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(12) **United States Design Patent** (10) **Patent No.:** **US D829,112 S**
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(54) **SENSING DEVICE**
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4,229,733 A 10/1980 Tulenko et al.
4,255,665 A 3/1981 Shriner
4,348,664 A 9/1982 Boschetti et al.
4,428,050 A 1/1984 Pellegrino et al.
D285,931 S * 9/1986 May D10/47
D286,298 S * 10/1986 May D10/47
4,726,688 A 2/1988 Ruel
4,851,686 A 7/1989 Pearson
5,008,548 A 4/1991 Gat
5,036,311 A 7/1991 Moran et al.
5,148,023 A 9/1992 Hayashi et al.
5,151,600 A 9/1992 Black
5,204,532 A 4/1993 Rosenthal

(Continued)

FOREIGN PATENT DOCUMENTS

JP 2011-221010 A 11/2011
WO WO01/52736 A1 7/2001

(Continued)

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USPC **D10/47**

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G01T 1/02; G01T 1/023; G01T 1/026;
G01T 1/04; G01T 1/06; G01T 1/08;
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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

376,547 A 1/1888 Pratt
2,949,880 A 8/1960 Stephen
3,268,839 A 8/1966 McFarland
3,878,496 A 4/1975 Erickson

OTHER PUBLICATIONS

Amini et al.; A wireless embedded device for personalized ultra-violet monitoring; Biodevices; 9; pp. 200-205; 2009.

(Continued)

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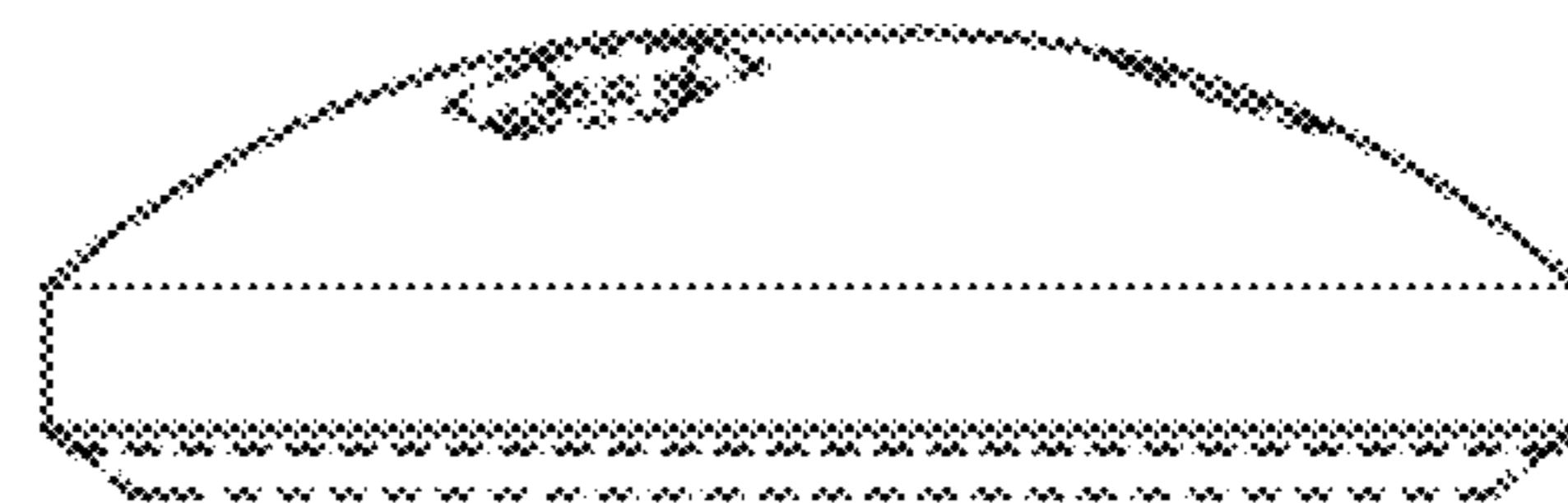
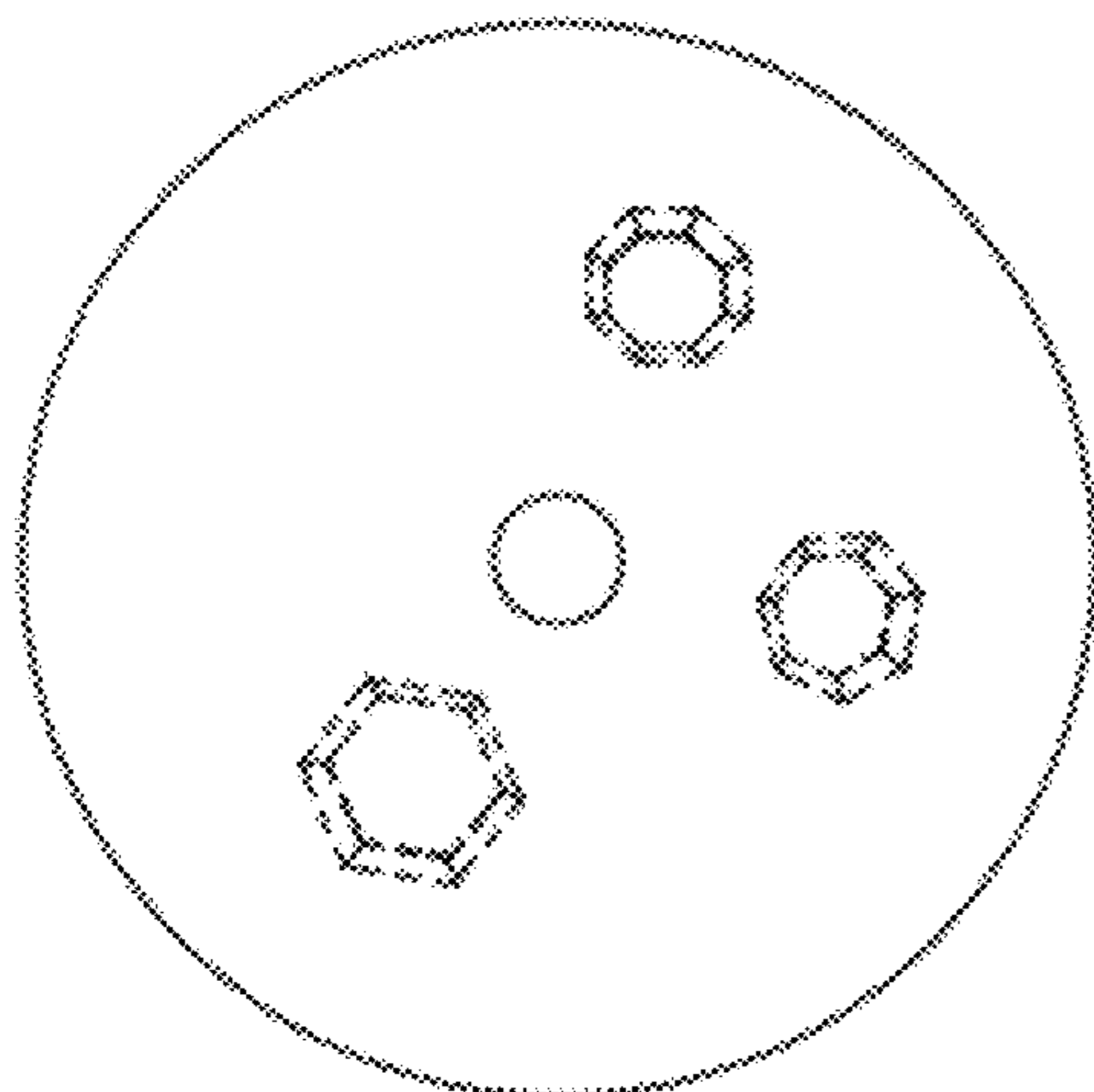
(57) **CLAIM**

The ornamental design for a sensing device, as shown and described.

DESCRIPTION

FIG. 1 is a top view of an embodiment of a sensing device; FIG. 2 is a back side view thereof; FIG. 3 is a left side view thereof; FIG. 4 is a front side view thereof; FIG. 5 is a right side view thereof; and, FIG. 6 is a bottom view thereof.

1 Claim, 1 Drawing Sheet



(56)

References Cited

U.S. PATENT DOCUMENTS

5,365,068 A 11/1994 Dickerson
 5,382,799 A 1/1995 May
 5,497,004 A 3/1996 Rudolph et al.
 5,500,532 A 3/1996 Kozicki
 5,731,589 A 3/1998 Sief et al.
 5,992,996 A 11/1999 Sawyer
 6,201,250 B1 3/2001 Morlock
 6,322,503 B1 11/2001 Sparhawk
 6,426,503 B1 7/2002 Wüest
 6,437,346 B1 8/2002 Goudjil
 6,439,763 B2 8/2002 Roeder et al.
 6,582,380 B2 6/2003 Kazlausky et al.
 D479,805 S 9/2003 Tsai
 6,729,756 B2 5/2004 Sezai
 6,967,447 B2 11/2005 Lim et al.
 D526,220 S * 8/2006 Wildey D10/46
 7,148,489 B2 12/2006 Yagi
 7,227,153 B2 6/2007 Yagi
 7,230,222 B2 6/2007 Cheng et al.
 7,265,358 B2 9/2007 Fontaine
 7,500,746 B1 3/2009 Howell et al.
 7,635,906 B2 12/2009 Nakamura et al.
 7,709,812 B2 5/2010 Simon et al.
 7,874,666 B2 1/2011 Xu et al.
 8,044,363 B2 10/2011 Ales et al.
 8,109,629 B2 2/2012 Howell et al.
 8,157,730 B2 4/2012 LeBoeuf et al.
 8,434,863 B2 5/2013 Howell et al.
 8,487,267 B2 7/2013 Abe et al.
 8,558,155 B2 10/2013 Tomlinson et al.
 8,586,938 B2 11/2013 Tsubata et al.
 8,605,802 B2 12/2013 Lee et al.
 8,829,457 B2 9/2014 Smith et al.
 9,068,887 B1 6/2015 Bennouri et al.
 9,360,364 B2 6/2016 Hingorani et al.
 9,368,537 B1 6/2016 Holmes et al.
 2003/0150998 A1 8/2003 Shin et al.
 2004/0149921 A1 8/2004 Smyk
 2004/0225530 A1 11/2004 Bell et al.
 2005/0190655 A1 9/2005 Blumberg
 2005/0226446 A1 10/2005 Luo et al.
 2006/0289779 A1 12/2006 Marmaropoulos
 2007/0073487 A1 3/2007 Albright et al.
 2007/0170366 A1 7/2007 Lin et al.
 2008/0103561 A1 5/2008 Moscovici
 2008/0217611 A1 9/2008 Nakamura et al.
 2009/0090865 A1 4/2009 Lub et al.
 2009/0296533 A1 12/2009 Kojima
 2010/0163750 A1 7/2010 Hunwick, III et al.
 2010/0308105 A1 12/2010 Savarese et al.
 2011/0133103 A1 6/2011 Folkesson
 2011/0190595 A1 8/2011 Bennett et al.
 2011/0191272 A1 8/2011 McGuire
 2012/0115512 A1 5/2012 Grainger et al.
 2012/0241618 A1 9/2012 Hsu et al.
 2012/0326046 A1 12/2012 Aslam et al.
 2013/0020477 A1 1/2013 Castellan et al.
 2013/0096466 A1 4/2013 Sarrafzadeh et al.
 2014/0032165 A1 1/2014 Sarrafzadeh et al.
 2014/0092238 A1 4/2014 Sandhu et al.
 2014/0145860 A1 5/2014 Park et al.
 2014/0296658 A1 10/2014 Yuen et al.
 2014/0374600 A1 12/2014 Gokingco et al.
 2015/0041663 A1 2/2015 Oliver et al.
 2015/0102208 A1 4/2015 Appelboom et al.
 2015/0136975 A1 5/2015 Sugaya et al.
 2015/0168365 A1 6/2015 Conner
 2015/0177055 A1 6/2015 Lian et al.
 2015/0177056 A1 6/2015 Lian et al.
 2015/0177057 A1 6/2015 Lian et al.
 2015/0177058 A1 6/2015 Lian et al.
 2015/0177059 A1 6/2015 Lian et al.
 2015/0177063 A1 6/2015 Lian et al.
 2015/0294080 A1 10/2015 Garnavi et al.

2015/0346025 A1 12/2015 Spinella et al.
 2015/0347625 A1 12/2015 Werneck et al.
 2016/0109959 A1 4/2016 Heo

FOREIGN PATENT DOCUMENTS

WO WO2005/103923 A2 11/2005
 WO WO2011/094742 A2 8/2011
 WO WO2013/034288 A1 3/2013
 WO WO2013/106653 A1 7/2013

OTHER PUBLICATIONS

Bharatula et al.; Towards wearable autonomous microsystems; Pervasive Computing: Proceedings of the 2nd Int'l Conference; pp. 225-237; Vienna, Austria; Apr. 18-23, 2004.
 CDC; Sunburn prevalence among adults—United States 1991, 2003 and 2004; MMWR Weekly; 56(21); pp. 524-528; (9 pgs. printed); Jun. 1, 2007.
 Chang et al.; Sun exposure and melanoma risk at different latitudes: a pooled analysis of 5700 cases and 7216 controls; Int J Epidemiol.; 38(3); pp. 814-830; Jun. 2009.
 Chiche et al.; Seasonal variations of systemic lupus erythematosus flares in southern France; Eur. J. Intern. Med.; 23(3); pp. 250-254; Apr. 2012.
 Corral et al.; Bright light therapy's effect on postpartum depression; Am J Psychiatry; 157(2); pp. 303-304; Feb. 2000.
 Corr ea et al.; Comparison between UV index measurements performed by research-grade and consumer-products instruments; Photochem. Photobiol. Sci.; 9; pp. 459-463; online: Mar. 19, 2010.
 Cortes et al.; Support-vector networks; Machine Learning; 20(3); pp. 273-297; Sep. 1995.
 Dennis et al.; Sunburns and risk of cutaneous melanoma: does age matter? A comprehensive meta-analysis; Ann Epidemiol; 18(8); pp. 614-627 (author manuscript, 25 pgs printed); Aug. 2008.
 Diffey et al.; The standard erythema dose: a new photobiological concept; Journal of Photodermatology, Photoimmunology & Photomedicine; 13(1-2); pp. 64-66; Feb./Apr. 1997.
 Environmental Protection Agency; Ultraviolet and Ozone Monitoring Program (program information); retrieved Oct. 24, 2016 from the internet archive: (<http://web.archive.org/web/20080516110808/http://www.epa.gov/uvnet/>); last updated: Jan./Feb. 2008.
 Fahrni et al.; Sundroid: Solar Radiation Awareness with Smartphones; Proceedings of the 13th Int'l. Conf. on Ubiquitous Computing (UbiComp '11); Beijing, China; pp. 365-374; Sep. 17-21, 2011.
 Gerd Neumann Jr.; Deep-Black Optical Paint (product page); 1 pg.; retrieved from the internet: (<http://www.gerdneumann.net/english/instrument-building-parts-telle-fuer-den-fernrohrbau/totmatte-schwarze-optikfarbe-deep-black-optical-paint.html>) on Oct. 24, 2016.
 Hartigan, John A.; Clustering Algorithms; John Wiley & Sons, Inc.; pp. 84-99; Apr. 1975.
 Hartigan et al.; Algorithm AS 136: A K-Means Clustering Algorithm; Journal of the Royal Statistical Society. Series C (Applied Statistics); 28(1); pp. 100-108; 1979.
 Heckman et al.; Minimal erythema dose (MED) testing; J. Vis. Exp.; 75; e50175; 5 pgs.; May 2013.
 Heydenreich et al.; Miniature personal electronic UVR dosimeter with erythema response and time-stamped reading in a wristwatch; Photochem Photobiol.; 81(5); pp. 1138-1144; Sep./Oct. 2005.
 Horsley et al.; Current action for skin cancer risk reduction in English schools: pupils' behaviour in relation to sunburn; Health Educ Res.; 17(6); pp. 715-731; Dec. 2002.
 Indiegogo; SunFriend UV Daily Activity Monitor(product information); 8 pgs.; retrieved from the internet (<https://www.indiegogo.com/projects/sunfriend-uv-daily-activity-monitor>) on Oct. 19, 2016.
 Klein et al.; Analysis of compact fluorescent lights for use by patients with photosensitive conditions; Photochem Photobiol; 85(4); pp. 1004-1010; (15 pgs., author manuscript version); Jul./Aug. 2009.
 Larason et al.; Sources of error in UV radiation measurements; J. Res. Natl. Inst. Stand. Technol.; 106(4); pp. 649-656; Jul./Aug. 2001.

(56)

References Cited

OTHER PUBLICATIONS

Lindgren et al.; Measuring effective vitamin D3-producing ultraviolet B radiation using Solartech's Solarmeter 6.4 Handheld, UVB radiometer®; *Bull. Chicago Herp. Soc.*; 43(4); pp. 57-62; 2008.

MacKenzie; The analysis of the ultraviolet radiation doses required to produce erythematous responses in normal skin; *Br. J. Dermatol.*; 108(1); pp. 1-9; Jan. 1983.

McKinlay et al.; A reference action spectrum for ultra-violet induced erythema in human skin; *CIE J.*; 6(1); pp. 17-22; Mar. 1987.

Microsoft; Microsoft Band Official Site; Live healthier and be more productive (product information); 22 pgs.; retrieved from the internet (<http://www.microsoft.com/microsoft-band/en-us>) on Dec. 9, 2014.

NASA; Actillum (hardware information page); 1 pg.; retrieved from the internet: (https://ltda.jsc.nasa.gov/scripts/hardware/hardw.aspx?hardware_id=173) on Oct. 21, 2016.

Natatmo; Be Sun Savvy: June by natatmo (product information); 6 pgs.; Jan. 5, 2014 (product date: 2011).

Oren et al.; An Open Trial of Morning Light Therapy for Treatment of Antepartum Depression; *American Journal of Psychiatry*; 159(4); pp. 666-669; Apr. 2002.

Pveducation.org; Spectral Irradiance; 1 pg.; retrieved from the internet: (<http://www.pveducation.org/pvcdrom/2-properties-sunlight/spectral-irradiance>); on Oct. 24, 2016.

Rabin; A portable glow to help melt those winter blues; *New York Times* (p. D5) 4 pgs.; Nov. 15, 2011.

Rensselaer, Lighting Research Center; Demesimeter—Light and Activity Measurement System Description and Calibration; 14 pgs.; Sep. 2, 2011 (rev. Nov. 15, 2011).

Rogers et al.; Prevalence and determinants of sunburn in Queensland; *Health Promot J Austr.* 20(2); pp. 102-106; Aug. 2009.

Sayre et al.; Skin type, minimal erythema dose (MED), and sunlight acclimatization; *Am. Acad. Dermatology*; 5(4); pp. 439-443; Oct. 1981.

SBIR (STTR); Actillum—A monitor for activity and light exposure (research information); 2 pgs.; retrieved from the internet: (https://ltda.jsc.nasa.gov/scripts/hardware/hardw.aspx?hardware_id=173) on Oct. 21, 2016.

Schmalwieser et al.; A first approach in measuring, modeling and forecasting the vitamin D effective UV radiation; *SPIE Proceedings*; vol. 6362; Remote Sensing of Clouds and the Atmosphere XI, 63622C; Stockholm, Sweden; 9 pgs.; Sep. 11, 2006.

Solartech, Inc.; Radiometer UV Index: Model 6.5 (product information: SM/Sensors/Model 6.5 UV Index_09/2015); 2 pgs.; retrieved from the internet (<http://www.solarmeter.com/model65.html>) on Oct. 19, 2016.

Solartech, Inc.; Solarmeter Model 5.0 UV Meter; 2 pgs.; retrieved from the internet (<http://www.solarmeter.com/model5.html>) on Oct. 19, 2016.

Solartech, Inc.; Solarmeter Model 6.5 UV Meter; 4 pgs.; retrieved from the internet (<http://www.solarmeter.com/model65.html>) on Oct. 19, 2016.

Sunsprite; Sunsprite Personal Light Tracker (product information); © 2016; 6 pgs.; retrieved from the internet (<https://www.sunsprite.com/>) on Oct. 19, 2016.

Thieden et al.; The wrist is a reliable body site for personal dosimetry of ultraviolet radiation; *Journal of Photodermatology, Photoimmunology & Photomedicine*; 16(2); pp. 57-61; Apr. 2000.

Weichenthal et al.; Phototherapy: how does UV work?; *Photodermatol Photoimmunol Photomed.*; 21(5); pp. 260-266; Oct. 2005.

Wikipedia; Bluetooth low energy; 11 pgs.; retrieved from the internet (https://en.wikipedia.org/wiki/Bluetooth_low_energy) on Oct. 21, 2016.

Wikipedia; Diffuser (optics); 2 pgs.; retrieved from the internet ([https://en.wikipedia.org/wiki/Diffuser_\(optics\)](https://en.wikipedia.org/wiki/Diffuser_(optics))) on Oct. 21, 2016.

Wikipedia; Lambert's cosine law; 4 pgs.; retrieved from the internet (https://en.wikipedia.org/wiki/Lambert's_cosine_law) on Oct. 21, 2016.

Wikipedia; Norm (mathematics): 3.2 Euclidean norm (definition); 10 pgs.; retrieved from the internet: ([https://en.wikipedia.org/wiki/Norm_\(mathematics\)#Euclidean_norm](https://en.wikipedia.org/wiki/Norm_(mathematics)#Euclidean_norm)) on Oct. 24, 2016.

Wikipedia; Solar zenith angle; 2 pgs.; retrieved from the internet (https://en.wikipedia.org/wiki/Solar_zenith_angle) on Oct. 21, 2016.

Wirz-Justice; A randomized, double-blind, placebo-controlled study of light therapy for antepartum depression; *J Clin Psychiatry*; 72(7); pp. 986-993; Jul. 2011.

Zayat et al.; Preventing UV-light damage of light sensitive materials using a highly protective UV-absorbing coating; *Chem Soc Rev.*; 36(8); pp. 1270-1281; Aug. 2007.

Dumont et al.; U.S. Appl. No. 15/247,829 entitled "Methods, Systems, and Apparatuses For Accurate Measurement and Real-Time Feedback of Solar Ultraviolet Exposure", filed Aug. 25, 2016.

Dumont et al.; U.S. Appl. No. 15/247,837 entitled "Methods, Systems, and Apparatuses For Accurate Measurement and Real-Time Feedback of Solar Ultraviolet Exposure", filed Aug. 25, 2016.

Dumont et al.; U.S. Appl. No. 15/247,813 entitled "Methods, Systems, and Apparatuses For Accurate Measurement and Real-Time Feedback of Solar Ultraviolet Exposure", filed Aug. 25, 2016.

Dumont et al.; U.S. Appl. No. 15/247,819 entitled "Methods, Systems, and Apparatuses For Accurate Measurement and Real-Time Feedback of Solar Ultraviolet Exposure", filed Aug. 25, 2016.

Amazon.com; UV meter (search results); 5 pgs.; retrieved from the internet (https://www.amazon.com/s/ref=nb_sb_noss_1?url=search-alias%3Daps&field-keywords=uv+meter) on Dec. 9, 2014.

Ferguson et al.; Voluntary exposure of some western-hemisphere snake and lizard species to ultraviolet-B radiation in the field: How much ultraviolet-B should a lizard or snake receive in captivity?; *Zoo Biol*; 29(3); pp. 317-334; May/Jun. 2010.

Xu et al.; Characterization and calibration of broadband ultraviolet radiometers; *Metrologia*; 37(3); pp. 235-242; Jun. 2000.

Dumont et al.; U.S. Appl. No. 15/616,814 entitled "Methods, systems, and devices for calibrating light sensing devices," filed Jun. 7, 2017.

* cited by examiner

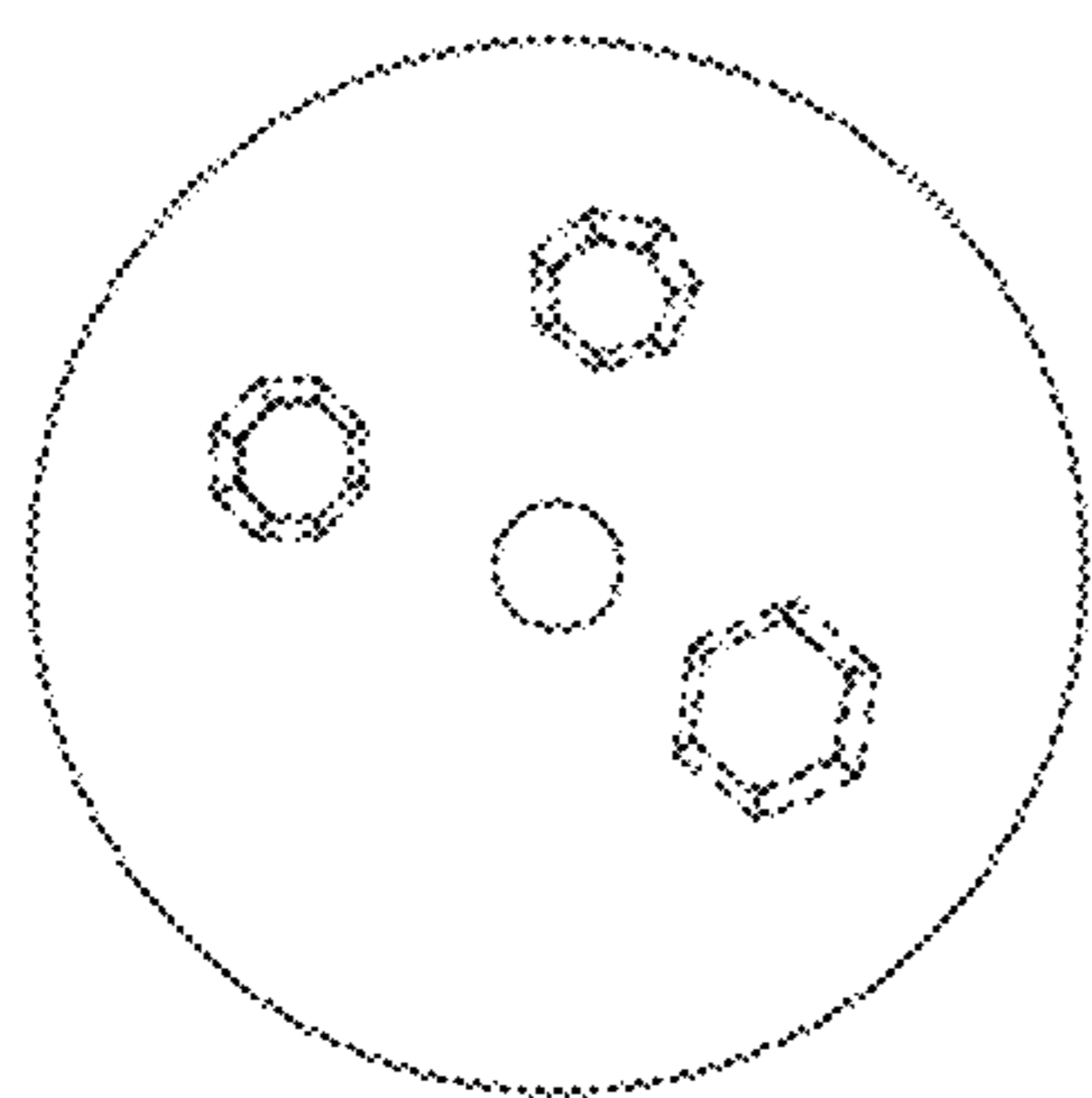


FIG. 1

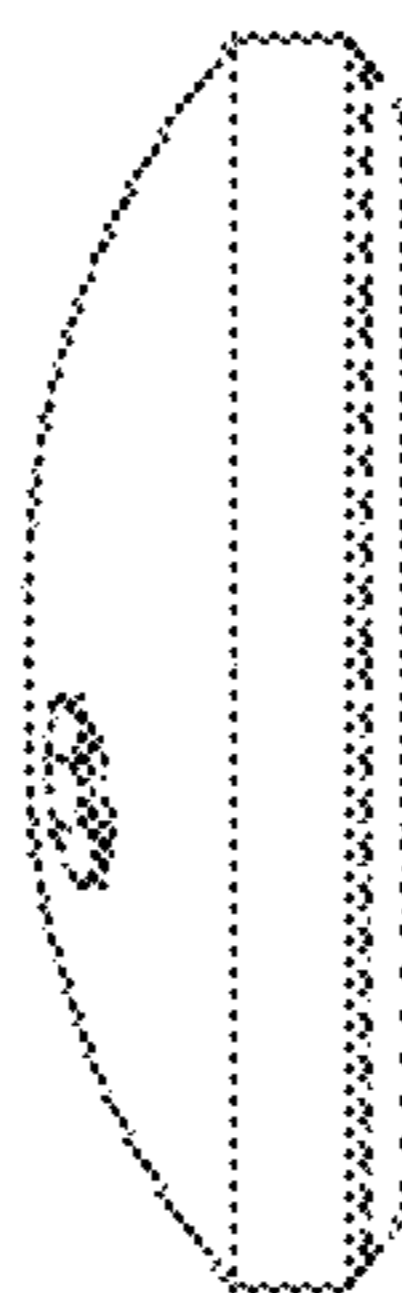


FIG. 2

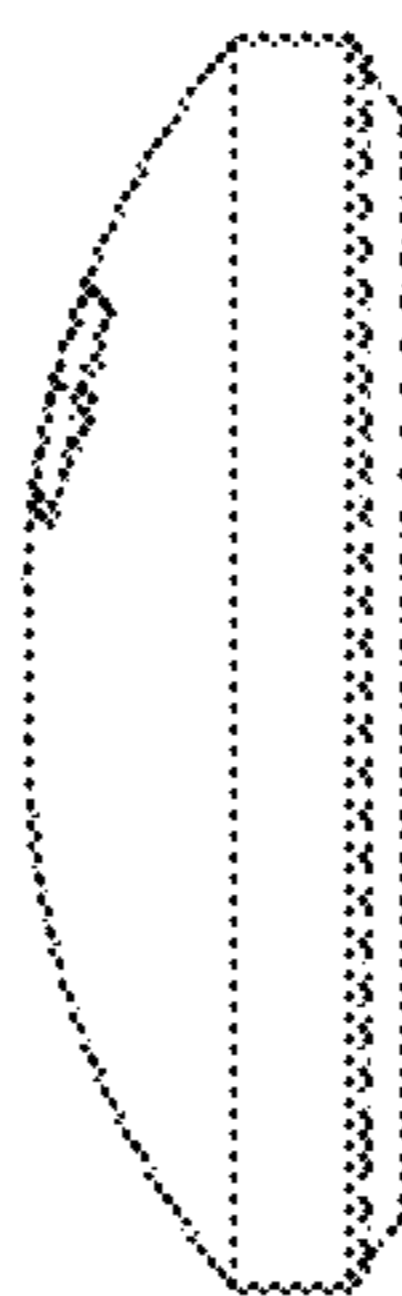


FIG. 3



FIG. 4



FIG. 5

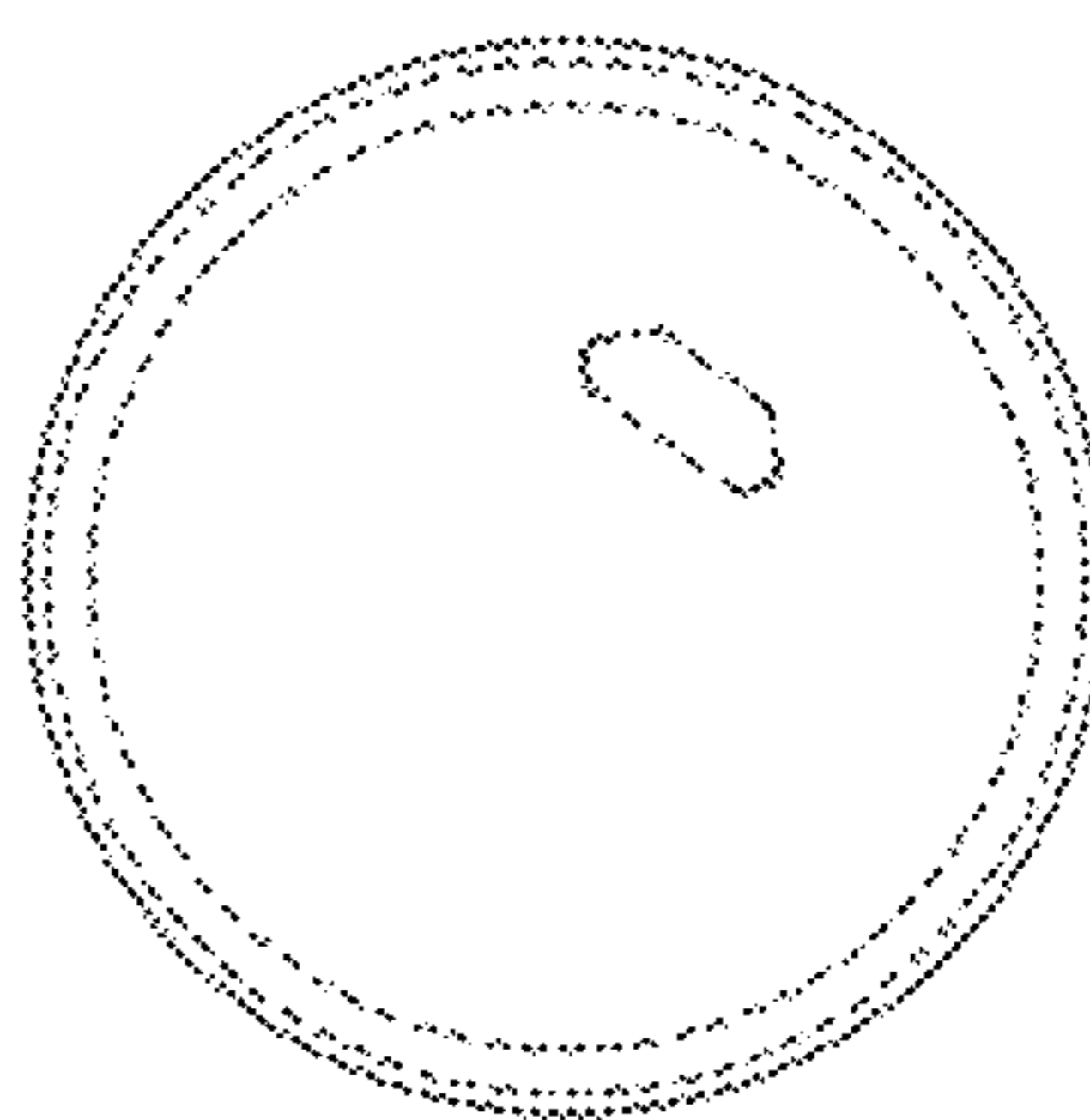


FIG. 6