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(54) **WEIGHT SET SELECTOR AND LOCKING MECHANISM**

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A63B 21/062 (2006.01)
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CPC . A63B 21/0728; A63B 21/063; A63B 21/075; A63B 21/0726; A63B 21/072;
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,346,448 A 9/1994 Sollo
5,769,762 A 6/1998 Towley, III et al.
(Continued)

FOREIGN PATENT DOCUMENTS

WO 2012058612 A1 5/2012

OTHER PUBLICATIONS

International Search Report and Written Opinion for PCT Application No. PCT/US2013/025096, Korean Intellectual Property Office, dated Nov. 18, 2013, 8 pages, Republic of Korea.
(Continued)

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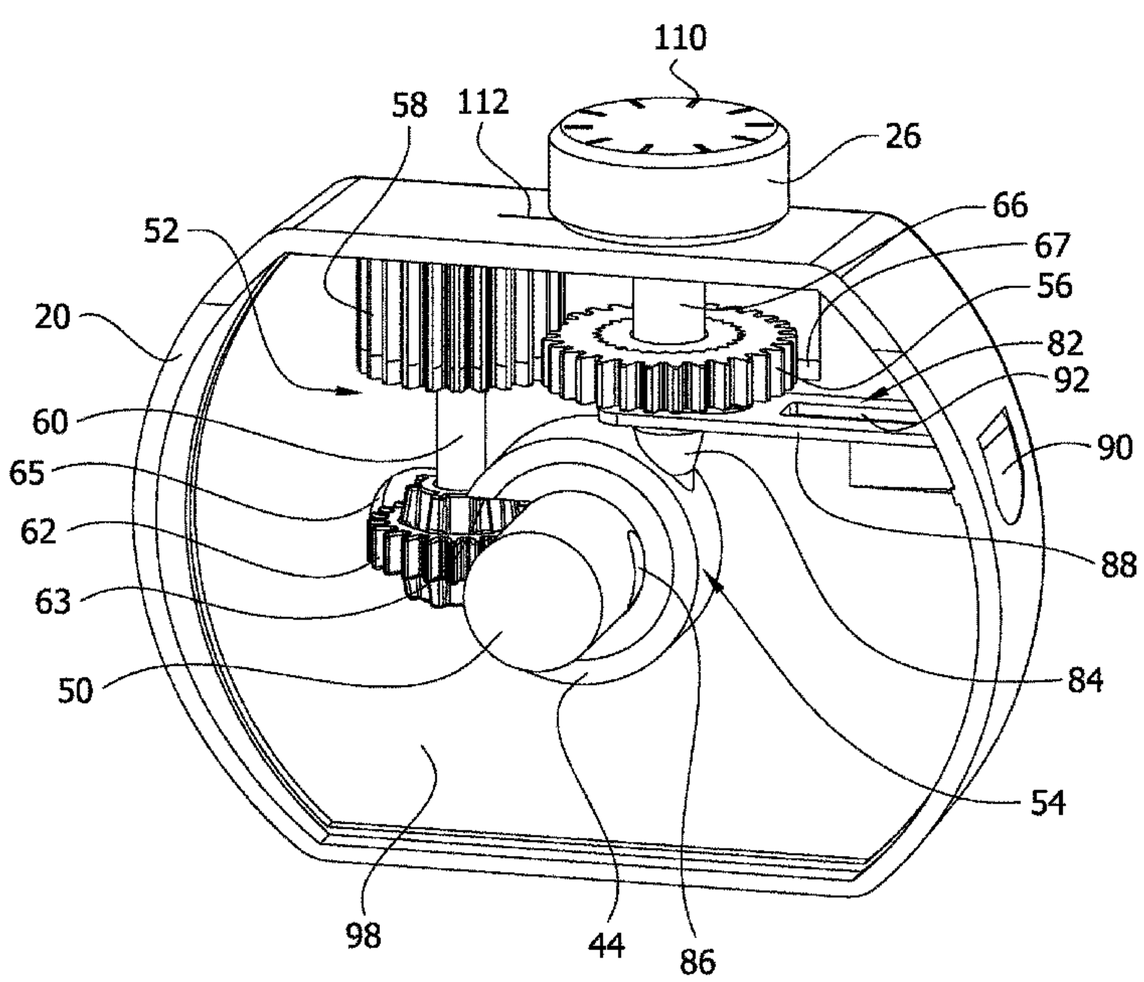
(57) **ABSTRACT**

A selectable weight set apparatus includes a handle assembly including a handle having a first end portion and a second end portion opposite the first end portion. A first weight set is adapted to be supported on the first end portion of the handle and a second weight set is adapted to be supported on the second end portion of the handle. Each of the first and second weight sets includes a plurality of weight plates. An adjustment assembly selects a number of weight plates to be retained to the handle assembly. The adjustment assembly includes at least one selector for movement relative to at least one of the first and second weight sets to engage and select the weight plates in said at least one of the first and second weight sets. A locking assembly fixes the selector relative to said at least one of the first and second weight sets.

32 Claims, 19 Drawing Sheets



(51) **Int. Cl.**

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A63B 21/06	(2006.01)
A63B 71/00	(2006.01)

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,083,144	A	7/2000	Towley, III et al.	
6,149,558	A	11/2000	Chen	
6,196,952	B1	3/2001	Chen	
6,228,003	B1	5/2001	Hald et al.	
6,261,022	B1	7/2001	Dalebout et al.	A63B 21/075 482/107
6,500,101	B1	12/2002	Chen	
6,540,650	B1	4/2003	Krull	
6,758,795	B2	7/2004	Barber	
6,899,661	B1 *	5/2005	Krull	A63B 21/075 482/107
7,090,625	B2	8/2006	Chermack	
7,153,244	B2	12/2006	Towley, III et al.	
7,264,578	B1	9/2007	Krull	
7,335,142	B2	2/2008	Towley, III et al.	
7,377,885	B2	5/2008	Doudiet	
7,387,596	B2	6/2008	Towley, III et al.	
7,491,155	B2	2/2009	Fenelon et al.	
7,497,814	B1	3/2009	Krull	
7,520,845	B2	4/2009	Towley, III et al.	
7,547,268	B1	6/2009	Krull	
7,578,772	B2	8/2009	Lippitt	
7,611,448	B2	11/2009	Schiff	
7,621,855	B1 *	11/2009	Krull	A63B 21/0728 482/107
7,862,487	B2	1/2011	Olson	
8,007,415	B1	8/2011	Lundquist	
2003/0096683	A1	5/2003	Fenelon et al.	
2003/0114276	A1	6/2003	Schiff	
2003/0148862	A1	8/2003	Chen et al.	A63B 21/0726 482/108
2006/0025287	A1 *	2/2006	Chermack	A63B 21/075 482/107
2007/0037675	A1	2/2007	Doudiet	
2008/0064575	A1	3/2008	Towley, III et al.	
2008/0188362	A1	8/2008	Chen	
2009/0163335	A1	6/2009	Towley, III et al.	
2009/0197745	A1 *	8/2009	Olson	A63B 21/0728 482/107
2009/0305852	A1	12/2009	Höglund	A63B 21/0728 482/107
2010/0229616	A1	9/2010	Fink et al.	
2010/0304938	A1	12/2010	Olson	
2010/0304940	A1	12/2010	Svenberg et al.	A63B 21/0728 482/108
2010/0323856	A1 *	12/2010	Svenberg	A63B 21/075 482/108
2012/0021877	A1	1/2012	Lundquist et al.	
2013/0324375	A1 *	12/2013	Svenberg	A63B 21/0728 482/108

OTHER PUBLICATIONS

Extended European Search Report dated Sep. 28, 2016 in related application PCT/US2013/025906, 8 pages.

* cited by examiner

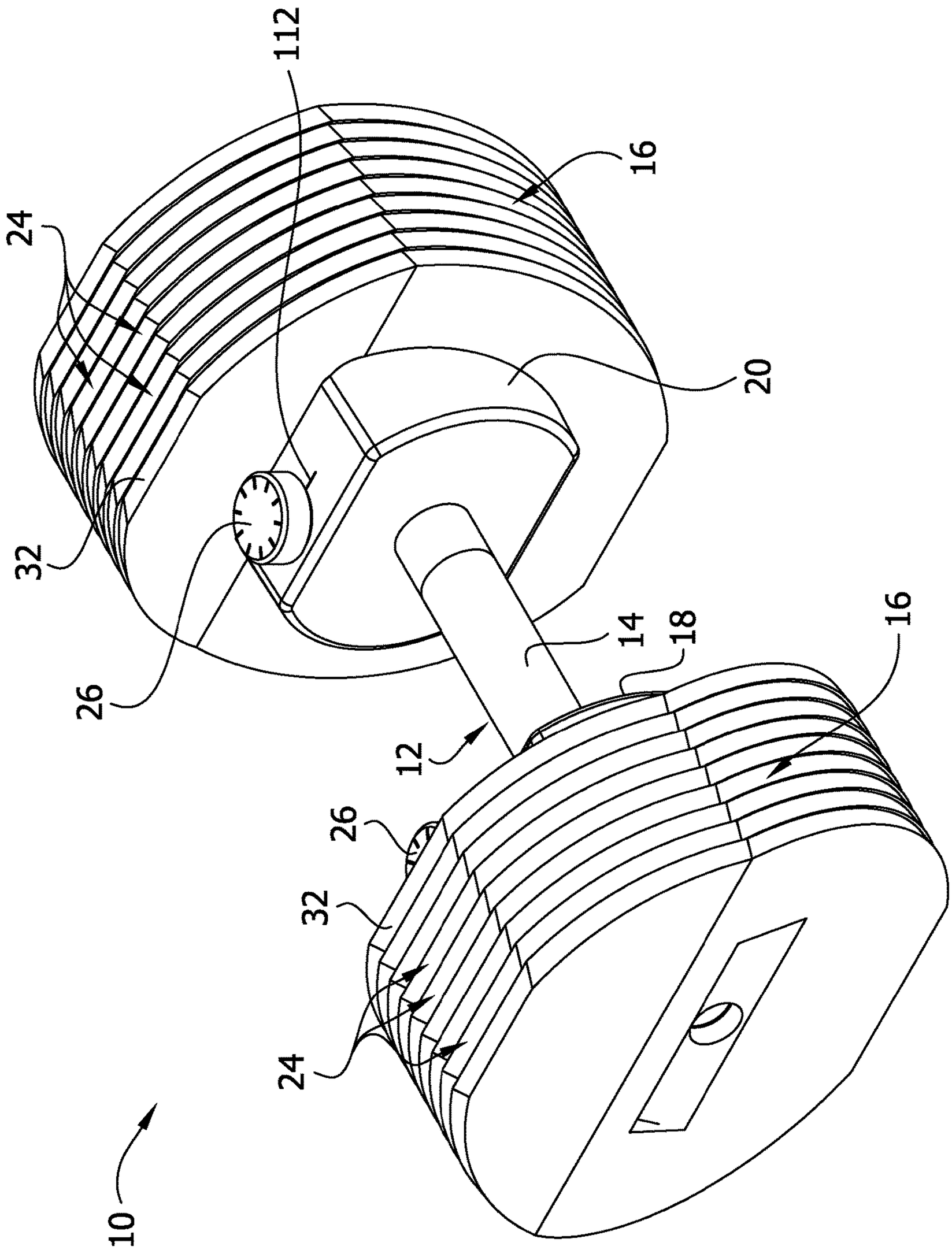


FIG. 1

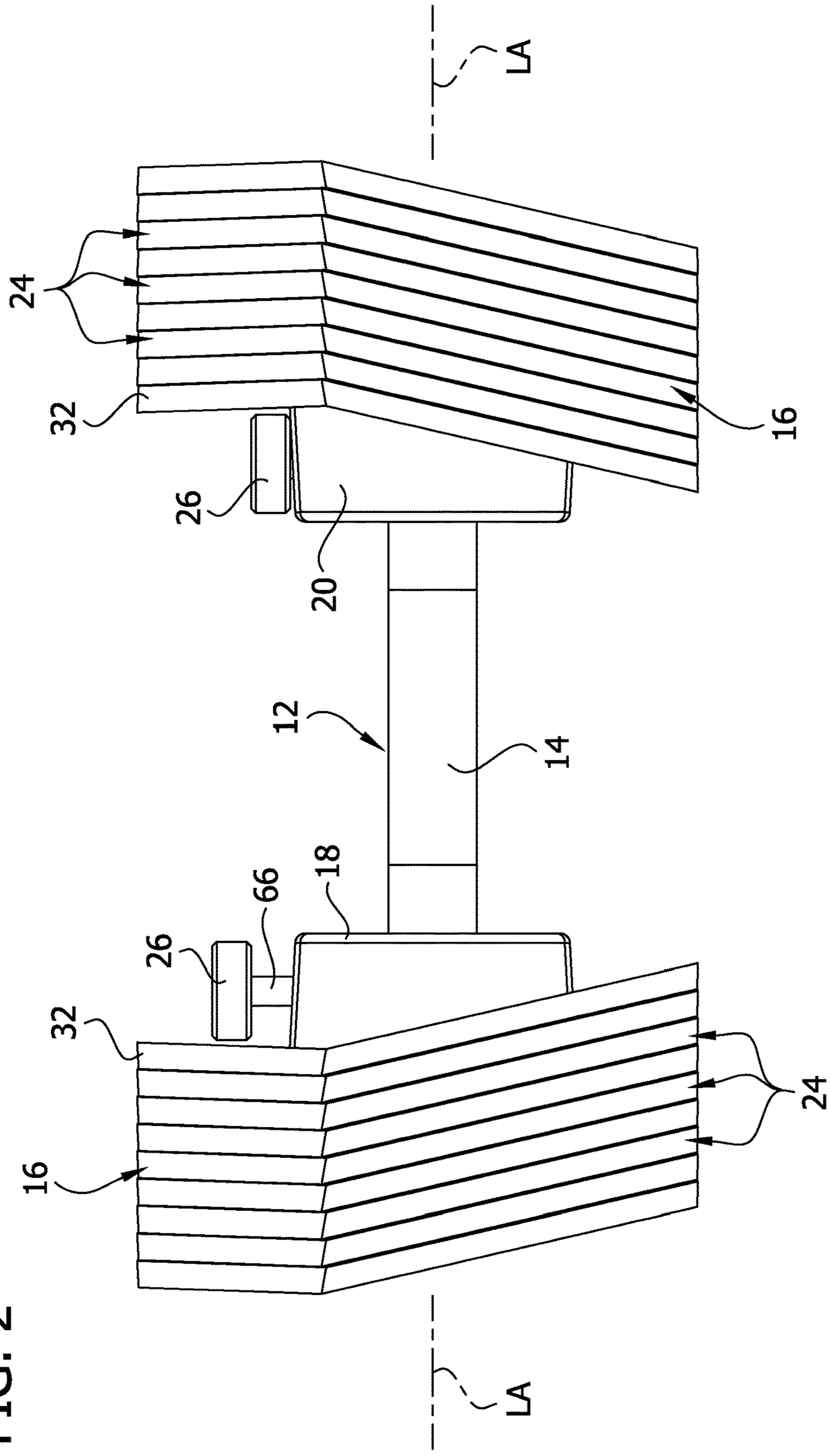


FIG. 2

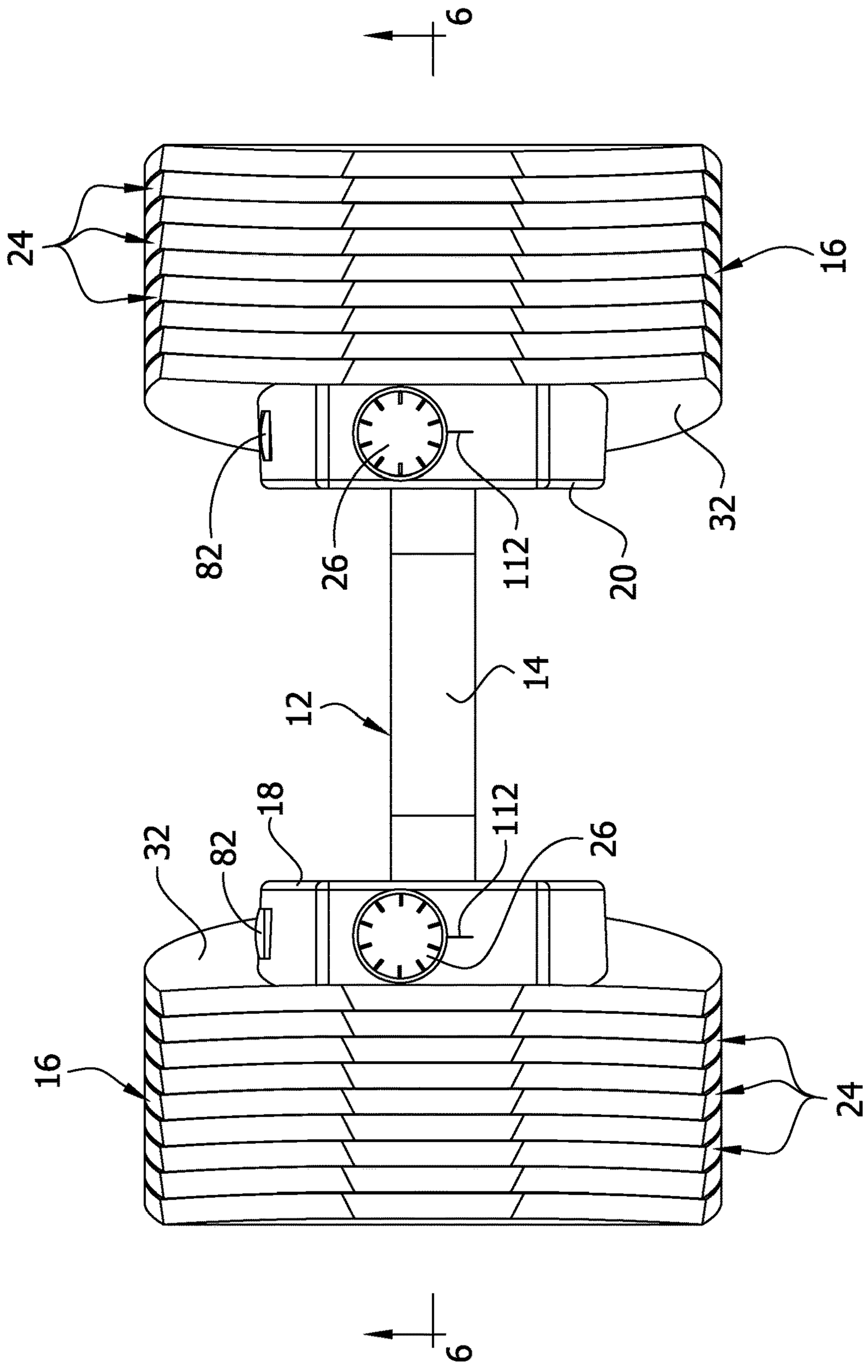


FIG. 3

FIG. 4

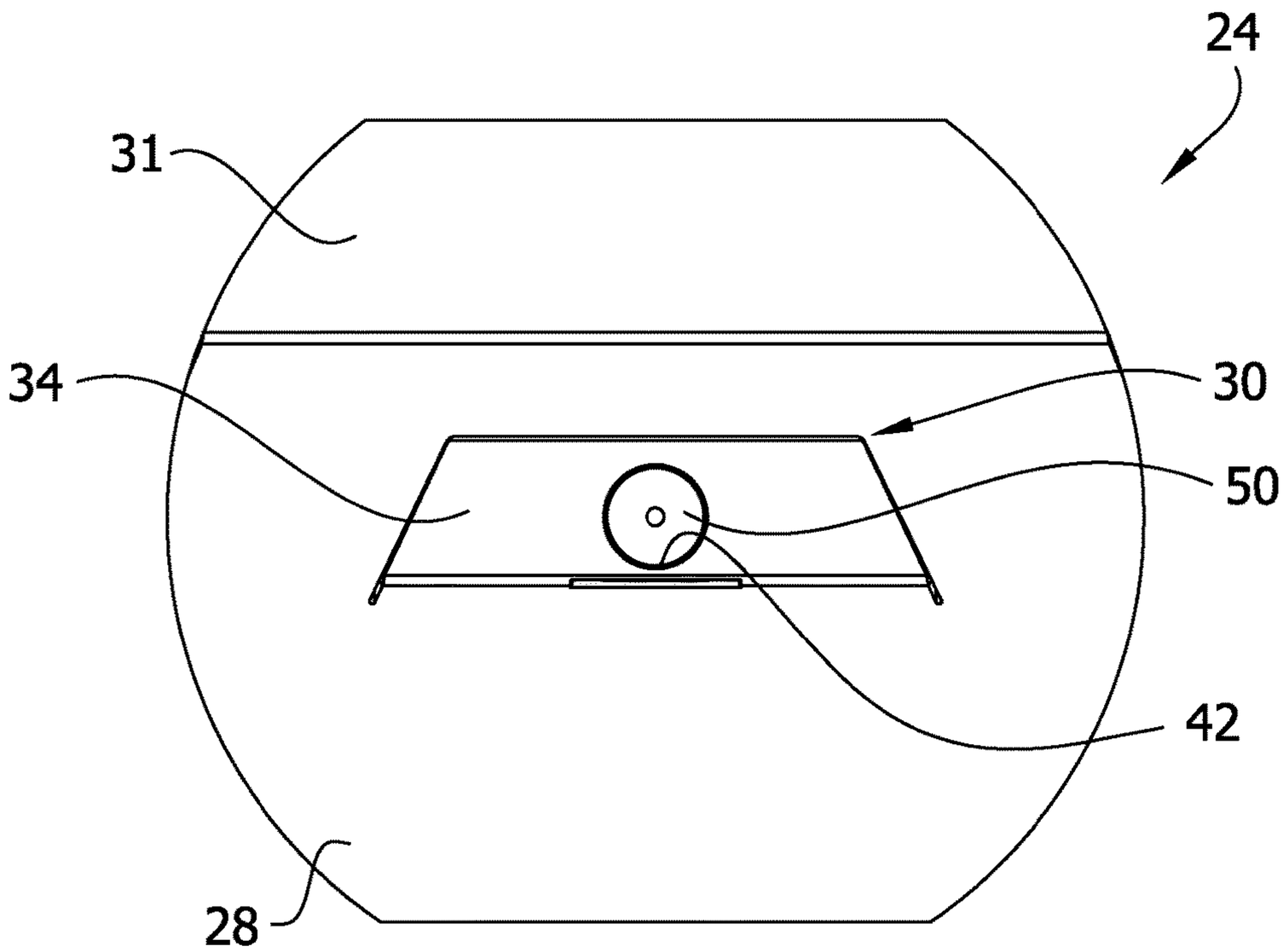


FIG. 5

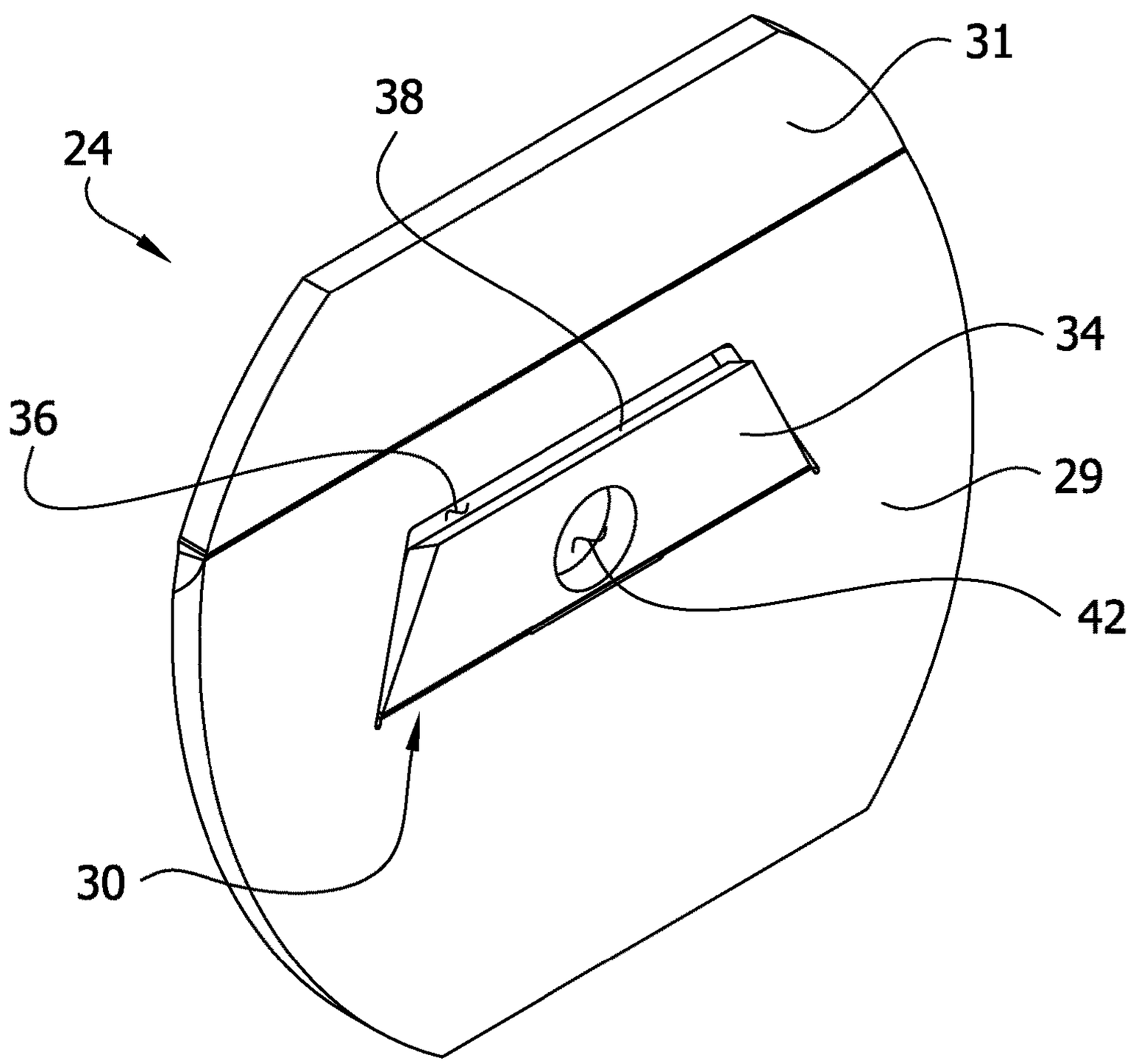


FIG. 5A

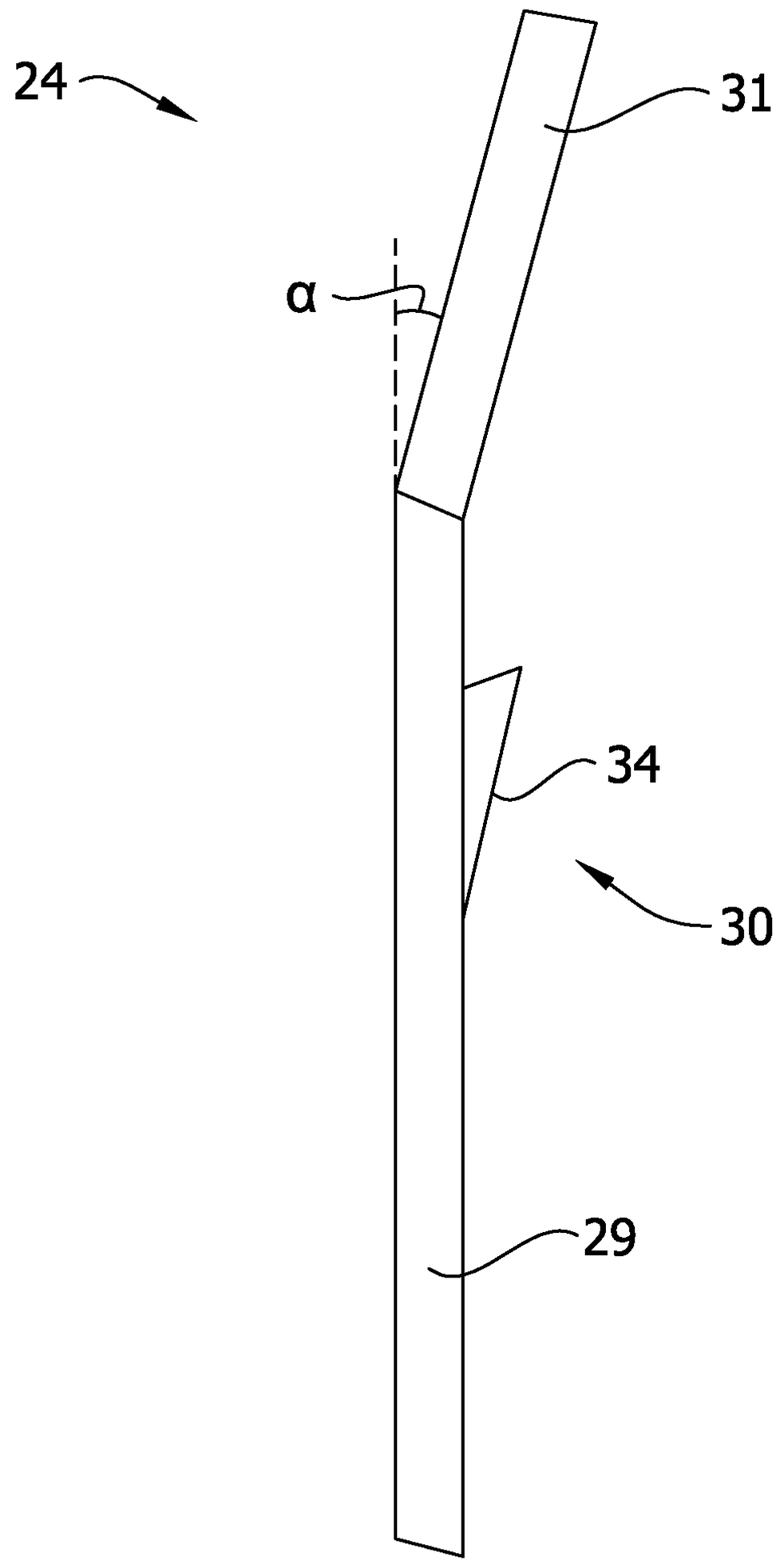
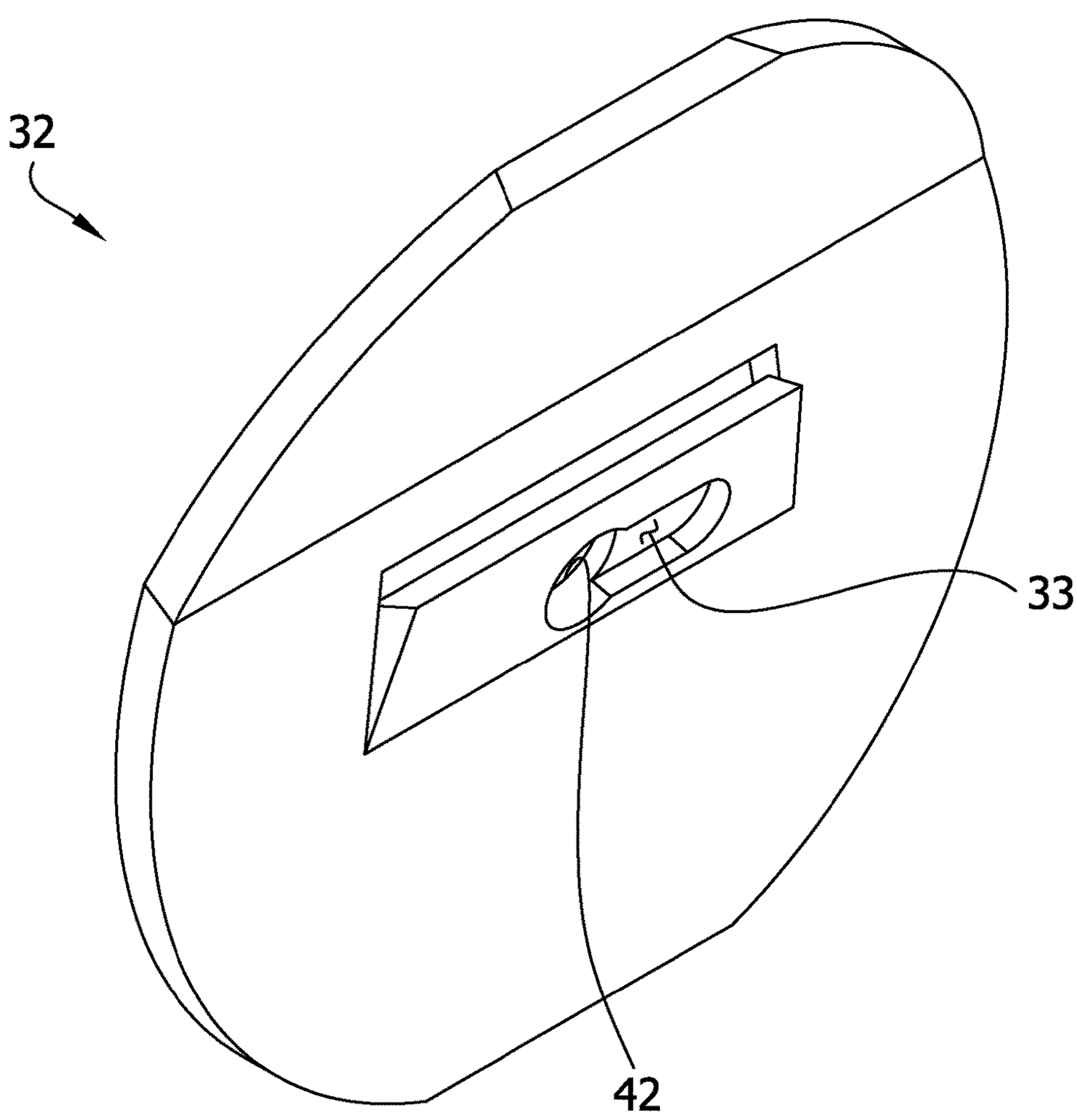


FIG. 5B



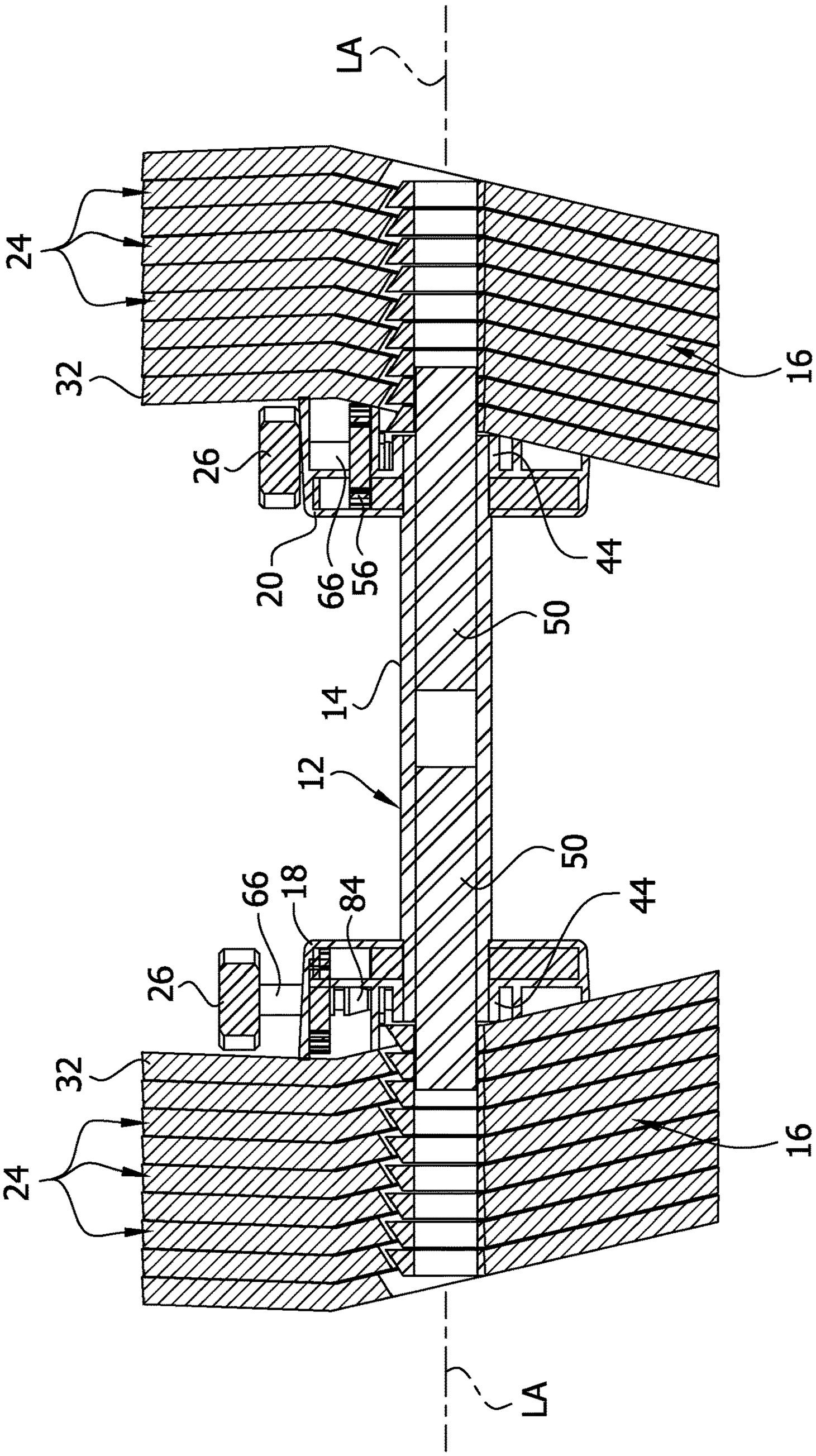


FIG. 6

FIG. 7

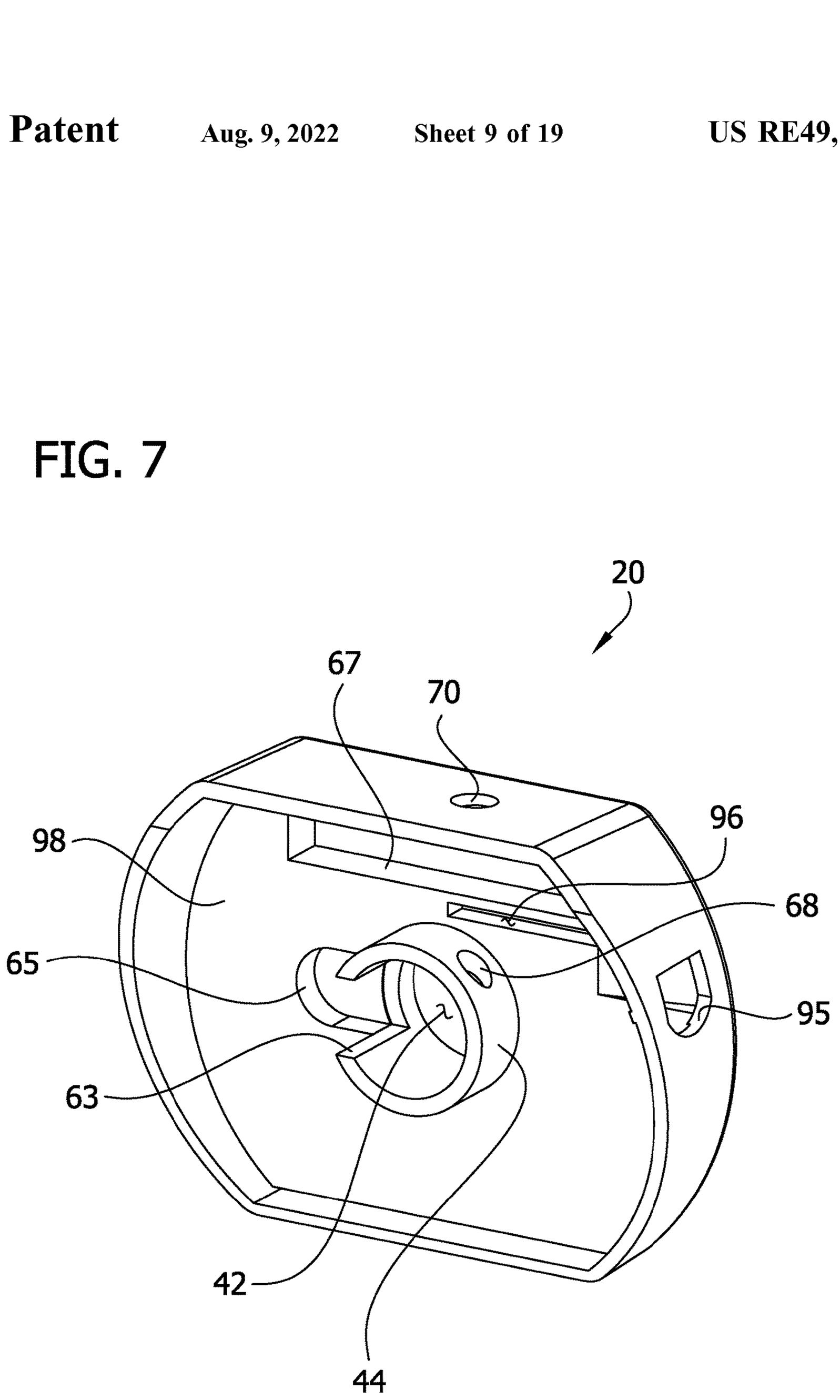
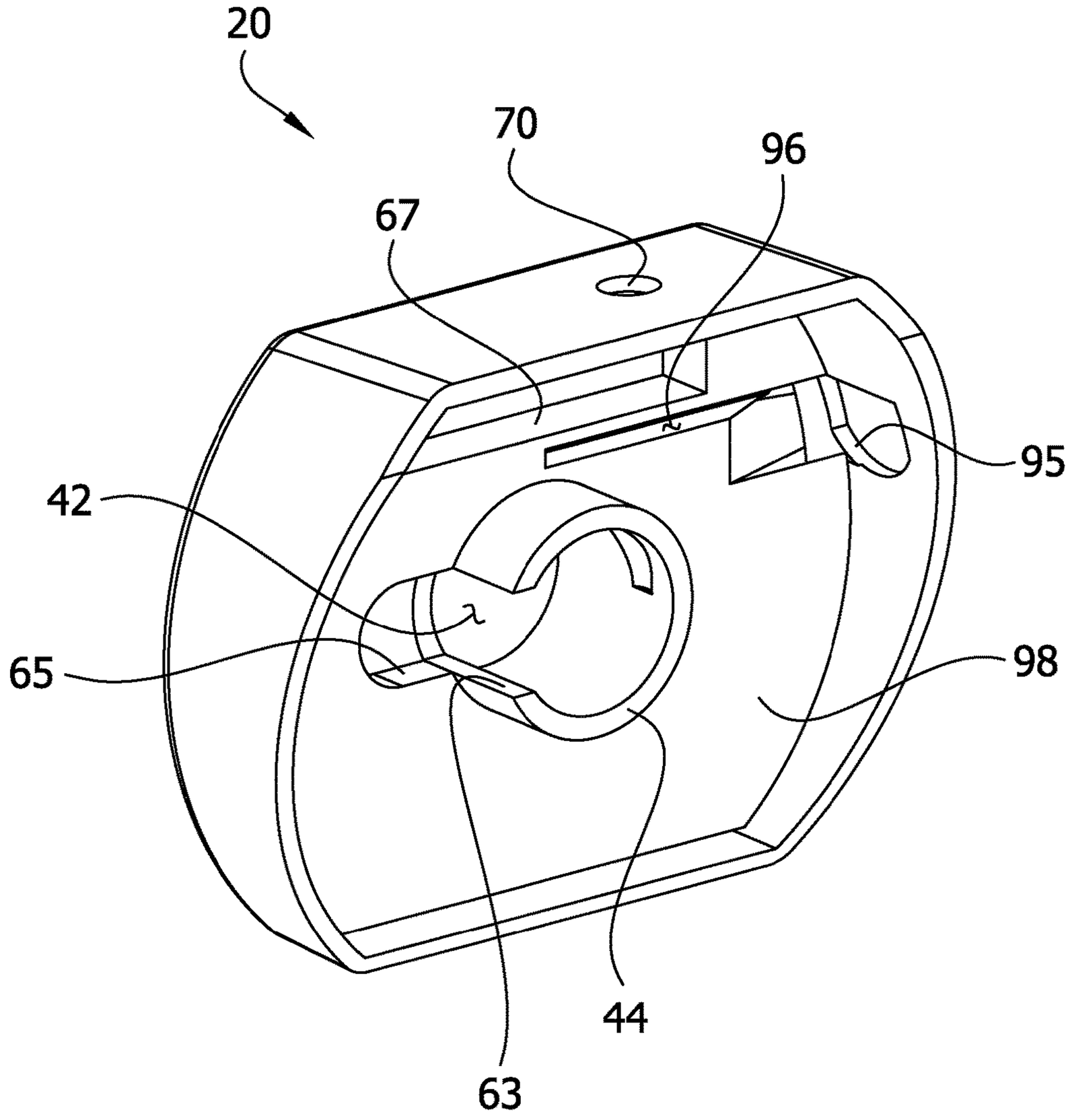


FIG. 7A



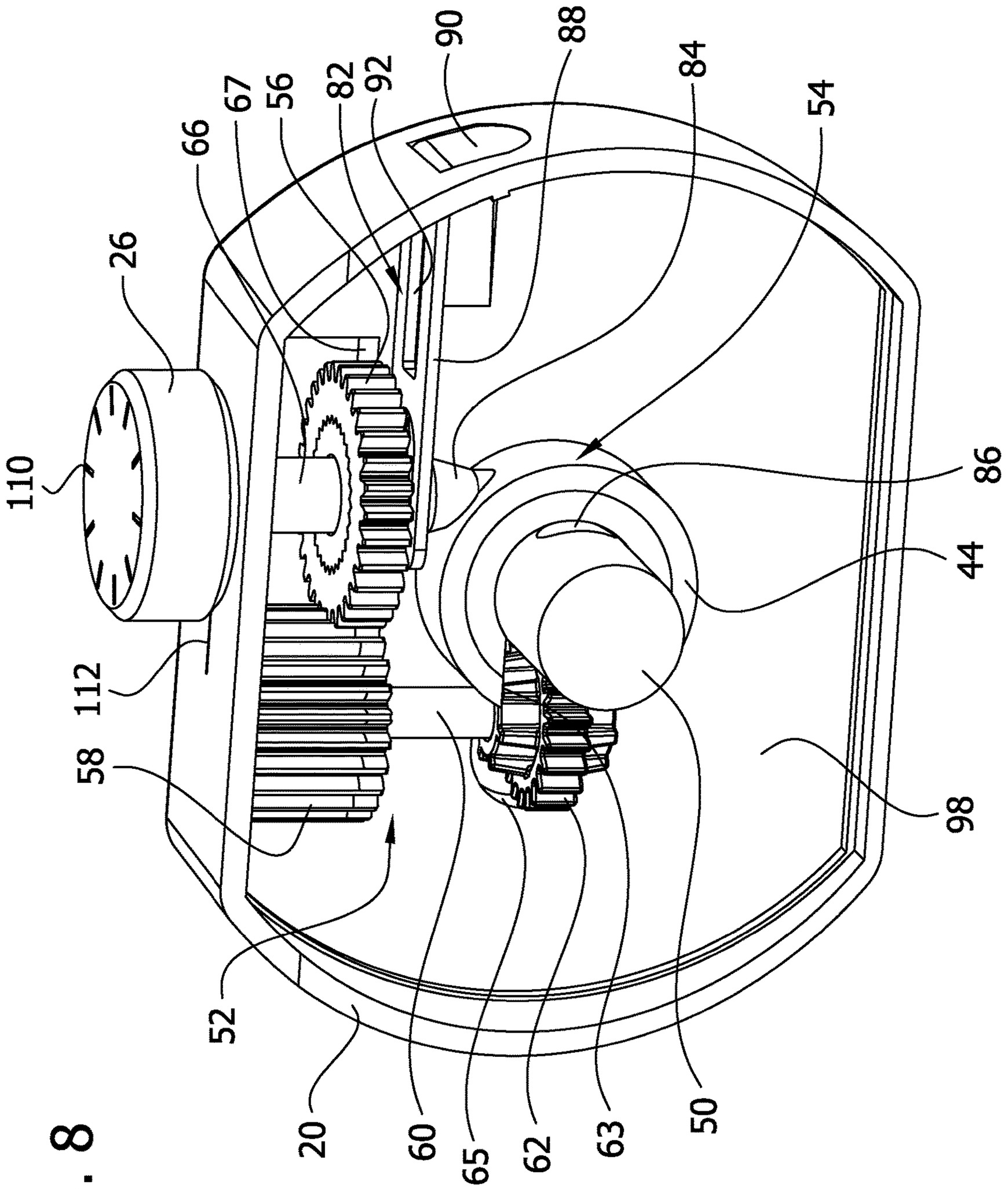
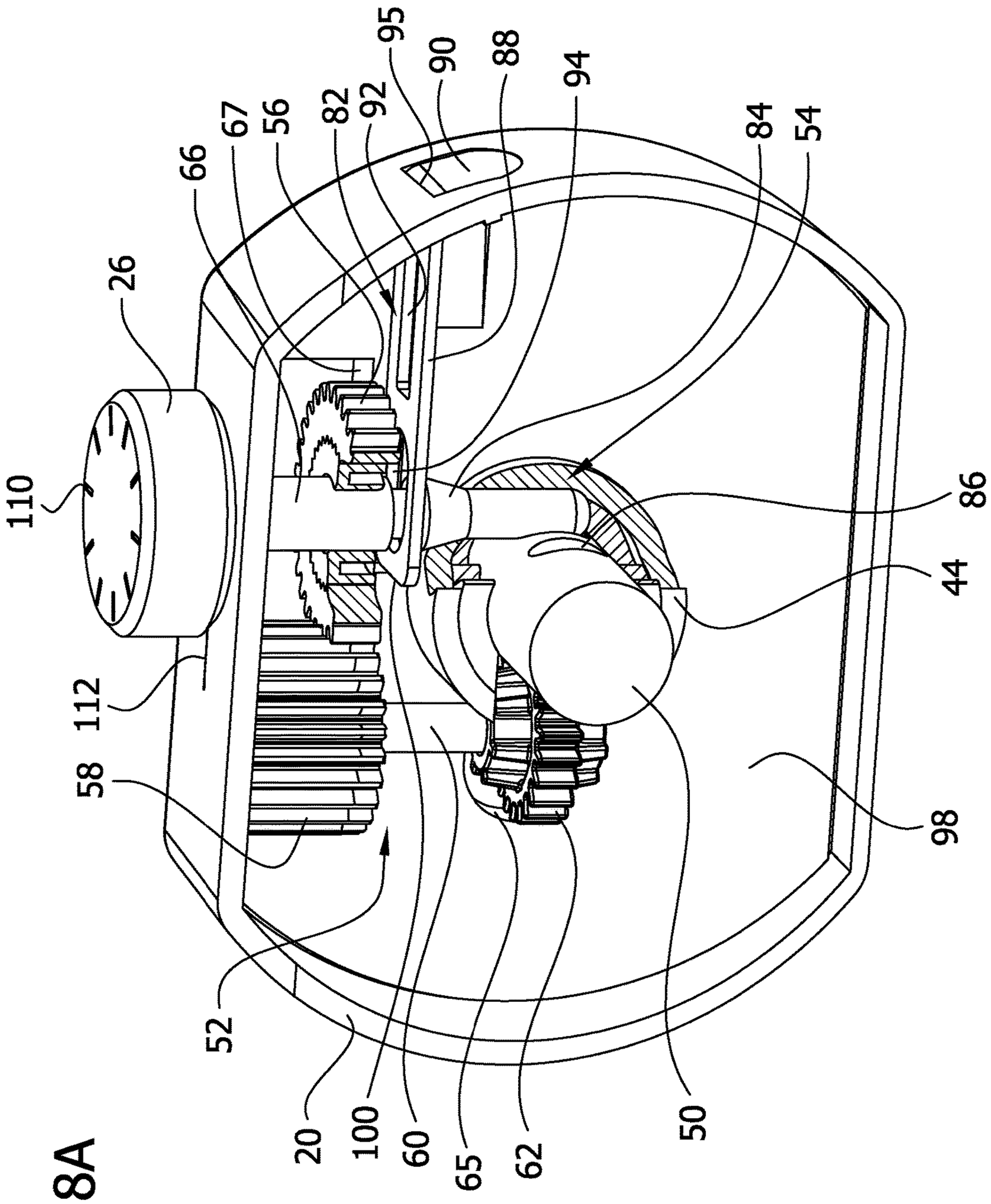


FIG. 8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88
94
84
54
66
67
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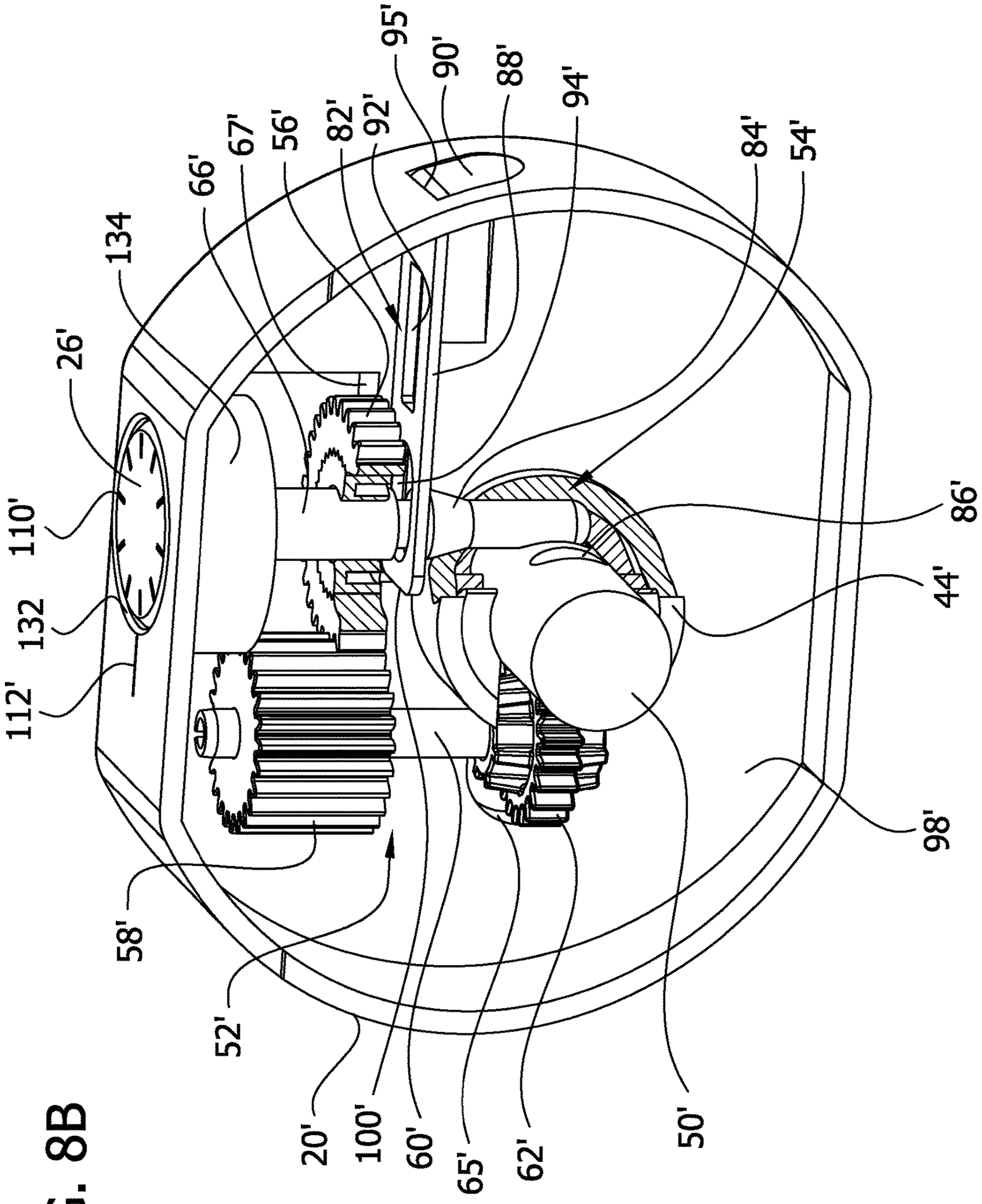
26
110
112
58
52
20
100
60
65
62
50
86
44
98

FIG. 8A


95'
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84'
54'
66'
67'
56'
82'
92'
134
26'
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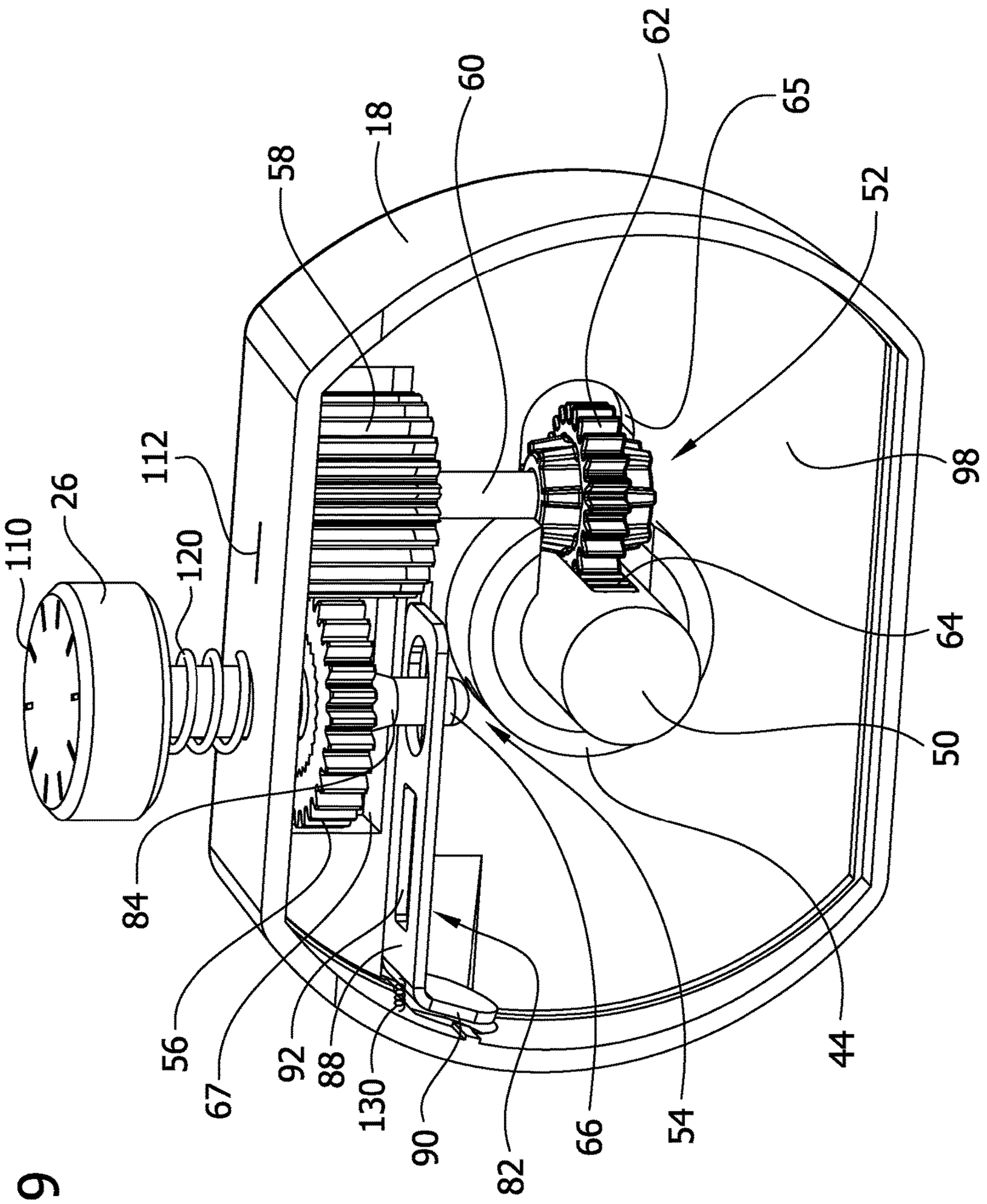
112'
58'
52'
20'
100'
60'
65'
62'
50'
86'
44'
98'

FIG. 8B


58
18
60
62
65
52
112
26
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98
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50
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56
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92
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130
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82
66
54
44

FIG. 9

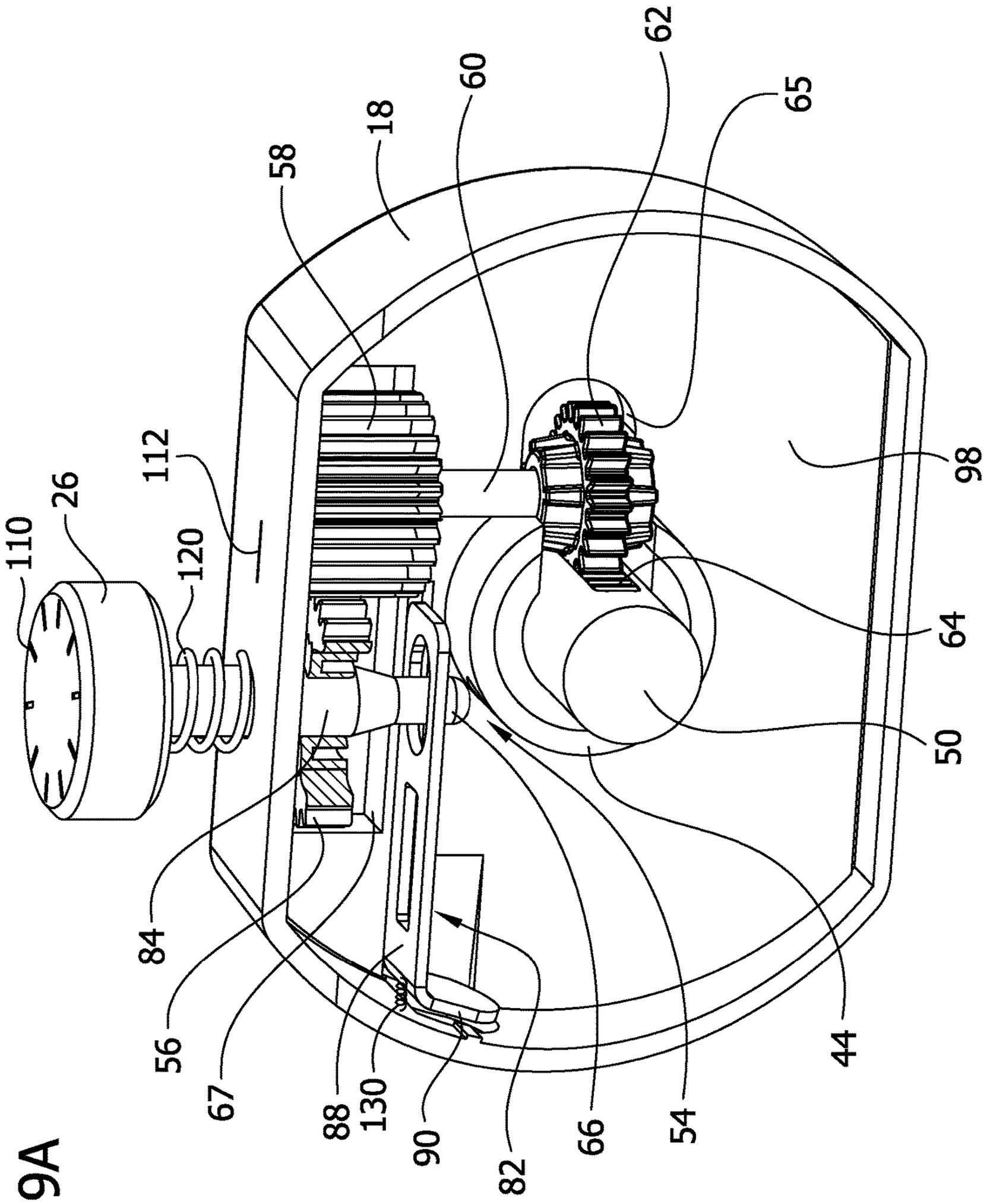


FIG. 9A

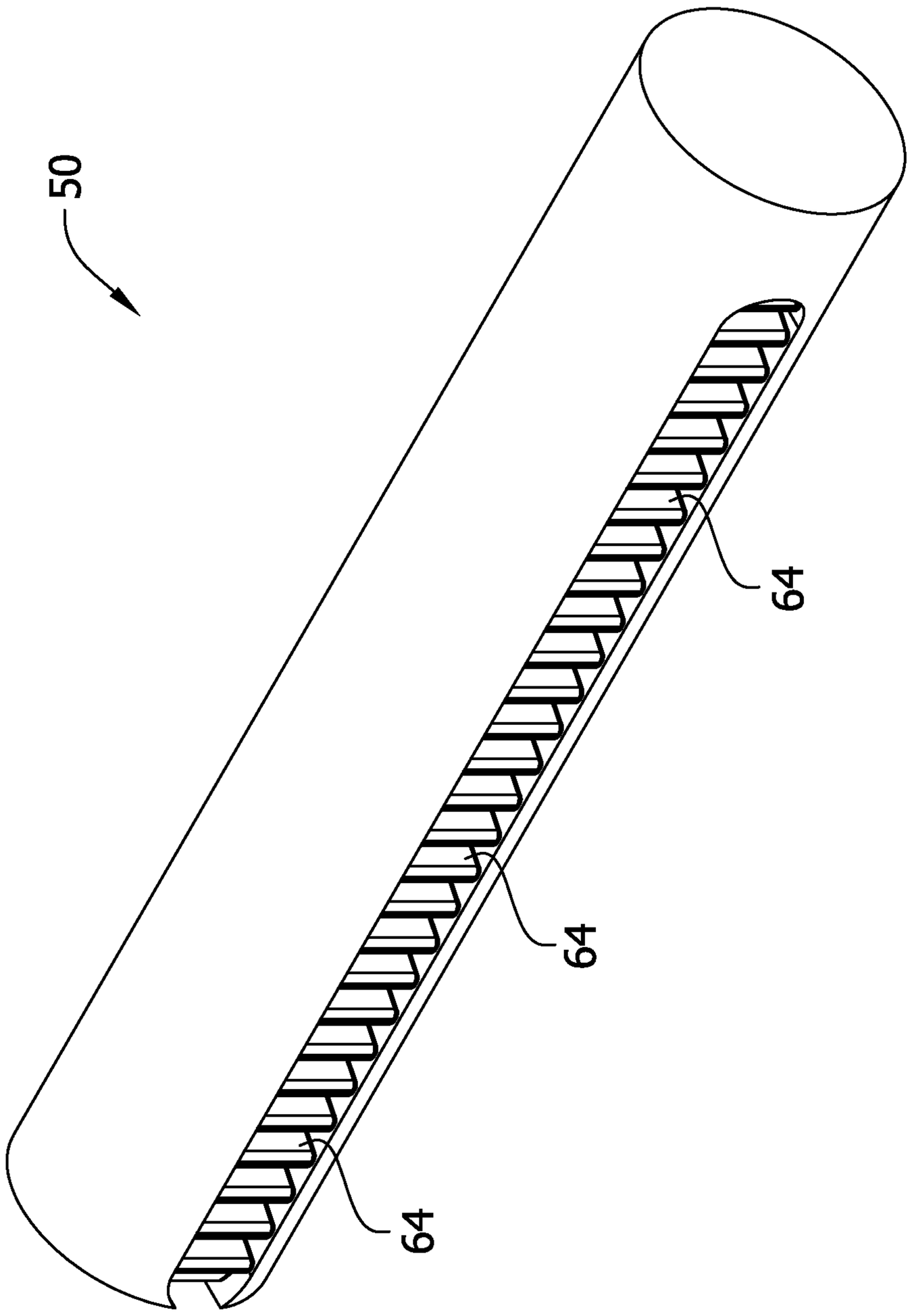


FIG. 10

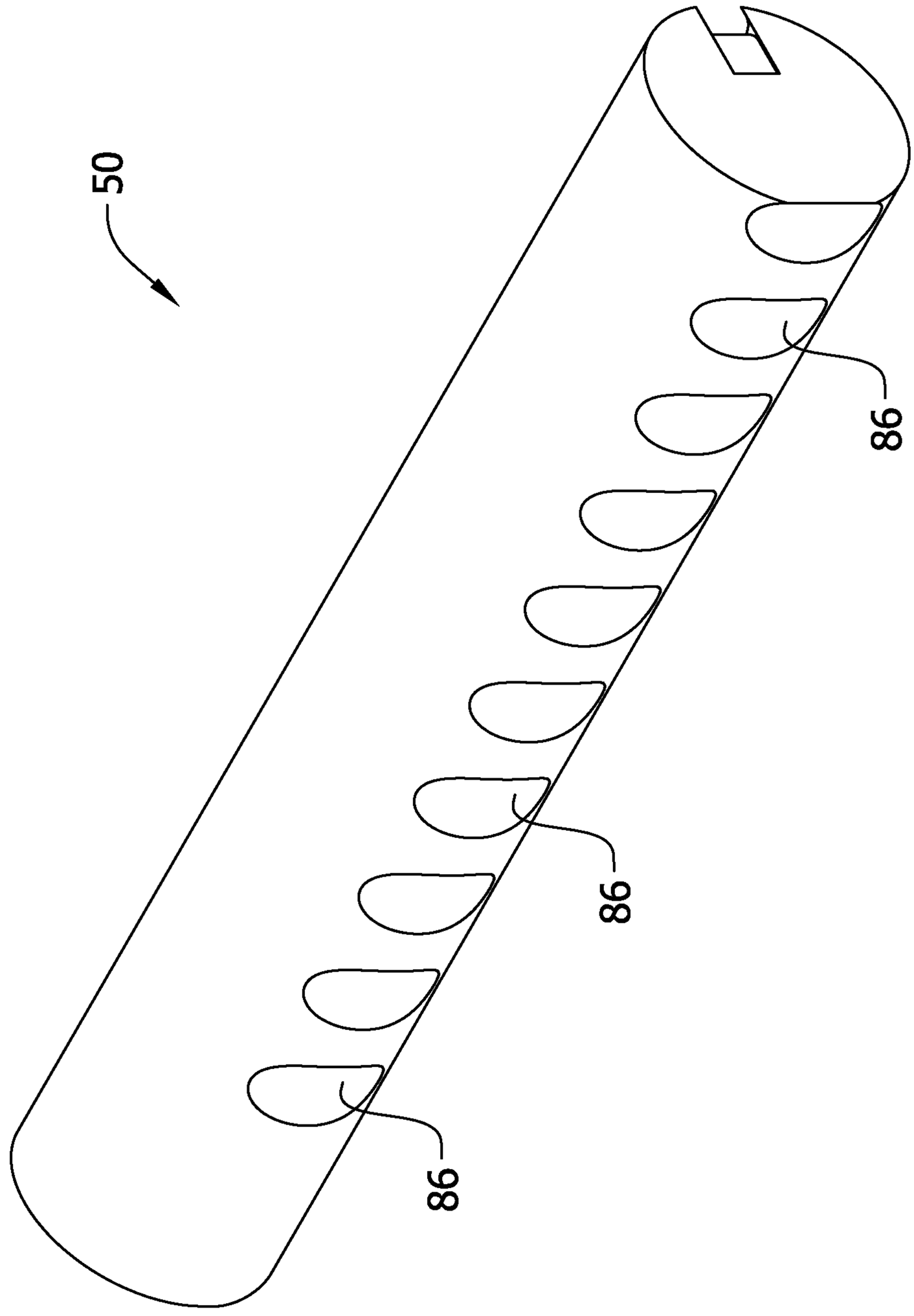
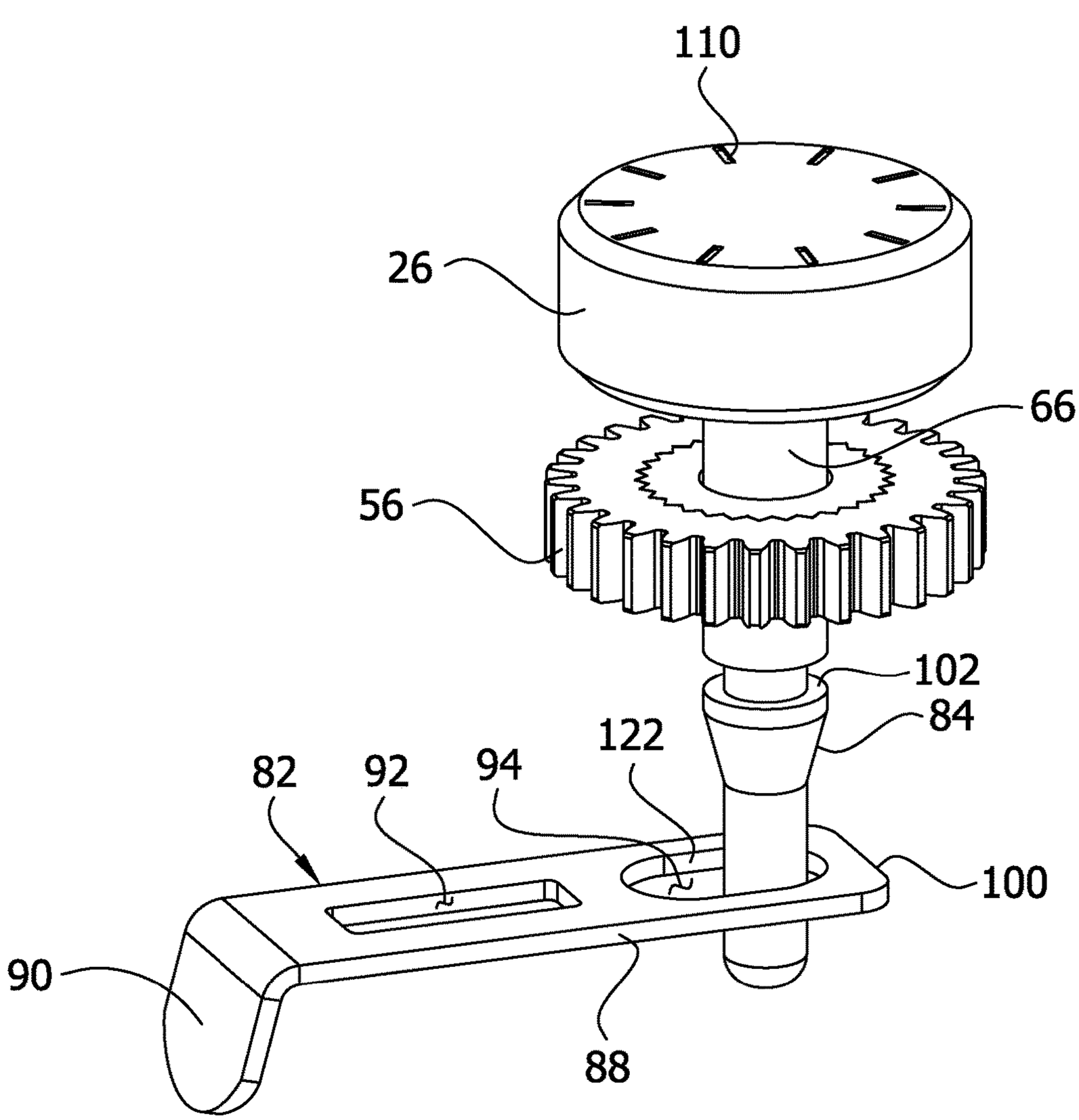


FIG. 10A

FIG. 11



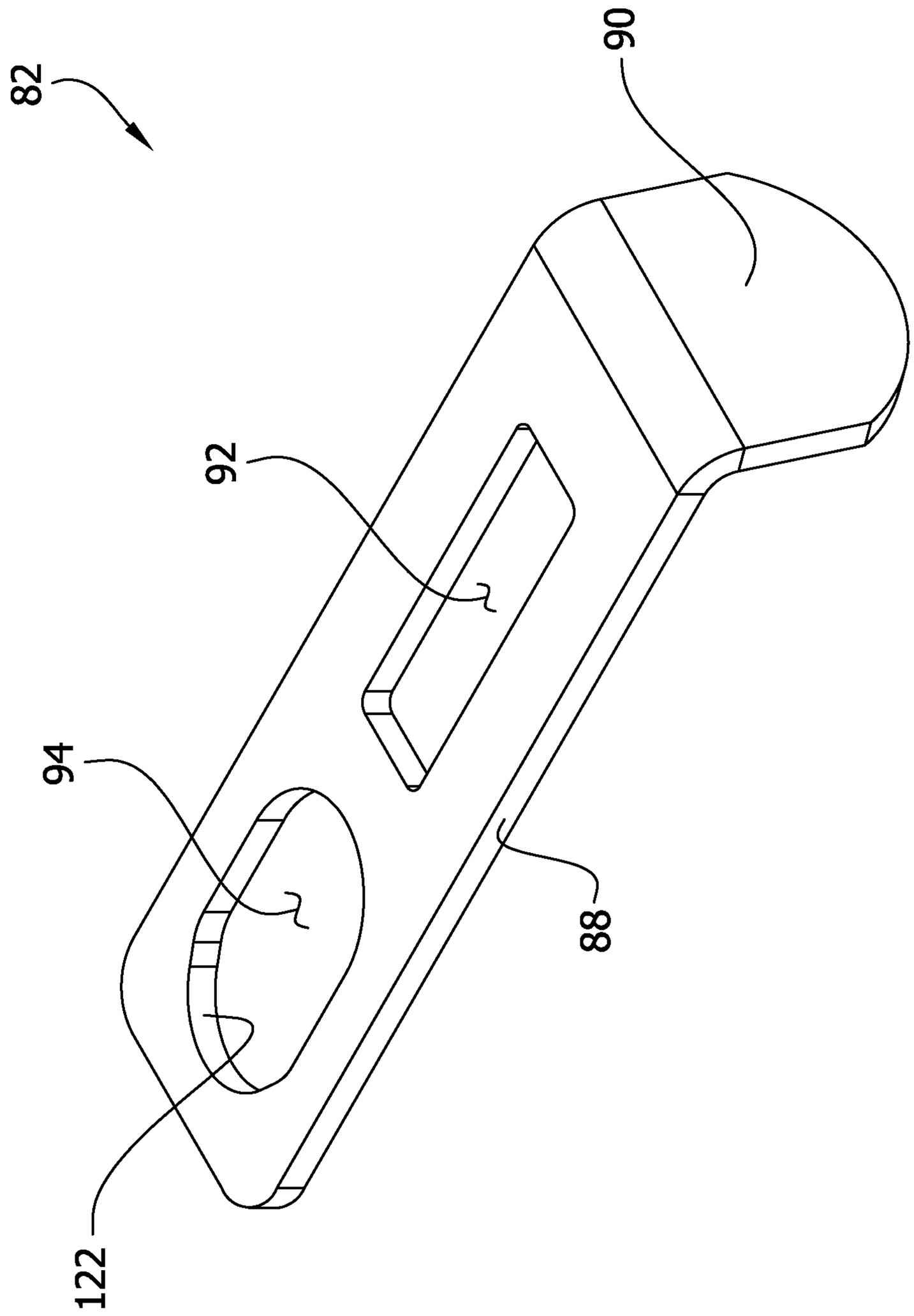


FIG. 12

WEIGHT SET SELECTOR AND LOCKING MECHANISM

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.

FIELD OF THE INVENTION

The present invention generally relates to a selectable free weight assembly having an improved weight set selector and locking mechanism.

BACKGROUND

An adjustable weight dumbbell apparatus enables a user to have access to a plurality of differing weight sets in a single handset by facilitating the addition or subtraction of weight (i.e., weight plates) from the apparatus. In the past, the use of free weight dumbbells generally offered the user one of two options. The first option was a plurality of free weight dumbbells of solid mass in a sufficient number to fulfill the entire desired free weight requirement (i.e., multiple pairs of dumbbells). The second option was an adjustable dumbbell that required physically clamping or securing the weights to a handset using a hand wrench manual locking apparatus. More recently, adjustable dumbbells have incorporated different mechanisms for securing the weight plates to each other and to the handset.

During use, free weight assemblies are often dropped from elevated positions. And even though conventional adjustable weight assemblies employ various selector and locking mechanisms, the weight plates can still become disengaged when the assemblies are dropped. This can cause the weight plates to become detached from the handset and can result in permanent damage to the assemblies. Therefore, there exists a need for an adjustable weight assembly with an improved weight set selector and locking mechanism.

SUMMARY

In one aspect, a selectable weight set apparatus generally comprises a handle assembly comprising a handle having a first end portion and a second end portion opposite the first end portion. A first weight set is adapted to be supported on the first end portion of the handle and a second weight set adapted to be supported on the second end portion of the handle. Each of the first and second weight sets comprises a plurality of weight plates. An adjustment assembly selects a number of weight plates to be retained to the handle assembly. The adjustment assembly comprises at least one selector for movement relative to at least one of the first and second weight sets to engage and select the weight plates in said at least one of the first and second weight sets. A locking assembly fixes the selector relative to said at least one of the first and second weight sets. The locking assembly comprises a first locking element and a plurality of second locking elements. The first locking element is configured for releasable engagement with the selector and one of the plurality of second locking elements on the selector after the selector is moved to engage and select the weight plates in said at least one of the first and second weight sets.

In another aspect, a handle assembly for a selectable weight set apparatus generally comprises a handle for supporting a plurality of weight plates. An adjustment assembly is associated with the handle for selecting a number of weight plates to be retained to the handle. The adjustment assembly comprises at least one selector for movement relative to the handle to engage and select the weight plates to be retained to the handle. A locking assembly fixes the selector relative to the handle. The locking assembly comprises a first locking element and a plurality of second locking elements. The first locking element is configured for releasable engagement with the selector and one of the plurality of second locking elements on the selector to place the locking assembly in locked and unlocked configurations.

Other aspects of the present invention will be apparent in view of the following description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective of a free weight dumbbell apparatus of the present invention;

FIG. **2** is a side view of the apparatus;

FIG. **3** is a top view of the apparatus;

FIG. **4** is an end view of the apparatus;

FIG. **5** is a perspective of a weight plate of the apparatus;

FIG. **5**A is a side view of the weight plate;

FIG. **5**B is a perspective of a collar plate of the apparatus;

FIG. **6** is a cross section of the apparatus taken through line **6-6** in FIG. **3**;

FIG. **7** is a perspective of a right side collar of the apparatus from a right side vantage;

FIG. **7**A is a perspective of a left side collar of the apparatus from a left side vantage;

FIG. **8** is a perspective of the right side collar including an adjustment assembly and locking assembly of the apparatus with the locking assembly in a locked configuration;

FIG. **8**A is the perspective in FIG. **8** with portions of the adjustment assembly and locking assembly broken away to show detail;

FIG. **8**B is a perspective like FIG. **8**, but showing a different embodiment in which a knob of the adjustment assembly is recessed into the collar in a locked configuration;

FIG. **9** is a perspective of the left side collar, but with the locking assembly in an unlocked configuration;

FIG. **9**A is the perspective of FIG. **9** with portions of the adjustment assembly and locking assembly broken away to show detail;

FIG. **10** is a front side perspective of a selector shaft of the apparatus;

FIG. **10**A is a rear side perspective of the selector shaft of the apparatus;

FIG. **11** is a perspective of a portion of the adjustment assembly and locking assembly of the apparatus;

FIG. **12** is a perspective of a retaining member of the locking assembly;

Corresponding reference characters indicate corresponding parts throughout the drawings.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to the drawings, and more specifically to FIGS. **1-4**, a freestanding selectable free weight dumbbell apparatus **10** generally comprises a dumbbell handle assembly **12** including a tubular handle **14** and a pair of collars **18**, **20** mounted on respective ends of the handle. A pair of weight plate sets **16** is supported by the handle assembly **12**.

Each weight plate set **16** comprises a plurality of weight plates **24** arranged in mating sequence between respective collars **18**, **20** and outermost weight plates **24**. A knob **26** (broadly, "a selector element") is mounted on each collar **18**, **20** to adjust the number of weight plates **24** in each respective set **16** supported by the handle assembly **12** for varying the total weight of the apparatus **10**. A portion of the handle **14** extends between the collars **18**, **20** for allowing a user to grasp and manipulate the apparatus **10**.

Referring to FIG. **5**, each weight plate **24** comprises a main body portion **29** and a top bent portion **31** extending from the main body portion at a skewed angle. The weight plate **24** is made of a suitable material such as steel and may be overmolded with another, safer material such as plastic. In a preferred embodiment, the top bent portion **31** is skewed from the main body portion **29** by an angle α of about 12 degrees (FIG. **5**A). This configuration of the weight plates **24** reduces the overall length of the apparatus **10** as compared to weight plates without a bend. As a result, the shape of the weight plates **24** creates a more compact apparatus **10** which makes it easier to manipulate. The weight plates **24** may have other shapes and configurations without departing from the scope of the present invention. For instance, the weight plates could be substantially round or substantially rectangular. Moreover, the plates could have a different bend or be flat.

Each collar **18**, **20** may have a collar plate **32** fixed to the respective collar for engaging the first weight plate **24** of the weight set **16** (FIGS. **1-3** and **5**B). The collar plates **32** can be made of a suitable material such as steel and have the same overall shape as the weight plates. However, it is to be understood that the collar plates may have a shape different from the shape of the weight plates. In the illustrated embodiment, a gear slot **33** is formed in the collar plate **32** to provide clearance for gears of the apparatus **10** as will be explained in greater detail below. Also, a collar plate (not shown) may be slightly smaller than the weight plates **24** shown in the drawings so as to accommodate weight plates of different shapes (e.g., circular weight plates, not shown) without projecting out from any peripheral edge of either shape of weight plate. The weight plates **24** are designed to lock together in sequence from the collar **18**, **20** toward the outermost weight plate **24**. Thus, the weight plates **24** can be designed to lock to the collar plates **32**.

Referring to FIGS. **4-5**A, the weight plates **24** and collar plates **32** each have plate locking mechanisms **30** for attaching to adjacent plates. Specifically, the locking mechanisms **30** function to lock two adjoining weight plates **24** together, or a weight plate to either one of the collar plates **32**. The locking mechanisms **30** include a central locking tang **34** formed by making a three-sided cut (two lateral side cuts and a transverse top cut) in each of the plates **24**, **32**. The area inside the cut is bent outward along a tang bend at an angle, forming the locking tang **34**. The void left by the tang **34** forms a central locking slot **36**. Additionally, the two lateral side cuts taper toward the top cut such that a bottom edge of the tang **34** is longer than a top edge of the tang. In the illustrated embodiment, the tang **34** has an isosceles trapezoidal shape. However, the tang **34** could have other shapes such as non-isosceles trapezoidal, rectangular or semi-circular without departing from the scope of the present invention. As such, any number of straight or curved cuts could be used to form the tang.

The central locking tangs **34** are designed to facilitate locking and unlocking of the weight plates **24** and collar plates **32** during use of the apparatus **10**. The top edge of each tang **34** has a locking surface **38**. The locking surface

38 is designed to engage and lock into an upper portion of a central locking slot **36** of an adjacent weight plate **24** or collar plate **32**. This method of construction allows for the necessary positioning of the central locking tangs **34** with respect to adjoining central locking slots **36** while providing a mechanism that allows for the placement of a plurality of weight plates **24** flush up against one another.

The locking mechanism **30** may further comprise secondary tangs (not shown) on the plates. It will be understood that any suitable plate interlock may be used within the scope of the present invention. One example of secondary tangs is shown in my International Patent Application No. PCT/US2012/062289, the disclosure of which is incorporated herein by reference

Referring to FIGS. **5** and **5**B, each of the weight plates **24** and collar plates **32** also include selector shaft holes **42** positioned at a center of the plates for allowing the passage of selector shafts **50** (see, FIG. **6**) in and out of the weight plates for engaging and selecting the desired amount of weight. Each collar **18**, **20**, although only collar **20** is illustrated, includes a shaft ring **44** that projects from an inner surface of the collar and surrounds the selector shaft hole **42** in the collar (FIGS. **7** and **7**A). An insert **98** is received inside an interior space of the collar **18**, **20**. The insert helps locate various components of the apparatus **10** as will be explained in greater detail below. The skewed orientation of the collar plates **32** with respect to a longitudinal axis LA of the handle **14**, in combination with the locking mechanisms **30**, cause a portion of the weight plates **24** to be held at a skewed angle with respect to the longitudinal axis of the handle **14** when the weight plates **24** are retained on the handle assembly **12**.

Selection of the desired weight is achieved through manipulation of the knobs **26** which in turn actuate components of the handle assembly **12**. Referring to FIGS. **6** and **8-10**A, the handle assembly comprises the handle **14**, selector shafts **50**, a gear assembly **52** and a locking assembly **54**. The knobs **26** and gear assembly **52** are broadly an adjustment assembly. The gear assembly **52** comprises a first spur gear **56**, a second spur gear **58** mating with the first spur gear, a connecting axle **60** extending from the second spur gear, and a third spur gear **62** mounted on a bottom end of the connecting axle for engaging teeth **64** (see, FIGS. **9-10**) on the selector shafts **50**. A cutout **63** (FIGS. **7** and **7**A) in the shaft ring **44** and a cutout **65** in the insert **98** receive at least a portion of the third spur gear **62** allowing the third spur gear to engage the selector shaft **50** without interfering with the collar **18**, **20**. The gear slot **33** in the collar plate **32** also receives a portion of the third spur gear **62** providing clearance for the gear. A cutout **67** in the insert **98** in the collar **18**, **20** receives portions of the first and second spur gears **56**, **58** providing clearance for the first and second gears. Each knob **26** is mounted on an actuator shaft **66** (broadly, "a first locking element"), and the first spur gear **56** is press fit onto the actuator shaft such that rotation of a knob also rotates a respective first spur gear on the actuator shaft. A hole **68** (FIG. **7**) in the shaft ring **44** receives the actuator shaft **66** so that a bottom end of the actuator shaft is positionable adjacent a side of the selector rod **50**. The knobs **26** are rotatable about the axis of the actuator shaft **60** which is generally perpendicular to the longitudinal axis LA of the handle **14**. However, other configurations are contemplated.

It is also contemplated that a structure other than a knob can be used. For instance, a dial (not shown) could be used to adjust the number of weight plates **24** in each set **16** supported by the handle assembly **12**. Also, in the illustrated embodiment each weight set **16** has a dedicated knob **26** for

selecting the weight plates **24** of the weight plate sets **16**. However, a single knob or dial could be used to adjust both weight sets **16**. It will be understood that the gear assembly **52** and locking assembly **54** would be modified to accommodate the single selector element configuration.

Referring to FIGS. **8-9**A, the first spur gear **56** engages the second spur gear **58** such that teeth on the first spur gear mesh with teeth on the second spur gear. Thus, rotation of a knob **26** rotates the first spur gear **56** in a first direction which in turn rotates the second spur gear **58** in a second direction, opposite the first direction. Because connecting axle **60** connects the second spur gear **58** to the third spur gear **62**, rotation of the second spur gear also causes rotation of the third spur gear in the second direction. As best seen in FIGS. **9** and **9**A, because teeth of the third spur gear **62** mesh with the teeth **64** on the selector shaft **50**, rotation of the third spur gear causes the selector shaft to translate longitudinally in the handle **14**. The collars **18**, **20** enclose portions of respective gear assemblies **52**. Each collar **18**, **20** has an opening **70** (FIGS. **7** and **7**A) that passes the actuating rod **66** so that the knobs **26** are accessible to a user to allow the user to rotate the knobs during use. As will be explained in greater detail below, the knobs **26** are vertically movable to lock and unlock the selector shafts **50** in place within the handle **14**. The vertical movement of the knob allows the locking assembly **54** to be easily locked and unlocked by a user.

The selector shafts **50** (broadly, "selectors") are at least partially received in the handle **14** and selector shaft holes **42** by a close tolerance such that movement of the selector shafts and weight plates **24** transverse to the longitudinal axis of the handle is restricted (FIG. **6**).

Referring to FIGS. **8-12**, each locking assembly **54** comprises a retaining member **82** slidably mounted in a respective collar **18**, **20**, a conical member **84** on the actuator shaft **66**, and a series of longitudinally spaced recesses **86** (broadly, "second locking elements") in the selector shaft **50**. The retaining member **82** comprises a locking portion **88** and a tab portion **90** extending from the locking portion. The locking portion **88** has an elongate plate opening **92** and an elongate rod opening **94**. The rod opening receives the actuator shaft **66** so that at least a portion of the bottom end of the actuator shaft may be received in a recess **86** in the selector shaft **50**. The tab portion **90** of the retaining member **82** extends at least partially though a hole **95** in a side wall of the collar **18**, **20** and the locking portion **88** is at least partially captured in channel **96** (FIGS. **7** and **7**A) in insert in the collar **18**, **20** to constrain movement of the retaining member to substantially sliding translational movement with respect to the collar.

Referring to FIGS. **8** and **8**A, when the locking assembly **54** is in a locked configuration, the knob **26** is in a depressed position wherein a free end **100** of the locking portion **88** of the retaining member **82** is disposed between a shoulder **102** of the conical member **84** and a bottom surface of the first spur gear **56**. The free end **100** of the retaining member **82** around the opening **94** engages the shoulder **102** of the conical member **84** and holds the dial **26** in the depressed position so that the bottom end of the actuator shaft **66** is secured in a recess **86** in the selector shaft **50**. Thus, the selector shaft **50** is held from longitudinal movement by the engagement between the bottom end of the actuator shaft **66** and the recess **86**. In particular, the outer longitudinally extending surface of the actuator shaft **66** engages the surface of the recess **86** and the opposing nature of the two surfaces restricts longitudinal movement of the selector shaft **50**. The selector shaft **50** is also held from transverse movement by the positioning of the bottom of the actuator shaft **66** and the third spur gear **62** being in opposed relation on opposite sides of the selector shaft. Specifically, the bottom end of the actuator shaft **66** and the third spur gear **62** are disposed on opposing lateral sides of the selector shaft **50** to restrict transverse movement of the selector shaft. Therefore, in the locked configuration, the selector shaft is fixed against both longitudinal and transverse movement. So the movement of the weight plates **24** is restricted, helping to eliminate looseness or "slop" and the points of weakness that can exist in prior art designs having side gaps. When the locking assembly **54** is in an unlocked configuration (FIGS. **9** and **9**A), the knob **26** is in a raised position freeing the bottom end of the actuator shaft **66** from the recess **86** in the selector shaft **50** permitting the selector shaft to be adjusted by the knob.

Referring to FIG. **8**B, another embodiment of the present invention is shown. In this embodiment, the same parts will be designated with the same reference numeral as in the prior embodiment, but with the addition of a prime after the numeral. Accordingly, not all parts will be described again for this embodiment. The collar **20'** now includes an opening **132** that is large enough to receive the knob **26'** into the interior of the collar so that the knob is generally flush with a top surface of the collar. A collar **20'** now includes a cup **134** that has a bottom wall (not shown) with an opening for receiving the actuator shaft **66'** through the cup. The bottom wall provides a reaction surface for the spring (not shown, but like spring **120** that may be seen in FIG. **9**A). When the actuator shaft **66'** is released by the retaining member **82'**, the knob **26'** pops up through the opening **132** under the influence of the spring, where the knob can be easily grasped for changing the weight selection. It will be understood that the opposite collar (not shown) may have the same construction including a recessed knob.

Weight indicia **110** can be provided on each knob **26**. The indicia **110** may comprise notches spaced around a top surface of the knob **26**. An indicator mark **112** on the collar **18**, **20** can indicate that a weight plate **24**, **32** is engaged when a notch on the knob **26** is aligned with the indicator mark. The notches may be spaced approximately 36 degrees from each other to define about 10 different weight increments of the apparatus **10**. Thus, each notch may correspond to a plate **24**, **32** so that a single rotation of the knob **26** will retain every plate of the apparatus **10**. As will be explained in greater detail below, the gear assembly **52** allows for this feature of the apparatus **10**. The recesses **86** on each selector shaft **50** are preferably positioned so that each recess corresponds to a plate **24**, **32** of the apparatus **10**. Thus, rotation of the knob **26** to a selected weight plate **24**, **32** may align the actuator shaft **66** with a corresponding recess **86**.

It may be seen that all or at least all major components of the apparatus **10** can be made of steel. However, use of other materials does not depart from the scope of the present invention.

During use, a user may place the apparatus **10** in the unlocked configuration from a locked configuration by pressing the tab portion **90** of the retaining member **82** causing the retaining member to slide further into the collar **18**, **20**. The sliding movement of the retaining member **82** disengages the free end **100** of the locking member from between the shoulder **102** of the conical member **84** and the bottom surface of the first spur gear **56** allowing the knob **26** to be lifted into the raised position. It will be understood, that the knob **26** can be biased, such as by a spring **120** mounted on the collar **18**, **20**, to the raised position so that the knob automatically lifts to the raised position when the tab portion

90 of the retaining member **82** is pressed. In the raised position, the user may select the desired amount of weight by rotating the knob **26** either clockwise or counterclockwise. In the illustrated embodiment, the spring **120** is mounted on top of the collar **18**, **20**. However, the spring **120** could be mounted in an interior of the collar so as not to be visible to the user.

In the illustrated embodiment, rotation of the right knob, as viewed in FIGS. **2** and **6**, in a clockwise direction and rotation of the left knob in a counterclockwise direction causes the teeth of the third spur gear **62** to ride along the teeth **64** of the selector shaft **50** moving the selector shafts outward away from a center of the handle **14**. As the selector shafts **50** are moved outward they will extend further into the weight sets **16** through the selector shaft holes **42** in the weight plates **24**, engaging more weight plates. Therefore, if the user lifts the handle **14** upward the locking mechanisms **30** will cause more weight plates **24** to be retained on the handle assembly **12**. The apparatus **10**, and particularly the gear assembly **52**, is configured such that one complete rotation of each knob **26** will retain every plate **24**, **32** on the handle assembly **12**. *A single weight plate indicia corresponds to a weight plate such that one full rotation of the selector element retains every weight plate in said at least one of the first and second weight sets.* The transfer of rotational movement by the gears **56**, **58**, **62** of gear assembly **52** to translational movement of the selector shaft **50** is such that rotation of the knob **26** and thus the first spur gear **56** an incremental degree (e.g., 36 degrees) causes translational movement of a distance sufficient to advance the selector shaft a single weight plate.

Conversely, if the right knob **26** is rotated in the counterclockwise direction and the left knob is rotated in the clockwise direction, the teeth of the third spur gear **62** will ride along the teeth **64** of the selector shaft **50** moving the selector shafts inward toward the center of the handle **14**. This will reduce the number of weight plates **24** engaged by the selector shafts **50**, resulting in an apparatus of lesser weight. The apparatus **10** is configured such that the selector shafts **50** will not extend past the outermost plate when at least one weight plate **24** or collar plate **32** on each side of the handle **14** is retained by the handle assembly **12**.

To lock the weight plates **24**, **32** in position, the user may depress the knob **26** causing the actuator shaft **66** to move downward and the outer surface of the conical member **84** to engage a rim **122** of the actuator opening **94**. The rim **122** of the actuator opening **94** will ride along the outer surface of the conical member **84** until the rim clears the shoulder **102** causing the free end **100** of the retaining member **82** to again be disposed between the shoulder **102** and the bottom surface of the first spur gear **56**. In this position, the selector shaft **50** will again be locked in place. It will be understood that the retaining member **82** may be biased outward, such as by a spring (**130**) in the collar **18**, **22**, so that the locking member automatically moves into the locked configuration when the knob **26** is fully depressed (FIGS. **9** and **9**A). It is also understood that the retaining member **82** itself may be a flex spring that biases the retaining member outward. In the event that the apparatus **10** is dropped during use, the locking mechanism **30** and the locking assembly **54** secure the plates **24**, **32** together keeping the plates in place on the apparatus.

Having described the invention in detail, it will be apparent that modifications and variations are possible without departing from the scope of the invention defined in the appended claims.

When introducing elements of the present invention or the preferred embodiment(s) thereof, the articles "a", "an", "the", and "said" are intended to mean that there are one or more of the elements. The terms "comprising", "including", and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

As various changes could be made in the above constructions, products, and methods without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A selectable weight set apparatus comprising:

a handle assembly comprising a handle having a first end portion and a second end portion opposite the first end portion;

a first weight set adapted to be supported on the first end portion of the handle and a second weight set adapted to be supported on the second end portion of the handle, each of the first and second weight sets comprising a plurality of weight plates;

an adjustment assembly for selecting a number of weight plates to be retained to the handle assembly, the adjustment assembly comprising at least one selector for movement relative to at least one of the first and second weight sets to engage and select the weight plates in said at least one of the first and second weight sets; and

a locking assembly for fixing the at least one selector relative to said at least one of the first and second weight sets, the locking assembly comprising a first locking element and a plurality of second locking elements, the first locking element being configured for releasable engagement with the at least one selector and one of the plurality of second locking elements on the at least one selector after the at least one selector is moved to engage and select the weight plates in said at least one of the first and second weight sets;

wherein the adjustment assembly further comprises a selector element fixed to the first locking element and operatively connected to the at least one selector for moving the at least one selector to retain a selected number of weight plates, movement of the selector element to advance the at least one selector to a selected weight plate aligning the first locking element with a second locking element associated with the selected weight plate; and

wherein the adjustment assembly further comprises at least one gear assembly for moving the at least one selector to engage and select the weight plates in said at least one of the first and second weight sets, the gear assembly engaging the at least one selector at a first location and the first locking element engaging the at least one selector at a second location different from the first location.

2. The selectable weight set apparatus as set forth in claim **1** wherein the first and second locations are on opposite lateral sides of the at least one selector to restrict transverse movement of the at least one selector.

3. The selectable weight set apparatus as set forth in claim **2** wherein the first locking element comprises a rod member and the second locking element comprising a plurality of recesses formed in the at least one selector, a longitudinal engagement surface of the rod member being receivable in one of the recesses to restrict longitudinal movement of the at least one selector.

4. The selectable weight set apparatus as set forth in claim 3 wherein the recesses are spaced longitudinally along a length of the at least one selector.

5. The selectable weight set apparatus as set forth in claim 4 wherein the at least one selector is a selector shaft moveable through selector holes in the weight plates.

6. The adjustable weight set apparatus as set forth in claim 1 wherein substantially vertical movement of the first locking element engages and disengages the first locking element with second locking elements on the at least one selector.

7. The selectable weight set apparatus as set forth in claim 1 wherein the locking assembly further comprises a retaining member slidably mounted on the handle assembly for selectively placing the locking assembly in locked and unlocked configurations.

8. The selectable weight set apparatus as set forth in claim 7 wherein the first locking element includes a shoulder and the retaining member is adapted to engage the shoulder of the first locking element to retain the locking assembly in the locked configuration.

9. The selectable weight set apparatus as set forth in claim 8 wherein the first locking element comprises a tubular portion and a conical portion around the tubular portion, the conical portion defining the shoulder of the first locking element.

10. The selectable weight set apparatus as set forth in claim 9 wherein the retaining member comprises a locking portion having an opening receiving the first locking element therethrough, the shoulder of the first locking element opposing a bottom surface of the locking portion when the locking assembly is in the locked configuration.

11. The selectable weight set apparatus as set forth in claim 8 wherein the retaining member is slidable to disengage the retaining member from the shoulder of the first locking element for placing the locking assembly in the unlocked configuration.

12. The selectable weight set apparatus as set forth in claim 8 wherein the first locking element is biased toward a position corresponding to the unlocked configuration of the locking assembly.

13. The selectable weight set apparatus as set forth in claim 12 wherein the retaining member is biased toward a position corresponding to the locked configuration of the locking assembly.

14. The selectable weight set apparatus as set forth in claim 1 further comprising a rotatable selector element including weight plate indicia, wherein selector element is operatively connected to the at least one selector by the at least one gear assembly for moving the at least one selector to engage and select the weight plates in said at least one of the first and second weight sets, a single weight plate indicia corresponds to a weight plate such that one full rotation of the selector element retains every weight plate in said at least one of the first and second weight sets.

15. A handle assembly for a selectable weight set apparatus comprising:

a handle for supporting a plurality of weight plates;

an adjustment assembly associated with the handle for selecting a number of weight plates to be retained to the handle, the adjustment assembly comprising at least one selector for movement relative to the handle to engage and select the weight plates to be retained to the handle, the selector having a length; and

a locking assembly for fixing the at least one selector relative to the handle, the locking assembly comprising a first locking element and a plurality of recesses on the at least one selector, the first locking element being configured for releasable engagement with the at least one selector and one of the plurality of recesses on the at least one selector to place the locking assembly in locked and unlocked configurations, each recess of the plurality of recesses defining a longitudinal axis extending transverse to the length of the selector, the first locking element being movable along the longitudinal axes of the plurality of recesses to place the locking assembly in the locked and unlocked configurations;

wherein the adjustment assembly further comprises a selector element fixed to the first locking element and operatively connected to the at least one selector for moving the at least one selector to retain a selected number of weight plates.

16. A handle assembly for a selectable weight set apparatus comprising:

a handle for supporting a plurality of weight plates;

an adjustment assembly associated with the handle for selecting a number of weight plates to be retained to the handle, the adjustment assembly comprising at least one selector shaft for movement lengthwise of the at least one selector shaft relative to the handle to engage and select the weight plates to be retained to the handle; and

a locking assembly for fixing the at least one selector shaft relative to the handle, the locking assembly comprising an actuator shaft and a plurality of locking structures on the at least one selector shaft, the actuator shaft being linearly movable relative to the at least one selector shaft to engage and disengage the locking structures on the at least one selector shaft to place the locking assembly in locked and unlocked configurations;

wherein the actuator shaft is operatively connected to the at least one selector shaft to drive movement of the at least one selector shaft to retain a selected number of weight plates.

17. A selectable weight set apparatus comprising:

a handle assembly comprising a handle having a first end portion and a second end portion opposite the first end portion;

a first weight set adapted to be supported on the first end portion of the handle and a second weight set adapted to be supported on the second end portion of the handle, each of the first and second weight sets comprising a plurality of weight plates;

an adjustment assembly for selecting a number of weight plates to be retained to the handle assembly, the adjustment assembly comprising at least one selector for movement relative to at least one of the first and second weight sets to engage and select the weight plates in said at least one of the first and second weight sets;

a locking assembly for fixing the at least one selector relative to said at least one of the first and second weight sets, the locking assembly comprising a first locking element and a plurality of second locking elements, the first locking element being configured for releasable engagement with the at least one selector and one of the plurality of second locking elements on the at least one selector after the at least one selector is moved to engage and select the weight plates in said at least one of the first and second weight sets;

wherein the adjustment assembly further comprises a selector element operatively connected to the at least one selector for moving the at least one selector to retain a selected number of weight plates, wherein

movement of the selector element from a first selector element position to a second selector element position causes movement of the selector from a first selector position to a second selector position, wherein movement of the selector element to advance the at least one selector to a selected weight plate aligns the first locking element with a second locking element associated with the selected weight plate, wherein the adjustment assembly and the locking assembly are adapted and configured to prevent, when the first locking element is engaged with any of the plurality of second locking elements, movement of the selector element from the first selector element position to the second selector element position and movement of the selector from the first selector position to the second selector position, wherein the adjustment assembly and the locking assembly are adapted and configured to allow, when the first locking element is disengaged with the plurality of second locking elements, movement of the selector element from the first selector element position to the second selector element position and movement of the selector from the first selector position to the second selector position; and

wherein the adjustment assembly further comprises at least one gear assembly for moving the at least one selector to engage and select the weight plates in said at least one of the first and second weight sets, the gear assembly engaging the at least one selector at a first location and the first locking element engaging the at least one selector at a second location different from the first location.

18. The selectable weight set apparatus as set forth in claim 17 wherein the first and second locations are on opposite lateral sides of the at least one selector to restrict transverse movement of the at least one selector.

19. The selectable weight set apparatus as set forth in claim 17 wherein the first locking element comprises a rod member and the second locking element comprising a plurality of recesses formed in the at least one selector, a longitudinal engagement surface of the rod member being receivable in one of the recesses to restrict longitudinal movement of the at least one selector.

20. The selectable weight set apparatus as set forth in claim 19 wherein the recesses are spaced longitudinally along a length of the at least one selector.

21. The selectable weight set apparatus as set forth in claim 20 wherein the at least one selector is a selector shaft moveable through selector holes in the weight plates.

22. The selectable weight set apparatus as set forth in claim 21 wherein the selector element is operatively connected to the at least one gear assembly in a manner such that movement of the selector element from the first selector element position to the second selector element position causes turning of the gear assembly and movement of the selector shaft from the first selector position to the second selector position, and such that turning of the selector element from the second element position to the first selector element position causes turning of the gear assembly and movement of the selector shaft from the second selector position to the first selector position.

23. The selectable weight set apparatus as set forth in claim 21 wherein the selector shaft includes a plurality of gear teeth at the first location, and wherein the at least one gear assembly comprises a selector element gear and a gear train, the selector element gear being operatively connected to the selector element in a manner such that the selector element gear moves with the selector element, the gear train comprising a plurality of gears, a first one of the plurality of gears having gear teeth meshing with the gear teeth of the selector element gear and a second one of the plurality of gears having gear teeth meshing with the gear teeth of the selector shaft, the gear train being adapted and configured such that movement of the selector element from the first selector element position to the second selector element position moves the selector shaft from the first selector position to the second selector position.

24. The selectable weight set apparatus as set forth in claim 17 wherein substantially vertical movement of the first locking element engages and disengages the first locking element with second locking elements on the at least one selector.

25. The selectable weight set apparatus as set forth in claim 17 wherein the locking assembly further comprises a retaining member slidably mounted on the handle assembly for selectively placing the locking assembly in locked and unlocked configurations.

26. The selectable weight set apparatus as set forth in claim 25 wherein the first locking element includes a shoulder and the retaining member is adapted to engage the shoulder of the first locking element to retain the locking assembly in the locked configuration.

27. The selectable weight set apparatus as set forth in claim 26 wherein the first locking element comprises a tubular portion and a conical portion around the tubular portion, the conical portion defining the shoulder of the first locking element.

28. The selectable weight set apparatus as set forth in claim 27 wherein the retaining member comprises a locking portion having an opening receiving the first locking element therethrough, the shoulder of the first locking element opposing a bottom surface of the locking portion when the locking assembly is in the locked configuration.

29. The selectable weight set apparatus as set forth in claim 26 wherein the retaining member is slidable to disengage the retaining member from the shoulder of the first locking element for placing the locking assembly in the unlocked configuration.

30. The selectable weight set apparatus as set forth in claim 17 further comprising a rotatable selector element including weight plate indicia, wherein selector element is operatively connected to the at least one selector by the at least one gear assembly for moving the at least one selector to engage and select the weight plates in said at least one of the first and second weight sets, a single weight plate indicia corresponds to a weight plate such that one full rotation of the selector element retains every weight plate in said at least one of the first and second weight sets.

31. A handle assembly for a selectable weight set apparatus comprising:

a handle for supporting a plurality of weight plates;

an adjustment assembly associated with the handle for selecting a number of weight plates to be retained to the handle, the adjustment assembly comprising at least one selector for movement relative to the handle to engage and select the weight plates to be retained to the handle, the selector having a length;

and a locking assembly for fixing the at least one selector relative to the handle, the locking assembly comprising a first locking element and a plurality of recesses on the at least one selector, the first locking element being configured for releasable engagement with the at least one selector and one of the plurality of recesses on the at least one selector to place the locking assembly in locked and unlocked configurations, each recess of the

plurality of recesses defining a longitudinal axis extending transverse to the length of the selector, the first locking element being movable along the longitudinal axes of the plurality of recesses to place the locking assembly in the locked and unlocked configurations;

wherein the adjustment assembly further comprises a selector element operatively connected to the at least one selector for moving the at least one selector to retain a selected number of weight plates, wherein movement of the selector element from a first selector element position to a second selector element position causes movement of the selector from a first selector position to a second selector position, wherein movement of the selector element to advance the at least one selector to a selected weight plate aligns the first locking element with one of the plurality of recesses associated with the selected weight plate, wherein the adjustment assembly and the locking assembly are adapted and configured to prevent, when the first locking element is engaged with any of the plurality of recesses, movement of the selector element from the first selector element position to the second selector element position and movement of the selector from the first selector position to the second selector position, wherein the adjustment assembly and the locking assembly are adapted and configured to allow, when the first locking element is disengaged with the plurality of recesses, movement of the selector element from the first selector element position to the second selector element position and movement of the selector from the first selector position to the second selector position.

32. A handle assembly for a selectable weight set apparatus comprising:

a handle for supporting a plurality of weight plates;

an adjustment assembly associated with the handle for selecting a number of weight plates to be retained to the handle, the adjustment assembly comprising at least one selector shaft for movement lengthwise of the at least one selector shaft relative to the handle to engage and select the weight plates to be retained to the handle; and

a locking assembly for fixing the at least one selector shaft relative to the handle, the locking assembly comprising an actuator shaft and a plurality of locking structures on the at least one selector shaft, the actuator shaft being linearly movable relative to the at least one selector shaft to engage and disengage the locking structures on the at least one selector shaft to place the locking assembly in locked and unlocked configurations;

wherein the actuator shaft is operatively cooperative with the at least one selector shaft to retain a selected number of weight plates, wherein the adjustment assembly and the locking assembly are adapted and configured to prevent, when the actuator shaft is engaged with any of the plurality of locking structures, movement of the selector shaft from a first selector shaft position to a second selector shaft position, and wherein the adjustment assembly and the locking assembly are adapted and configured to allow, when the actuator shaft is disengaged with the plurality of locking structures, movement of the selector shaft from the first selector shaft position to the second selector shaft position.

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