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(54) **TILLERS FOR MARINE DRIVES HAVING YAW ADJUSTMENT DEVICE**

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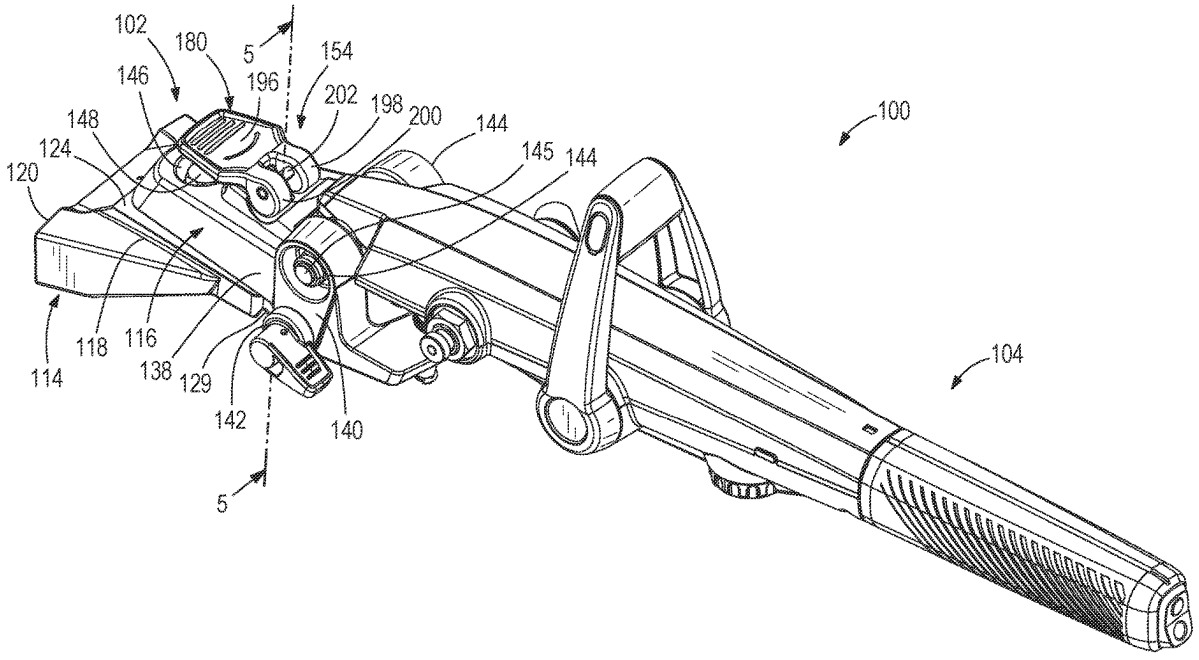
(57) **ABSTRACT**

A tiller is for steering a marine vessel. The tiller has a yaw bracket configured for attachment to a marine drive, a tiller arm which is pivotable about a yaw axis relative to the yaw bracket, and a yaw lock configured to lock the tiller arm in a plurality of yaw positions relative to the yaw bracket. Unlocking the yaw lock facilitates movement of the tiller arm into a new yaw position in the plurality of yaw positions.



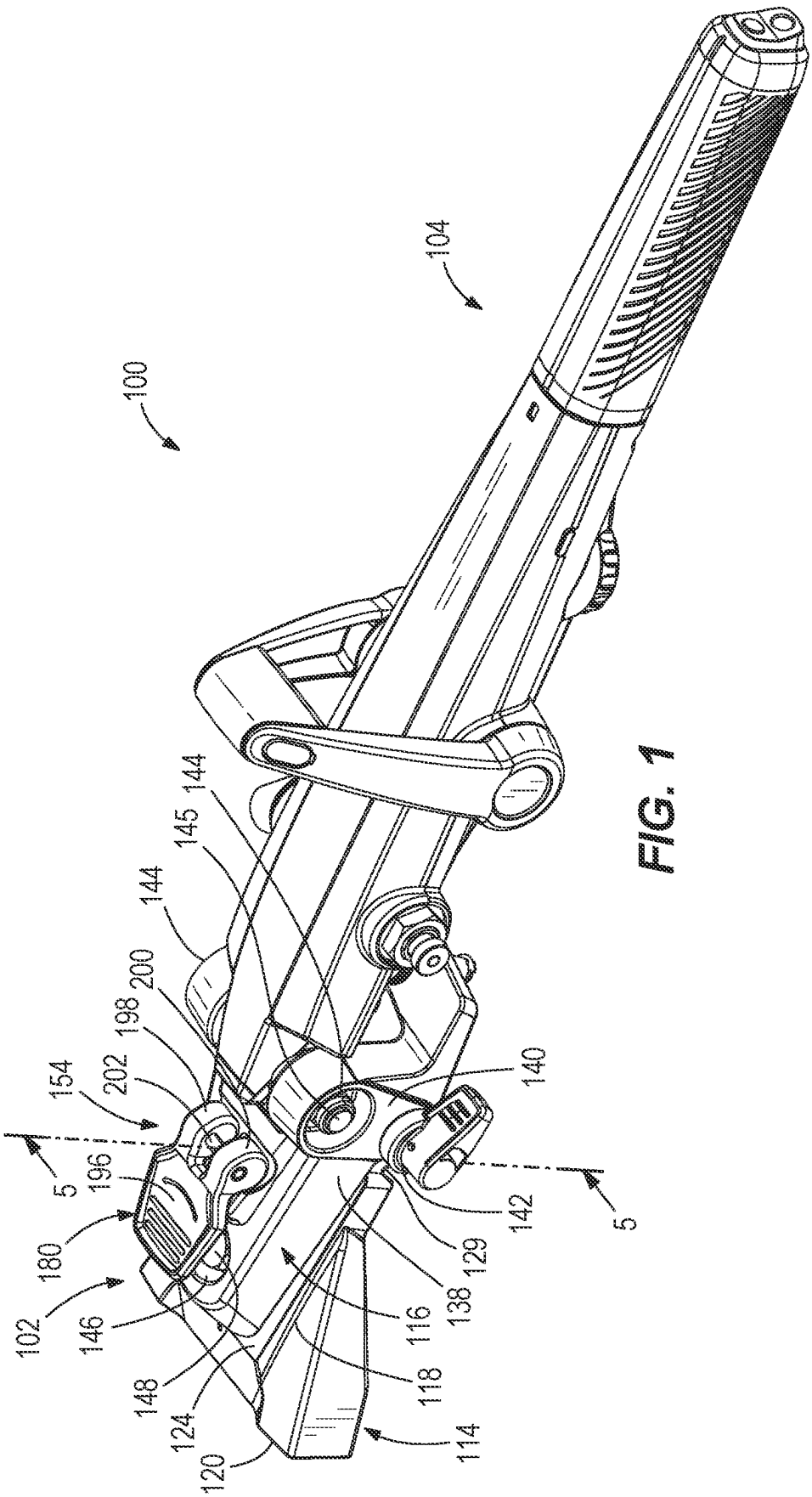

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FIG. 1

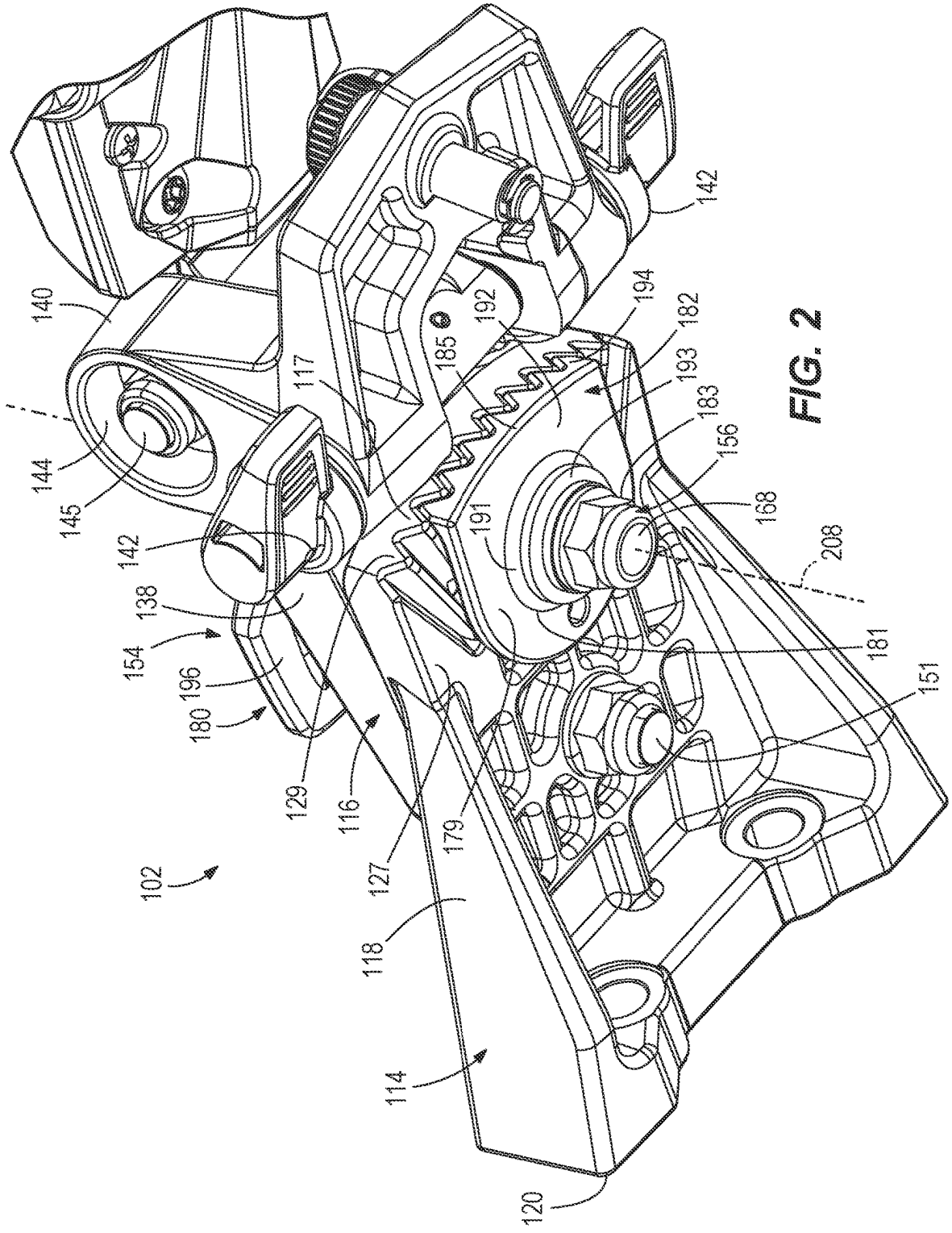
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FIG. 2

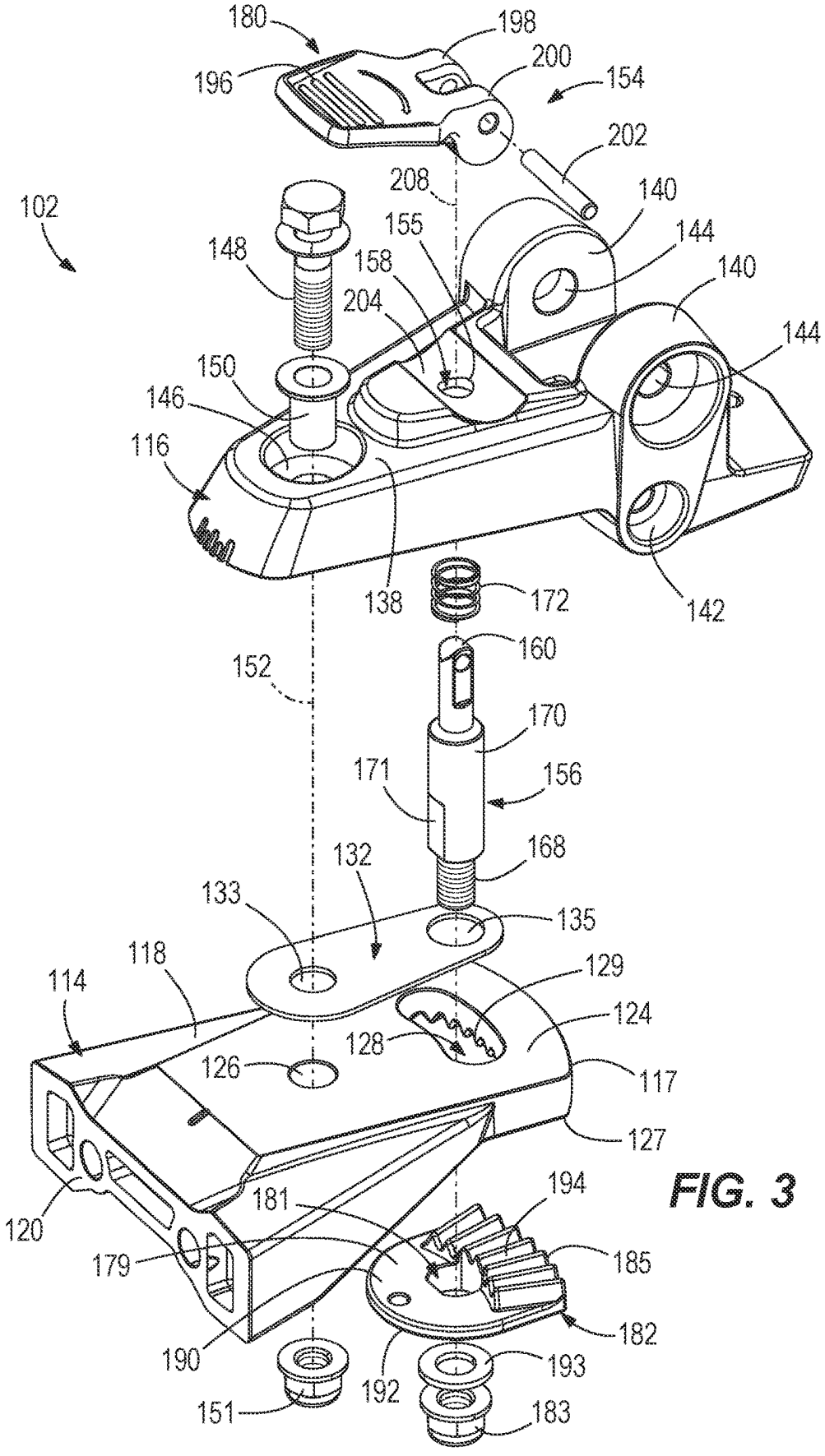
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FIG. 3

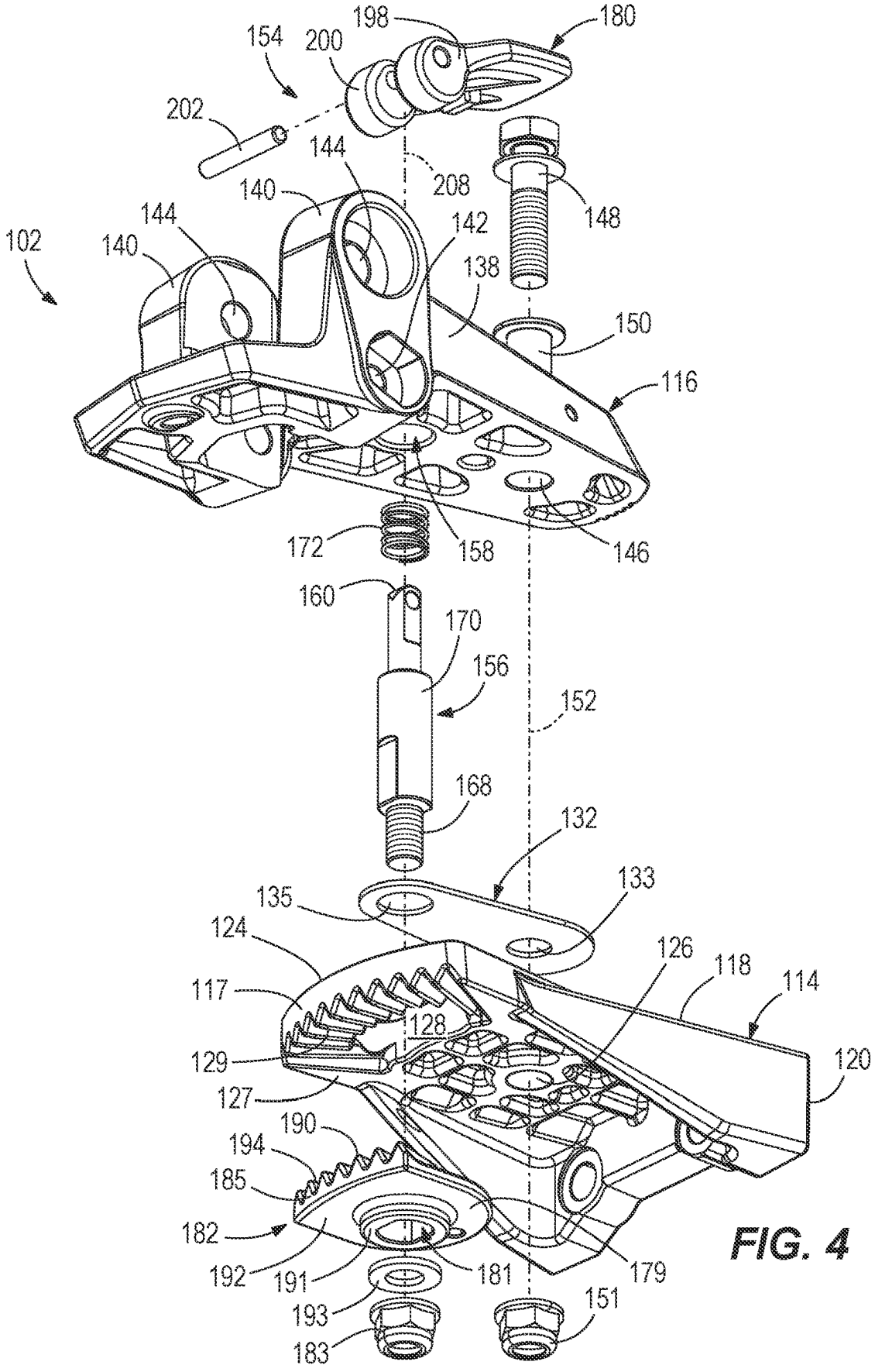
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FIG. 4

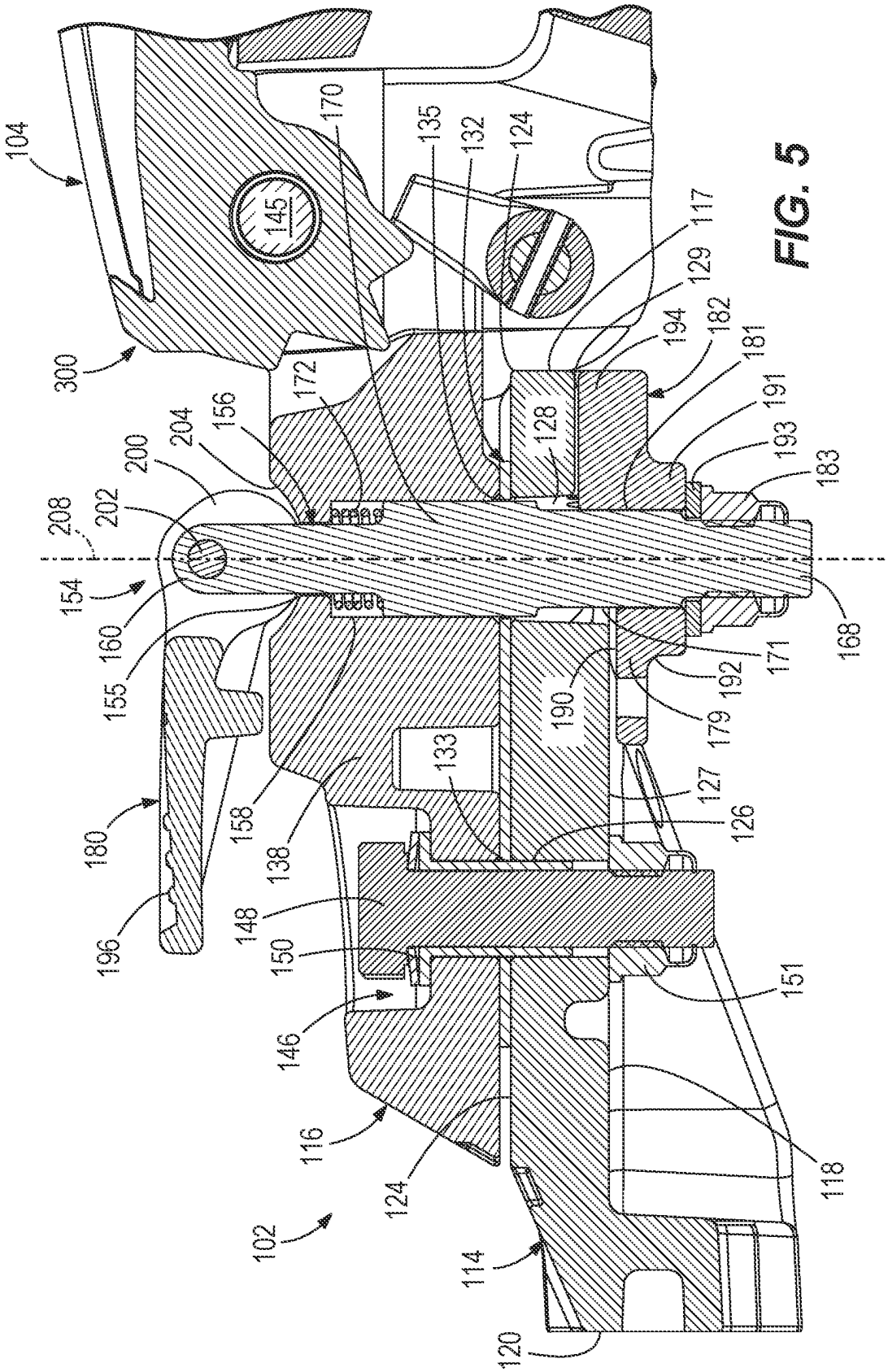
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FIG. 5

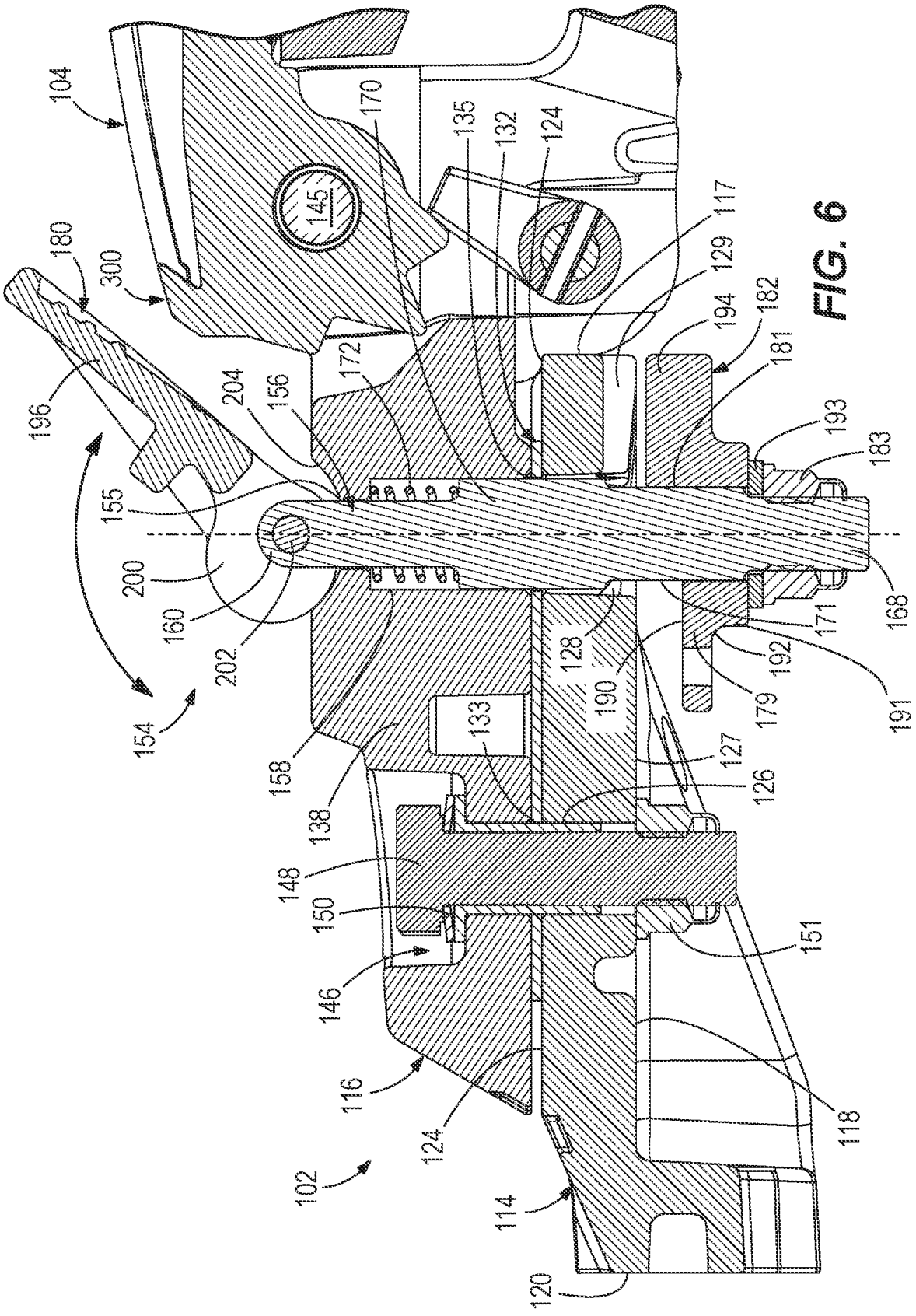
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FIG. 6

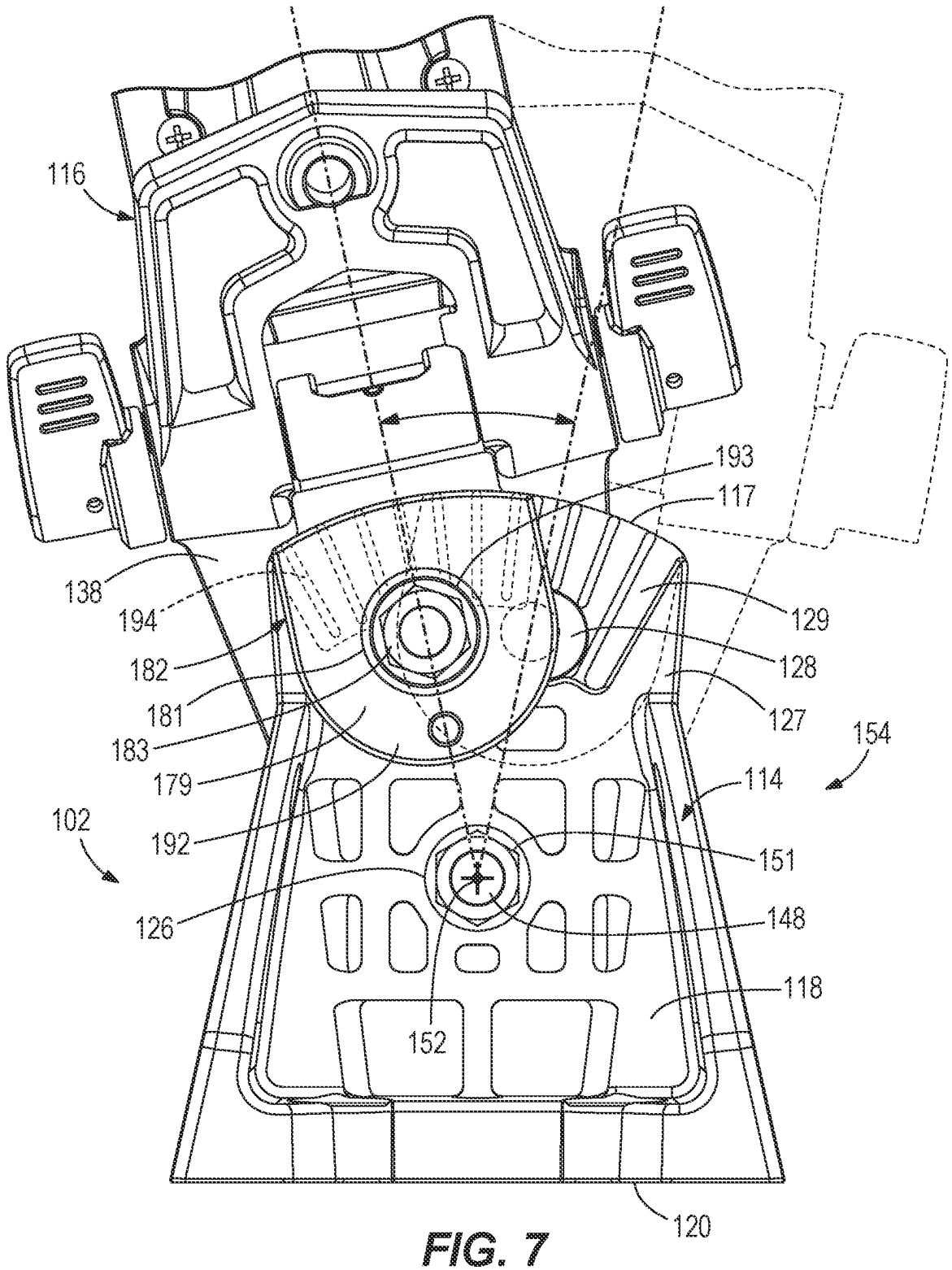
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FIG. 7

TILLERS FOR MARINE DRIVES HAVING YAW ADJUSTMENT DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority to Chinese Application No. 2024202919109, filed Feb. 8, 2024, the content of which is incorporated herein by reference.

FIELD

[0002] The present disclosure relates to tillers for steering marine drives.

BACKGROUND

[0003] The following U.S. Patent is incorporated herein by reference in entirety.

[0004] U.S. Pat. Pub. No. 2023/0257092 is incorporated herein by reference and discloses a tiller for controlling a marine drive. The tiller has a base bracket assembly and a tiller arm which extends outwardly from the base bracket assembly. The base bracket assembly is configured to facilitate yaw adjustment of the tiller arm, in particular into and between a variety of yaw positions relative to the base bracket assembly. The tiller arm has a grip restraining device which is located on the bottom of the middle portion of the tiller arm and is manually accessible from both sides of the tiller arm. The grip restraining device is specially configured to selectively restrain rotation of a hand grip on the outer end of the tiller arm. The tiller arm also has a tilt mechanism which facilitates tilting of the tiller arm relative to the base bracket assembly into and between a variety of tilt positions, including a straight upward tilt position and a straight downward tilt position.

SUMMARY

[0005] This Summary is provided to introduce a selection of concepts which are further described herein below in the Detailed Description. This Summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used as an aid in limiting scope of the claimed subject matter.

[0006] In independent examples disclosed herein, a tiller is for steering a marine drive relative to a marine vessel. The tiller includes a yaw bracket configured for attachment to the marine drive, a tiller arm which is pivotable about a yaw axis relative to the yaw bracket, and a yaw lock configured to lock the tiller arm in a plurality of yaw positions relative to the yaw bracket. Unlocking the yaw lock facilitates movement of the tiller arm into a new yaw position in the plurality of yaw positions.

[0007] In independent examples disclosed herein, the yaw lock is movable into a locked position in which the tiller arm is prevented from pivoting about the yaw axis relative to the yaw bracket. Further, the yaw lock is movable into an unlocked position in which the tiller arm is pivotable about the yaw axis relative to the yaw bracket.

[0008] In independent examples disclosed herein, in a locked position, the yaw lock clamps a first one of the yaw bracket and the tiller arm between a second one of the yaw bracket and the tiller arm, and in an unlocked position the yaw lock unclamps the first one of the yaw bracket and the tiller arm from between the second one of the yaw bracket and the tiller arm.

[0009] In independent examples disclosed herein, in a locked position the yaw lock is coupled to one of the yaw bracket and the tiller arm via a meshed engagement.

[0010] In independent examples disclosed herein, the yaw lock is movable back and forth along a lock axis into a locked position and an unlocked position, respectively.

[0011] In independent examples disclosed herein, the yaw lock is cammed into at least one of a locked position and an unlocked position.

[0012] In independent examples disclosed herein, the yaw lock is spring-biased into one of a locked position and an unlocked position.

[0013] In independent examples disclosed herein, the yaw lock includes a spring which biases the yaw lock towards an unlocked position and a cam which upon operation of the yaw lock cams the yaw lock into a locked position against the spring.

[0014] In independent examples disclosed herein, the yaw lock includes a jaw which is engaged with one of the yaw bracket and the tiller arm in a locked position and which is disengaged from the one of the yaw bracket and the tiller arm in an unlocked position

[0015] In independent examples disclosed herein, the jaw includes a first plurality of teeth and the one of the yaw bracket and the tiller arm includes a second plurality of teeth. The first plurality of teeth are meshed with the second plurality of teeth when the yaw lock is in the locked position, and the first plurality of teeth are not meshed with the second plurality of teeth when the yaw lock is in the unlocked position.

[0016] In independent examples disclosed herein, the yaw lock includes a plunger which is slidable back and forth to bring the first plurality of teeth into and out of engagement with the second plurality of teeth.

[0017] In independent examples disclosed herein, the yaw lock includes a handle for manually operating the plunger and the jaw.

[0018] In independent examples disclosed herein, operation of the handle cams the jaw into engagement with the one of the yaw bracket and the tiller arm.

[0019] In independent examples disclosed herein, the plunger is spring-biased towards the unlocked position.

[0020] In independent examples disclosed herein, the yaw lock extends through the yaw bracket and the tiller arm.

[0021] In independent examples disclosed herein, the yaw lock includes a jaw configured to engage with one of the yaw bracket and steering bracket to lock the tiller arm in each of the plurality of yaw positions.

[0022] In independent examples disclosed herein, the yaw lock includes a plunger disposed in a through-bore extending through the yaw bracket and the tiller arm. The plunger is slidable back and forth in the through-bore to move the jaw into and out of engagement with the one of the yaw bracket and the tiller arm.

[0023] In independent examples disclosed herein, the yaw lock includes a handle configured to move the plunger back and forth in the through-bore.

[0024] In independent examples disclosed herein, the handle is pivotable into a locked position and an unlocked position, such that pivoting the handle into the locked position cams the jaw into engagement with the one of the yaw bracket and the tiller arm.

[0025] In independent examples disclosed herein, the handle is spring-biased towards the unlocked position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] Embodiments are described with reference to the following drawing figures. The same numbers are used throughout to reference like features and components.

[0027] FIG. **1** is a perspective view looking down at a tiller according to the present disclosure.

[0028] FIG. **2** is a perspective view looking up at a base bracket assembly.

[0029] FIG. **3** is an exploded view of the base bracket assembly.

[0030] FIG. **4** is an exploded view looking up at the base bracket assembly.

[0031] FIG. **5** is a section view of the base bracket assembly illustrating a yaw lock in a locked position.

[0032] FIG. **6** is a section view of the base bracket assembly illustrating the yaw lock in an unlocked position.

[0033] FIG. **7** is a perspective view looking up at the base bracket assembly, showing movements of the tiller partially in phantom.

DETAILED DESCRIPTION

[0034] FIG. **1** illustrates a tiller **100** for controlling a not-shown marine drive, such as an outboard motor. In general, the tiller **100** has a base bracket assembly **102** and a tiller arm **104** which is coupled to and extends outwardly from the base bracket assembly **102**. The tiller **100** has several novel attributes which will be further explained herein below. Briefly, the base bracket assembly **102** is specially configured to facilitate yaw adjustment of the tiller arm **104**, in particular into and between a variety of yaw positions relative to the marine drive. Further, the base bracket assembly **102** includes a novel yaw lock **154** configured to lock the tiller arm **104** in a plurality of yaw positions relative to the base bracket assembly **102** such that unlocking the yaw lock **154** facilitates movement of the tiller arm **104** into a new yaw position in the plurality of yaw positions. Shown in FIGS. **5-6**, optionally the tiller **100** also may have a tilt mechanism **300**, which advantageously facilitates selective retainment of the tiller arm **104** in any one of a range of user-selectable tilt positions relative to the tilt axis on the base bracket assembly **102**.

[0035] Referring to FIGS. **2-4**, the base bracket assembly **102** includes a yaw bracket **114** which is pivotably coupled to a steering bracket **116** of the tiller arm **104**. The yaw bracket **114** is a rigid member having a body **118** and a base **120** which extends from the body **118** and is configured for fixed mounting to a not-shown steering arm of the marine drive. The body **118** of the yaw bracket **114** provides a pedestal **124** on an upper face of the body **118** upon which the steering bracket **116** is mounted. A through-bore **126** (FIG. **3**) extends through the center portion of the pedestal **124**, defining a yaw axis **152** about which the tiller arm **104** is pivotable relative to the yaw bracket **114**. A pivot slot **128** is spaced apart from the through-bore **126** and extends through the pedestal **124**. The pivot slot **128** is arc-shaped and spans fifteen degrees relative to the through-bore **126** in either direction. The pivot slot **128** defines a passage through the body **118** having a top opening on the pedestal **124** and a bottom opening on an underside **127** of the body **118**. Engagement teeth **129** (FIG. **4**) are arranged in an arc that extends outwardly from the underside **127** from the bottom opening toward a forward end **117** of the yaw bracket **114**. Corresponding to the span of the pivot slot **128**, the engagement teeth **129** span fifteen degrees relative to the through-bore **126** in either direction. A dual washer **132** is positioned on the pedestal **124**. A first hole **133** of the dual washer **132** is aligned with the through-bore **126** and a second hole **135** is aligned with the pivot slot **128**.

[0036] The steering bracket **116** is a rigid member having a body **138** and a pair of upwardly angled arms **140** having opposed lower through-bores **142** through the lower ends of the arms **140** and opposed through-bores **144** through the upper ends of the arms **140**. A fastener **145** extends through the opposed through-bores **144** and through a corresponding through-bore **147** (not shown) in the tiller arm **104** so as to couple the tiller arm **104** to the steering bracket **116** in a way that the tiller arm **104** is tiltable up and down relative to the steering bracket **116**. The fastener **145** defines a tilt axis about which the tiller arm **104** is pivotable relative to the base bracket assembly **102**. Further description of the tilt mechanism shown in the drawings is presented in U.S. Patent Application No. 2023/0257092, which is incorporated by reference herein.

[0037] A through-bore **146** (FIG. **4**) extends through the body **138**. A fastener **148** extends along the yaw axis **152** through the through-bore **146**, through the first hole **133** of the dual washer **132**, through the through-bore **126** in the body **118** and into threaded engagement with a threaded bolt cap **151**. The fastener **148** extends through a bearing **150** with a smooth outer surface, which is disposed in the through-bore **146**, the washer **132** and the through-bore **126** when the fastener **148** is in its position of use. As such, the steering bracket **116** is rotatable in either direction relative to the yaw bracket **114** about the yaw axis **152**. As explained above, the yaw bracket **114** is fixed to the steering arm of the marine drive and the steering bracket **116** is attached to the tiller arm **104**. Thus, the tiller arm **104** and steering bracket **116** are pivotable together about the yaw axis **152** (FIG. **3**) defined by the fastener **148** into and between a variety of yaw positions relative to the yaw bracket **114** and marine drive, as will be further described herein below.

[0038] Referring to FIGS. **3-4**, a yaw lock **154** is specially configured to lock the tiller arm **104** and steering bracket **116** in a variety of yaw positions relative to the yaw bracket **114** and marine drive, as shown by arrows and phantom lines in FIG. **7**. The yaw lock **154** is movable into a locked position (FIG. **5**) in which the tiller arm **104** is prevented from pivoting about the yaw axis **152** relative to the yaw bracket **114**, and further into an unlocked position (FIG. **6**) in which the tiller arm **104** is pivotable about the yaw axis **152** relative to the yaw bracket **114**.

[0039] The yaw lock **154** includes a plunger **156** which frictionally engages with a jaw **182**. The plunger **156** resides in a through-bore **158** in the steering bracket **116** which defines an inner cavity, a bottom opening, and a top opening **155** which is smaller than the bottom opening. The plunger **156** extends along a lock axis **208** through the through-bore **158**, through the second hole **135** in the washer **132**, through the pivot slot **128**, through a bore **181** in the jaw **182** and into threaded engagement with a threaded bolt cap **183**.

[0040] The plunger **156** is an elongated member with a top end **160** which normally protrudes out of the top opening **155**, a relatively enlarged annular body **170**, and a threaded bottom end **168** which engages with the threaded bolt cap **183**. The annular body **170** has a smooth outer surface with diametrically opposed flats **171** for frictionally engaging with corresponding flats of the bore **181** of the jaw **182**. A

coiled spring **172** is disposed between the top of the annular body **170** and the inside of the cavity adjacent to the top and normally biases the bottom end **168** of the plunger **156** outwardly relative to the bottom opening and into the position shown in FIG. **6**.

[0041] The jaw **182** is disk-like with a body **179** having the bore **181** extending through a center thereof. A top face **190** engages with the underside of the yaw bracket **114** and a bottom face **192** includes a raised rim **191** extending annularly about the bore **181**. A washer **193** is positioned between the jaw **182** and the threaded bolt cap **183**. In a preferred embodiment, the washer **193** is a Belleville washer to provide a secure fitting, although this configuration is not limiting. The top face **190** includes radial teeth **194** for engagement with the yaw bracket **114** which splay outwardly from the bore **181** toward a front end **185** of the jaw **182**.

[0042] The yaw lock **154** also includes a release lever **180** on top of the steering bracket **116** such that it is easily manually accessible from above and from the sides of the tiller **100**. The release lever **180** has a handle **196** and first and second over-center cams **198**, **200** which rotate together about a pin **202** extending therebetween. The cams **198**, **200** are configured to retain their positioning in the locked position and the unlocked position. The handle **196** can be manually lifted by the operator's finger(s) to pivot the release lever **180** upwardly about the pivot axis defined by the pin **202** which cams the plunger **156** along the lock axis **208**. The first and second cams **198**, **200** are seated within an elongated recess **204** at the top opening **155** on the steering bracket **116**. The top end **160** of the plunger **156** protrudes out of the top opening **155** and is pivotally coupled to the release lever **180** between the first and second cams **198**, **200** via the pin **202**. As described further herein, rotation of the release lever **180** about the pin **202** in a first direction shuttles the plunger **156** downward along the lock axis **208** and rotation of the release lever **180** about the pin **202** in a second direction opposite the first direction shuttles the plunger **156** upward along the lock axis **208**.

[0043] The yaw lock **154** is movable via the first and second cams **198**, **200** back and forth along the lock axis **208** into and between the locked position (FIG. **5**) and the unlocked position (FIG. **6**). FIG. **5** shows the yaw lock **154** in the locked position wherein the yaw bracket **114** is clamped between the jaw **182** and the steering bracket **116** of the tiller arm **104**. In this position, the radial teeth **194** of the jaw **182** are meshed with the engagement teeth **129** of the yaw bracket **114** to prevent rotation of the tiller arm **104** relative to the yaw bracket **114**. The coil spring **172** biases the bottom end **168** of the plunger **156** toward the unlocked position and provides tension between the release lever **180** and the plunger **156**.

[0044] As shown by arrows in FIG. **6**, to change the yaw position of the tiller **100** relative to the marine drive, the user moves the yaw lock **154** into the unlocked position. In the unlocked position, the yaw lock **154** unclamps the yaw bracket **114** from the steering bracket **116** which frees the steering bracket **116** and tiller arm **104** for pivoting motion about the yaw axis **152** (FIG. **3**) relative to the yaw bracket **114** and marine drive. To move the yaw lock **154** into the unlocked position, the user manually pivots the first end of the release lever **180** upwardly relative to the pin **202**, which rotates the cams **198**, **200** and thus moves the plunger **156** downwardly. As this occurs, the jaw **182** disengages from the yaw bracket **114** and the user is free to pivot the steering bracket **116** into a new yaw position in the plurality of yaw positions. As discussed above, in the illustrated embodiment, the steering bracket **116** is pivotable through thirty degrees relative to the yaw axis **152**, as shown in FIG. **7**, and lockable into various yaw positions designated by the engagement teeth **129**.

[0045] To move the yaw lock **154** into the locked position, the user can rotate the release lever **180** downwardly, which rotates the cams **198**, **200** against the bias of the coil spring **172** and shuttles the plunger **156** upwardly. As this occurs, the radial teeth of the jaw **182** mesh with the engagement teeth **129** of the yaw bracket **114**. As such, it will be understood that unlocking the yaw lock **154** advantageously facilitates movement of the tiller arm **104** along the path shown in FIG. **7** and into a new yaw position relative to the marine drive. In the non-limiting illustrated embodiment, the tiller arm **104** and steering bracket **116** are pivotable through thirty degrees relative to the yaw bracket **114**.

[0046] In alternative examples, the base bracket assembly **102** may be configured such that the yaw lock **154** extends first through the yaw bracket **114** and second through the steering bracket **116** of the tiller arm **104** such that in a locked position the yaw lock **154** clamps the tiller arm **104** between the jaw **182** and the yaw bracket **114**. It is conceivable that the jaw **182** is positioned above or below the yaw bracket **114** or the steering bracket **116** such that the yaw lock **154** is movable along the lock axis **208** into and out of meshed engagement with one of the yaw bracket **114** and the steering bracket **116**.

[0047] In the present description, certain terms have been used for brevity, clarity, and understanding. No unnecessary limitations are to be implied therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes only and are intended to be broadly construed. The different apparatuses described herein may be used alone or in combination with other apparatuses. Various equivalents, alternatives and modifications are possible within the scope of the appended claims.

1. A tiller for steering a marine drive relative to a marine vessel, the tiller comprising:

a yaw bracket configured for attachment to the marine drive,

a tiller arm which is pivotable about a yaw axis relative to the yaw bracket, and

a yaw lock configured to lock the tiller arm in a plurality of yaw positions relative to the yaw bracket, wherein unlocking the yaw lock facilitates movement of the tiller arm into a new yaw position in the plurality of yaw positions.

2. The tiller according to claim **1**, wherein the yaw lock is movable into a locked position in which the tiller arm is prevented from pivoting about the yaw axis relative to the yaw bracket, and further wherein the yaw lock is movable into an unlocked position in which the tiller arm is pivotable about the yaw axis relative to the yaw bracket.

3. The tiller according to claim **1**, wherein in a locked position the yaw lock clamps a first one of the yaw bracket and the tiller arm between a second one of the yaw bracket and the tiller arm, and wherein in an unlocked position the yaw lock unclamps the first one of the yaw bracket and the tiller arm from between the second one of the yaw bracket and the tiller arm.

4. The tiller according to claim **1**, wherein in a locked position the yaw lock is coupled to one of the yaw bracket and the tiller arm via a meshed engagement.

5. The tiller according to claim **1**, wherein the yaw lock is movable back and forth along a lock axis into a locked position and an unlocked position, respectively.

6. The tiller according to claim **1**, wherein the yaw lock is cammed into at least one of a locked position and an unlocked position.

7. The tiller according to claim **1**, wherein the yaw lock is spring-biased into one of a locked position and an unlocked position.

8. The tiller according to claim **1**, wherein the yaw lock comprises a spring which biases the yaw lock towards an unlocked position and a cam which upon operation of the yaw lock cams the yaw lock into a locked position against the spring.

9. The tiller according to claim **1**, wherein the yaw lock comprises a jaw which is engaged with one of the yaw bracket and the tiller arm in a locked position and which is disengaged from the one of the yaw bracket and the tiller arm in an unlocked position.

10. The tiller according to claim **9**, wherein the jaw comprises a first plurality of teeth and wherein the one of the yaw bracket and the tiller arm comprises a second plurality of teeth; and further wherein the first plurality of teeth are meshed with the second plurality of teeth when the yaw lock is in the locked position, and the first plurality of teeth are not meshed with the second plurality of teeth when the yaw lock is in the unlocked position.

11. The tiller according to claim **10**, wherein the yaw lock further comprises a plunger which is slidable back and forth to bring the first plurality of teeth into and out of engagement with the second plurality of teeth.

12. The tiller according to claim **11**, wherein the yaw lock further comprises a handle for manually operating the plunger and the jaw.

13. The tiller according to claim **12**, wherein operation of the handle cams the jaw into engagement with the one of the yaw bracket and the tiller arm.

14. The tiller according to claim **12**, wherein the plunger is spring-biased towards the unlocked position.

15. The tiller according to claim **1**, wherein the yaw lock extends through the yaw bracket and the tiller arm.

16. The tiller according to claim **15**, wherein the yaw lock comprises a jaw configured to engage with one of the yaw bracket and steering bracket to lock the tiller arm in each of the plurality of yaw positions.

17. The tiller according to claim **16**, wherein the yaw lock further comprises a plunger disposed in a through-bore extending through the yaw bracket and the tiller arm, wherein the plunger is slidable back and forth in the through-bore to move the jaw into and out of engagement with the one of the yaw bracket and the tiller arm.

18. The tiller according to claim **17**, wherein the yaw lock comprises a handle configured to move the plunger back and forth in the through-bore.

19. The tiller according to claim **18**, wherein the handle is pivotable into a locked position and an unlocked position, and wherein pivoting the handle into the locked position cams the jaw into engagement with the one of the yaw bracket and the tiller arm.

20. The tiller according to claim **19**, wherein the handle is spring-biased towards the unlocked position.

* * * * *