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Ross, III et al.

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(54) **ANTENNA**

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(73) Assignee: **Antennas Direct, Inc.**, Ellisville, MO (US)

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

(21) Appl. No.: **29/713,645**

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Related U.S. Application Data

(63) Continuation-in-part of application No. 29/671,595, filed on Nov. 28, 2018, now Pat. No. Des. 867,347, which is a continuation-in-part of application No. 15/685,749, filed on Aug. 24, 2017, now Pat. No. 10,615,501, which is a continuation of application No. 14/308,422, filed on Jun. 18, 2014, now abandoned, and a continuation-in-part of application No. 29/430,632, filed on Aug. 28, 2012, now abandoned, which is a continuation-in-part of application No. 29/376,791, filed on Oct. 12, 2010, now Pat. No. Des. 666,178, said application No. 14/308,422 is a continuation-in-part of application No. 13/759,750, filed on Feb. 5, 2013, now Pat. No. 8,994,600, which is a continuation-in-part of application No. 12/606,636, filed on Oct. 27, 2009, now Pat. No. 8,368,607, which is a continuation-in-part of application No. 12/050,133, filed on Mar. 17, 2008, now Pat. No. 7,609,222, which is a continuation-in-part of application No. 29/304,423, filed on Feb. 29, 2008, now Pat. No. Des. 598,433, said application No. 12/606,636 is a continuation-in-part of application No. 12/040,464, filed on Feb. 29, 2008, now Pat. No. 7,839,347, said application No. 12/606,636 is a continuation-in-part of application No. 29/305,294, filed on Mar. 17, 2008,

now Pat. No. Des. 604,276, which is a continuation-in-part of application No. 12/040,464, filed on Feb. 29, 2008, now Pat. No. 7,839,347, and a continuation-in-part of application No. 12/050,133, filed on Mar. 17, 2008, now Pat. No. 7,609,222, said application No. 12/606,636 is a continuation-in-part of application No. PCT/US2008/061908, filed on Apr. 29, 2008, and a continuation of application No. 12/040,464, filed on Feb. 29, 2008, now Pat. No. 7,839,347, and a continuation of application No. 12/050,133, filed on Mar. 17, 2008, now Pat. No. 7,609,222.

(51) **LOC (12) Cl.** **14-03**

(52) **U.S. Cl.**

USPC **D14/230**

(58) **Field of Classification Search**

USPC D14/138, 230-238, 299, 358; D12/42, D12/43

CPC H01Q 7/00; H01Q 13/10; H01Q 9/285; H01Q 19/30; H01Q 19/12; H01Q 1/38; H01Q 1/36; H04B 1/0475; H04B 1/034; H05K 11/00

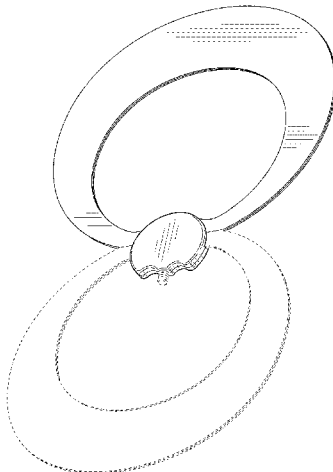
See application file for complete search history.

(56)

References Cited

U.S. PATENT DOCUMENTS

| | | |
|-------------|---------|-----------------|
| 2,060,098 A | 11/1936 | Norman |
| 2,220,008 A | 10/1940 | Woodward et al. |
| 2,437,251 A | 3/1948 | Frische et al. |
| 2,480,155 A | 8/1949 | Masters |
| 2,589,578 A | 3/1952 | Sabins |
| D170,203 S | 8/1953 | Leonard |
| D171,560 S | 2/1954 | Ritter |
| D177,200 S | 3/1956 | Valiulis |
| D179,111 S | 11/1956 | Ballan |
| 2,821,710 A | 1/1958 | Hale |
| 3,015,101 A | 12/1961 | Turner et al. |
| 3,123,826 A | 3/1964 | Durham |
| 3,161,975 A | 12/1964 | McMillan |
| 3,239,838 A | 3/1966 | Kelleher |
| 3,261,019 A | 7/1966 | Lundy |
| 3,273,158 A | 9/1966 | Fouts et al. |
| D209,402 S | 11/1967 | Burlingame |
| D211,025 S | 5/1968 | Callaghan |
| 3,434,145 A | 3/1969 | Wells |



| | | | | | | |
|----------------|---------|----------------------|-----------------|---------|----------------------|---------|
| 3,521,284 A | 7/1970 | Strom et al. | D850,425 S * | 6/2019 | Yang | D14/230 |
| 3,560,983 A | 2/1971 | Willie et al. | D867,347 S | 11/2019 | Ross, III et al. | |
| 3,587,105 A | 6/1971 | Neilson | D868,045 S | 11/2019 | Ross, III | |
| 3,721,990 A | 3/1973 | Gibson et al. | D868,720 S | 12/2019 | Feit et al. | |
| 3,739,388 A | 6/1973 | Callaghan | 2002/0158798 A1 | 10/2002 | Chiang et al. | |
| 3,828,867 A | 8/1974 | Elwood | 2003/0071757 A1 | 4/2003 | Yamaki | |
| 3,971,031 A | 7/1976 | Burke | 2004/0090379 A1 | 5/2004 | Fourdeux et al. | |
| 4,183,027 A | 1/1980 | Ehrenspeck | 2004/0090385 A1 | 5/2004 | Green | |
| 4,184,163 A | 1/1980 | Woodward | 2004/0113841 A1 | 6/2004 | Louzir et al. | |
| 4,418,427 A | 11/1983 | Muterspaugh | 2004/0217912 A1 | 11/2004 | Mohammadian | |
| D308,521 S | 6/1990 | Lonczak | 2005/0088342 A1 | 4/2005 | Parsche | |
| D310,671 S | 9/1990 | Weiss | 2005/0162332 A1 | 7/2005 | Schantz | |
| 4,987,424 A | 1/1991 | Tamura et al. | 2005/0259023 A1 | 11/2005 | Wang | |
| D318,673 S | 7/1991 | Terk | 2005/0280582 A1 | 12/2005 | Powell et al. | |
| D327,690 S | 7/1992 | Ogawa et al. | 2006/0033665 A1 | 2/2006 | Yang | |
| D332,262 S | 1/1993 | Borchardt | 2006/0055618 A1 | 3/2006 | Poilasne et al. | |
| 5,280,645 A | 1/1994 | Nguyen et al. | 2006/0077115 A1 | 4/2006 | Oh et al. | |
| D344,731 S | 3/1994 | Witzky | 2006/0103577 A1 | 5/2006 | Lee | |
| D345,982 S | 4/1994 | Lucey | 2006/0164304 A1 | 7/2006 | Huang et al. | |
| 5,313,218 A | 5/1994 | Busking | 2007/0069955 A1 | 3/2007 | McCorkle | |
| 5,943,025 A | 8/1999 | Benham et al. | 2007/0200769 A1 | 8/2007 | Nakano et al. | |
| D414,495 S | 9/1999 | Heiligenstein et al. | 2008/0040464 A1 | 2/2008 | Chia | |
| 5,959,586 A | 9/1999 | Benham et al. | 2008/0094291 A1 | 4/2008 | Bystrom et al. | |
| D421,610 S | 3/2000 | Ghalebi | 2008/0211720 A1 | 9/2008 | Hansen | |
| 6,054,963 A | 4/2000 | Muterspaugh | 2008/0258980 A1 | 10/2008 | Chen et al. | |
| 6,239,764 B1 | 5/2001 | Timofeev et al. | 2008/0291345 A1 | 11/2008 | Schneider | |
| D449,593 S | 10/2001 | Schultz | 2009/0058732 A1 | 3/2009 | Nakano et al. | |
| 6,590,541 B1 | 7/2003 | Schultze | 2009/0073067 A1 | 3/2009 | Soler Castany et al. | |
| 6,593,886 B2 | 7/2003 | Schantz | 2009/0146899 A1 | 6/2009 | Schneider et al. | |
| D480,714 S | 10/2003 | Wang | 2010/0085269 A1 | 4/2010 | Sadowski et al. | |
| 6,680,708 B2 | 1/2004 | Yamaki | 2014/0292597 A1 | 10/2014 | Schneider et al. | |
| D501,468 S | 2/2005 | Wang | | | | |
| 6,885,352 B2 | 4/2005 | Lee et al. | | | | |
| 6,917,793 B2 | 7/2005 | Wang | | | | |
| 6,922,179 B2 | 7/2005 | McCollum | | | | |
| 7,091,925 B1 | 8/2006 | Wang | | | | |
| 7,126,556 B1 | 10/2006 | Wang | | | | |
| 7,209,089 B2 | 4/2007 | Schantz | | | | |
| D544,471 S | 6/2007 | Wang | | | | |
| 7,239,290 B2 | 7/2007 | Poilasne et al. | | | | |
| 7,245,266 B1 | 7/2007 | Szente et al. | | | | |
| D558,189 S | 12/2007 | Inoue | | | | |
| 7,356,362 B2 | 4/2008 | Chang et al. | | | | |
| 7,436,973 B2 | 10/2008 | Liao | | | | |
| D581,931 S | 12/2008 | Pine | | | | |
| D585,883 S | 2/2009 | Kaneko | | | | |
| D598,433 S | 8/2009 | Schneider et al. | | | | |
| D598,434 S | 8/2009 | Schneider et al. | | | | |
| D598,469 S | 8/2009 | Harris, Jr. | | | | |
| 7,609,222 B2 | 10/2009 | Schneider et al. | | | | |
| D604,276 S | 11/2009 | Schneider et al. | | | | |
| D611,460 S | 3/2010 | Chao | | | | |
| 7,693,570 B2 | 4/2010 | Green et al. | | | | |
| D624,531 S | 9/2010 | Fleck et al. | | | | |
| 7,839,347 B2 | 11/2010 | Schneider et al. | | | | |
| 7,839,351 B2 | 11/2010 | Schadler et al. | | | | |
| 7,898,496 B2 | 3/2011 | Olsen et al. | | | | |
| D638,031 S | 5/2011 | Lee et al. | | | | |
| 7,936,311 B2 | 5/2011 | Rowser et al. | | | | |
| 7,990,335 B2 | 8/2011 | Schneider et al. | | | | |
| D655,692 S | 3/2012 | Silverman et al. | | | | |
| 8,144,069 B2 | 3/2012 | Sadowski et al. | | | | |
| 8,174,457 B1 | 5/2012 | Lam | | | | |
| D664,564 S | 7/2012 | Gillett et al. | | | | |
| D666,178 S | 8/2012 | Schneider et al. | | | | |
| 8,368,607 B2 | 2/2013 | Schneider et al. | | | | |
| 8,736,500 B1 | 5/2014 | Lam | | | | |
| D721,737 S | 1/2015 | Ahn et al. | | | | |
| 8,994,600 B2 * | 3/2015 | Schneider | H01Q 7/00 | | | |
| | | | 343/741 | | | |

FOREIGN PATENT DOCUMENTS

| | | | |
|----|-----------------|----|---------|
| CN | 201243084 | Y | 5/2009 |
| CN | ZL2008200072832 | | 5/2009 |
| CN | ZL2008301199963 | | 5/2009 |
| CN | 101453057 | A | 6/2009 |
| CN | ZL2008301199978 | | 7/2009 |
| CN | ZL2008300091398 | | 9/2009 |
| CN | 203707328 | U | 7/2014 |
| EM | 000946587 | | 5/2008 |
| EP | 1555717 | A1 | 7/2005 |
| EP | 1653560 | A1 | 5/2006 |
| EP | 1753080 | A1 | 2/2007 |
| GB | 2263360 | A | 7/1993 |
| JP | D1213590 | | 6/2004 |
| TW | M249233 | U | 11/2004 |
| TW | D112283 | | 8/2006 |
| TW | D119092 | | 9/2007 |
| TW | 200926506 | A | 6/2009 |
| TW | D129744 | | 7/2009 |
| TW | D129745 | | 7/2009 |
| TW | D129746 | | 7/2009 |
| WO | WO-2009073249 | A1 | 6/2009 |

OTHER PUBLICATIONS

“Analog High-Definition Television System”, Wikipedia: the Free Encyclopedia. Wikimedia Foundation, Inc. Oct. 12, 2016. Web. Mar. 16, 2017, 5 pages.

“Television Antenna”, Wikipedia: The Free encyclopedia. Wikimedia Foundation, Inc. Mar. 13, 2017. Web. Mar. 15, 2017, 6 pages.

A Broadband Eccentric Annular Slot Antenna, Young Hoon Suh and Ikmo Park, Department of Electrical Engineering, Ajou University, pp. 94-97, IEEE copyright notice 2001.

A Printed Crescent Patch Antenna for Ultrawideband Applications, Ntsanderh C. Azenui an H.Y.D. Yang, IEEE Antennas and Wireless Propagation Letters, vol. 6, 2007, pp. 113-116.

Antenna Engineering Handbook, 3rd Edition, Edited by Richard C. Johnson, McGraw Hill, 1993, pp. 5-13 to 5-16.

Antenna Theory: a. Review, Balanis, Proc. IEEE vol. 80 No. 1 Jan. 1992, 17 pages.

Antennas Direct. PF7 Picture Frame Antenna, Oct. 1. 2005, Antennas Direct, <http://web.archive.org/web/2005100102653/http://antennasdirect.com/PF7.su-b--antenna.html>. 1 page.

| | | | |
|---------------|---------|------------------|---------|
| D809,490 S | 2/2018 | Feit | |
| D815,073 S | 4/2018 | Feit | |
| D824,884 S | 8/2018 | Ross, III | |
| D831,010 S | 10/2018 | Yang | |
| 10,128,575 B2 | 11/2018 | Ross, III et al. | |
| D837,769 S * | 1/2019 | Yang | D14/230 |
| D838,697 S * | 1/2019 | Yang | D14/230 |
| D847,798 S * | 5/2019 | Yang | D14/230 |
| D849,722 S * | 5/2019 | Yang | D14/230 |

C. M. Shah, S. Siriam, M. Bhaskaran and A. Mitchell, "Large area metal-silicone flexible electronic structures," 2010 Conference on Optoelectronic and Microelectronic Materials and Devices, Canberra, ACT, 2010, pp. 187-188.

Chinese office action dated Nov. 4, 2015 for Chinese application No. 2014101113505 filed Feb. 7, 2014, published as CN103972657 on Aug. 6, 2014, which names the same inventors, Richard E. Schneider and John Edwin Ross III, as the instant application but is not related through a priority claim; 7 pages.

Clearstream.TM. 2V; <http://www.antennasdirect.com/cmss.sub.--files/attachementlibrary/pdf/C2--V-.sub.--Qs.sub.--FINAL.sub.--20120702.pdf>; Jul. 2, 2012; 2 pgs.

Design of Compact Components for Ultra Wideband Communication Front Ends. Marek Bialkowski, Amin Abbosh, and Hing Kan, School of Information Technology and Electrical Engineering, The University of Queensland, four pages.

European Search Report dated Apr. 24, 2014 for EP application No. 14153878.5 which claims priority to the instant application; 9 pages.

European Search Report dated Jan. 17, 2011, issued by the European Patent Office for European Patent Application No. EP 10193159.0 which is related to the instant application through a priority claim; (5 pages).

European Supplementary Search Report and Opinion dated Oct. 7, 2010, issued by the European Patent Office for European Patent Application No. EP 08747115 (6 pages).

Frequency—and Time-Domain Modeling of Tapered Loop Antennas in Ultra-Wideband Radio Systems, Shiou-Li Chen and Shau-Gang Mao, Graduate Institute of Computer and Communication Engineer, pp. 179-182, IEEE copyright notice 2006.

IEEE Spectrum: Antennas for the New Airwaves, <http://www.spectrum.ieee.org/print/7328>, Published Feb. 2009, 9 pages, Authors Richard Schneider and John Ross.

Mao S-G et al., "Time-domain characteristics of ultra-wideband tapered loop antennas", Electronics Letters, IEE Stevenage, GB, vol. 42, No. 22, Oct. 26, 2006; 1262-1264; 2 pages.

One-Element Loop Antenna with Finite Reflector, B. Rojarayanont and T. Sekiguchi, Electronics & Communications in Japan, vol. 59-B, No. 5, May 1976, p. 68.

Planar Miniature Tapered-Slot-Fed Annular Slot Antennas for Ultrawide-Band Radios, Tzyh-Ghuang Ma, Student Member, and Shyh-Kang, Jeng, Senior Member, IEEE, IEEE Transactions on Antennas and Propagation, vol. 53, No. 3, Mar. 2005, pp. 1194-1202.

Self-Mutual Admittances of Two Identical Circular Loop Antennas in a Conducting Medium and in Air, K. Iizuka, Senior Member, IEEE, R. W. P. King, Fellow, IEEE, and C. W. Harrison, Jr., Senior Member, IEEE, IEEE Transactions on Antennas and Propagation, vol. AP014, No. 4, Jul. 1966, pp. 440-450.

Tofel, Kevin C., HD Picture frame antenna, Aug. 11, 2005, <http://hd.engadget.com/2005/08/11/hd-picture-frame-antenna>, 1 page.

* cited by examiner

Primary Examiner — John Windmuller
(74) *Attorney, Agent, or Firm* — Harness, Dickey & Pierce, P.L.C.; Anthony G. Fussner

(57) CLAIM

The ornamental designs for an antenna, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a first embodiment of an antenna, showing our new design;

FIG. 2 is a back perspective view of the antenna shown in FIG. 1;

FIG. 3 is a front elevation view of the antenna shown in FIG. 1;

FIG. 4 is a back elevation of the antenna shown in FIG. 1;

FIG. 5 is a right elevation view of the antenna shown in FIG. 1;

FIG. 6 is a left elevation view of the antenna shown in FIG. 1;

FIG. 7 is a top plan view of the antenna shown in FIG. 1;

FIG. 8 is a bottom plan view of the antenna shown in FIG. 1;

FIG. 9 is a perspective view of a second embodiment of an antenna, showing our new design;

FIG. 10 is a back perspective view of the antenna shown in FIG. 9;

FIG. 11 is a front elevation view of the antenna shown in FIG. 9;

FIG. 12 is a back elevation of the antenna shown in FIG. 9;

FIG. 13 is a right elevation view of the antenna shown in FIG. 9;

FIG. 14 is a left elevation view of the antenna shown in FIG. 9;

FIG. 15 is a top plan view of the antenna shown in FIG. 9;

FIG. 16 is a bottom plan view of the antenna shown in FIG. 9;

FIG. 17 is a perspective view of a third embodiment of an antenna, showing our new design;

FIG. 18 is a back perspective view of the antenna shown in FIG. 17;

FIG. 19 is a front elevation view of the antenna shown in FIG. 17;

FIG. 20 is a back elevation of the antenna shown in FIG. 17;

FIG. 21 is a right elevation view of the antenna shown in FIG. 17;

FIG. 22 is a left elevation view of the antenna shown in FIG. 17;

FIG. 23 is a top plan view of the antenna shown in FIG. 17;

FIG. 24 is a bottom plan view of the antenna shown in FIG. 17;

FIG. 25 is a perspective view of a fourth embodiment of an antenna, showing our new design;

FIG. 26 is a back perspective view of the antenna shown in FIG. 25;

FIG. 27 is a front elevation view of the antenna shown in FIG. 25;

FIG. 28 is a back elevation of the antenna shown in FIG. 25;

FIG. 29 is a right elevation view of the antenna shown in FIG. 25;

FIG. 30 is a left elevation view of the antenna shown in FIG. 25;

FIG. 31 is a top plan view of the antenna shown in FIG. 25; and,

FIG. 32 is a bottom plan view of the antenna shown in FIG. 25.

In the drawings, the details shown in broken lines depict environmental subject matter only and form no part of the claimed design.

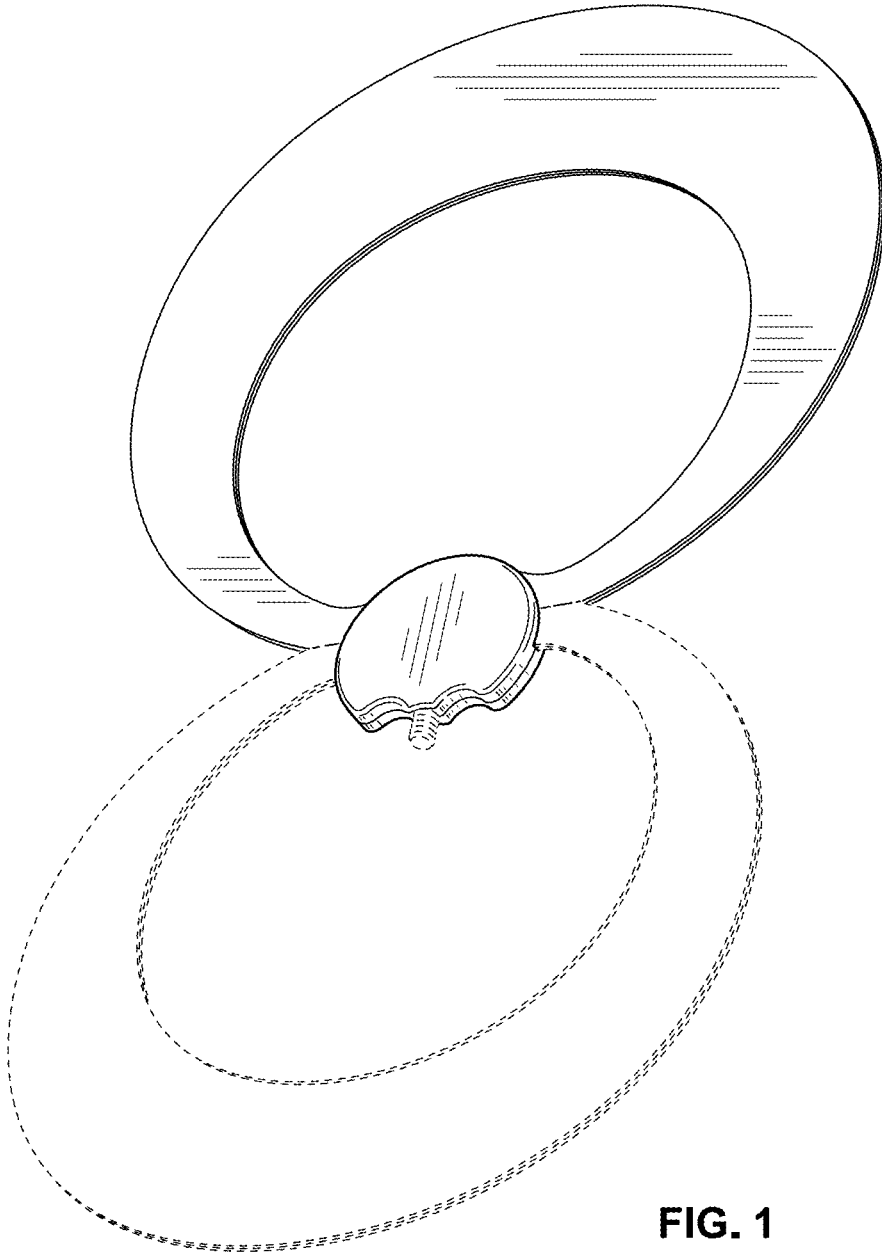


FIG. 1

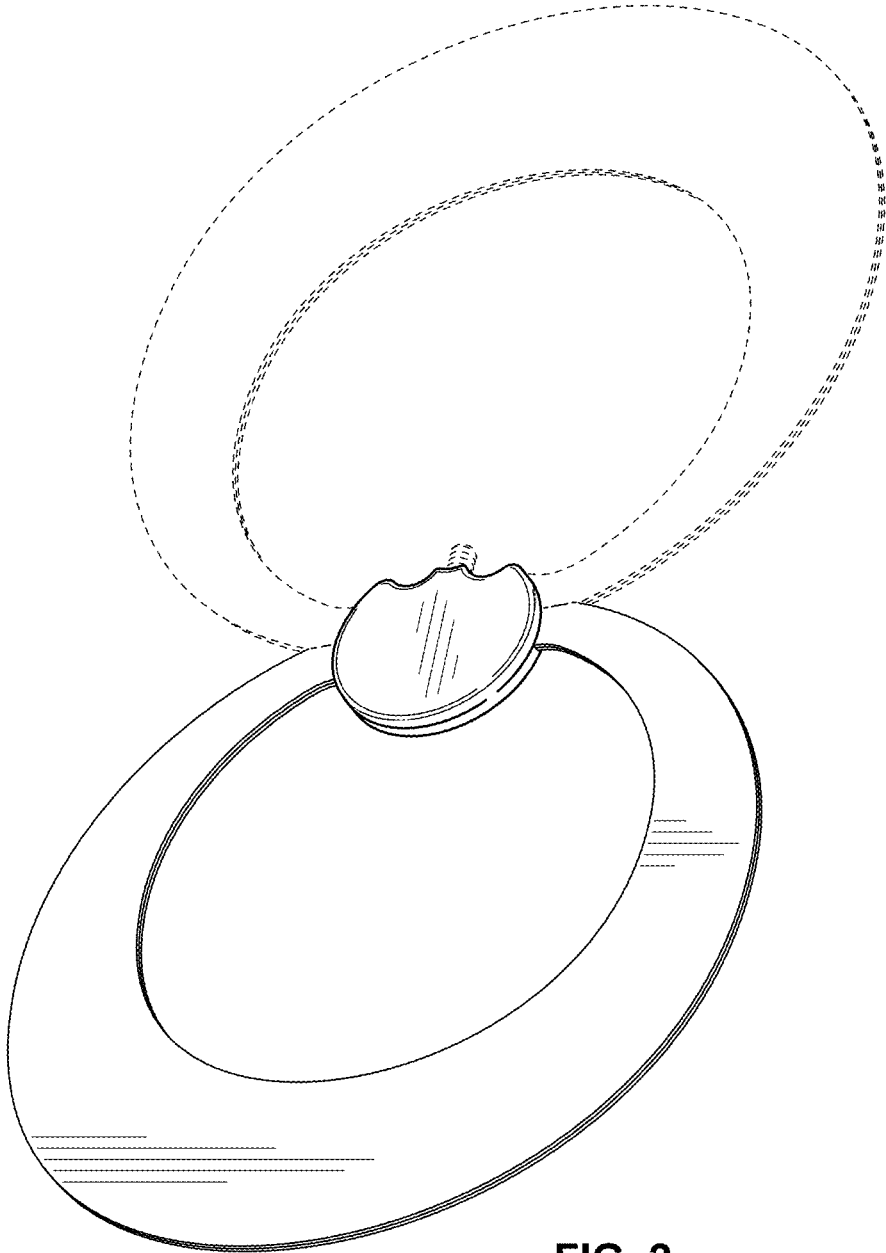


FIG. 2

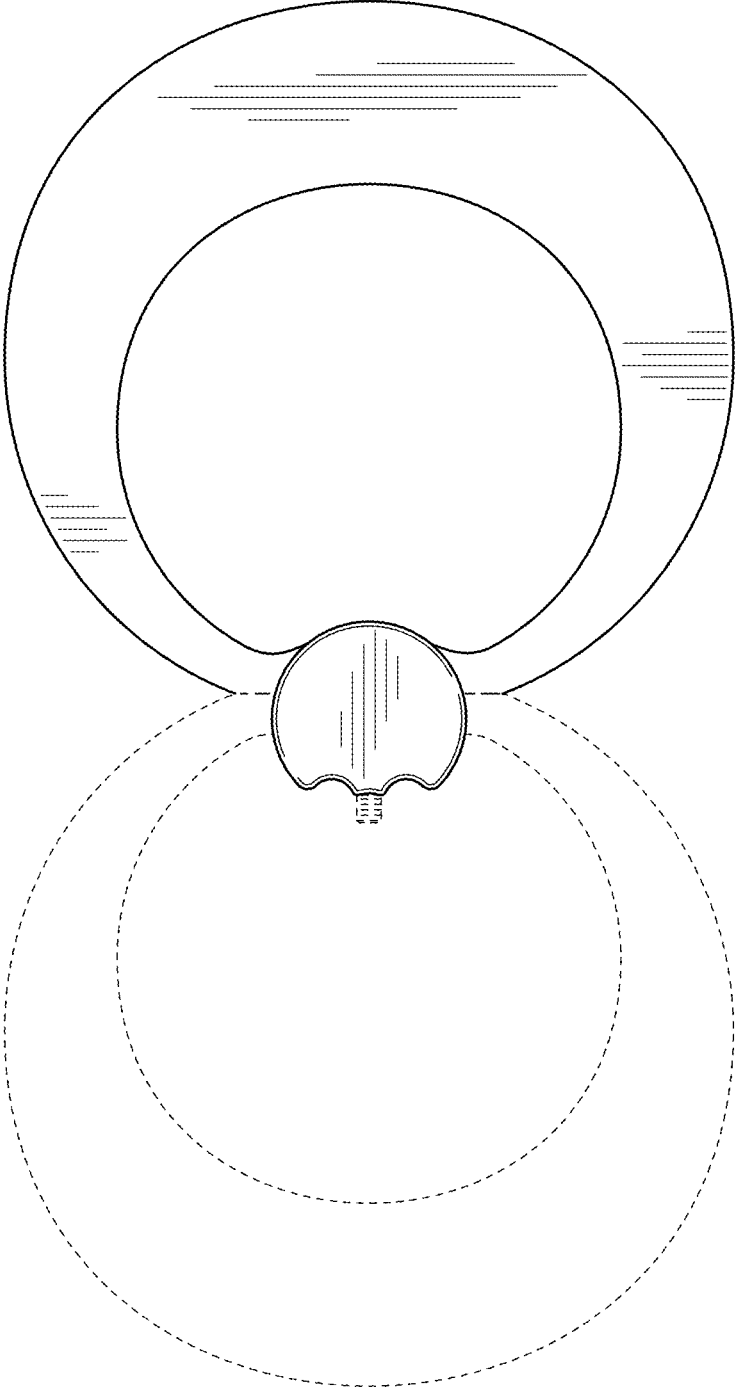


FIG. 3

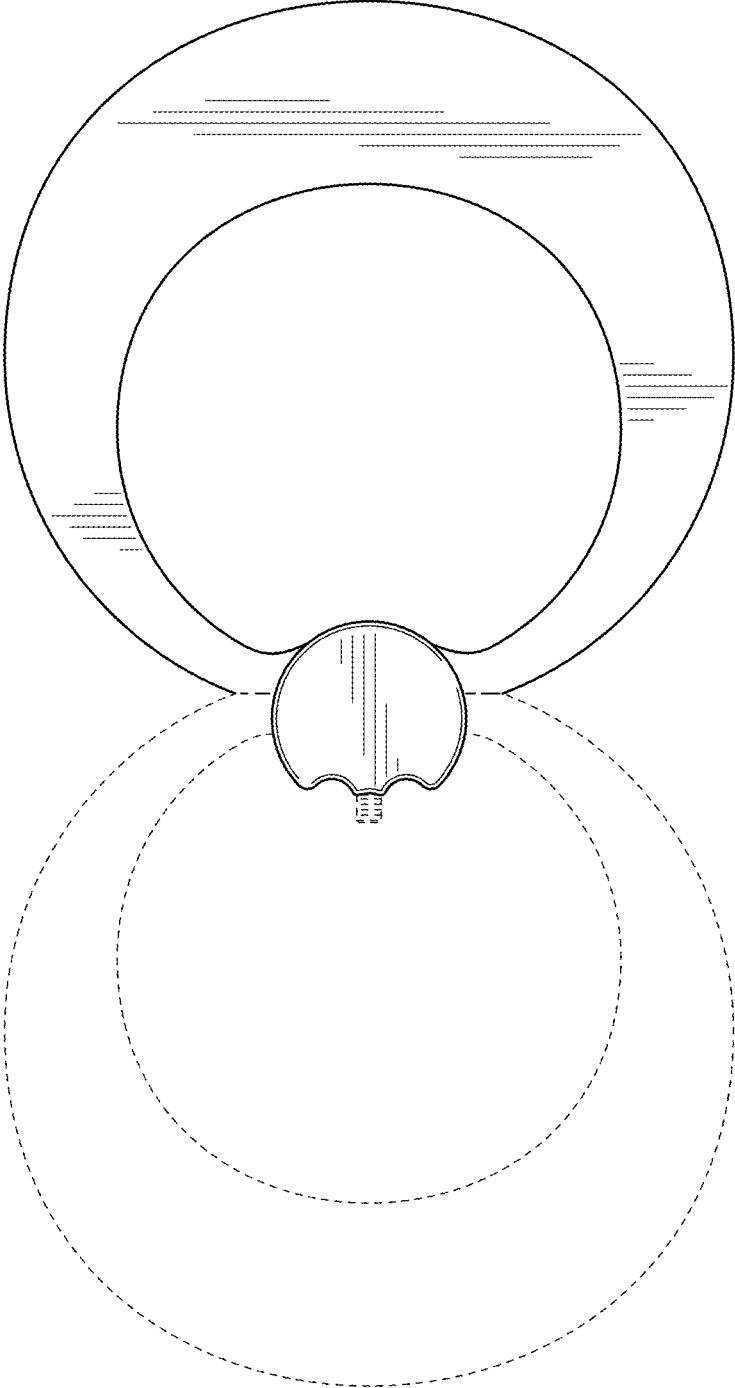


FIG. 4



FIG. 5



FIG. 6

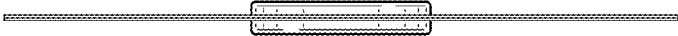


FIG. 7

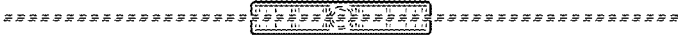


FIG. 8

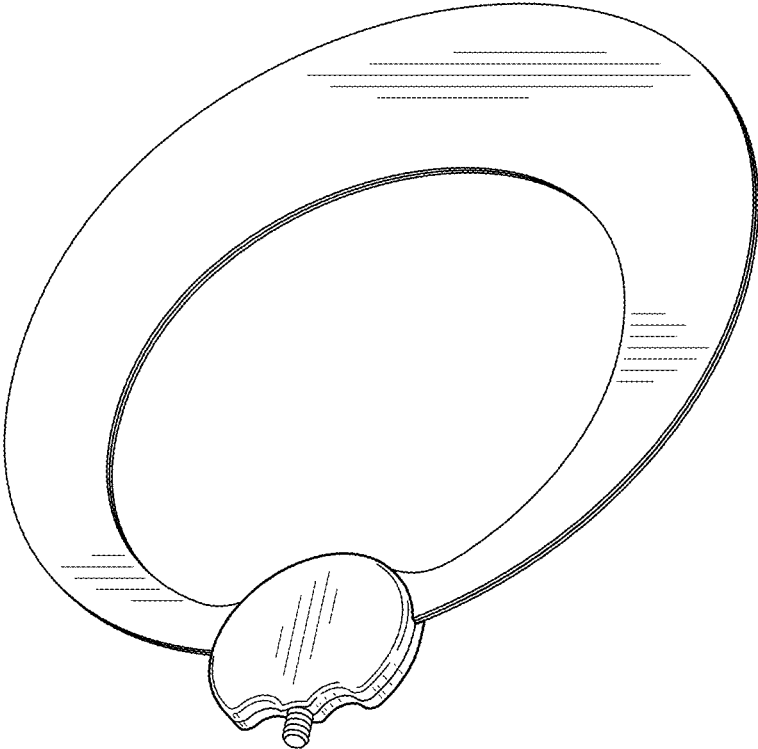


FIG. 9

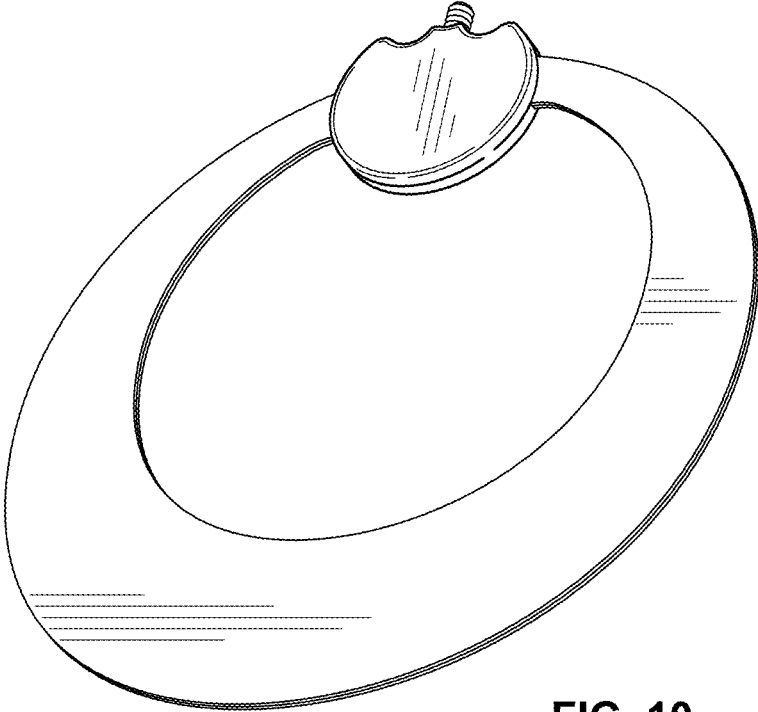


FIG. 10

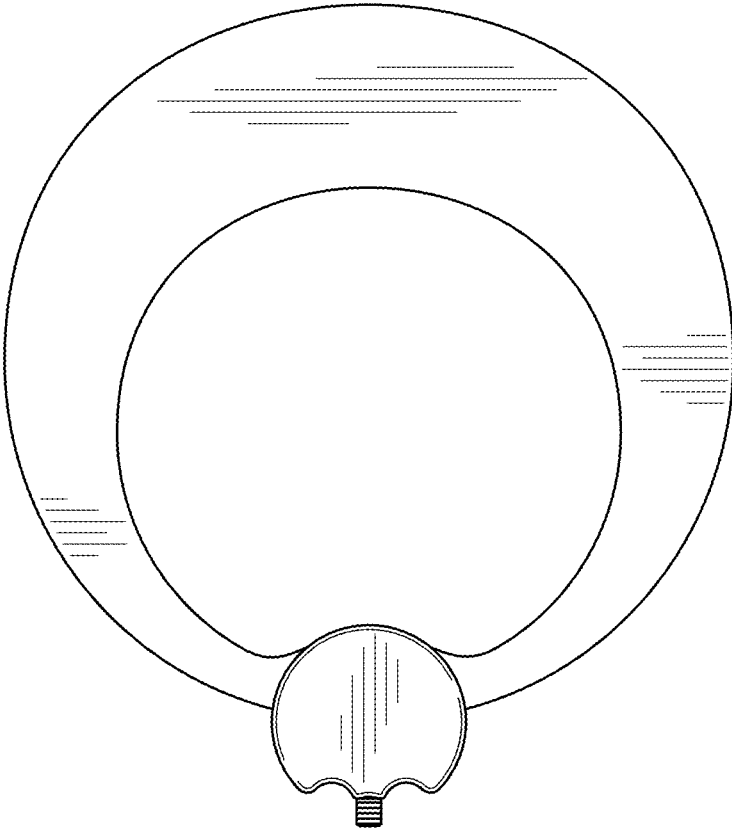


FIG. 11

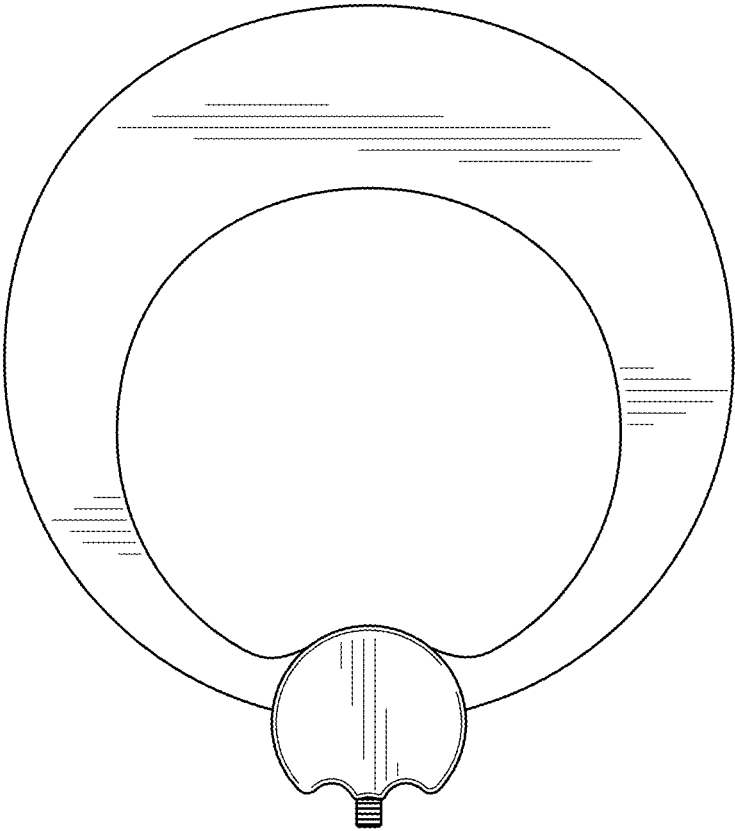


FIG. 12



FIG. 13

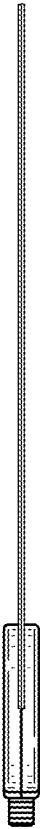


FIG. 14



FIG. 15



FIG. 16

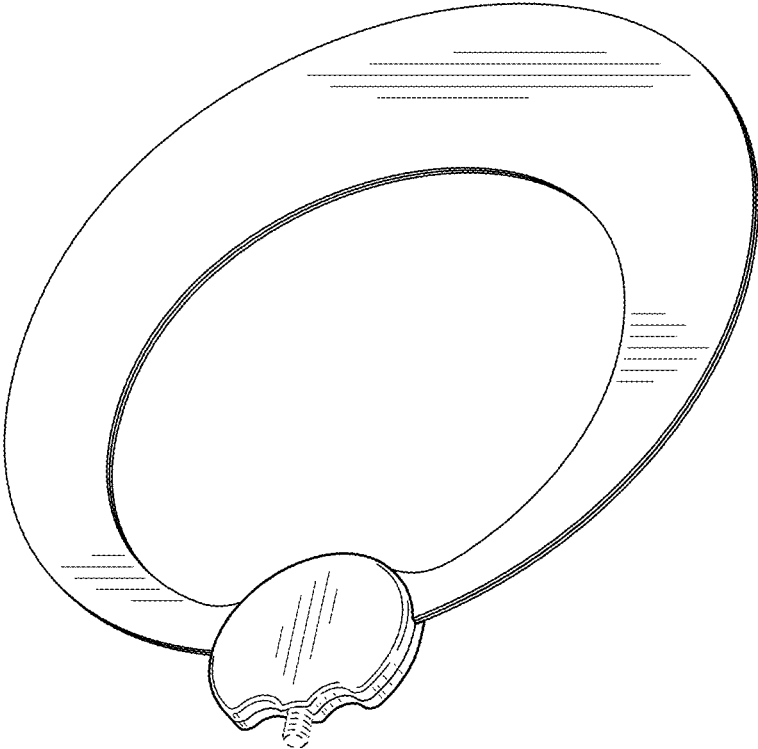


FIG. 17

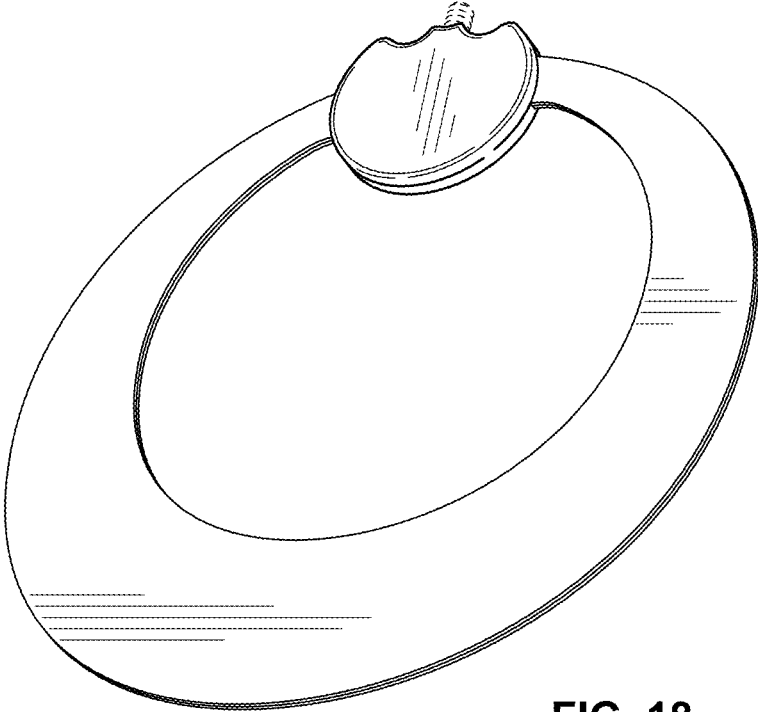


FIG. 18

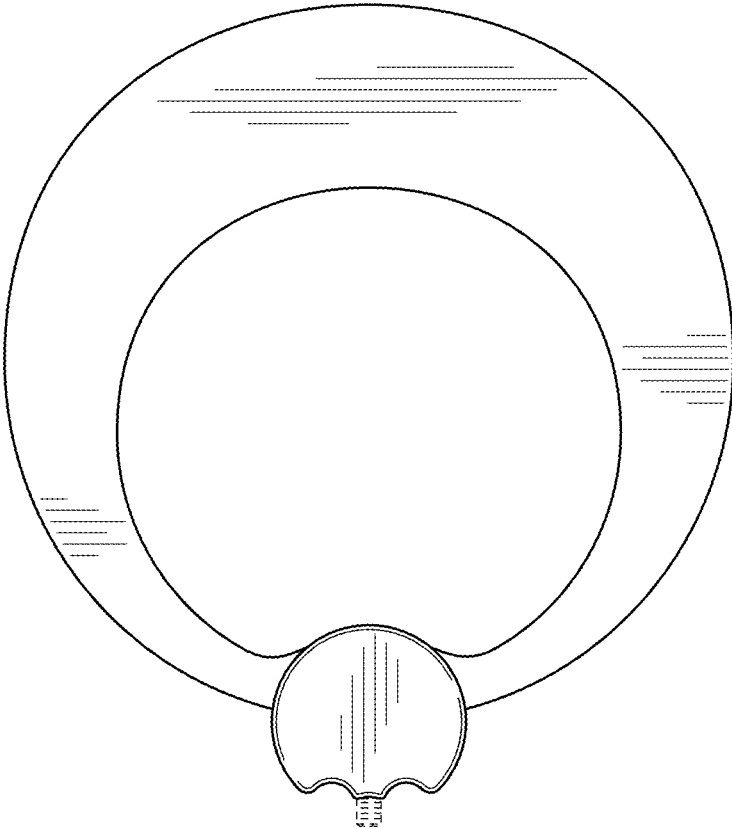


FIG. 19

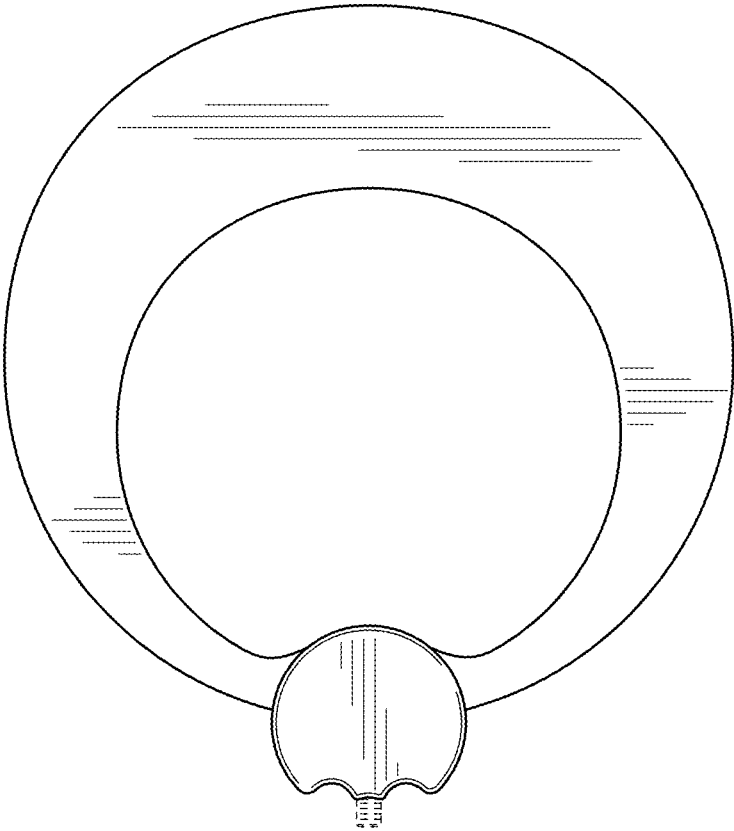


FIG. 20



FIG. 21

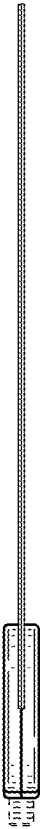


FIG. 22



FIG. 23



FIG. 24

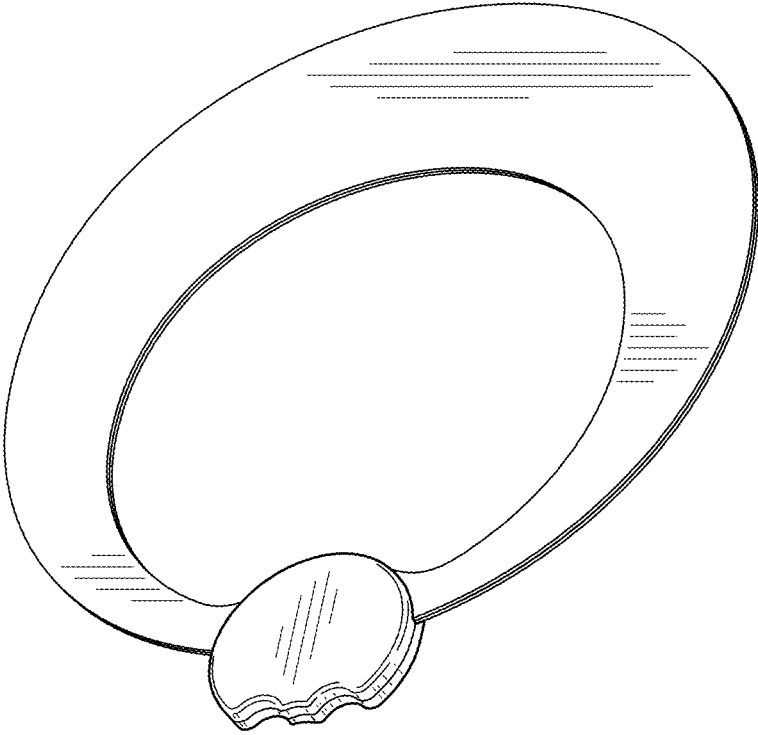


FIG. 25

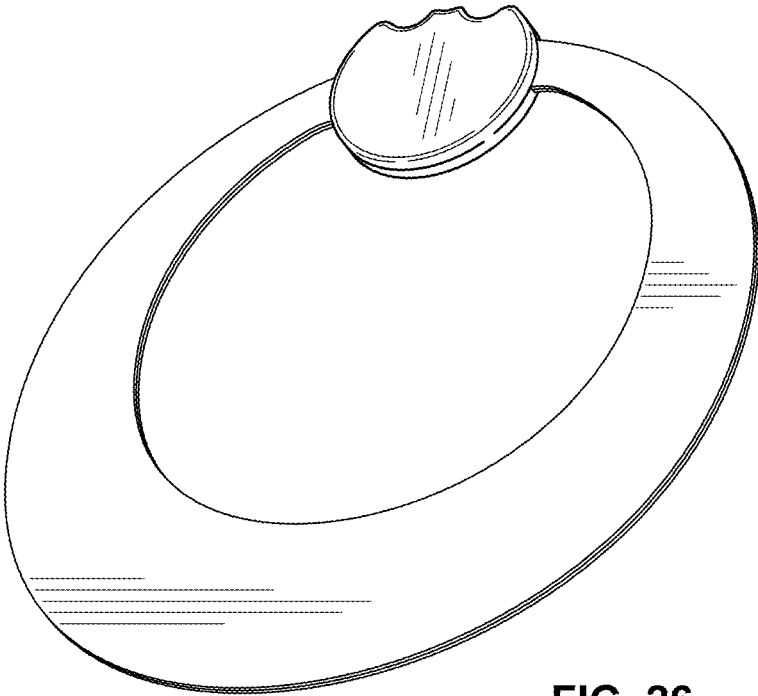


FIG. 26

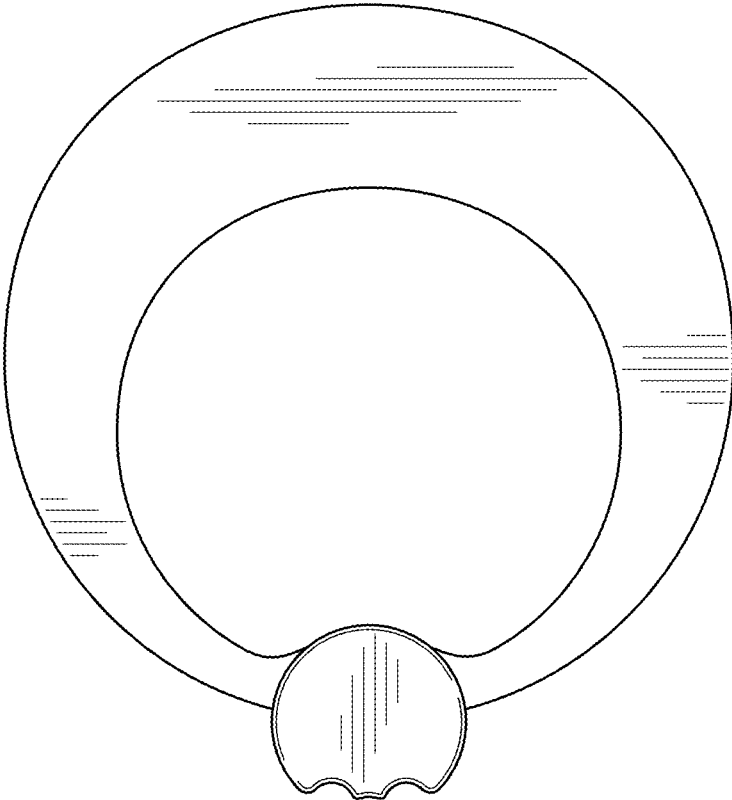


FIG. 27

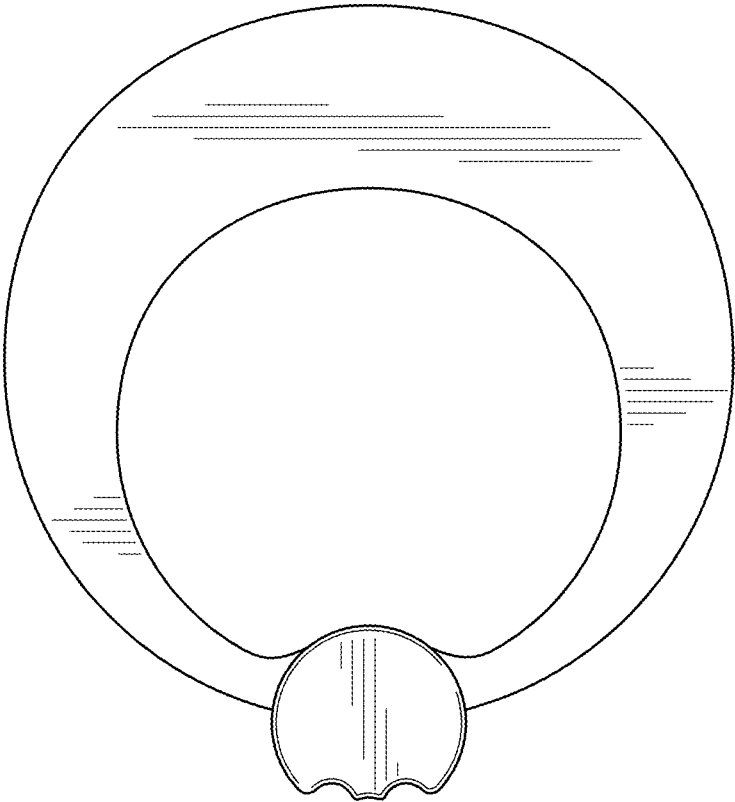


FIG. 28



FIG. 29

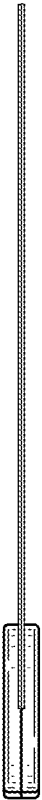


FIG. 30



FIG. 31



FIG. 32