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A VEHICLE BIN ASSEMBLY

Abstract

A road or rail bin assembly (10) to transport a flowable material, the assembly (10) including:
a chassis (55) for movement in a predetermined direction, the chassis (55) being longitudinally elongated in said direction;
a bin (11) having an open top and mounted on the chassis (55) for angular movement generally transverse of said direction between a transport position at which said open top is generally upwardly facing, and a discharge position at which the open top faces at least partly horizontally to provide for discharge under gravity of the material from within the bin (11) via said open top;
a lid (20) mounted on the chassis (55) and configured to cover at least a portion of the open top, the lid (20) being mounted on the chassis (55) for angular movement generally transverse of said direction between a covering position at least partly covering said open top when the bin (11) is in the transport position, and an open position at which the lid (20) is spaced laterally relative to said direction from the covered position; and wherein
the angular movement of said bin (11) from the transport position to the discharge position is in a first angular direction, and the angular movement of the lid (20) moves from the covered position to the open position in a second angular direction that is opposite said first angular direction.

A VEHICLE BIN ASSEMBLY

Related Applications

[0001] This application is a divisional application of Australian Patent Application No. 2019261723 claims priority from Australian Provisional Patent Application No. 2018904695 filed on 10 December 2018, whose specifications as originally filed are hereby incorporated by reference in their entirety.

Field

[0002] The present invention relates to transportable bins having a cover (lid) to close the open top of the bin during transportation, and more particularly but not exclusively to road mobile bins that are tilted to empty the bins.

Background

[0003] Road and rail bins used to transport bulk materials such as mined materials, are frequently tilted about a longitudinal axis to discharge the contents of the bin through a side door that is movable between a closed position and an open position. These bins have an open top that is required to be covered. Frequently this will entail the use of tarps that are tied down. There are also roll tarp assemblies that are frequently motor driven. A still further means of covering the top of the bin is a lid that is pivotally mounted adjacent one longitudinal edge of the bin and via a hydraulic motor or other means the lid is movable between a closed position and an open position.

[0004] Tie down tarps have the disadvantage that they are very time consuming. Roll tarp assemblies are prone to damage and are unreliable. Pivot lid type assemblies suffer from the disadvantage that they project upwardly from the bin and therefore cannot be used in areas where there is limited “head room”. For example, the lid when in the open position can prevent the bin being located under a hopper and may prevent the lid being raised while in a work shed. There is also the disadvantage that the trailer hauling the bin may be unbalanced when the lid is in the open position due to the weight of the lid, and weight of the bin.

Object

[0005] It is the object of the present invention to substantially overcome or ameliorate at least one of the above disadvantages.

Summary of Invention

[0006] There is disclosed herein a road or rail bin assembly to transport a flowable material, the assembly including:

a chassis for movement in a predetermined direction, the chassis being longitudinally elongated in said direction;

a bin having an open top and mounted on the chassis for angular movement generally transverse of said direction between a transport position at which said open top is generally upwardly facing, and a discharge position at which the open top faces at least partly horizontally to provide for discharge under gravity of the material from within the bin via said open top;

a lid mounted on the chassis and configured to cover at least a portion of the open top, the lid being mounted on the chassis for angular movement generally transverse of said direction between a covering position at least partly covering said open top when the bin is in the transport position, and an open position at which the lid is spaced laterally relative to said direction from the covered position; and wherein

the angular movement of said bin from the transport position to the discharge position is in a first angular direction, and the angular movement of the lid moves from the covered position to the open position in a second angular direction that is opposite said first angular direction.

[0007] Preferably, said bin has a width transverse of said direction, and said lid has a width transverse of said direction, with the transverse width of the lid having a vertical component of extension when the lid is in the open position.

[0008] Preferably, said transverse width of the lid is oriented generally vertically when the lid is in the open position.

[0009] Preferably, the lid is displaced laterally, relative to said direction, from said bin when the lid is in the open position and the bin is in the transport position, such that the lid isspaced from the bin.

[00010] Preferably, said open top faces at least partly downward when in said discharge position.

[0010] Preferably, said chassis has a base providing opposite first and second side portions, said first and second side portions extending generally in said direction, said lid being pivotally attached to said base adjacent said first side portion, and said bin being pivotally attached to said base adjacent said second side portion.

[0011] Preferably, said assembly includes a mounting bracket mounted to said base and extending generally upwardly from said base adjacent said first side portion, said mounting bracket having an upper end portion to which said lid is pivotally attached.

[0012] Preferably, said assembly includes an arm having opposite first and second end portions, and a link having opposite first and second end portions, with said arm first end portion and said link first end portion being pivotally attached to said lid, and said arm second end portion and said link second end portion being pivotally attached to said upper end portion of said mounting bracket.

[0013] Preferably, said mounting bracket includes a first pivot located at said upper end portion, and a second pivot located at said upper end portion, said first pivot being spaced upwardly from said second pivot, said link second end portion being pivotally attached to said first pivot, and said arm second end portion being pivotally attached to said second pivot.

[0014] Preferably, said lid is of a rectangular configuration so as to have a pair of longitudinally extending side edges and a pair of transversely extending end edges joining the longitudinal edges, with said arm first end portion being pivotally attached to said lid adjacent one of said longitudinally extending side edges, and said link first end portion being pivotally attached to said lid adjacent the other of said longitudinally extending side edges.

[0015] Preferably, said assembly includes a motor to provide for the angular movement of said lid, said motor having opposite first and second end portions, said motor first end portion being pivotally attached to said arm intermediate the end portions of the arm, and said motor second end portion being pivotally attached to said base adjacent said second side portion.

[0016] Preferably, said motor is a hydraulic ram.

Brief Description of Drawings

[0017] A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings wherein:

[0018] Figure 1 is a schematic end perspective view of a road or rail bin assembly;

[0019] Figure 2 is a further end perspective view of the assembly of Figure 1 with a lid of the assembly shown in an open position;

[0020] Figure 3 is a further end perspective view of the assembly of Figure 1 with a bin of the assembly shown in a discharge position;

[0021] Figure 4 is a schematic isometric view of the assembly of Figure 3; and

[0022] Figure 5 is a further isometric view of the assembly of Figure 3.

Description of Embodiments

[0023] In the accompanying drawings there is schematically depicted a road or rail bin assembly 10 that would be typically a road trailer forming part of a road train to transport a flowable material (not shown). The assembly 10 includes a chassis 55 for movement in a predetermined direction D (shown in FIG. 4), the chassis 55 being longitudinally elongated in the direction D. The chassis 55 has a base 56 providing opposite first and second side portions 56a,b (shown in FIG. 4) extending generally in the direction D.

[0024] The assembly 10 includes a bin 11 having an open top and pivotally attached to the base 56 by a pivot 54 providing a pivot axis 58 (shown in FIG. 4) adjacent the second side portion 56b for angular movement generally transverse of the direction D between a transport position at which the open top is generally upwardly facing (shown in FIGs. 1 and 2), and a discharge position (shown in FIGs. 3, 4 and 5) at which the open top has a horizontal facing component of direction and a downward facing component of direction to provide for discharge under gravity of the material from within the bin 11 via the open top. The angular movement of the bin 11 from the transport position to the discharge position is in a first angular direction α (shown in

FIG. 3). A hydraulic ram 53 extends between the base 56 and the bin 11 and is operable to cause tilting of the bin 11 to empty the bin 11. The axis 58 generally extends in the direction D.

[0025] The bin 11 is of a general rectangular form so as to have longitudinally extending side walls 12 and 13 and transverse end walls 14 (shown in FIG. 4) providing a width transverse of the direction D. The walls 12, 13 and 14 provide a rectangular rim 15 that surrounds the open top of the bin 11. The rim 15 includes longitudinally extending rim portions 16 and 17 and transverse rim portions 18 extending between the rim portions 16 and 17 located on opposite sides of the opening. A floor 19 joins the walls 12, 13 and 14 so that the walls 12, 13 and 14 extend upwardly therefrom.

[0026] Pivotally attached to the base 56 adjacent the first side portion 56a is a lid 20 for angular movement generally transverse of the direction D between a covering position covering the open top when the bin 11 is in the transport position (shown in FIG. 1), and an open position at which the lid 20 is spaced laterally relative to the direction D from the covered position (shown in FIGs. 2-5). The angular movement of the lid 20 moves from the covered position to the open position in a second angular direction β that is opposite the first angular direction α (shown in FIG. 3).

[0027] The lid 20 is generally rectangular in configuration so as to have longitudinally extending edges 22 and transverse edges 23 providing a width transverse of the direction D. With reference to FIG. 2, when in the open position the transverse width of the lid 20 is oriented generally vertically and is spaced laterally relative to the direction D from the bin 11 when the bin 11 is in the transport position so as to be spaced from the bin 11. As best seen in FIG. 2, the lid 20 when in the open position is partly located lower than the rim portion 17 of the bin 11 when the bin 11 is in the transport position.

[0028] With reference to FIG. 4, the lid 20 includes a frame 25 consisting of longitudinally extending beams 26 joined by transverse brace members 27. A stiff cover sheet (typical sheet metal) 57 is fixed to the frame 25 so as to be supported thereby. The frame 25 also includes end beams 28 to which the beams 26 are attached at their end extremities.

[0029] Each end beam 28 has operatively associated with it an arm 29. The arm has a first end portion 31 and a second end portion 32. The beam 28 has end portions 33 and 34, with the end

portion 31 being pivotally attached to the beam 28 intermediate the end portions 33 and 34 but spaced toward the end portion 33. The end portion 32 is pivotally attached to a mounting bracket 35 fixed to the base 56 and extending generally upwardly from the base 56 adjacent the first side portion 56a. The end portion 31 is pivotally attached to the beam 28 by a pivot 36 providing a pivot axis 37. The end portion 32 is pivotally attached to the mounting bracket 35 at an upper end portion of the mounting bracket 35 by a pivot 38 providing a pivot axis 39.

[0030] With reference to FIG. 2, also extending between the beam 28 and the mounting bracket 35 is a link 40, having an end portion 41 pivotally attached to the upper end portion of the mounting bracket 35 by a pivot 42 providing a pivot axis 43 (FIG. 4). The pivot 42 is spaced upwardly from the pivot 38. The link 40 also has an end portion 44 pivotally attaching the link 40 to the beam 28 via a pivot 45, providing a pivot axis 46. The axes 37, 39, 43 and 46 are generally parallel and extend longitudinally of the assembly 10.

[0031] The pivot 45 is located intermediate the end portions 33 and 34 but is spaced toward the end portion 34. Accordingly the pivots 36 and 45 are spaced transversely of the assembly 10. The pivots 38 and 42 are also spaced transverse of the assembly 10.

[0032] A motor in the form of a hydraulic ram 47 extends between a mounting bracket 48 (fixed to the base 56 adjacent the second side portion 56b as illustrated in FIG. 5) and the arm 29. More particularly hydraulic ram 47 is pivotally attached to the mounting bracket 48 by means of a pivot 49 providing a pivot axis 50. The ram 47 is also pivotally attached to the arm 29 by a pivot 51 providing a pivot axis 52. The axes 50 and 52 are parallel to the axes 37, 39, 43 and 46. The pivot 52 is located intermediate the end portions 31 and 32 of the arm 29.

[0033] By the delivery of hydraulic fluid under pressure to the hydraulic ram 47, the arm 29 is caused to pivot about the axis 37, in turn causing the link 40 to pivot about the axis 43 and ultimately the beam 28 to move angularly in the second angular direction β. The link 40 has a length shorter than a length of the arm 29 so that as the lid 20 moves from the covering position to the open position, the beams 28 of the lid 20 initially move upwardly and subsequently tilt thereby minimising vertical travel of the lid 20.

[0034] In the assembly 10, the pivots 36, 38, 42, 45, 49 and 51 are arranged generally in a single plane that is generally transverse of the assembly 10.

[0035] The assembly 10 has the advantage that the bin 11 can be tilted independently to the lid 20 and in an opposite angular direction to the lid 20 when the lid 20 is in the open position to minimise the amount of “head room” required to operate the assembly 10. There is also the advantage that the lid 20 may act as a counter-weight to the bin 11 when the lid 20 is in the open position and when the bin 11 is in the discharge position by virtue of the positioning of the lid 20 and the bin 11 on either sides of the base 56.

CLAIMS

1. A road or rail bin assembly to transport a flowable material, the assembly including:

a chassis for movement in a predetermined direction, the chassis being longitudinally elongated in said direction;

a bin having an open top and mounted on the chassis for angular movement generally transverse of said direction between a transport position at which said open top is generally upwardly facing, and a discharge position at which the open top faces at least partly horizontally to provide for discharge under gravity of the material from within the bin via said open top;

a lid mounted on the chassis and configured to cover at least a portion of the open top, the lid being mounted on the chassis for angular movement generally transverse of said direction between a covering position at least partly covering said open top when the bin is in the transport position, and an open position at which the lid is spaced laterally relative to said direction from the covered position; and wherein

the angular movement of said bin from the transport position to the discharge position is in a first angular direction, and the angular movement of the lid moves from the covered position to the open position in a second angular direction that is opposite said first angular direction.

2. The road or rail bin assembly of claim 1, wherein said bin has a width transverse of said direction, and said lid has a width transverse of said direction, with the transverse width of the lid having a vertical component of extension when the lid is in the open position.

3. The road or rail bin assembly of claim 2, wherein said transverse width of the lid is oriented generally vertically when the lid is in the open position.

4. The road or rail bin assembly of any one of claims 1 to 3, wherein the lid is displaced laterally, relative to said direction, from said bin when the lid is in the open position and the bin is in the transport position, such that the lid is spaced from the bin.

5. The road or rail bin assembly of any one of the preceding claims, wherein said open top faces at least partially downward when in said discharge position.

6. The road or rail bin assembly of any one of the preceding claims, wherein said chassis has a base providing opposite first and second side portions, said first and second side portions

extending generally in said direction, said lid being pivotally attached to said base adjacent said first side portion, and said bin being pivotally attached to said base adjacent said second side portion.

7. The road or rail bin assembly of claim 6, wherein said assembly includes a mounting bracket mounted to said base and extending generally upwardly from said base adjacent said first side portion, said mounting bracket having an upper end portion to which said lid is pivotally attached.

8. The road or rail bin assembly of claim 7, wherein said assembly includes an arm having opposite first and second end portions, and a link having opposite first and second end portions, with said arm first end portion and said link first end portion being pivotally attached to said lid, and said arm second end portion and said link second end portion being pivotally attached to said upper end portion of said mounting bracket.

9. The road or rail bin assembly of claim 8, wherein said mounting bracket includes a first pivot located at said upper end portion, and a second pivot located at said upper end portion, said first pivot being spaced upwardly from said second pivot, said link second end portion being pivotally attached to said first pivot, and said arm second end portion being pivotally attached to said second pivot.

10. The road or rail bin assembly of claim 9, wherein said lid is of a rectangular configuration so as to have a pair of longitudinally extending side edges and a pair of transversely extending end edges joining the longitudinal edges, with said arm first end portion being pivotally attached to said lid adjacent one of said longitudinally extending side edges, and said link first end portion being pivotally attached to said lid adjacent the other of said longitudinally extending side edges.

11. The road or rail bin assembly of claim 10, wherein said assembly includes a motor to provide for the angular movement of said lid, said motor having opposite first and second end portions, said motor first end portion being pivotally attached to said arm intermediate the end portions of the arm, and said motor second end portion being pivotally attached to said base adjacent said second side portion.

12. The road or rail bin assembly of claim 11, wherein said motor is a hydraulic ram.

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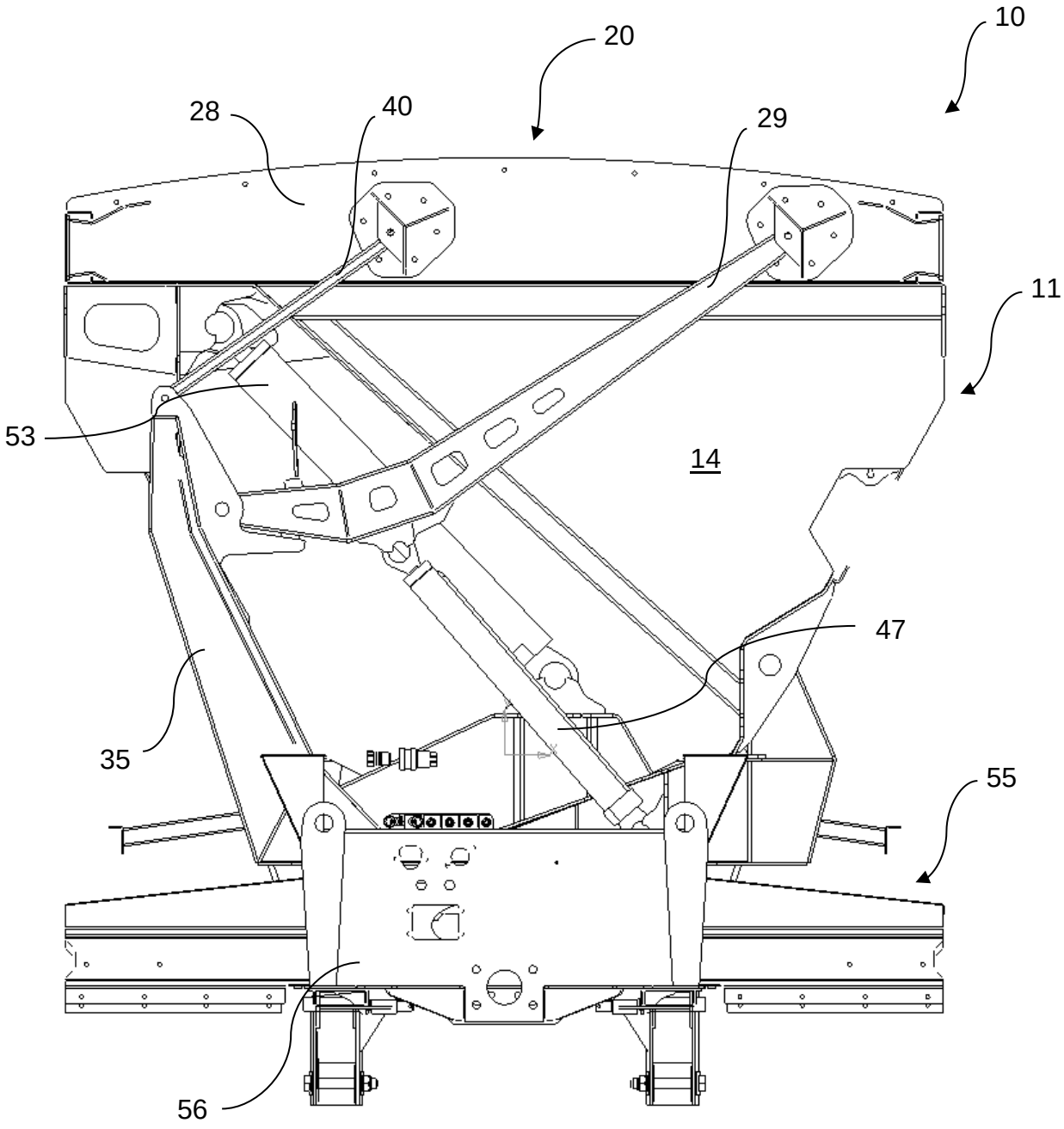

FIG. 1

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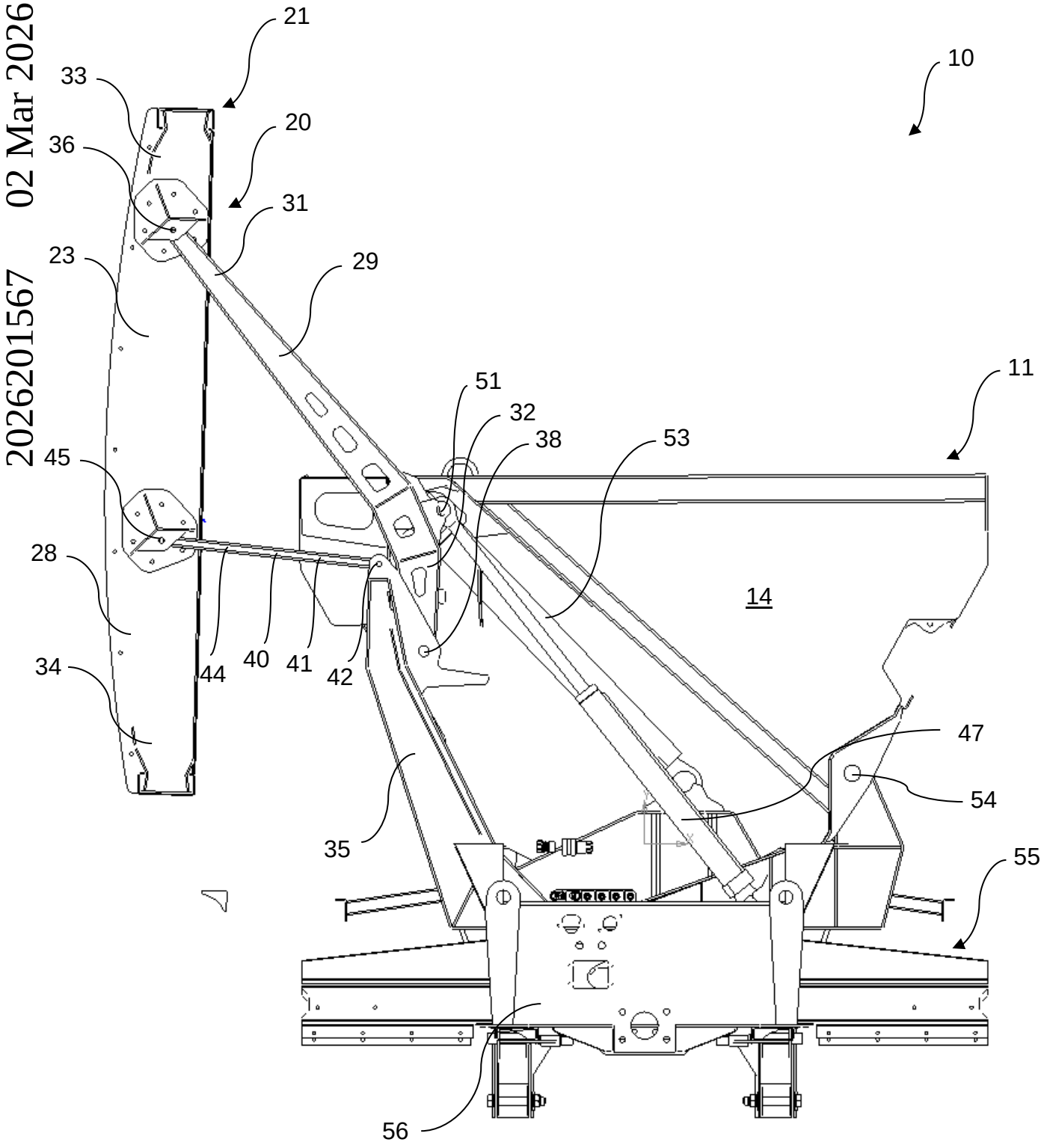

FIG. 2

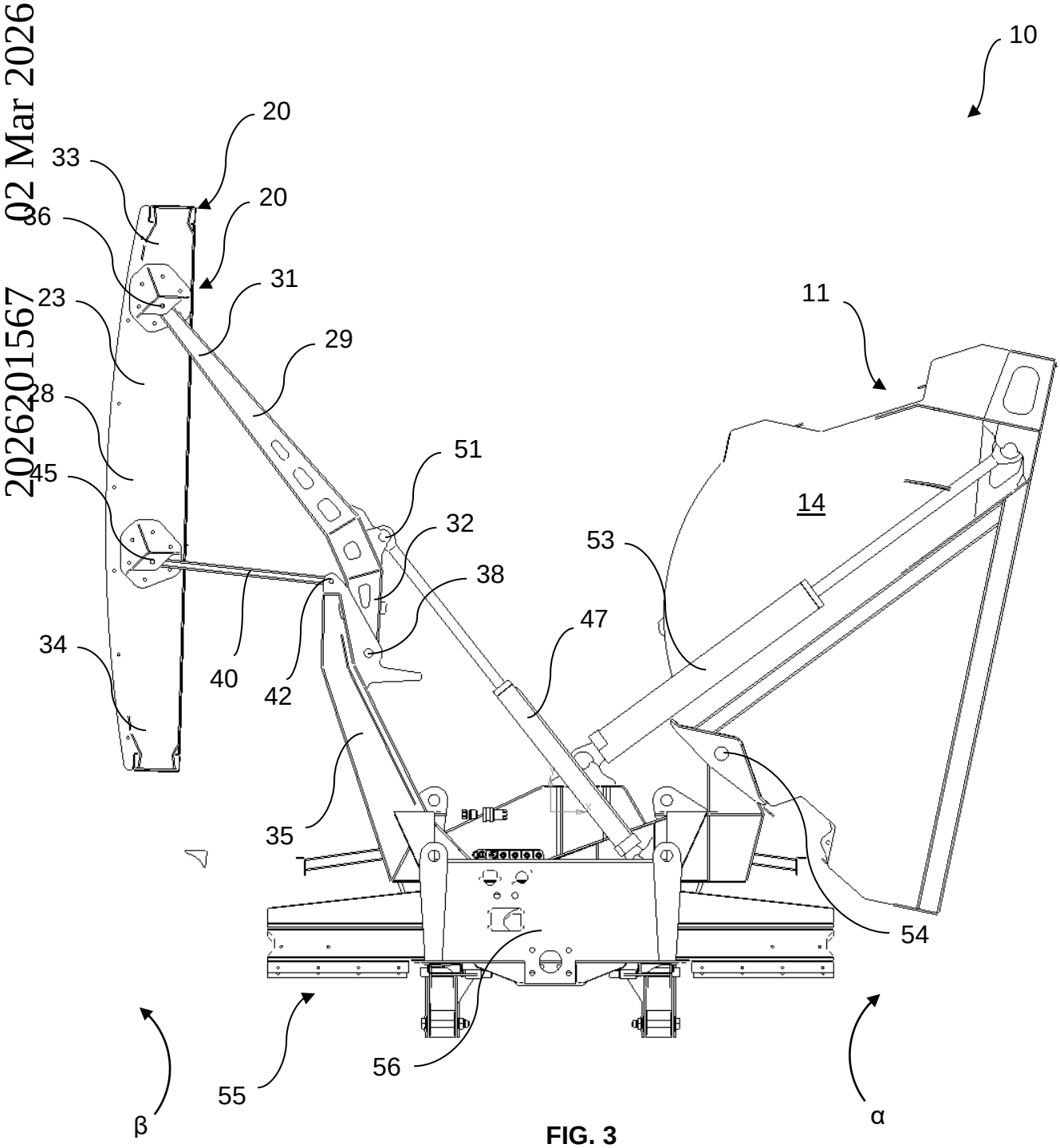

FIG. 3

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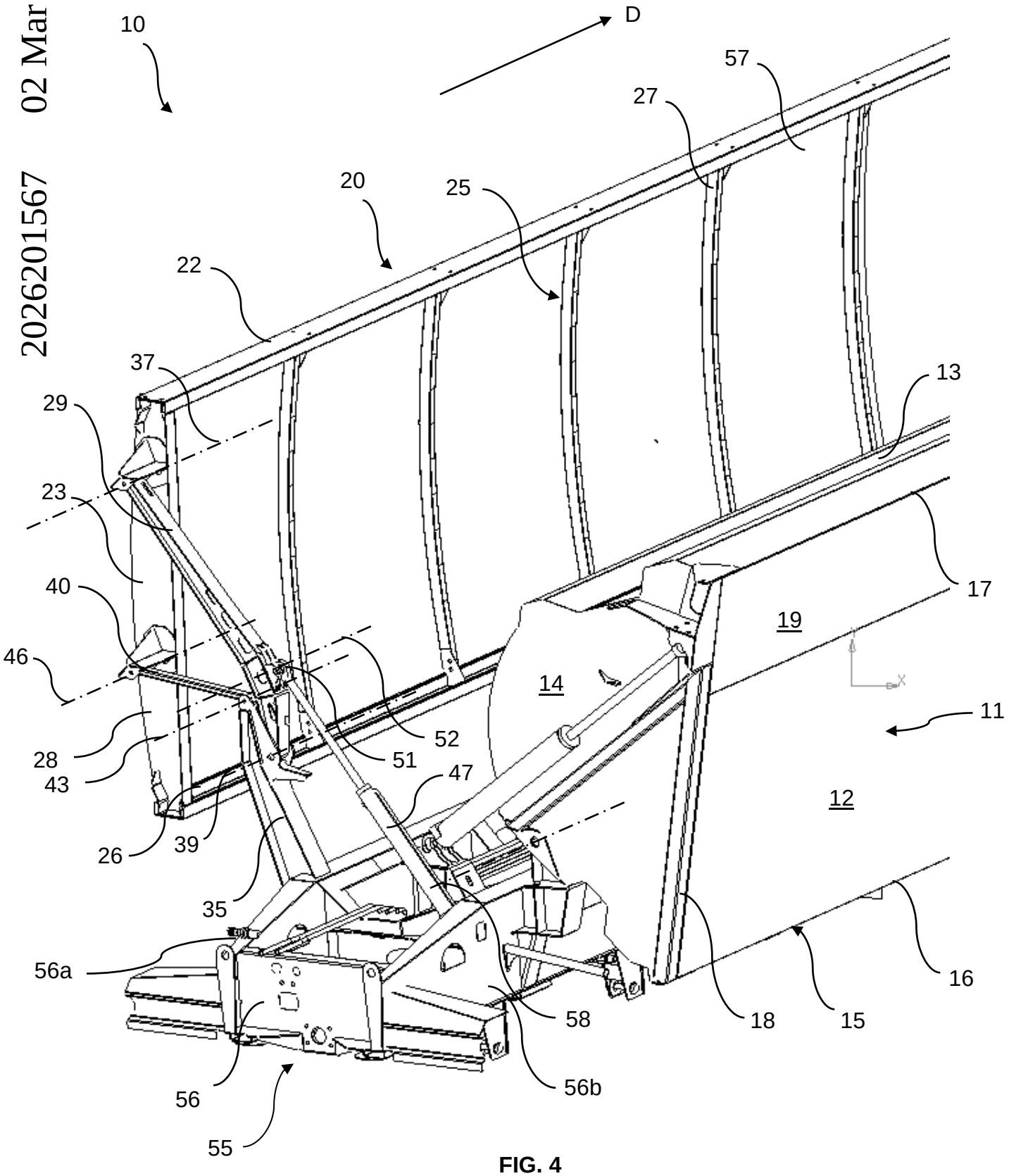

FIG. 4

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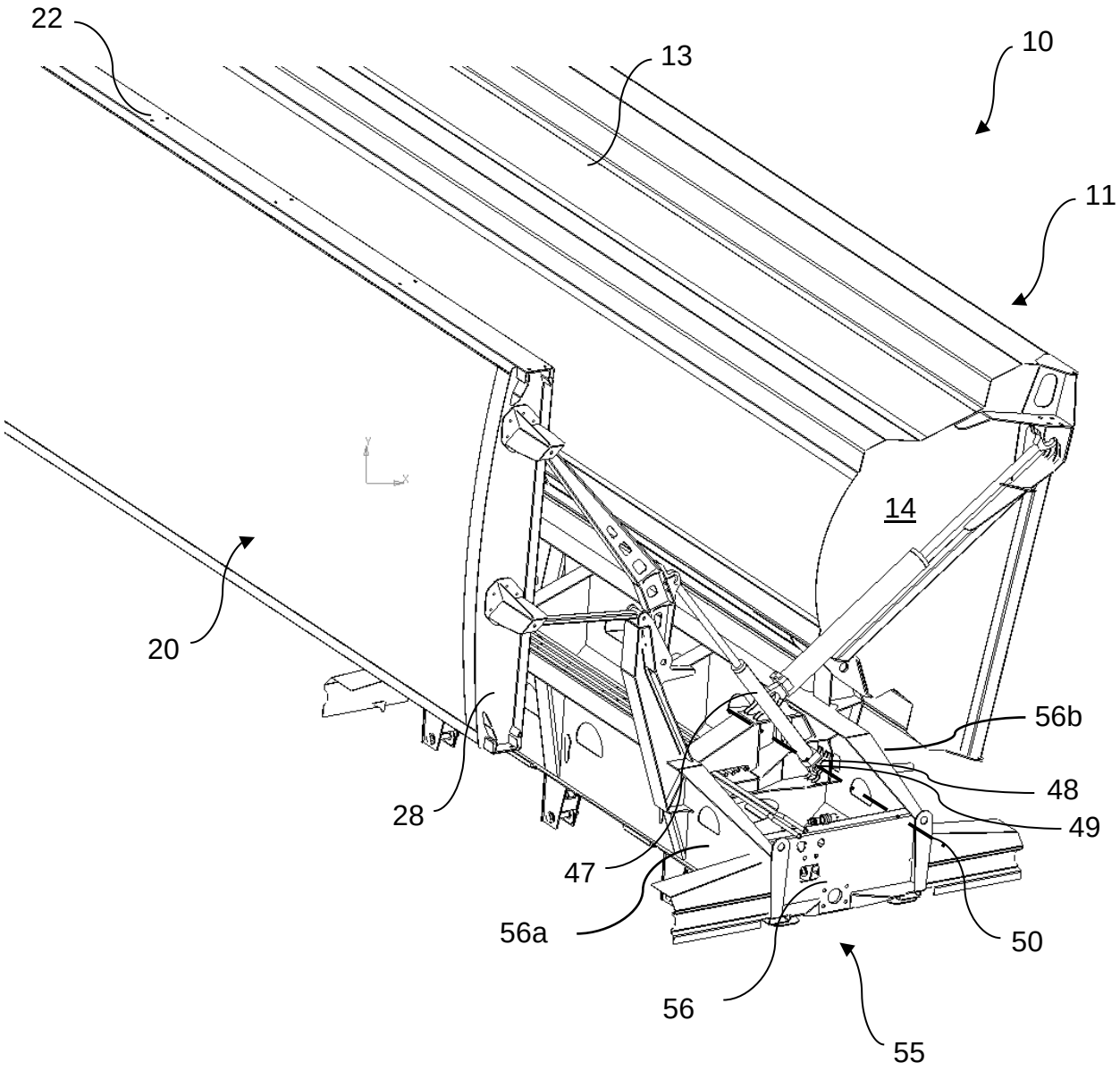

FIG. 5