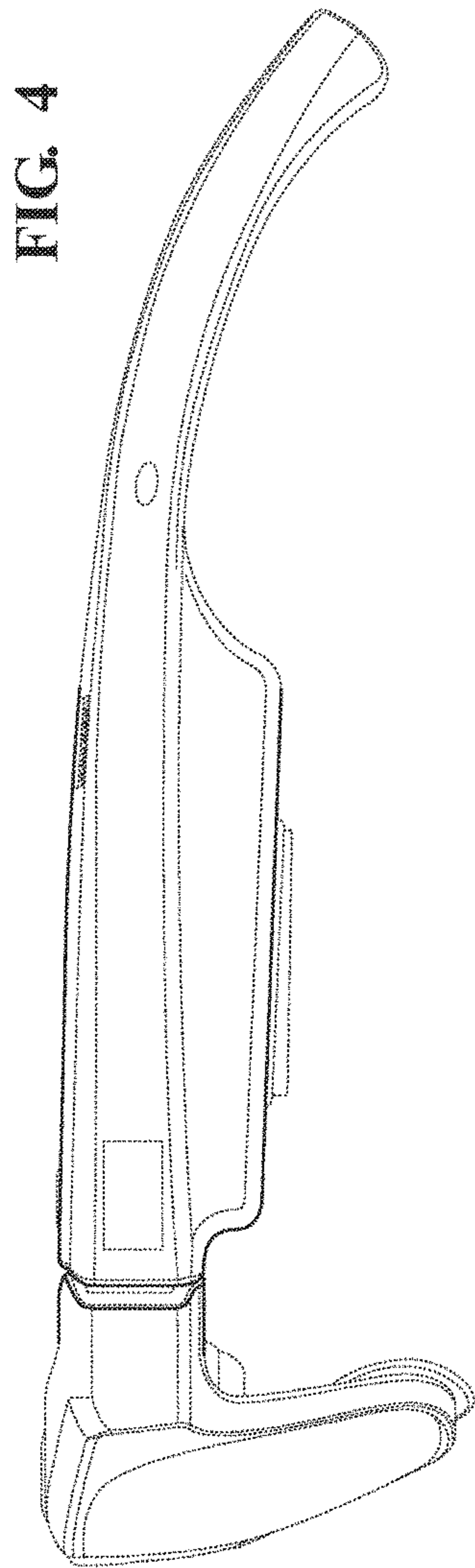


FIG. 3



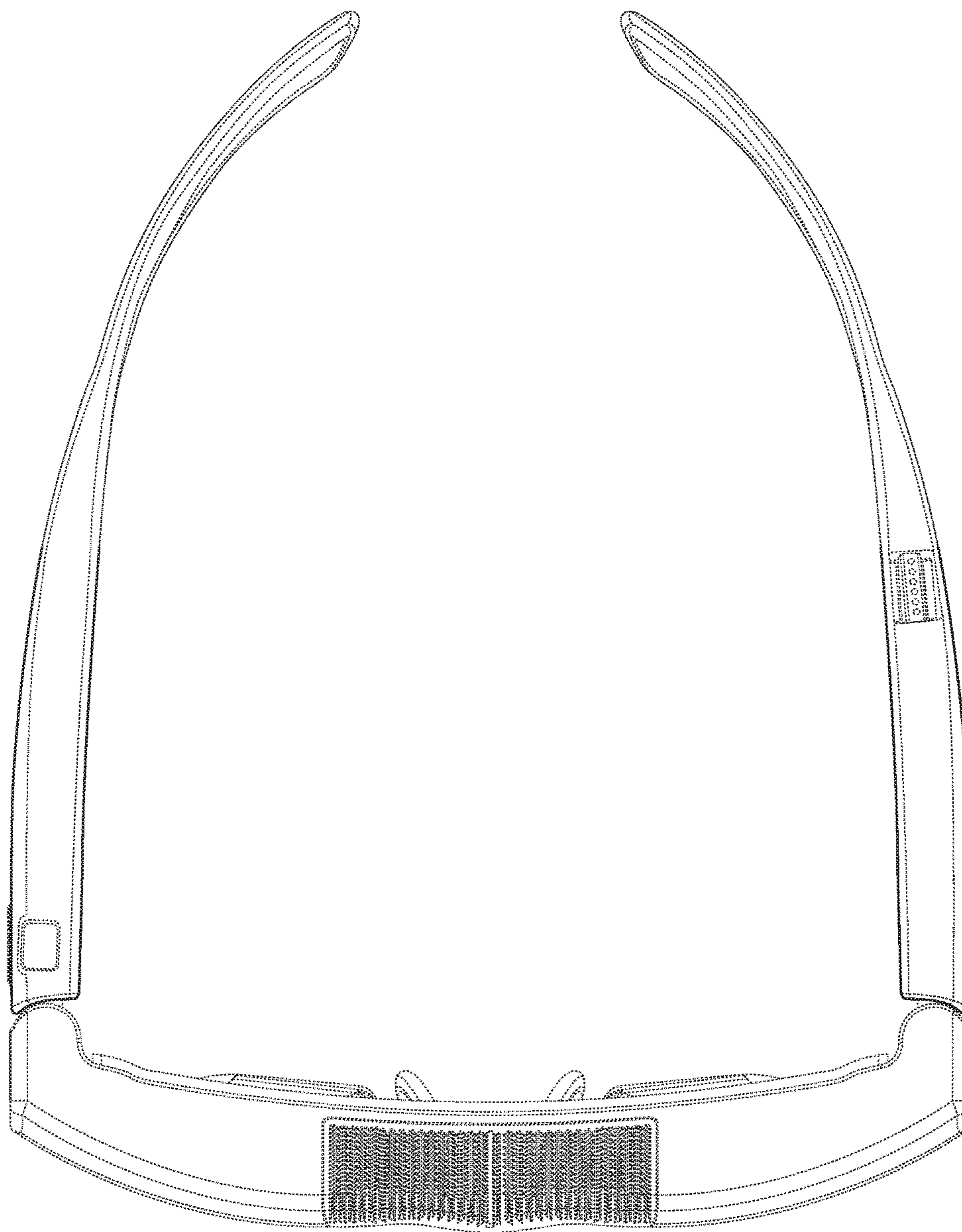


FIG. 6

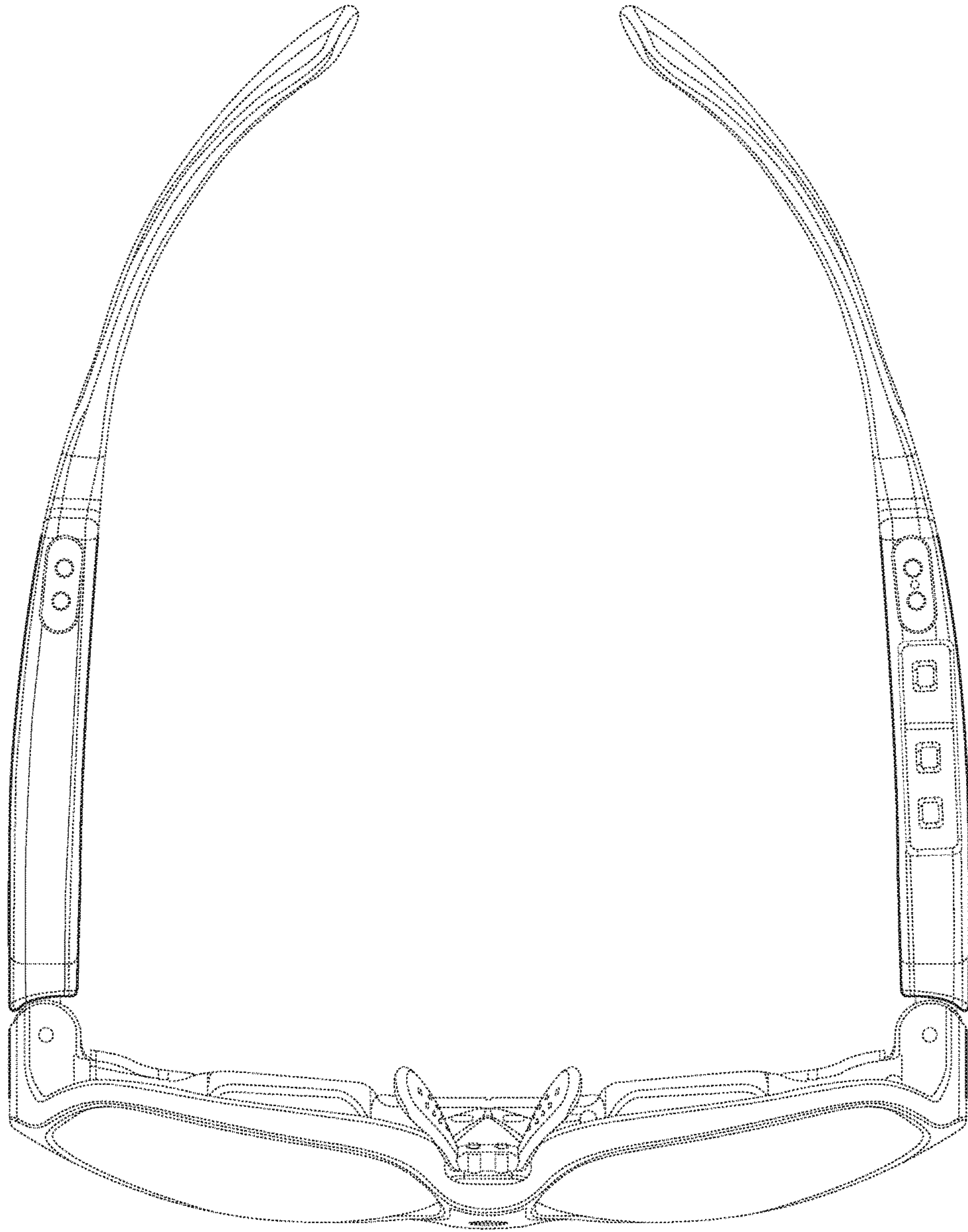


FIG. 7