



US00D849166S

(12) **United States Design Patent** (10) **Patent No.:** **US D849,166 S**  
**Dingman et al.** (45) **Date of Patent:** **\*\* May 21, 2019**

- (54) **GOLF PUTTER GRIP**
- (71) Applicant: **SSG International, LLC**, Wixom, MI (US)
- (72) Inventors: **Dean M. Dingman**, Brighton, MI (US); **Steven Ogg**, Carlsbad, CA (US); **Ryan Scott Crisp**, Lewis Center, OH (US)
- (73) Assignee: **SSG International, LLC**, Wixom, MI (US)

- 3,219,348 A 11/1965 Dishner
- 3,252,706 A 5/1966 Rosasco
- 3,516,674 A 6/1970 Rogacki
- 3,589,731 A 6/1971 Chancellor, Jr.
- 3,606,326 A 9/1971 Sparks
- 3,625,517 A 12/1971 Durnack
- 3,625,518 A 12/1971 Solheim
- 3,771,794 A 11/1973 Crockett
- 3,791,652 A 2/1974 Schuler
- 3,815,910 A 6/1974 Raines
- 3,815,921 A 6/1974 Turner

(Continued)

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

FOREIGN PATENT DOCUMENTS

(21) Appl. No.: **29/628,729**

- JP 2003190334 A 7/2003
- JP 2005168998 A 6/2005
- JP 1384372 S 4/2010

(22) Filed: **Dec. 7, 2017**

*Primary Examiner* — Mitchell I. Siegel

(51) **LOC (11) Cl.** ..... **21-02**

(74) *Attorney, Agent, or Firm* — Harness, Dickey & Pierce, P.L.C.

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

USPC ..... **D21/756**

(58) **Field of Classification Search**

USPC ..... D21/756-758  
 CPC ..... A63B 60/06-60/34; A63B 60/00; A63B 60/46; A63B 59/20; A63B 59/40; A63B 59/60-59/80; A63B 49/00-49/14; A63B 53/00-53/14

See application file for complete search history.

(57) **CLAIM**

The ornamental design for a golf putter grip, as shown and described.

(56) **References Cited**

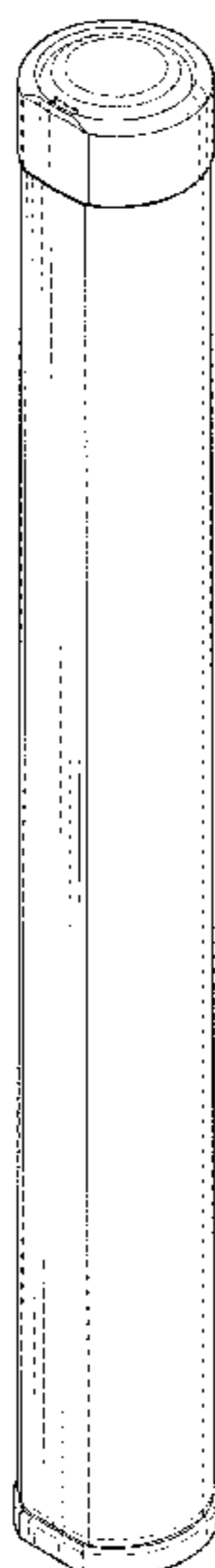
U.S. PATENT DOCUMENTS

- 1,528,190 A 3/1925 Howe
- 1,634,082 A 6/1927 Rigby
- 1,634,887 A 7/1927 Rigby
- 1,677,099 A \* 7/1928 Harness ..... A63B 60/00 473/201
- 1,709,546 A 4/1929 Stanton
- 2,004,968 A 6/1935 Young
- 2,014,829 A 9/1935 Young
- 2,178,872 A 11/1939 Engstrom
- 2,301,369 A 11/1942 Carvill
- 2,593,368 A 4/1952 Verderber
- 3,062,549 A 11/1962 Duden

**DESCRIPTION**

FIG. 1 is a side view of the golf putter grip attached to an unclaimed golf putter and shaft;  
 FIG. 2 is an enlarged perspective of the golf putter grip;  
 FIG. 3 is a front elevational view of FIG. 2;  
 FIG. 4 is a rear elevational view of FIG. 2;  
 FIG. 5 is a top plan view of FIG. 2;  
 FIG. 6 is a bottom plan view of FIG. 2;  
 FIG. 7 is a right side elevational view of FIG. 2; and,  
 FIG. 8 is a left side elevational view of FIG. 2.  
 The broken line showing of the putter head, shaft and top and bottom surfaces of the golf putter grip is included for the purpose of illustrating unclaimed subject matter and forms no part of the claimed design.

**1 Claim, 4 Drawing Sheets**



(56)

References Cited

U.S. PATENT DOCUMENTS

3,995,856 A	12/1976	Hollendorfer, Jr.	5,792,000 A	8/1998	Weber et al.
D243,355 S	2/1977	Spencer	5,800,281 A	9/1998	Gilbert
D244,100 S	4/1977	Spencer	5,813,920 A	9/1998	Rife
4,022,470 A	5/1977	Vidal	5,826,874 A	10/1998	Teitell et al.
D245,797 S	9/1977	Hollendorfer	5,879,241 A	3/1999	Cook et al.
4,063,737 A	12/1977	Tom et al.	D408,461 S	4/1999	Lamkin
4,139,196 A	2/1979	Riley	5,931,745 A	8/1999	Adams
4,186,924 A	2/1980	Southey	5,941,779 A	8/1999	Zeiner-Gundersen
4,239,216 A	12/1980	Bauer	5,952,921 A	9/1999	Donnelly
D258,750 S	3/1981	Hallaman et al.	5,984,798 A	11/1999	Gilmour
4,272,077 A	6/1981	Spivey	6,073,086 A	6/2000	Marinelli
D259,802 S	7/1981	Williams	6,083,123 A	7/2000	Wood
4,327,916 A	5/1982	Shiratori	6,093,113 A	7/2000	Mertens
D268,944 S	5/1983	Southey	6,095,928 A	8/2000	Goszyk
4,461,479 A	7/1984	Mitchell	6,224,493 B1	5/2001	Lee et al.
4,498,673 A	2/1985	Swanson	6,251,028 B1	6/2001	Jackson
4,506,888 A	3/1985	Nardozzi, Jr.	6,302,461 B1	10/2001	Debras et al.
4,597,578 A	7/1986	Lancaster	6,309,310 B1	10/2001	Shira
4,600,195 A	7/1986	Hunter	RE37,647 E	4/2002	Wolf
4,628,698 A	12/1986	Needham et al.	6,364,787 B1	4/2002	Huiskamp
4,671,513 A	6/1987	Swanson	6,366,205 B1	4/2002	Sutphen
4,679,791 A	7/1987	Hull	6,375,579 B1	4/2002	Hart
4,735,414 A	4/1988	Williams et al.	6,386,939 B1	5/2002	Wu et al.
4,746,120 A	5/1988	Mockovak	6,413,167 B1	7/2002	Burke
4,756,534 A	7/1988	Thompson	6,435,975 B2	8/2002	Middleton
4,804,184 A	2/1989	Maltby	6,441,745 B1	8/2002	Gates
4,822,052 A	4/1989	Dimmick et al.	D463,520 S	9/2002	Ulrich
4,826,168 A	5/1989	McGuire et al.	6,447,405 B1	9/2002	Chen
4,878,667 A	11/1989	Tosti	6,449,803 B1	9/2002	McConchie
4,905,147 A	2/1990	Logg	6,471,601 B1	10/2002	McCabe et al.
4,905,168 A	2/1990	McCarthy et al.	6,488,595 B1	12/2002	Grace
4,930,074 A	5/1990	McCarthy	6,494,790 B1	12/2002	Toyota et al.
4,944,515 A	7/1990	Shearer	6,506,128 B1	1/2003	Bloom, Jr.
4,979,743 A	12/1990	Sears	6,517,352 B2	2/2003	Smith
4,988,102 A	1/1991	Reisner	6,527,648 B2	3/2003	Erickson et al.
5,118,112 A	6/1992	Bregman et al.	6,551,198 B2	4/2003	Huang
5,152,527 A	10/1992	Mather et al.	6,569,029 B1	5/2003	Hamburger
5,169,152 A	12/1992	Marquardt	6,585,605 B2	7/2003	Erickson et al.
5,203,561 A	4/1993	Lancot	6,626,768 B2	9/2003	Roelke
5,209,474 A	5/1993	Voyer	6,656,054 B2	12/2003	Ulrich
5,213,329 A	5/1993	Okumoto et al.	6,666,777 B1	12/2003	Lamkin et al.
5,228,688 A	7/1993	Davis	6,709,344 B2	3/2004	Erickson et al.
5,239,158 A	8/1993	Locklear et al.	6,719,648 B1	4/2004	Smith
5,267,733 A	12/1993	Szokola	D492,374 S	6/2004	Barouh
5,322,290 A	6/1994	Minami	6,753,778 B2	6/2004	Kruger
5,326,105 A	7/1994	Fenton, Jr.	6,793,585 B1	9/2004	Miyamoto et al.
5,340,106 A	8/1994	Ravaris	6,821,211 B2	11/2004	Otten et al.
5,351,952 A	10/1994	Hackman	6,843,732 B1	1/2005	Huang
5,364,102 A	11/1994	Appledorn	6,857,971 B2	2/2005	Huang
5,373,138 A	12/1994	Locklear et al.	6,860,818 B2	3/2005	Mahaffey et al.
5,433,441 A	7/1995	Olsen et al.	6,966,847 B2	11/2005	Lenhof et al.
5,438,518 A	8/1995	Bianco et al.	6,988,958 B2	1/2006	Roelke
5,441,256 A	8/1995	Hackman	D517,138 S	3/2006	Barouh
5,465,967 A	11/1995	Boeckenhaupt	D517,622 S	3/2006	Barouh
D369,195 S *	4/1996	Jaekel ..... D21/757	7,048,644 B2	5/2006	Wang
5,513,845 A *	5/1996	Sonagere ..... A63B 53/14 473/206	7,101,287 B1	9/2006	Wagner
5,542,676 A	8/1996	Howe, Jr. et al.	7,104,900 B1	9/2006	Finley
5,547,189 A	8/1996	Billings	7,137,904 B2	11/2006	Huang
5,573,469 A	11/1996	Dekura	D534,602 S	1/2007	Norton et al.
5,575,473 A	11/1996	Turner	D534,603 S	1/2007	Norton et al.
5,595,544 A	1/1997	Roelke	D534,604 S	1/2007	Norton et al.
5,632,694 A	5/1997	Lee	D534,605 S	1/2007	Norton et al.
5,632,695 A	5/1997	Hlinka et al.	D534,606 S	1/2007	Norton et al.
5,653,644 A *	8/1997	Jaekel ..... A63B 53/007 473/303	D534,607 S	1/2007	Norton et al.
5,682,230 A	10/1997	Anfinsen et al.	D534,975 S	1/2007	Norton et al.
5,728,006 A	3/1998	Teitell et al.	D536,048 S	1/2007	Chen
5,735,754 A	4/1998	Antonious	7,160,200 B2	1/2007	Grober
5,741,193 A	4/1998	Nolan	D538,540 S	3/2007	Barouh
5,749,792 A	5/1998	Engfer et al.	D538,868 S	3/2007	Norton et al.
5,766,088 A	6/1998	Severtsen	D538,869 S	3/2007	Wang et al.
5,779,555 A	7/1998	Nomura et al.	7,228,670 B2	6/2007	Oilman
5,779,559 A	7/1998	Eberle	7,250,006 B2	7/2007	McGonigle
5,779,565 A	7/1998	Adams	7,264,555 B2	9/2007	Lee et al.
			7,264,759 B2	9/2007	Lamkin
			7,267,619 B1	9/2007	Pettis
			D553,705 S	10/2007	Barouh
			D554,724 S	11/2007	Savasky
			D556,847 S	12/2007	DeVaney
			7,310,895 B2	12/2007	Whittlesey et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

7,311,612 B2	12/2007	DeLucia	D657,432 S	4/2012	Gill
7,319,203 B1	1/2008	Briggs et al.	D657,835 S	4/2012	Gill
D562,923 S	2/2008	DeVaney et al.	D660,385 S	5/2012	Gill
D562,924 S	2/2008	DeVaney et al.	D660,386 S	5/2012	Chang
D564,610 S	3/2008	Chen	D660,387 S	5/2012	Sun
7,396,296 B2	7/2008	Evans	D660,388 S	5/2012	Gill et al.
7,399,235 B2	7/2008	Gill et al.	8,177,658 B1	5/2012	Johnson
7,406,386 B2	7/2008	Brett et al.	8,182,361 B2	5/2012	Gill
7,438,646 B2	10/2008	Huang	8,183,487 B2	5/2012	Lee
7,458,902 B2	12/2008	Gill	D664,223 S	7/2012	Lamkin et al.
7,458,903 B2	12/2008	Wang et al.	D664,224 S	7/2012	Lamkin et al.
7,470,199 B2	12/2008	Huang	D664,225 S	7/2012	Lamkin et al.
D584,781 S	1/2009	Chen	8,226,495 B2	7/2012	Savarese et al.
7,476,160 B2	1/2009	Hocknell et al.	8,226,501 B2	7/2012	Stites et al.
7,481,716 B1	1/2009	Johnson	8,253,586 B1	8/2012	Matak
D592,262 S	5/2009	Devaney et al.	8,294,066 B2	10/2012	Gill et al.
D592,263 S	5/2009	Devaney et al.	8,296,907 B2	10/2012	Gill et al.
D592,264 S	5/2009	Devaney et al.	8,296,908 B2	10/2012	Gill
D592,265 S	5/2009	Devaney et al.	8,303,429 B2	11/2012	Cackett et al.
D592,266 S	5/2009	Devaney et al.	8,303,434 B1	11/2012	DePaul
D592,267 S	5/2009	Devaney et al.	8,323,433 B1	12/2012	Lowry et al.
D593,172 S	5/2009	Gill et al.	8,334,337 B2	12/2012	Lamkin et al.
7,527,564 B2	5/2009	Huang	8,360,898 B2	1/2013	Huang
7,537,526 B2	5/2009	Cho	8,371,956 B2	2/2013	Walls
D595,378 S	6/2009	Devaney et al.	8,371,962 B2	2/2013	Solheim et al.
D595,379 S	6/2009	Devaney et al.	8,419,566 B2	4/2013	Gill
D595,380 S	6/2009	Koehler	8,424,164 B2	4/2013	Gill
D595,796 S	7/2009	Devaney et al.	8,430,764 B2	4/2013	Bennett et al.
7,563,174 B1	7/2009	Hung	8,465,376 B2	6/2013	Bentley
D597,622 S	8/2009	Devaney et al.	8,480,510 B2	7/2013	Huang
7,585,230 B2	9/2009	Huang	8,485,916 B2	7/2013	Gill et al.
D602,104 S	10/2009	Black et al.	8,491,409 B2	7/2013	Turnpaugh et al.
D603,921 S	11/2009	Gill et al.	8,496,543 B2	7/2013	Cackett et al.
7,641,565 B2	1/2010	Kiraly	8,517,850 B1	8/2013	Beno et al.
7,648,426 B2	1/2010	Evans	8,517,851 B2	8/2013	Cackett et al.
7,672,781 B2	3/2010	Churchill et al.	D689,495 S	9/2013	Bentley et al.
7,699,717 B2	4/2010	Morris et al.	8,541,497 B2	9/2013	Lamkin et al.
7,699,718 B2	4/2010	Lindner	D691,682 S	10/2013	Su et al.
7,704,155 B2	4/2010	Bennett et al.	D693,892 S	11/2013	Bentley et al.
7,704,160 B2	4/2010	Lindner	8,579,731 B2	11/2013	Gadiyar et al.
7,705,733 B2	4/2010	Tethrake et al.	8,591,350 B2	11/2013	Evans et al.
D618,296 S	6/2010	Gill et al.	D694,842 S	12/2013	Bentley et al.
7,736,242 B2	6/2010	Stites et al.	8,613,676 B2	12/2013	Bentley
7,758,447 B2	7/2010	Sugimae	8,617,005 B2	12/2013	Moran et al.
7,780,541 B2	8/2010	Bauer	8,624,738 B2	1/2014	Savarese et al.
7,797,783 B2	9/2010	Chandler et al.	8,641,551 B2	2/2014	Johnson
7,798,911 B2	9/2010	Gill	8,641,553 B2	2/2014	Gill et al.
7,798,912 B2	9/2010	Kou	8,647,462 B2	2/2014	Su et al.
7,803,065 B2	9/2010	Breier et al.	8,700,354 B1	4/2014	Bentley et al.
7,804,404 B1	9/2010	Balardeta et al.	8,702,516 B2	4/2014	Bentley et al.
D626,614 S	11/2010	Wood et al.	8,715,096 B2	5/2014	Cherbini
D627,023 S	11/2010	Hsu	8,734,267 B2	5/2014	Huang
7,837,574 B2	11/2010	Brunner	D706,654 S	6/2014	Bentley et al.
7,837,575 B2	11/2010	Lee et al.	8,766,088 B2	7/2014	Cheng et al.
7,837,577 B2	11/2010	Evans	D710,466 S	8/2014	Bentley et al.
D629,857 S	12/2010	Gill et al.	D711,991 S *	8/2014	LaCleda ..... D21/756
7,870,790 B2	1/2011	Sato et al.	8,804,404 B2	8/2014	Asami et al.
7,878,921 B2	2/2011	Bennett et al.	8,814,718 B1	8/2014	Rollinson et al.
7,909,705 B2	3/2011	Gill et al.	8,814,719 B2	8/2014	Wall, Jr.
7,927,236 B2	4/2011	Brunton et al.	8,827,824 B2	9/2014	Bentley et al.
7,931,544 B2	4/2011	Gill	8,840,483 B1	9/2014	Steusloff et al.
7,934,999 B2	5/2011	Cackett et al.	8,845,448 B2	9/2014	Huang
7,946,926 B1	5/2011	Balardeta et al.	8,858,356 B2	10/2014	Chu et al.
7,967,695 B2	6/2011	Voges et al.	8,870,673 B2	10/2014	Beno et al.
D644,285 S	8/2011	Gill et al.	8,888,606 B2	11/2014	Bocchieri
8,006,349 B2	8/2011	Gill	8,903,521 B2	12/2014	Goree et al.
8,012,034 B1	9/2011	Cackett et al.	8,905,855 B2	12/2014	Fitzpatrick et al.
D648,816 S	11/2011	Sun	8,913,134 B2	12/2014	Goree et al.
D652,097 S	1/2012	Gill	8,932,146 B2	1/2015	Chu et al.
D653,296 S	1/2012	Gill	8,941,723 B2	1/2015	Bentley et al.
8,105,522 B2	1/2012	Walls et al.	8,944,928 B2	2/2015	Kaps et al.
D654,973 S *	2/2012	Marshall ..... D21/756	8,992,346 B1	3/2015	Raposo
8,123,627 B2	2/2012	Huang	8,994,826 B2	3/2015	Bentley
D656,424 S	3/2012	Bentley	9,005,047 B2	4/2015	Savarese et al.
8,142,304 B2	3/2012	Reeves	9,028,337 B2	5/2015	Bentley
			9,033,810 B2	5/2015	Bentley
			9,039,527 B2	5/2015	Bentley et al.
			9,052,201 B2	6/2015	Bentley et al.
			9,072,952 B2	7/2015	Chu et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,076,041 B2	7/2015	Bentley et al.	2006/0261938 A1	11/2006	Lai et al.
D735,825 S	8/2015	Lamkin et al.	2007/0049397 A1	3/2007	Bieske
9,114,295 B2	8/2015	Huang	2007/0072696 A1	3/2007	Chen
D738,973 S	9/2015	Dingman	2007/0149310 A1	6/2007	Bennett et al.
D738,974 S	9/2015	Miller et al.	2007/0149315 A1	6/2007	Bennett et al.
9,174,104 B1	11/2015	Rogacki	2007/0159336 A1	7/2007	Tethrake et al.
9,192,833 B2	11/2015	Margoles et al.	2007/0161431 A1	7/2007	Lindner
9,195,781 B2	11/2015	Savarese et al.	2007/0191126 A1	8/2007	Mandracken
D745,100 S	12/2015	Miller et al.	2007/0270214 A1	11/2007	Bentley
9,199,146 B2	12/2015	Lamkin et al.	2007/0298895 A1	12/2007	Nusbaum et al.
9,211,456 B2	12/2015	Barksdale et al.	2007/0298896 A1	12/2007	Nusbaum et al.
9,227,118 B2	1/2016	Beno et al.	2008/0009363 A1	1/2008	Solodovnick
9,235,765 B2	1/2016	Bentley et al.	2008/0020861 A1	1/2008	Adams et al.
9,247,212 B2	1/2016	Bose et al.	2008/0125239 A1	5/2008	Clausen et al.
9,261,526 B2	2/2016	Bentley et al.	2008/0132350 A1	6/2008	Gill et al.
9,302,164 B2	4/2016	Lamkin et al.	2008/0148050 A1	6/2008	Sparrell
9,320,957 B2	4/2016	Bentley	2008/0198022 A1	8/2008	Battles et al.
9,349,049 B2	5/2016	Bentley et al.	2008/0227562 A1	9/2008	Gill
9,361,522 B2	6/2016	Bentley et al.	2008/0227564 A1	9/2008	Breier et al.
9,375,833 B2	6/2016	Huang	2008/0254909 A1	10/2008	Callinan et al.
9,396,385 B2	7/2016	Bentley et al.	2008/0274822 A1	11/2008	Lindner
9,401,178 B2	7/2016	Bentley et al.	2008/0274823 A1	11/2008	Lindner
9,403,073 B2	8/2016	McDonnell et al.	2009/0017935 A1	1/2009	Wang et al.
9,406,336 B2	8/2016	Bose et al.	2009/0017944 A1	1/2009	Savarese et al.
9,409,071 B1	8/2016	Beno et al.	2009/0075747 A1	3/2009	Kou
9,418,705 B2	8/2016	Kaps et al.	2009/0088275 A1	4/2009	Solheim et al.
9,421,421 B2	8/2016	Knutson et al.	2009/0111602 A1	4/2009	Savarese et al.
9,421,439 B2	8/2016	McLoughlin	2009/0124410 A1	5/2009	Rife
D768,251 S	10/2016	Giannatti et al.	2009/0131190 A1	5/2009	Kimber
D772,361 S	11/2016	Giannatti et al.	2009/0143882 A1	6/2009	Young
9,568,108 B2	2/2017	Takahashi	2009/0197694 A1	8/2009	Soracco et al.
9,604,142 B2	3/2017	Bentley et al.	2009/0209358 A1	8/2009	Niegowski
9,607,652 B2	3/2017	Bose et al.	2009/0215551 A1	8/2009	Liang et al.
9,616,298 B1	4/2017	Barksdale et al.	2009/0233730 A1	9/2009	Doerr
9,619,891 B2	4/2017	Bose et al.	2009/0233735 A1	9/2009	Savarese et al.
9,622,361 B2	4/2017	Bentley et al.	2009/0239673 A1	9/2009	Drimer
9,626,554 B2	4/2017	Bose et al.	2009/0247312 A1	10/2009	Sato et al.
9,633,254 B2	4/2017	Bose et al.	2009/0247316 A1	10/2009	De La Cruz et al.
9,643,049 B2	5/2017	Bentley et al.	2009/0253528 A1	10/2009	Brolly
9,646,199 B2	5/2017	Bose et al.	2009/0264214 A1	10/2009	De La Cruz et al.
9,646,209 B2	5/2017	Kaps et al.	2009/0298605 A1	12/2009	Wiegers
9,694,267 B1	7/2017	Thornbrue et al.	2009/0326688 A1	12/2009	Thomas et al.
9,746,354 B2	8/2017	Martin et al.	2010/0056297 A1	3/2010	Roach et al.
D796,609 S *	9/2017	Serrano ..... D21/756	2010/0081515 A1	4/2010	White et al.
9,791,253 B2	10/2017	Rothenbuhler et al.	2010/0093457 A1	4/2010	Ahern et al.
9,814,935 B2	11/2017	Bentley et al.	2010/0093458 A1	4/2010	Davenport et al.
9,824,264 B2	11/2017	Bose et al.	2010/0093463 A1	4/2010	Davenport et al.
9,830,951 B2	11/2017	Bose et al.	2010/0105498 A1	4/2010	Johnson
D807,215 S	1/2018	Martin et al.	2010/0105499 A1	4/2010	Roach et al.
9,866,827 B2	1/2018	Bose et al.	2010/0113174 A1	5/2010	Ahern
9,911,045 B2	3/2018	Bose et al.	2010/0144455 A1	6/2010	Ahern
D818,065 S *	5/2018	Lin ..... D21/756	2010/0144456 A1	6/2010	Ahern
D835,738 S *	12/2018	Serrano ..... D21/756	2010/0154255 A1	6/2010	Robinson et al.
2002/0077189 A1	6/2002	Tuer et al.	2010/0210377 A1	8/2010	Lock
2002/0187860 A1	12/2002	Shoane	2010/0222152 A1	9/2010	Jaekel et al.
2003/0008731 A1	1/2003	Anderson et al.	2010/0261543 A1	10/2010	Breier et al.
2003/0104876 A1	6/2003	Sosin	2010/0287735 A1	11/2010	Gill et al.
2003/0144088 A1	7/2003	Shoane	2010/0292018 A1	11/2010	Cackett et al.
2003/0157990 A1	8/2003	Bloom	2010/0298065 A1	11/2010	Soracco et al.
2003/0176234 A1	9/2003	Sheets et al.	2010/0304877 A1	12/2010	Iwahashi et al.
2004/0087384 A1	5/2004	Sosin	2010/0308105 A1	12/2010	Savarese et al.
2004/0147339 A1	7/2004	Lindner et al.	2010/0323811 A1	12/2010	Mickelson et al.
2004/0166958 A1	8/2004	Perry	2011/0028230 A1	2/2011	Balardeta et al.
2004/0219987 A1	11/2004	Scott et al.	2011/0039637 A1	2/2011	Cackett et al.
2004/0224787 A1	11/2004	Lindner	2011/0053702 A1	3/2011	Stites et al.
2005/0079925 A1	4/2005	Cheng et al.	2011/0053703 A1	3/2011	Stites et al.
2005/0215347 A1	9/2005	Pollman	2011/0143854 A1	6/2011	Bennett et al.
2005/0272516 A1	12/2005	Gobush	2011/0151989 A1	6/2011	Golden et al.
2005/0288119 A1	12/2005	Wang et al.	2011/0152003 A1	6/2011	Hartwell et al.
2006/0094527 A1	5/2006	Evans	2011/0159982 A1	6/2011	Takeuchi
2006/0128489 A1	6/2006	Mooney et al.	2011/0165959 A1	7/2011	Klein
2006/0166737 A1	7/2006	Bentley	2011/0190070 A1	8/2011	Morris et al.
2006/0166738 A1	7/2006	Eyestone et al.	2011/0207560 A1	8/2011	Wright et al.
2006/0199659 A1	9/2006	Caldwell	2011/0257945 A1	10/2011	Sato
2006/0255918 A1	11/2006	Bernstein et al.	2011/0275455 A1	11/2011	Soracco
			2011/0277313 A1	11/2011	Soracco et al.
			2011/0304460 A1	12/2011	Keecheril et al.
			2011/0305369 A1	12/2011	Bentley et al.
			2011/0312436 A1	12/2011	Cackett et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2012/0035003	A1	2/2012	Moran et al.	2014/0342845	A1	11/2014	Dingman
2012/0050529	A1	3/2012	Bentley	2014/0376876	A1	12/2014	Bentley et al.
2012/0052971	A1	3/2012	Bentley	2015/0011324	A1	1/2015	Beno et al.
2012/0052972	A1	3/2012	Bentley	2015/0018890	A1	1/2015	Ihde
2012/0052973	A1	3/2012	Bentley	2015/0034859	A1	2/2015	Compton et al.
2012/0071258	A1	3/2012	Yamaguchi et al.	2015/0105175	A1	4/2015	Wang
2012/0116548	A1	5/2012	Goree et al.	2015/0154452	A1	6/2015	Bentley et al.
2012/0120572	A1	5/2012	Bentley	2015/0231462	A1	8/2015	Chapin
2012/0120573	A1	5/2012	Bentley	2015/0251063	A1	9/2015	Dingman et al.
2012/0171258	A1	3/2012	Yamaguchi et al.	2015/0251064	A1	9/2015	Chapin
2012/0116548	A1	5/2012	Goree et al.	2015/0269435	A1	9/2015	Bentley et al.
2012/0120572	A1	5/2012	Bentley	2015/0310280	A1	10/2015	Bentley et al.
2012/0120573	A1	5/2012	Bentley	2015/0317801	A1	11/2015	Bentley et al.
2012/0122574	A1	5/2012	Fitzpatrick et al.	2015/0318015	A1	11/2015	Bose et al.
2012/0122603	A1	5/2012	Cackett et al.	2015/0324636	A1	11/2015	Bentley et al.
2012/0139729	A1	6/2012	Savarese et al.	2015/0348591	A1	12/2015	Kaps et al.
2012/0196692	A1	8/2012	Beck et al.	2015/0360101	A1	12/2015	Solhaug
2012/0202610	A1	8/2012	Voges et al.	2016/0089584	A1	3/2016	Beno et al.
2012/0215474	A1	8/2012	Bentley et al.	2016/0146643	A1	5/2016	Martin et al.
2012/0238381	A1	9/2012	Denton et al.	2016/0151666	A1	6/2016	Bentley et al.
2012/0249330	A1	10/2012	Savarese et al.	2016/0166903	A1	6/2016	McDonnell et al.
2012/0256731	A1	10/2012	Luciano, Jr. et al.	2016/0184639	A1	6/2016	Bentley et al.
2012/0276851	A1	11/2012	Layne, IV et al.	2016/0210549	A1	7/2016	Savarese et al.
2012/0277015	A1	11/2012	Boyd et al.	2016/0213987	A1	7/2016	Beno et al.
2012/0277018	A1	11/2012	Boyd et al.	2016/0217325	A1	7/2016	Bose et al.
2012/0295726	A1	11/2012	Cherbini	2016/0224828	A1	8/2016	Bose et al.
2012/0316843	A1	12/2012	Beno et al.	2016/02292509	A1	10/2016	Kaps et al.
2012/0322569	A1	12/2012	Cottam	2016/0292881	A1	10/2016	Bose et al.
2012/0331058	A1	12/2012	Huston et al.	2016/0322078	A1	11/2016	Bose et al.
2013/0012334	A1	1/2013	Stites et al.	2016/0346657	A1	12/2016	Beno et al.
2013/0027602	A1	1/2013	Kasuga	2016/0354634	A1	12/2016	McDonnell et al.
2013/0029783	A1	1/2013	Kimizuka et al.	2017/0004358	A1	1/2017	Bose et al.
2013/0063432	A1	3/2013	Kaps et al.	2017/0220855	A1	8/2017	Bose et al.
2013/0095941	A1	4/2013	Bentley et al.	2017/0229154	A1	8/2017	Bose et al.
2013/0128022	A1	5/2013	Bose et al.	2017/0230651	A1	8/2017	Bose et al.
2013/0144411	A1	6/2013	Savarese et al.	2017/0234706	A1	8/2017	Martin et al.
2013/0165249	A1	6/2013	Margoles et al.	2017/0243359	A1	8/2017	Bose et al.
2013/0203517	A1	8/2013	Bolane et al.	2017/0252607	A1	9/2017	Haas et al.
2013/0211774	A1	8/2013	Bentley et al.	2017/0262697	A1	9/2017	Kaps et al.
2013/0225309	A1	8/2013	Bentley et al.	2017/0296868	A1	10/2017	Bentley et al.
2013/0225317	A1	8/2013	Clausen et al.	2017/0300755	A1	10/2017	Bose et al.
2014/0014953	A1	1/2014	Asami et al.	2018/0021648	A1	1/2018	Thornbrue et al.
2014/0162802	A1	6/2014	Beno et al.	2018/0021653	A1	1/2018	Thornbrue et al.
2014/0221121	A1	8/2014	Margoles et al.				
2014/0229138	A1	8/2014	Goree et al.				

\* cited by examiner

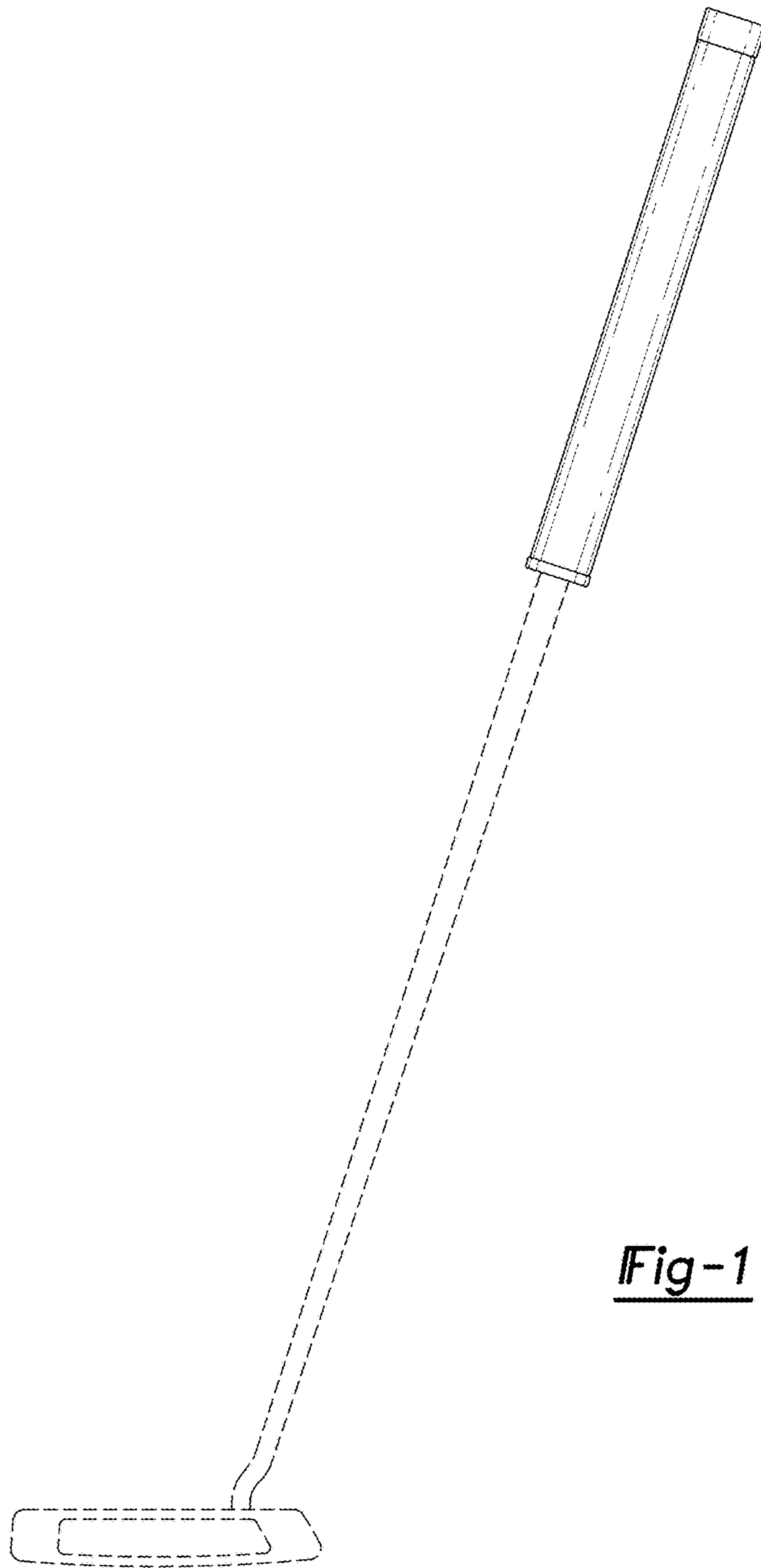


Fig-1

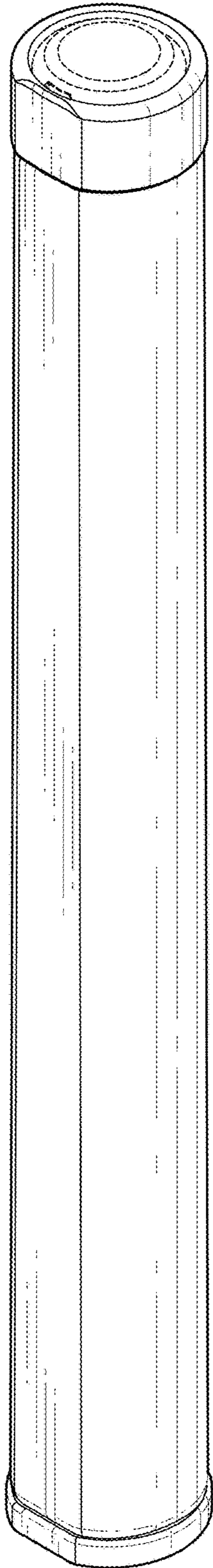


Fig-2

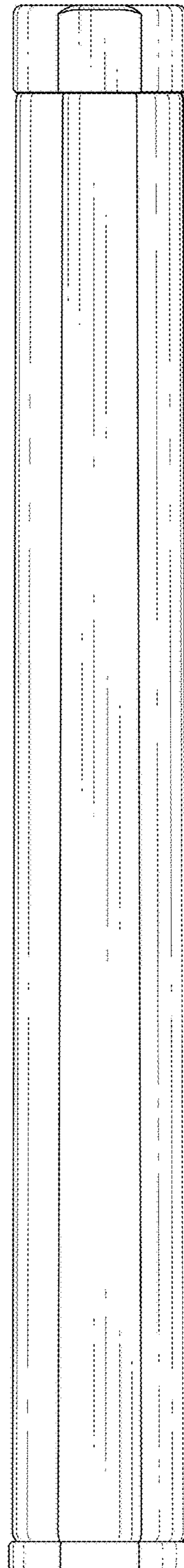


Fig-3

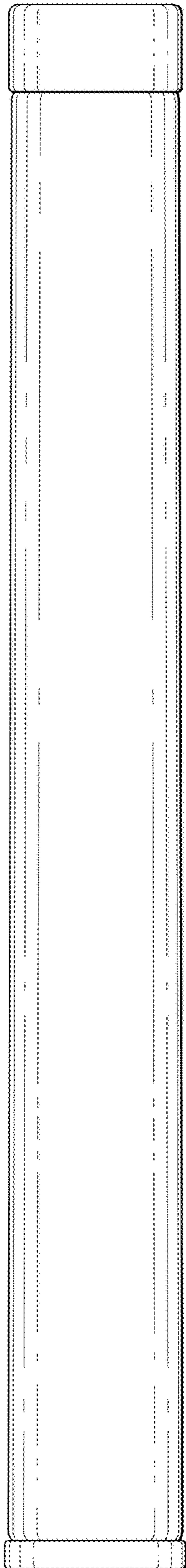


Fig-4

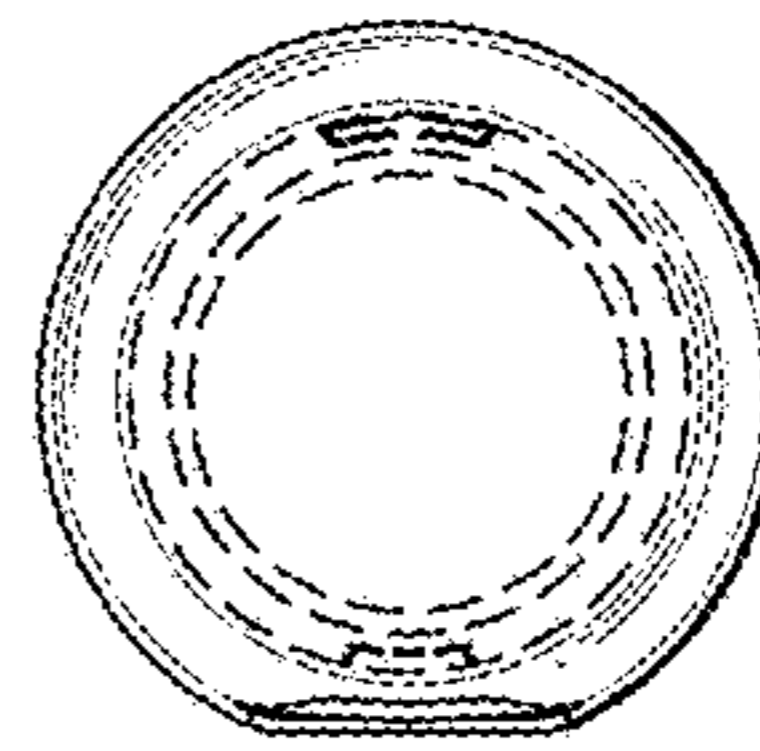


Fig-5

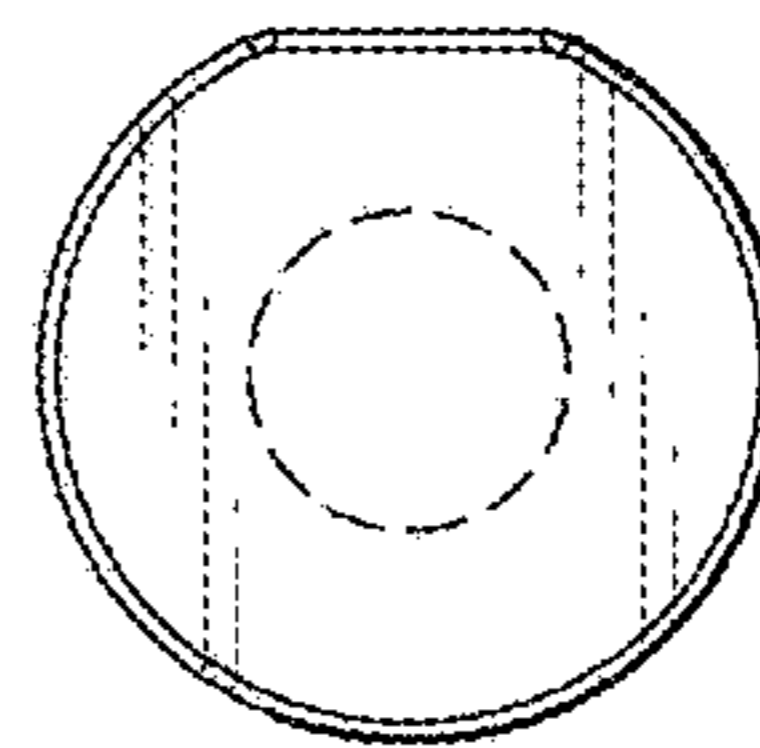


Fig-6



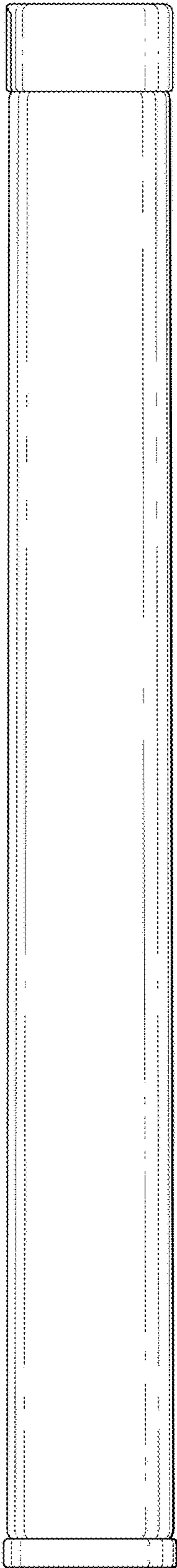


Fig-7

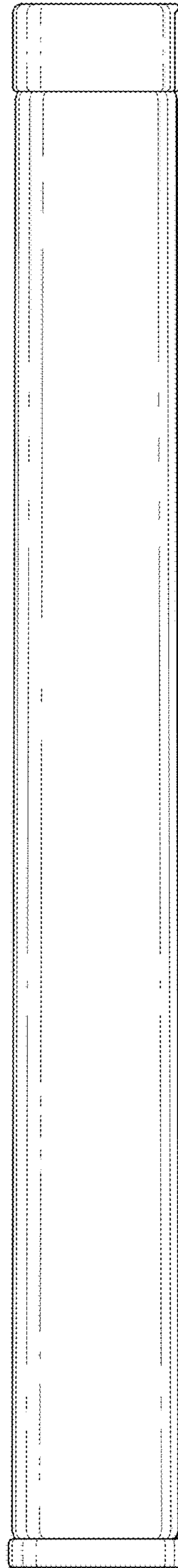


Fig-8