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(71) Applicant (for all designated States except US): **TURN-
STYLE INTELLECTUAL PROPERTY, LLC** [US/US];
1001 Front Street, Georgetown, South Carolina 29440
(US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **STULL, Edward J.**
[US/US]; 950 Hummer Lake Rd., Oxford, Michigan 48371
(US).

(74) Agent: **SIRAGUSA, John M.**; Carlson, Gaskey & Olds,
P.C., 400 West Maple Rd., Suite 350, Birmingham,
Michigan 48009 (US).

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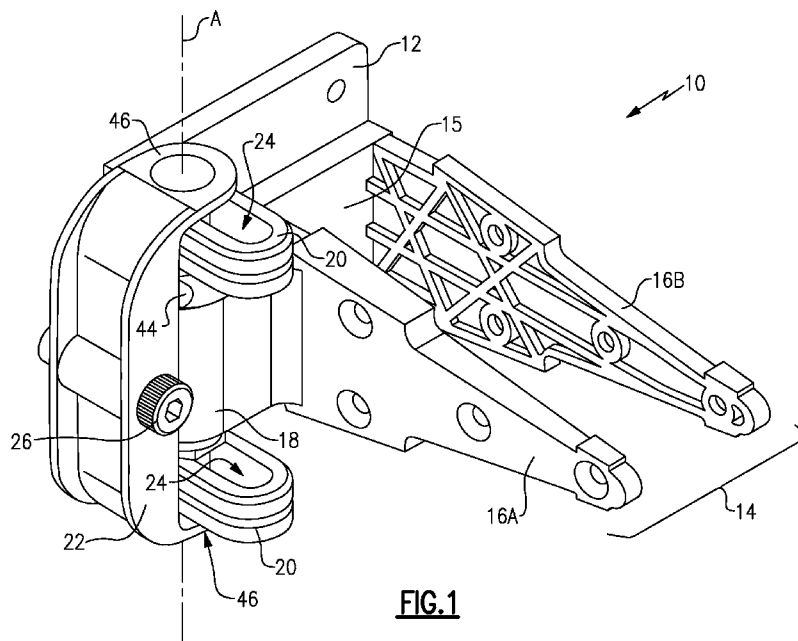


FIG. 1

(57) Abstract: A hinge assembly for supporting a gate includes a mount plate securable to a fixed support. The mount plate includes a pair of arms that define slots. A gate mount is securable to a gate structure such as a rail or panel and includes a pivot housing supported for movement within the slots. Posts supported within the pivot housing provide support for rotation of the gate mount about an axis of rotation relative to the mount plate. A position adjustment member is adapted for moving the pivot housing within the slots for setting a distance between the mount plate and the gate mount.

ADJUSTABLE GATE MOUNTING HINGE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 61/440,949 which was filed on February 9, 2011.

BACKGROUND

[0002] This disclosure generally relates to gate mounting hinge. More particularly, this disclosure relates to a gate-mounting hinge that is adjustable while supporting the gate.

[0003] A gate is typically supported by hinges attached to a fixed post or other fixed structure. One type of gate hinge utilizes a “J” shaped bolt that extends into a portion of a movable gate. A distance between the fixed post and the gate is adjusted to provide a desired gate alignment with another gate or a second fixed post. This distance is typically adjustable by rotating the “J” bolt. As appreciated, because the vertical portion of the “J” bolt is required to be facing in a given direction, adjustment is limited to a complete turn of the bolt. In other words, to adjust the distance and thereby gate alignment, the “J” bolt must be turned a full turn. Moreover, the adjustment can only be accomplished with the “J” bolt free of the gate. In such instances, it can be difficult to determine if the gate is properly adjusted until reassembled and therefore increase the effort and time required to provide a desired alignment of the gate assembly.

[0004] Moreover, some gate hinges include a return spring that biases the hinge and gate toward a closed position. The size and shape of gate panels vary widely and therefore such hinges are sometimes provided with an incremented spring adjustment mechanism. Such spring adjustments are movable at specified increments to provide different spring biasing forces. However, such incremental adjustment devices require some degree of disassembly that complicates any such adjustment. Moreover, incremental adjustment results in spring positions that are not precisely as desired.

SUMMARY

[0005] A disclosed example hinge assembly for supporting a gate includes a mount plate securable to a fixed support. The mount plate including at least a pair of arms that define slots. A gate mount securable to a gate structure such as a rail or panel includes a pivot housing supported for movement within the slots. At least one post is supported within the pivot housing for supporting rotation of the gate mount about an axis of rotation relative to the mount plate. A position adjustment member is adapted for moving the pivot housing within the slots for setting a distance between the mount plate and the gate mount.

[0006] The hinge assembly further includes a pivot ball disposed at one end of the at least one post for supporting rotation about the axis. A biasing spring is supported within the pivot housing for biasing the gate mount toward a closed position. A spring adjustment mechanism including a worm gear rotatable responsive to rotation of a spring adjustment screw for adjusting a biasing force of the biasing spring. The position adjust member moves the pivot housing relative to the mount plate for defining a spacing between the axis of rotation and the mount plate without removing the hinge or gate member.

[0007] Although the different examples have the specific components shown in the illustrations, embodiments of this invention are not limited to those particular combinations. It is possible to use some of the components or features from one of the examples in combination with features or components from another one of the examples.

[0008] These and other features disclosed herein can be best understood from the following specification and drawings, the following of which is a brief description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Figure 1 is a schematic view of an example gate hinge assembly.

[0010] Figure 2 is a cross-sectional view of the example gate hinge assembly.

[0011] Figure 3A is a top view of the example gate hinge assembly in a closed position.

[0012] Figure 3B is a top view of the example gate hinge assembly in a fully opened position.

[0013] Figure 4A is a top view of the example gate hinge assembly adjusted out from a mounting bracket.

[0014] Figure 4B is a top view of the example gate hinge shown in Figure 4A in a fully open position.

DETAILED DESCRIPTION

[0015] Referring to Figure 1, an example gate hinge assembly 10 includes a mount plate 12 for mounting the hinge to a fixed object such as a fixed post. Pivotaly attached to the mount plate 12 is a gate mount assembly 14. The example gate mount assembly 14 includes a first arm 16a and a second arm 16b that receive a gate panel or other gate structure. The arms 16a and 16b extend from a back plate 15. The back plate 15 is integrally formed as single continuous member to include a pivot housing 18. A pivot and biasing mechanism is at least partly housed within the pivot housing 18. The pivot housing 18 is in turn mounted on outwardly extending arms 20 that extend from and that are integrally formed as part of the base 12. An adjustment housing 22 engages portions of the pivot assembly that extend from the pivot housing 18 to secure the gate mount assembly 14 in a selectively movable manner such that the gate mount 14 may rotate about the axis A.

[0016] The first arm 16a and the second arm 16b are disposed on opposite sides of the gate panel or gate structure such that a fastener can extend through each of the arms 16a, 16b and the gate structure. The through bolting of the gate constrains movement of the gate and prevents pull out that could occur should the gate structure be secured from only one side. Moreover, securing a gate structure with arms 16a, 16b on each side reduces stress on the fastener joint as compared to securement being provided only from one side of a gate structure.

[0017] The mount arms 20 that extend from the mount plate 12 define slots 24. The adjustment housing 22 and pivot assembly within the pivot housing 18 are movable within the slots 24 to adjust a space between the gate mount and the mount plate 12. The adjustment housing 22 engages the pivot assembly about the axis A and includes an adjustment screw 26 that provides desired calibrated movement within the slots 24 defined by the arms 20.

[0018] Referring to Figure 2 with continued reference to Figure 1, the pivot assembly is disposed within the pivot housing 18 and includes a spring 38 mounted to a spring base 32. The spring base 32 extends the substantial length of the interior space defined by the pivot housing 18. A worm gear 36 is rotatably mounted to an exterior surface of the spring base 32 and receives a first end 42 of the spring 38. The spring base 32 includes a slot 34 that receives a second spring end 40. The worm gear 36 is rotatable responsive to rotation of a spring adjustment screw 44 for adjusting a biasing force of the spring 38. The example spring adjustment screw 44 includes gear teeth that mate with teeth formed on the worm gear 36. Rotation of the spring adjustment screw 44 results in corresponding rotation of the worm gear 36. This rotation varies changes spring strength that is provided by the spring 38. The combination of the spring screw 44 and the worm gear 36 provides an infinite number of adjustable spring positions that can be accomplished by rotating this spring adjustment screw 44. In other words the adjustment screw 44 and worm gear 36 provide an infinitely variable adjustment of the biasing force provided by the spring 38. No disassembly of any part of the example hinge 10 is required to accomplish adjustment of the spring 38.

[0019] The pivot housing 18 also supports pivot posts 48 that are disposed within the spring base 32 and concentric about the axis A. Each of the posts 48 is supported on a pivot ball 50. The ends of the pivot housing 18 are closed off by caps 28. These caps 28 are received within end portions 46 of the adjustment housing 22. Inside caps 30 are disposed on an end opposite the outside caps 28 to trap the pivot housing within the slots 24 defined by the arms 20 of the mount plate 12. The pivot posts 48 are disposed within a cavity 52 defined within the spring base 32. In this example, the spring base 32 extends from a first end that also receives a first spring end 40 upward to a distal end that supports the worm gear 36. The worm gear 36 is, in turn, engaged to the second end 42 of the return spring 38.

[0020] Referring to Figures 3A and 3B, the example adjustable hinge assembly 10 is shown mounted to a post 68 and holding a fence or gate member 66 (Figure 3A). The gate member 66 is attached to the gate mount 14 through attachment to the arms 16a and 16b by fasteners 58. In this example, the fasteners 58 extend through openings 60 within each of the arms 16a and 16b to extend into the gate member 66. In this example, the fasteners 58 are

threaded members that are supported within the material comprising the fence member 66. Moreover, the fasteners may also include a threaded screw 62 that extends entirely through the fence element 66 and is secured on a distal end by a nut 64. As appreciated, any known fastener could be utilized within the contemplation of this invention to secure the gate 66 to the gate mount 14.

[0021] The gate mount 14 is adjustable a distance 56 between the back plate 15 and the mount plate 12. Adjustment is provided by moving the pivot housing 18 supported within the upper and lower arms 20 within the slots 24. Movement of the pivot assembly 18 within the slots 24 is facilitated responsive to rotation of the adjustment screw 26. The adjustment screw 26 is housed within the adjustment housing 22 and is engaged to a screw base 54 that is formed integrally with the base 12. The screw base 54 is secured to the fixed structure 12 while the gate holding portion 14 is movable about the spring base 32. The adjustment screw 26 is captured within the adjustment base 22 such that the adjustment base 22 moves responsive to threading of the adjustment screw 26 toward or away from the base 12. Rotation of the adjustment screw provides for the infinitely variable adjustment of the spacing between the mount plate 12 and the pivot assembly 18.

[0022] Referring to Figure 3B, the gate mount 14 is movable to an open position by swinging about the axis A. The biasing spring 38 exerts the biasing force that drives the gate mount 14 back towards a closed position against the mount plate 12. The strength or biasing force exerted by the spring 38 towards the closing direction is adjusted by turning adjustment screw 44.

[0023] Referring to Figures 4A and 4B, an adjusted position is shown where the distance 56 has been lengthened in comparison to the distance indicated in Figures 3A and 3B. The adjustment of the distance 56 is facilitated by rotation of the screw 26. The screw 26 is captured within the adjustment housing 22 and thereby causes movement to carry the pivot housing 18 within the slot 24. As is shown in Figures 4A and 4B, the pivot housing 18 is disposed at its outermost distance 56 from the mount plate 12.

[0024] As should be appreciated, the pivot housing 18 can be set at any point within the slots 24 to set the desired distance 56 between the mount plate 12 and the back plate 15. As

appreciated, the distance 56 between the back plate 15 and the mount plate 12 will correspond to a gap between an end of a gate and another gate or an opposite post. Accordingly, the spacing of the gate assembly with an opening is adjusted by setting features of the example hinge assembly 10. Moreover, each gate will utilize at least two gate hinge assemblies 10. Therefore separate adjustment of each hinge assembled to a gate member can provide for vertical centering and alignment within an opening.

[0025] The gate mount 14 could be moved to provide any desired distance from the back plate 12 within the range facilitated by the slot 24 defined by the arms 20. The example screw 26 may include outer serrations to provide for manual turning or may also include an interface to accept a tool such as an Allen wrench or screwdriver to facilitate further adjustment as is desired. Moreover, the adjustment screw 26 is captured within the adjustment housing 22 such that rotation of the screw 26 will not result in the screw 26 being removed from the adjustment housing 22 but instead will result in movement of the adjustment housing 22 along the spring base 54.

[0026] Accordingly, the disclosed example gate hinge assembly provides for not only adjustment of the opening and closing force exerted on the gate but also provides for adjustment of the gate by movement of the gate mount relative to the mounted base plate.

[0027] Although an example of the mounting hinge has been disclosed, a worker of ordinary skill in this art would recognize that certain modifications would come within the scope of this disclosure. For that reason, the following claims should be studied to determine the true scope and content of this invention.

CLAIMS

What is claimed is:

1. A hinge assembly for supporting a gate within an opening of a fence comprising:
 - a mount plate securable to a fixed support, the mount plate including at least a pair of arms that define slots;
 - a gate mount securable to a gate structure, the gate mount including a pivot housing supported for movement within the slots;
 - at least one post supported within the pivot housing for supporting rotation of the gate mount about an axis of rotation relative to the mount plate; and
 - a position adjustment member adapted for moving the pivot housing within the slots for infinitely varying a distance between the mount plate and the gate mount.
2. The hinge assembly as recited in claim 1, including a pivot ball disposed at one end of the at least one post for supporting rotation about the axis.
3. The hinge assembly as recited in claim 2, wherein the at least one post includes first and second posts supported within the pivot housing and a corresponding pivot ball disposed at an end of each of the first and second posts for supporting rotation about the axis.
4. The hinge assembly as recited in claim 1, including a biasing spring supported within the pivot housing for biasing the gate mount toward a closed position.
5. The hinge assembly as recited in claim 4, including a spring adjustment mechanism including a worm gear rotatable responsive to rotation of a spring adjustment screw for infinitely varying a biasing force of the biasing spring.
6. The hinge assembly as recited in claim 5, wherein the biasing spring is disposed about the at least one post.

7. The hinge assembly as recited in claim 1, wherein the position adjustment member comprises a threaded member disposed within the pivot housing and engaged to the mount plate such that rotation of the threaded member generates movement of the pivot housing relative to the mount plate.
8. The hinge assembly as recited in claim 1, wherein the position adjust member moves the pivot housing relative to the mount plate for defining a spacing between the axis of rotation and the mount plate.
9. The hinge assembly as recited in claim 1, wherein the gate mount includes first and second arms for securing a gate structure therebetween, wherein a fastening member extends through each of the first and second arms and the gate structure for holding the gate structure.
10. A hinge assembly for supporting a gate within an opening of a fence comprising:
- a mount plate securable to a fixed support, the mount plate including at least one arm that defines at least one slot;
 - a gate mount securable to a gate structure, the gate mount including a pivot housing supported for movement within the at least one slot;
 - at least one post supported within the pivot housing for supporting rotation of the gate mount about an axis of rotation relative to the mount plate; and
 - a pivot ball disposed at one end of the at least one post for supporting rotation about the axis;
 - a biasing spring supported within the pivot housing for biasing the gate mount toward a closed position; and
 - a spring adjustment mechanism including a worm gear rotatable responsive to rotation of a spring adjustment screw for adjusting a biasing force of the biasing spring.

11. The hinge assembly as recited in claim 10, including a position adjustment member adapted for moving the pivot housing within the at least one slot for setting a distance between the mount plate and the gate mount.

12. The hinge assembly as recited in claim 11, wherein the position adjustment member comprises a threaded member disposed within the pivot housing and engaged to the mount plate such that rotation of the threaded member generates movement of the pivot housing relative to the mount plate.

13. The hinge assembly as recited in claim 11, wherein the position adjustment member moves the pivot housing relative to the mount plate for defining a spacing between the axis of rotation and the mount plate.

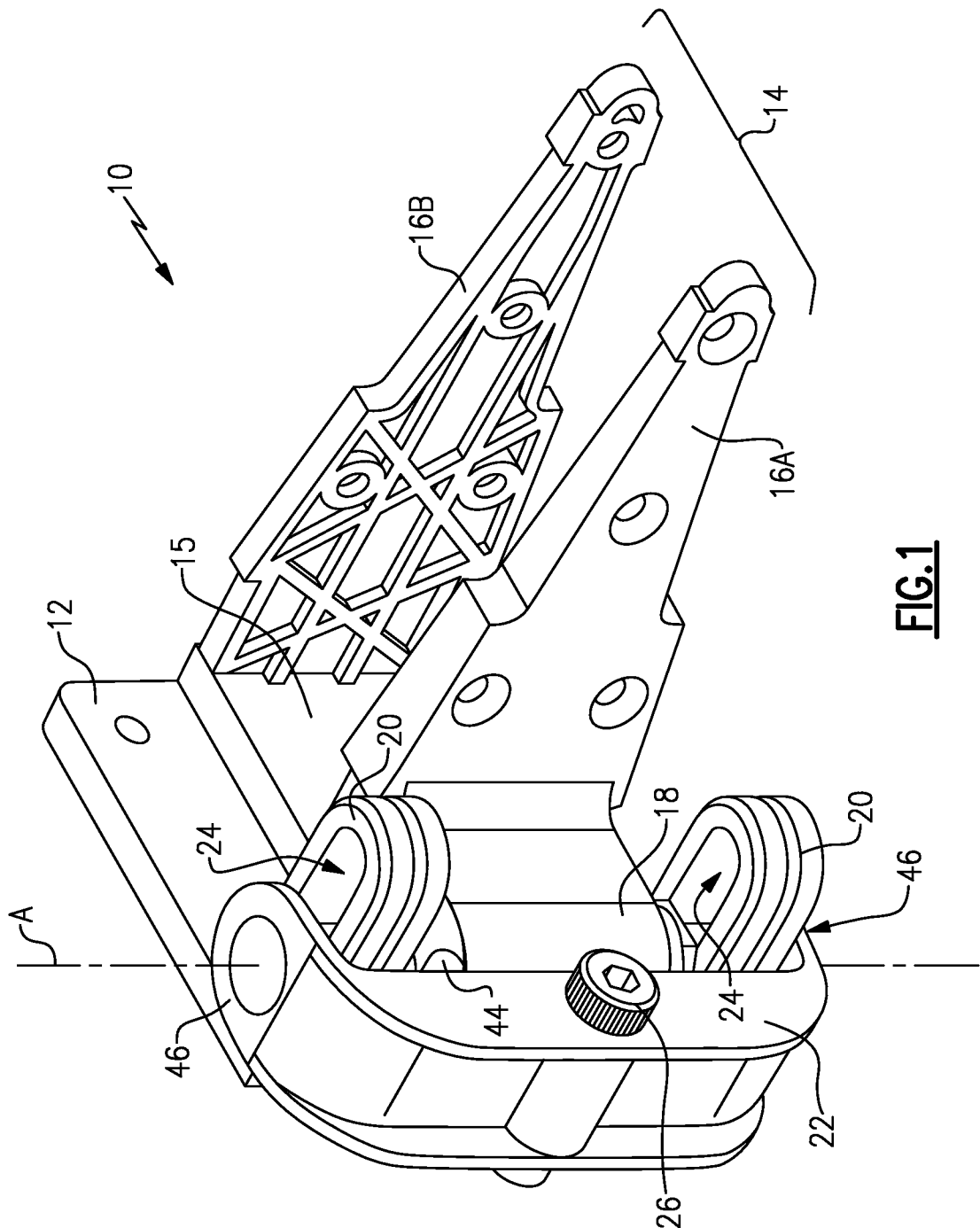
14. The hinge assembly as recited in claim 10, wherein the biasing spring is disposed about the at least one post.

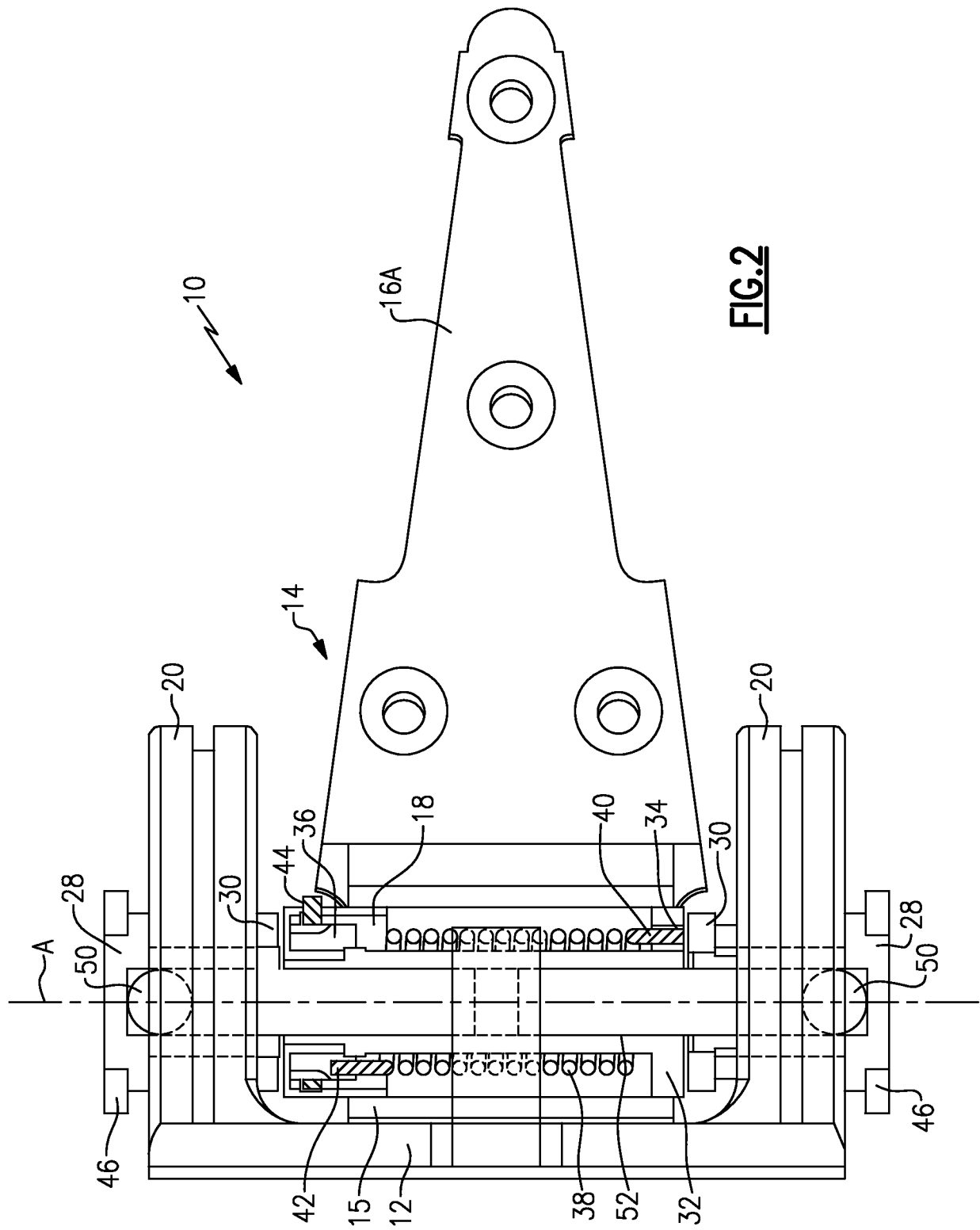
15. The hinge assembly as recited in claim 10, wherein the at least one post comprises two posts supported within the pivot housing and a pivot ball disposed at an end of each of the two posts for supporting rotation of the gate mount about the axis of rotation.

16. The hinge assembly as recited in claim 10, wherein the at least one arm that defines the at least one slot extends outward perpendicular to the axis of rotation.

17. The hinge assembly as recited in claim 16, wherein the at least one arm comprises first arm defining a first slot disposed on a first side of the pivot housing and a second arm defining a second slot disposed on a second side of the pivot housing.

18. The hinge assembly as recited in claim 10, wherein the gate mount includes first and second arms for securing a gate structure therebetween, wherein a fastening member extends through each of the first and second arms and the gate structure for holding the gate structure.





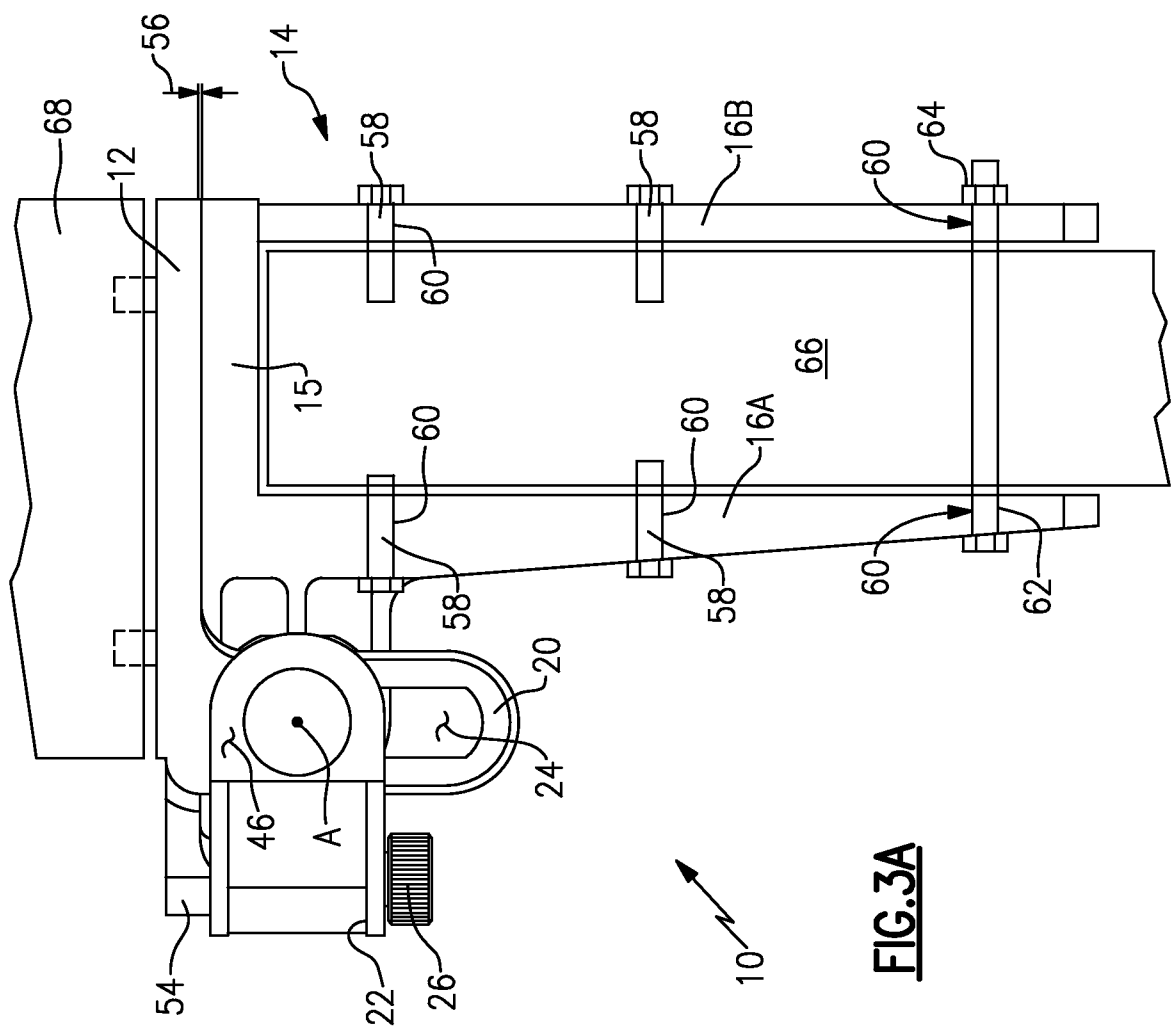


FIG. 3A

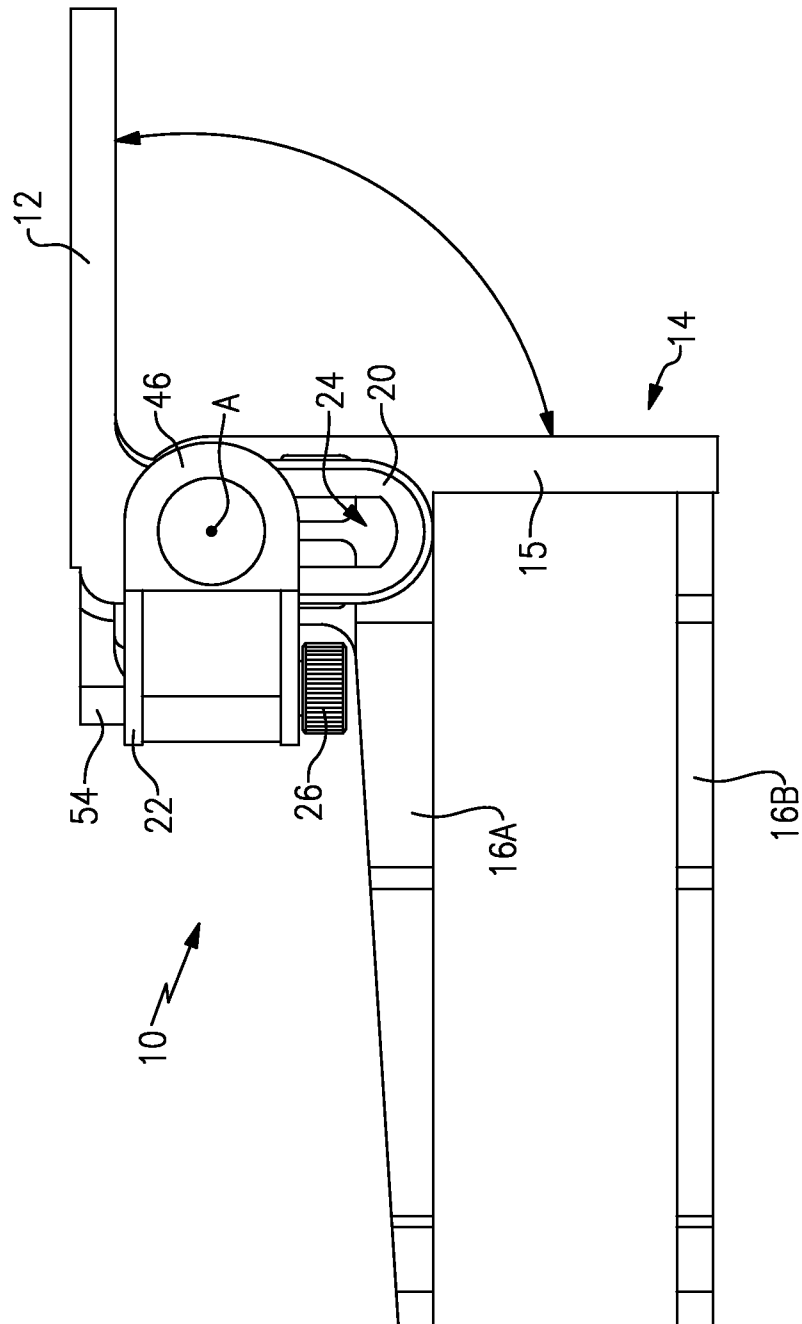


FIG. 3B

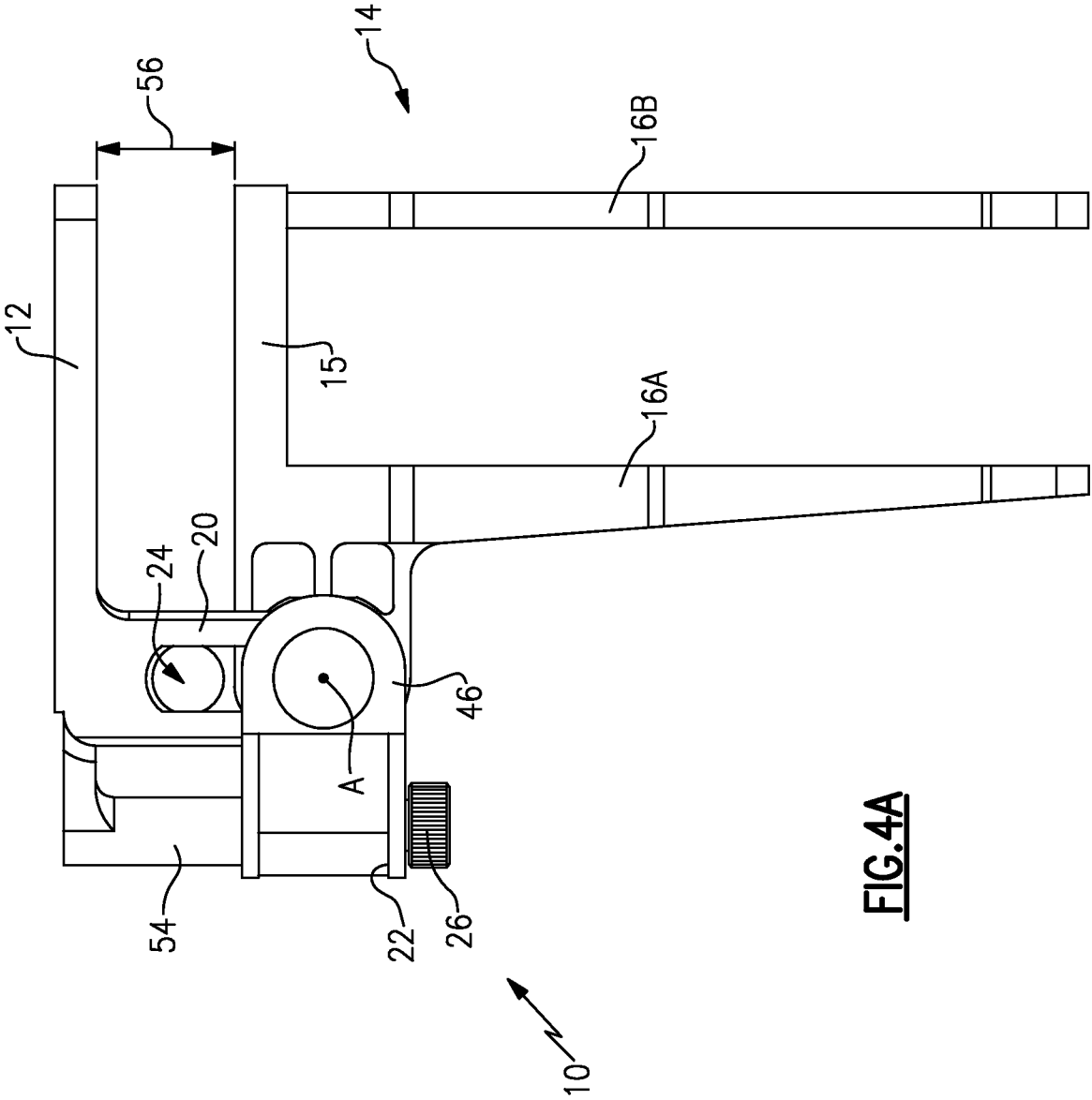
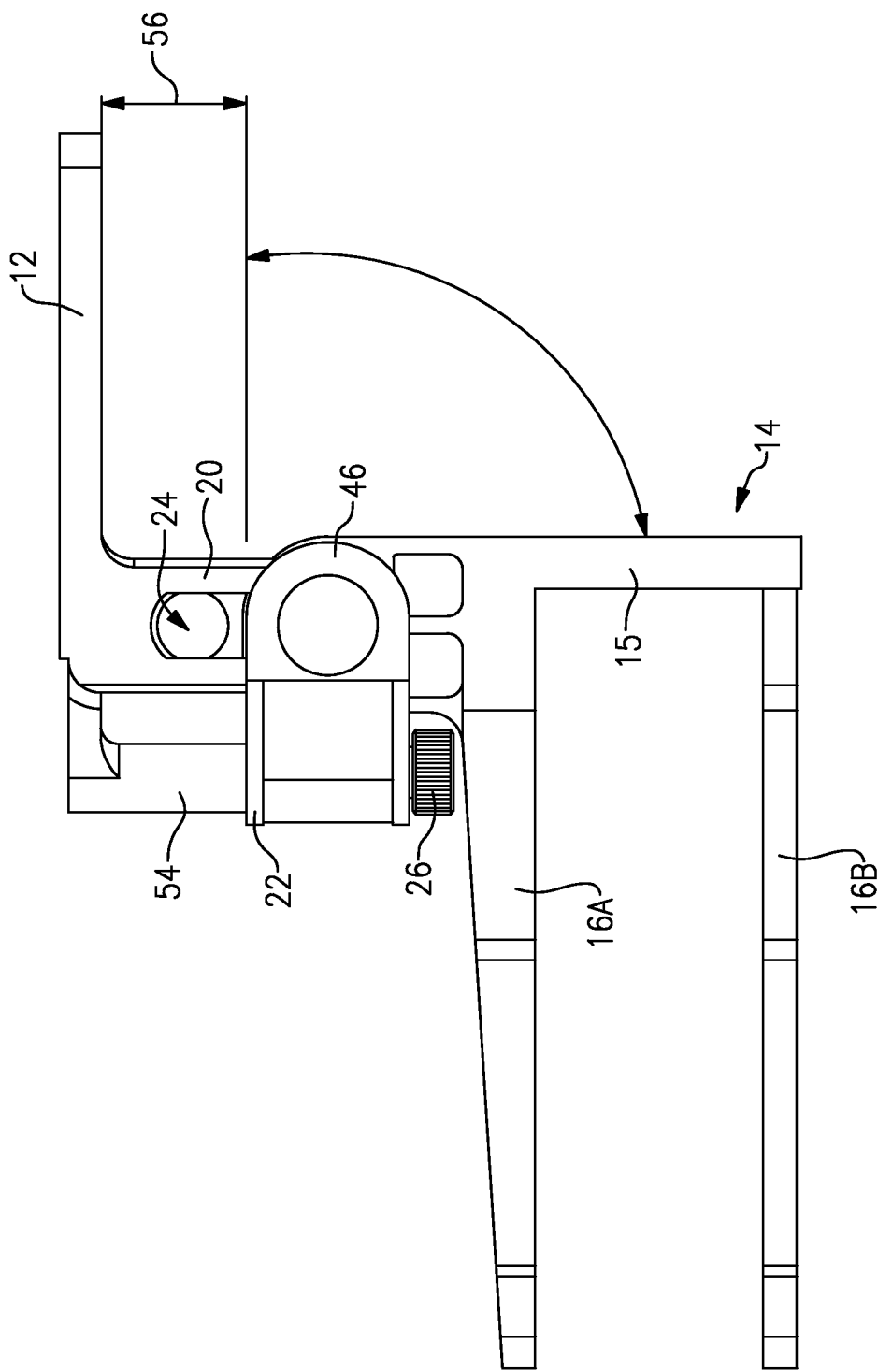


FIG. 4A



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/024408

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E05D 7/04 (2012.01)

USPC - 16/238

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - E05D 7/04; E05F 1/12, 7/00 (2012.01)

USPC - 16/86.1, 221, 235, 237, 238, 242, 244, 245, 246; 49/381, 386

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patents, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0241106 A1 (SOSA et al) 03 November 2005 (03.11.2005) entire document	1,4, 9
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Y		2-3, 5-6, 10-11, 14-18
Y	WO 2010/094083 A1 (KING et al) 26 August 2010 (26.08.2010) entire document	2-3, 10, 11, 14-18
Y	US 6,397,432 B1 (DI VINADIO) 04 June 2002 (04.06.2002) entire document	3, 15
Y	DE 20 2010 009 919 U1 (HOMNER et al) 04 November 2010 (04.11.2010) entire document	5-6, 10, 11, 14-18
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