US00RE49257E

(19) **United States**

(12) **Reissued Patent**

Artioli

(10) **Patent Number: US RE49,257 E**

(45) **Date of Reissued Patent: Oct. 25, 2022**

(54) **GRIP APPARATUS FOR EXERCISE EQUIPMENT AND METHOD FOR MAKING THEREOF**

(71) Applicant: **ORBITAL ROTATION ACCESSORY INTERNATIONAL INC.**, Montréal (CA)

(72) Inventor: **Vezio Artioli**, Montréal (CA)

(73) Assignee: **ORBITAL ROTATION ACCESSORY INTERNATIONAL INC.**, Montréal (CA)

(21) Appl. No.: **17/096,946**

(22) Filed: **Nov. 12, 2020**

Related U.S. Patent Documents

Reissue of:

(64) Patent No.: **10,124,207**
Issued: **Nov. 13, 2018**
Appl. No.: **15/577,437**
PCT Filed: **May 30, 2016**
PCT No.: **PCT/CA2016/050609**
§ 371 (c)(1),
(2) Date: **Nov. 28, 2017**
PCT Pub. No.: **WO2016/191867**
PCT Pub. Date: **Dec. 8, 2016**

U.S. Applications:

(60) Provisional application No. 62/167,931, filed on May 29, 2015.

(51) **Int. Cl.**
A63B 21/00 (2006.01)
A63B 21/072 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A63B 21/4035*** (2015.10); ***A63B 21/072*** (2013.01); ***A63B 21/0722*** (2015.10);
(Continued)

(58) **Field of Classification Search**
CPC A63B 21/0628; A63B 21/0125; A63B 21/0724; A63B 21/0722; A63B 21/4035;
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,333,005 A 3/1920 Warner
3,384,370 A * 5/1968 Bailey A63B 21/0724 482/106

(Continued)

FOREIGN PATENT DOCUMENTS

CN 203736796 7/2014
CN 204121675 1/2015

OTHER PUBLICATIONS

Body Gym Equipements—Gymnetic, "360 Degree biceps/triceps bar with swivel", published on Feb. 25, 2015. (The year of publication is sufficiently earlier than the effective U.S. filing date so that the particular month of publication is not an issue).

(Continued)

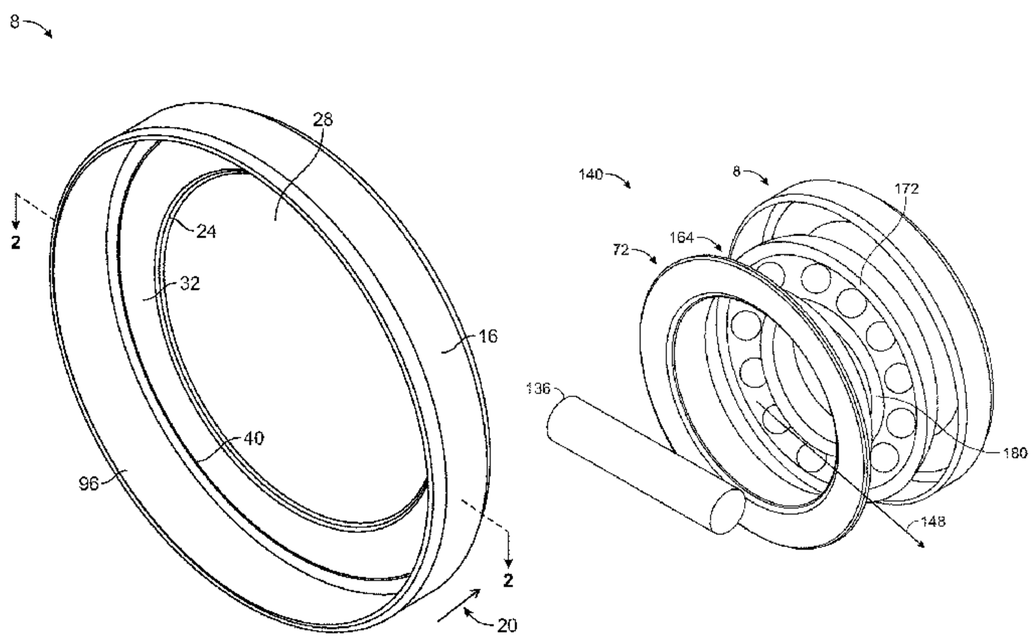
Primary Examiner — Terrence R Till

(74) *Attorney, Agent, or Firm* — Bereskin & Parr LLP/S.E.N.C.R.L., s.r.l.

(57) **ABSTRACT**

The present disclosure relates to a grip apparatus for exercise equipment, the grip apparatus comprising: a first annular member having a first annular sidewall and a first flange extending radially inwardly from the first annular sidewall; a second annular member having a second annular sidewall and a second flange extending radially **[**inwardly**]** *outwardly* from the second annular sidewall, a diameter of the second annular sidewall being less than a diameter of the first annular sidewall, the second annular member being positioned within the first annular member whereby the first annular sidewall, the second annular sidewall, the first flange and the second flange define together an annular chamber; a handle member connected to the second annular sidewall; and a bearing in the annular chamber, the first annular sidewall frictionally engaging a first race of the bearing and the second annular sidewall frictionally engaging a second race of the bearing.

20 Claims, 12 Drawing Sheets



AMENDED

(51) **Int. Cl.**

A63B 21/062	(2006.01)
A63B 21/012	(2006.01)
A63B 23/035	(2006.01)
A63B 71/06	(2006.01)

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

CPC ***A63B 21/0724*** (2013.01); ***A63B 21/4049*** (2015.10); *A63B 21/0125* (2013.01); *A63B 21/0628* (2015.10); *A63B 21/4043* (2015.10); *A63B 23/03525* (2013.01); *A63B 2071/0694* (2013.01); *A63B 2209/02* (2013.01)

(58) **Field of Classification Search**

CPC . A63B 21/4049; A63B 21/4043; A63B 22/00; A63B 2071/0694

USPC 248/57, 58

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,629,184	A	12/1986	Selkee	
4,768,778	A	9/1988	Thomas, Jr.	
4,822,035	A	4/1989	Jennings et al.	
5,024,434	A	6/1991	Smith	A63B 21/0724 482/106
5,080,349	A	1/1992	Vittone	
5,211,616	A	5/1993	Riley, Jr.	
5,334,113	A	8/1994	Roepke	
5,718,654	A	2/1998	Kennedy	
6,022,300	A	2/2000	Hightower	
6,652,420	B2	11/2003	Chen	
7,094,182	B1	8/2006	Holten	
7,094,186	B2 *	8/2006	Diakonov et al.	A63B 21/0724 482/104
D535,336	S	1/2007	Diakonov et al.	
7,238,147	B2	7/2007	Mills et al.	
7,862,486	B1	1/2011	Watson	
D671,996	S	12/2012	Wierszewski	
8,485,948	B2	7/2013	Cen	
8,549,854	B2	10/2013	Dion et al.	
8,602,951	B2	12/2013	Morris	
8,636,630	B2	1/2014	Morris	
8,672,815	B1	3/2014	Springer	
8,800,528	B2	8/2014	Fuqua et al.	
8,820,294	B2	9/2014	Fuqua et al.	
8,845,500	B2	9/2014	Huang	
8,870,723	B2	10/2014	Morris	
9,004,387	B2	4/2015	Hiraoka	
2003/0207740	A1	11/2003	Fenelon et al.	
2004/0082448	A1	4/2004	Martin	
2005/0085352	A1	4/2005	Baxter	
2005/0187079	A1	8/2005	Diakonov et al.	
2005/0202942	A1	9/2005	De Lano	
2008/0176723	A1	7/2008	Johnson	
2012/0028770	A1	2/2012	Barchi	
2012/0115688	A1	5/2012	Cen	
2013/0035218	A1	2/2013	Wierszewski	
2013/0059696	A1	3/2013	Hijmans et al.	
2013/0193700	A1 *	8/2013	Walden	A01B 1/02 294/58
2013/0260969	A1 *	10/2013	Huang	A63B 23/03525 482/122
2014/0151483	A1	6/2014	Hiraoka	
2017/0100628	A1 *	4/2017	Wilt	A63B 23/03533
2021/0077853	A1 *	3/2021	Martin, Sr.	A63B 21/4035

OTHER PUBLICATIONS

English Translation—Machine Generated of CN203736796U, "Burn Machine", published on Jul. 30, 2014.

Burn Machine LLC, "The Universal Barbell", [online], [retrieved on Dec. 18, 2012]. Retrieved from the Internet <URL:http://theburnmachine.com/the-universal.html>.

English Abstract of WO2011137556(A1), "Physical training device comprising a central movable weight and having variable handling options", published on Nov. 10, 2011.

English Translation—Machine Translation of CN204121675(U), "Arm exerciser structure", published on Jan. 28, 2015.

Pumphouse Fitness Systems, "Specialty training Bars", [online], [retrieved on Nov. 9, 2017]. Retrieved from the Internet <URL:http://pumphousefitness.com/SPECIALTY%20TRAINING%20BARS.html>, published on Nov. 7, 2011.

* cited by examiner

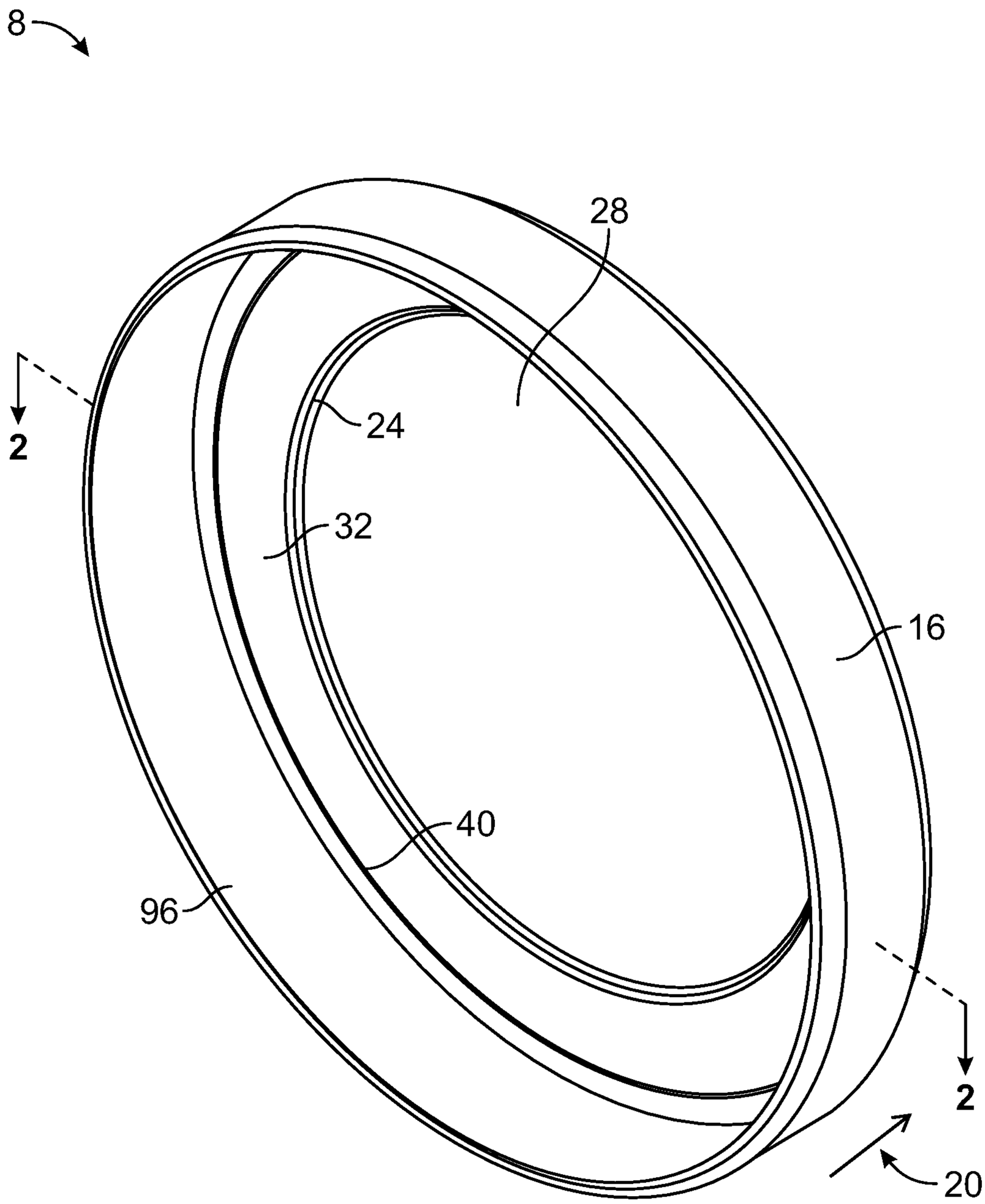


FIG. 1
AMENDED

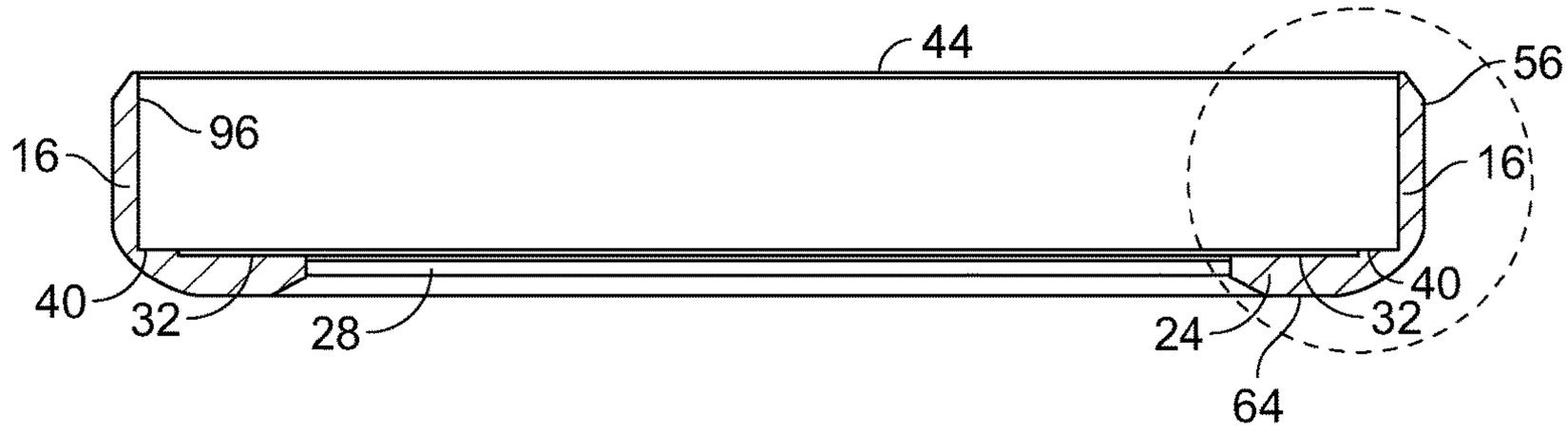


FIG. 2

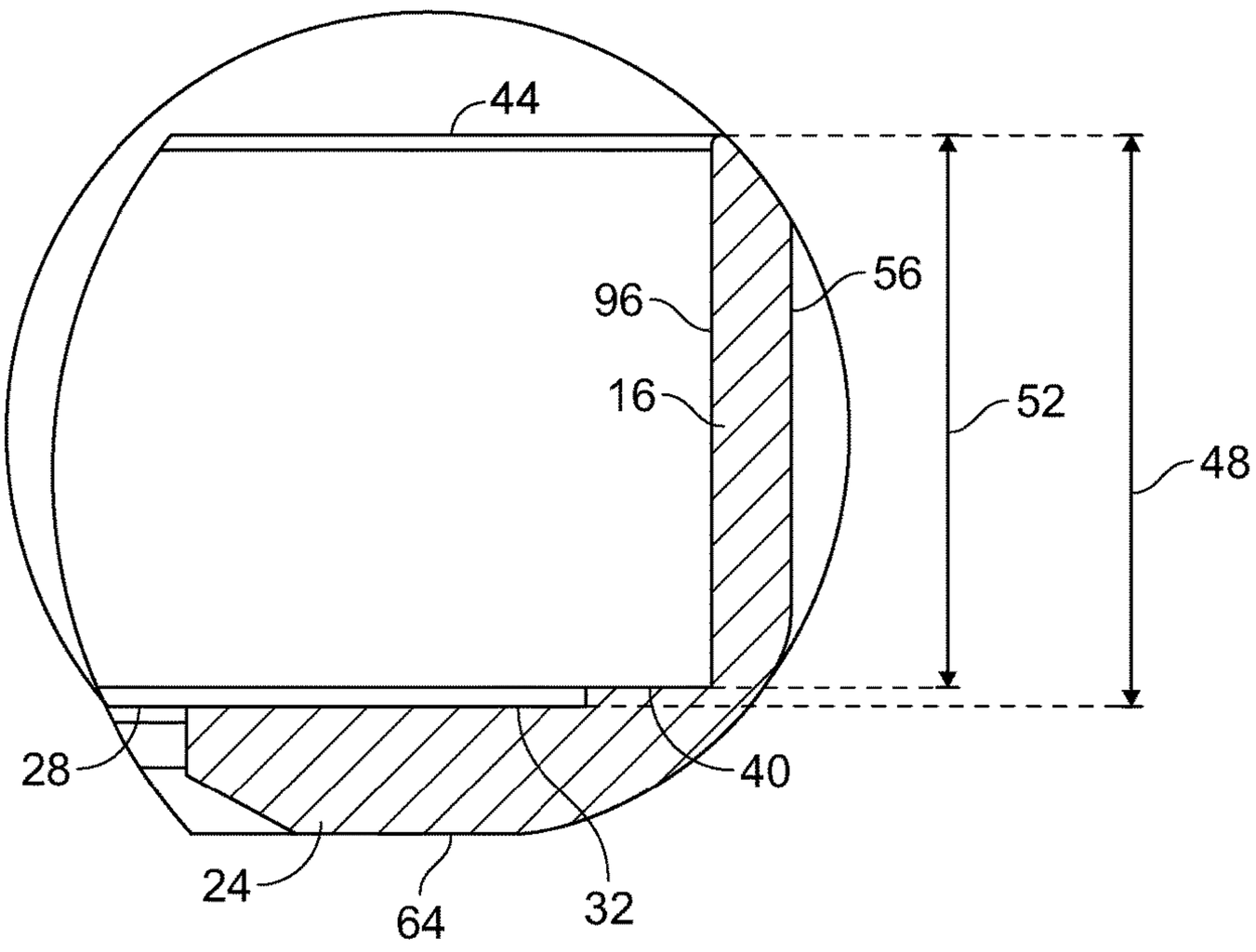


FIG. 3

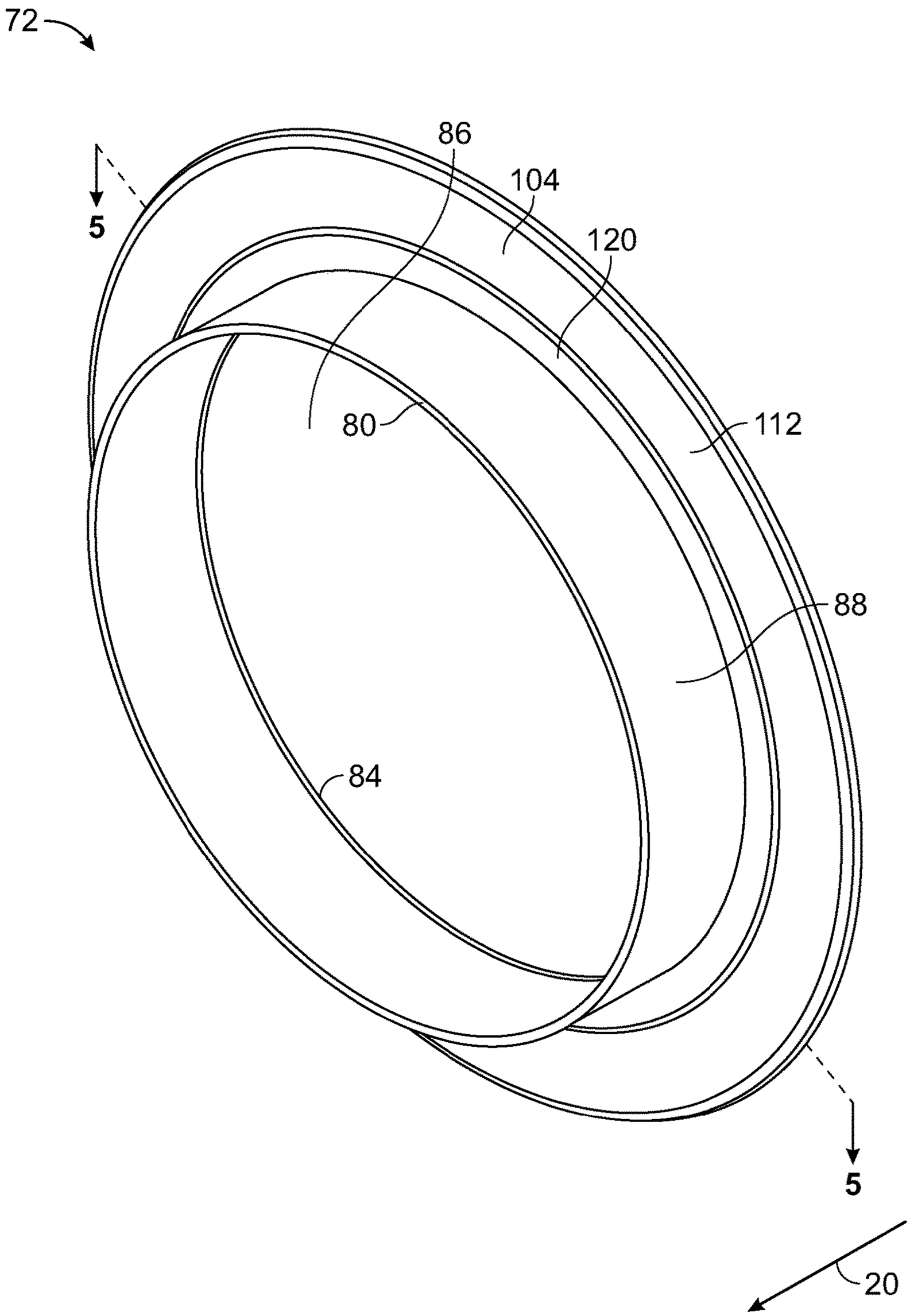


FIG. 4

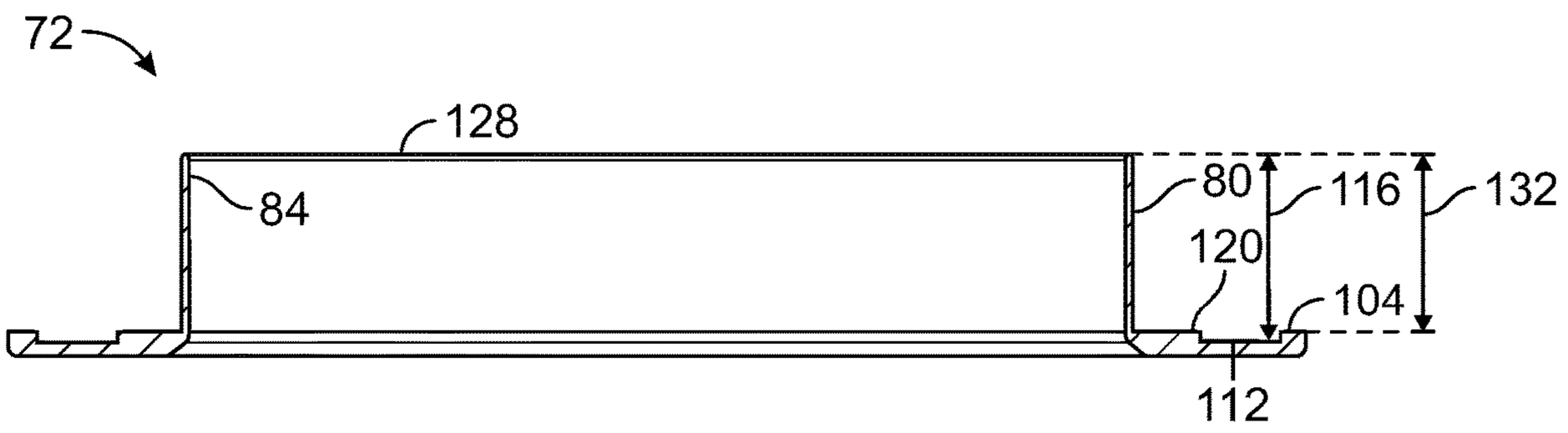


FIG. 5
AMENDED

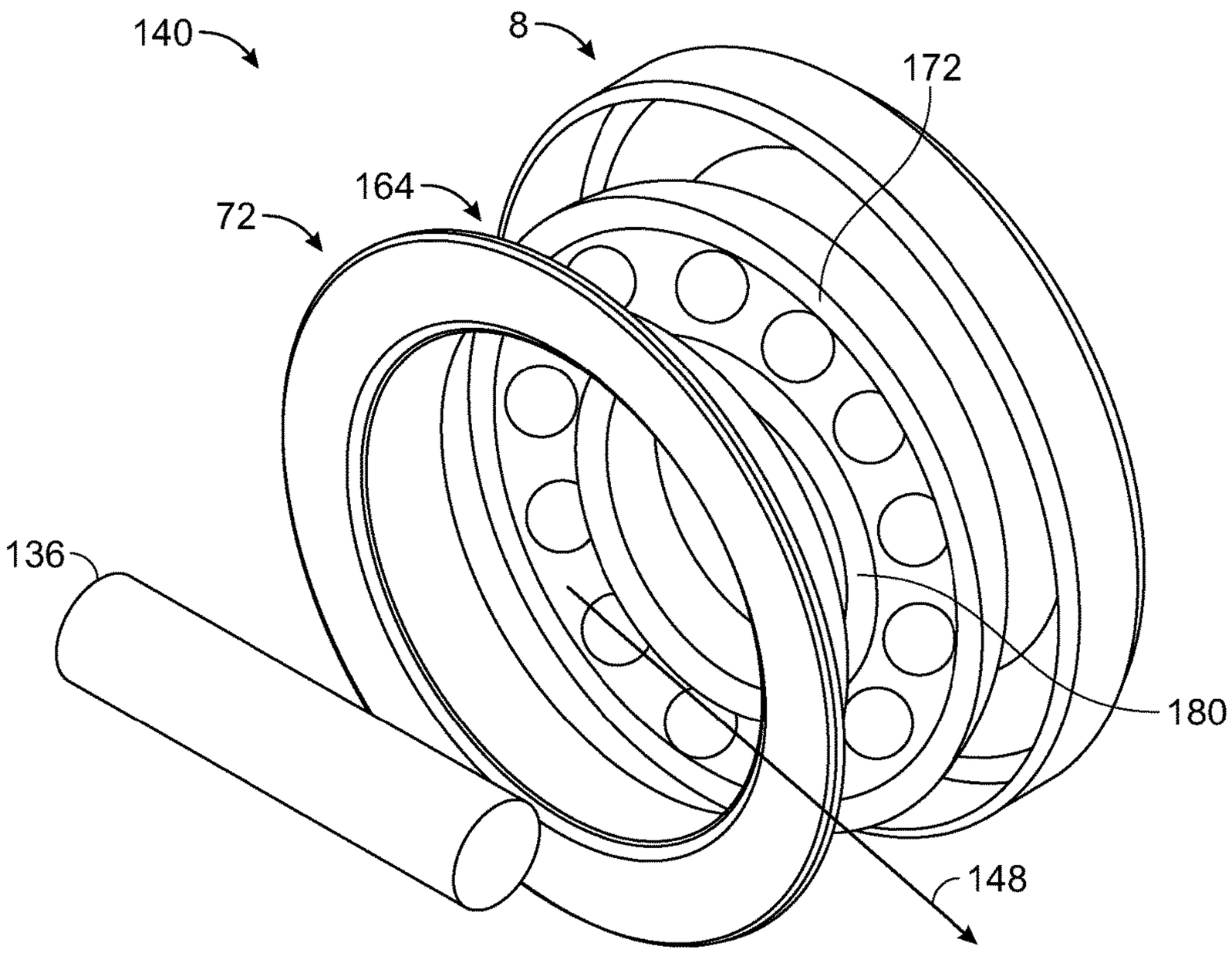


FIG. 6A

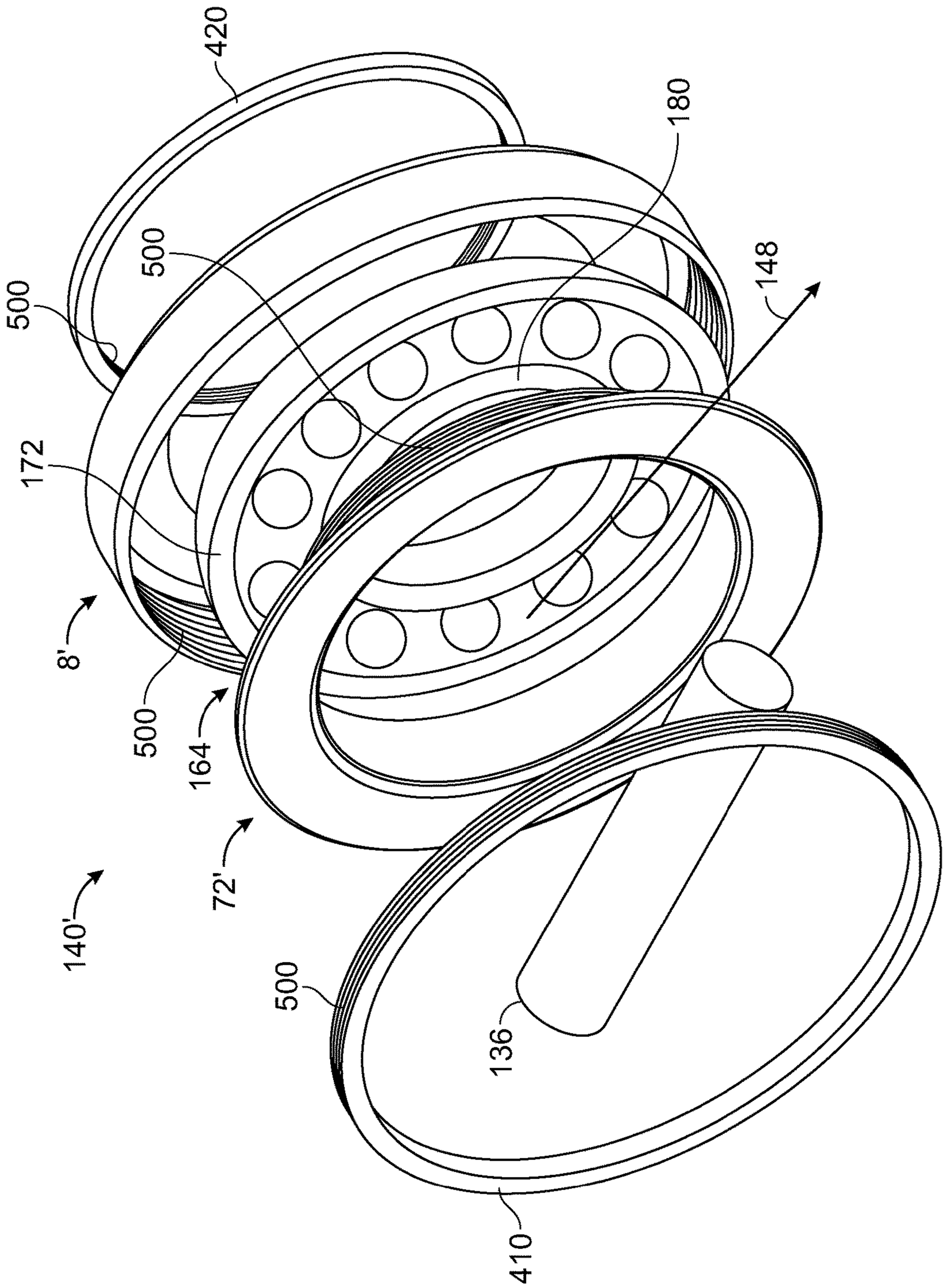


FIG. 6B

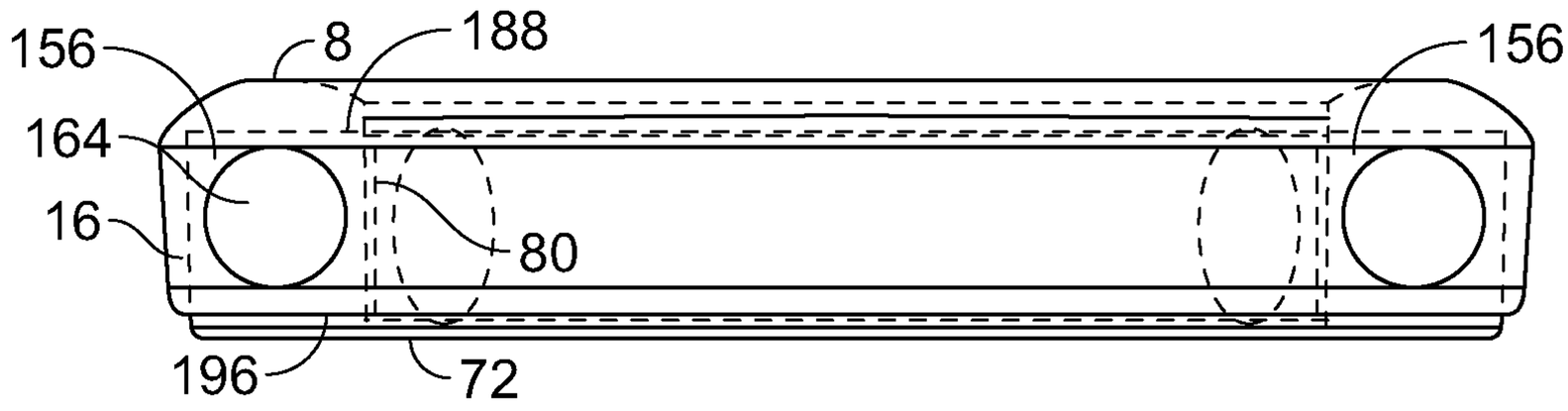


FIG. 7

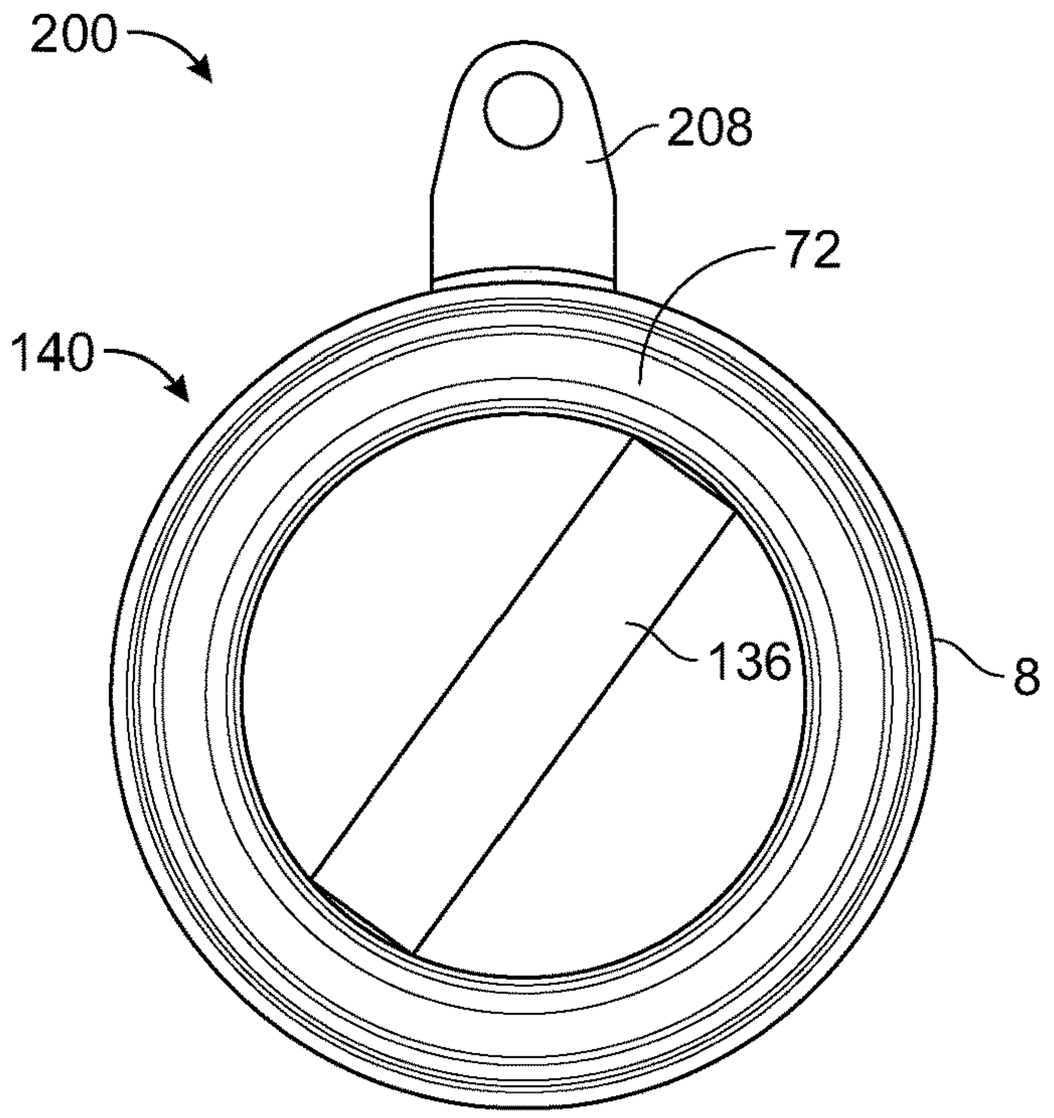


FIG. 8

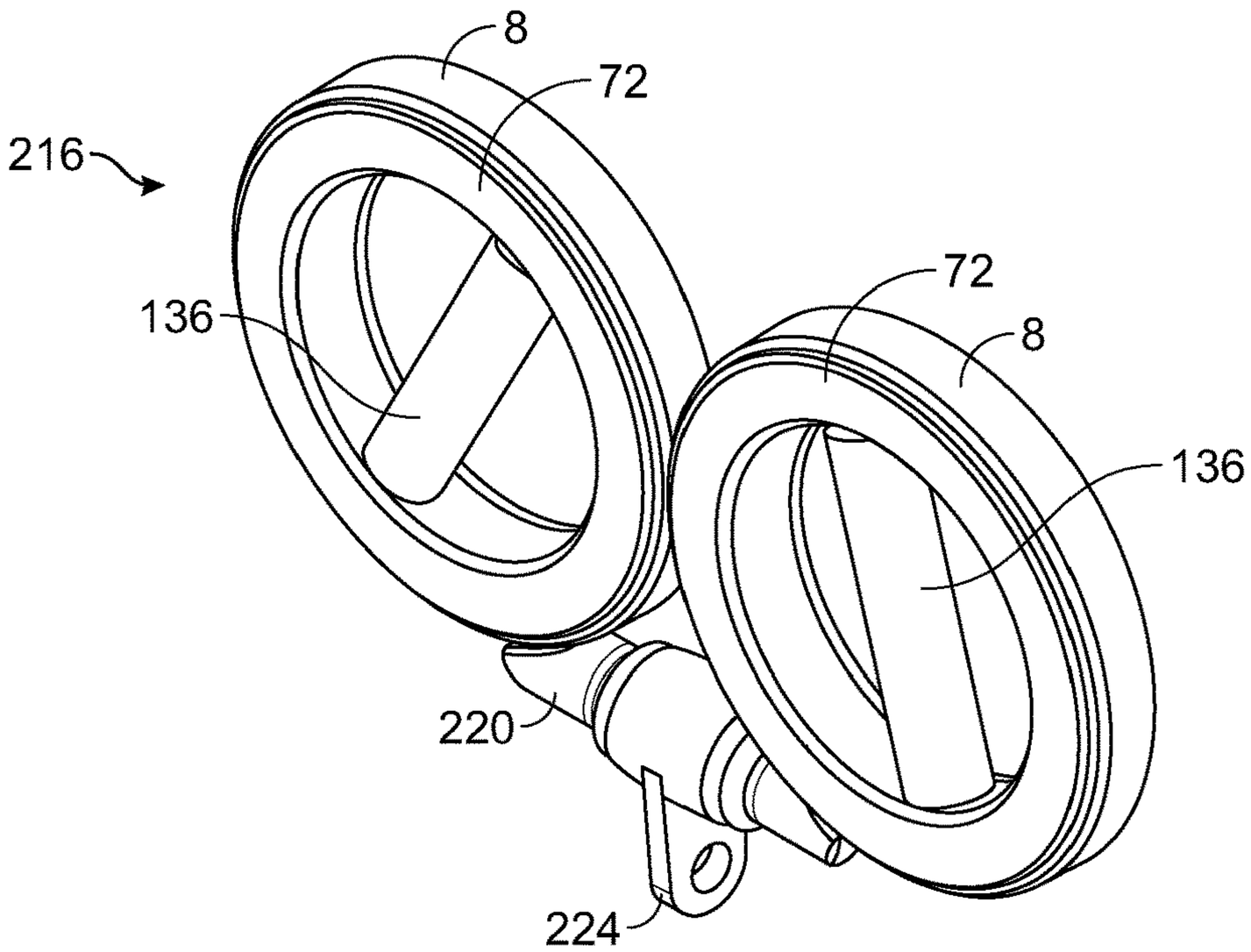


FIG. 9

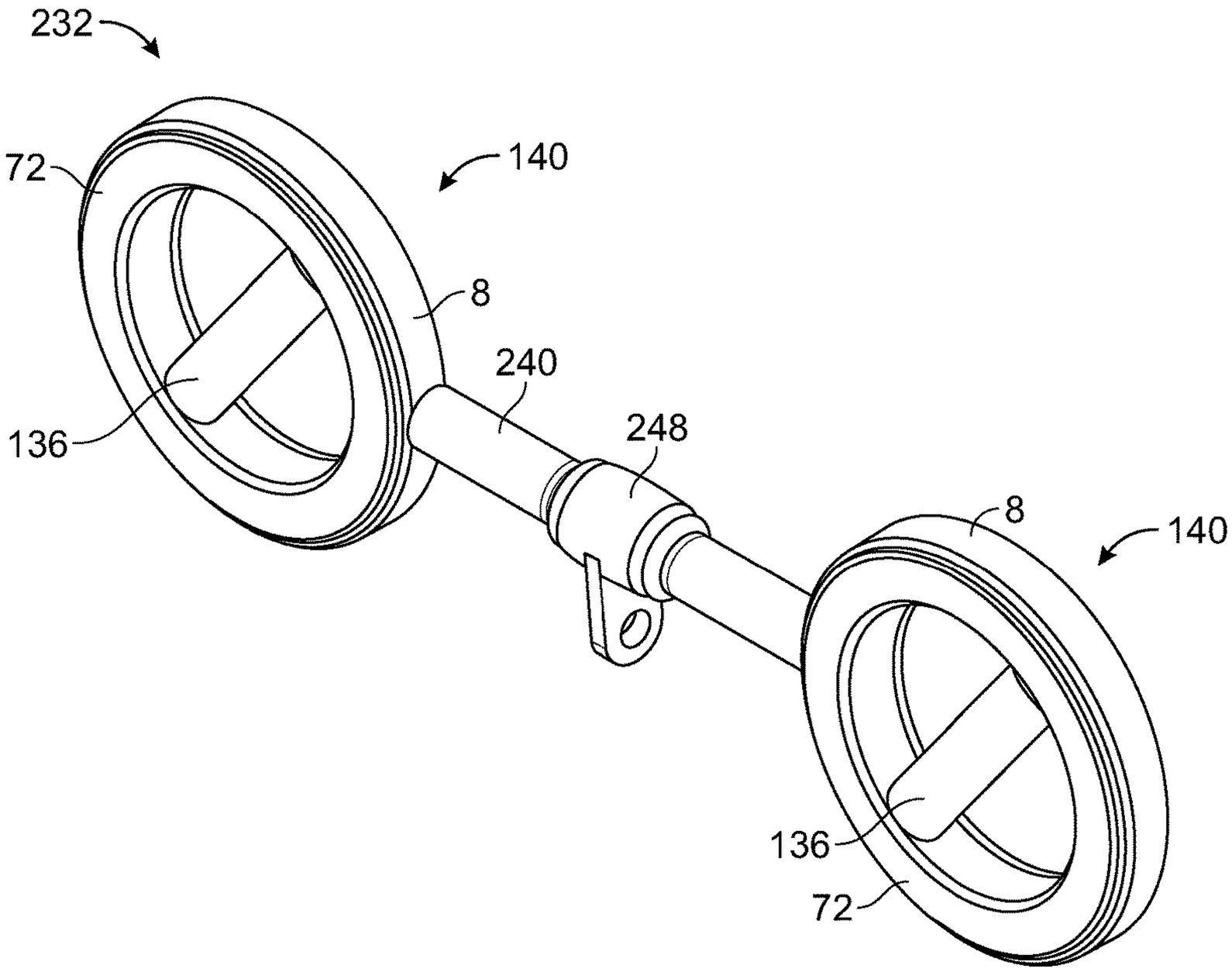


FIG. 10

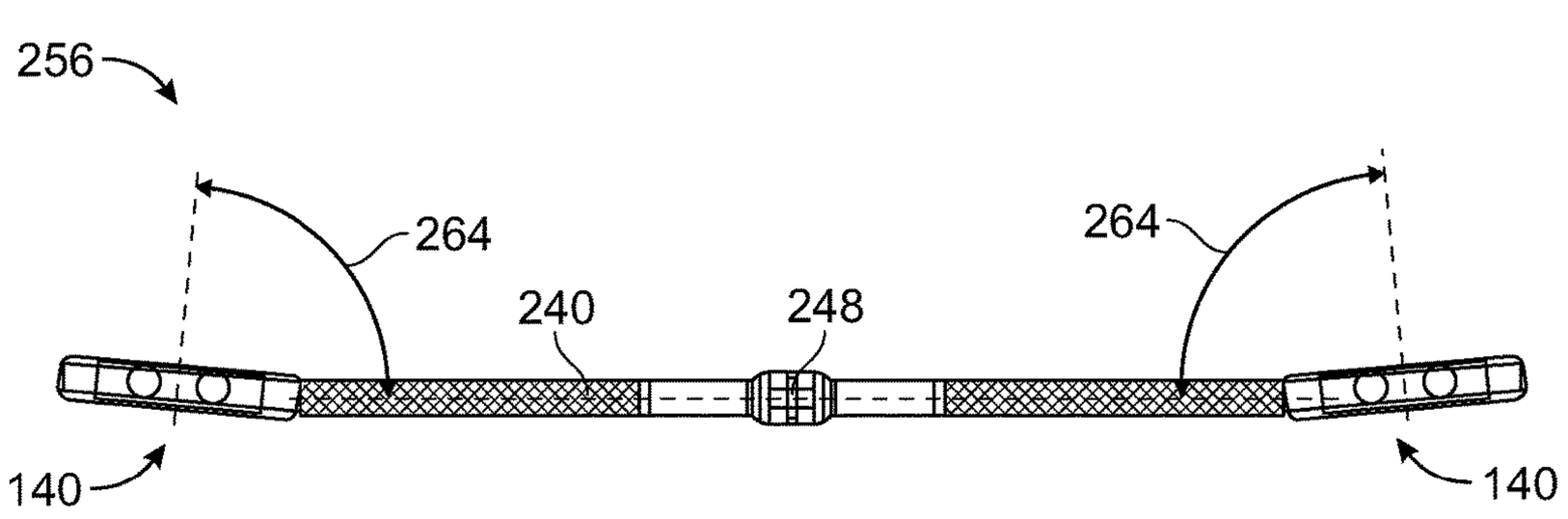


FIG. 11

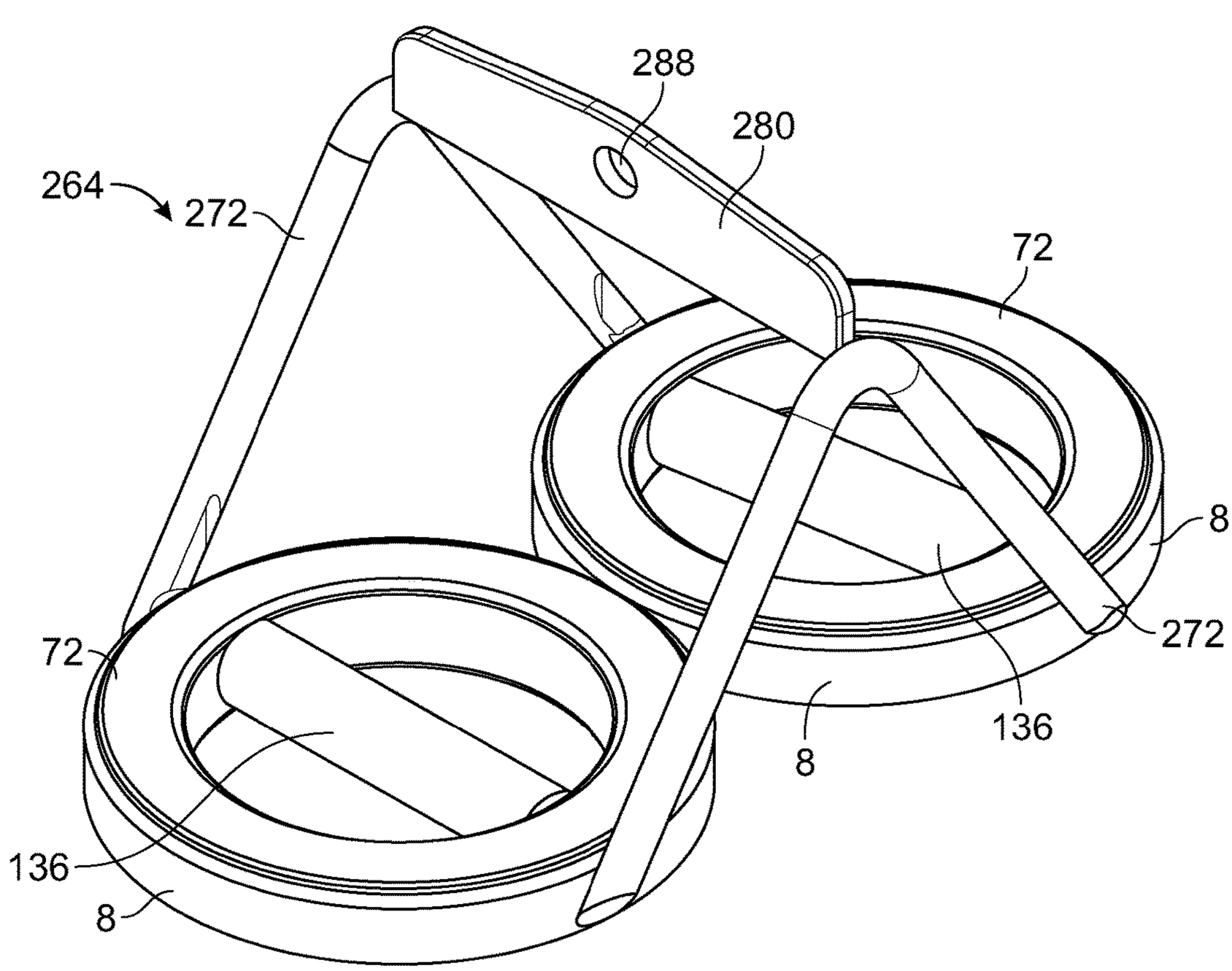


FIG. 12

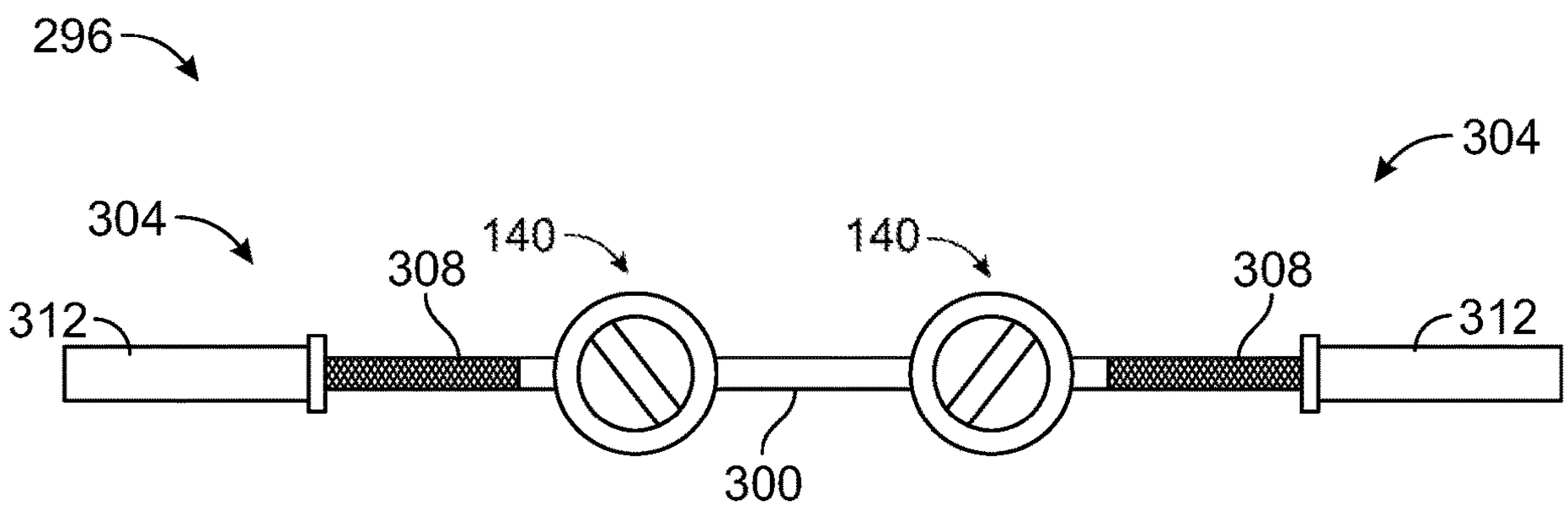


FIG. 13
AMENDED

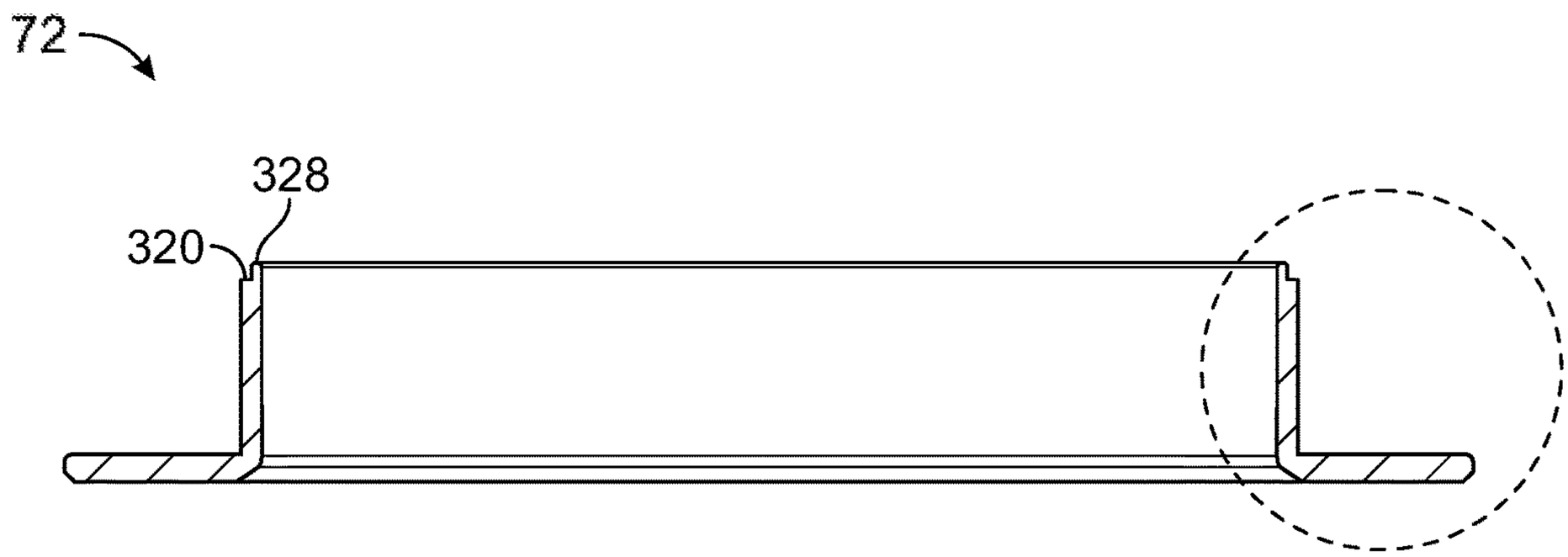


FIG. 14
AMENDED

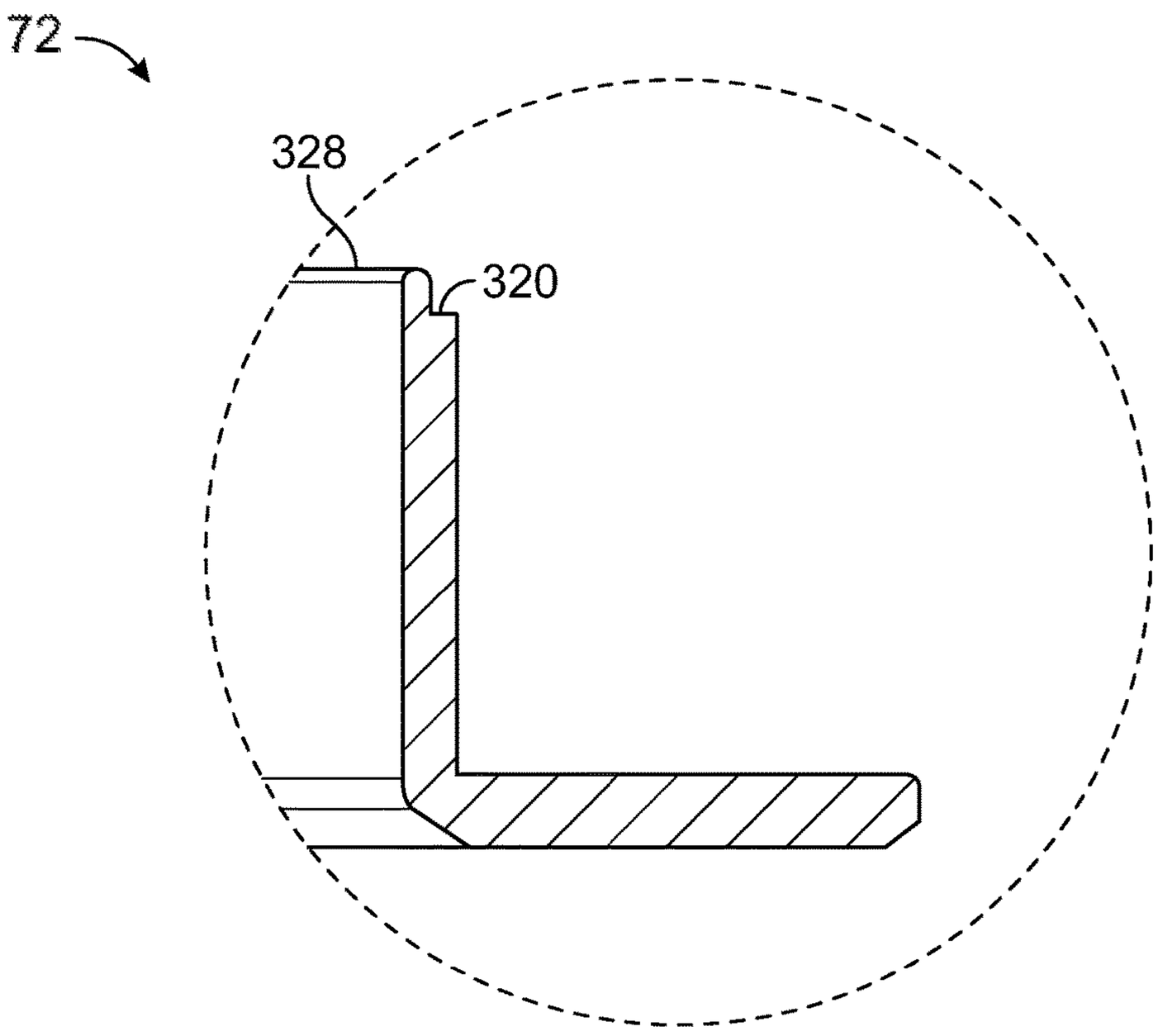


FIG. 15
AMENDED

GRIP APPARATUS FOR EXERCISE EQUIPMENT AND METHOD FOR MAKING THEREOF

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is *a reissue application of U.S. patent application Ser. No. 15/577,437, filed on Nov. 28, 2017 and issued as U.S. Pat. No. 10,124,207 on Nov. 13, 2018, which is* an 35 USC 371 national stage entry of PCT/CA2016/050609 filed on May 30, 2016 which claims priority on U.S. 62/167,931 filed on May 29, 2015. These documents are hereby incorporated by reference in their entirety.

FIELD OF THE DISCLOSURE

The present disclosure relates to a grip apparatus for exercise equipment and a method for making thereof, and in particular, a grip apparatus having a freely rotatable handle.

BACKGROUND OF THE DISCLOSURE

Various types of exercise equipment, especially weight lifting equipment, provide a grip for a user to hold. Such grips are typically stationary, which may cause user discomfort or limit the user's ability to maximize his or her workout.

SUMMARY

It would thus be highly desirable to be provided with an apparatus, system or method that would at least partially address the disadvantages of the existing technologies.

The embodiments described herein provide in one aspect a grip apparatus for exercise equipment, the grip apparatus comprising a first annular member having a first annular sidewall and a first flange extending radially inwardly from the first annular sidewall, a second annular member having a second annular sidewall and a second flange extending radially **[**inwardly**]** *outwardly* from the second annular sidewall, a diameter of the second annular sidewall being less than a diameter of the first annular sidewall, the second annular member being positioned within the first annular member whereby the first annular sidewall, the second annular sidewall, the first flange and the second flange define together an annular chamber, a handle member extending between opposing portions of the second annular sidewall and a bearing positioned within the annular chamber, the first annular sidewall frictionally engaging a first race of the bearing and the second annular sidewall frictionally engaging a second race of the bearing, whereby the second annular member is freely rotatable relative to the first annular member.

The embodiments described herein provide in another aspect a grip apparatus for exercise equipment, the grip apparatus comprising: a first annular member having a first annular sidewall and a first flange extending radially inwardly from the first annular sidewall. The apparatus also comprises a second annular member having a second annular sidewall and a second flange extending radially **[**inwardly**]** *outwardly* from the second annular sidewall, a diameter of the second annular sidewall being less than a diameter of the first annular sidewall, the second annular member being positioned within the first annular member whereby the first annular sidewall, the second annular sidewall, the first flange and the second flange define together an annular chamber; a handle member connected to the second annular sidewall; and a bearing positioned within the annular chamber, the first annular sidewall frictionally engaging a first race of the bearing and the second annular sidewall frictionally engaging a second race of the bearing, whereby the second annular member is freely rotatable relative to the first annular member.

The embodiments described herein provide in another aspect an exercise equipment comprising at least one grip apparatus for exercise equipment as described herein according to various exemplary embodiments and one attachment member connected to the first annular member and adapted to be connected to a weight system.

The embodiments described herein provide in yet another aspect a method for manufacturing a grip apparatus for exercise equipment, the method comprising: providing a first annular member having a first annular sidewall and a first flange extending radially inwardly from the first annular sidewall, providing a second annular member having a second annular sidewall and a second flange extending radially inwardly from the second annular sidewall, a diameter of the second annular sidewall being less than a diameter of the first annular sidewall, attaching a handle member to opposing portions of the second annular sidewall, inserting a bearing into the first annular member, whereby an inner surface of the first annular member frictionally engages an outer surface of the bearing; and inserting the second annular member into the bearing, whereby an outer surface of the second annular member frictionally engages an inner surface of the bearing.

DRAWINGS

The following drawings represent non-limitative examples in which:

FIG. **1** illustrates a perspective view of a first annular member according to one exemplary embodiment;

FIG. **2** illustrates a section view of the exemplary first annular member along the line **2-2** of FIG. **2**;

FIG. **3** illustrates a close-up view of the section encircled by dotted lines in FIG. **2** of the exemplary first annular member;

FIG. **4** illustrates a perspective view of a second annular member according to one exemplary embodiment;

FIG. **5** illustrates a section view of the exemplary second annular member along the line **5-5** of FIG. **4**;

FIG. **6**A illustrates a perspective exploded view of a grip apparatus according to one exemplary embodiment;

FIG. **6**B illustrates a perspective exploded view of a grip apparatus according to another exemplary embodiment;

FIG. **7** illustrates a section view of a fully assembled grip apparatus according to one exemplary embodiment;

FIG. **8** illustrates an elevated front view of an exemplary stirrup handle having an exemplary grip apparatus;

FIG. **9** illustrates a perspective view of an exemplary double stirrup handle having an exemplary grip apparatus;

FIG. **10** illustrates a perspective view of an exemplary lat bar having an exemplary grip apparatus;

FIG. **11** illustrates a perspective view of an exemplary variant lat bar having an exemplary grip apparatus;

FIG. **12** illustrates a perspective view of an exemplary tricep press down bar having an exemplary grip apparatus;

FIG. **13** illustrates a side elevation view of an exemplary Olympic bar having an exemplary grip apparatus;

FIG. **14** illustrates a section view of an initially formed second annular member according to one exemplary embodiment; and

FIG. **15** illustrates a close-up view of the section encircled by dotted lines of the exemplary initially formed second annular member.

DESCRIPTION OF VARIOUS EMBODIMENTS

The following examples are presented in a non-limiting manner.

The word "a" or "an" when used in conjunction with the term "comprising" in the claims and/or the specification may mean "one", but it is also consistent with the meaning of "one or more", "at least one", and "one or more than one" unless the content clearly dictates otherwise. Similarly, the word "another" may mean at least a second or more unless the content clearly dictates otherwise.

As used in this specification and claim(s), the words "comprising" (and any form of comprising, such as "comprise" and "comprises"), "having" (and any form of having, such as "have" and "has"), "including" (and any form of including, such as "include" and "includes") or "containing" (and any form of containing, such as "contain" and "contains"), are inclusive or open-ended and do not exclude additional, unrecited elements or process steps.

The terms "coupled" or "coupling" as used herein can have several different meanings depending in the context in which these terms are used. For example, the terms coupled or coupling can have a mechanical or electrical connotation. For example, as used herein, the terms coupled or coupling can indicate that two elements or devices are directly connected to one another or connected to one another through one or more intermediate elements or devices via an electrical element, electrical signal or a mechanical element depending on the particular context.

According to example grip apparatuses disclosed herein the first race is an outer race of the bearing, the second race is an inner race of the bearing, and an inner surface of the first annular sidewall frictionally engages the outer race of the bearing and the second race frictionally engages the inner race of the bearing.

According to example grip apparatuses disclosed herein, the inner surface of the first annular sidewall is press fit against the outer race of the bearing.

According to example grip apparatuses disclosed herein, the outer surface of the second annular sidewall is press fit against the inner race of the bearing.

According to example grip apparatuses disclosed herein, the second annular member is swaged against the inner race.

According to example grip apparatuses disclosed herein, a diameter of the inner race corresponds with a diameter of the outer surface of the second annular sidewall within a tolerance of approximately ±0.0015 inch.

According to example grip apparatuses disclosed herein, a diameter of the outer race corresponds with a diameter of the inner surface of the first annular sidewall within a tolerance of approximately ±0.0015 inch.

According to example grip apparatuses disclosed herein, a difference between the diameter of the inner surface of the first annular sidewall and the diameter of the outer surface of the second annular sidewall substantially corresponds to a radial width of the first annular flange.

According to example grip apparatuses disclosed herein, a difference between the diameter of the inner surface of the first annular sidewall and the diameter of the outer surface of the second annular sidewall substantially corresponds to a radial width of the second annular flange.

According to example grip apparatuses disclosed herein, a top wall of the bearing abuts against the first annular flange of the first annular member.

According to example grip apparatuses disclosed herein, a bottom wall of the bearing abuts against the second annular flange of the second annular member.

According to example grip apparatuses disclosed herein, wherein the first annular flange has an annular recessed portion for accommodating portions of balls of the bearing protruding from a top wall of the bearing.

According to example grip apparatuses disclosed herein, the second annular flange has an annular recessed portion for accommodating portions of balls of the bearing protruding from a bottom wall of the bearing.

According to example grip apparatuses disclosed herein, the handle member is welded to the second annular sidewall of the second annular member.

According to example grip apparatuses disclosed herein, the grip apparatus can be free of fastening systems for attaching the first annular member to the second annular member.

According to example grip apparatuses disclosed herein, the bearing is a ball bearing.

According to example grip apparatuses disclosed herein, the bearing is chosen from a rolling element bearing, rotational bearing, a thrust bearing, a spherical bearing, a thrust bearing, a needle bear, a cam follower, a cup and cone bearing and individual ball bearings.

According to example grip apparatuses disclosed herein, the bearing is formed of a material chosen from at least one of carbon, steel, chromium steel, bronze, oil impregnated bronze, plastic, nylon based resins, graphite filled, UHMW, acetal resin, PTFE, engineered plastics, phenolic resin and wood.

According to example exercise equipment disclosed herein, the weight system is chosen from weight plates and cabled weight system.

According to example exercise equipment disclosed herein, the strength equipment is chosen from chinning triangle, a tricep press down, a lat bar, a stirrup handle, a pulldown bar, a curl bar, an Olympic bar, dumbbell handle, a hex bar, and a tricep bar.

According to example methods disclosed herein, the inner surface of the first annular member is pressfit against the outer race of the bearing and the outer surface of the second annular member is pressfit against the inner race of the bearing.

According to example methods disclosed herein, the method further includes swaging the inner surface of the second sidewall of the second annular member outwardly radially.

According to example methods disclosed herein, the handle member is welded to the second annular sidewall and the method further includes after welding the handle member, machining the outer surface of the second annular sidewall to a diameter substantially corresponding to an inner diameter of the inner race.

Referring now to FIGS. **1**, **2** and **3** simultaneously, therein illustrated is a perspective view, section view along the line **2**-**2** and close-up view of the encircled section of FIG. **2** (see

FIG. **3**), respectively, of a first annular member **8** according to one exemplary embodiment. The first annular member **8**, which may have a generally cupped shape having a bottom opening, includes an annular sidewall **16**. The annular sidewall **16** extends circumferentially and in a generally axial direction **20** of the first annular member **8**. The first annular member **8** further includes a flange **24** extending radially inwardly from the annular sidewall **16**. As shown in FIG. **2**, the annular flange **24** extends transversely to the annular sidewall **16**. The annular flange **24** defines an opening **28** of the first annular member **8**.

It will be understood that although the flange **24** of the first annular member **8** is illustrated in FIG. **1** to extend continuously and circumferentially, in other exemplary embodiments of the first annular member **8**, the flange **24** may be formed of discontinuous portions positioned angularly about an axis of the first annular member **8**.

According to various exemplary embodiments, and as illustrated in FIGS. **1** to **3**, the flange **24** may have a recessed portion **32** and a raised portion **40**. Compared to the raised portion **40**, the recessed portion **32** has a greater depth **48** from a top **44** of the first annular member **8** than the depth **52** of the raised portion **40**.

For example, and as illustrated, both the recessed portion **32** and the raised portion **40** extend continuously and circumferentially.

According to various exemplary embodiments, an outer surface **56** of the annular sidewall **16** and outer surface **64** of the flange **24** may have rounded corners so as to provide a more pleasing visual appearance. The rounded corners may also be used to identify the first annular member **8**.

The first annular member **8** may be formed of a material that is susceptible to be easily machined and welded. For example, the first annular member **8** can be formed of a low carbon steel.

Referring now to FIGS. **4** and **5** simultaneously, therein illustrated is a perspective view and a section view along the line **5-5** respective of a second annular member **72** according to one exemplary embodiment. The second annular member **72** includes an annular sidewall **80**. The annular sidewall **80** extends circumferentially and in a generally axial direction **20** of the second annular member **72**. The inner surface **84** of the annular sidewall **80** defines an opening **86** of the second annular member **72**. For example, the diameter of the second annular member **72** may be substantially equal to the opening **28** of the first annular member **8**. For example, the diameter of the second annular member **72** may be smaller than the opening **28** of the first annular member **8**.

The diameter of the annular sidewall **80** is smaller than the diameter of the annular sidewall **16** of the first annular member **8**. For example, the difference between the diameter of an outer surface **88** of the annular sidewall **80** of the second annular member **72** and inner surface **96** of the annular sidewall **16** of the first annular member **8** can be between about 0.5 inches to about 2 inches.

The second annular member **72** further includes a flange **104** extending outwardly from the annular sidewall **80**. As shown in FIG. **5**, the annular flange **104** extends transversely to the annular sidewall **80**.

It will be understood that although the flange **104** of the second annular member **72** is illustrated in FIG. **5** to extend continuously and circumferentially, in other exemplary embodiments of the second annular member **72**, the flange **104** may be formed of discontinuous portions positioned angularly about an axis of the second annular member **72**.

According to various exemplary embodiments, and as illustrated in FIGS. **4** and **5**, the flange **104** of the second annular member **72** may have a recessed portion **112** and a raised portion **120**. Compared to the **[**recessed**]** *raised* portion **120**, the recessed portion **112** has a greater depth **116** from a top **128** of the second annular member **72** than the depth **132** of the raised portion. For example, and as illustrated, both the recessed portion **112** and the raised portion *120* extend **[120]** continuously and circumferentially.

The second annular member **72** may be formed of a material that is susceptible to be easily machined and welded. For example, the second annular member **72** is formed of a low carbon steel.

A handle member **136** (FIG. **6**) extends between opposing portions of the inner surface **84** of the annular sidewall **80** of the second annular member **72**. The handle member **136** has dimensions corresponding to the diameter of a typical exercise handle used in the art. For example the handle has a length of about 4 inches to about 6 inches and a diameter of about 0.8 inches to about 1.5 inches. An outer surface of the handle member **136** may be knurled to provide easier gripping of the handle member **136**.

For example, the handle member **136** may be connected to the annular sidewall **80** using suitable fastening systems known in the art, such as, welding, rivets, nuts and bolts, and/or screws.

For example, the handle member **136** may be connected to the annular sidewall **80** by welding ends of the handle member **136** to the opposing portions of the inner surface **84** of the annular sidewall **80**.

Referring now to FIG. **6**A, therein illustrated is a perspective exploded view of a grip apparatus **140** according to one exemplary embodiment. The handle member **136** is positioned so as to be connected to the annular sidewall **80** of the second annular member **72**. The second annular member **72** is further positioned so that its annular sidewall **80** is extending towards the flange **24** of the first annular member **8**. The second annular member **72** is inserted into to the first annular member **8** so that a top **128** of the second annular member **72** is positioned proximate the flange **24** of the first annular member **8**. Similarly, a top **48** of the first annular member **8** is positioned proximate the flange **104** of the second annular member **72**. Furthermore, in this position, the annular sidewall **80** of the second annular member **72** overlaps with the annular sidewall **16** of the first annular member **8** in a radial direction **148** of the grip apparatus **140**. The opening **28** of the first annular member **8** is axially aligned with the opening **86** of the second annular member **72**.

Referring now to FIG. **6**B, the apparatus **140'** is similar to the apparatus **140** shown in FIG. **6**A, with the exception that it contains two additional components (third annular member **410** and fourth annular member **420**). The third annular member **410** is dimensioned to be connected to the first annular member **8'**, and a fourth annular member **420** is dimensioned to be connected to the second annular member **72'**, The second annular member **72'** and the forth annular member **420** are, when connected together, sandwiching and holding together the bearing and the first annular member **8'**, and wherein the third annular member **410** and the first annular member **8'** are, when connected together, sandwiching and holding the second annular member **72'**. For example, the first annular member **8'** and the second annular member **72'** can contain threads **500**. The third annular member **410** and the fourth annular member **420** are also threaded (see **500**). The third annular member comprises external threads **500** dimensioned to be screwed into the internal threads of the first annular member **8'**. The third annular member **410** comprises external threads **500** dimen-

sioned to be screwed into the internal threads of the first annular member **8'**. The fourth annular member **420** comprises internal threads **500** dimensioned to be screwed into the external threads of the second annular member **72'**.

Referring now to FIG. **7**, therein illustrated in a section view of a fully assembled grip apparatus **140** with the second annular member **72** inserted into the first annular member **8**. The flange **24** and sidewall **16** of the first annular member **8** defines with the flange **104** and sidewall **80** of the second annular member **72** an annular chamber **156**.

Referring back to FIG. **6**A, the grip apparatus **140** further includes a bearing **164** positioned between the first annular member **8** and the second annular member **72**. When the grip apparatus **140** is fully assembled, the bearing **164** is positioned within the annular chamber **156**.

According to various exemplary embodiments, the bearing **164** may be formed other suitable materials, such as metal, steel, carbon, chromium steel, bronze, oil impregnated bronze (ex: Oilite™) or plastics. The plastics may include nylon based resins, nylon MC901, MC905, Nylatron™, graphite filled, Nyoil™ filled, UHMW copolymer types, Delrin™ acetal types, PTFE (Teflon™), and engineered plastics. Phenolic resins or wood may also be used.

For example, the bearing **164** may have sealed lubrication so as to reduce maintenance required.

The bearing **164** may be chosen from various types, such as a rolling element bearing, rotational bearing, a thrust bearing, a ball bearing, a spherical bearing, a thrust bearing, a needle bear, a cam follower, a cup and cone bearing or individual ball bearings.

The bearing **164** includes a first race and a second race being freely rotatable relative to one another. The bearing **164** is positioned between the first annular member **8** and the second annular member **72** so that the annular sidewall **16** of the first annular member **8** frictionally engages the first race. In this position, the annular sidewall **80** of the second annular member **72** frictionally engages the second race. Accordingly, the second annular member and handle member **136** is freely rotatable relative to the first annular member **8**.

According to example illustrated in FIG. **6**, the bearing **164** is of the rotational bearing having an outer race **172** and an inner race **180**. For example, the rotational bearing is of the ball bearing type. For example, inner race **180** and outer race **172** may be made formed of carbon and chromium steel. The inner race **180** and the outer race **172** may further be induction hardened to 58 to 65 RC and precision ground.

An outer diameter of the outer race **172** substantially corresponds with an inner diameter of an inner surface **96** of the annular sidewall **16** of the first annular member **8**. The diameter of the outer race **172** may correspond with the inner diameter of the annular sidewall **16** within a tolerance of approximately ±0.0015 inch. Accordingly, when the bearing **164** is positioned within the annular chamber **156**, the inner surface **96** frictionally engages the outer race **172** of the bearing **164**. For example, the sidewall **16** of the first annular member **8** is press fit against the outer race **172** of the bearing **164**. Engagement of the outer race **172** with the sidewall **16** restricts the bearing **164** separating from the first annular member **8**.

An inner diameter of the inner race **180** substantially corresponds with an outer diameter of an outer surface **88** of the annular sidewall **80** of the second annular member **72**. The diameter of the inner race **180** may correspond with the outer diameter of the annular sidewall **80** within a tolerance of approximately ±0.0015 inch. Accordingly, when the bearing **164** is positioned within the annular chamber **156**, the outer surface **88** frictionally engages the inner race **180** of the bearing **164**. For example, the sidewall **80** of the second annular member **72** is press fit against the inner race **180** of the bearing **164**. Engagement of the inner race **180** with the sidewall **72** restricts the bearing **164** separating from the first annular member **8**. Furthermore, the engagement of the sidewall **16** of the first annular member **8** with the outer race **172** combined with the engagement of the sidewall **80** of the second annular member **72** with the inner race **180** restricts the first annular member **8** separating from the second annular member **72**.

According to various exemplary embodiments, after positioning the second annular member **72** within the first annular member **8**, the inner surface **88** of the annular sidewall **80** is swaged outwardly to promote engagement of the annular sidewall **80** with the inner race **180**. The outward force on the annular sidewall **80** from the swaging may be further transmitted to the outer race **172**, thereby also promoting engagement of the outer race **180** with the annular sidewall **16** of the first annular member **8**.

The inner race **180** is freely rotatable relative to the outer race **172** of the bearing **164**. Accordingly, when the grip apparatus **140** is fully assembled, the second annular member **72** is freely rotatable relative to the first annular member **8**. Furthermore, the handle member **136** connected to the second annular member **72** is also freely rotatable relative to the first annular member **8**.

According to various exemplary embodiments, the radial width of the annular flange **24** of the first annular member **8** substantially corresponds to a difference between the diameter of the inner surface **96** of the annular sidewall **16** and the diameter of the outer surface **88** of the annular sidewall **80**. Similarly, the radial width of the annular flange **104** of the second annular member **72** substantially corresponds to a difference between the diameter of the inner surface **96** of the annular sidewall **16** and the diameter of the outer surface **88** of the annular sidewall **80**. Accordingly, when the grip apparatus **140** is fully assembled, the bearing **164** is concealed by the flange **24**, sidewall **16**, flange **104** and sidewall **80** so that it is not visible from the outside.

According to various exemplary embodiments, a top wall **188** of the bearing **164** abuts against the annular flange **24** of the first annular member **8**. More particularly, the top wall **188** abuts against a surface of the raised portion **40** of the annular flange **24**. Furthermore, a portion of the balls of the bearing **164** may protrude past the top wall **188**. This protruding portion is positioned within the space of the annular chamber **156** provided by the recessed portion **32** of the flange **24**. Accordingly, the balls of the bearing **164** are disengaged from the annular flange **24** and can be rotated to allow free rotation of the inner race **180**.

Similarly, a bottom wall **196** may abut against the annular flange **104** of the second annular member **72**. More particularly, the top wall **196** abuts against a surface of the raised portion **120** of the annular flange **104**. Furthermore a portion of the balls of the bearing **164** may protrude past the bottom wall **196**. This protruding portion is positioned within the space of the annular chamber **156** provided by the recessed portion **112** of the flange **104**. Accordingly, the balls of the bearing **164** are disengaged from the annular flange **[014]** *104* and can be rotated to allow free rotation of the inner race **180**. Accordingly, the bearing **164** is positioned snugly within the annular chamber **156**.

It will be appreciated that according to various exemplary embodiments where the handle member **136** is welded to the second annular member **72** and the first annular member **8**, the second annular member **72** and the bearing **164** are

mutually engaged through frictional engagement, the grip apparatus **140** can be assembled without the use (i.e. free of) any fastening system, such as the use of rivets, bolts and nuts, and/or screws.

According to various exemplary embodiments, an exercise equipment includes at least one grip apparatus **140** described according to various exemplary embodiments herein. The exercise equipment further includes at least one attachment member connected to the first annular member **8**. The at least one attachment member is adapted to be connected to a weight system.

Referring back to FIG. **6**B, the grip apparatus **140'** further includes the third annular member **410** and fourth annular member **420**. As indicated, above, the first annular member **8'**, the second annular member **72'**, the third annular member **410** and the fourth annular member **420** contain threads **500**. The apparatus **140'** mainly works as described above for apparatus **140** with the exception of the interaction of the threaded annular members **8'**, **72'**, **410** and **420**. For example, the threaded portion **500** of the second annular member **72'** will be inserted into the bearing **164** since the threaded portion has a diameter substantially smaller than the inner diameter of the inner race **180**. The second annular member **72'** will be matched with the fourth annular member **420** in view of the matching threads of each of these two members. Due to the action of these matching threads **500**, bearing **164** and the first annular member **8'** will be sandwiched between the second annular member and the **72'** and the forth annular member **420**. These components will thus be locked and held together in view of the components screwed together (**72'** and **420**) Similarly, the matching threads **500** of the third annular member **410** and the first annular member **8'** allow for sandwiching the second annular member **72'**, thereby holding together these three components. The external diameter of the third annular member **410** is dimensioned to be matching the internal threads **500** of the first annular member **8'** and is thus smaller. Once inserted and screwed into the first annular member **8'**, the third annular member **410** can be flush to the top portion **44**. The member **410** thus abuts the flange **104** of the member **72'**. Similarly, the member **420**, once screwed into member **8'**, can be flush to surface **64**.

An inner diameter of the inner race **180** substantially corresponds with an outer diameter of an outer surface **88** of the annular sidewall **80** of the second annular member **72**. The diameter of the inner race **180** may correspond with the outer diameter of the annular sidewall **80** within a tolerance of approximately ±0.0015 inch.

Referring now to FIG. **8**, therein illustrated is an elevated front view of an exercise equipment that is stirrup handle **200** according to one exemplary embodiment. An attachment member that is a loop **208** is welded to the outer surface **96** of the first annular member **8** of the grip apparatus **140**. The loop **208** is adapted to be connected to a connector of a cabled weight system.

Referring now to FIG. **9**, therein illustrated is a perspective view of an exercise equipment that is a double stirrup handle **[200]** *216* according to one exemplary embodiment. An attachment member includes a cross bar **220** welded to the outer surface **96** of the first annular members **8** of two grip apparatuses **140** and a loop **224** rotatable about the cross bar **220**. The loop **224** is adapted to be connected to a connector of a cabled weight system.

Referring now to FIG. **10**, therein illustrated is a perspective view of an exercise equipment that is a lat bar or pulldown bar **232** according to one exemplary embodiment. An attachment member includes a cross bar **240** welded to and extending from the outer surface **96** of the first annular members **8** of two grip apparatus **140** and a loop **248** rotatable about the cross bar **240**. The loop **248** is adapted to be connected to a connector of a cabled weight system.

Referring now to FIG. **11**, therein illustrated is a side elevation view of an exercise equipment that is a variant **256** of the lat bar or pulldown bar **232** illustrated in FIG. **10**. The variant lat bar **256** includes a longer cross bar **240** and grip apparatuses **140** that are angled relative to the cross bar **240**. For example, and as illustrated, each axis of the grip apparatuses **140** forms a 85 degree angle *264* with the cross bar **240**.

Referring now to FIG. **12**, therein illustrated is a perspective view of an exercise equipment that is a tricep press down bar **264**. The tricep press down bar **264** includes a pair grip apparatuses **140** connected by opposing elbow members **272** welded to the outer surface **96** of the first annular members **8** of the grip apparatuses **140**. An attachment member being a cross member **280** connects the two elbow members **272** and defines an opening **288**. The opening **288** is adapted to be connected to a connector of a cabled weight system.

Referring now to FIG. **13**, therein illustrated is a side elevation view of an exercise equipment that is an Olympic bar **296**. Two grip apparatus **140** are connected by a middle bar **300** welded at its ends to the outer surface **96** of the first annular members **8** of the grip apparatuses **140**. Attachment members being outwardly extending bars **304** are welded to outer portions of the first annular members **8** as shown. The extending bars **304** may each include a handle portion **308** and a weight support portion **312**. The handle portions **308** may be knurled to facilitate gripping. Weight plates may be supported on the weight support portions **312**.

According to various exemplary methods for manufacturing the grip apparatus **140** described herein, a first annular member **8** as described herein according to various exemplary embodiments is first provided. For example, the first annular member **8** may be formed by machining block of metal, such as low carbon steel.

A second annular member **72** as described herein according to various exemplary embodiments is also provided. For example, the first annular member **8** may be formed by machining a block of metal, such as low carbon steel.

Referring now to FIGS. **14** and **15**, therein illustrated is a section view and close-up view of the section encircled by dotted lines in FIG. **14** (see FIG. **15**) of an initially formed second annular member **72** according to one exemplary embodiment. The initially formed second annular member **72** corresponds to its state prior to connecting a handle member **136** (*see FIG. 6*) thereto. The initially formed second annular member **72** has an annular sidewall **80** that has an outer portion **320** and inner portion **328**.

According to various exemplary methods for manufacturing the grip apparatus **140** described herein, a handle member **136** is attached to opposing portions of the second annular member **72**.

Attaching the handle member **136** to the initially formed second annular member **72**, for example by welding the handle member **136**, may cause the outer diameter of the outer surface **88** of the annular sidewall **80** to expand outwardly. Accordingly, the method further includes machining the outer portion **320** of the annular sidewall **80** of the second annular member **72** after welding the handle member **136** thereto to reduce the outer diameter of the annular sidewall **80** such that this diameter corresponds to the inner diameter of the inner race **180** of the bearing **164** to be included in the grip apparatus. For example, after

further machining the outer portion **320**, the second annular member **72** may have the shape illustrated in FIG. **5**.

According to various exemplary methods for manufacturing the grip apparatus **140** described herein, a bearing **164** is inserted into the first annular member **8** so that an inner surface **96** of the annular sidewall **16** of the first annular member **8** frictionally engages the outer race **172** of the bearing **164**. For example, the annular sidewall **16** is press fit against the outer race **180** of the bearing **164**.

Furthermore, the second annular member **72** (ex: after further machining of its outer surface **80**) is inserted into the bearing **164** so that an outer surface **88** of the annular sidewall **72** of the second annular member **72** frictionally engages the inner race **180** of the bearing **164**. For example, the annular sidewall **72** is press fit against the inner race **180** of the bearing **164**.

According to various exemplary methods for manufacturing the grip apparatus **140** described herein, the inner surface **84** of the annular sidewall **72** of the second annular member **72** is swaged radially outwardly so as to promote engagement of the annular sidewall **72** with the inner race **180**. This swaging may further promote engagement of the annular sidewall **8** with outer race **172**.

It will be appreciated that, for simplicity and clarity of illustration, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements or steps. In addition, numerous specific details are set forth in order to provide a thorough understanding of the exemplary embodiments described herein. However, it will be understood by those of ordinary skill in the art that the embodiments described herein may be practiced without these specific details. In other instances, well-known methods, procedures and components have not been described in detail so as not to obscure the embodiments described herein. Furthermore, this description is not to be considered as limiting the scope of the embodiments described herein in any way but rather as merely describing the implementation of the various embodiments described herein.

The invention claimed is:

1. A grip apparatus for exercise equipment, the grip apparatus comprising:

a first annular member having a first annular sidewall and a first flange extending radially inwardly from the first annular sidewall;

a second annular member having a second annular sidewall and a second flange extending radially **[**inwardly**]** *outwardly* from the second annular sidewall, a diameter of the second annular sidewall being less than a diameter of the first annular sidewall, the second annular member being positioned within the first annular member whereby the first annular sidewall, the second annular sidewall, the first flange and the second flange define together an annular chamber;

a handle member extending between opposing portions of the second annular sidewall;

a bearing positioned within the annular chamber, the first annular sidewall frictionally engaging a first race of the bearing and the second annular sidewall frictionally engaging a second race of the bearing, whereby the second annular member is freely rotatable relative to the first annular member;

wherein the first race is an outer race of the bearing;

wherein the second race is an inner race of the bearing;

wherein an inner surface of the first annular sidewall frictionally engages an outer race of the bearing and the outer surface of the second annular sidewall frictionally engages the inner race of the bearing; and

wherein the second annular member is swaged against the inner race.

2. The grip apparatus for exercise equipment of claim **1**, wherein a first difference between an inner surface diameter of the inner surface of the first annular sidewall and an outer surface diameter of the outer surface of the second annular sidewall substantially corresponds to a radial width of the first flange.

3. The grip apparatus for exercise equipment of claim **2**, wherein a second difference between the inner surface diameter of the inner surface of the first annular sidewall and the outer surface diameter of the outer surface of the second annular sidewall substantially corresponds to a radial width of the second flange.

4. The grip apparatus for exercise equipment of claim **3**, wherein a top wall of the bearing abuts against the first flange of the first annular member.

5. The grip apparatus for exercise equipment of claim **4**, wherein the first flange has an annular recessed portion for accommodating portions of balls of the bearing protruding from the top wall of the bearing.

6. The grip apparatus for exercise equipment of claim **5**, wherein the second flange has an annular recessed portion for accommodating portions of the balls of the bearing protruding from the bottom wall of the bearing.

7. The grip apparatus for exercise equipment of claim **4**, wherein a bottom wall of the bearing abuts against the second flange of the second annular member.

8. The grip apparatus for exercise equipment of claim **1**, further comprising a third annular member dimensioned to be connected to the first annular member, and a fourth annular member dimensioned to be connected to the second annular member, wherein the second annular member and the fourth annular member are, when connected together, sandwiching and holding together the bearing and the first annular member, and wherein the third annular member and the first annular member are, when connected together, sandwiching and holding the second annular member.

9. The grip apparatus for exercise equipment of claim **1**, further comprising a third annular member comprising external threads dimensioned to be matched with internal threads of the first annular member, and a fourth annular member comprising internal threads dimensioned to be matched with external threads of the second annular member, wherein the second annular member and the fourth annular member are, when connected together, effective for sandwiching and holding together the bearing and the first annular member, and wherein the third annular member and the first annular member are, when connected together, effective for sandwiching and holding the second annular member.

10. A grip apparatus for exercise equipment, the grip apparatus comprising:

a first annular member having a first annular sidewall and a first flange extending radially inwardly from the first annular sidewall;

a second annular member having a second annular sidewall and a second flange extending radially **[**inwardly**]** *outwardly* from the second annular sidewall, a diameter of the second annular sidewall being less than a diameter of the first annular sidewall, the second annular member being positioned within the first annular member whereby the first annular sidewall, the second annular sidewall, the first flange and the second flange define together an annular chamber;

a handle member extending between opposing portions of the second annular sidewall;

a bearing positioned within the annular chamber, the first annular sidewall frictionally engaging a first race of the bearing and the second annular sidewall frictionally engaging a second race of the bearing, whereby the second annular member is freely rotatable relative to the first annular member; and

a third annular member dimensioned to be connected to the first annular member, and a fourth annular member dimensioned to be connected to the second annular member, wherein the second annular member and the fourth annular member are, when connected together, sandwiching and holding together the bearing and the first annular member, and wherein the third annular member and the first annular member are, when connected together, sandwiching and holding the second annular member.

11. The grip apparatus for exercise equipment of claim **10**, wherein the first race is an outer race of the bearing;

wherein the second race is an inner race of the bearing; and

wherein an inner surface of the first annular sidewall frictionally engages the outer race of the bearing and an outer surface of the second annular sidewall frictionally engages the inner race of the bearing.

12. The grip apparatus for exercise equipment of claim **11**, wherein the inner surface of the first annular sidewall is press fit against the outer race of the bearing.

13. The grip apparatus for exercise equipment of claim **12**, wherein an outer surface of the second annular sidewall is press fit against the inner race of the bearing.

14. The grip apparatus for exercise equipment of claim **11**, wherein the second annular member is swaged against the inner race.

15. The grip apparatus for exercise equipment of claim **10**, wherein the grip apparatus for exercise equipment is free of fastening systems for attaching the first annular member to the second annular member.

16. The grip apparatus for exercise equipment of claim **10**, wherein the bearing is a ball bearing.

17. The grip apparatus for exercise equipment of claim **10**, wherein the bearing is chosen from a rolling element bearing, rotational bearing, a thrust bearing, a ball bearing, a spherical bearing, a thrust bearing, a needle bearing, a cam follower, a cup and cone bearing (timkin) and individual ball bearings.

18. Exercise equipment comprising:

at least one grip apparatus for exercise equipment according to claim **10**; and

one attachment member connected to the first annular member and adapted to be connected to a weight system.

19. The exercise equipment of claim **18**, wherein the exercise equipment is chosen from a chinning triangle, a tricep press down, a lat bar, a stirrup handle, a pulldown bar, a curl bar, an Olympic bar, a dumbbell handle, a hex bar, and a tricep bar.

20. A method for manufacturing a grip apparatus for exercise equipment, the method comprising:

providing a first annular member having a first annular sidewall and a first flange extending radially inwardly from the first annular sidewall;

providing a second annular member having a second annular sidewall and a second flange extending radially **[**inwardly**]** *outwardly* from the second annular sidewall, a diameter of the second annular sidewall being less than a diameter of the first annular sidewall;

attaching a handle member to opposing portions of the second annular sidewall;

inserting a bearing into the first annular member, whereby an inner surface of the first annular sidewall frictionally engages an outer race of the bearing;

inserting the second annular member into the bearing, whereby an outer surface of the second annular sidewall frictionally engages an inner race of the bearing; and

swaging the inner surface of the second sidewall of the second annular member outwardly radially.

* * * * *