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(12) **United States Design Patent** (10) **Patent No.:** **US D908,754 S**
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(54) **TANDEM SUB**

FOREIGN PATENT DOCUMENTS

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CA 2821506 A1 1/2015
CA 2824838 A1 2/2015

(Continued)

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OTHER PUBLICATIONS

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(Continued)

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(57) **CLAIM**

I claim the ornamental design of a tandem sub, as shown and described.

(51) **LOC (13) Cl.** **15-09**

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

USPC **D15/139**

(58) **Field of Classification Search**

USPC 8/354, 358, 382; 12/197; 15/21, 126,
15/138, 139; 22/100, 112

CPC ... E21B 43/117; E21B 43/119; E21B 43/1185

See application file for complete search history.

DESCRIPTION

FIG. 1 is a front perspective view of a tandem sub showing an embodiment of our new design;

FIG. 2 is a rear perspective view of the tandem sub of FIG. 1;

FIG. 3 is a top plan view of the tandem sub of FIG. 1;

FIG. 4 is a bottom plan view of the tandem sub of FIG. 1;

FIG. 5 is a left-side elevated view of the tandem sub of FIG. 1;

FIG. 6 is a right-side elevated view of the tandem sub of FIG. 1;

FIG. 7 is a front elevated view of the tandem sub of FIG. 1;

FIG. 8 is a rear elevated view of the tandem sub of FIG. 1;

FIG. 9 is a cross-section view of the tandem sub of FIG. 3 along line 9-9; and,

FIG. 10 is a cross-section view of the tandem sub of FIG. 3 along line 10-10.

The broken lines consisting of dashes show an environment that forms no part of the claimed design. The broken lines consisting of a double-dot/dash pattern show a boundary of the claimed design.

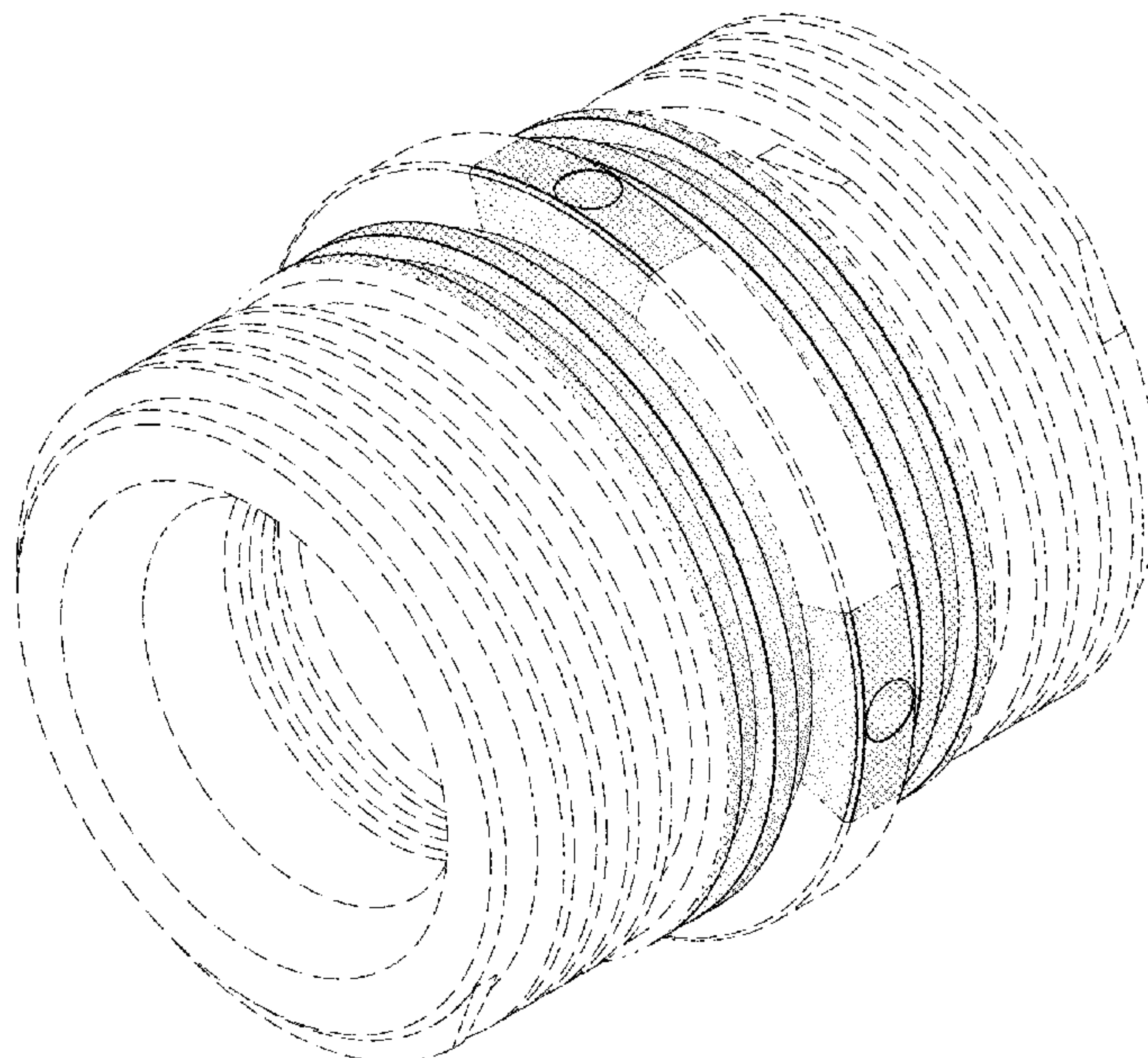
(56) **References Cited**

U.S. PATENT DOCUMENTS

2,216,359 A	10/1940	Spencer
2,358,466 A	9/1944	Miller
2,418,486 A	4/1947	Smylie
2,889,775 A	6/1959	Owen
3,158,680 A	11/1964	Lovitt et al.
3,170,400 A	2/1965	Nelson
3,173,992 A	3/1965	Boop
3,246,707 A	4/1966	Bell
3,374,735 A	3/1968	Moore
3,504,723 A	4/1970	Cushman et al.
3,859,921 A	1/1975	Stephenson

(Continued)

1 Claim, 10 Drawing Sheets



US D908,754 S

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(56)

References Cited

U.S. PATENT DOCUMENTS

4,007,790 A	2/1977	Henning		7,533,722 B2	5/2009	George et al.	
4,007,796 A	2/1977	Boop		7,568,429 B2	8/2009	Hummel et al.	
4,058,061 A	11/1977	Mansur, Jr. et al.		7,591,212 B2	9/2009	Myers, Jr. et al.	
4,100,978 A *	7/1978	Boop	E21B 43/1185	7,661,474 B2	2/2010	Campbell et al.	
			102/306	7,762,172 B2	7/2010	Li et al.	
4,182,216 A	1/1980	DeCaro		7,762,351 B2	7/2010	Vidal	
4,266,613 A	5/1981	Boop		7,778,006 B2	8/2010	Stewart et al.	
4,290,486 A	9/1981	Regalbuto		7,810,430 B2	10/2010	Chan et al.	
4,411,491 A	10/1983	Larkin et al.		7,908,970 B1	3/2011	Jakaboski et al.	
4,491,185 A	1/1985	McClure		7,929,270 B2	4/2011	Hummel et al.	
4,496,008 A	1/1985	Pottier et al.		8,066,083 B2	11/2011	Hales et al.	
4,523,650 A	6/1985	Sehnert et al.		8,069,789 B2	12/2011	Hummel et al.	
4,574,892 A	3/1986	Grigar et al.		8,074,737 B2	12/2011	Hill et al.	
4,598,775 A	7/1986	Vann et al.		8,079,296 B2	12/2011	Barton et al.	
4,619,333 A	10/1986	George		8,136,439 B2 *	3/2012	Bell	E21B 29/02
4,621,396 A	11/1986	Walker et al.					166/55
4,650,009 A	3/1987	McClure et al.		8,157,022 B2	4/2012	Bertoja et al.	
4,657,089 A	4/1987	Stout		8,181,718 B2	5/2012	Burleson et al.	
4,660,910 A	4/1987	Sharp et al.		8,182,212 B2	5/2012	Parcell	
4,744,424 A	5/1988	Lendermon et al.		8,186,259 B2	5/2012	Burleson et al.	
4,747,201 A	5/1988	Donovan et al.		8,230,932 B2	7/2012	Ratcliffe et al.	
4,776,393 A	10/1988	Forehand et al.		8,256,337 B2	9/2012	Hill	
4,790,383 A	12/1988	Savage et al.		8,336,437 B2	12/2012	Barlow et al.	
4,800,815 A	1/1989	Appledom et al.		8,395,878 B2	3/2013	Stewart et al.	
4,850,438 A	7/1989	Regalbuto		8,451,137 B2	5/2013	Bonavides et al.	
4,889,183 A	12/1989	Sommers et al.		8,469,087 B2	6/2013	Gray	
5,027,708 A	7/1991	Gonzalez et al.		8,661,978 B2	3/2014	Backhus et al.	
5,042,594 A *	8/1991	Gonzalez	E21B 43/1185	8,695,506 B2	4/2014	Lanclos	
			175/4.55	8,770,301 B2 *	7/2014	Bell	E21B 43/1185
							166/297
5,052,489 A	10/1991	Carisella et al.		8,863,665 B2	10/2014	DeVries et al.	
5,060,573 A	10/1991	Montgomery et al.		8,869,887 B2	10/2014	Deere et al.	
5,088,413 A	2/1992	Huber		8,875,787 B2 *	11/2014	Tassaroli	E21B 43/1185
5,105,742 A	4/1992	Sumner					166/297
5,159,145 A	10/1992	Carisella et al.		8,881,816 B2	11/2014	Glenn et al.	
5,159,146 A	10/1992	Carisella et al.		8,910,718 B2	12/2014	Watson et al.	
5,223,665 A	6/1993	Burleson et al.		8,985,023 B2	3/2015	Mason	
5,237,136 A	8/1993	Langston		9,080,433 B2	7/2015	Lanclos et al.	
5,241,891 A	9/1993	Hayes et al.		9,145,763 B1	9/2015	Sites, Jr.	
5,322,019 A	6/1994	Hyland		9,145,764 B2 *	9/2015	Burton	F42D 1/043
5,347,929 A	9/1994	Lerche et al.		9,157,718 B2	10/2015	Ross	
5,392,851 A *	2/1995	Arend	E21B 17/023	9,175,553 B2	11/2015	Mccann et al.	
			166/65.1	9,181,790 B2	11/2015	Mace et al.	
				9,194,219 B1	11/2015	Hardesty et al.	
5,392,860 A	2/1995	Ross		9,206,675 B2	12/2015	Hales et al.	
5,436,791 A	7/1995	Turano et al.		9,441,465 B2 *	9/2016	Tassaroli	E21B 43/116
5,571,986 A	11/1996	Snider et al.		9,476,289 B2	10/2016	Wells	
5,703,319 A	12/1997	Fritz et al.		9,494,021 B2	11/2016	Parks et al.	
5,775,426 A	7/1998	Snider et al.		9,518,443 B2	12/2016	Tunget et al.	
5,816,343 A	10/1998	Markel et al.		9,518,454 B2	12/2016	Current et al.	
5,871,052 A	2/1999	Benson et al.		9,574,416 B2	2/2017	Wright et al.	
5,927,402 A	7/1999	Benson et al.		9,581,422 B2	2/2017	Preiss et al.	
D417,252 S *	11/1999	Kay	D22/100	9,598,942 B2	3/2017	Wells et al.	
6,006,833 A	12/1999	Burleson et al.		9,605,937 B2	3/2017	Eitschberger et al.	
6,012,525 A	1/2000	Burleson et al.		9,677,363 B2	6/2017	Schacherer et al.	
6,085,659 A	7/2000	Beukes et al.		9,689,223 B2	6/2017	Schacherer et al.	
6,112,666 A	9/2000	Murray et al.		9,689,240 B2	6/2017	LaGrange et al.	
6,263,283 B1 *	7/2001	Snider	G01V 1/104	9,702,680 B2	7/2017	Parks et al.	
			702/6	9,784,549 B2	10/2017	Eitschberger	
				9,810,035 B1	11/2017	Carr et al.	
6,305,287 B1	10/2001	Capers et al.		9,822,618 B2 *	11/2017	Eitschberger	F42B 3/26
6,333,699 B1	12/2001	Zierolf		9,835,015 B2	12/2017	Hardesty	
6,354,374 B1	3/2002	Edwards et al.		9,874,083 B2	1/2018	Logan et al.	
6,412,388 B1	7/2002	Frazier		10,066,921 B2	9/2018	Eitschberger	
6,418,853 B1	7/2002	Duguet et al.		10,077,641 B2	9/2018	Rogman et al.	
6,439,121 B1	8/2002	Gillingham		10,151,152 B2	12/2018	Wight et al.	
6,497,285 B2	12/2002	Walker		10,151,181 B2	12/2018	Lopez et al.	
6,516,901 B1	2/2003	Falgout		10,174,595 B2	1/2019	Knight et al.	
6,651,747 B2	11/2003	Chen et al.		10,188,990 B2	1/2019	Burmeister et al.	
6,719,061 B2	4/2004	Muller et al.		10,190,398 B2	1/2019	Goodman et al.	
6,739,265 B1	5/2004	Badger et al.		10,273,788 B2 *	4/2019	Bradley	F42B 3/08
6,742,602 B2	6/2004	Trotechaud		10,337,270 B2	7/2019	Carisella et al.	
6,752,083 B1	6/2004	Lerche et al.		10,352,136 B2	7/2019	Goyeneche	
7,013,977 B2	3/2006	Nordaas		10,422,195 B2	9/2019	LaGrange et al.	
7,107,908 B2	9/2006	Forman et al.		10,429,161 B2	10/2019	Parks et al.	
7,193,527 B2	3/2007	Hall		10,458,213 B1 *	10/2019	Eitschberger	E21B 43/1185
7,278,491 B2	10/2007	Scott		10,472,938 B2 *	11/2019	Parks	E21B 43/1185
7,347,278 B2	3/2008	Lerche et al.		D873,373 S *	1/2020	Hartman	D22/112
				D904,475	12/2020	Preiss	

(56)

References Cited**U.S. PATENT DOCUMENTS**

2002/0020320 A1 2/2002 Lebaudy et al.
 2002/0062991 A1 5/2002 Farrant et al.
 2003/0000411 A1 1/2003 Cernocky et al.
 2003/0001753 A1 1/2003 Cernocky et al.
 2004/0216632 A1 11/2004 Finsterwald
 2004/0239521 A1 12/2004 Zierolf
 2005/0178282 A1 8/2005 Brooks et al.
 2005/0194146 A1 9/2005 Barker et al.
 2005/0229805 A1 10/2005 Myers, Jr. et al.
 2007/0084336 A1 4/2007 Neves
 2007/0158071 A1 7/2007 Mooney, Jr. et al.
 2007/0267195 A1 11/2007 Grigar et al.
 2008/0047456 A1 2/2008 Li et al.
 2008/0110632 A1* 5/2008 Beall E21B 34/103
 166/332.3
 2008/0134922 A1 6/2008 Grattan et al.
 2008/0149338 A1 6/2008 Goodman et al.
 2008/0173204 A1 7/2008 Anderson et al.
 2008/0264639 A1 10/2008 Parrott et al.
 2009/0050322 A1 2/2009 Hill et al.
 2009/0272529 A1 11/2009 Crawford
 2009/0301723 A1 12/2009 Gray
 2010/0000789 A1 1/2010 Barton et al.
 2010/0024674 A1 2/2010 Peeters et al.
 2010/0089643 A1 4/2010 Vidal
 2010/0230104 A1 9/2010 Nölke et al.
 2011/0024116 A1 2/2011 McCann et al.
 2012/0006217 A1* 1/2012 Anderson E21B 43/1185
 102/215
 2012/0152542 A1 6/2012 Le
 2012/0160483 A1* 6/2012 Carisella E21B 27/02
 166/270
 2012/0199031 A1 8/2012 Lanclos
 2012/0199352 A1 8/2012 Lanclos et al.
 2012/0241169 A1 9/2012 Hales et al.
 2012/0242135 A1 9/2012 Thomson et al.
 2012/0247769 A1 10/2012 Schacherer et al.
 2012/0247771 A1 10/2012 Black et al.
 2012/0298361 A1 11/2012 Sampson
 2013/0008639 A1 1/2013 Tassaroli et al.
 2013/0043074 A1* 2/2013 Tassaroli E21B 43/1185
 175/2
 2013/0118342 A1 5/2013 Tassaroli
 2013/0199843 A1 8/2013 Ross
 2014/0131035 A1 5/2014 Entchev et al.
 2015/0136419 A1 5/2015 Mauldin
 2015/0226044 A1* 8/2015 Ursi E21B 43/119
 166/55
 2016/0040520 A1 2/2016 Tolman et al.
 2016/0061572 A1 3/2016 Eitschberger et al.
 2016/0084048 A1 3/2016 Harrigan et al.
 2016/0108722 A1 4/2016 Whitsitt et al.
 2016/0168961 A1 6/2016 Parks et al.
 2016/0202033 A1* 7/2016 Shahinpour E21B 43/1185
 102/206
 2016/0273902 A1 9/2016 Eitschberger
 2016/0290084 A1* 10/2016 LaGrange E21B 29/02
 2016/0298404 A1* 10/2016 Beckett E21B 33/12
 2016/0356132 A1 12/2016 Burmeister et al.
 2017/0030693 A1 2/2017 Preiss et al.
 2017/0052011 A1 2/2017 Parks et al.
 2017/0138150 A1 5/2017 Yencho
 2017/0175500 A1 6/2017 Robey et al.
 2017/0241244 A1 8/2017 Barker et al.
 2017/0268860 A1* 9/2017 Eitschberger F42D 1/05
 2017/0276465 A1 9/2017 Parks et al.
 2017/0298716 A1* 10/2017 McConnell E21B 43/119
 2017/0314373 A9 11/2017 Bradley et al.
 2018/0080298 A1 3/2018 Covalt et al.
 2018/0119529 A1* 5/2018 Goyeneche E21B 43/117
 2018/0202789 A1 7/2018 Parks et al.
 2018/0202790 A1 7/2018 Parks et al.
 2018/0318770 A1 11/2018 Eitschberger et al.
 2019/0049225 A1 2/2019 Eitschberger

2019/0085685 A1 3/2019 McBride
 2019/0162055 A1 5/2019 Collins et al.
 2019/0162056 A1* 5/2019 Sansing F42C 19/06
 2019/0195054 A1 6/2019 Bradley et al.
 2019/0211655 A1 7/2019 Bradley et al.
 2019/0234188 A1* 8/2019 Goyeneche E21B 43/119
 2019/0257158 A1 8/2019 Langford et al.
 2019/0257181 A1 8/2019 Langford et al.
 2019/0330947 A1 10/2019 Mulhern et al.
 2019/0338612 A1 11/2019 Holodnak et al.
 2019/0368293 A1 12/2019 Covalt et al.
 2020/0024934 A1 1/2020 Eitschberger et al.
 2020/0024935 A1 1/2020 Eitschberger et al.
 2020/0032626 A1 1/2020 Parks et al.
 2020/0063537 A1* 2/2020 Langford F42D 1/05
 2020/0088011 A1* 3/2020 Eitschberger G01R 27/00
 2020/0182025 A1* 6/2020 Brady E21B 43/11852
 2020/0199983 A1 6/2020 Preiss et al.

FOREIGN PATENT DOCUMENTS

CA 3021913 A1 2/2018
 CN 85107897 A 9/1986
 CN 1082601 C 4/2002
 CN 201209435 3/2009
 CN 101397890 A 4/2009
 CN 201428439 3/2010
 CN 101691837 B 4/2010
 CN 201507296 U 6/2010
 CN 201620848 U 11/2010
 CN 202431259 U 9/2012
 CN 101892822 B 1/2013
 CN 103485750 A 1/2014
 CN 103993861 5/2017
 CN 207847603 U 9/2018
 CN 208347755 U 1/2019
 CN 208870580 U 5/2019
 CN 209195374 U 8/2019
 CN 110424930 A 11/2019
 CN 209780779 U 12/2019
 CN 209908471 U 1/2020
 EP 0416915 A2 3/1991
 EP 0482969 B1 8/1996
 GB 2531450 B 2/2017
 GB 2548101 A 9/2017
 GB 2548203 A 9/2017
 RU 100552 U1 12/2010
 RU 2633904 C1 10/2017
 WO 2001059401 A1 8/2001
 WO 2009091422 A2 7/2009
 WO 2015006869 A1 1/2015
 WO 2015134719 A1 9/2015
 WO 2017147329 A1 8/2017
 WO 2018009223 A1 1/2018
 WO 2019148009 A2 8/2019

OTHER PUBLICATIONS

Baker Hughes, SurePerf Rapid Select-Fire System, Perforate production zones in a single run, Sep. 2012, 2 pgs., www.bakerhughes.com.
 GeoDynamics; “STRATX”; promotional brochure; Jan. 30, 2020.
 GeoDynamics; “VaporGun”; promotional brochure; Mar. 4, 2020.
 GeoDynamics; “Vapr”; promotional brochure; Oct. 1, 2019.
 Hunting Energy Services Pte Ltd., “H-1 Perforating Gun System”; promotional brochure; Jun. 21, 2019.
 Hunting Energy Services Pte Ltd., “H-2 Perforating System”; promotional brochure; Feb. 12, 2020.
 OSO Perforating; “OsoLite”; promotional brochure; Jan. 2019.
 SWM International Inc.; “Thunder Disposable Gun System”; promotional brochure; Oct. 2018.
 Thilo Scharf; “DynaEnergetics exhibition and product briefing”; pp. 5-6; presented at 2014 Offshore Technology conference; May 2014.
 Thilo Scharf; “DynaStage & BTM Introduction”; pp. 4-5, 9; presented at 2014 Offshore Technology Conference; May 2014.

(56)

References Cited

OTHER PUBLICATIONS

Vigor USA; "Sniper Addressable System"; promotional brochure; Sep. 2019.

Vigor, Perforating Gun Accessories, China Vigor Drilling Oil Tools and Equipment Co., Ltd., Sep. 14, 2018, 4 pgs., <http://www.vigordrilling.com/completion-tools/perforation-gun-accessories.html>.

Hunting Energy Service, ControlFire RF Safe ControlFire® RF-Safe Manual, 33 pgs., Jul. 2016, http://www.hunting-intl.com/media/2667160/ControlFire%20RF_Assembly%20Gun%20Loading_Manual.pdf.

Owen Oil Tools, E & B Select Fire Side Port, Tandem Sub, Apr. 2010, 2 pgs., https://www.corelab.com/owen/cms/docs/Canada/10A_eandbsystem-01.0-c.pdf.

Owen Oil Tools, Expendable Perforating Guns, Jul. 2008, 7 pgs., https://www.corelab.com/owen/cms/docs/Canada/10A_erhsc-01.0-c.pdf.

United States Patent and Trademark Office, Case IPR2018-00600 for U.S. Pat. No. 9,581,422 B2, Petitioner's Reply in Inter Partes Review of U.S. Pat. No. 9,581,422, dated Mar. 7, 2019, 44 pgs.

United States Patent and Trademark Office, Case PGR 2020-00072 for U.S. Pat. No. 10,429,161 B2, Petition for Post Grant Review of Claims 1-20 of U.S. Pat. No. 10,429,161 Under 35 U.S.C. §§ 321-28 and 37 C.F.R. §§ 42.200 ET SEQ., dated Jun. 30, 2020, 109 pages.

United States Patent and Trademark Office, Final Written Decision of Case IPR2018-00600 for U.S. Pat. No. 9,581,422 B2, Paper No. 42, dated Aug. 20, 2019, 31 pgs.

United States Patent and Trademark Office, Non-final Office Action of U.S. Appl. 16/455,816, dated Jul. 2, 2020, 15 pgs.

United States Patent and Trademark Office, Office Action of U.S. Appl. No. 16/585,790, dated Nov. 12, 2019, 9 pgs.

United States Patent and Trademark Office, Office Action of U.S. Appl. No. 16/858,041, dated Jun. 16, 2020, 11 pgs.

United States Patent and Trademark Office, Office Action of U.S. Appl. No. 29/733,080, dated Jun. 26, 2020, 8 pgs.

Yellow Jacket Oil Tools, Orienting Sub, 2019, 2 pgs., <https://www.yjoiltools.com/Wireline-Subs/Orienting-Sub>.

Yellow Jacket Oil Tools; Tandem Sub; 2019; 3 pages.

Amit Govil, Selective Perforation: A Game Changer in Perforating Technology—Case Study, presented at the 2012 European and West African Perforating Symposium, Schlumberger, Nov. 7-9, 2012, 14 pgs.

Austin Powder Company; A-140 F & Block, Detonator & Block Assembly; Jan. 5, 2017; 2 pgs.; https://www.austinpowder.com/wp-content/uploads/2019/01/OilStar_A140Fbk-2.pdf.

Baker Hughes, Long Gun Deployment Systems IPS-12-28, Presented at 2012 International Perforating Symposium, Apr. 26 and 27, 2011, 11 pages.

Core Lab, ZERO180™ Gun System Assembly and Arming Procedures, 2015, 33 pgs., <https://www.corelab.com/owen/CMS/docs/Manuals/gunsys/zero180/MAN-Z180-000.pdf>.

Dynaenergetics GMBH & Co. KG, Patent Owner's Response to Hunting Titan's Petition for Inter Parties Review—Case IPR2018-00600, filed Dec. 6, 2018, 73 pages.

DynaEnergetics GmbH & Co. KG; Case No. IPR2018-00600; Patent Owner's Motion to Amend; filed Dec. 6, 2018, 53 pgs.

Dynaenergetics, DYNAslect Electronic Detonator 0015 SFDE RDX 1.4B, Product Information, Dec. 16, 2011, 1 pg.

Dynaenergetics, DYNAslect Electronic Detonator 0015 SFDE RDX 1.4S, Product Information, Dec. 16, 2011, 1 pg.

Dynaenergetics, DYNAslect System, information downloaded from website, Jul. 3, 2013, 2 pages, <http://www.dynaenergetics.com/>.

Dynaenergetics, Electronic Top Fire Detonator, Product Information Sheet, Jul. 30, 2013, 1 page.

Dynaenergetics, Gun Assembly, Product Summary Sheet, May 7, 2004, 1 page.

Dynaenergetics, Selective Perforating Switch, information downloaded from website, Jul. 3, 2013, 2 pages, <http://www.dynaenergetics.com/>.

Dynaenergetics, Selective Perforating Switch, Product Information Sheet, May 27, 2011, 1 pg.

Dynaenergetics; DynaStage Solution—Factory Assembled Performance-Assured Perforating Systems; 6 pages.

Eric H. Findlay, Jury Trial Demand in Civil Action No. 6:20-cv-00069-ADA, dated Apr. 22, 2020, 32 pages.

European Patent Office; International Search Report and Written Opinion for PCT Application No. PCT/EP2014/065752 dated May 4, 2015; 12 pgs.

Federal Institute of Industrial Property; Search Report for RU App. No. 2016104882/03; dated Feb. 1, 2018; 7 pgs. (English translation 4 pages).

GB Intellectual Property Office, Examination Report for GB App. No. GB1600085.3, dated Mar. 9, 2016, 1 pg.

GB Intellectual Property Office, Search Report for App. No. GB 1700625.5; dated Jul. 7, 2017; 5 pgs.

GB Intellectual Property Office; Office Action for GB App. No. 1717516.7; dated Feb. 27, 2018; 6 pages.

German Patent Office; Office Action for DE App. No. 10 2013 109 227.6; dated May 22, 2014; 8 pgs.

Horizontal Wireline Services, Presentation of a completion method of shale demonstrated through an example of Marcellus Shale, Pennsylvania, USA, Presented at 2012 International Perforating Symposium (Apr. 26-28, 2012), 17 pages.

Hunting Titan Inc., Petition for Inter Parties Review of U.S. Pat. No. 9581422, filed Feb. 16, 2018, 93 pgs.

Hunting Titan, H-1® Perforating Gun System, 2016, 2 pgs., <http://www.hunting-intl.com/titan>.

Hunting Titan, Wireline Top Fire Detonator Systems, Nov. 24, 2014, 2 pgs, <http://www.hunting-intl.com/titan/perforating-guns-and-setting-tools/wireline-top-fire-detonator-systems>.

Intellectual Property India, Office Action of in Application No. 201647004496, dated Jun. 7, 2019, 6 pgs.

International Searching Authority; International Search Report and Written Opinion for PCT App. No. PCT/CA2014/050673; dated Oct. 9, 2014; 7 pages.

International Searching Authority; International Search Report and Written Opinion for PCT App. No. PCT/EP2019/072064; dated Nov. 20, 2019; 15 pages.

International Searching Authority; International Search Report and Written Opinion for PCT App. No. PCT/US2015/018906; dated Jul. 10, 2015; 12 pages.

International Searching Authority; PCT Search Report and Written Opinion for PCT App No. PCT/EP2014/065752; dated May 4, 2015; 12 pgs.

Jet Research Center Inc., JRC Catalog, 36 pgs., https://www.jetresearch.com/content/dam/jrc/Documents/Books_Catalogs/06_Dets.pdf.

Jet Research Center Inc., Red RF Safe Detonators Brochure, 2008, 2 pages, www.jetresearch.com.

Jet Research Center, Velocity™ Perforating System Plug and Play Guns for Pumpdown Operation, Ivarado, Texas, Jul. 2019, 8 pgs., <https://www.jetresearch.com/content/dam/jrc/Documents/Brochures/jrc-velocity-perforating-system.pdf>.

Norwegian Industrial Property Office; Office Action and Search Report for NO App. 20160017; dated Jun. 15, 2017; 5 pages.

Norwegian Industrial Property Office; Office Action and Search Report for NO App. No. 20171759; dated Jan. 14, 2020; 6 pages.

Owen Oil Tools & Pacific Scientific; RF-Safe Green Det, Side Block for Side Initiation, Jul. 26, 2017, 2 pgs.

Owen Oil Tools, Recommended Practice for Oilfield Explosive Safety, Presented at 2011 MENPAS Middle East and North Africa Perforating Symposium, Nov. 28-30, 2011, 6 pages.

Owens Oil Tools, E & B Select Fire Side Port Tandem Sub Assembly, 2009, 9 pgs., <https://www.corelab.com/owen/CMS/docs/Manuals/gunsys/MAN-30-XXX-0002-96-R00.pdf>.

Robert Parrott, Case IPR2018-00600 for U.S. Pat. No. 9,581,422 B2, Declaration regarding Patent Invalidity, dated Jun. 29, 2020, 146 pages.

Schlumberger & Said Abubakr, Combining and Customizing Technologies for Perforating Horizontal Wells in Algeria, Presented at 2011 MENAPS, Nov. 28-30, 2011, 20 pages.

Schlumberger, Perforating Services Catalog, 2008, 521 pages.

(56)

References Cited

OTHER PUBLICATIONS

Smylie; New Safe and Secure Detonators for the Industry's consideration; Presented at Explosives Safety & Security Conference Marathon Oil Co, Houston; Feb. 23-24, 2005; 20 pages.

State Intellectual Property Office, P.R. China; First Office Action for Chinese App No. 201580011132.7; dated Jun. 27, 2018; 5 pages (Eng. Translation 9 pages).

State Intellectual Property Office, P.R. China; First Office Action for CN App. No. 201480040456.9; dated Mar. 29, 2017; 12 pages (English translation 17 pages).

State Intellectual Property Office, P.R. China; First Office Action with full translation for CN App. No. 201480040456.9; dated Mar. 29, 2017; 12 pages (English translation 17 pages).

U.S. Patent Trial and Appeal Board, Institution of Inter Partes Review of U.S. Pat. No. 9581422, Case IPR2018-00600, Aug. 21, 2018, 9 pages.

United States Patent and Trademark Office, Case IPR2018-00600 for U.S. Pat. No. 9,581,422 B2, DynaEnergetics GmbH & Co. KG's Patent Owner Preliminary Response, dated May 22, 2018, 47 pgs. GE Oil & Gas; Pipe Recovery Technology & Wireline Accessories; pp. 317-318, 330, 381-382; 2013 (435 pages).

Jet Research Center, Plugs and Setting Tools, Alvarado, Texas, 13 pgs., https://www.jetresearch.com/content/dam/jrc/Documents/Books_Catalogs/02_Plugs_STNG_Tool.pdf.

United States Patent and Trademark Office, U.S. Appl. No. 61/733,129; filed Dec. 4, 2012; 10 pages.

United States Patent and Trademark Office, U.S. Appl. No. 61/819,196; filed May 3, 2013 ; 10 pages.

* cited by examiner

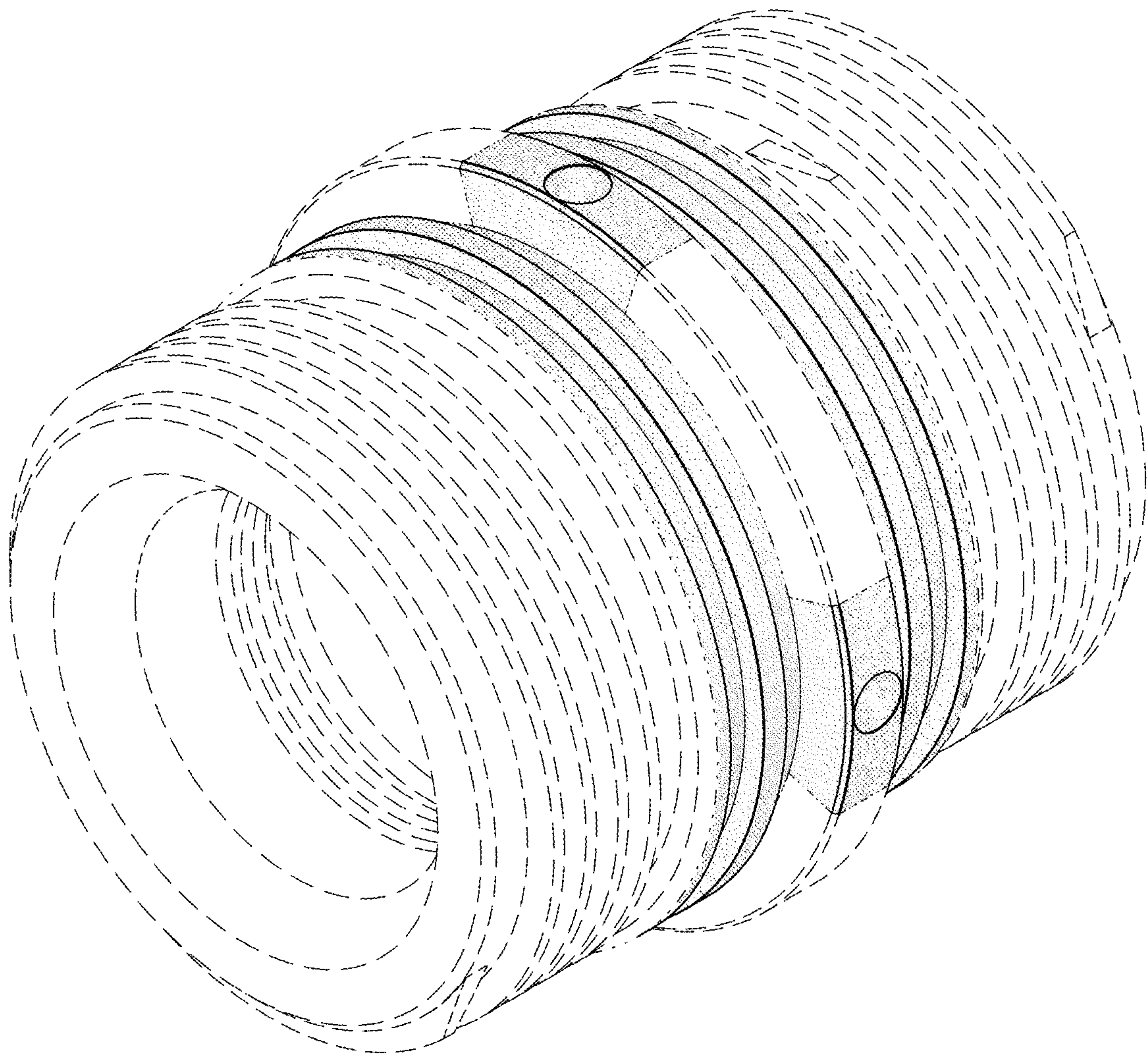


FIG. 1

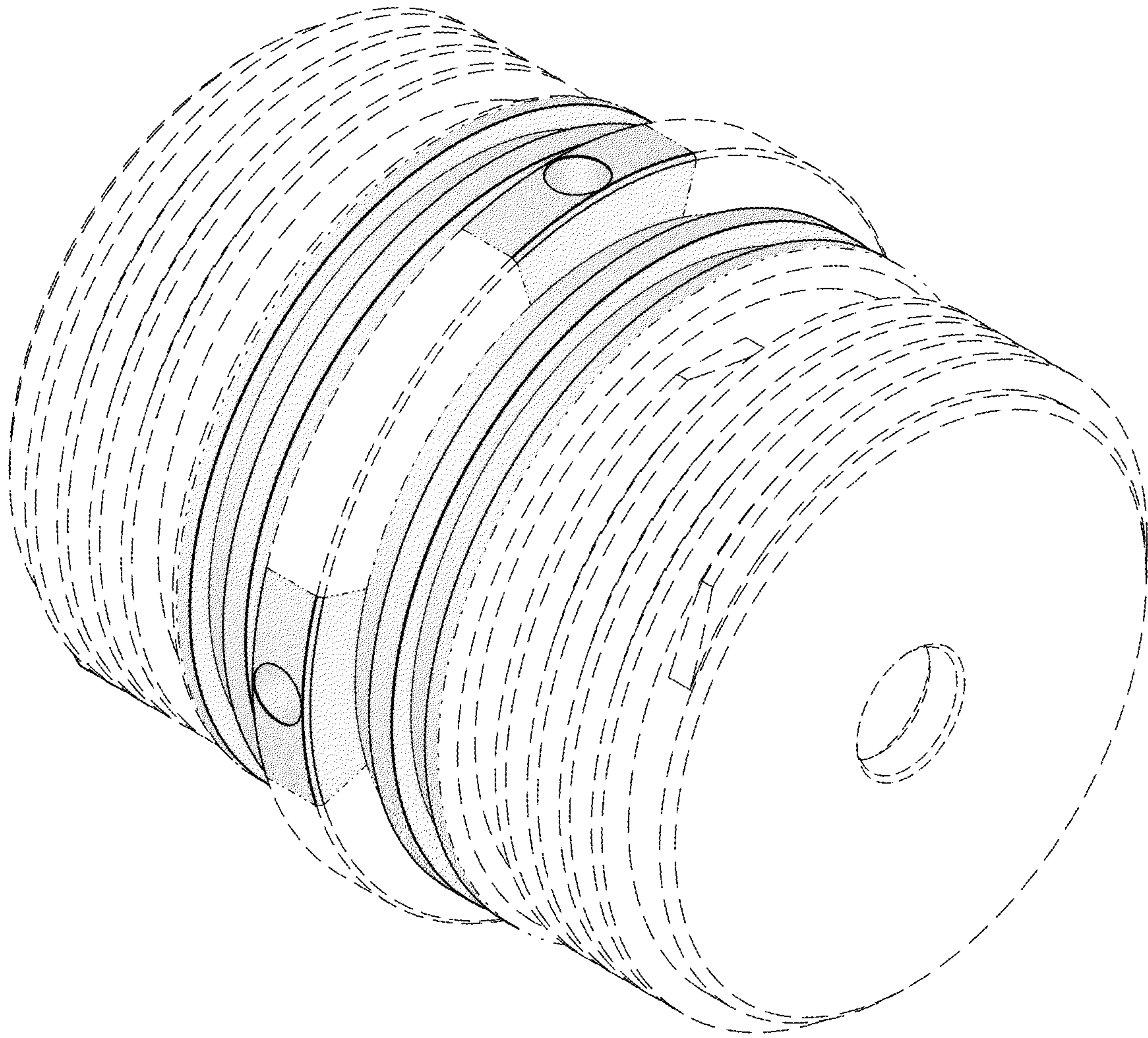


FIG. 2

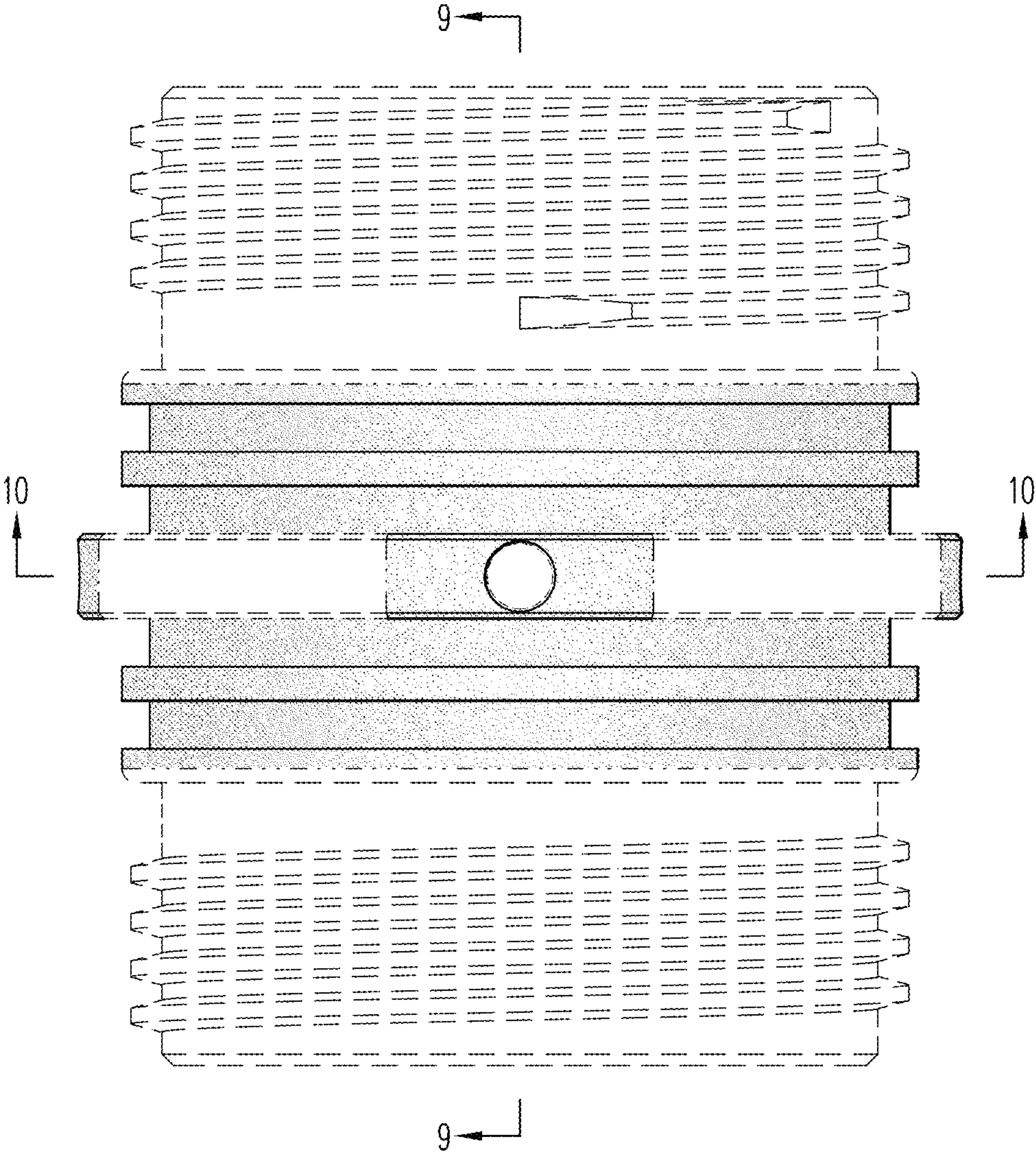


FIG. 3

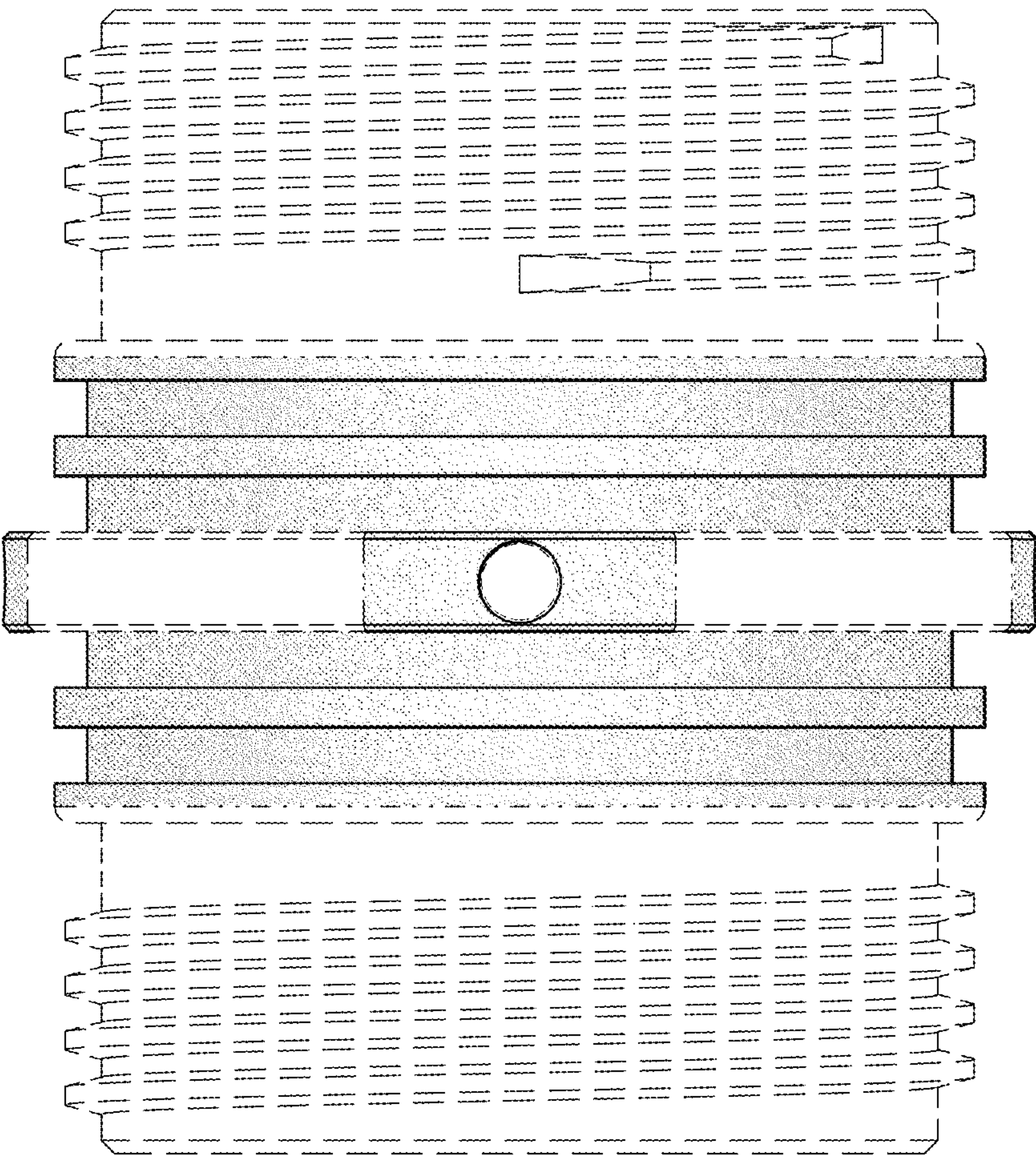


FIG. 4

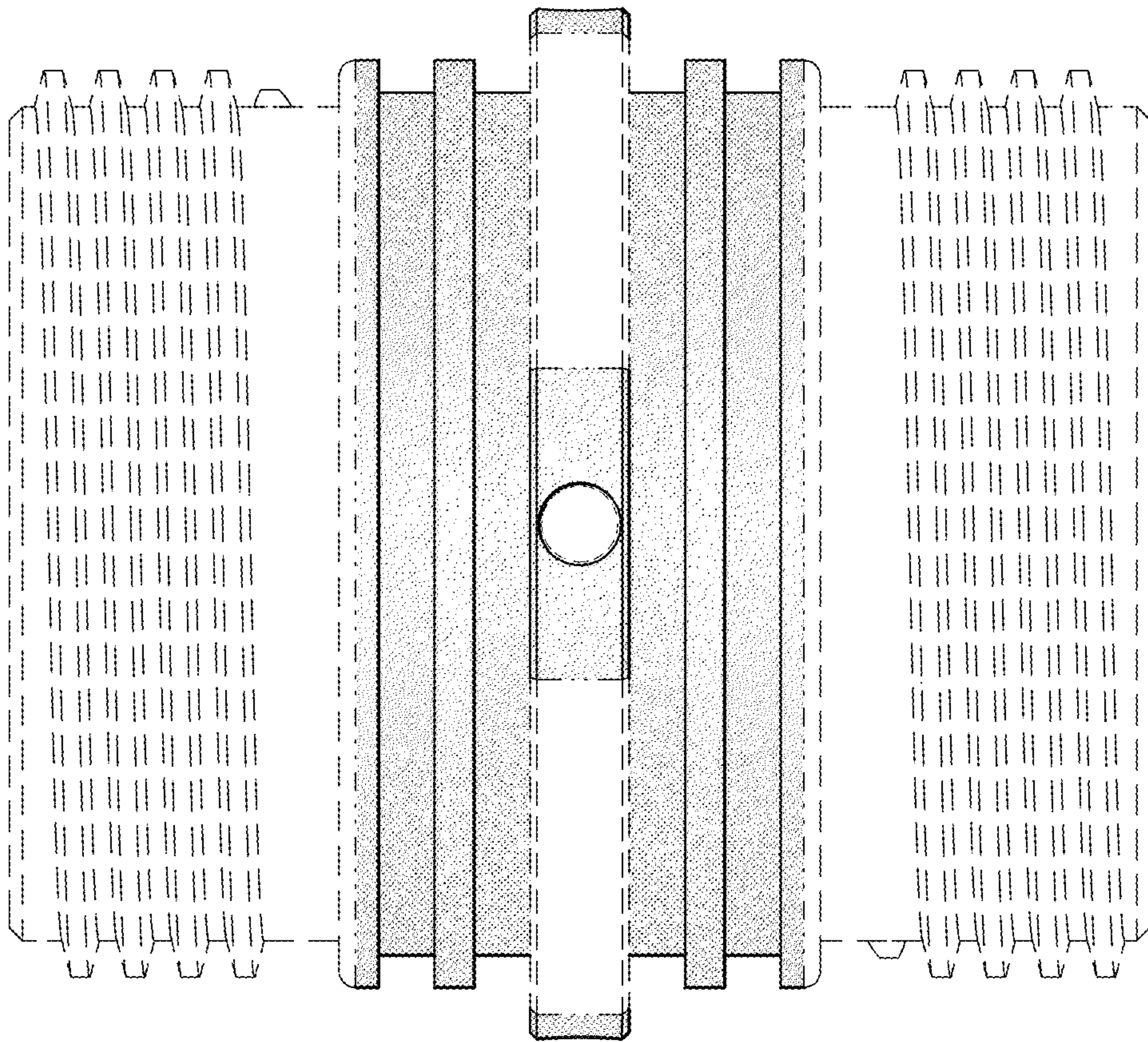


FIG. 5

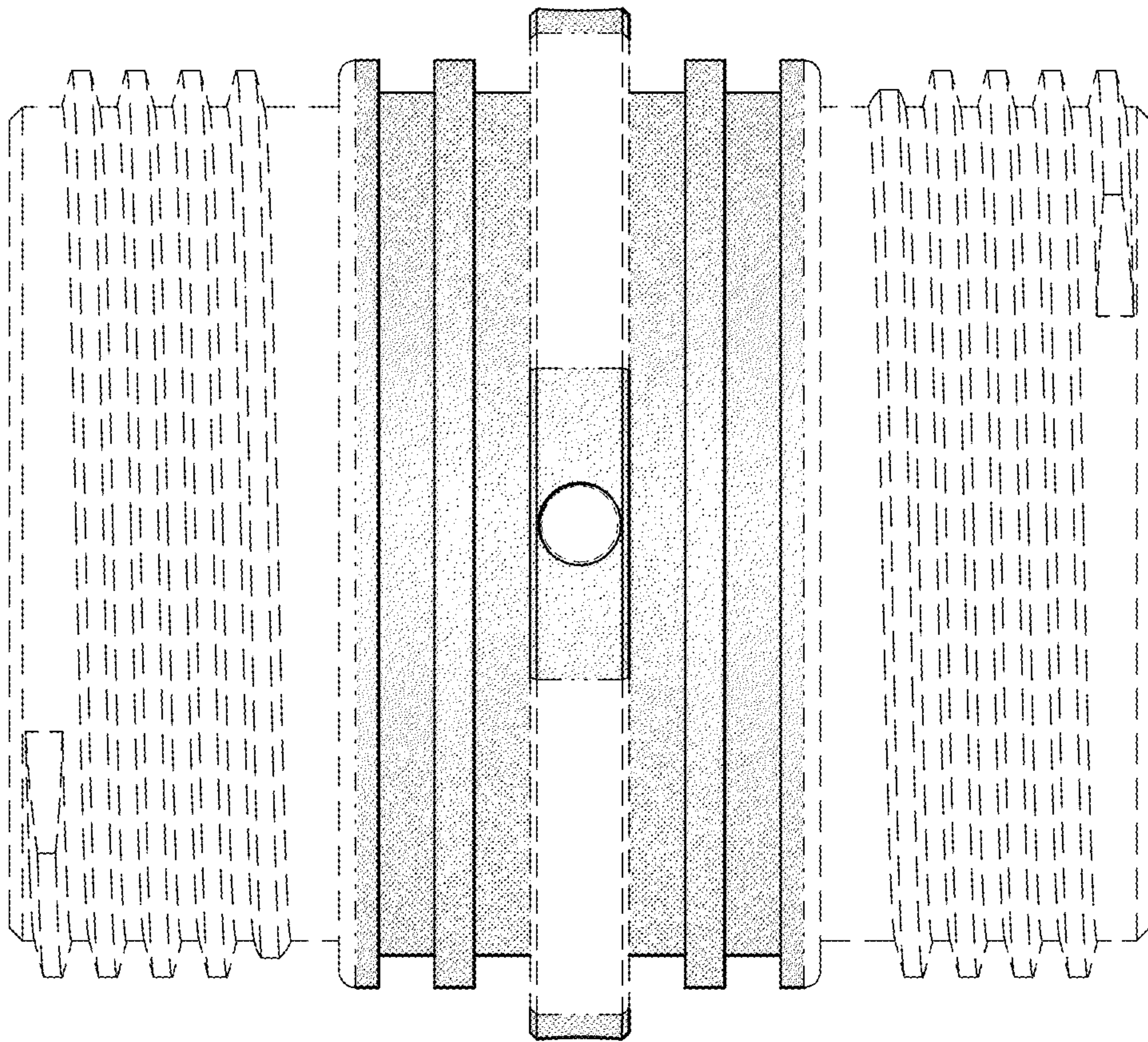


FIG. 6

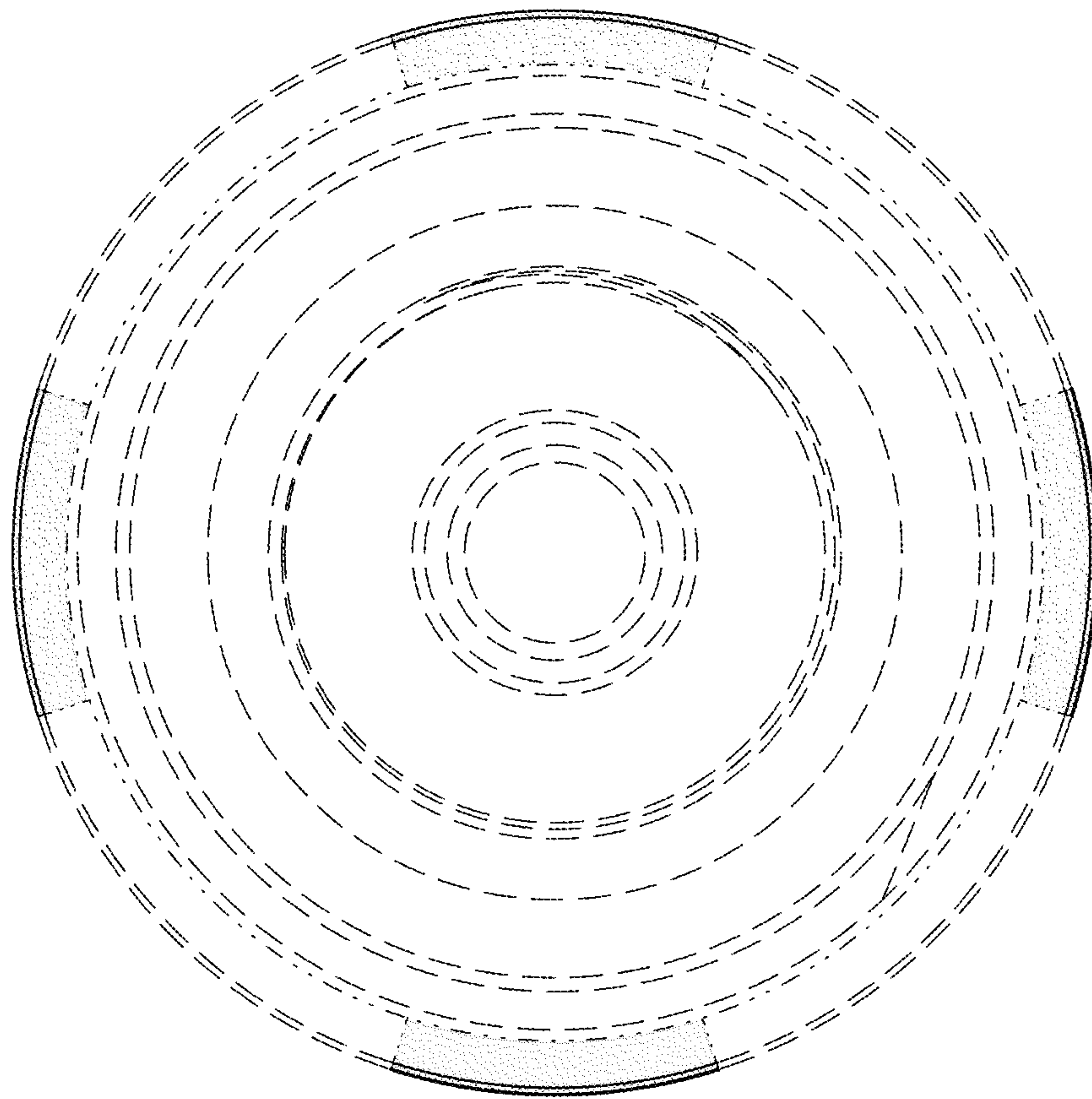


FIG. 7

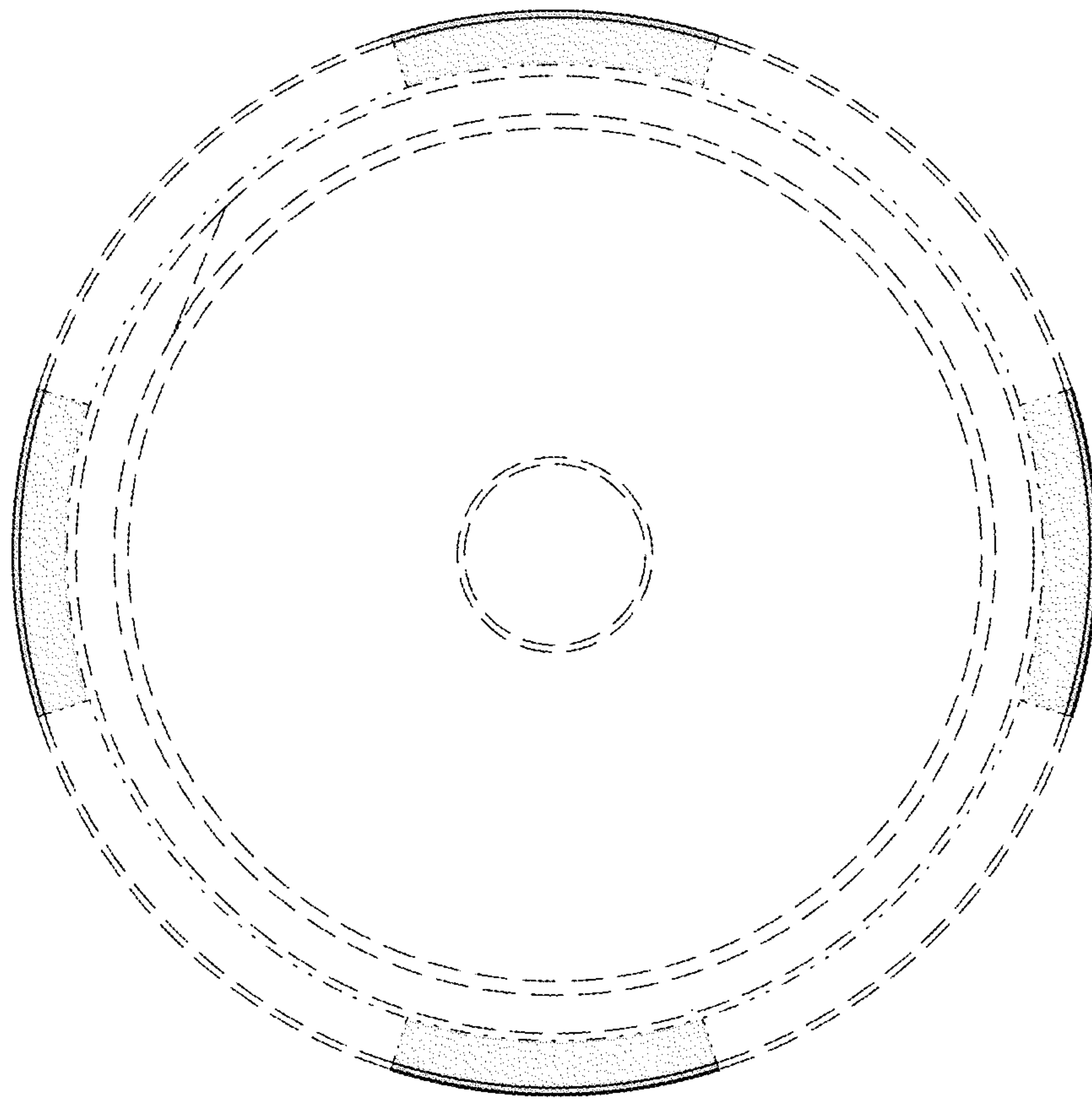


FIG. 8

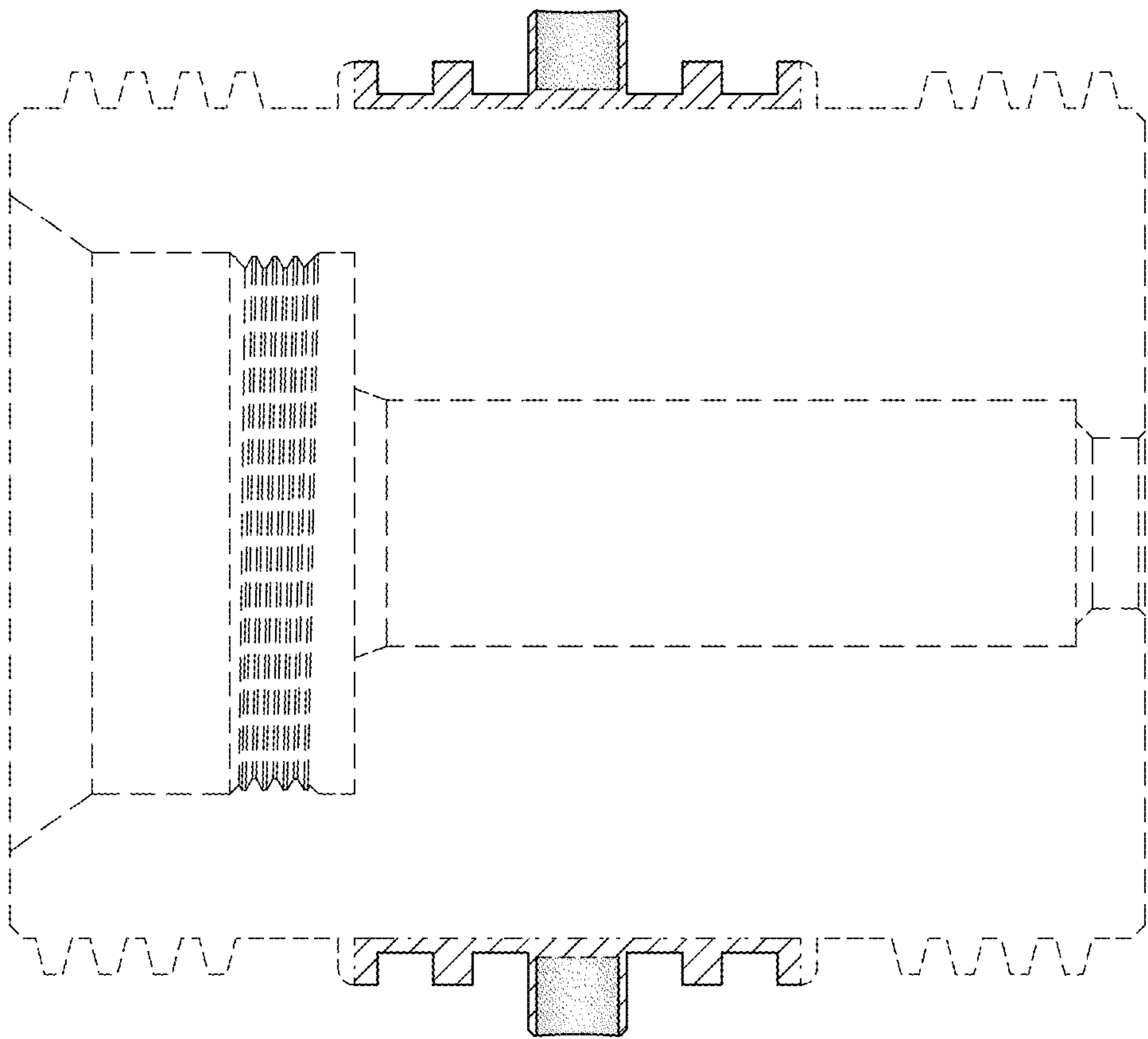


FIG. 9

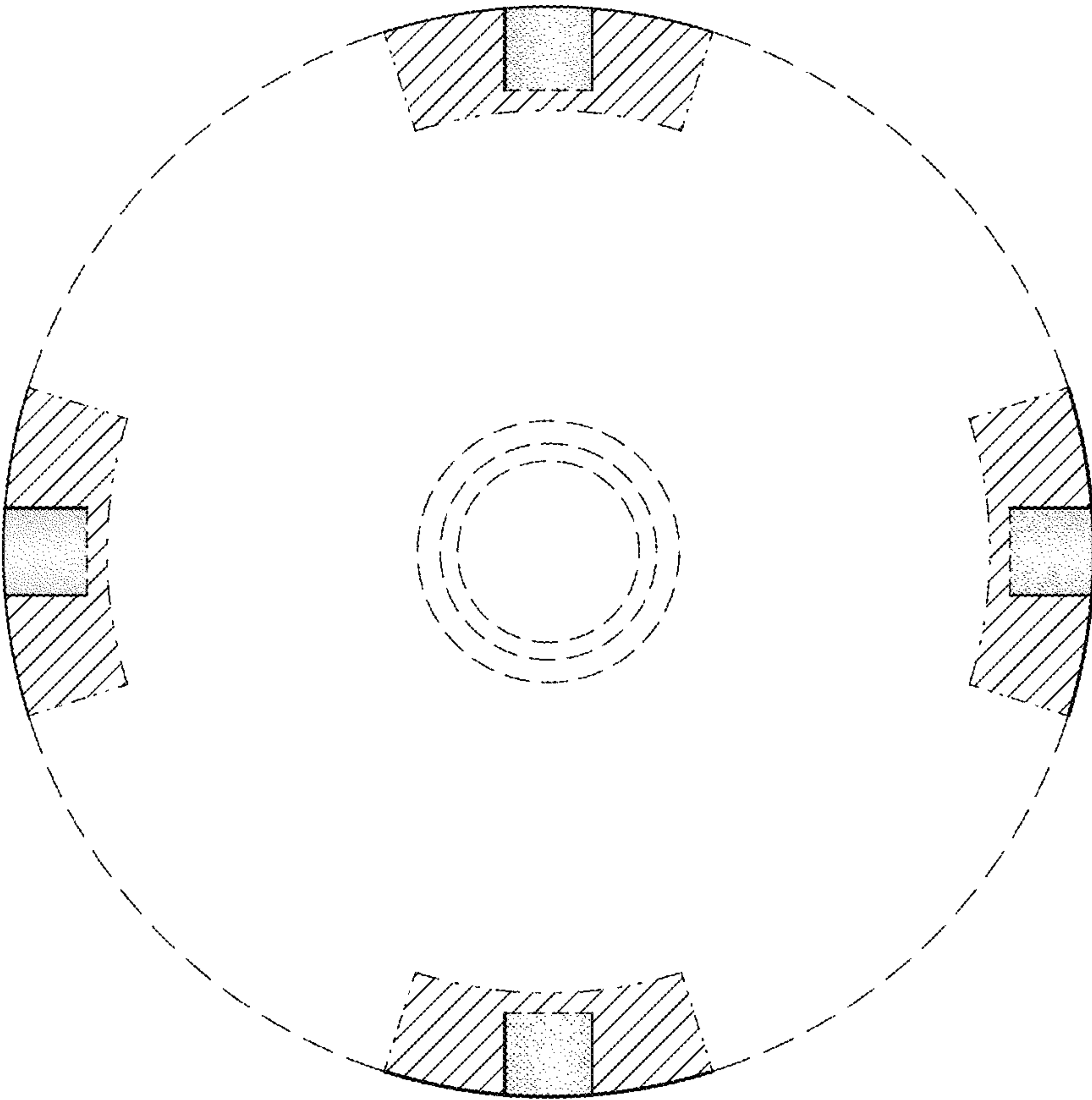


FIG. 10