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(54) **ATTACHMENT STRUCTURE FOR MARINE VESSEL**

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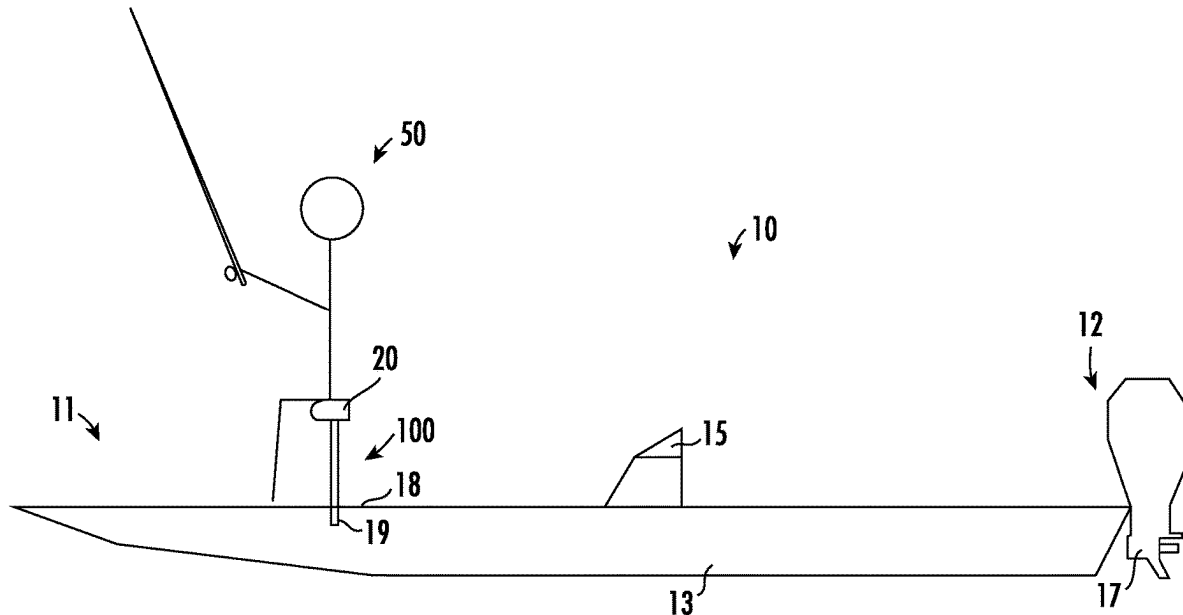
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(57) **ABSTRACT**

An attachment structure for an auxiliary component for a marine vessel includes a first structure configured to be attached to an attachment portion of the marine vessel, an elastic structure, and a second structure connected to the first structure via the elastic structure so as to allow axial movement of the first structure with respect to the second structure.



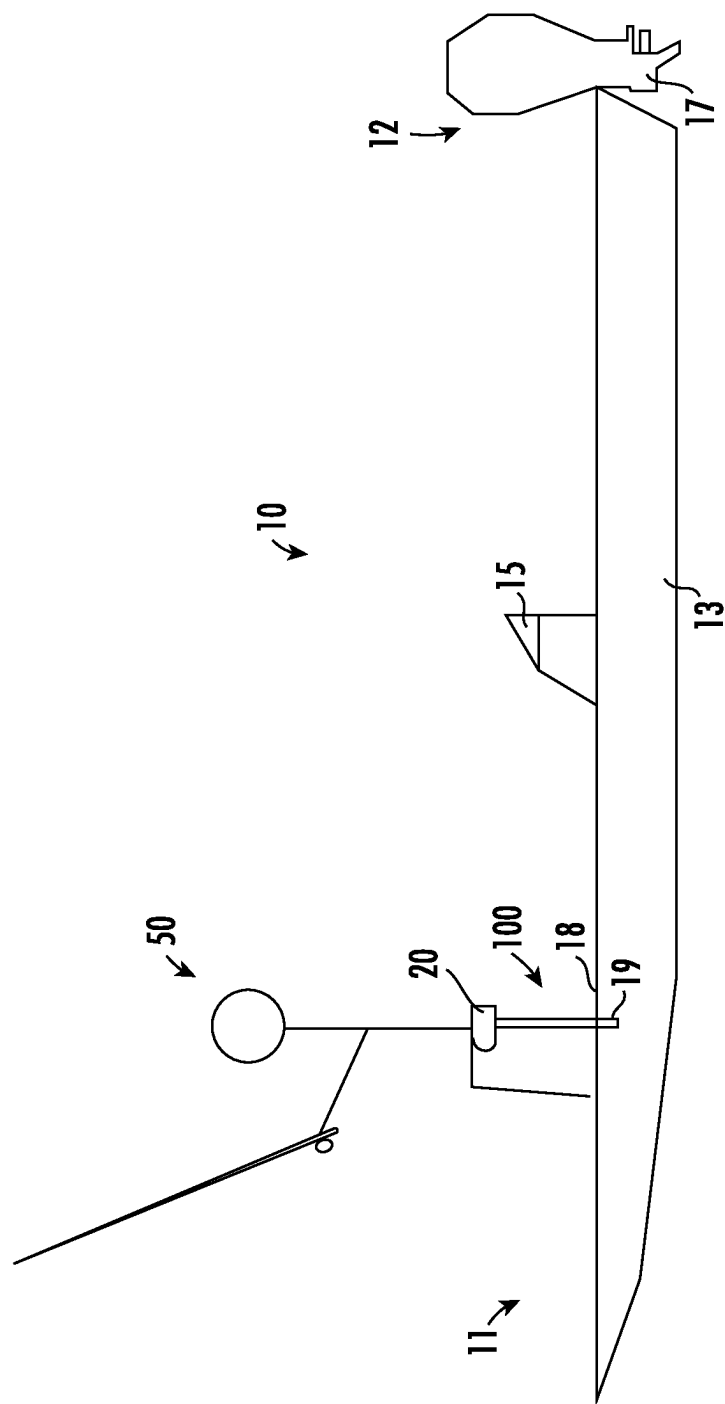


FIG. 1

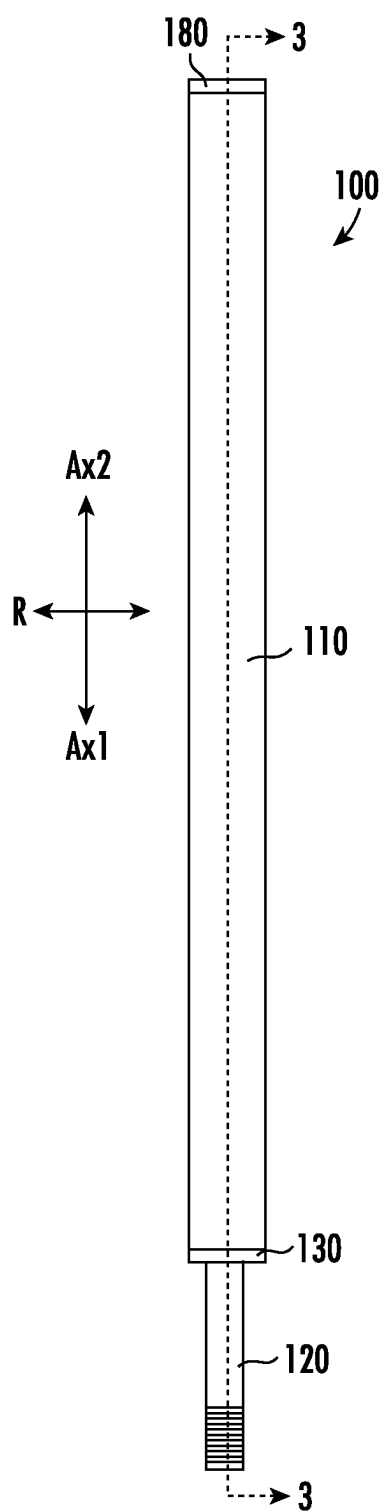


FIG. 2

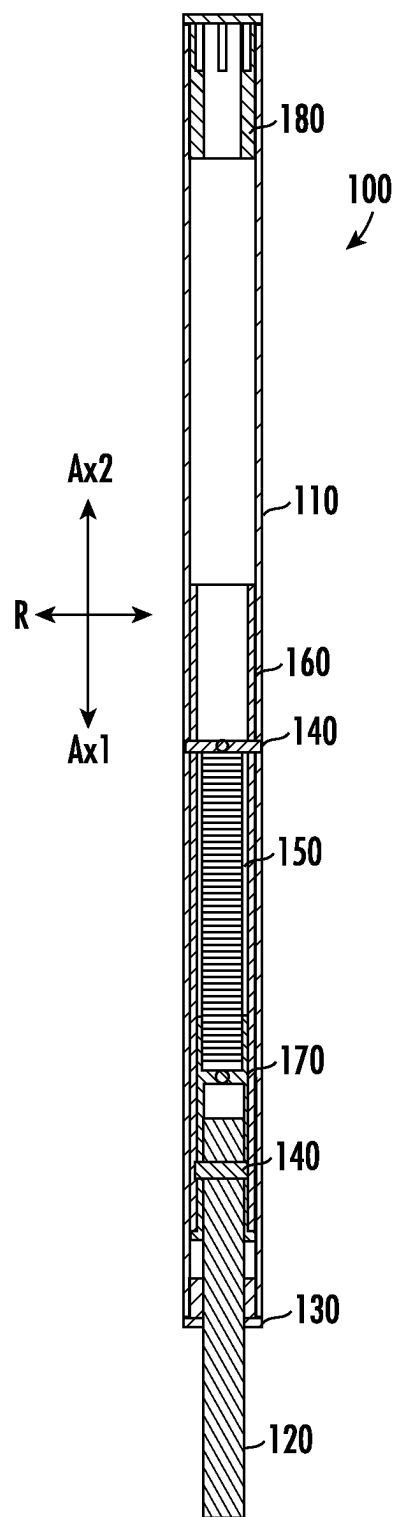


FIG. 3

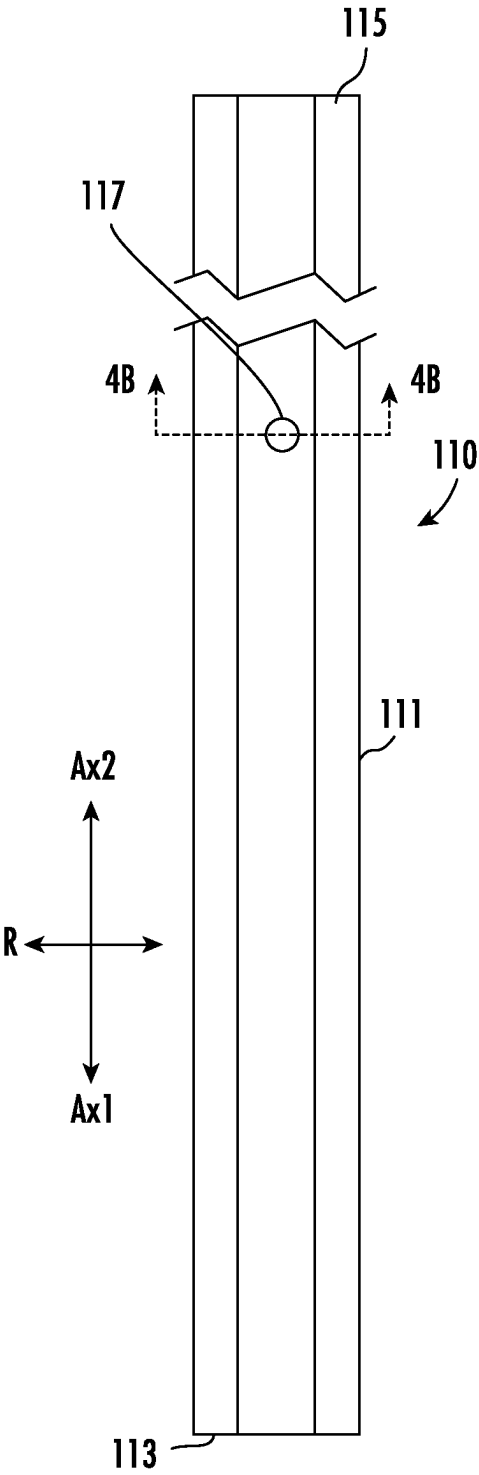


FIG. 4A

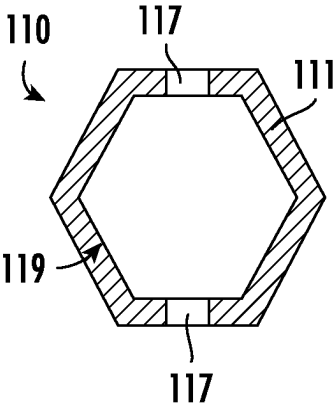


FIG. 4B

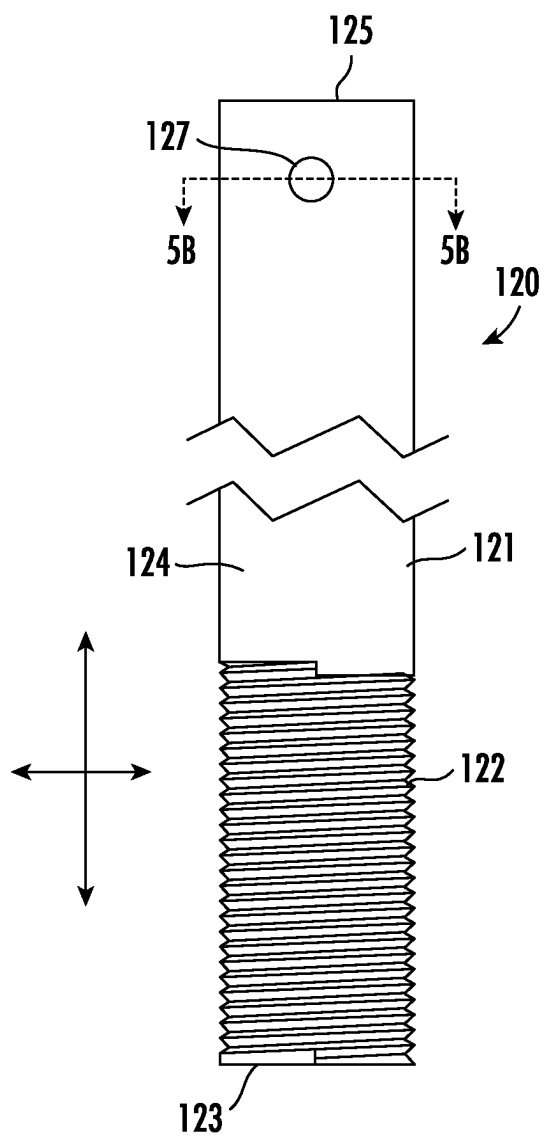


FIG. 5A

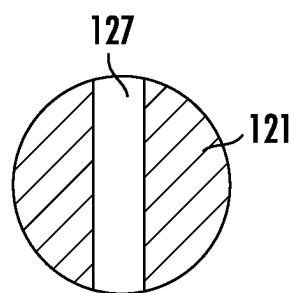


FIG. 5B

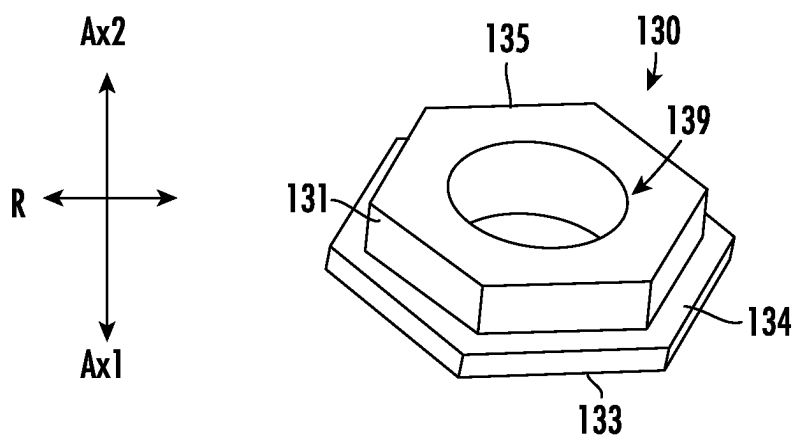


FIG. 6

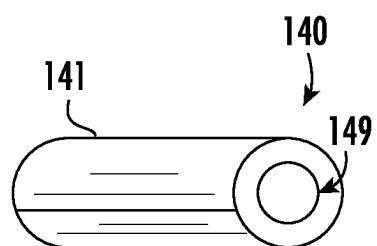


FIG. 7

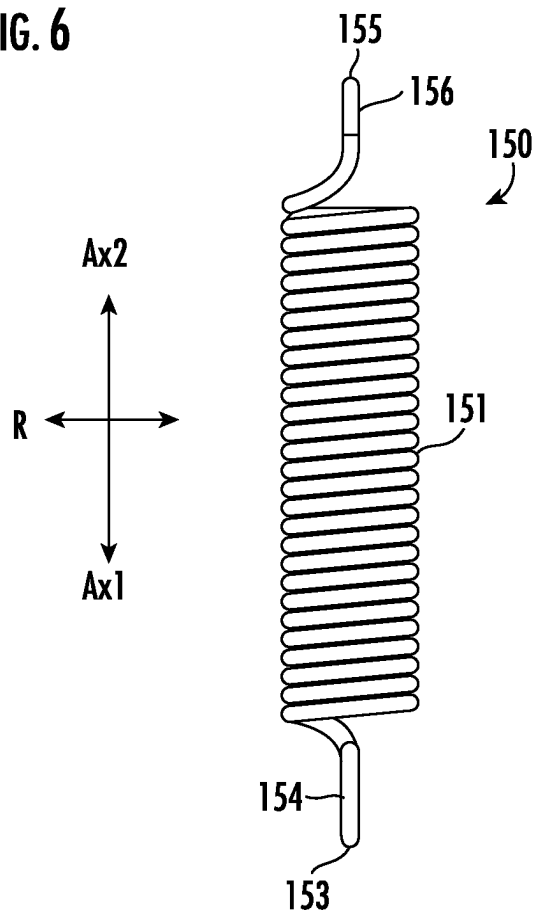


FIG. 8

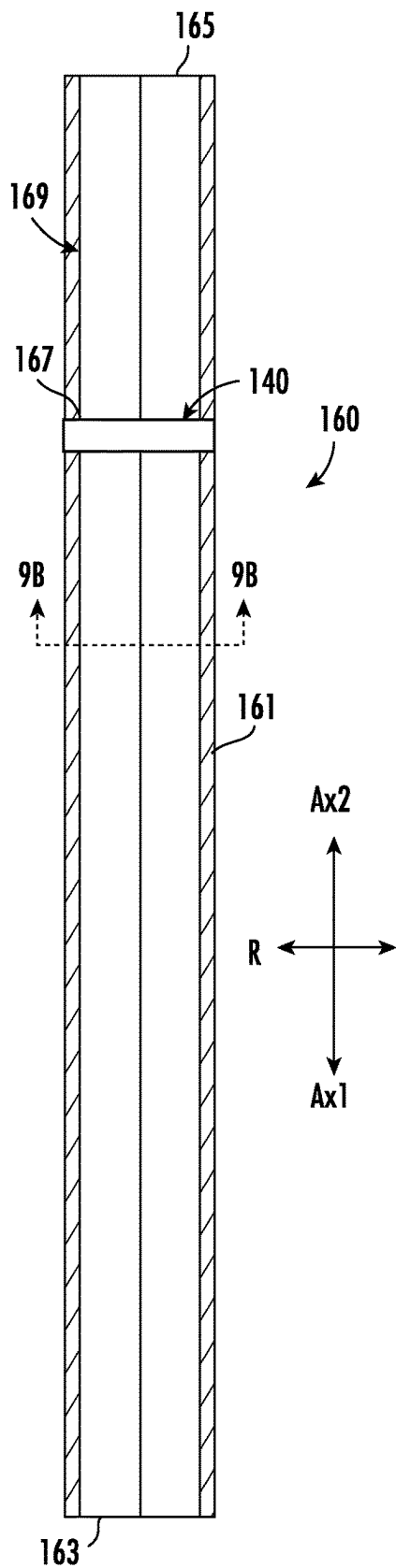


FIG. 9A

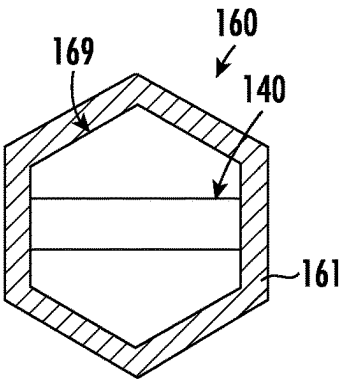
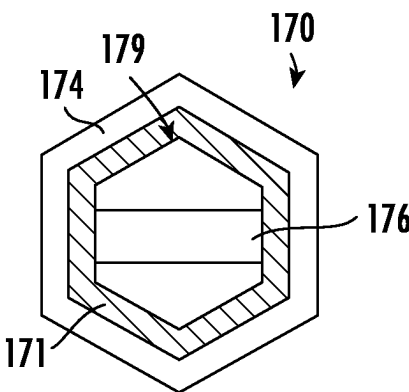
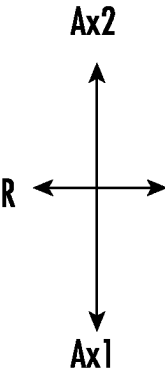
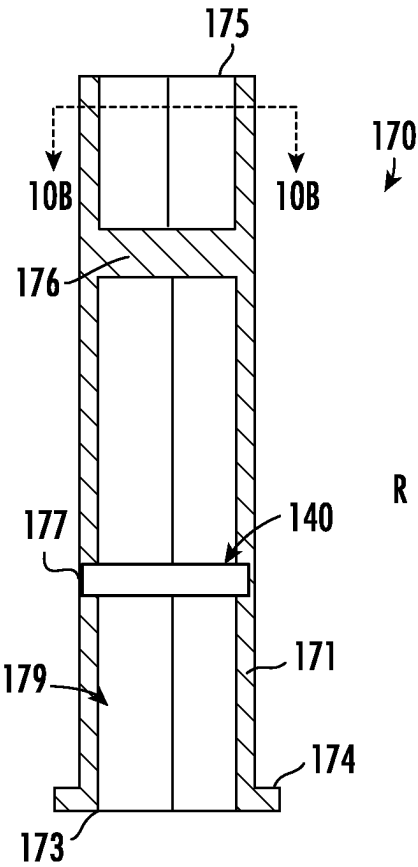


FIG. 9B



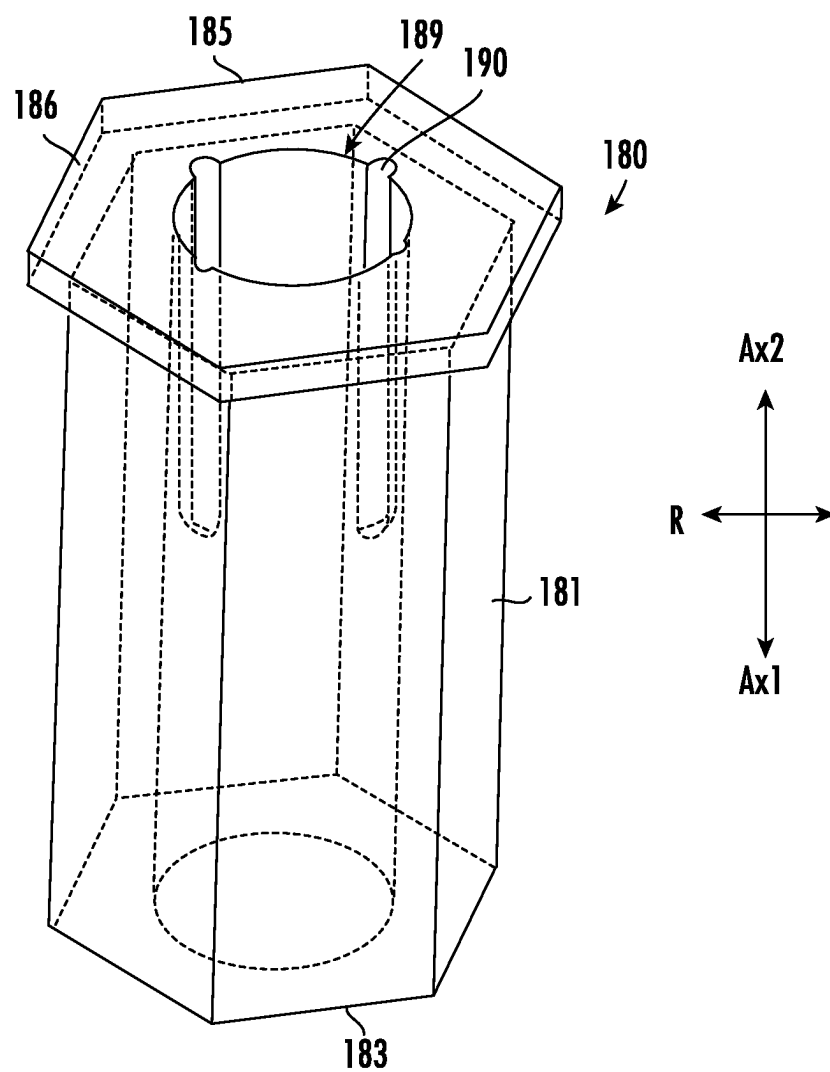


FIG. 11

ATTACHMENT STRUCTURE FOR MARINE VESSEL

BACKGROUND

[0001] The present disclosure relates to marine vessels and, more particularly, to an attachment structure for auxiliary components for a marine vessel.

[0002] Marine vessels, such as boats, include integral structures. Marine vessels may also have auxiliary components that are attached thereto. An improvement in the attachment structure for the auxiliary components may be desirable.

SUMMARY

[0003] In accordance with a non-limiting example, an attachment structure for an auxiliary component for a marine vessel comprises a first structure configured to be attached to an attachment portion of the marine vessel, an elastic structure, and a second structure connected to the first structure via the elastic structure so as to allow axial movement of the first structure with respect to the second structure.

[0004] In addition to one or more of the features described herein, the elastic structure is a tension spring.

[0005] In addition to one or more of the features described herein, the first structure comprises an inner sleeve, the second structure comprises an outer sleeve, the inner sleeve is positioned at least partially within the outer sleeve, and the elastic structure is positioned at least partially within the inner sleeve.

[0006] In addition to one or more of the features described herein, the first structure further comprises a rod fixed to the inner sleeve, and the rod is configured to be directly attached to the attachment portion of the marine vessel.

[0007] In addition to one or more of the features described herein, the rod comprises a threaded portion configured to engage with threading within the attachment portion of the marine vessel to attach the attachment structure to the marine vessel.

[0008] In addition to one or more of the features described herein, the second structure further comprises a housing fixed to the outer sleeve, and the outer sleeve and the inner sleeve are disposed within the housing.

[0009] In addition to one or more of the features described herein, the second structure further comprises an end cap fixed to the housing, and the end cap includes a bore configured to receive the auxiliary component.

[0010] In addition to one or more of the features described herein, the bore includes at least one guide groove configured to restrict rotation of the auxiliary component.

[0011] In addition to one or more of the features described herein, the second structure is configured to receive the auxiliary component.

[0012] In addition to one or more of the features described herein, the housing is fixed to the outer sleeve via a fastener, the inner sleeve comprises a bridge portion on which a first attachment portion of the elastic structure is attached, and a second attachment portion of the elastic structure is attached to the fastener.

[0013] In addition to one or more of the features described herein, the elastic structure is a tension spring that biases the inner sleeve towards the outer sleeve in an axial direction.

[0014] In addition to one or more of the features described herein, the inner sleeve comprises a flange that abuts an axial end of the outer sleeve to limit movement of the inner sleeve with respect to the outer sleeve in the axial direction.

[0015] In addition to one or more of the features described herein, the second structure is not rotatable with respect to the first structure.

[0016] In addition to one or more of the features described herein, the outer sleeve is not rotatable with respect to the inner sleeve.

[0017] In addition to one or more of the features described herein, the inner sleeve and a bore within the outer sleeve have a hexagonal cross-sectional shape.

[0018] In addition to one or more of the features described herein, the inner sleeve comprises a bridge portion, the elastic structure is attached to the bridge portion, at least a portion of the rod is positioned within the inner sleeve in a first axial direction of the bridge portion, and at least a portion of the elastic structure is disposed within the inner sleeve in a second axial direction of the bridge portion.

[0019] In addition to one or more of the features described herein, wherein the inner sleeve, the outer sleeve, and the housing are positioned radially around the elastic structure.

[0020] In addition to one or more of the features described herein, when the first structure is inserted within the attachment structure of the marine vessel, a portion of the first structure attached to a first attachment portion of the elastic structure moves away in an axial direction from a portion of the second structure attached to a second attachment portion of the elastic structure such that the elastic structure biases the first structure towards the second structure.

[0021] In accordance with a non-limiting example, an attachment structure for an auxiliary component for a marine vessel, the attachment structure defining a first axial direction and a second axial direction and comprises a housing, an end cap disposed on a terminal end of the housing in the second axial direction and having a bore configured to accept the auxiliary component, an outer sleeve disposed at least partially within the housing and fixed to the housing via a first fastener, an inner sleeve disposed at least partially within the outer sleeve and comprising a bridge portion, an elastic structure having a first attachment portion attached to the bridge portion and a second attachment portion attached to the first fastener so as to allow axial movement of the first structure with respect to the second structure, and a rod disposed at least partially within the inner sleeve and fixed to the inner sleeve via a second fastener. The attachment structure is configured such that, when the rod is inserted into an attachment portion of the marine vessel, the inner sleeve is moved in the first axial direction with respect to the outer sleeve, thereby generating a biasing force in the elastic structure that pulls the inner sleeve towards the outer sleeve.

[0022] In accordance with a non-limiting example, a marine vessel comprises the attachment structure, a hull comprising the attachment portion, and the auxiliary component attached to the attachment structure.

[0023] The above features and advantages, and other features and advantages of the disclosure are readily apparent from the following detailed description when taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 shows a schematic diagram of a marine vessel with an attachment structure according to one or more embodiments;

[0025] FIG. 2 shows a side view of an attachment structure for a marine vessel according to one or more embodiments;

[0026] FIG. 3 shows a cross-sectional view of the attachment structure taken at 3-3 in FIG. 2.

[0027] FIG. 4A shows a housing according to one or more embodiments;

[0028] FIG. 4B shows a cross-sectional view of the housing taken at 4B-4B in FIG. 4A;

[0029] FIG. 5A shows a rod according to one or more embodiments;

[0030] FIG. 5B shows a cross-sectional view of the rod taken at 5B-5B in FIG. 5A;

[0031] FIG. 6 shows a first end cap according to one or more embodiments;

[0032] FIG. 7 shows a fastener according to one or more embodiments;

[0033] FIG. 8 shows an elastic structure according to one or more embodiments;

[0034] FIG. 9A shows an outer sleeve according to one or more embodiments;

[0035] FIG. 9B shows a cross-sectional view of the outer sleeve taken at 9B-9B in FIG. 9A;

[0036] FIG. 10A shows an inner sleeve according to one or more embodiments;

[0037] FIG. 10B shows a cross-sectional view of the inner sleeve taken at 10B-10B in FIG. 10A; and

[0038] FIG. 11 shows a second end cap according to one or more embodiments.

DETAILED DESCRIPTION

[0039] The following description is merely exemplary in nature and is not intended to limit the present disclosure, its application or uses. It should be understood that throughout the drawings, corresponding reference numerals indicate like or corresponding parts and features.

[0040] A marine vessel 10 having an attachment structure 100 according to a non-limiting example is shown in FIG. 1. The marine vessel 10 may be, according to a non-limiting example, a motor boat. The marine vessel 10 may include a hull 13, and a prime mover 17 may be disposed at a stern 12 of the hull 13. The prime mover 17 may be, according to a non-limiting example, a motor. A helm 15 may be disposed proximate to a central portion of the hull 13. The hull 13 may include an upper surface 18 and an attachment portion 19 formed in the upper surface 18 at or near a bow 11 of the hull 13. The attachment portion 19 may be, for example, a hole with threading. An attachment structure 100 according to one or more embodiments may be attached to the attachment portion 19. As a non-limiting example, the attachment structure 100 may be inserted into the attachment portion 19. An auxiliary component 20 may be disposed on the attachment structure 100. As a non-limiting example, the auxiliary component 20 may be a seat. A user 50, which may be a helmsman or a passenger, may use the auxiliary component. In the case that the auxiliary component 20 is a seat, the user 50 may sit on the auxiliary component 20. According to a non-limiting example, the auxiliary component 20 disposed on the attachment structure 100 may function as a pedestal seat.

[0041] An attachment structure 100 according to one or more embodiments is shown in FIG. 2, and a cross-sectional view of the attachment structure 100 taken at 3-3 in FIG. 2 is shown in FIG. 3. The attachment structure 100 extends along an axis including a first axial direction Ax1 and a second axial direction Ax2 and may include a housing 110, a rod 120, a first end cap 130, a plurality of fasteners 140, an elastic structure 150, an outer sleeve 160, an inner sleeve 170, and a second end cap 180. The attachment structure 100 further defines radial directions R extend perpendicular to the first axial direction Ax1 and the second axial direction Ax2.

[0042] FIG. 4A shows the housing 110 according to one or more embodiments, and FIG. 4B shows a cross-sectional view of the housing 110 taken at 4B-4B in FIG. 4A. The housing 110 extends along the axis including the first axial direction Ax1 and the second axial direction Ax2. The housing 110 may include a housing body 111 that extends from a first end 113 in the first axial direction Ax1 to a second end 115 in the second axial direction Ax2. The housing body 111 may be hexagonal in shape. Alternatively, the housing body 111 may be cylindrical, or any other shape known in the art. The housing body 111 may define a housing bore 119 extending from the first end 113 to the second end 115. The housing bore 119 may be hexagonal in shape. Alternatively, the housing bore 119 may be cylindrical, or any other shape known in the art. A housing fastener hole 117 may extend through the housing body 111 in a radial direction R.

[0043] FIG. 5A shows the rod 120 according to one or more embodiments, and FIG. 5B shows a cross-sectional view of the rod 120 taken at 5B-5B in FIG. 5A. The rod 120 extends along the axis including the first axial direction Ax1 and the second axial direction Ax2. The rod 120 may include a rod body 121 that extends from a first end 123 in the first axial direction Ax1 to a second end 125 in the second axial direction Ax2. The rod body 121 may be cylindrical in shape. Alternatively, the rod body 121 may be any other shape known in the art. The rod body 121 may include a threaded portion 122 formed on a part of the rod body 121 at or near the second end 125, and a non-threaded portion 124. A rod fastener hole 127 may extend through the rod body 121 in a radial direction R.

[0044] FIG. 6 shows the first end cap 130 according to one or more embodiments. The first end cap 130 may include a first end cap body 131 that extends from a first end 133 in the first axial direction Ax1 to a second end 135 in the second axial direction Ax2, and a first end cap flange 134 extending radially outward from the first end cap body 131 at or near the first end 133. The first end cap body 131 and/or the first end cap flange 134 may be hexagonal in shape. Alternatively, the first end cap body 131 and/or the first end cap flange 134 may be cylindrical, or any other shape known in the art. The first end cap body 131 may define a first end cap bore 139 extending from the first end 133 to the second end 135. The first end cap bore 139 may be cylindrical in shape. Alternatively, first end cap bore 139 may be any other shape known in the art.

[0045] FIG. 7 shows the fastener 140 according to one or more embodiments. The fastener 140 may include a fastener body 141 which may be cylindrical. Alternatively, the fastener body 141 may be any other shape known in the art. The fastener body 141 may define a fastener through-hole 143 extending therethrough. Alternatively, the fastener body 141

may be a solid body with no hole formed therein or a partial hole therein. The fastener 140 may be, for example, a pin, a shaft, or another fastener known in the art.

[0046] FIG. 8 shows an elastic structure 150 according to one or more embodiments. The elastic structure 150 may include a first attachment portion 154 at or near a first end 153 in the first axial direction Ax1 and a second attachment portion 156 at or near a second end 155 in the second axial direction Ax2, and an elastic body 151 extending axially between the first attachment portion 154 and the second attachment portion 156. According to one or more embodiments, the elastic structure 150 may be a spring, and/or the first and second attachment portions 154, 156 may be hooks.

[0047] FIG. 9A shows the outer sleeve 160 according to one or more embodiments, and FIG. 9B shows a cross-sectional view of the outer sleeve 160 taken at 9B-9B in FIG. 9A. The outer sleeve 160 extends along the axis including the first axial direction Ax1 and the second axial direction Ax2. The outer sleeve 160 may include an outer sleeve body 161 that extends from a first end 163 in the first axial direction Ax1 to a second end 165 in the second axial direction Ax2. The outer sleeve body 161 may be hexagonal in shape. Alternatively, the outer sleeve body 161 may be cylindrical, or any other shape known in the art. The outer sleeve body 161 may define an outer sleeve bore 169 extending from the first end 163 to the second end 165. The outer sleeve bore 169 may be hexagonal in shape. Alternatively, the outer sleeve bore 169 may be cylindrical, or any other shape known in the art. An outer sleeve fastener hole 167 may extend through the outer sleeve body 161 in a radial direction R.

[0048] FIG. 10A shows the inner sleeve 170 according to one or more embodiments, and FIG. 10B shows a cross-sectional view of the inner sleeve 170 taken at 10B-10B in FIG. 10A. The inner sleeve 170 extends along the axis including the first axial direction Ax1 and the second axial direction Ax2. The inner sleeve 170 may include an inner sleeve body 171 that extends from a first end 173 in the first axial direction Ax1 to a second end 175 in the second axial direction Ax2. The inner sleeve 170 further includes an inner sleeve flange 174 extending radially outward from the inner sleeve body 171 at or near the first end 173. The inner sleeve body 171 and/or the inner sleeve flange 174 may be hexagonal in shape. Alternatively, the inner sleeve body 171 and/or the inner sleeve flange 174 may be cylindrical, or any other shape known in the art. The inner sleeve body 171 may define an inner sleeve bore 179 extending from the first end 173 to the second end 175. The inner sleeve bore 179 may be hexagonal in shape. Alternatively, the inner sleeve bore 179 may be cylindrical, or any other shape known in the art. An inner sleeve fastener hole 177 may extend through the inner sleeve body 171 in a radial direction R. The inner sleeve 170 may further include a bridge portion 176 extending radially between inner walls of the inner sleeve body 171 through the inner sleeve bore 179. According to one or more embodiments, the bridge portion 176 may be formed integrally with the inner sleeve body 171. Alternatively, the bridge portion 176 may be formed separately from the inner sleeve body 171 and attached to the inner sleeve body 171 or inserted into holes and/or indentations formed in the inner sleeve body 171.

[0049] FIG. 11 shows the second end cap 180 according to one or more embodiments. The second end cap 180 may include a second end cap body 181 that extends from a first

end 183 in the first axial direction Ax1 to a second end 185 in the second axial direction Ax2, and a second end cap flange 186 extending radially outward from the second end cap body 181 at or near the second end 185. The second end cap body 181 and/or the second end cap flange 186 may be hexagonal in shape. Alternatively, the second end cap body 181 and/or the second end cap flange 186 may be cylindrical, or any other shape known in the art. The second end cap body 181 may define a second end cap bore 189 extending from the first end 183 to the second end 185. Alternatively, the second end cap bore 189 may be defined only partially through the second end cap body 181 from the second end 185 partially towards the first end 183. The second end cap bore 189 may be cylindrical in shape. Alternatively, the second end cap bore 189 may be any other shape known in the art. The second end cap body 181 may further define guide grooves 190 at or near the second end 185. Each of the guide grooves 190 may be a partial cylinder. Alternatively, the guide grooves 190 may be any other shape known in the art. While FIG. 11 shows four guide grooves 190, the second end cap body 181 may include any number of guide grooves, including a single guide groove 190, two guide grooves 190, three guide grooves 190, five guide grooves 190, etc. The guide grooves 190 may be defined only partially through the second end cap body 181 from the second end 185 partially towards the first end 183. Alternatively, the guide grooves 190 may extend entirely through the second end cap body 181.

[0050] The attachment structure 100 may be formed by assembling the housing 110, the rod 120, the first end cap 130, the fasteners 140, the elastic structure 150, the outer sleeve 160, the inner sleeve 170, and the second end cap 180.

[0051] The elastic structure 150 may be disposed partially within the inner sleeve bore 179 of the inner sleeve 170 on a side of the bridge portion 176 in the second axial direction Ax2, and the first attachment portion 154 may be attached to the bridge portion 176. For example, the first attachment portion 154 may be a hook that is hooked onto the bridge portion 176. The first attachment portion 154 may be fixed to the bridge portion 176 by welding, adhesives, and/or other fixing methods known in the art. The rod 120 may be disposed partially within the inner sleeve bore 179 of the inner sleeve 170 on a side of the bridge portion 176 in the first axial direction Ax1 with the rod fastener hole 127 of the rod 120 aligned with the inner sleeve fastener hole 177 of the inner sleeve 170. One of the fasteners 140 may be inserted through the inner sleeve fastener hole 177 and the rod fastener hole 127. According to one or more embodiments, the fastener 140 may be fixed to the inner sleeve 170 and/or the rod 120 by welding, adhesives, and/or other fixing methods known in the art. The rod 120 is thus fixed to the inner sleeve 170 via the fastener 140.

[0052] The inner sleeve 170 may be disposed partially or entirely inside the outer sleeve bore 169 of the outer sleeve 160. The inner sleeve flange 174 of the inner sleeve 170 may abut the first end 163 of the outer sleeve 160.

[0053] The outer sleeve 160 may be disposed inside the housing bore 119 of the housing 110 with the outer sleeve fastener hole 167 aligned with the housing fastener hole 117, and the elastic structure 150 attached to the bridge portion 176 of the inner sleeve 170 via the first attachment portion 154 may be disposed inside the outer sleeve bore 169 of the outer sleeve 160. One of the fasteners 140 may be inserted through the housing fastener hole 117 and the outer sleeve

fastener hole 167, and the second attachment portion 156 of the elastic structure 150 may be attached to the fastener 140. For example, the second attachment portion 156 may be a hook that is hooked onto the fastener 140. According to one or more embodiments, the fastener 140 may be fixed to the housing 110, the outer sleeve 160, and/or the second attachment portion 156 by welding, adhesive, and/or other fixing methods known in the art.

[0054] The inner sleeve 170 may be disposed within the outer sleeve 160 without being fixed thereto. The elastic structure 150 may be tensioned to generate a tension force on the inner sleeve 170 towards the outer sleeve 160 in the second axial direction Ax2, and the inner sleeve flange 174 abutting the first end 163 of the outer sleeve 160 may maintain the tension force. Thus, the inner sleeve 170 may be attached to the outer sleeve 160 along the axis including the first axial direction Ax1 and the second axial direction Ax2 via the elastic structure 150, while the elastic structure 150 may allow limited axial movement of the inner sleeve 170 with respect to the outer sleeve 160.

[0055] The first end cap 130 may be disposed partially or entirely within the housing bore 119 of the housing 110 at the first end 113, with the rod 120 being disposed within the first end cap bore 139 of the first end cap 130. The first end cap flange 134 may abut the first end 113 of the housing 110.

[0056] The second end cap 180 may be disposed partially or entirely within the housing bore 119 of the housing 110 at the second end 115. The second end cap flange 186 may abut the second end 115 of the housing 110.

[0057] Referring to FIG. 1, the attachment structure 100 may be attached to the attachment portion 19 formed in the bow 11 of the hull 13. The attachment portion 19 may be, for example, a hole with threading. As a non-limiting example, the attachment structure 100 may be inserted into the attachment portion 19, with the threaded portion 122 of the rod 120 being threaded onto the threading in the attachment portion 19. The auxiliary component 20 may be disposed on the attachment structure 100. The auxiliary component 20 may include a shaft portion (not shown) corresponding to the second end cap bore 189 such that the shaft portion may be inserted into the second end cap bore 189. The shaft portion may include radial protrusions (not shown) corresponding to the guide grooves 190 such that the radial protrusions may fit into the guide grooves 190 as the shaft portion is inserted into the second end cap bore 189. The guide grooves 190 may function to control the depth of insertion of the auxiliary component 20 within the attachment structure 100. Furthermore, the guide grooves 190 may prevent rotation of the auxiliary component 20 with respect to the attachment structure 100 about the axis including the first axial direction Ax1 and the second axial direction Ax2. According to one or more embodiments, the guide grooves 190 may also function as keying features.

[0058] As described above, the housing bore 119, the second end cap body 181, the outer sleeve body 161, the outer sleeve bore 169, and the inner sleeve body 171 may be hexagonal such that the second end cap body 181 and the outer sleeve body 161 cannot rotate within the housing bore 119 about the axis including the first axial direction Ax1 and the second axial direction Ax2 and the inner sleeve body 171 cannot rotate within the outer sleeve bore 169. The rotation may still be prevented if, instead of hexagonal, the housing bore 119 and the outer sleeve body 161, the outer sleeve bore

169, and the inner sleeve body 171 are other polygonal shapes including triangular, rectangular/square, pentagon, heptagon, etc.

[0059] A rigid attachment structure threaded into the attachment portion 19 of the marine vessel 10 and on which the auxiliary component 20 is disposed may translate vibrational forces from the auxiliary component 20 directly to the threaded portion of the rigid attachment structure. Furthermore, there may be some tolerance between the threaded portion of the rigid attachment structure and the threading in the attachment portion 19. The vibrational forces may move the threads of the threaded portion of the rigid attachment structure within the tolerance and may loosen the threaded portion of the rigid attachment structure from the attachment portion 19. Thus, the rigid attachment structure may eventually become detached from the attachment portion 19. The rigid attachment structure may thereby unintentionally be removed from the attachment portion 19 during use of the auxiliary component 20. For example, if the auxiliary component 20 is a seat, the user 50 may sit on the seat, and vibrations being translated to the threaded portion may eventually remove the rigid attachment structure from the attachment portion 19. Such unintentional removal may result in injury to the user 50.

[0060] When the attachment structure 100 according to one or more embodiments is being attached to the attachment portion 19 of the marine vessel 10, the rod 120 may be inserted into the attachment portion 19 in the first axial direction Ax1. Once a portion of the rod 120 outside of the housing 110 is fully inserted into the attachment portion 19, the first end cap 130 may abut the upper surface 18 of the hull 13 of the marine vessel 10. As described above, the elastic structure 150 connecting the outer sleeve 160 and the inner sleeve 170 allows for limited axial movement between the outer sleeve 160 and the inner sleeve 170. Thus, after the first end cap 130 abuts the upper surface 18, the elastic structure 150 allows the rod 120 to be further inserted into the attachment portion 19 in the first axial direction Ax1. As the rod 120 is fixed to the inner sleeve 170 via the fastener 140, the inner sleeve 170 moves toward the first axial direction Ax1 while the first end cap 130 pushes against the upper surface 18 to keep the housing 110 and the outer sleeve 160 stationary. Thus, the first end 153 of the elastic structure 150 is pulled in the first axial direction Ax1 by the inner sleeve 170 while the second end 155 of the elastic structure 150 remains in place. This relative movement of the inner sleeve 170 in the first axial direction Ax1 with respect to the outer sleeve 160 resulting from the insertion of the rod 120 into the attachment portion 19 thus creates a tension force pulling the inner sleeve 170 in the second axial direction Ax2 towards the outer sleeve 160. This tension force is translated to the rod 120 and the threaded portion 122 thereof via the fastener 140. This tension force in turn keeps surfaces of threads of the threaded portion 122 facing the second axial direction Ax2 in contact with surfaces of the threads of the attachment portion 19 facing the first axial direction Ax1. That is, the threads of the threaded portion 122 may not move within the threads of the attachment portion 19 when the rod 120 and/or the attachment portion 19 vibrate, reducing or eliminating the occurrence of the threaded portion 122 becoming loose from the attachment portion 19 due to vibrations.

[0061] Furthermore, the first end cap 130 maintains a force against the upper surface 18 due to the tension force of

the elastic structure **150** such that the attachment structure **100** is less likely to experience vibrational movement with respect to the attachment portion **19**.

[0062] While the first end cap **130** abutting the upper surface **18** is described above, according to one or more embodiments, the first end cap **130** may be omitted such that a terminal end of the housing **110** in the first axial direction Ax1 abuts the upper surface **18**.

[0063] This limited axial movement may absorb and/or dampen the vibrations between the auxiliary component **20** inserted into the second end cap **180** and the rod **120** inserted into the attachment portion **19** of the marine vessel. The limited axial movement may reduce or prevent the occurrence of the unintentional removal of the attachment structure **100** from the attachment portion **19** due to vibrations.

[0064] The attachment structure **100** may be formed of a first structure and a second structure that are connected by the elastic structure **150** so as to allow limited axial movement between the first and second structures. As a non-limiting example, the first structure may be an assembly that includes the rod **120**, the inner sleeve **170**, and the fastener **140** fixing the rod **120** to the inner sleeve **170**. As a non-limiting example, the second structure may be an assembly that includes the outer sleeve **160**, the housing **110**, the fastener **140** fixing the outer sleeve **160** to the housing **110**, the first end cap **130**, and the second end cap **180**.

[0065] The terms “a” and “an” do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced items. The term “or” means “and/or” unless clearly indicated otherwise by context. Reference throughout the specification to “an aspect”, means that a particular element (e.g., feature, structure, step, or characteristic) described in connection with the aspect is included in at least one aspect described herein, and may or may not be present in other aspects. In addition, it is to be understood that the described elements may be combined in any suitable manner in the various aspects.

[0066] When an element such as a layer, film, region, or substrate is referred to as being “on” another element, it can be directly on the other element or intervening elements may also be present. In contrast, when an element is referred to as being “directly on” another element, there are no intervening elements present.

[0067] Unless specified to the contrary herein, all test standards are the most recent standard in effect as of the filing date of this application, or, if priority is claimed, the filing date of the earliest priority application in which the test standard appears.

[0068] Unless defined otherwise, technical, and scientific terms used herein have the same meaning as is commonly understood by one of skill in the art to which this disclosure belongs.

[0069] While the above disclosure has been described with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from its scope. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the disclosure without departing from the essential scope thereof. Therefore, it is intended that the present disclosure not be limited to the particular embodiments disclosed, but will include all embodiments falling within the scope thereof.

What is claimed is:

1. An attachment structure for an auxiliary component for a marine vessel, comprising:
 - a first structure configured to be attached to an attachment portion of the marine vessel;
 - an elastic structure; and
 - a second structure connected to the first structure via the elastic structure so as to allow axial movement of the first structure with respect to the second structure.
2. The attachment structure of claim 1, wherein the elastic structure is a tension spring.
3. The attachment structure of claim 1, wherein the first structure comprises an inner sleeve, wherein the second structure comprises an outer sleeve, wherein the inner sleeve is positioned at least partially within the outer sleeve, and wherein the elastic structure is positioned at least partially within the inner sleeve.
4. The attachment structure of claim 3, wherein the first structure further comprises a rod fixed to the inner sleeve, and wherein the rod is configured to be directly attached to the attachment portion of the marine vessel.
5. The attachment structure of claim 4, wherein the rod comprises a threaded portion configured to engage with threading within the attachment portion of the marine vessel to attach the attachment structure to the marine vessel.
6. The attachment structure of claim 3, wherein the second structure further comprises a housing fixed to the outer sleeve, and wherein the outer sleeve and the inner sleeve are disposed within the housing.
7. The attachment structure of claim 6, wherein the second structure further comprises an end cap fixed to the housing, and wherein the end cap includes a bore configured to receive the auxiliary component.
8. The attachment structure of claim 7, wherein the bore includes at least one guide groove configured to restrict rotation of the auxiliary component.
9. The attachment structure of claim 1, wherein the second structure is configured to receive the auxiliary component.
10. The attachment structure of claim 6, wherein the housing is fixed to the outer sleeve via a fastener, wherein the inner sleeve comprises a bridge portion on which a first attachment portion of the elastic structure is attached, and wherein a second attachment portion of the elastic structure is attached to the fastener.
11. The attachment structure of claim 3, wherein the elastic structure is a tension spring that biases the inner sleeve towards the outer sleeve in an axial direction.
12. The attachment structure of claim 11, wherein the inner sleeve comprises a flange that abuts an axial end of the outer sleeve to limit movement of the inner sleeve with respect to the outer sleeve in the axial direction.
13. The attachment structure of claim 1, wherein the second structure is not rotatable with respect to the first structure.
14. The attachment structure of claim 3, wherein the outer sleeve is not rotatable with respect to the inner sleeve.
15. The attachment structure of claim 14, wherein the inner sleeve and a bore within the outer sleeve have a hexagonal cross-sectional shape.

16. The attachment structure of claim **4**, wherein the inner sleeve comprises a bridge portion, wherein the elastic structure is attached to the bridge portion, wherein at least a portion of the rod is positioned within the inner sleeve in a first axial direction of the bridge portion, and wherein at least a portion of the elastic structure is disposed within the inner sleeve in a second axial direction of the bridge portion.

17. The attachment structure of claim **6**, wherein the inner sleeve, the outer sleeve, and the housing are positioned radially around the elastic structure.

18. The attachment structure of claim **1**, wherein, when the first structure is inserted within the attachment structure of the marine vessel, a portion of the first structure attached to a first attachment portion of the elastic structure moves away in an axial direction from a portion of the second structure attached to a second attachment portion of the elastic structure such that the elastic structure biases the first structure towards the second structure.

19. An attachment structure for an auxiliary component for a marine vessel, the attachment structure defining a first axial direction and a second axial direction and comprising:

a housing;
an end cap disposed on a terminal end of the housing in the second axial direction and having a bore configured to accept the auxiliary component;
an outer sleeve disposed at least partially within the housing and fixed to the housing via a first fastener;
an inner sleeve disposed at least partially within the outer sleeve and comprising a bridge portion;
an elastic structure having a first attachment portion attached to the bridge portion and a second attachment portion attached to the first fastener so as to allow axial movement of the first structure with respect to the second structure; and
a rod disposed at least partially within the inner sleeve and fixed to the inner sleeve via a second fastener, wherein the attachment structure is configured such that, when the rod is inserted into an attachment portion of the marine vessel, the inner sleeve is moved in the first axial direction with respect to the outer sleeve, thereby generating a biasing force in the elastic structure that pulls the inner sleeve towards the outer sleeve.

20. A marine vessel comprising:
the attachment structure of claim **1**;
a hull comprising the attachment portion; and
the auxiliary component attached to the attachment structure.

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