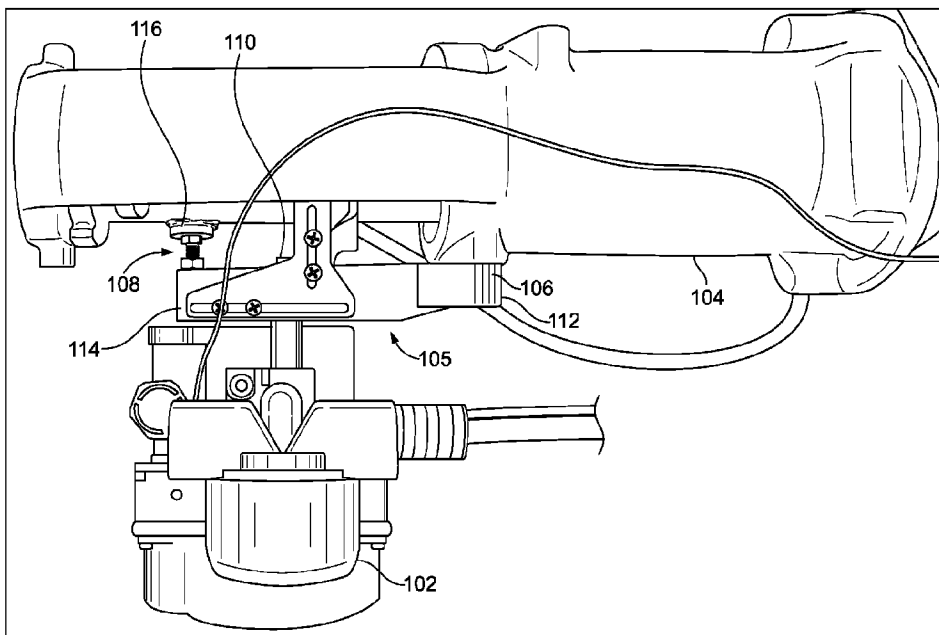




(86) Date de dépôt PCT/PCT Filing Date: 2013/05/29
 (87) Date publication PCT/PCT Publication Date: 2013/12/12
 (45) Date de délivrance/Issue Date: 2021/05/11
 (85) Entrée phase nationale/National Entry: 2014/11/24
 (86) N° demande PCT/PCT Application No.: US 2013/043026
 (87) N° publication PCT/PCT Publication No.: 2013/184460
 (30) Priorité/Priority: 2012/06/04 (US13/488,013)

(51) Cl.Int./Int.Cl. *H02K 5/26* (2006.01)
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(54) Titre : ENSEMBLES DE SUPPORT POUR L'UTILISATION AVEC DES ACTIONNEURS
 (54) Title: BRACKET ASSEMBLIES FOR USE WITH ACTUATORS



(57) **Abrégé/Abstract:**

Bracket assemblies for use with actuators are described. An example apparatus includes a bracket defining first apertures and second apertures. The first apertures are to receive fasteners to couple a first end of the bracket to an actuator. One or more of the second apertures is to receive fasteners to couple a controller to the bracket. The actuator is to be on a first side of the bracket and the controller to be on a second side of the bracket. The example apparatus also includes an adjuster to be coupled to the bracket. The adjuster is to vary a distance between a second end of the bracket and the actuator and to support the second end relative to the actuator.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau(10) International Publication Number
WO 2013/184460 A2(43) International Publication Date
12 December 2013 (12.12.2013)

- (51) **International Patent Classification:**
H02K 5/26 (2006.01)
- (21) **International Application Number:**
PCT/US2013/043026
- (22) **International Filing Date:**
29 May 2013 (29.05.2013)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
13/488,013 4 June 2012 (04.06.2012) US
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- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) **Title:** BRACKET ASSEMBLIES FOR USE WITH ACTUATORS

(57) **Abstract:** Bracket assemblies for use with actuators are described. An example apparatus includes a bracket defining first apertures and second apertures. The first apertures are to receive fasteners to couple a first end of the bracket to an actuator. One or more of the second apertures is to receive fasteners to couple a controller to the bracket. The actuator is to be on a first side of the bracket and the controller to be on a second side of the bracket. The example apparatus also includes an adjuster to be coupled to the bracket. The adjuster is to vary a distance between a second end of the bracket and the actuator and to support the second end relative to the actuator.



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BRACKET ASSEMBLIES FOR USE WITH ACTUATORS

FIELD

[0001] This patent relates generally to bracket assemblies and, more specifically, to bracket assemblies for use with actuators.

BACKGROUND

[0002] A controller may be used to measure and control a position of an actuator. In some examples, a bracket may be used to couple the controller to the actuator.

SUMMARY

[0003] An example apparatus includes a bracket defining first apertures and second apertures. The first apertures are to receive fasteners to couple a first end of the bracket to an actuator. One or more of the second apertures are to receive fasteners to couple a controller to the bracket. The actuator is to be on a first side of the bracket and the controller is to be on a second side of the bracket. The example apparatus also includes an adjuster to be coupled to the bracket. The adjuster is to vary a distance between a second end of the bracket and the actuator and to support the second end relative to the actuator.

[0004] Another example apparatus includes a bracket defining first apertures and second apertures. The first apertures are to receive fasteners to couple a first end of the bracket to an actuator. One or more of the second apertures are to receive fasteners to couple a controller to the bracket. The actuator is to be on a first side of the bracket and the controller is to be on a second side of the bracket. The apparatus also includes an adjuster to be coupled to the bracket and to be adjustable to dampen vibrations.

[0005] Hence, according to a broad aspect, there is provided a bracket apparatus for use with an actuator and a controller, the bracket apparatus comprising: a bracket having a first end, a second end, a first side, a second side, and defining first apertures and second apertures, the bracket being adapted to couple the actuator and the controller, the first apertures being adapted to receive fasteners to couple the first end of the bracket to the actuator, one or more of the second apertures being adapted to receive fasteners to couple the controller to the bracket, the actuator to be on the first side of the bracket and the controller to be on the second side of the bracket; and an adjuster coupled to the bracket and having an end engaged with a surface of the actuator, the adjuster being adapted to vary a distance between the second end of the bracket and the actuator and to support the second end relative to the actuator.

[0006] According to another broad aspect, the bracket apparatus for use with an actuator and a controller, the bracket apparatus comprising: a bracket having a first end, a second end, a first side, a second side, and defining first apertures and second apertures, the bracket being adapted to couple the actuator and the controller, the first apertures being adapted to receive fasteners to couple the first end of the bracket to an actuator, one or more of the second apertures being

adapted to receive fasteners to couple a controller to the bracket, the actuator to be on the first side of the bracket and the controller to be on the second side of the bracket; and an adjuster coupled to the bracket and having an end engaged with a surface of the actuator, the adjuster being adjustable to dampen vibrations.

[0007] According to a further broad aspect, there is provided a bracket apparatus for use with an actuator and a controller, the bracket apparatus comprising: a bracket having a first end and a second end opposite the first end, the bracket defining apertures, the bracket being adapted to couple the actuator and the controller, wherein some of the apertures being adapted to receive fasteners to couple the first end of the bracket to the actuator one or more of the other apertures being adapted to receive fasteners to couple the controller to the bracket; and means for changing a distance between the second end of the bracket and the actuator, the means for changing a distance having an end engaged with a surface of the actuator and being configured to support the second end of the bracket relative to the actuator to dampen vibrations of the bracket assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 depicts an example bracket assembly coupling a controller and an actuator.

[0009] FIG. 2 depicts the example bracket assembly of FIG. 1.

[0010] FIG. 3 depicts an example bracket of the bracket assembly of FIG. 1.

[0011] FIG. 4 depicts a detailed view of the engagement between an example adjuster of the example bracket assembly and the actuator.

[0012] FIG. 5 depicts an example adjuster that can be used to implement the example bracket assembly of FIG. 1.

DETAILED DESCRIPTION OF EMBODIMENTS

[0013] Certain variants, examples and preferred embodiments of the invention are shown in the above-identified figures and described in detail below. In describing these examples, like or identical reference numbers are used to identify the same or similar elements. The figures are not necessarily to scale and certain features and certain views of the figures may be shown exaggerated in scale or in schematic for clarity and/or conciseness. Additionally, several examples have been described throughout this specification. Any features from any example may be included with, a replacement for, or otherwise combined with other features from other examples.

[0014] The examples disclosed herein relate to example bracket assemblies to couple controllers and actuators in a control system. In some known examples, fasteners couple a first end of a bracket to an actuator and a second end of the bracket is unsupported or free. The second end may be unsupported because the different actuators with which the bracket assemblies are used have different yokes sizes with different mounting hole spacings and/or

arrangements. However, leaving the second end unsupported allows the second end of the bracket to oscillate harmonically as process fluid flows through the associated control valve. The magnitude of the oscillations may increase when the vibrational frequencies of the process fluid and the natural frequencies of the control valve system are substantially equal. Oscillating the bracket may loosen and/or break fasteners that couple the bracket to the actuator.

[0015] In contrast, the example bracket assemblies disclosed herein substantially prevent fasteners that couple a bracket to an actuator from loosening and/or breaking in applications where the actuator and/or other components of the control system vibrate, while also enabling the example bracket assemblies to be used with different actuator models having different yoke sizes and/or different mounting hole spacings and/or arrangements. In some examples, the example bracket assemblies may include a bracket and an example adjuster or adjustment member. The bracket includes a first end and a second end and defines a plurality of apertures and/or mounting holes.

[0016] In operation, fasteners and the adjustment member couple a controller to the bracket, and fasteners couple the first end of the bracket to the actuator body. After coupling the controller to the bracket, the adjustment member extends from the bracket adjacent its second end such that an elastomeric base of the adjustment member engages the actuator body and supports the second end and/or places the bracket in tension. Thus, using the examples disclosed, both the first and second bracket ends are supported or mechanically coupled to the actuator, which prevents the bracket from oscillating and the associated problems encountered in known examples.

[0017] To tension the bracket, enable the bracket to be substantially parallel to a longitudinal axis of the actuator body and/or to ensure that the second end is fully supported, a distance between the second end and the actuator may be adjusted by operating (e.g., manually rotating) the adjustment member. In addition, to prevent movement of the adjustment member relative to the bracket, a locknut that threadably engages an elongate body of the adjustment member may be tightened against the bracket.

[0018] FIG. 1 depicts a controller 102, an actuator 104 and an example bracket assembly 105 that includes a bracket 106 and an adjustment member or adjuster 108. The controller 102 may be used to determine and provide feedback related to a position of the actuator 104, and the bracket assembly 105 may be used to couple the controller 102 and the actuator 104.

[0019] In operation, fasteners 110 and the adjuster 108 extend through apertures 202, 204 and 206 (FIG. 2) of the bracket 106 to couple the controller 102 to the bracket 106 by threadably engaging the controller 102, and fasteners 207 (FIG. 2) extend through apertures 208 and 210

(FIG. 2) of the bracket 106 to couple a first end 112 of the bracket 106 to the actuator 104. To enable a second end 114 of the bracket 106 to be supported by or mechanically coupled to the actuator 104, the adjuster 108 extends from the bracket 106 and engages a surface 116 of the actuator 104. Placing the bracket 106 in tension by having both the first and second ends 112 and 114 mechanically coupled to the actuator 104 substantially dampens vibrations and/or substantially prevents the bracket 106 from oscillating as process fluid flows through an associated control valve (not shown).

[0020] Additionally, having the second end 114 supported but not directly coupled or fixed to the actuator 104 enables the bracket assembly 105 to be used with different actuator models having different yoke sizes and/or mounting hole spacings and/or mounting hole arrangements. In other words, in this example, there is no fastener extending through the bracket 106 adjacent its second end 114 and threadably engaging the actuator 104.

[0021] FIG. 2 depicts the bracket 106 and the adjuster 108 of the example bracket assembly 105. As shown, the bracket assembly 105 includes the apertures 202 – 206 through which the fasteners 110 and an elongate body 212 of the adjuster 108 extends to couple the controller 102 to the bracket 106. In other examples, the elongate body 212 may be coupled to and/or threadably engage the bracket 106, but is not used to couple the controller 102 to the bracket 106. In operation, the fasteners 207 extend through the apertures 208 and 210 to couple the first end 112 to the actuator 104. FIG. 3 is a plan view of the bracket 106 without the fasteners 110 or the adjuster 108.

[0022] FIG. 4 depicts a detailed view of the engagement between a base 402 of the adjuster 108 and the surface 116 of the actuator 104. In this example, the base 402 includes a first portion 404 and a second portion 406. The first portion 404 may be composed of a metal material and may be coupled (e.g., welded) to the elongate body 212. In other examples, the first portion 404 and the elongate body 212 are integrally formed from a single piece of material (e.g., machined from a single piece of bar stock). The second portion 406 may be composed of an elastomeric material and may be coupled to the first portion 404 using any suitable method such as an adhesive, for example. In this example, the first and second portions 404 and 406 have a cylindrical and/or disc shape. However, any other shapes(s) may be used instead.

[0023] In operation, the adjuster 108 may be adjusted (e.g., rotated) to support the second end 114 of the bracket 106 relative to the actuator 104 to place the bracket 106 in tension and/or to enable a surface 408 of the bracket 106 to be substantially parallel to the surface 116 of the actuator 104. Once the adjuster 108 is in a desired position, a lock nut 410, which threadably engages the elongate body 212, may be rotated until the lock nut 410 engages the surface 408

to substantially maintain a position of the adjuster 108 relative to the bracket 106 and/or the actuator 104.

[0024] FIG. 5 depicts an example adjustment member or adjuster 500 that may be used to implement the examples disclosed herein. The adjuster 500 includes the elongate body 212 and a base or foot 502. In this example, the foot 502 includes a first portion 504 and a second portion 506, which is coupled to the first portion 504. The first portion 504 defines an aperture 508 that is to receive a tool (not shown) to enable the adjuster 500 to be rotated to change a distance between the second end 114 of the bracket 106 and the actuator 104. The first portion 504 may be composed of a metal material and the second portion 506 may be composed of an elastomeric material.

[0025] Although certain example methods, apparatus and articles of manufacture have been described herein, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all methods, apparatus and articles of manufacture fairly falling within the scope of the appended claims either literally or under the doctrine of equivalents.

CLAIMS

1. A bracket apparatus for use with an actuator and a controller, the bracket apparatus comprising:

a bracket having a first end, a second end, a first side, a second side, and defining first apertures and second apertures, the bracket being adapted to couple the actuator and the controller, the first apertures being adapted to receive fasteners to couple the first end of the bracket to the actuator, one or more of the second apertures being adapted to receive fasteners to couple the controller to the bracket, the actuator to be on the first side of the bracket and the controller to be on the second side of the bracket; and

an adjuster coupled to the bracket and having an end engaged with a surface of the actuator, the adjuster being adapted to vary a distance between the second end of the bracket and the actuator and to support the second end relative to the actuator.

2. The bracket apparatus of claim 1, wherein the bracket is to be substantially parallel to a longitudinal axis of the actuator.

3. The bracket apparatus of claim 1 or 2, wherein the adjuster is to extend through one of the second apertures to couple the controller to the bracket.

4. The bracket apparatus of any one of claims 1 to 3, wherein the adjuster is to threadably engage the controller to couple the adjuster to the bracket.

5. The bracket apparatus of any one of claims 1 to 4, wherein the adjuster comprises an elongate body and a base, the base to engage the actuator, the elongate body to threadably engage one or more of the bracket or the controller to enable the distance between the second end of the bracket and the actuator to vary.

6. The bracket apparatus of claim 5, comprising a locknut to threadably engage the elongate body and to engage the first side of the bracket to secure the position of the elongate body relative to the bracket.

7. The bracket apparatus of claim 5 or 6, comprising an aperture formed in the base to receive a tool to operate the adjuster.

8. The bracket apparatus of any one of claims 5 to 7, wherein the base comprises a disc.
9. The bracket apparatus of any one of claims 5 to 8, wherein the base comprises of elastomeric material to dampen vibrations of the bracket assembly.
10. A bracket apparatus for use with an actuator and a controller, the bracket apparatus comprising:
 - a bracket having a first end, a second end, a first side, a second side, and defining first apertures and second apertures, the bracket being adapted to couple the actuator and the controller, the first apertures being adapted to receive fasteners to couple the first end of the bracket to an actuator, one or more of the second apertures being adapted to receive fasteners to couple a controller to the bracket, the actuator to be on the first side of the bracket and the controller to be on the second side of the bracket; and
 - an adjuster coupled to the bracket and having an end engaged with a surface of the actuator, the adjuster being adjustable to dampen vibrations.
11. The bracket apparatus of claim 10, wherein the bracket is to be substantially parallel to a longitudinal axis of the actuator.
12. The bracket apparatus of claim 10 or 11, wherein the adjuster is to extend through one of the second apertures to couple the controller to the bracket.
13. The bracket apparatus of any one of claims 10 to 12, wherein the adjuster is to threadably engage the controller to couple the adjuster to the bracket.
14. The bracket apparatus of any one of claims 10 to 13, wherein the adjuster comprises an elongate body and a base, the base to engage the actuator, the elongate body to threadably engage one or more of the bracket or the controller to enable a distance between a second end of the bracket and the actuator to change.
15. The bracket apparatus of claim 14, comprising a locknut to threadably engage the elongate body and to engage the first side of the bracket to secure the position of the elongate body relative to the bracket.

16. The bracket apparatus of claim 14 or 15, comprising an aperture defined by the base to receive a tool to engage the adjuster.

17. The bracket apparatus of any one of claims 14 to 16, wherein the base of the adjuster comprises a disc.

18. The bracket apparatus of any one of claims 14 to 17, wherein the base comprises of elastomeric material.

19. A bracket apparatus for use with an actuator and a controller, the bracket apparatus comprising:

a bracket having a first end and a second end opposite the first end, the bracket defining apertures, the bracket being adapted to couple the actuator and the controller, wherein some of the apertures are adapted to receive fasteners to couple the first end of the bracket to the actuator and one or more of the other apertures being adapted to receive fasteners to couple the controller to the bracket; and

means for changing a distance between the second end of the bracket and the actuator, the means for changing a distance having an end engaged with a surface of the actuator and being configured to support the second end of the bracket relative to the actuator to dampen vibrations of the bracket assembly.

20. The bracket apparatus of claim 19, wherein the means for changing a distance between the second end and the actuator is to enable an adjustment of the bracket to be substantially parallel to a longitudinal axis of the actuator.

21. The bracket apparatus of claim 19 or 20, wherein the means for changing a distance between the second end and the actuator comprises an elongate body and a base, the base to engage the actuator, the elongate body to threadably engage one or more of the bracket or the controller to enable the distance between the second end of the bracket and the actuator to change.

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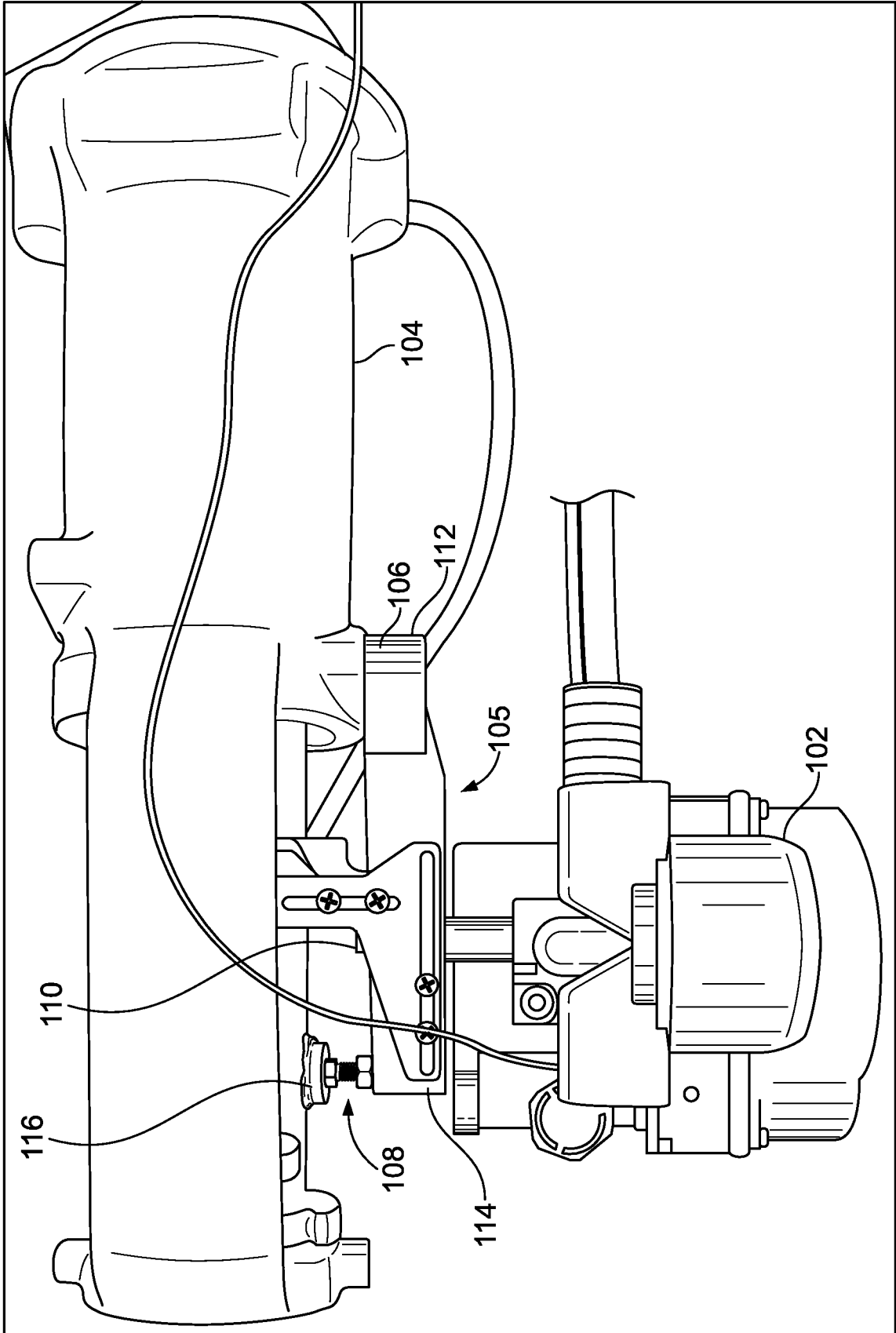


FIG. 1

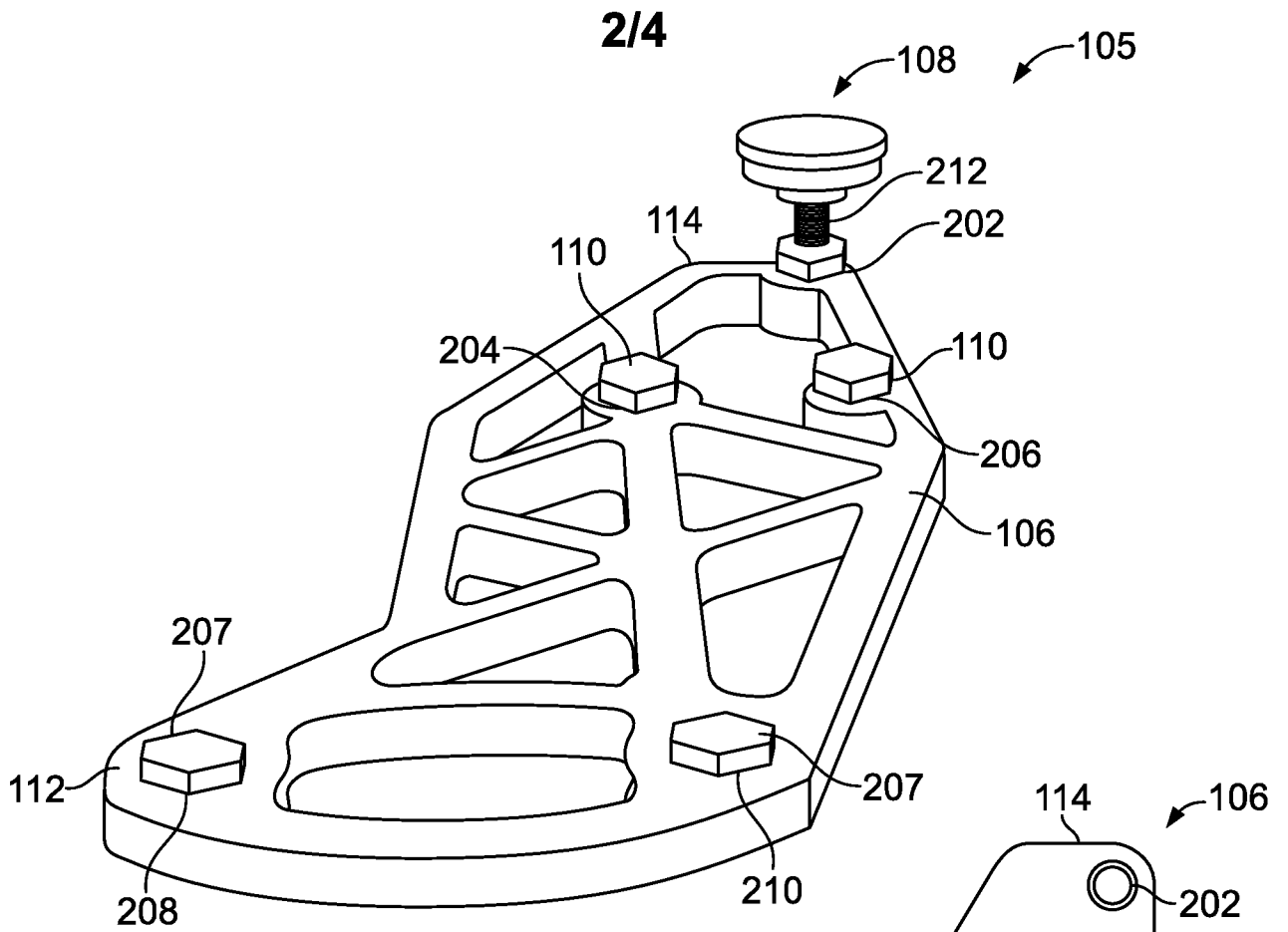


FIG. 2

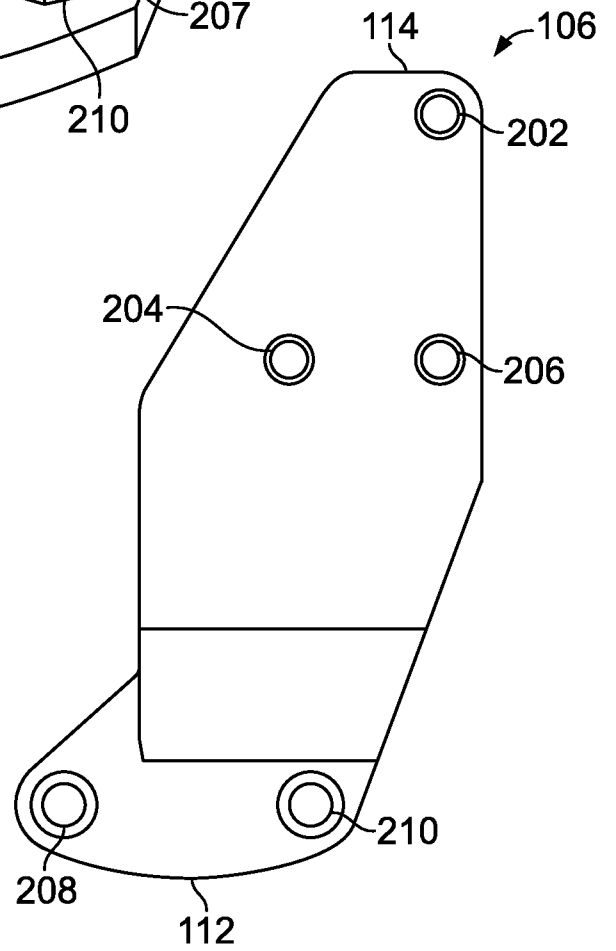


FIG. 3

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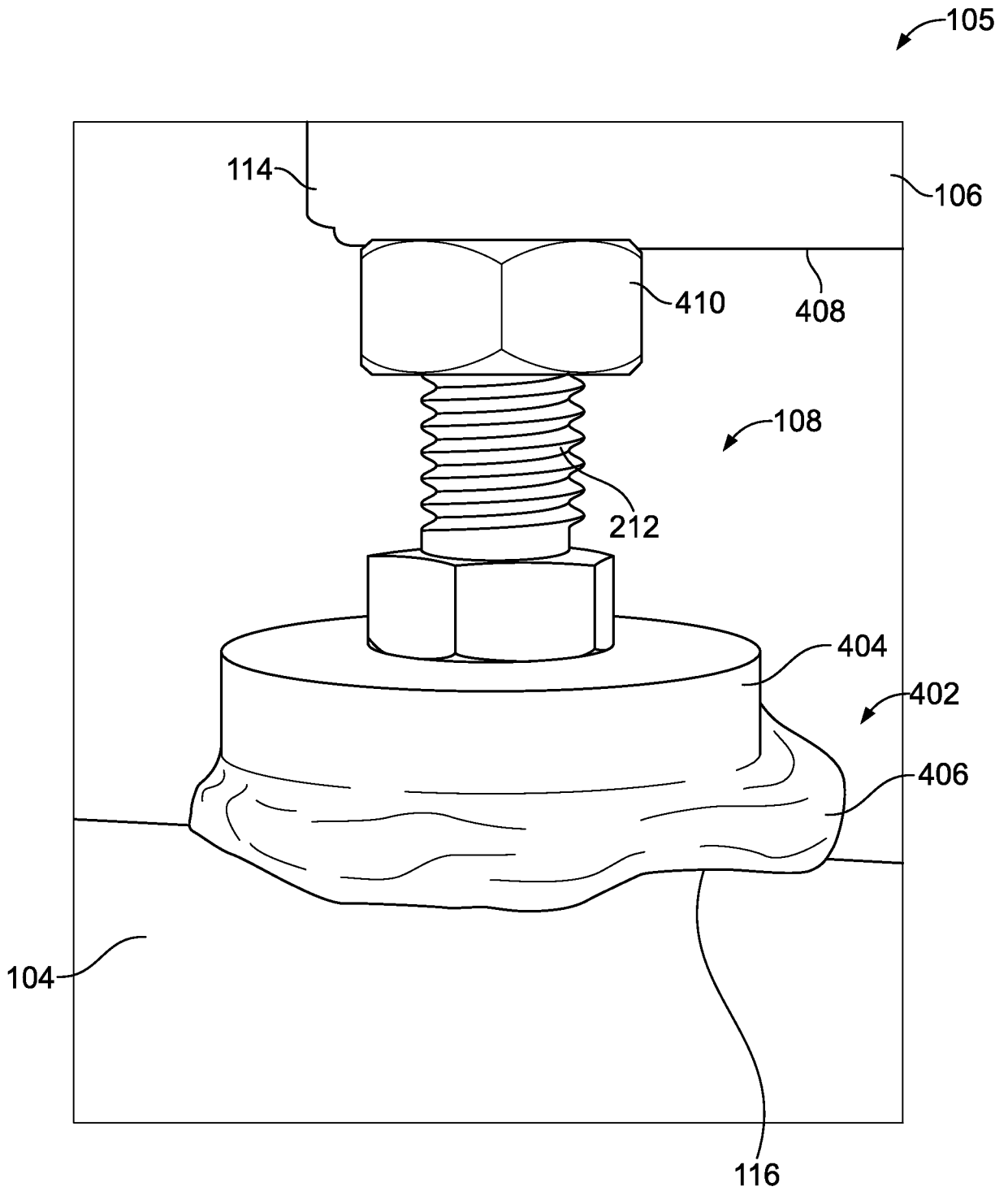


FIG. 4

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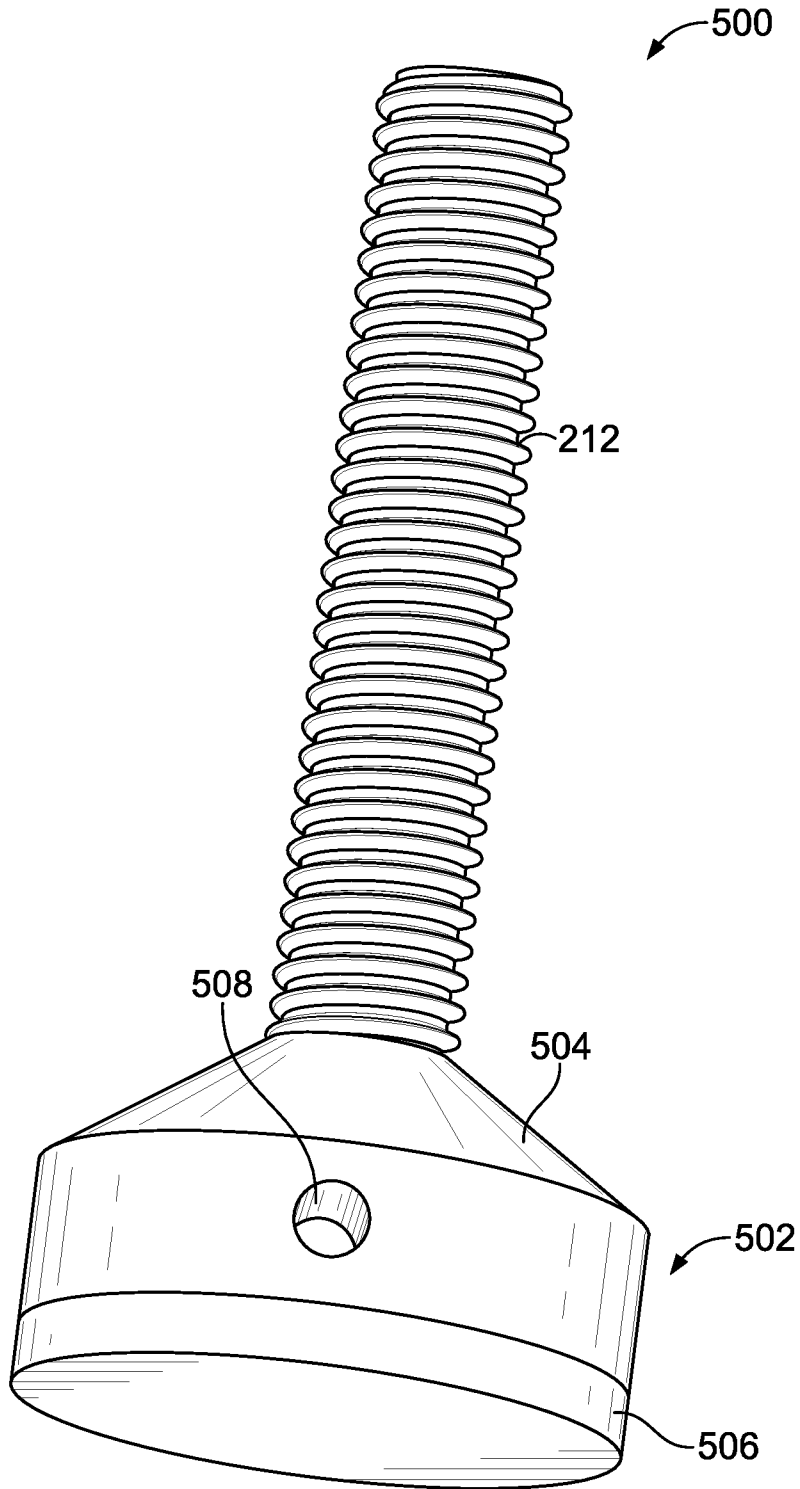


FIG. 5

